Deliverable D3.2 – Farmers and stakeholders opinions on implementation of suggested contract solutions based on survey results

Project	CONSOLE
Project title	CONtract Solutions for Effective and lasting delivery of agri-environmental-climate public goods by EU agriculture and forestry
Work Package	3
Deliverable	D3.2
Period covered	M12 - 31
Publication date	Final version 27th October 2022
Dissemination level	Public
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QUALITY ASSURANCE PROCEDURES

An internal review and validation process were applied to ensure the quality and correctness of the current deliverable. Draft version was developed by D'Alberto, R., Raggi, M., Hamunen, K., Tarvainen, O., Haltia, E. and it was reviewed by Kurttila, M., Hamunen, K., Tarvainen, O., Haltia, E., and Viaggi, D., as well as by all the enlisted contributors.

TABLE REVISION HISTORY DELIVERABLE

Row	Version	Date	Reviewers	Description
1	V1.0	19/10/2021	Raggi, M., Davide, V., Targetti, S.	Sending the first draft to the members of the UNIBO team to be reviewed
2	V2.0	27/11/2021	Kurttila, M., Hamunen, K., Tarvainen, O., Haltia, E., Viaggi, D.	Sending the first draft to the members of the WP3 leading-team (LUKE) to be reviewed
3	V2.1	16/12/2021	Kurttila, M., Hamunen, K., Tarvainen, O., Haltia, E., Viaggi, D.	Sending the second draft to the members of the WP3 leading-team (LUKE) to be reviewed
4	V3.0	24/01/2021	All partners	Sending the first finalized draft to the members of the Consortium to be reviewed
5	V4.0	21/02/2022	Raggi, M., Davide, V., Kurttila, M., Hamunen, K., Tarvainen, O., Haltia, E.	Sending the final draft to be reviewed, approved, and shared with the Consortium
6	V4.1	27/10/2022	All partners	Sending the final, reviewed and approved version to be shared with the Consortium

Project Consortium

N°	Participant organisation name	Country
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2	REGIONE EMILIA ROMAGNA	IT
3	CONSORZIO DELLA BONIFICA DELLA ROMAGNA OCCIDENTALE	IT
4	UNIVERSITAET FUER BODENKULTUR WIEN	AT
5	Ecorys Brussels N.V.	BE
6	EUROPEAN LANDOWNERS ORGANIZATION	BE
7	ASSOCIATION OF AGRI-ENVIRONMENTAL FARMERS	BG
8	INSTITUTE OF AGRICULTURAL ECONOMICS	BG
9	JOHANN HEINRICH VON THUENEN-INSTITUT, BUNDESFORSCHUNGSINSTITUT FUER LAENDLICHE RAEUME, WALD UND FISCHEREI	DE
10	EVENOR TECH SL	ES
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15	ASSOCIATION TRAME	FR
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21	STICHTING VU	NL
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23	SZKOLA GLOWNA GOSPODARSTWA WIEJSKIEGO	PL
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25	UNIVERSITA DI FERRARA	IT

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1 Introduction

1.1 Scope of Task 3.2

Title of Task 3.2 is ***Pan-EU survey of farmers and other rural landowners***. The task, through a questionnaire, aims at identifying the acceptance and the farmers/forest owners' behaviour towards the contract solutions proposed in WP1 from the potential contractors. The task also benefits of insights from WP2 and Task 3.1. The survey has been designed to tackle different target groups of farmers in the 12 countries involved in the project. The target sample size of the surveys is in the range between 100 and 300 farmers, forest owners, or landowners (hereafter referred as land managers), per country. Under certain needs, the target sample has been discussed among partners and, depending on the precise survey design and the expected outcomes of the analyses, it has been reconsidered during the project.

The questionnaire includes questions on land managers' background variables such as socio-demographic characteristics, existing tenure situation and AECPG arrangements, as well as the vision and potential response of land managers about the proposed contract solutions and their design parameters (e.g., length, collective features, parameters for result verification and control, distribution of risk, etc.). It was envisaged that the questionnaire is structured on a common part as well as on a part designed to target the specific issues at stake in each country. A choice experiment analysis to elicit preferences on additional key contract parameters and to estimate their economic value has been included in 5 countries (Italy –both UNIBO and UNIPI partners–, Finland, France, Poland, and the UK), depending on partner availability to conduct such analysis. Austria analysed the intention of Austrian farmers to perform results-based contracts by means of a structural equation model.

The questionnaire has been translated to the respective native language and conducted using the most appropriate means in each country. The task leader guided and supported the formulation and analysis of common questions on the chosen contract solutions in order to secure coherence, comparable results and appropriate policy analysis framework using the aggregated dataset. The report also provides additional elaboration targeted to local specificities and individually relevant policy issues by each partner when deemed locally relevant.

1.2 Scope of Task 3.3

Title of the Task 3.3 is ***Survey of other key actors and stakeholders***. First, each country identified key stakeholders and key actors, different from land managers, who are likely to be involved in the contract solutions that were examined in Task 3.2, also benefiting of the network built in Task 5.1. After this, a survey involving the identified stakeholders and actors was performed. The target sample size of these surveys varied between 30 and 100 respondents in each country. The questionnaires were adapted to the needs and possibilities of each participating country.

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In the first part of the survey, background characteristics of the respondents were inquired. In the second part, the similar questions of acceptability, motivations, and obstacles as in the land manager survey were used. In the third part of the stakeholder survey, focus was on societal factors that can affect in the adoption of result-based contract in each country. Societal factors were analysed via PESTLE framework. Results of the PESTLE framework are reported in the Deliverable D3.3.

The stakeholder questionnaire was completed in each country, according to the guidelines given by the task leader and co-leader. Elaboration of the aggregated database was run by the task leader and co-leader. This approach increased the comparability of results with landowner surveys across countries.

1.3 Deliverable outline

The Deliverable D3.2 is organised as follows: after the introductory summary of the CONSOLE Project tasks which are related to the present document (section 1), two distinct sections present and discuss the results from the land managers survey (**section 2**) and the stakeholders survey (**section 4**). Both these sections present the data collection procedures that have been adopted, by showing and discussing the results from the whole sample of respondents as well as the relevant insights from specific groups, also presenting few insights from the country-specific case studies (**sub-section 2.4**). The discussion of the results related to the acceptability of the contract solutions by the land managers and forest holders is structured in **sub-section 2.5**. **Section 3** presents the additional work done by each partner in relation to Task 3.2 objectives, beyond the common questionnaire for land managers and forest holders and its related analysis (e.g., the Choice Experiments conducted by some partners and/or the additional questions targeting the peculiarities of the national case studies). **Section 5** hosts the document references. **Annexes** related to both the land managers survey and the stakeholders one are attached at the end of the present document.

2 Land managers survey – Task3.2

2.1 Introduction

The aim of Task 3.2 **_Pan-EU survey of farmers and other rural landowners_** is to identify acceptance and land managers' behaviour towards the contract solutions proposed in WP1 from the potential contractors. By benefiting of insights from WP2 and Task 3.1, the surveys targeted groups of land managers (both farmers and foresters) in 12 countries involved in the CONSOLE Project. The sample sizes of the surveys lie in the range between 100 and 400 respondents per country.

The questionnaire includes questions on respondents' socio-economic characteristics, structural and accounting features of the respondents' holdings, existing tenure situation and AECPG arrangements, as well as the vision and potential response of land managers about the proposed contract solutions and their design parameters (e.g., length, collective features, parameters for result verification and control, distribution of risk, etc.). The questionnaire has a common part as well as a part designed to target the specific issues at stake in each country, including a Choice Experiment exercise aiming at eliciting the preferences on key contract parameters and to estimate their economic value, as per the cases of Finland, France, Italy (both UNIBO and UNIPI partners), Poland and the UK. In addition, Austria carried out a structural equation model to analyse the Austrian farmers behaviour in relation to result-based contract solution. The questionnaire has been translated to the respective native language and conducted using the most appropriate means in each country.

2.2 Data collection

2.2.1 Questionnaire overview

The questionnaire for the land managers survey (see Annex A) is structured on a preliminary section (that was not shown to respondents) dedicated to partners only. This section describes the questionnaire structure, its main aims, and the target population that is expected to be addressed. Moreover, this section contains the questionnaire introduction to be shown to the respondents and the mandatory country-specific "Privacy and data confidentiality statement" with the linked "Consent question(s)" to be accepted by each respondent, as per the Project DMP prescriptions and guidelines (see Deliverable D7.4).

The questionnaire is structured in two parts. Part I is dedicated to the "Individual characteristics and agricultural/forest holding features". Here, there are questions about, e.g., the respondent's gender, age, education level, his/her direct involvement in the holding management as well as questions about the holding features like, e.g., its legal status, specialization, the hectares of land owned, rented-in/out, the direct and RDP payments received in the last year, etc. Part II is dedicated to the "Contract types for improving environmental benefits and their acceptability" where, for example, there are questions about

the respondent behaviour about the main environmental measures carried out and/or envisaged for the holding in relation to both the last five management years and the incoming future, the contracts characteristics influencing his/her willingness to enrol in an environmental programme as well as specific acceptability questions on the four contract types investigated (result-based, collective, value chain and land tenure contract solutions). Furthermore, a country-specific Part III was added by partners willing to carry out, e.g., a Choice Experiments and/or willing to investigate the peculiarities of their case studies by means of additional questions/analysis.

2.2.2 Sampling and data collection approach

Table 1 depicts the main information related to the data collection procedure adopted. Most partners collected data on land managers during the period between March and July 2021. Few partners started data collection already in December 2020 or January 2021, while few others slightly delayed it, finishing in September 2021. No relevant issues must be reported in terms of the accomplishment of the envisaged population targets by the tasks (as they were planned/described initially) and/or with respect to the retrieval of information. This, although the COVID-19 outbreak imposed further barriers and challenges to the primary data collection. Indeed, the range of sample sizes per country reflects the number of complete respondents envisaged by Task 3.2, with almost all the partners accomplishing the minimum target of 100 completed responses (ranging from the minimum of 60 Spanish respondents up to the maximum of 794 Finnish respondents). The main strategy adopted by each partner for data collection, also considering the COVID-19 outbreak, was based on online surveys implemented e.g., by means of Qualtrics or LimeSurvey software. In few cases, face-to-face and telephone interviews were carried out too. The questionnaires were advertised mainly by national institutional partners, non-profit organizations, farmers unions, etc. and, in few cases, interviews were carried out by subcontracted research agencies and service provider entities. The questionnaires were eventually promoted by links published on the official institutional partners websites, shared by mailing lists and social media.

Table 1. Data collection – Land managers survey

Partner ID	Partner	Country	Nr. of respondents contacted	Nr. of questionnaires collected	Nr. of completed answers	Questionnaire way (tool)	Survey advertised/promoted by	Timing
1	UNIBO	Italy	*NA* from Emilia-Romagna Region website; ≈6,000 e-mailed; 100 by "Openfields"	559 (459 via Emilia-Romagna Region; 100 via "Openfields")	305	online (Qualtrics); face-to-face by "Openfields"	Emilia-Romagna Region (both via official website and e-mails); "OpenFields" channel	May-Jul 2021
2	LUKE	Finland	4,974 farmers; *NA* for forest owners	794 (408 farmers; 386 forest owners)	794	online		Apr-May 2021 (farmers); Apr 2021 (forest owners)
3	BOKU	Austria	*NA*	152	152	online (LimeSurvey)	by market research institute "market.at"	Mar-May 2021

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No.	Partner	Country	Contacted			Mode	Source	Period
							(e-mails within an internet panel)	
4	IAE	Bulgaria	NA	96	96	online; by phone		Dec 2020-Feb 2021
5	TI	Germany	≈700	146	146	online (LimeSurvey)	TI e-mail contacts; Twitter	Feb-Apr 2021
6	EVENOR, ASAJA, UPM	Spain	NA	60	60	face-to-face		Mar-Sept 2021
7	TRAME, INRA	France	≈160	130	130	face-to-face	farmers union (Confederation Paysanne); Brittany Regional Federation of Organic Farming (FRAB); organizations of milk producers (CIVAM, CEBR, OLPGO); GEDA35, CETA35	May-Jun 2021
8	UCC	Ireland	NA	210	210	online	social media; National Farm Advisory Service; European Innovation Networks	Jan-Mar 2021
9	UNIPI	Italy	≈ 300 farmers contacted from a database of a farmers' association	110	94	face-to face; using links on Qualtrics	Entity which has subcontracted the survey, and which offers administrative and technical services to farmers	Jun-Sept 2021
10	ZSA	Latvia	≈900	101	101	online	ZSA e-mail contacts; social media	Mar-May 2021
11	VUA	Netherlands	≈15,000	201	160	online (Qualtrics)	Twitter	Apr-Jul 2021
12	SGGW	Poland	450	279	279	online (LimeSurvey)	agricultural advisors and Environmental Association	Mar-Jul 2021
13	UoL	United Kingdom	209	194	194	online (Qualtrics)	iCASP	Mar-May 2021

2.3 Survey results

2.3.1 Whole sample characteristics

The final number of observations presenting a completed questionnaire is 2,721. The majority of respondents in the sample come from Finland (794 individual, split between farmers and foresters), followed by Italy (399) and Poland (279). Bulgaria and Spain are the only countries that have a final number of completed questionnaires under the lower bound of 100 respondents set by Task 3.2, with 96 and 60 respondents respectively. Figure 1 shows the share of respondents by country.
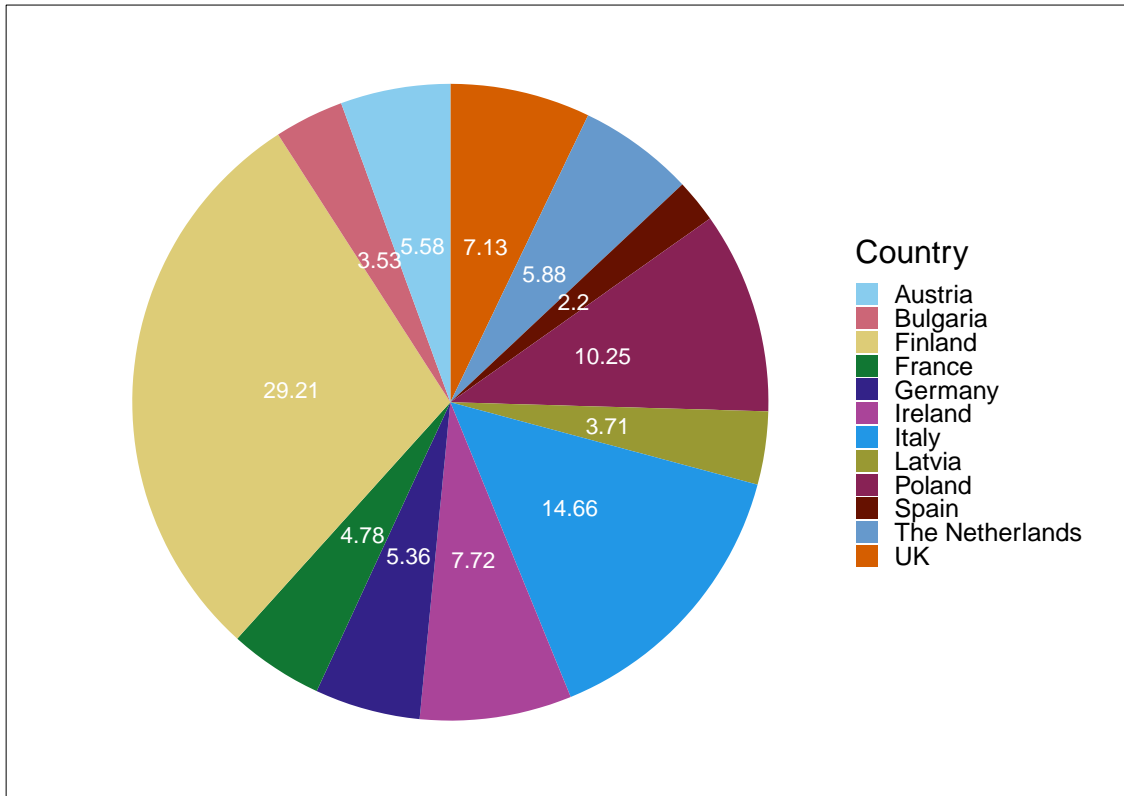
Figure 1. Share of respondents by country – Land managers survey (N=2,721)

Table 2 shows the descriptive statistics related to the information retrieved by Part I questions of the land managers survey. The majority of respondents (82%) identify themselves in the male gender, while almost 55% of respondents are between 41 and 60 years old. Upper-Secondary education is the most frequent education level among the individuals in the sample which shows also the peculiar presence of high-educated farmers and foresters (21% and almost 24% of respondents have a Bachelor or Master's degree, respectively). The majority of respondents have a specific education in either agriculture or silviculture, being mainly single owners (57%) and being directly responsible of the holding management. Mainly, the sample is composed by individual holdings, specialized in "Cereals, oilseed and protein crops" (21.20%), "Forestry" (15.58%) and "Dairying" (13.78%), not producing organic products (more than 62% of the holdings are not organic). Around 15% of the holdings do pay an external service and/or get assistance with an environmental-related focus, while the majority of them (52%) are assisted by an external service with a technical or accounting focus. Moreover, 13% of respondents declared to be member of an environmental or nature conservation organization, while one out of two is a member of farmers union(s). Almost half of the respondents have the intention to keep going the holding-related activity for more than 10 years with 31% of the respondents getting more than the 89% of their income directly from the agriculture or silviculture activity. 69% of respondents indicated that they receive direct payments under the Common Agricultural Policy (CAP) programming, in

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the previous year of holding activity, while 45% declared receiving payments related to Rural Development Programmes (RDP).

Table 2. Descriptive statistics – Land managers survey

Variable		Count (n=2,721)	Percentage	Min; 1st quartile; Median; Mean (Standard Deviation); 3rd quartile; Max; {NA}
Gender	Male	2,234	82.10	
	Female	478	17.57	
	NA	9	0.33	
Age	18-20	21	0.77	
	21-30	173	6.36	
	31-40	426	15.66	
	41-50	707	25.99	
	51-60	780	28.68	
	61-70	408	15.00	
	71-80	158	5.81	
	>80	27	0.99	
	NA	20	0.74	
Education level	Primary	250	9.19	
	Upper secondary	771	28.36	
	Post-secondary non tertiary	421	15.48	
	Bachelor	579	21.29	
	Master's	646	23.76	
	PhD or equivalent	39	1.43	
	NA	15	0.55	
Agri-forestry education	None	1,078	39.62	
	Agriculture	1,313	48.25	
	Forestry	251	9.23	
	Both	70	2.57	
	NA	9	0.33	
Role	Single owner	1,565	57.52	
	Co-owner	913	33.55	
	Tenant	182	6.69	
	NA	61	2.24	
Management responsible	Yes	2,578	94.75	
	No	140	5.15	
	NA	3	0.11	
Legal status	Individual	2,219	78.24	
	Partnerships	484	17.79	
	Other	104	3.82	
	NA	4	0.15	
Specialization	Specialist cereals, oilseed, and protein crops	577	21.21	
	General field cropping	301	11.06	
	Specialist horticulture	94	3.46	
	Specialist vineyards	73	2.68	
	Specialist fruit and citrus fruit	71	2.61	
	Specialist olives	44	1.62	
	Various permanent crops combined	47	1.73	
	Specialist dairying	375	13.78	
	Specialist cattle-rearing and fattening	109	4.01	
	Cattle-dairying, rearing and fattening combined	118	4.34	
	Sheep, goats and other grazing livestock	44	1.62	

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		n	%	Min; Q1; Median; Mean (SD); Q3; Max; {NA}
	Specialist granivores (e.g., poultry)	49	1.80	
	Mixed farming	90	3.31	
	Mixed livestock, mainly grazing livestock	42	1.54	
	Mixed livestock, mainly granivores	19	0.70	
	Field crops-grazing livestock combined	89	3.27	
	Various crops and livestock combined	106	3.90	
	Forestry	424	15.58	
	Other	45	1.65	
	NA	4	0.15	
Organic[1]	Yes, all products	456	16.76	
	Yes, some	153	5.62	
	No	1,706	62.70	
	NA	20	0.74	
Agricultural land owned (ha.[2] of UAA[3])				0; 4.35; 20; 71.18 (280.36); 50; 10,000; {87}
Agricultural land rented-in (ha.[2] of UAA[3])				0; 0; 6; 73.01 (517.80); 40; 18,000 {170}
Agricultural land rented out (ha.[2] of UAA[3])				0; 0; 0; 3.11 (21.82); 0; 700 {456}
Forest land owned (ha.[2])				0; 0; 5; 34.62 (142.26); 30; 5,200 {703}
Forest land rented-in (ha.[2])[4]				0; 0; 0; 1 (5.51); 0; 70; {929}
Forest land rented out (ha.[2])[4]				0; 0; 0; 0.02 (0.52); 0; 16.10; {939}
Full-time family workers (nr.)[1]				0; 1; 1; 1.98 (8.24); 2; 200 {190}
Part-time family workers (nr.)[1]				0; 0; 1; 0.84 (2.15); 1; 80; {538}
Full-time external workers (nr.)[1]				0; 0; 0; 1.67 (7.96); 1; 195; {370}
Part-time external workers (nr.)[1]				0; 0; 0; 0.76 (3.07); 1; 100; {378}
Full-time seasonal workers (nr.)[1]				0; 0; 0; 1.80 (8.81); 0; 150; {799}
Part-time seasonal workers (nr.)[1]				0; 0; 0; 0.54 (3.56); 0; 100; {854}
Service assistance	No	873	32.08	
	Environmental-related	403	14.81	
	Technical or accounting-related	1,430	52.55	
	NA	15	0.55	
Membership	Farmers union	1,277	46.93	
	Environmental organisations	347	12.75	
	None	1,084	39.84	
	NA	13	0.48	
Investments in the last 5 years	Yes	1,207	47.84	
	No	1,315	52.12	
	NA	1	0.04	
Continuing the activity	< 1 year	69	2.54	
	Between 1 and 5 years	419	15.40	
	Between 5 and 10 years	497	18.27	
	> 10 years	1,311	48.18	
	Don't know	425	15.62	
Household income from agriculture/forestry	< 10%	547	20.10	
	10-29%	338	12.42	
	30-49%	325	11.94	
	50-69%	365	13.41	
	70-89%	293	10.77	
	> 89%	832	30.58	
	NA	21	0.77	
Sells to processor[6]	0%	1,073	50.12	
	1-20%	212	9.90	
	21-40%	111	5.18	
	41-60%	123	5.74	
	61-80%	112	5.23	
	81-100%	339	15.83	
	NA	171	7.98	

Sells to private wholesaler/retailer[6]	0%	1,053	49.18
	1-20%	256	11.95
	21-40%	114	5.32
	41-60%	121	5.65
	61-80%	96	4.48
	81-100%	267	12.46
	NA	234	10.92
Sells to cooperative wholesaler/retailer[6]	0%	1,189	55.53
	1-20%	113	5.28
	21-40%	85	3.97
	41-60%	88	4.11
	61-80%	130	6.07
	81-100%	363	16.95
	NA	173	8.08
Sells to consumer[6]	0%	1,313	61.33
	1-20%	210	9.80
	21-40%	66	3.08
	41-60%	63	2.94
	61-80%	52	2.43
	81-100%	161	7.52
	NA	276	12.89
Sells to other farms[6]	0%	1,324	61.79
	1-20%	341	15.92
	21-40%	76	3.55
	41-60%	39	1.82
	61-80%	36	1.68
	81-100%	163	7.61
	NA	163	7.61
Sells (other)[6]	0%	1,331	62.17
	1-20%	98	4.58
	21-40%	16	0.75
	41-60%	19	0.89
	61-80%	22	1.03
	81-100%	55	2.61
	NA	600	28.01
Direct payments	Yes	1,865	68.52
	No	659	24.21
	NA	197	7.24
RDP payments	Yes	1,211	44.49
	No	1,381	50.74
	NA	129	4.74
Direct payments (Euro)[1]		0; 4,370; 13,000; 31,159 (91,372.22); 29,000; 1,600,000; {571}	
RDP payments (Euro)[1]		0; 600; 5,000; 14,489 (33,483.38); 15,000; 600,000; {869}	
Area under AECMs (ha.[2])[1]		0; 0; 8; 48.33 (213.37); 45; 5,000; {548}	
Area under organic measures (ha.[2])[1]		0; 0; 0; 22.13 (277.93); 0; 10,000; {855}	
Livestock heads under organic measures[1]		0; 0; 0; 95.15 (1,810.12); 0; 60,000 {992}	

Note: [1] The related question was not asked to the 386 Finnish foresters (hence, n=2,335). [2] ha.: hectares. [3] UAA: Utilized Agricultural Area. [4] The related question was not asked to the 408 Finnish farmers (hence, n=2,313). [6] The related question was not asked to the 386 Finnish foresters, neither to the 194 respondents from the United Kingdom (hence, n=2,141).

In Part II of the land managers survey, respondents were asked to express their perception and behaviour in relation to the acceptability of different contract solutions. First, they were asked to consider specific contract features and rate them with respect to their influence in the willingness to adopt a certain contract solution (question 2.2.1-13). Figure 2 depicts the ranking of such features, in decreasing order with respect to the influence that they have in "considerably increasing" the respondents' willingness to adopt. Among the most preferred features (i.e., the characteristics that considerably increase the willingness to adopt a certain contract solution) there are: the remittance of the compensation payment on an annual basis; the possibility for land

managers/forest holders to decide, autonomously, about the management practices to adopt in order to achieve the environmental results; the idea that, by achieving better environmental results, a higher payment is provided. On the other hand, the features that contribute the most in considerably decreasing the willingness to adopt a certain contract solution are: the idea that, by adopting a certain environmental contract/programme, it is possible to get recognition for the holding's products by, e.g., a specific product label; the fact that the compensation payment is given to a group of land managers/forest holders and, then, they are called to collectively decide how to distribute it among its members; the fact that the payment is split in a time span, e.g., half is provided at the beginning of the contract, half when the contract ends.
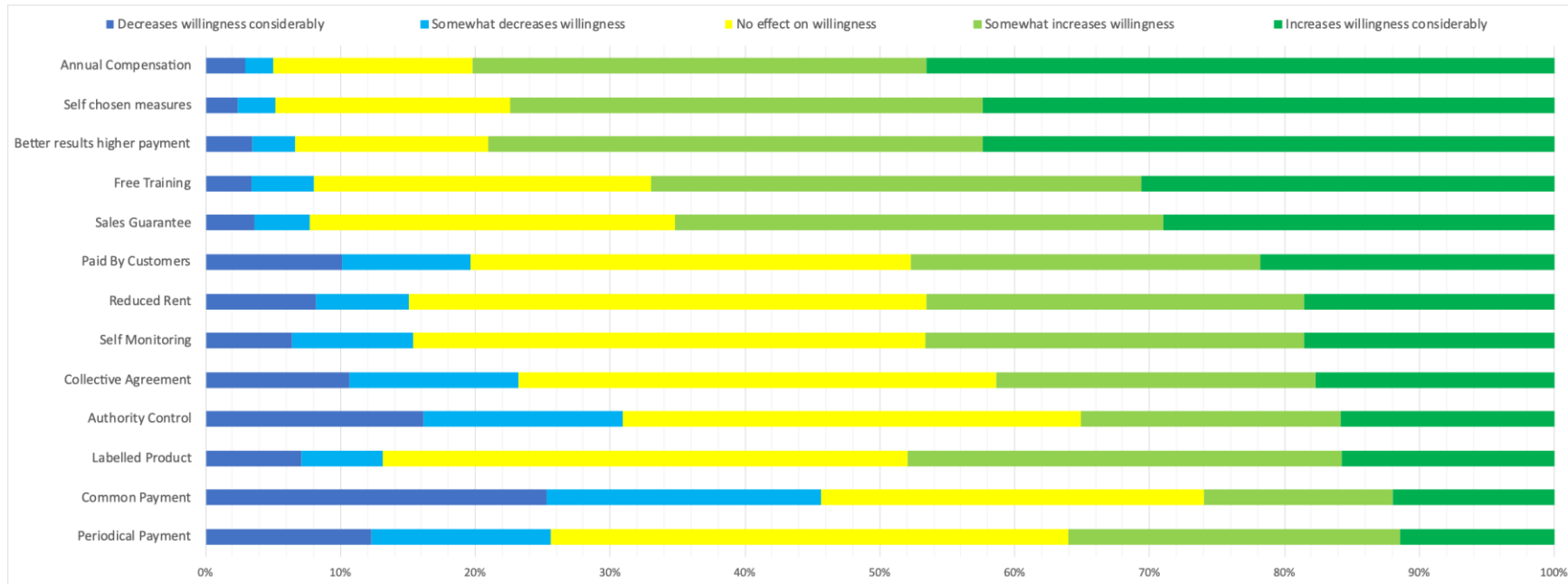
Figure 2. Contract features influencing respondents' willingness to adopt[1]

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[1] Mean nonresponse rate: 2.33%. The questions related to *"Collective Agreement", "Self Monitoring", "Authority Control", "Free training", "Annual Compensation"* features were not asked to the 210 Irish respondents (hence, n=2,511). The questions related to "S*elf chosen measure"*, "*Paid By Customers"*, "*Reduced Rent"* features were not asked to the 194 British respondents (hence, n=2,527). The questions related to *"Labelled Product", "Sales Guarantee", "Periodical Payment"* features were not asked neither to the 210 Irish respondents, nor to the 194 British ones (hence, n=2,317).

The respondents were also asked to express their perceptions about each one of the proposed contract solutions in terms of three statements which resume the ideas of contract "understandability", "applicability" (in their holding), and "potential economic beneficial" (for their holding). Therefore, they were asked to rank the acceptability of the contract solutions with respect to three key statements expressing the aforementioned concepts (questions 2.4.1-3, 2.8.1-3, 2.12.1-3, 2.16.1-3). Figure 3 shows the distribution of the four contract solutions ranked in terms of how much they result to be understandable, applicable and (potentially) beneficial from the economic point of view. The ranking of the contract solutions is the same for all the three statements, with result-based contract outperforming value chain, land tenure and collective contract typologies. Peculiarly, the latter two contract solutions are perceived also as the less applicable in the considered holdings as well as the less economically beneficial (at least, potentially).
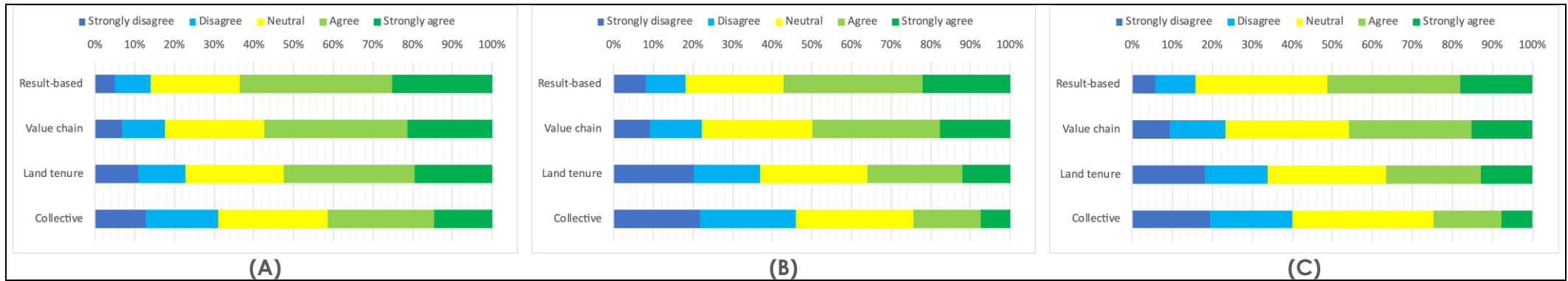
Figure 3. Respondents' perception of "understandability" (A), "applicability" (B), "economic beneficial" (C) of different contract solutions[2]

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[2] Mean nonresponse rate: 1.41% (Figure 3 (A)); 1.43% (Figure 3 (B)); 1.67% (Figure 3 (C)). The questions related to the perception of "understandability" and "economic beneficial" of the four contract solutions were not asked to the 194 British respondents (hence, n=2,527). The questions related to the perception of "applicability" of value chain and land tenure contract solutions were not asked to the 194 British respondents (hence, n=2,527).

Figure 4 depicts the ranking of the contract solutions proposed to the respondents, with respect to the stated willingness to enrol in the contract, in the incoming future (questions 2.6, 2.10, 2.14, 2.18). Partially disattending the hints from the ranking that results from the three statements on acceptability, result-based contracts receive the highest approval, followed by land tenure ones, collective and value chain contract solutions.
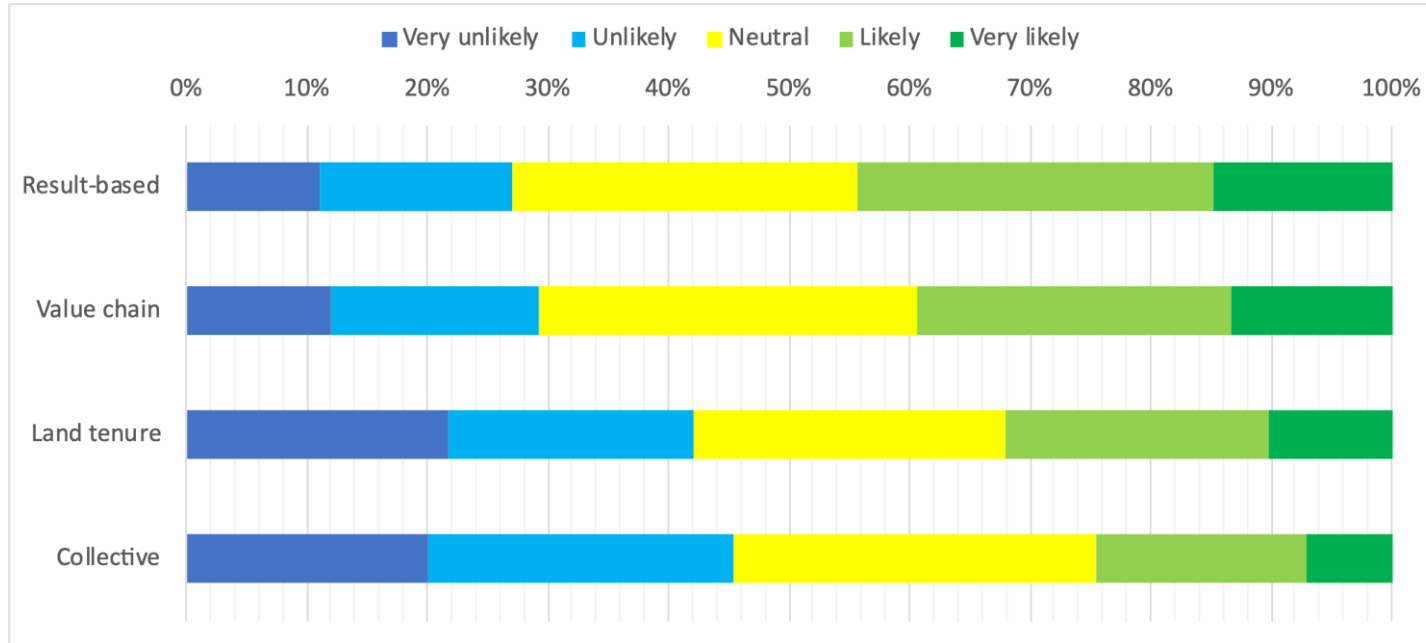
Figure 4. Respondents' willingness to enrol in different contract solutions[3]

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[3] Mean nonresponse rate: 1.47%. The questions related to the willingness to enrol in value chain and land tenure contract solutions were not asked to the 194 British respondents (hence, n=2,527).

2.3.2 Relevant groups characteristics

The majority of respondents that identify themselves as being forest holders/owners are Finnish (n=386), while the remaining 38 respondents come from Austria, Germany, Italy and Latvia. Therefore, beside the country-specific focus of Finland, it is considered not worthy to report here the analysis of differences between land managers and forest owners in relation to the whole sample.

On the contrary, the differences among the holdings' specializations (arable, horticulture, permanent, herbivores, granivores, mixed and forestry) are investigated and the results presented and discussed here. The differences further investigated consist in:

- *i)* the preferences (i.e., the scoring) attributed by respondents to the individual features potentially characterising the environmental contract/programme;
- *ii)* the perceptions (i.e., the "level of agreement"/scoring) linked to the three statements on "understandability", "applicability" and "economic beneficial";
- *iii)* the level of agreement on the willingness to enrol in the contract solution in the future.

In order to investigate these differences, analysis of variance (anova) tests are carried out (see Box, 1953; Cochran and Cox, 1992; Gelman, 2005). The score assigned by each respondent (whose holding belongs to a certain specialization, i.e., to a certain group), to the individual features which characterize a general contract solution, as well as the score attributed in terms of "agreement level" to the three statements and to the willingness to enrol in the future are not Gaussian distributed. In addition to such issue, the hypothesis of homoscedasticity is often violated, or, in other words, the groups can differ in terms of scores variability. For the former reason, a non-parametric approach to anova testing is adopted, based on the Dunn test for independent groups (Dunn, 1961), by resorting to the Wilcoxon test with the Bonferroni correction for the analysis of the pairwise comparisons. For the latter reason, whether the Levene robust test gives proofs of heteroscedasticity, the non-parametric approach based on the Kruskal-Wallis test is applied to analyse the differences among the groups (Conover, 1999).

The results show that no statistically significant differences must be reported between the holdings' specializations with respect to the following features: "sales guarantee", "paid by customers", "free training", "annual compensation" and "periodical payment". On the contrary, statistically significant differences (alpha = 0.05) do hold in the pairwise comparisons between holdings specialized in forestry versus those specialized in arable, granivores and mixed crops with respect to the "self chosen measures" feature and the "better results, higher payment" one. This hints at the fact that the aforementioned specializations

react differently when the contract/programme is characterized by the possibility of autonomously deciding which practices to adopt in order to achieve the environmental result and the orientation towards a "result-based" contract solution, where better results bring a higher compensation. The latter feature is characterized also by the fact that the holdings specialized in permanent crops relevantly differ from those specialized in forestry. The scores attributed to the "collective agreement" feature (i.e., the fact that the land managers/forest holders can collectively agree on environmental targets and measures to adopt) differ also between herbivores, arable and permanent specialized holdings. Moreover, the idea of adopting a contract/programme that is characterized by a common payment that must be distributed among those who uptake it by means of a collective decision does result in statistically significant differences between forestry specialization versus arable, herbivores and mixed ones. The "labelled product" characteristic brings to relevant differences between arable farms versus holdings specialized in herbivores and permanent crops. "Authority control" (i.e., the fact that the results achieved by the holding are controlled by a competent authority) makes the scoring significantly differ between arable farms and both horticulture and mixed ones. Statistically significant differences (alpha = 0.01) emerge then in terms of "self monitoring" (i.e., the possibility of independently monitoring the results achieved by the holding by the farmers/foresters themselves) between arable farms versus horticulture and mixed ones. Finally, the possibility to lease land with a reduced rent results in statistically significant differences between arable farms and holdings specialized in herbivores as well as between forestry specialization and all the other ones.

Considering the scoring related to the result-based contract solution "understandability", "applicability" and "economic beneficial", statistically significant differences (alpha = 0.01) hold in terms of understandability perception between holdings specialized in forestry versus arable, herbivores and permanent ones. In terms of perceptions on applicability and economic beneficial, relevant differences (alpha = 0.01) exist between the holdings specialized in forestry and all the others, but, also, limited to economic beneficial, significant differences (alpha = 0.05) exist between arable farms and granivores specialized holdings.

Similar results, considering the collective contract solution do hold in terms of perception on understandability between arable farms versus holdings specialized in herbivores and granivores (alpha = 0.01). Moreover, statistically significant differences (alpha = 0.01) in scoring related to collective contract solution being potentially economically beneficial emerge between arable farms versus forestry and herbivores specialized holdings.

Value chain contracts are characterized by significant differences (alpha = 0.01) in terms of applicability and economic beneficial perceptions when forestry holdings are compared to all the others.

Finally, land tenure contract solution is perceived differently in terms of understandability between arable farms and holdings specialized in herbivores (alpha = 0.01), while no statistically significant differences must be reported with respect to the two other statements (but for the differences between forestry holdings and all the others for the perception of the "economic beneficial" of such contract type).

2.3.3 Per country characteristics

Considering the information collected by Part I of the questionnaire, the majority of respondents identify themselves in the **male** gender (see Figure D1), with almost 60% of respondents in each country being between 41 and 60 years old (exceptions are represented by Finland, Italy and the United Kingdom which present, on average, younger respondents), as depicted by Figure D2. The **education level** of respondents does vary among countries, as Figure D3 (A) shows, with lower educated respondents in countries like, e.g., Italy, and higher educated ones in, e.g., the United Kingdom. There are also relevant differences among countries in terms of the specific education received by respondents in agriculture or silviculture (or both), as Figure D3 (B) shows. For example, Austria, Italy, and Spain present the lowest shares of respondents educated in agricultural sciences or that received an agriculture-related instruction (below the 40%). On the other hand, almost all the Finnish forest owners have a specific education in silviculture.

As Figure D4 and Figure D5 depict, respectively, the majority of respondents in the sample are either **owner or co-owner of the holding**, being actively involved in the holding management. Mainly, the sample is composed by **individual holdings**, with a rather homogeneous distribution among the countries (see Figure D6). The share of respondents being **member of farmers unions** do vary across the countries; for example, it goes beyond the 70% of respondents in Finland and Latvia, while in Bulgaria and the Netherlands the 18% and 25% of respondents belong to farmer unions, respectively (see Figure D11). Residual shares of respondents are **member of nature conservation and/or environmental organisations** in each country, with relevant high shares in Bulgaria (66%) and the Netherlands (67%).

Almost half of the respondents (or more) in each country has not **invested in the holding** in the last 5 years (see Figure D12), while the number of respondents willing to keep going the holding activity, at least in the medium/long term, is quietly high in all the countries, as Figure D13 depicts. Among those who have already defined the **successor for the holding** activity, the vast majority identified he/her in the family range (from the 44% up to the 75% of respondents), while France, Spain and the Netherlands present shares of "in family" successors lower than the 29% (see Figure D14). The distribution of holdings that are actually paying for an **external service and/or assistance** is heterogeneous, with technical/accounting-oriented assistance outdoing the environmental-related one in almost all the countries (see Figure D10).

Figure D7 shows the heterogeneity of the sample in terms of the per-country **specialization** of the holdings: "Cereals, oilseed and protein crops" specialization represents between the 15% and 55% of the holdings in several countries (e.g., Bulgaria, France, Germany, Italy, Latvia, Poland, Spain, and the UK). France, Ireland, Poland, the Netherlands, and the UK present shares between 20% and 57% of holdings specialized in "Fields crops-grazing livestock combined", while "General field cropping" is the third specialization that is most equally represented in the different countries (e.g., Bulgaria, Finland, Germany, Poland, Spain, and the Netherlands). The relevance of the aforementioned specializations in the considered countries is straightforward when we look at Figure D8, with "Arable" and "Mixed" crops specialized holdings, as well as holdings specialized in "Herbivores" livestock being the three main specializations in almost all the countries (exceptions are, e.g., Bulgaria, Italy, and Spain with 20% up to 53% of "Permanent" crops specialized holdings).

In terms of **organic production**, countries are quite homogeneous in terms of the number of non-organic holdings (see Figure D9). As per the distribution of the **household income** that comes directly from the holding activity, Figure D15 shows that the respondents' household characteristics related to agriculture or forestry activities relevantly differ by country. Countries where the respondents' household is strictly dependant from the holding activity (i.e., those with a share of the household revenue coming from the holding activity greater than the 89% of the income) are, e.g., Bulgaria, France, Latvia, Poland, Spain, and the Netherlands. The holdings differ also, by country, in terms of the **shares of sells to the different types of clients** (processors, direct buyers/retailers, cooperatives, etc.), as Figures D16-D21 depict. Almost all (or at least half) of the holdings did receive a direct payment during the year before the survey (see Figure D22), while the distribution of those that received a RDP payment (agricultural subsidies/payments) is more heterogeneous, with, e.g., the 80% of holdings receiving a RDP payment in the UK, while only 16% received it in the Spanish sample (see Figure D23).

From Part II of the questionnaire, Figure D24 shows how, in each country, the measures that the respondents adopted within their holdings in the last 5 years were characterised by very different environmental-climate aspects. Moreover, those aspects characterizing the measures largely vary among the countries. The same differences hold both among the several aspects and the different countries when we consider the willingness of respondents in having the aforementioned aspects as key features of the measures that they would adopt in the incoming 5 years (see Figure D25). As Figure D26 shows, the preference of respondents for the contract length in agriculture is homogeneous among the countries and it is the same of the ongoing agri-environmental measures (i.e., 5 years). Finally, in the sample, less relevance has the desired contract length in forestry, either due to the shortage of represented foresters in the national sub-samples or to the decision to not ask the related question (see Figure D27).

2.4 Country-specific focus

2.4.1 Italy – Emilia-Romagna Region

The collection of data related to the Emilia-Romagna Region case study lasted from May until July 2021. The Emilia-Romagna Region plaid the role of principal promoter of the on-line survey among the potential respondents. First, an announcement was published on the Emilia-Romagna Region official website. This included: *i)* a brief description of the CONSOLE Project, *ii)* a description of the land manager survey main aims, *iii)* an overview of the questionnaire structure and, *iv)* the Qualtrics link to access it. Second, around 6,000 potential respondents were directly e-mailed by the Emilia-Romagna Region officers in order to directly address the promotion of the survey (to be accessed by means of the same aforementioned Qualtrics link). In addition, 100 farmers participating in the "OpenFields" Project were directly interviewed by the "OpenFields" staff. While face-to-face interviews were carried out, the interviewers completed real-time a parallel Qualtrics survey. The total amount of answered questionnaires is 559 (459 from the Emilia-Romagna channel, 100 from the "OpenFields" one). As Table 1 depicts, the number of completed, valid respondents is equal to 305.

Figure 5 shows the main features characterizing an environmental contract/programme with respect to the influence that they have in decreasing or increasing the acceptability of such contract among the Italian respondents. The features in Figure 5 are presented in descending order of influence. For example, receiving an annual compensation/payment for the environmental commitment as well as the possibility to attend a training (for free) aiming at building the know-how for, e.g., the monitoring of the results or for the better accomplishment of the environmental targets of the contract are two keys feature that considerably increase the acceptability of the contract. Italian respondents seem also to be oriented towards result-based contract solutions, appreciating the fact that better results in terms of environmental targets achieved, could bring higher payment. At the same time, the possibility of choosing, autonomously, the practices and measures to adopt during the contract in order to accomplish its targets, does increase the contract acceptability. Agreeing on a sale guarantee on the holding product(s) with a retailer/cooperative/etc., whether the holding uptakes an environmental programme, is a feature that positively influences the acceptability of the contract. However, the 15% of Italian respondents think negatively about the fact that the compensation is not paid by public money, but it is charged on the buyers of the holding's product(s). Particularly negative are considered also the characteristics of an authority and/or institution that monitors the environmental results (e.g., by means of technicians moving to the holding periodically), as well as the possibility to collectively agree on targets and measures of the contract with the other farmers/foresters. Finally, both the fact that the payment is paid periodically (e.g., half at the beginning of the contract period, half at the end) and the idea of a common payment that is remitted to the group and then, the members of the group must decide how to share it, determine a decrease of contract acceptability.

Figure 6 depicts the perception of the Italian respondents about the "understandability", "applicability" and the "economic beneficial" of the different contract solutions. Value chain and land tenure typologies are the most understandable as well as the most economic beneficial. Moreover, value chain contract outperforms the other solutions in terms of the perception that the Italian respondents have with regard of the applicability in their holdings. Collective contracts do receive the lowest scorings in terms of understandability and, above all, in relation to their applicability and potential economic beneficial.

Figure 7 shows that Italian respondents have a preference in terms of future enrolment for value chain contracts.
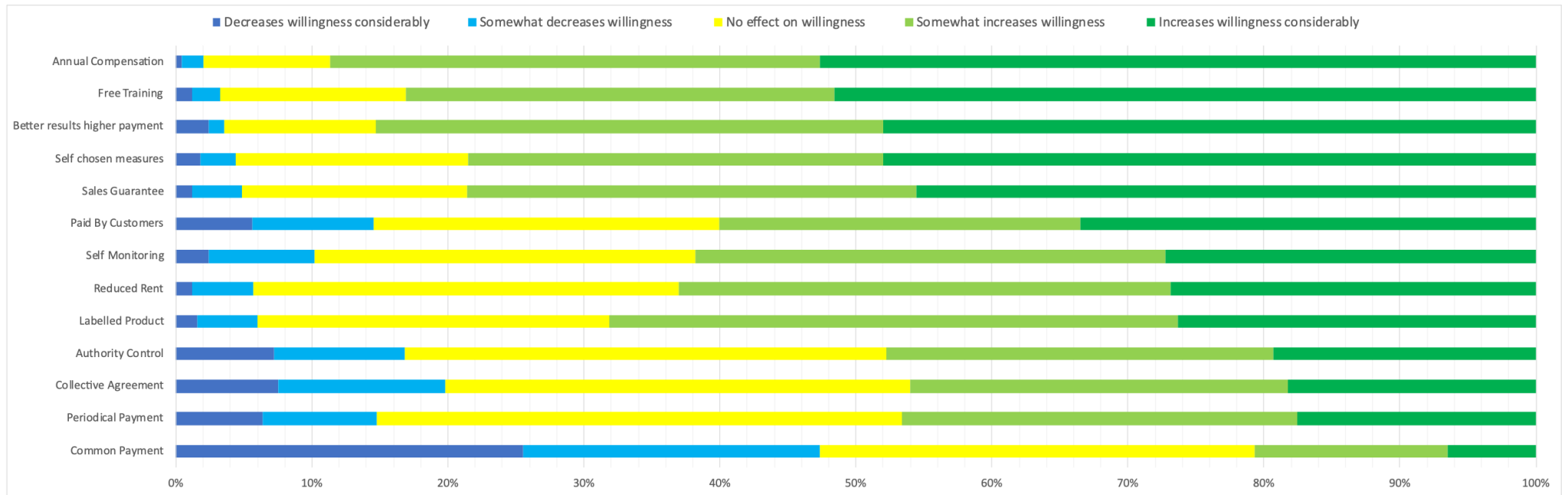
Figure 5. Contract features influencing Italian (Emilia-Romagna region) respondents' willingness to adopt[4]

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[4] Mean nonresponse rate: 17.78%.

Figure 6. Italian (Emilia-Romagna region) respondents' perception of "understandability" (A), "applicability" (B), "economic beneficial" (C) of different contract solutions[5]

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[5] Mean nonresponse rate: 1.72% (Figure 6 (A)); 2.05% (Figure 6 (B)); 2.87% (Figure 6 (C)).

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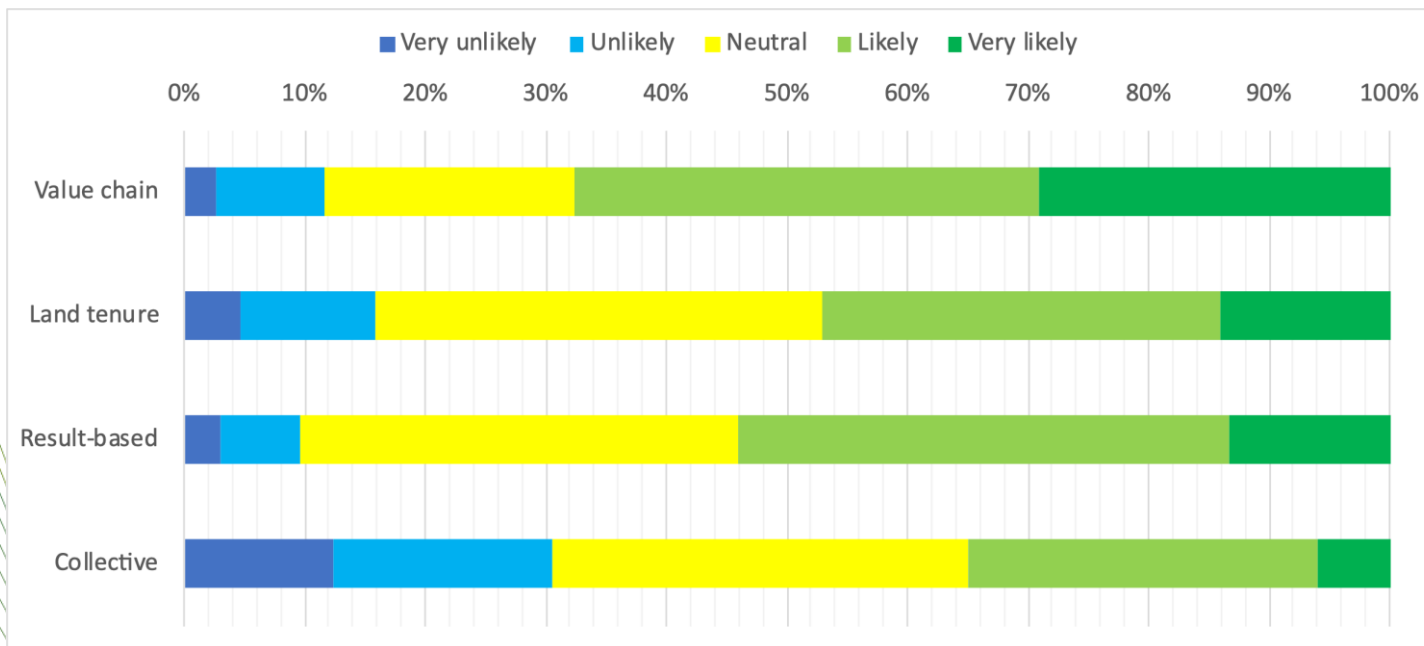
Figure 7. Italian (Emilia-Romagna region) respondents' willingness to enrol in different contract solutions[6]

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[6] Mean nonresponse rate: 1.72%.

Finnish data was collected via online surveys and acquisition of data was outsourced to a market research company (Taloustutkimus). Separate surveys were sent for farmers and forest owners. Farmers' email addresses were acquired from Finnish Food Authority (Ruokavirasto). The sample group of farmers included those who were active in agriculture and who had received subsidies for farming. Forest owner data was collected via Internet panel of Taloustutkimus. Internet panel consists of those volunteers, who have expressed willingness to response for surveys via Internet. From this Internet panel, the sample was defined as those forest owners whose forest holdings were larger than 5 hectares. Data from the farmers was collected during April and May 2021. Online survey was sent altogether 4974 farmers and 408 valid responses were received (response rate 8.2 %). Data from 386 forest owners was collected during April 2021. Here, farmer and forest owner data are reported together.

Self-chosen measures and receiving annual compensation were characteristics which at least somewhat increased willingness to participate in for more than 80% of the responses (Figure 8). Moreover, a characteristic related to result-based contracts, 'Better result, higher payment' increased willingness to participate in (75 %). Characteristic related to collective contract type ('Common payment') decreased willingness to participate in. Also, 'Authority control' was a contract characteristic which at least somewhat decreased willingness to participate in for almost among 50% of the respondents.

When comparing different contract types, result-based contract was the most, and collective contract the least, understandable, acceptable, and economically beneficial among the respondents (Figure 9). Finnish respondents would prefer result-based and value-chain contracts in a future, whereas land-tenure and collective contracts were least preferred (Figure 10). Around 27% of the respondents would be likely or very likely to participate in the result-based contract in the future, and only 13% of respondents would be willing to participate in collective contracts. Compared to results from all countries (Figure 4), Finnish respondents are less willing to participate in for different contract types. This is partly explained by great share of forest owners among respondents, and this applies especially for land tenure contracts which were not familiar among forest owners in Finland.

Figure 8. Contract features influencing Finnish respondents' willingness to adopt

FIGURE 9. FINNISH RESPONDENTS' PERCEPTION OF "UNDERSTANDABILITY" (A), "APPLICABILITY" (B), "ECONOMIC BENEFICIAL" (C) OF DIFFERENT CONTRACT SOLUTIONS
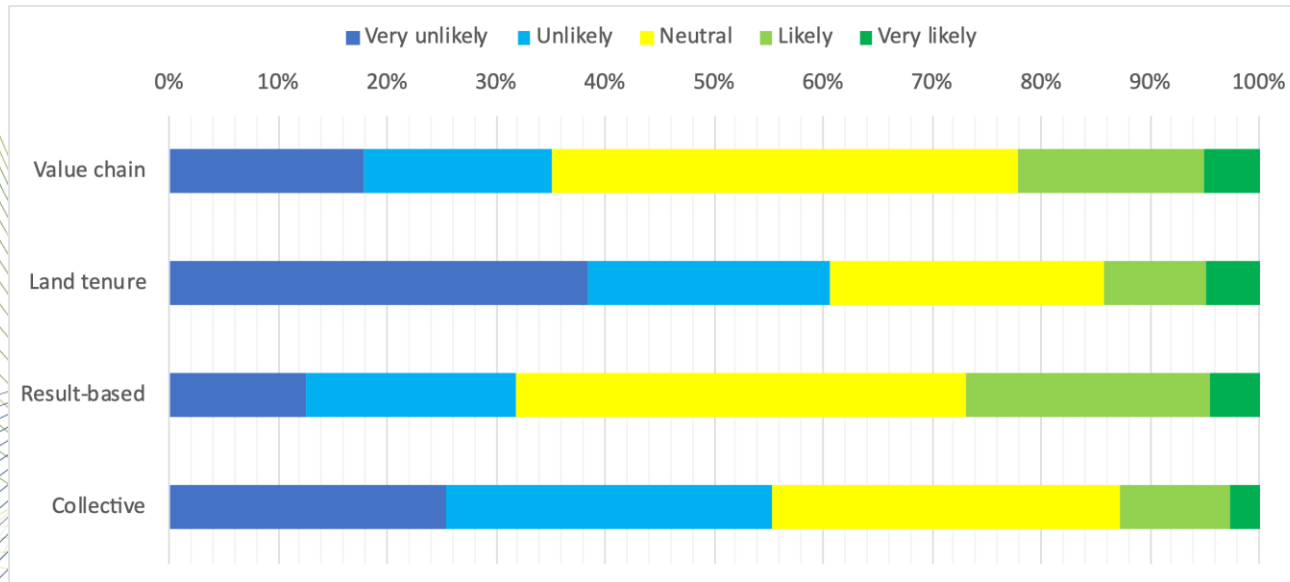
Figure 10. Finnish respondents' willingness to enrol in different contract solutions

The consultation regarding the farmer survey started in Austria in spring 2021. First, after finalizing the questionnaire, a pre-test was conducted with two farmers from Austria. The questionnaire was then translated into German and implemented in LimeSurvey, an online survey tool, in close cooperation with Thünen Institut (Germany). The survey was conducted with the help of an Austrian market research institute. The main survey started in March 2021 and ended in May 2021. The market research institute sent the link to the survey to its panel. 152 valid responses were received.

The four contract types are characterized by specific contract features, which were queried in 13 statements. Figure 11 shows the responses of the Austrian farmers. Regarding the payment model, the Austrian farmers show a clear preference for an annual payment with 82.2% stating that this characteristic increases the willingness to participate. A "Periodical Payment" received less approval, with only 43%. Characteristics typical for a results-based contract (better results higher payment; self-chosen measures) also increase the willingness to participate considerably. Furthermore, the assurance of having a sales guarantee for their products and the possibility of free training increase the contract acceptability. Two features that are particularly important in collective contracts (namely collective agreement and common payment) differed in the approval. The "collective agreement" was rated by more than 50% of the participants as a factor that increases the willingness to participate. The "common payment", on the other hand, received the lowest approval of all characteristics and almost 50% of the respondents answered that this characteristic decreases their willingness to participate. The characteristic for land tenure contracts, reduced rent for fulfilling environmental clauses, is perceived as beneficial by more than 43% of the participants, and negatively by almost 18%. Control by authority received less approval compared to the other characteristics; there was slightly more approval for self-monitoring of environmental results.

In the survey, respondents were asked to assess the four types of contracts in terms of "understandability", "applicability", "economic beneficial". The results can be seen in Figure 12. There is a positive tendency towards results-based contracts and contracts along the value chain. These two types of contracts were rated as more economically beneficial and applicable than the collective contracts and the land tenure contracts. The value chain contract is ranked most understandable, followed by the land tenure contract. For all three statements (understandability, applicability, economic beneficial), the collective contract always received the least agreement.

In figure 13, the aim was to find out how likely it was that farmers would participate in one of these contract solutions in the future, based on the information provided. Again, the results-based contracts and the contracts along the value chain were those in which farmers were most likely to participate. In results-based contracts, 50% of respondents indicated that participation in the future was very likely or likely. For the contract along the value chain, it was just

under 45%. For collective contracts, only about 20% think participation in the future is very likely or likely, and half think participation is unlikely or very unlikely. Participation in land tenure contracts with environmental clauses was indicated as very likely or likely by just under a quarter and about 45% indicated participation was unlikely or very unlikely.

Figure 11. Contract features influencing Austrian respondents' willingness to adopt
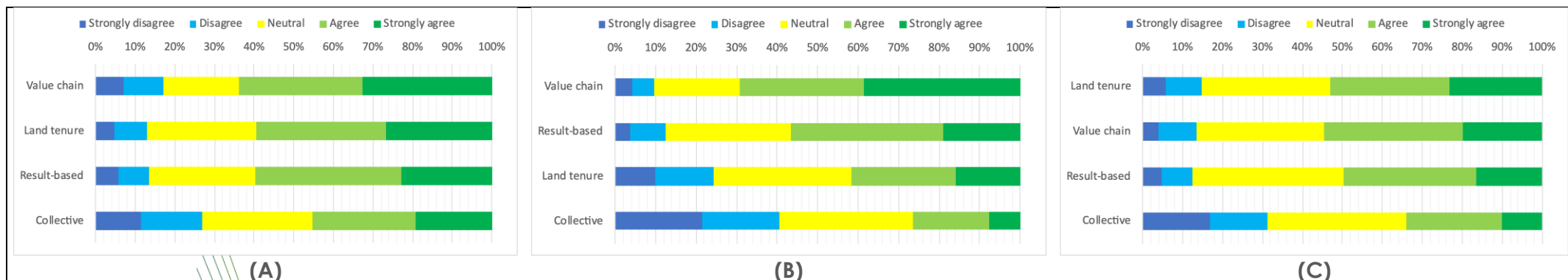
FIGURE 12. AUSTRIAN RESPONDENTS' PERCEPTION OF "UNDERSTANDABILITY" (A), "APPLICABILITY" (B), "ECONOMIC BENEFICIAL" (C) OF DIFFERENT CONTRACT SOLUTIONS
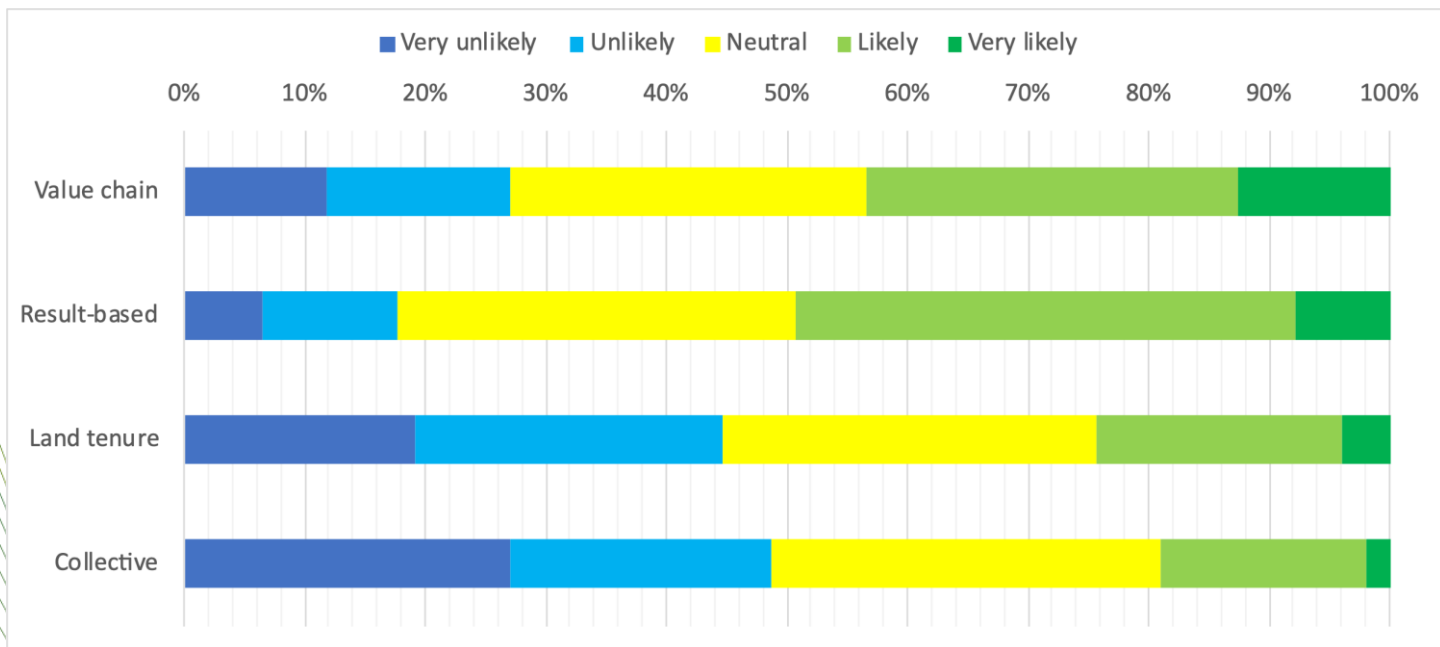
Figure 13. Austrian respondents' willingness to enrol in different contract solutions

The surveys took place between February and April 2021. The information for the project and the questionnaire was distributed via two main channels: stakeholder network of the Institute of agriculture economics and trough the Association of Agri-environmental farmers. The information was disseminated during meetings, via email and on the phone. Part of the surveys were conducted face-to-face, others on the telephone and several online. The total number of valid surveys that were further analysed is 147.

Bulgarian respondents show high acceptance of result-based contracts in terms of their understandability, applicability, and economic benefits. They also find this type of contract solution as a potentially suitable one in future enrolment. Collective contracts, on the other hand, are the least recognized for future adoption.

On Figure 14 we can observe that the factor that will mostly increase willingness to adopt environmental contracts is sales guarantee, followed by increasing payments with achieving higher results, and finally measures that are chosen by the farmer (e.g., he/she decides about which practices to adopt). These three factors would increase motivation in more than 50% of the respondents. On the contrary, those factors that would decrease willingness to adopt ecological contracts relate to collective initiatives (collective agreement and receiving common payment) as well as payment received by customers. These three factors are found to decrease motivation considerably in more than 20% of the respondents. It is interesting to observe that factors like labelling products, control by authority and payment received by customers are not recognized to influence the willingness by about 50% of farmers. Overall, farmers would prefer increasing payments based on results and self-selection of measures to a higher degree – these factors would increase their motivation considerably.

Respondents' understanding of the four contracts is presented on Figure 15. Regarding "understandability", the predominant part of the respondents, over 90%, state that they more easily understand the result-based contract, and over 70% the value chain contract and land tenure contract. The collective contracts are somehow less "understandable" for farmers; most respondents are either neutral or strongly disagree. As for the perceptions about "applicability" and "economic beneficial" of contracts, we observe somehow similar results. Again, result-based contracts are the most applicable and economically beneficial, while value-chain and land tenure contract solutions show results where almost 30-40% of respondents are neutral. Finally, the collective contracts are the least applicable and economically beneficial (for about 40-45% of respondents). Overall, the predominant part of respondents finds result-based contracts as the most understandable, applicable, and economically beneficial, while, on the opposite side, there are the collective contracts.

The positive perceptions of Bulgarian respondents on the applicability, understandability and economic benefits of result-based contracts can be also reflected in their willingness to enrol in this kind of contract solutions (see Figure

16). On the other hand, respondents are mostly neutral (unsure) about value-chain and land tenure contracts (almost 40% are neutral), but the percentage of those stating that they are unlikely to enrol in land tenure contracts is higher (about 35% of respondents).
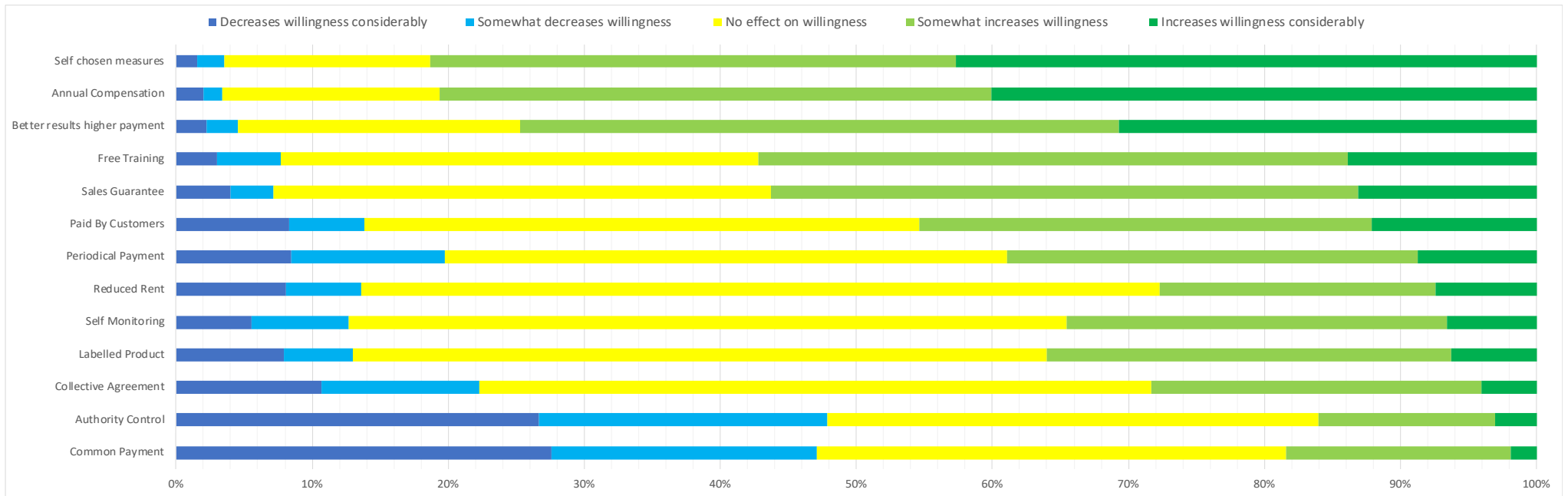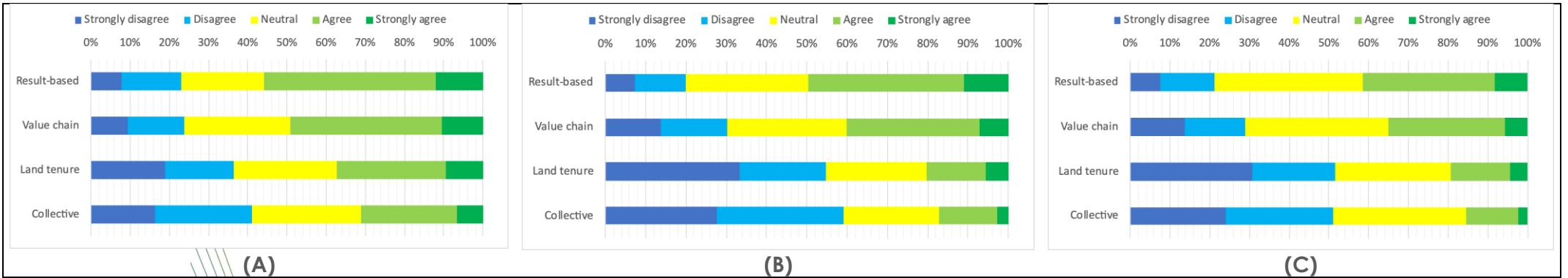
Figure 14. Contract features influencing Bulgarian respondents' willingness to adopt

FIGURE 15. BULGARIAN RESPONDENTS' PERCEPTION OF "UNDERSTANDABILITY" (A), "APPLICABILITY" (B), "ECONOMIC BENEFICIAL" (C) OF DIFFERENT CONTRACT SOLUTIONS

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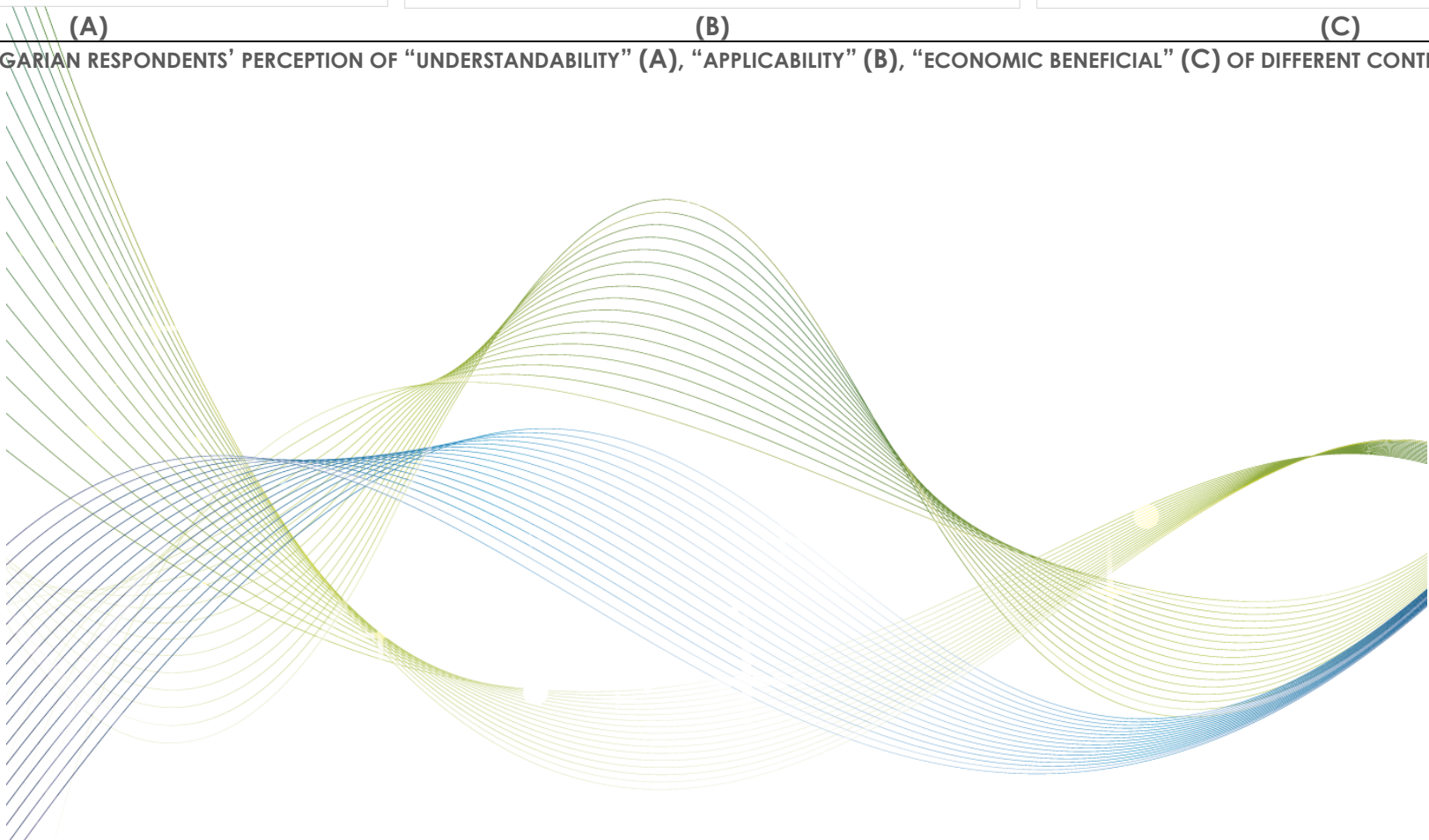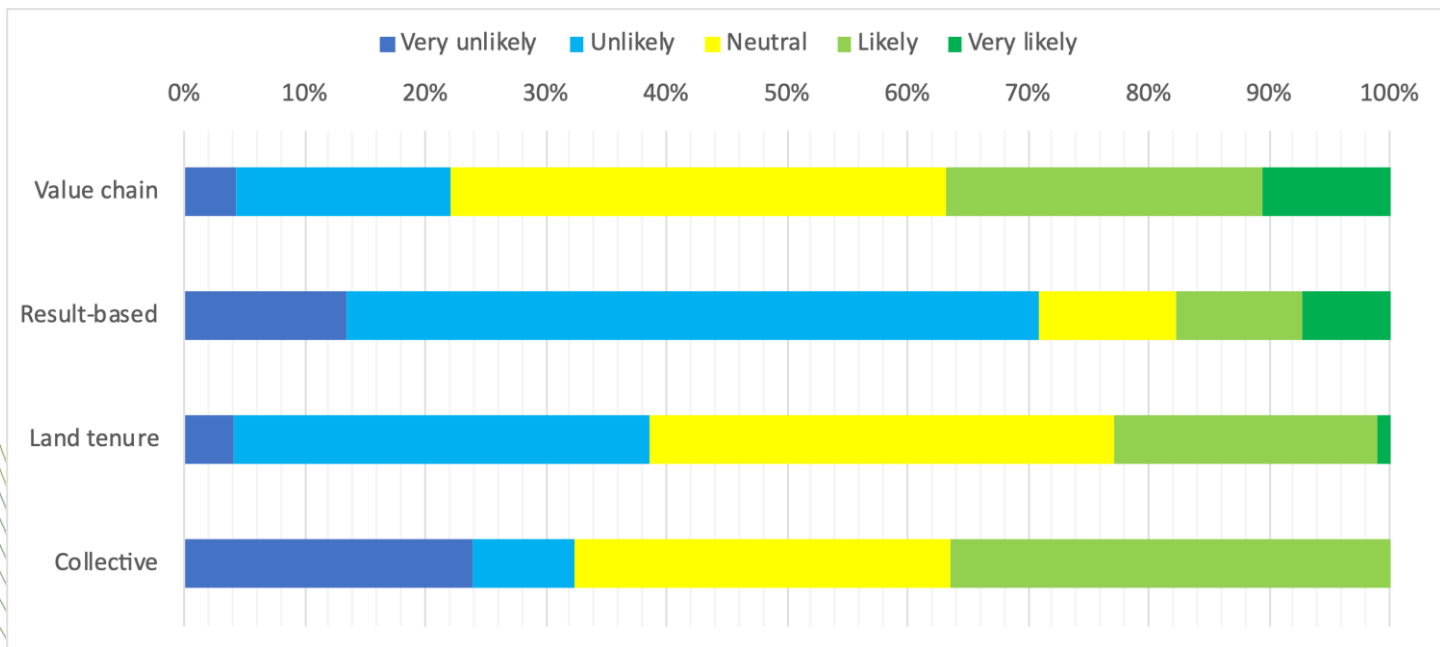
Figure 16. Bulgarian respondents' willingness to enrol in different contract solutions[7]

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[7] Mean nonresponse rate: 0.26%.

2.4.5 Germany

The land manager survey has been sent out to around 700 farmers from across the 16 German Laender and furthermore promoted via the social media channel of the Thünen Institute and personal contacts. It was online for 8 weeks (22.02-15.04.2021). In order to increase participation, farmers who finished the survey got the possibility to win a tree. The order of the two sections - "Individual characteristics and agricultural/forest holding features" and "Contract types for improving environmental benefits and their acceptability" – has been inversed in order to first address contract related questions. After a plausibility check from the 149 fully filled out questionnaires 146 remained for further assessment. When it comes to contract features, the responses clearly show that freedom in the chosen measures is positively influencing the willingness to engage in voluntary measures, closely followed by the availability of free training and compensation payments on an annual basis. Farmers did not like the option of receiving a common payment to be distributed amongst participants while the engagement in a collective agreement with other farmers was seen more positively, still one third being neutral. When it comes to the four novel contract types, German farmers stated a clear preference for the result-based approach when it comes to understandability and applicability at farm level. Value chain contracts are seen as the most economic beneficial amongst the four options, still there are considerable respondents who consider this contract type less economic attractive than the result-based approach. When it comes to the willingness to engage in future into such contracts, result-based is seen as being the most likely with nearly 60% of the farmers indicating that it is likely or even very likely, followed by value chain and land tenure. For collective contract solutions 50 % of the farmers stated that it is unlikely that they would engage into them.

For Germany a question on which environmental aspect farmers think each of the four contract types is best suited. They had to select only one environmental aspect. Initially, only foreseen in the stakeholder survey, this question has been added to allow comparison between farmers' answers and those from stakeholders. Landscape and scenery were seen as being the most relevant for the collective approach, for result-based contracts biodiversity is the most relevant.
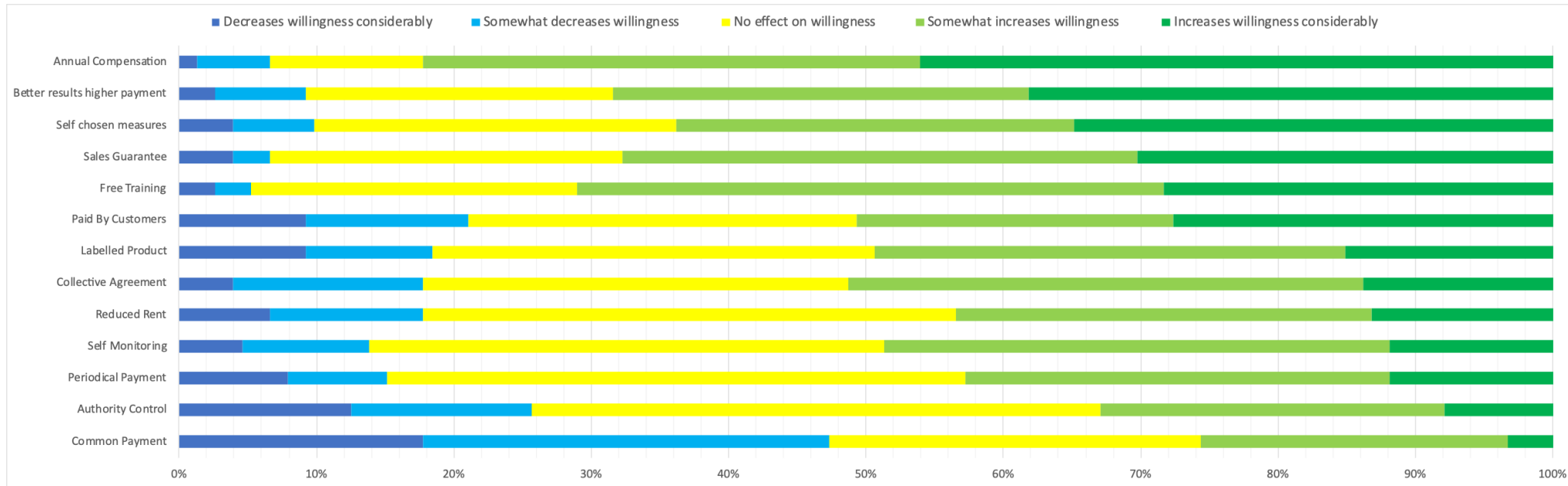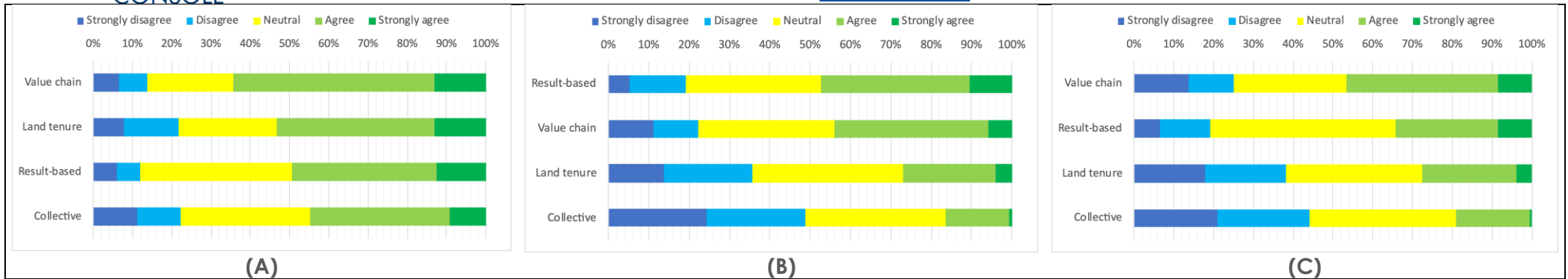
Figure 17. Contract features influencing German respondents' willingness to adopt
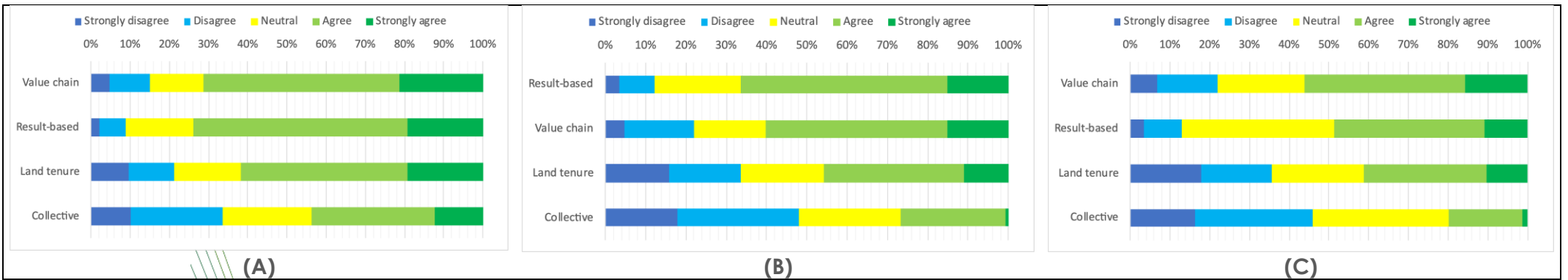
Figure 18. German respondents' perception of "understandability" (A), "applicability" (B), "economic beneficial" (C) of different contract solutions
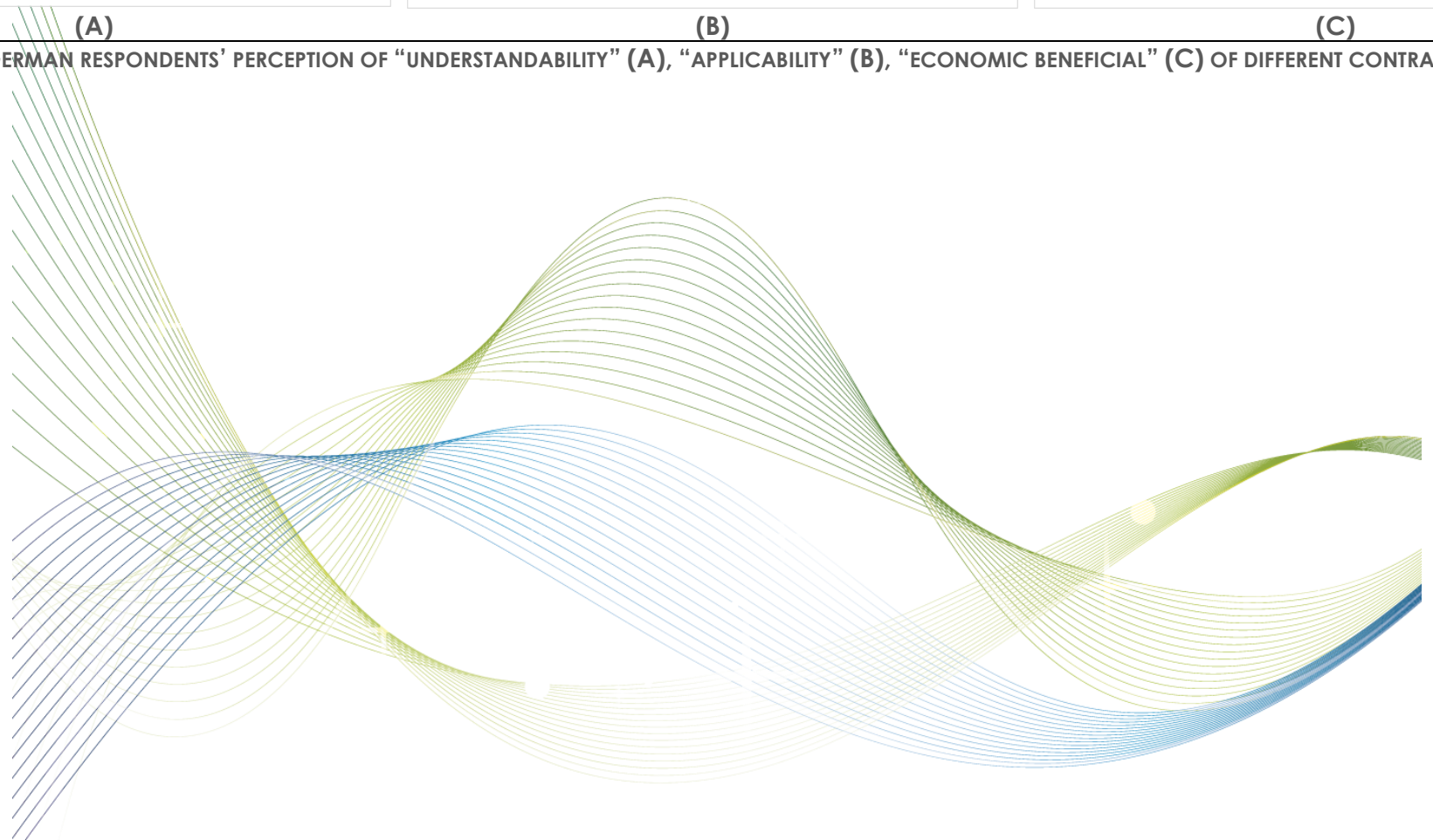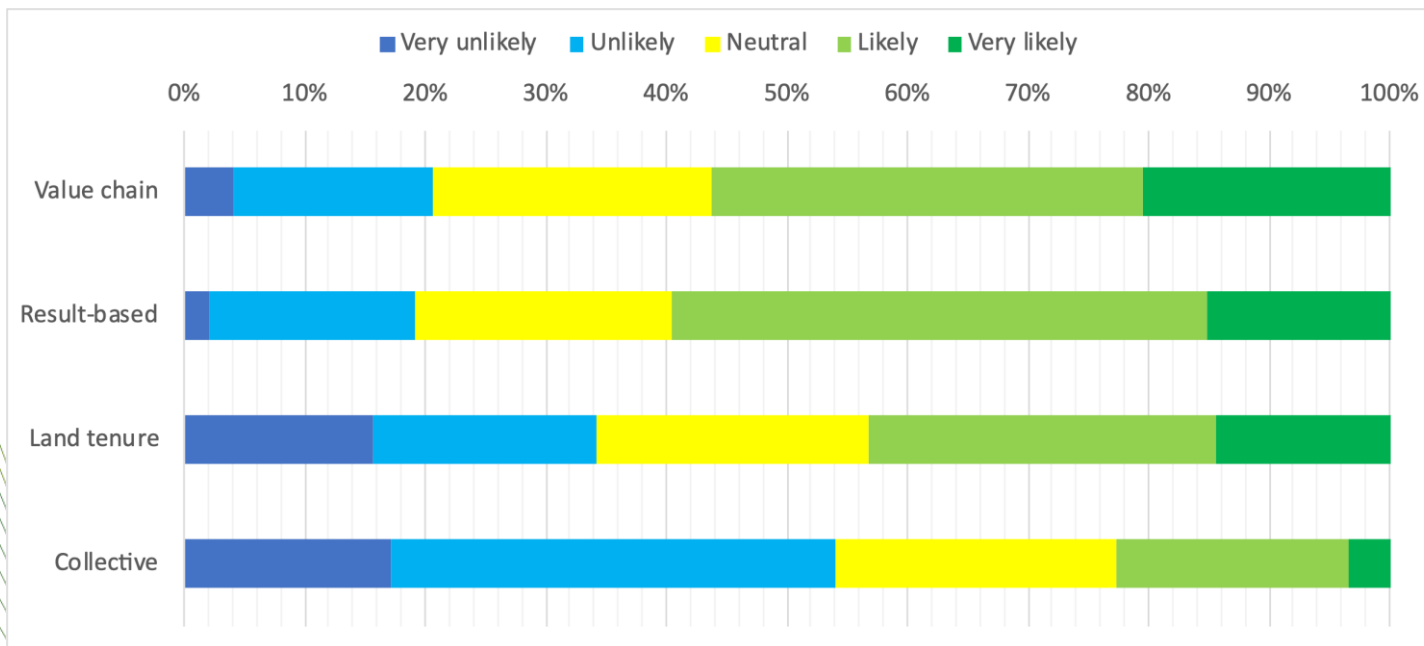
Figure 19. German respondents' willingness to enrol in different contract solutions

The results showed that Spanish farmers prefer value-chain and results-based, meanwhile land-tenure and collective implementation has been less selected. Around 45% of farmers would be likely or very likely to participate in the value-chain contract. On the other hand, only 2-3% of farmers would be willing to participate in collective contracts. This could be due to the "understandability" of value chain contracts is less than value-chain and results-based where both contract solutions have similar perception of understandability. In fact, value-chain has the same "applicability" perception that results-based but more "economic beneficial" and "different contract solutions".

"Annual compensation" is the feature more selected as more influential followed by "Better results higher payment" (both close to 90%). Other features selected were "Sales guarantee", "Labelled product" and "self-chosen measures" (70-80%). These characteristics are related to results-based and value chain contracts. On the other hand, features more related to collective implementation such as "collected agreement", "periodical payment" and "common payment" decrease willingness to participate.
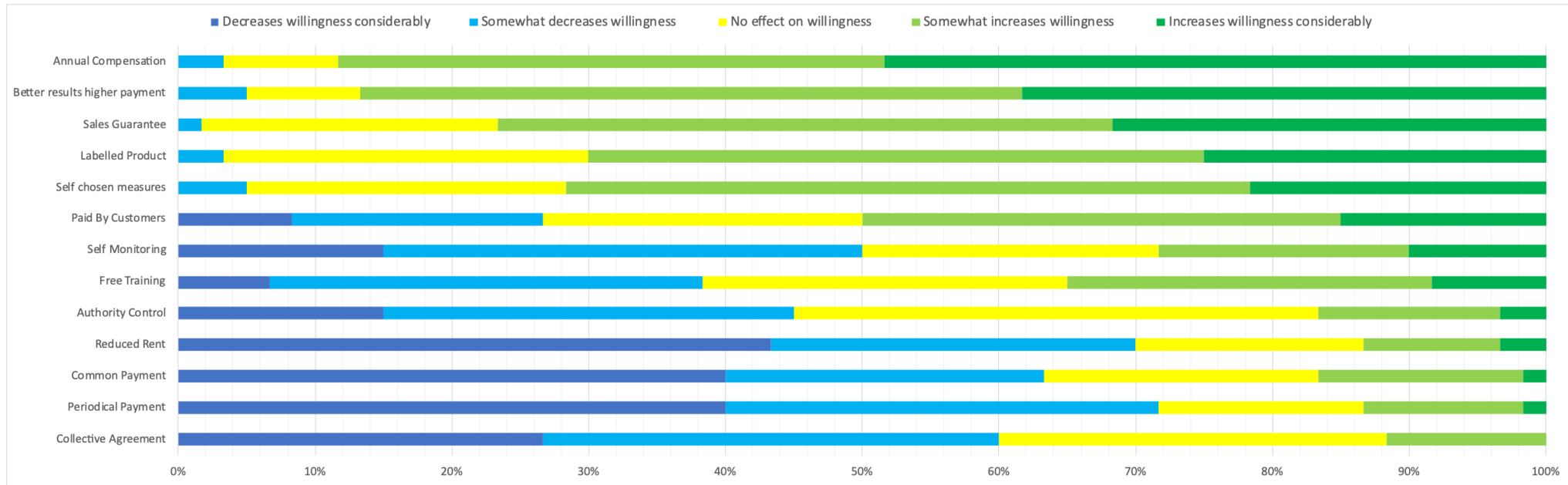
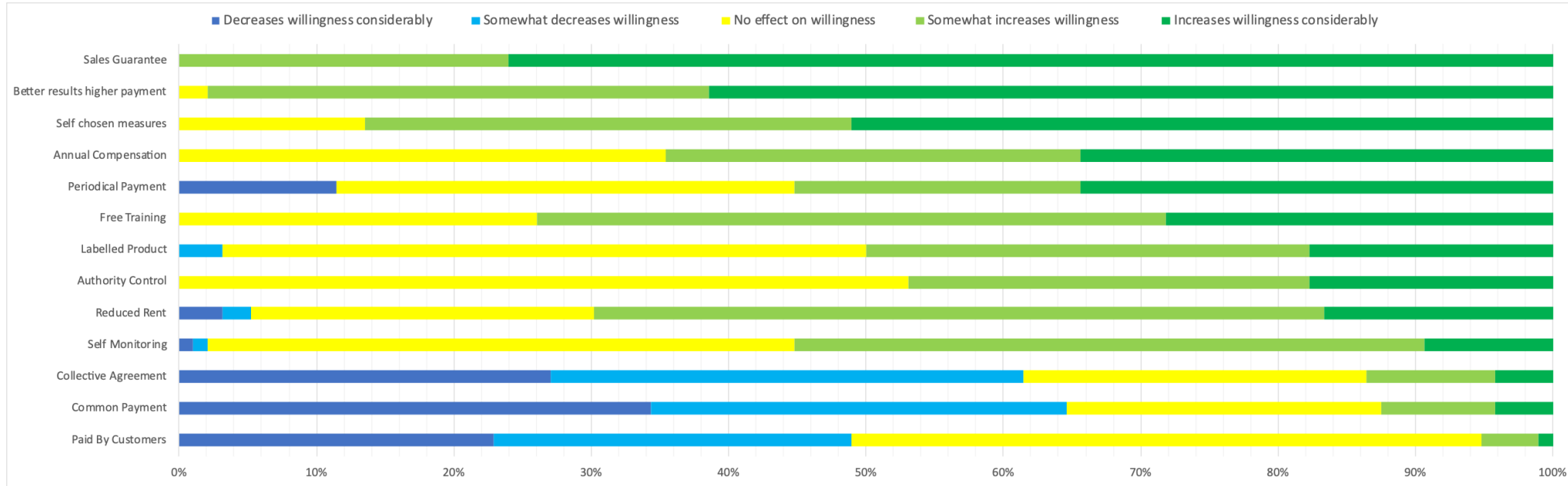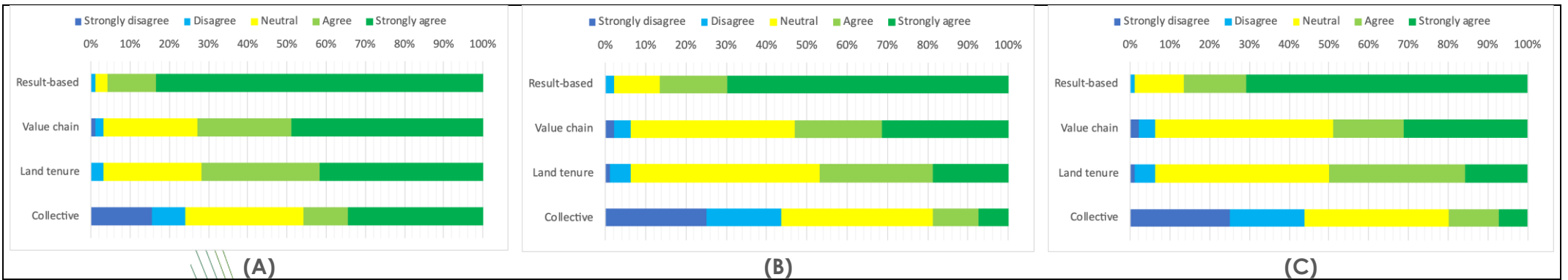*Figure 20. Contract features influencing Spanish respondents' willingness to adopt*

FIGURE 21. SPANISH RESPONDENTS' PERCEPTION OF "UNDERSTANDABILITY" (A), "APPLICABILITY" (B), "ECONOMIC BENEFICIAL" (C) OF DIFFERENT CONTRACT SOLUTIONS[8]

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[8] Mean nonresponse rate: 0.42% (Figure 21 (A)).

56
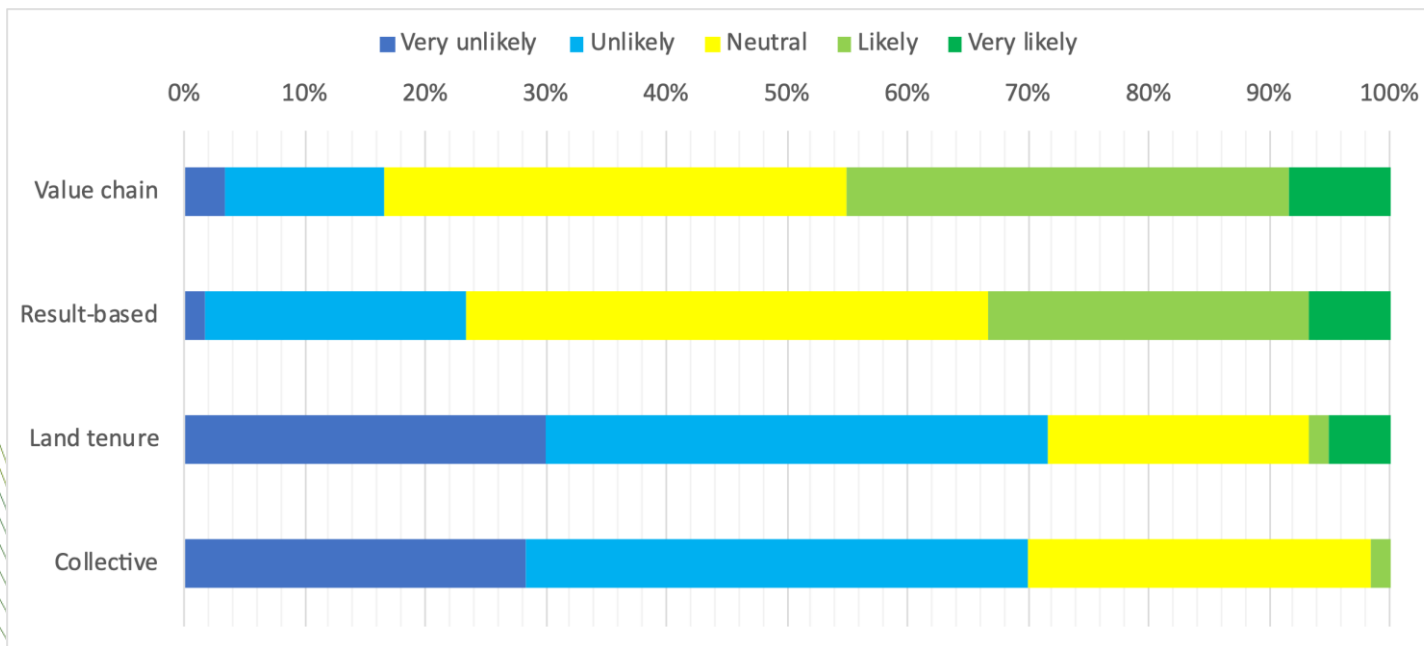
Figure 22. Spanish respondents' willingness to enrol in different contract solutions

The collection of data from INRAE – TRAME in the Brittany, Normandy and Pays de la Loire Regions took place from May to July 2021. First, TRAME and INRAE contacted agricultural development organizations, agricultural unions and producer organizations to present the CONSOLE Project and the main aims of the survey to them and ask for their agreement to mobilize their networks of farmers. Then, these organizations surveyed their farmer members looking for volunteers to participate in the survey. They forwarded the lists of volunteers to TRAME and INRAE. INRAE subcontracted the realization of face-to-face interviews to Agrocampus Junior Etude (ACJE). ACJE pollsters and TRAME team contacted the volunteer farmers by e-mail or telephone to set a date for the face-to-face interview. During the interviews, a parallel Limesurvey was filled with the answers of the respondents to facilitate data collection. 130 interviews were conducted with farmers.

Figure 23 shows the main features characterizing an environmental contract and how they influence the acceptability of such contract among the French respondents. French respondents seem to particularly appreciate the feature that better environmental results would lead to higher payment. The acceptability of the contracts is also increased if the compensation/payment for the environmental commitment is made on an annual basis, or if farmers have the assurance of having sales guarantee for their products. The possibility of free training aiming at building know-how or the possibility to choose the practices and measures to adopt during the contract in order to accomplish its targets are also features that positively influence the acceptability of the contract.

However, more than 40% of French respondents think negatively of the idea of a common payment to a group of farmers who must decide how to share it. Both the monitoring of the environmental results by an authority and/or institution and self-monitoring by the farmers themselves are features which seem to decrease the willingness to adopt. Another contract characteristic that decreases the acceptability of the contract is the idea that half of the payment could be at the beginning of the contract period, while the other half should be paid at the end. Finally, 21% of French respondents think negatively about the fact that the compensation is charged to consumers and not paid by public money.

Figure 24 depicts the perception of the French respondents about the "understandability", "applicability" and the "economic beneficial" of the different contract solutions. All contract types seem to be understandable for the French respondents, land tenure contracts slightly less than the other three. French farmers seem to have a better perception of the applicability and the potential economic benefits of the result-based and value chain contract solutions compared with the other two contract types. Land tenure contracts seem the most difficult to understand and apply on farm and score the lowest in terms of potential economic benefits.

Figure 25 shows that the preference of the French respondents for result-based and value chain contracts is confirmed in terms of willingness to enrol in the

future. More than 60% of the respondents stated they would likely or very likely enrol in value chain or result-based contracts in the future. Contrariwise, collective and land tenure contracts do not seem to attract them.
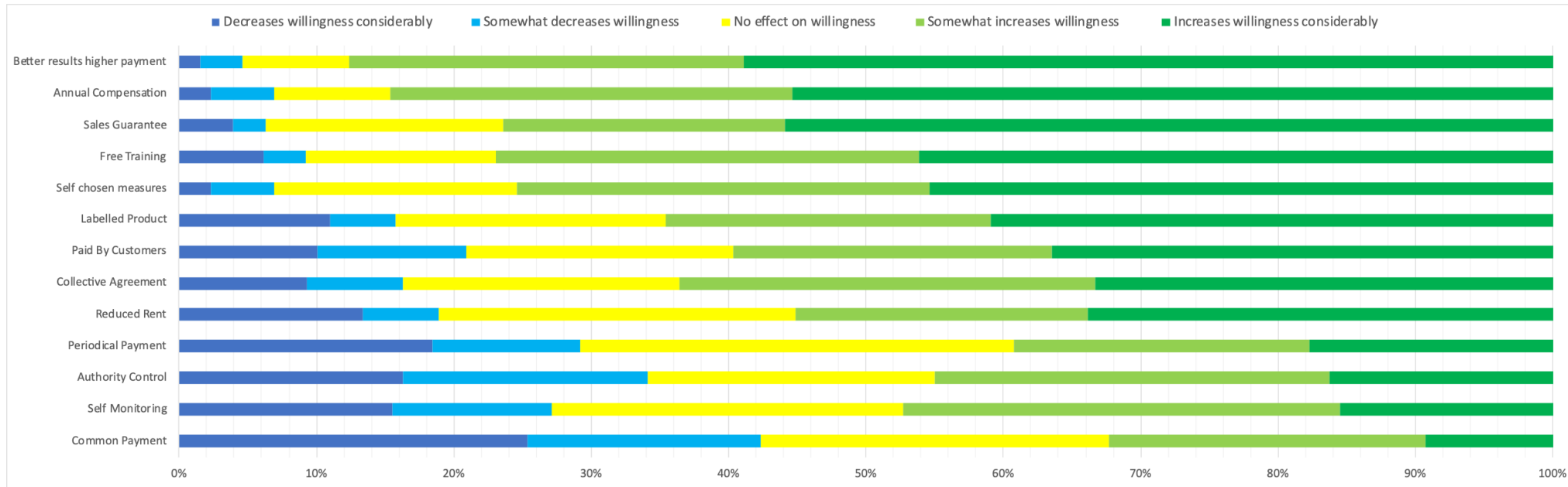
Figure 23. Contract features influencing French respondents' willingness to adopt[9]

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[9] Mean nonresponse rate: 0.83%.

FIGURE 24. FRENCH RESPONDENTS' PERCEPTION OF "UNDERSTANDABILITY" (A), "APPLICABILITY" (B), "ECONOMIC BENEFICIAL" (C) OF DIFFERENT CONTRACT SOLUTIONS[10]

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[10] Mean nonresponse rate: 0.77% (Figure 24 (A)); 0.96% (Figure 24 (B)); 2.12% (Figure 24 (C)).

61
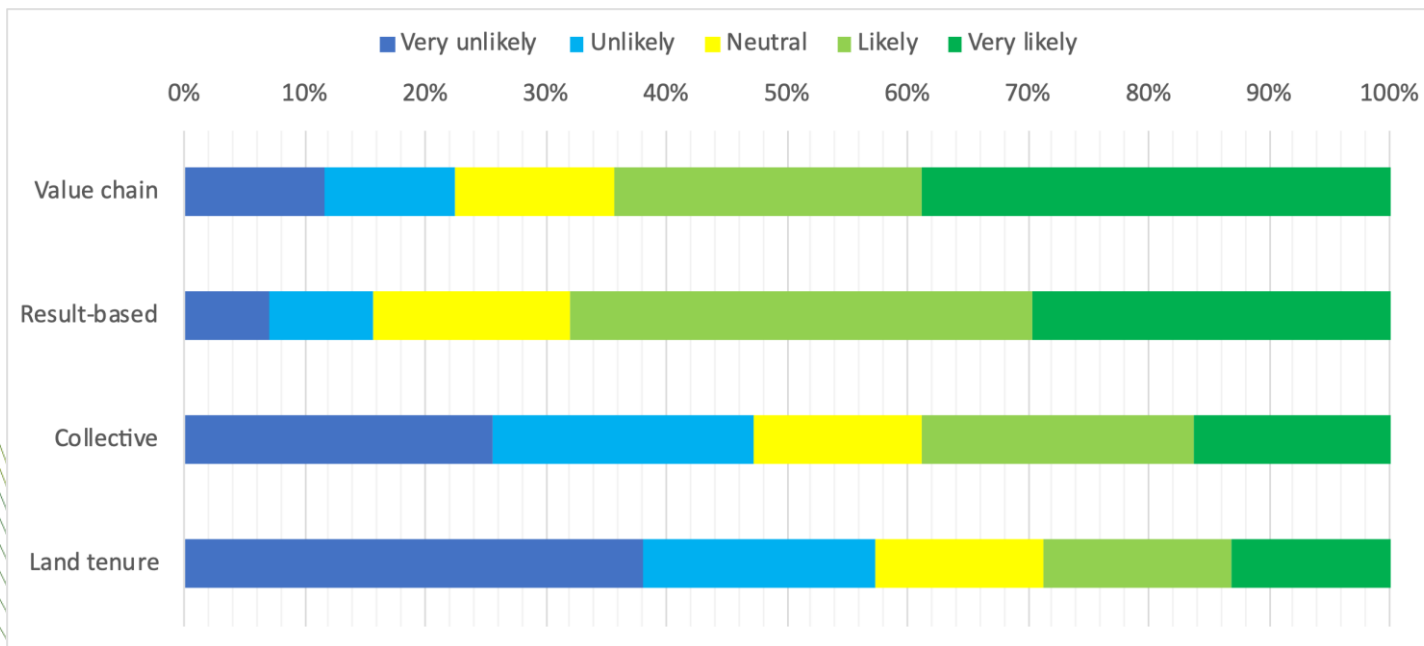
Figure 25. French respondents' willingness to enrol in different contract solutions[11]

The data related to Ireland were collected in April and May of 2021. All data were collected online.

Figure 26 shows the contract features that are influencing Irish respondents' willingness to adopt an environmental contract or programme. An ability of land managers to determine the management practices that are required to achieve the specified environmental result has the greatest influence on adoption. Passing of the cost to the customer is favoured by the majority of respondents. This would be a novel approach that would see consumer prices rise and public expenses fall. Nonetheless, consumers are increasingly seeking environmental approaches to food production. A financial gain for farmers through lower rent payments increases the willingness of most respondents to adopt. This is likely to boost land mobility which is persistently low in Ireland. The least attractive contract factor is an ability for land managers to receive a common payment.

Figure 27 depicts the perception of the Irish respondents about the "understandability", "applicability" and the "economic beneficial" of the different contract solutions. Result-based and value chain contracts are perceived by respondents as the most understandable as well as the most economically beneficial. Result-based contracts outperform the other contract solutions in terms of the perception that Irish respondents have with regard to the applicability in their holdings, followed by land tenure ones. Similar to other countries in this study, collective contracts receive the lowest scorings in terms of their understandability, applicability and potential economic beneficial.

Figure 28 shows Irish respondents' willingness to enrol in different contract solutions. Despite Figure 27 showing high levels of understandability and perceived benefit, a large portion of Irish respondents are unlikely to adopt result-based contracts. Some cited reasons for this unwillingness are concerns that financial incentives will not be sufficient, administrative costs will be high, policies will not be driven by farmers' opinions and that measures will not reflect the heterogenous natures of farms and their landscapes.
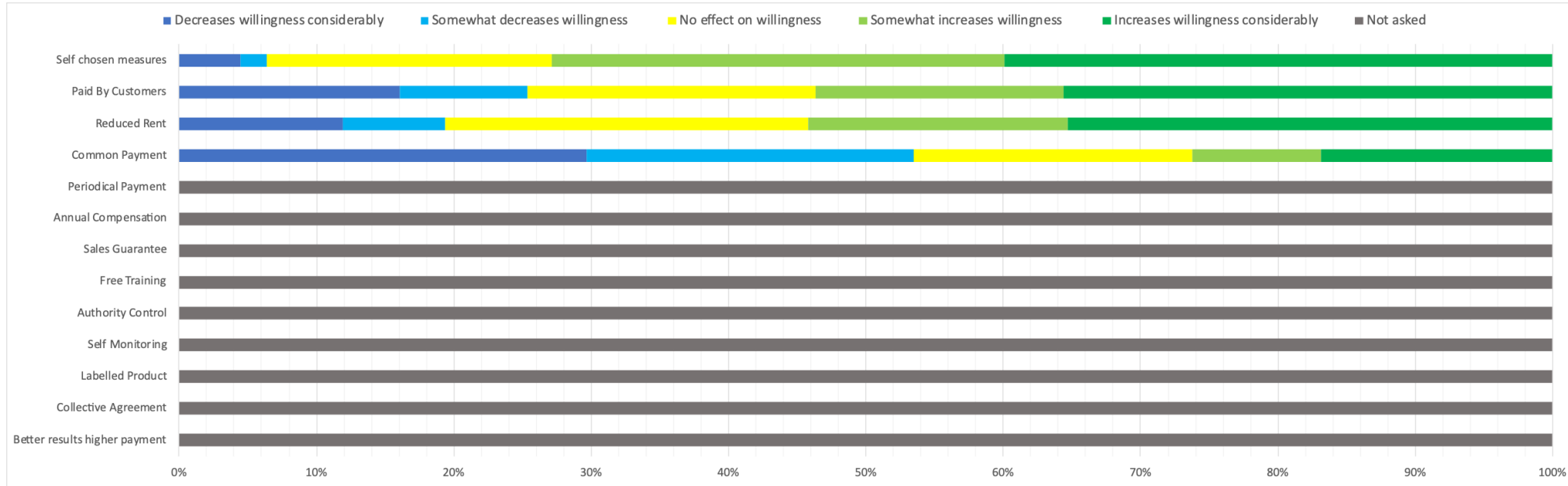
Figure 26. Contract features influencing Irish respondents' willingness to adopt
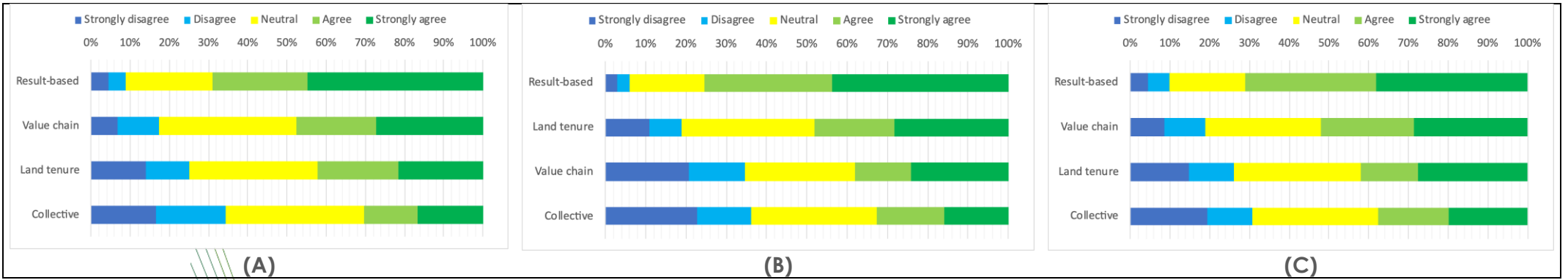
FIGURE 27. IRISH RESPONDENTS' PERCEPTION OF "UNDERSTANDABILITY" (A), "APPLICABILITY" (B), "ECONOMIC BENEFICIAL" (C) OF DIFFERENT CONTRACT SOLUTIONS[12]
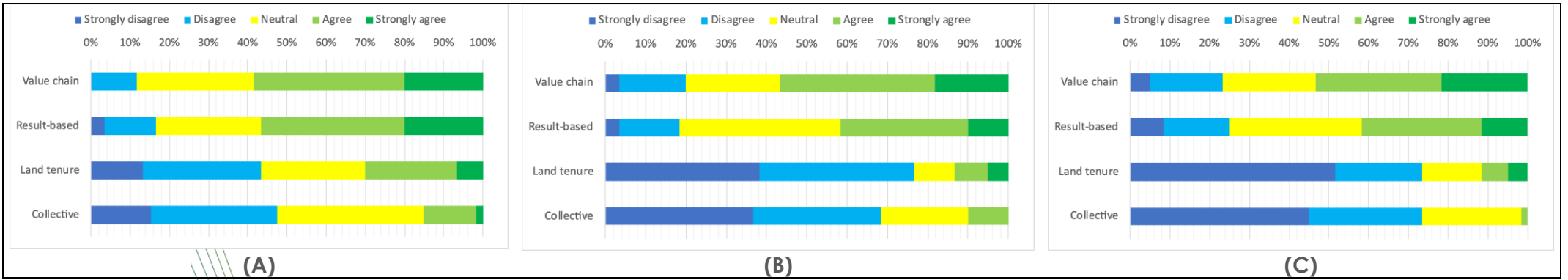


[12] Mean nonresponse rate: 3.81% (Figure 27 (A)); 4.05% (Figure 27 (B)); 4.64% (Figure 27 (C)).
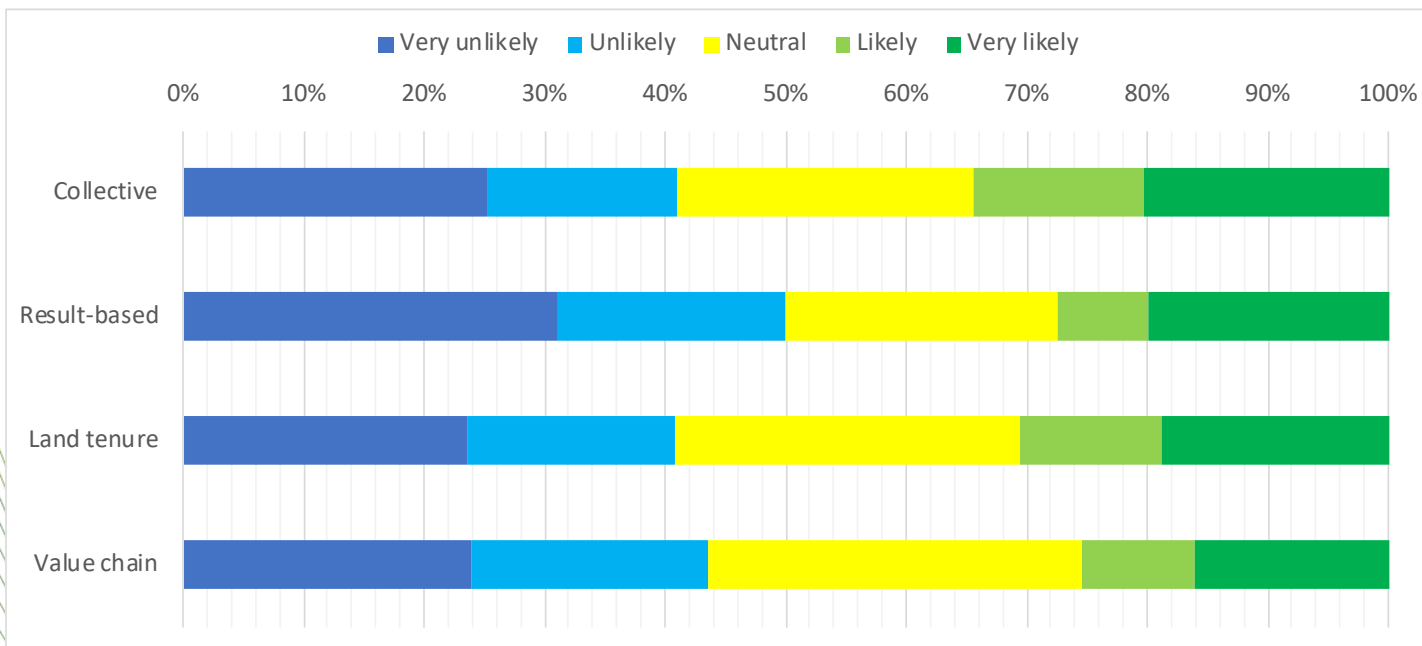
Figure 28. Irish respondents' willingness to enrol in different contract solutions[13]

2.4.9 Italy – Liguria Region

The farmer's interviews were conducted from June to September 2021 in Borghetto Vara in the Vara Valley (Liguria Region). We strategically decided to subcontract the promotion of the questionnaire to a farmers' association that offers administrative and technical services in the management of practices related to the Rural Development Programme of the Liguria Region. The specificities of Ligurian territory and the exposure to several risks (i.e., geographical condition, ageing, land abandonment, vulnerability to extreme weather) requires innovative solutions to maintaining various ecosystems services (i.e., reducing soil erosion) and the landscape. We tailored the survey to the local condition through several bilateral meetings. During the several meetings, we explained the CONSOLE Project and related objectives of the WP3 and landowner survey. We adapted the survey to the local condition and the local agricultural system. In addition, three logistic factors motivated our choice: *a)* competence and understanding of the problems addressed in the survey by the association; *b)* a high number of associated farmers (300 companies); *c)* possibility of carrying out the survey face-to-face with farmers by taking advantage of the moments of advice or the opening hours of the association branches where Ligurian farmers usually go for different kinds of obligations.

A final version of the questionnaire elaborated with the different suggestions collected and in line with the project specifications was uploaded to Qualtrics and the choice experiment. The database of associated farms (300) of the delegated association was the main source of data. Despite the survey being promoted face-to-face, we opted for a PC based interview through a Qualtrics link for each farmer to facilitate the data record. The online data collection excluded us from any potential error in the data entry process. The interviewer was limited to read the questions and answer directly on the online page generated by the Qualtrics link, filling in the various answers for the company. In other words, the farmers were assisted during the questionnaire by the delegated team members and by an expert person from UNIPI. After the data gathering, the questionnaires were analysed and revised to eliminate the uncompleted ones.

The association advises farmers in the east of the Liguria region. The survey area includes all the municipalities of the La Spezia Province and some municipalities of the Genoa Province. We included all types of farms in the survey, such as animal husbandry, vegetable crops, olive oil, beekeeper, foresters, and multifunctional farms. We included farms in the hill, mountains (heroic agriculture) and flat areas. The Hobbyist small farms were also included in the survey because of their relevance in performing voluntarily and non-productive environmental actions in the Ligurian Territory. This type of farmer generally does not respect the minimal requisites in the UE funding schemes and does not receive any remuneration for their activities. The prevailing representative landscape of the survey is characterised by high slopes, dry walls terraces and high hydrogeological instability. Also, the average hectares extension of the farms included are below the national average.

A good percentage of the farmers were proud to contribute to CONSOLE since the Project tackles crucial questions for their survival, i.e., the opportunity to receive funding for maintaining the territory. However, some participants showed doubts and perplexities regarding the current architecture and CAP support in general.

Figure 29 depicts that farmers consider the result-based feature (i.e., the idea that better results bring higher payment) the most relevant characteristic influencing the uptake of the contract solution. Therefore, most of the farmers consider it good to have a measure of the real environmental effectiveness of the UE funding. They also pointed out the possibility of delivering higher environmental benefits if payments are linked with the results. Farmers also consider further flexibility positively in choosing the measure and practices to reach the environmental objectives. Furthermore, they are more prone to have a controlling authority than to control the results of the measures autonomously. However, they showed positive reactions to the free training courses for farmers that can help to understand the utilised indicators. Overall, the Ligurian farmers prefer the annual compensation if they understand that environmental measures can need longer time-periods to be effective. The self-monitoring of the outcomes, the periodical payments, and the common payment criteria reached the highest number of negative opinions. The farmers also showed perplexity in the case of value chain contracts because the customers are not prone to pay the environmental effects in the product price.

Figure 30 shows the distinction between the more suitable innovative contracts to be utilised and the other two. Therefore, the farmers have a positive perception regarding the understanding ability of the result-based, collective implementation and land tenure contracts. The value chain contract solution can be more difficult to understand. The farmers feel that the result-based, collective and land tenure contracts are easier to apply than the value chain contract solution. The farmers underlined that every type of product value chain certification in the area had no strong positive effects. From an economic point of view, the result-based and land tenure contracts showed better perceptions. The other types of contracts showed a low level of positive economic effects (percentage under 30 % of positive replies).

Figure 31 shows that more than 60% of farmers had a positive willingness to enrol in the results-based contracts. The Land tenure, the second one, reached about 40% of farmers' positive opinions. Collective contracts and land tenure did not reach a good level of applicability, about thirty and twenty percent respectively.

Figure 29. Contract features influencing Italian (Liguria region) respondents' willingness to adopt
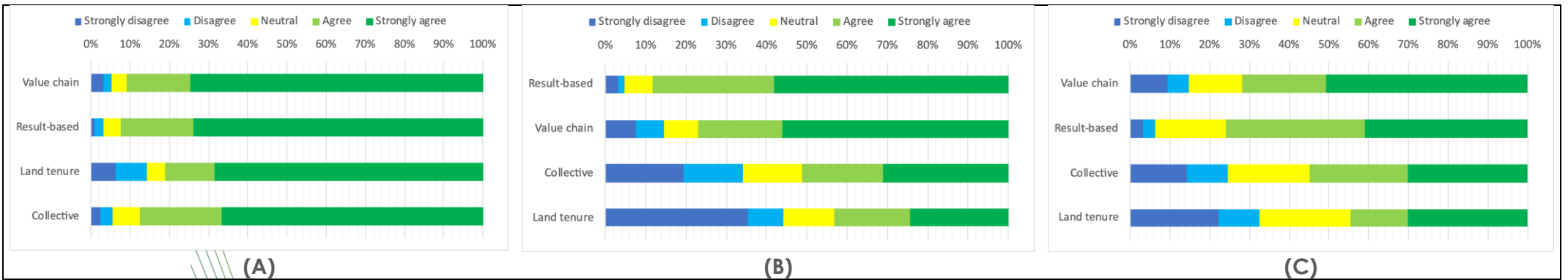
FIGURE 30. ITALIAN (LIGURIA REGION) RESPONDENTS' PERCEPTION OF "UNDERSTANDABILITY" (A), "APPLICABILITY" (B), "ECONOMIC BENEFICIAL" (C) OF DIFFERENT CONTRACT SOLUTIONS[14]

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[14] Mean nonresponse rate: 0.80% (Figure 30 (A)); 1.06% (Figure 30 (B)); 0.53% (Figure 30 (C)).

70
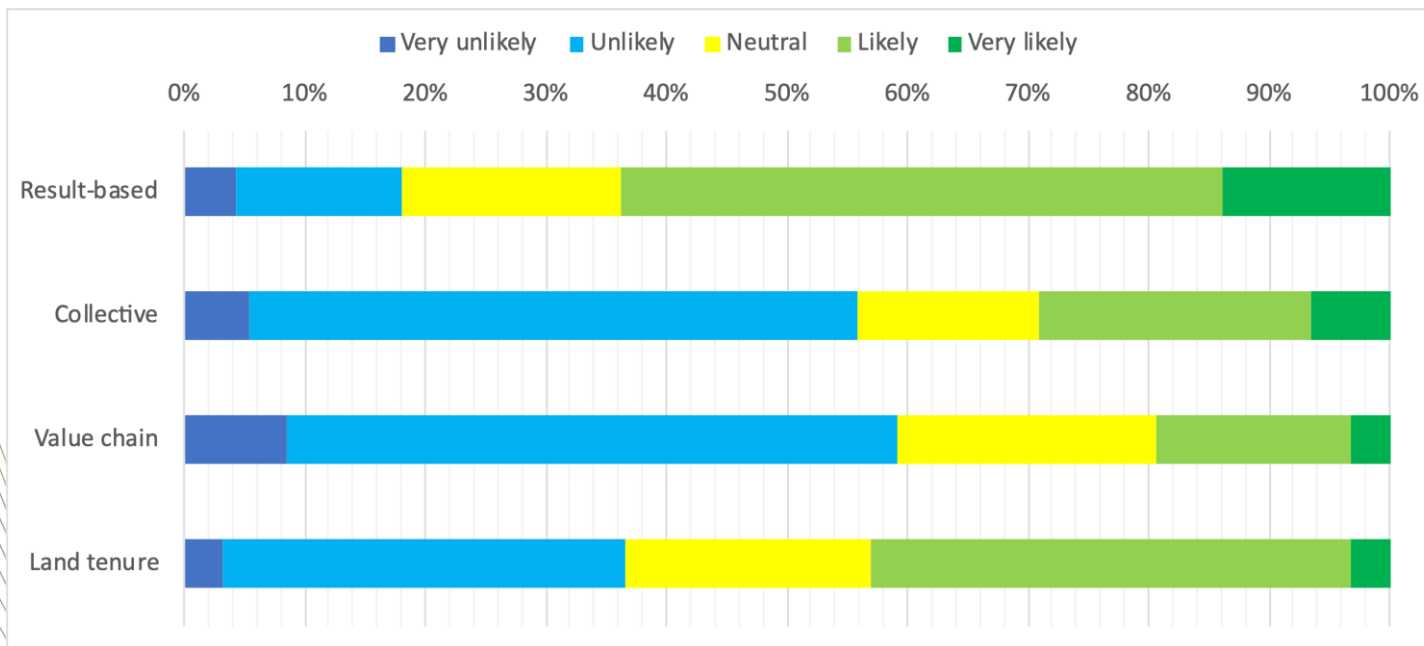
Figure 31. Italian (Liguria region) respondents' willingness to enrol in different contract solutions[15]

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[15] Mean nonresponse rate: 0.80%.

Survey in Latvia was carried out during March, April, and May 2021. Multiple steps were used to reach the potential respondents. For the implementation of the survey, there was contracted service company. Firstly, the survey was sent to all the members of ZSA (approximately 800 farmers-landowners). Secondly, ZSA reached out to forester NGOs and through them sent the survey to their members. Thirdly, other stakeholders were addressed to send the survey to their landowner partners. In addition, the information about survey was communicated through ZSA webpage, Facebook page, weekly message, etc. The information was short, simple, and included instructions. After these efforts, approximately 65% of the sample size was reached. To reach the rest of the target group, the call to fill in the survey was communicated through multiple workshops (non-CONSOLE related). The strategy worked, likely due to the personal eye-to-eye delivered message.

After 101 valid landowner answers were collected, the data was coded according to circulated excel form, to ensure its compatibility with data collected in other countries.

Figure 32 shows the main features characterizing an environmental contract/programme and the influence that these features may have on Latvian respondents. The features in Figure 5 are presented in descending order of influence. Latvian respondents seem the most likely to enrol in contracts that offer higher pay for better results achieved (the better the results, the higher the compensation). The next more positively assessed factor is the ability to choose for themselves the actions that are taken to achieve environmental results, so the landowners themselves want to dictate the rules. These factors are followed by fairly similar results in receiving compensation each year, a purchase guarantee (a guarantee that the products produced will be purchased if the terms of the contract are met), the opportunity to participate in paid training and reduced land rents.

On the other hand, factors such as receiving compensation collectively (an opportunity provided by cooperating to achieve environmental goals - compensation is paid to a group that distributes it itself), monitoring from above, collective agreement, periodic payments, and the principle of "buyer pays" are assessed as rather unmotivating; which means that the costs of meeting environmental objectives are included in the final price of the products produced.

Figure 33 depicts the perception of the Latvian respondents about the "understandability", "applicability" and the "economic beneficial" of the different contract solutions.

Result-based contract solution is the most understandable, applicable and the most economic beneficial for Latvian respondents. Value chain contract solution rates as the second best on all these accounts. Evaluation of land tenure solutions is similar to that of value chain. Collective agreements don't seem to be as understandable, acceptable, and economically beneficial to respondents.

Figure 34 shows that Latvian respondents have a preference in terms of future enrolment for result-based contracts; the results are consistent with the results stated above.

Figure 32. Contract features influencing Latvian respondents' willingness to adopt
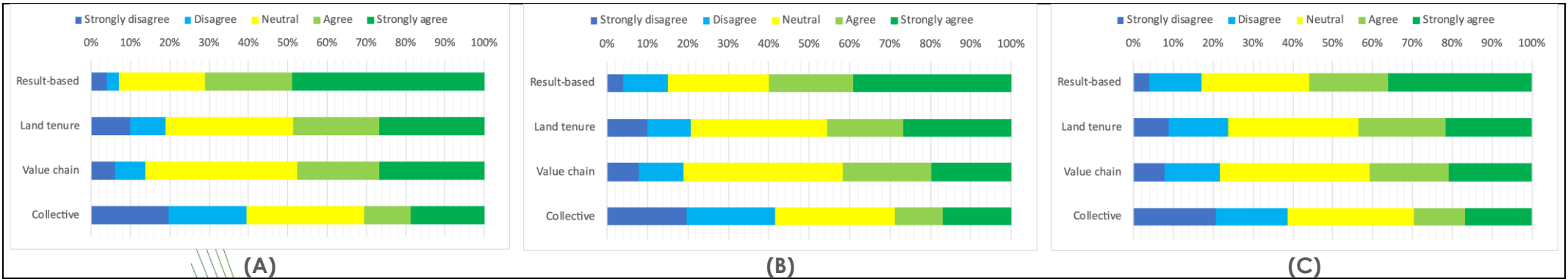
FIGURE 33. LATVIAN RESPONDENTS' PERCEPTION OF "UNDERSTANDABILITY" (A), "APPLICABILITY" (B), "ECONOMIC BENEFICIAL" (C) OF DIFFERENT CONTRACT SOLUTIONS[16]

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[16] Mean nonresponse rate: 0.25% (Figure 33 (A)); 0.25% (Figure 33 (B)); 0.25% (Figure 33 (C)).

75
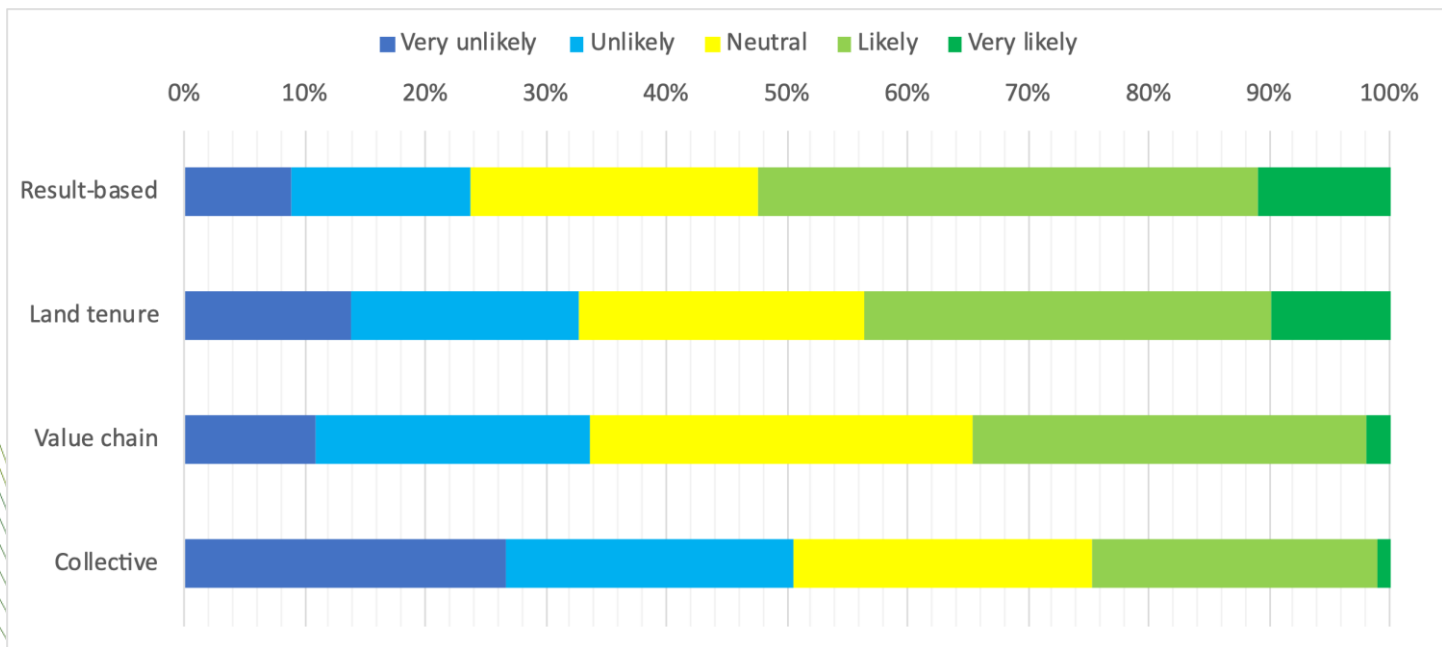
Figure 34. Latvian respondents' willingness to enrol in different contract solutions

2.4.11 Netherlands

Dutch respondents strongly prefer self-chosen measures and practices and annual compensation. Collective agreements are welcomed by over half of the respondents and result-based contract solutions are about as popular. Collective agreements are, at the same time, also seen as the least applicable and economically beneficial. Opinions about the likeliness to enrol in collective agreements are most polarized, with the highest number of respondents stating it is very unlikely that they will enrol and the highest number of respondents who deem it very likely. Value chain and result-based agreements seem slightly less attractive, but also less contested.

Figure 35. Contract features influencing Dutch respondents' willingness to adopt
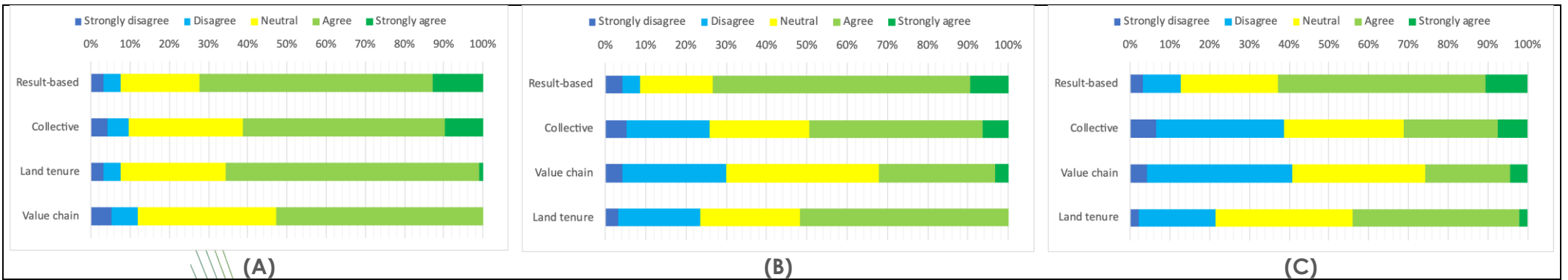
FIGURE 36. DUTCH RESPONDENTS' PERCEPTION OF "UNDERSTANDABILITY" (A), "APPLICABILITY" (B), "ECONOMIC BENEFICIAL" (C) OF DIFFERENT CONTRACT SOLUTIONS[17]

[17] Mean nonresponse rate: 12.34% (Figure 36 (A)); 12.35% (Figure 36 (B)); 12.66% (Figure 36 (C)).

79
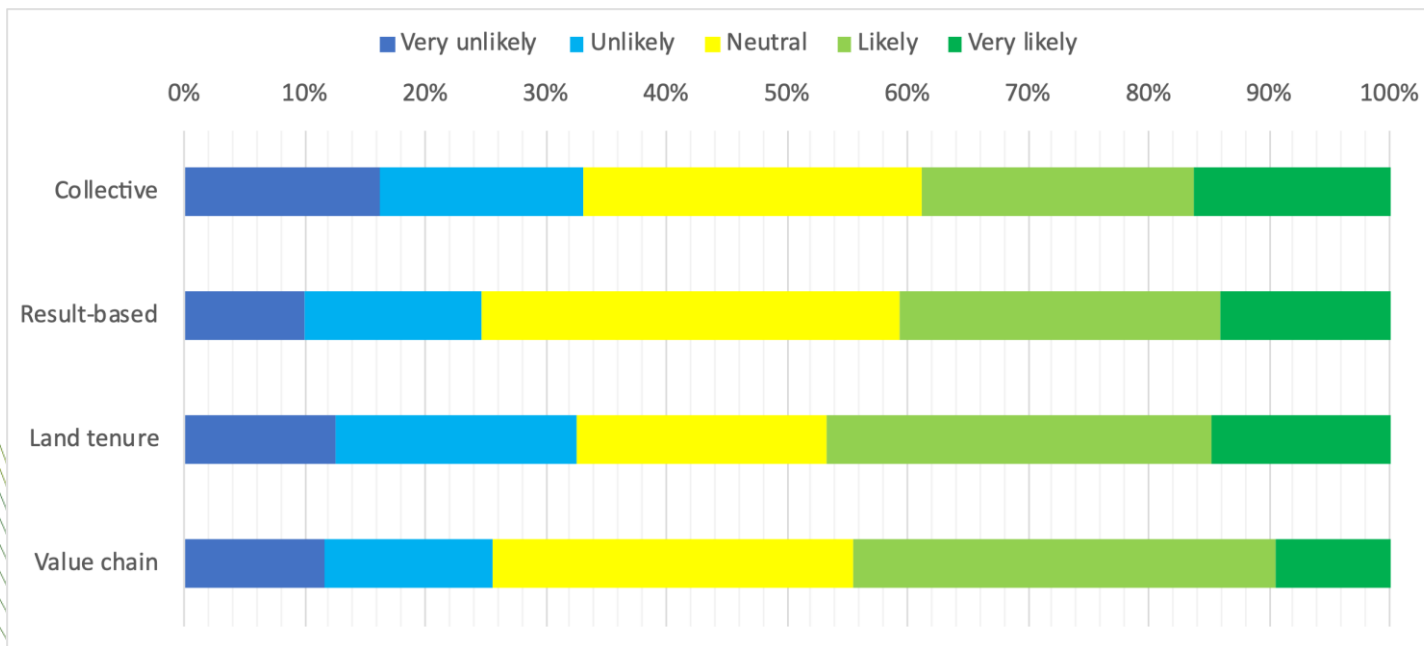
Figure 37. Dutch respondents' willingness to enrol in different contract solutions[18]

The data collection in Poland was based on online survey distributed and assisted by the extension service advisors and one environmental NGO. The questionnaire was first translated into Polish and tested in 10 farms. The LimeSurvey, was used as an online survey tool. The main survey was collected since May until July 2021, and the total 279 complete questionnaires were received (Table 1). Figure 38 shows the most important features characterizing environmental contracts with respect to the influence that they have in decreasing or increasing the acceptability of such arrangements among the Polish respondents.

Regarding the payment model (figure 38), the Polish farmers show a clear preference for an annual payment with 77% stating that this characteristic increases the willingness to participate. A "Periodical Payment" received much less approval, with only 33% of respondents declaring that it increases their willingness to participate. Characteristics typical for a results-based contract ("better results higher payment"; "self-chosen measures") significantly increase the willingness to participate by Polish farmers. Almost 80% of farmers declared that this parameter is an important incentive. Furthermore, the assurance of having a "sales guarantee" for their products and the possibility of "free training" increase considerably the contract acceptability.

Two features that are particularly important in collective contracts (namely collective agreement and common payment) were the least encouraging farmers to involve in the contract solutions. The "collective agreement" was rated by 33% of the participants as a factor that increases their willingness to participate and the "common payment", received the lowest approval of all characteristics – only 18%. This result shows reluctance of polish farmers to engage in the collective contracts. The characteristic for land tenure contracts, reduced rent for fulfilling environmental clauses, is perceived as beneficial by more than 63% of the participants, whereas "labelling" being important for the chain initiatives, was an incentive for 59% of respondents. Regarding control arrangements, Polish farmers prefer self-monitoring of environmental results (for 56% of farmers this feature increases their willingness to participate) than authority control – 43% of approval.

Figure 39 depicts the opinion of the Polish respondents about the "understandability", "applicability" and the "economic benefits" of the different contract solutions. In all three parameters result based and land tenure contracts received higher scores than value chain and collective contracts. Collective contracts do receive the lowest scorings in terms of 'understandability' (48% perceive them as such) and, above all, in relation to their 'applicability' (28% of respondents perceives them as applicable) as well as their potential economic benefits (30% of farmers see some potential economic benefits).

The figure 40, shows how likely farmers would participate in one of the contract types in the future. Similar to previous observations, the results-based contracts and land tenure arrangements were those in which farmers were most likely to participate. Ca. 70% and 62% of farmers respectively, were positive about

participation in such type of contract. For collective contracts, only about 29% of farmers think participation in the future is very likely or likely, and 46% think participation is unlikely or very unlikely. This again shows reluctance of Polish farmers towards collective contract solutions.

Figure 38. Contract features influencing Polish respondents' willingness to adopt

FIGURE 39. POLISH RESPONDENTS' PERCEPTION OF "UNDERSTANDABILITY" (A), "APPLICABILITY" (B), "ECONOMIC BENEFICIAL" (C) OF DIFFERENT CONTRACT SOLUTIONS[19]

[19] Mean nonresponse rate: 0.18% (Figure 39 (A)); 0.18% (Figure 39 (B)); 0.18% (Figure 39 (C))

84
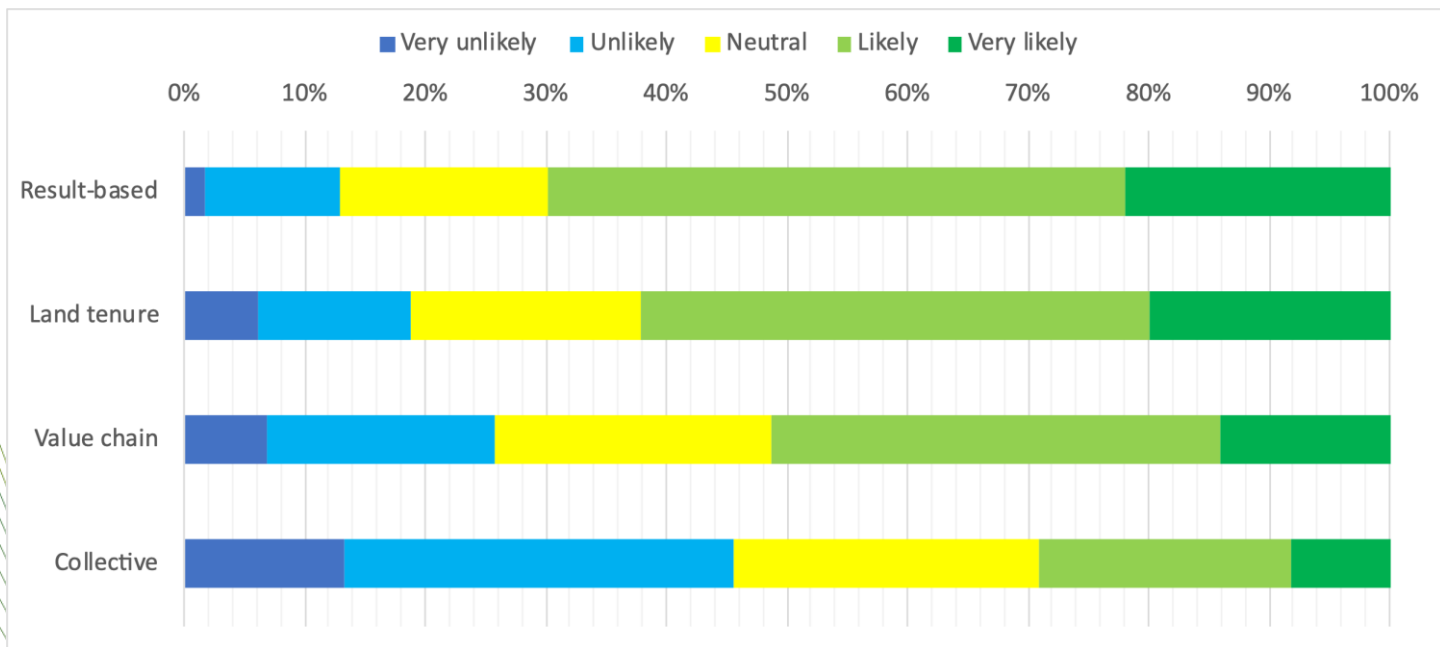
Figure 40. Polish respondents' willingness to enrol in different contract solutions

In the UK a sample of 196 land managers was procured through the survey company Qualtrics. Responses came primarily from England from arable, lowland farmers (cattle). The sample was highly educated (72% of the sample had a university degree) with a relatively young age (89% of the sample was below 50 years of age) with a lower income than the average gross UK income (approx. £96k). The sample also had significant prior experience with agri-environment schemes (AES), either through Entry-level AES or through Higher-level tier AES and current enrolment in AES (approximately 40% of UK Utilised Agricultural Land (UAA) is under some type of AES in 2020, compared to 36% of UAA in the sample). The differences with respect to age and education in the sample are common amongst Internet surveys which tend to be filled in by younger and more technologically adept individuals (Windle and Ross, 2011).

Table 3. Descriptive statistics – UK sample

	Mean (Standard Deviation)	
AGE (years)	41.36 (8.35)	
FARM_INCOME (£)	£62,535 (23,362.9)	
LAND_MANAGED (hectares)	180.87 (337.17)	
	Frequencies	
GENDER	Male = 87%	
EDUCATION	No formal qualifications = 1%	
	Secondary school = 8%	
	Vocational/professional qualification = 20%	
	College or University degree = 72%	
	Prefer not to say = 1%	
		English averages
FARMING TYPE	Arable = 12%	36%
	Dairy = 24%	9%
	Lowland livestock = 6%	30%
	Upland livestock = 9%	12%
	Mixed (arable and livestock) = 31%	8%
	Pig = 2%	2%
	Poultry = 7%	3%
	Horticulture = 8%	3%
	Other (horses) = 1%	1%

These farmers showed considerable preferences towards evidence-driven payments and schemes, with payment being reflective of produced results, as is evident from Figure 41. Larger independence through self-monitoring is desired and these findings were confirmed by the results in the subsequent section including a Choice Experiment. Nevertheless, the sample was split when it comes to considering result-based schemes (see Fig. 42) and largely neutral when considering collective schemes, reflecting current trends and findings in the UK. Similarly, UK respondents seemed rather split in the preferences when considering how applicable suggested schemes were (see Fig 43). Result-based schemes appear to be more applicable according to the land managers in the sample while collective implementation is still rather unknown to them. Collective implementation is still at its infancy in the UK, with some current trial schemes implementing as part of the new Environment Land Management Scheme Test and Trials[20].

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[20] Source: Defra (2021). What we're learning about collaboration through tests and trials. Available at: https://defrafarming.blog.gov.uk/2021/09/07/what-were-learning-about-collaboration-through-tests-and-trials/ (last accessed: 06/09/2021).
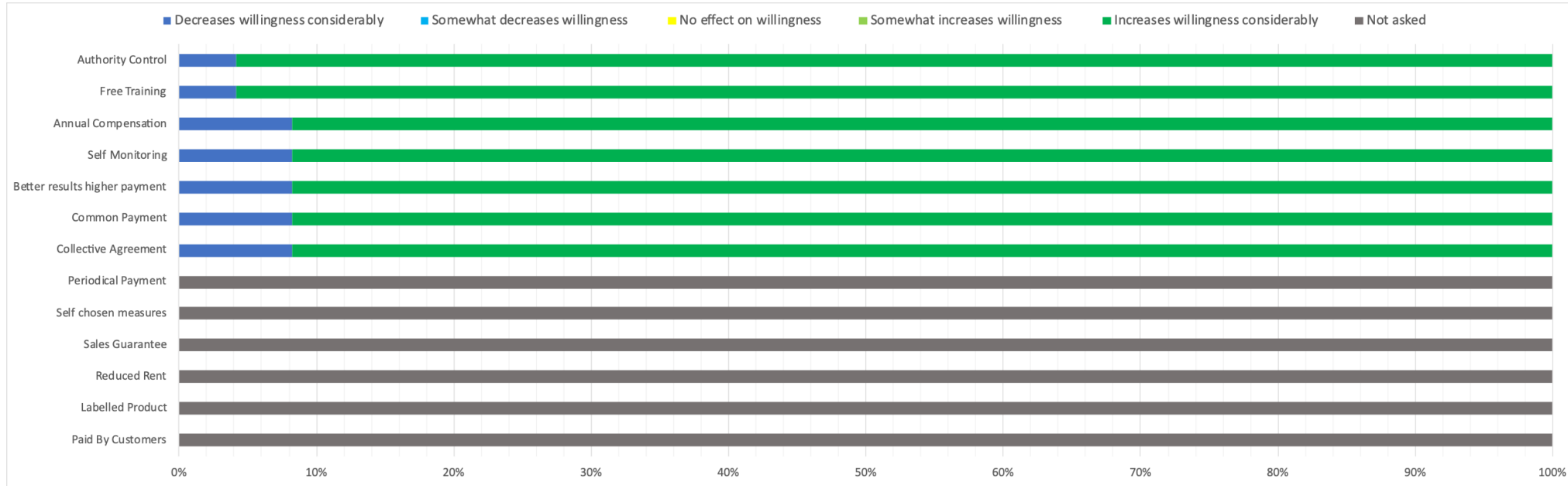
Figure 41. Contract features influencing British respondents' willingness to adopt
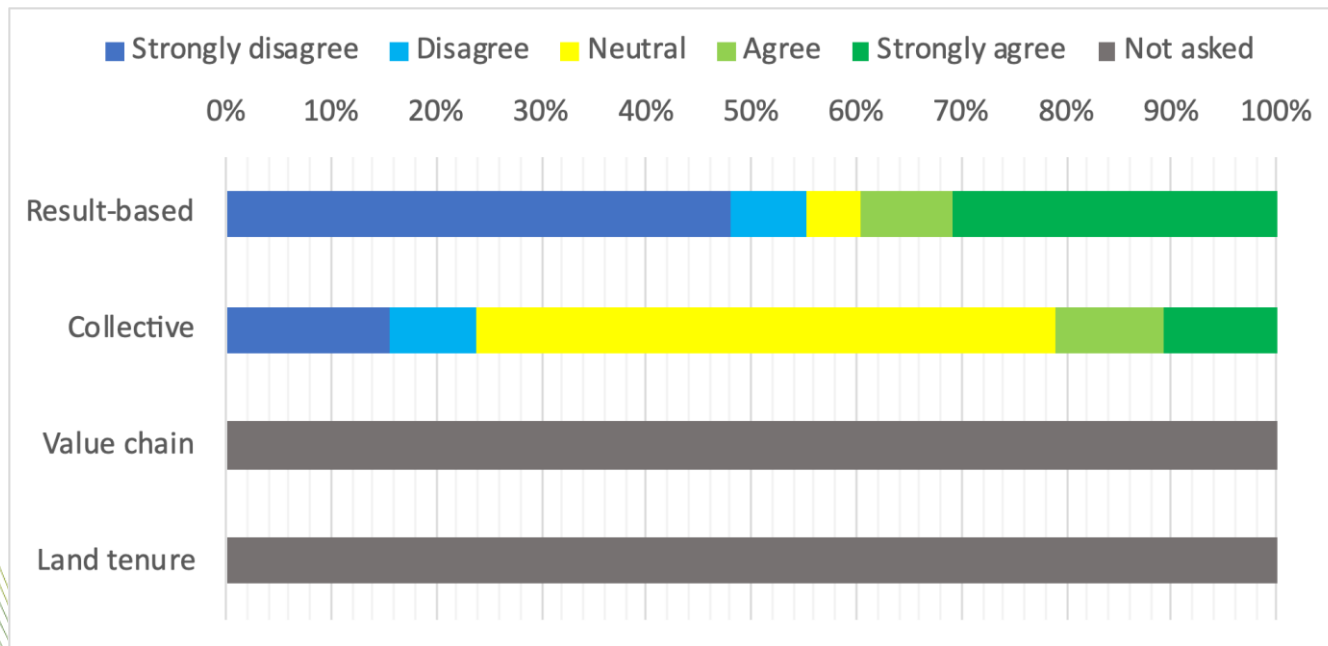
Figure 42. British respondents' perception of "applicability"
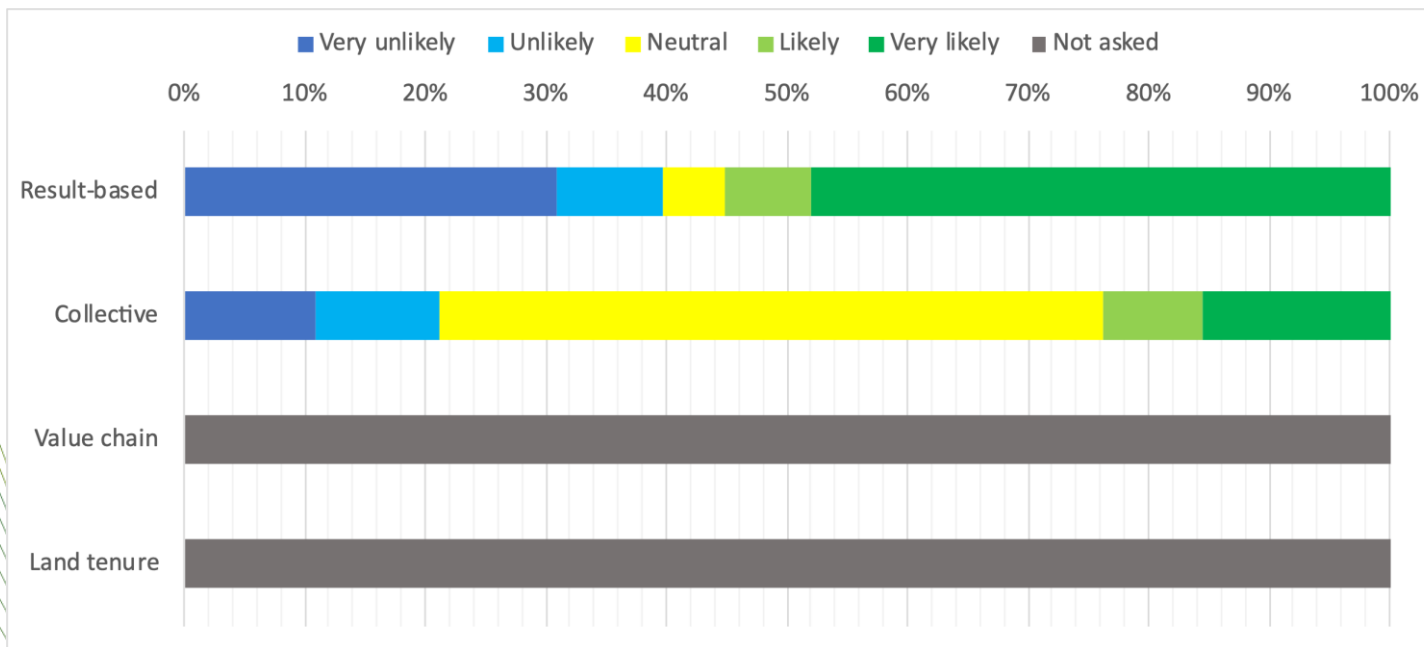
Figure 43. British respondents' willingness to enrol in different contract solutions

2.5 Whole sample contract solutions acceptability analysis

Figure 44 depicts the distribution of the respondents' perceptions about the three statements on "understandability", "applicability" and "economic beneficial" of the result-based contract solution, given the enrolment status of the holding with respect to such contract. Respondents, both those perceiving that they are and those effectively enrolled in the result-based contract solution tend to be more inclined to agree on the statements about the contract potentialities. This, in terms of the contract structure understanding easiness, as well as in terms of its applicability and economic beneficial. On the other hand, respondents who experienced the contract solution in the past or who are not enrolled in the contract are less incline to consider it easily understandable, applicable, and beneficial from the economic point of view.

Figure 45 shows the agreement of the respondents about the future willingness to enrol, given the level of agreement on the "understandability", "applicability" and "economic beneficial" statements. The distributions of the respondents' perceptions hint at the fact that there is behavioural coherence: the greater is the level of agreement with the three statements, the greater is the level of agreement on the willingness to enrol in such contract in the future.

The aforementioned trends are reflected also by the results on collective contracts, with respect to both the link between the enrolment status and the level of agreement on the three statements (see Figure 46) and the level of agreement on the "understandability", "applicability" and "economic beneficial" statements with the level of agreement related to the future willingness to enrol (Figure 47).

More polarized seem to be the perceptions about the collective contract solution. The respondents who are actually enrolled in such contract tend to have a greater propension to think that this contract solution is easily understandable, applicable and economic beneficial, compared to the respondents not enrolled or enrolled in the past (see Figure 48). This clearer distinction about the perceptions related to the contract solution characteristics and the willingness to enrol is then represented also in Figure 49, which depicts the relation about the willingness to enrol, given the level of agreement on the three statements.

Figure 50 and Figure 51 show the respondents' perception about the level of agreement on the three statements about the land tenure contract type, given the enrolment status and the considerations about the willingness to enrol, given the perceptions on the "understandability", "applicability" and "economic beneficial" of the land tenure contract, respectively. In relation to this contract solution, respondents seem to be less polarized whether they are actually enrolled or have been enrolled in the past, compared to the respondents who never experienced them.
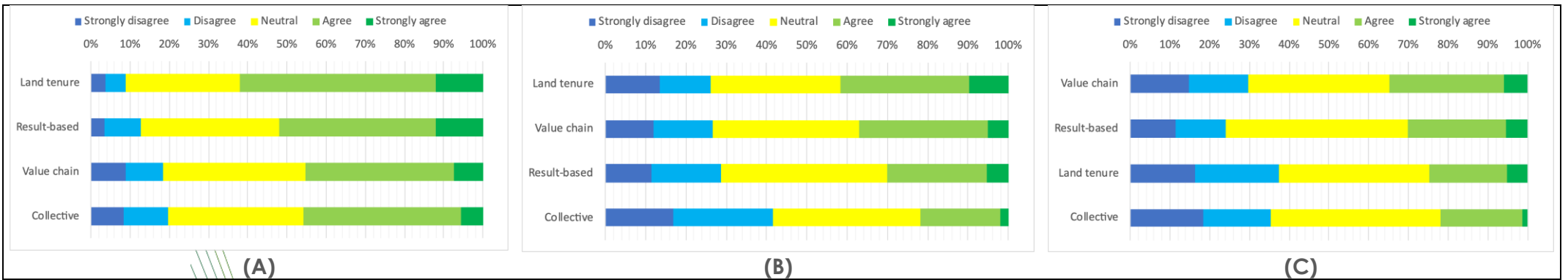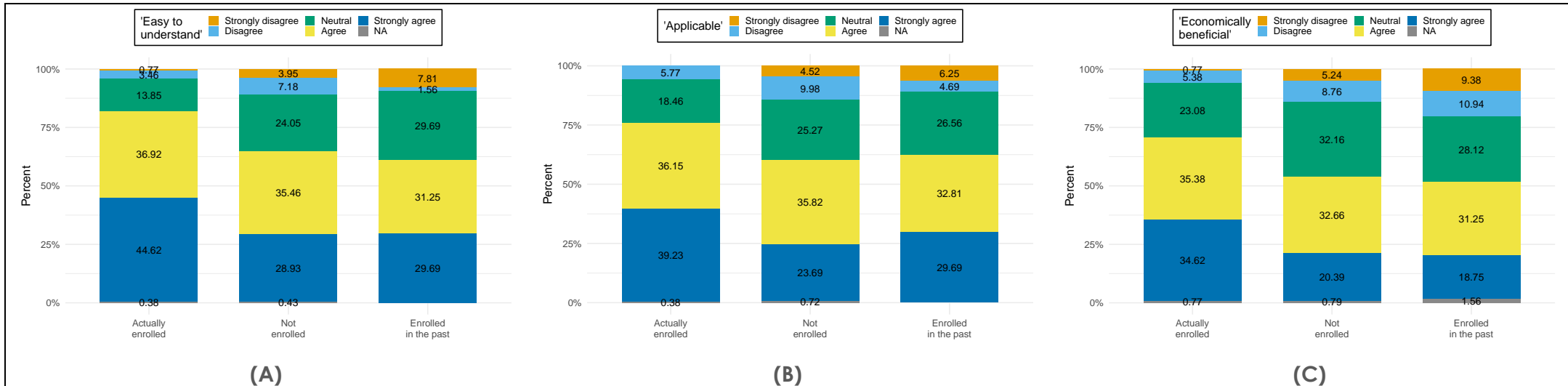
Figure 44. Respondents' perception of "understandability" (A), "applicability" (B), "economic beneficial" (C) of result-based contract, given the enrolment status[21]

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[21] The question on the previous enrolment status of the holding with respect to the result-based contract solution was not asked to the Finnish respondents (n=794), while British respondents (n=194) were asked only about the perception of "applicability" of result-based and collective contract solutions. Therefore, they are not considered here (hence, n=1,733).
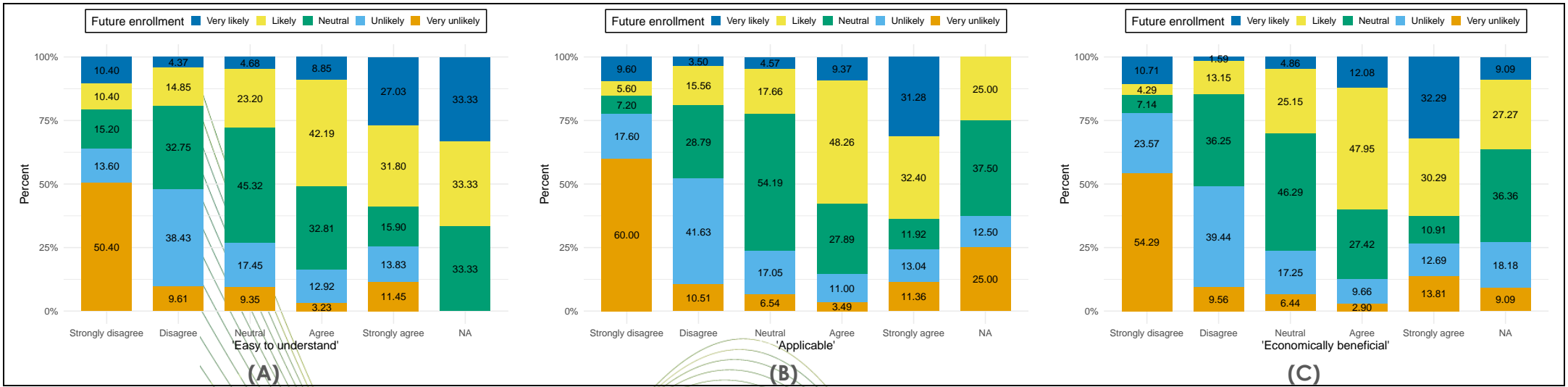
Figure 45. Respondents' willingness to enrol in result-based contracts given their perception of "understandability" (A), "applicability" (B), "economic beneficial" (C) of the contract solution[22]

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[22] The questions related to the willingness to enrol in contract solutions were asked to the 194 British respondents only with respect to result-based and collective contract solutions. Therefore, they are not considered here (hence, n=2,527).
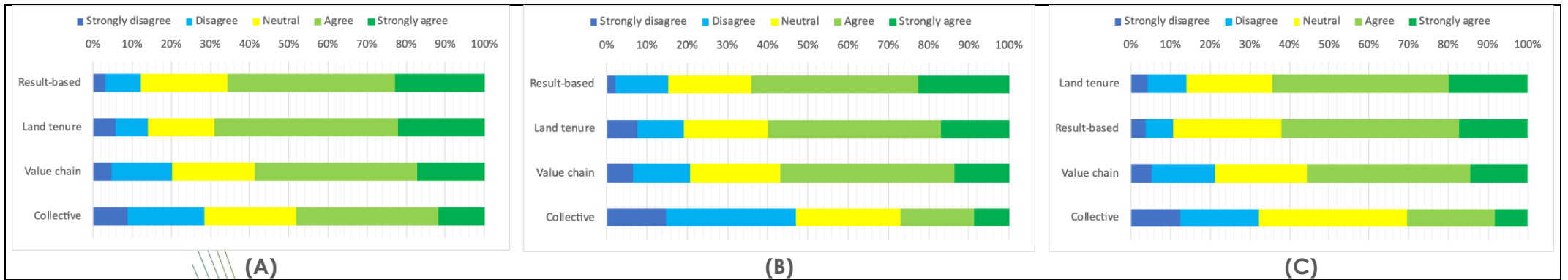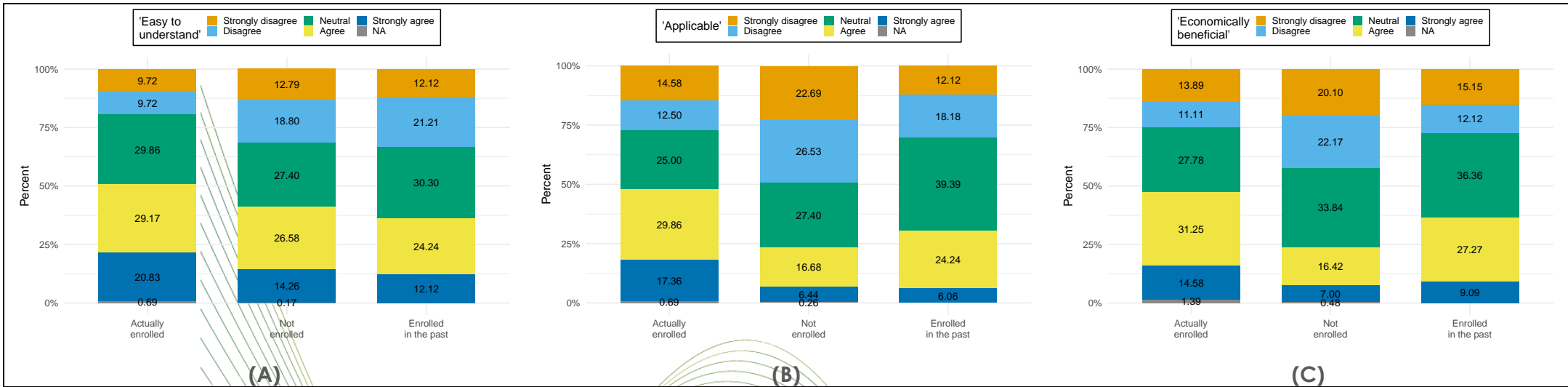
Figure 46. Respondents' perception of "understandability" (A), "applicability" (B), "economic beneficial" (C) of collective contract, given the enrolment status[23]

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[23] British respondents (n=194) were asked only about the perception of "applicability" of result-based and collective contract solutions. Therefore, they are not considered here (hence, n=2,527).
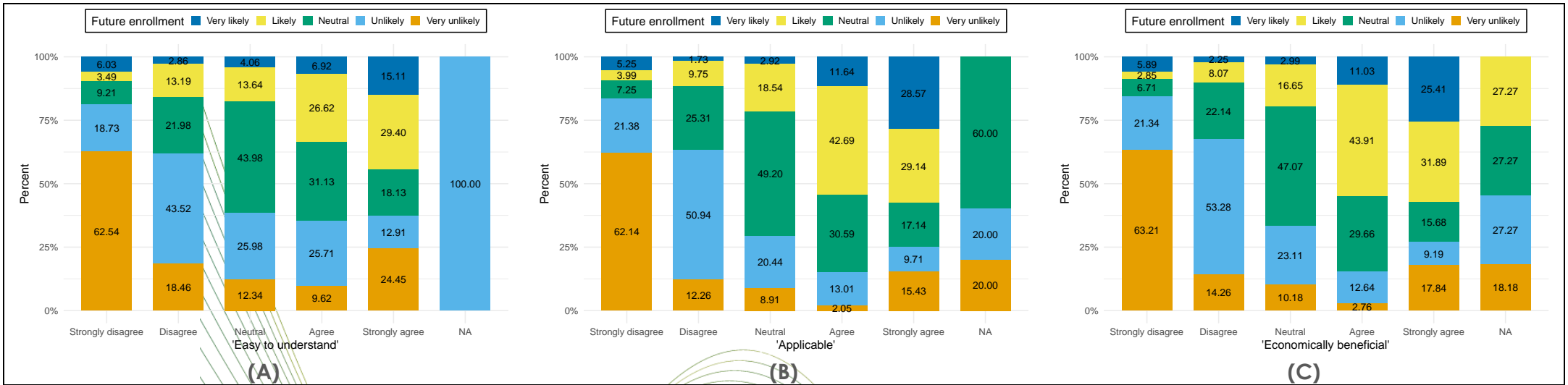
Figure 47. Respondents' willingness to enrol in collective contracts given their perception of "understandability" (A), "applicability" (B), "economic beneficial" (C) of the contract solution[24]

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[24] The questions related to the willingness to enrol in contract solutions were asked to the 194 British respondents only with respect to result-based and collective contract solutions. Therefore, they are not considered here (hence, n=2,527).
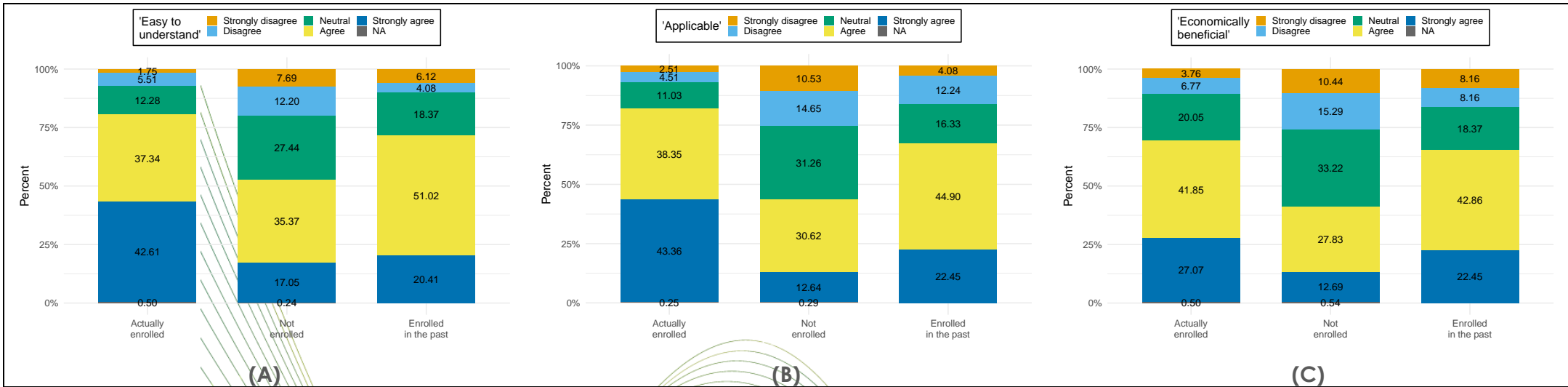
Figure 48. Respondents' perception of "understandability" (A), "applicability" (B), "economic beneficial" (C) of value chain contract, given the enrolment status[25]

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[25] British respondents (n=194) were asked only about the perception of "applicability" of result-based and collective contract solutions. Therefore, they are not considered here (hence, n=2,527).
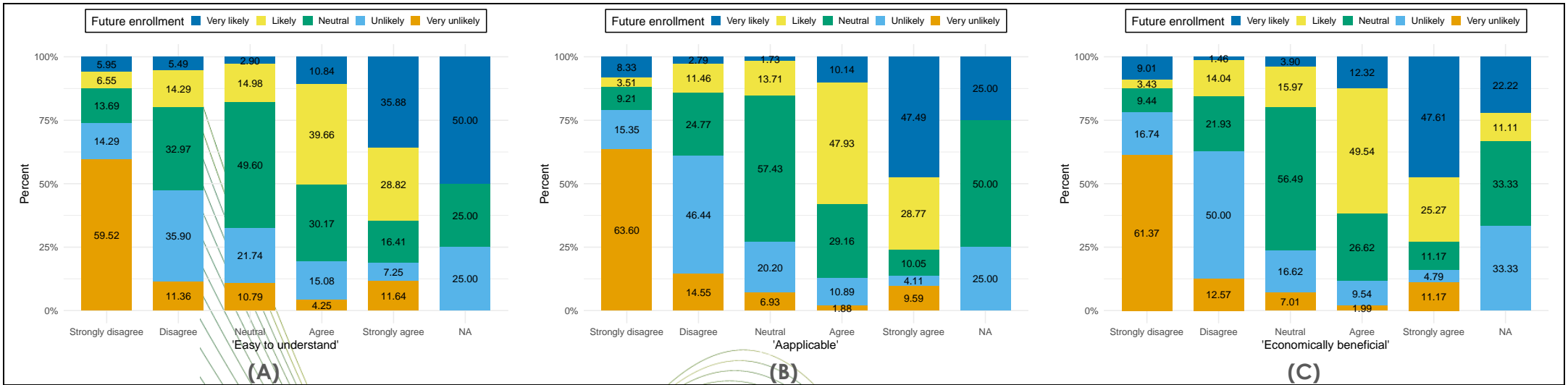
Figure 49. Respondents' willingness to enrol in value chain contracts given their perception of "understandability" (A), "applicability" (B), "economic beneficial" (C) of the contract solution[26]

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[26] The questions related to the willingness to enrol in contract solutions were asked to the 194 British respondents only with respect to result-based and collective contract solutions. Therefore, they are not considered here (hence, n=2,527).

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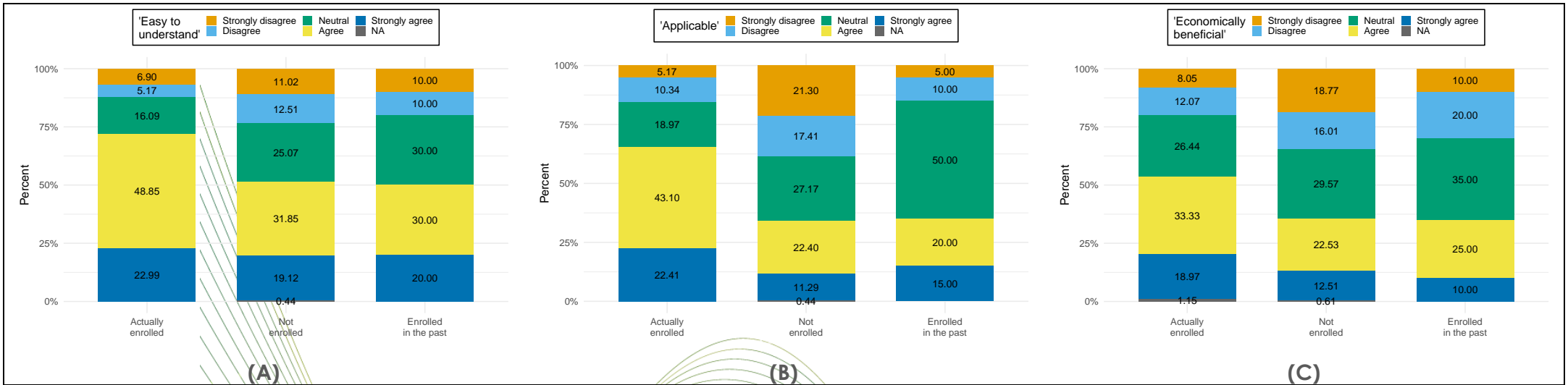
Figure 50. Respondents' perception of "understandability" (A), "applicability" (B), "economic beneficial" (C) of land tenure contract, given the enrolment status[27]

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[27] British respondents (n=194) were asked only about the perception of "applicability" of result-based and collective contract solutions. Therefore, they are not considered here (hence, n=2,527).
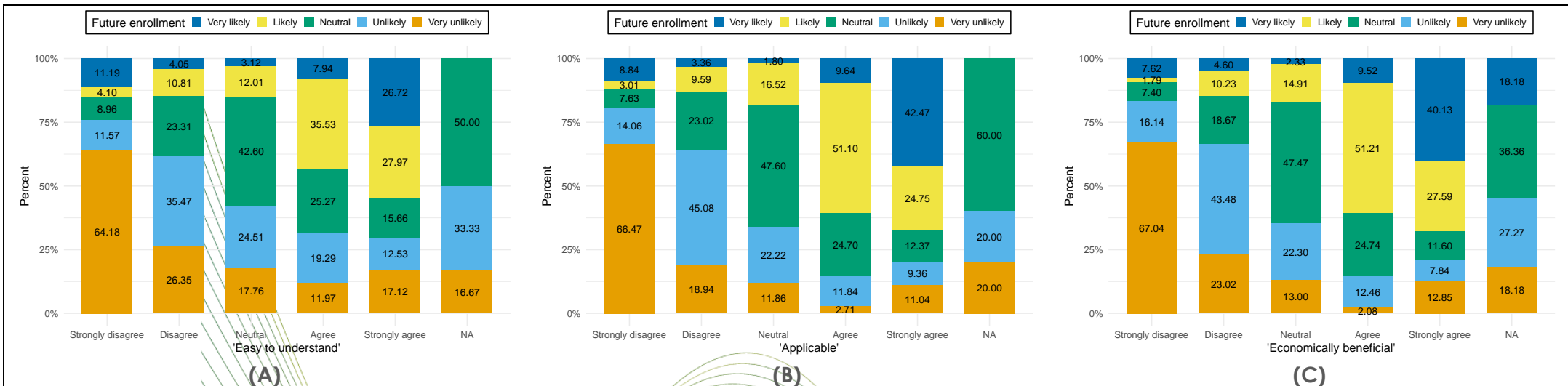
Figure 51. Respondents' willingness to enrol in land tenure contracts given their perception of "understandability" (A), "applicability" (B), "economic beneficial" (C) of the contract solution[28]

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[28] The questions related to the willingness to enrol in contract solutions were asked to the 194 British respondents only with respect to result-based and collective contract solutions. Therefore, they are not considered here (hence, n=2,527).

The Ordered Logistic Regression method (McCullagh, 1980) is applied with the purpose of further investigating the determinants that guide the land managers and forest holders towards the willingness to enrol in different contract solutions. The ordinal regression model (or proportional odds model) is an extension of the logistic model applied to dichotomous dependent variable and it is particularly suited for ordinal response variables. When the respondent is requested to answer one question by choosing among ordered levels of preference expressed, e.g., by a Likert scale (Schuman and Presser, 1981; Robinson, 1999) the ordered logit model allows to predict the response (that is then split among those levels) by different explicative variables, both qualitative and quantitative.

The latest literature in tools and schemes that can represent potential alternatives to the action-oriented agri-environmental-climate measures of the CAP hints at different factors influencing the behaviour of farmers/forest holders (and the general public) towards the aforementioned measures. Among the most recent works, the findings of Vanio et al. (2019) on the different perceptions of legitimacy, between citizens and farmers, of result-oriented versus action-oriented measures, the results of Russi et al. (2016) from an empirical study on farmers behaviour towards result-based agri-environmental measures as well as the results from White and Hanley (2016) on information solution modelling of outcome-based payments for ecosystem services, motivated the following modelling choices. One ordinal regression model per contract solution is adopted; then, in each model, the dependent ordinal variable *willingness to enrol* (asked to respondents by means of a Likert scale with the levels 1–"very unlikely", 2–"unlikely", 3–"neutral", 4–"likely", 5–"very likely"), is evaluated by means of the independent variables (predictors) listed below:

- *country*, categorical variable;
- *membership*, categorical variable indicating whether the respondent is neither a member of farmer union(s) nor of nature conservation/environmental organisation(s) (0), just a member of farmer union(s) (1), a member of both (2);
- *direct payments*, dummy variable indicating whereas the agricultural/forest holding received CAP direct payments during the previous year of management (1), or not (0);
- *rdp payments*, dummy variable indicating whereas the agricultural/forest holding received RDP payments during the previous year of management (1), or not (0);
- *specialization*, categorical variable indicating whether the holding specialization is arable, horticulture, permanent, herbivores, granivores, mixed or forestry;
- *utilized agricultural area*, continuous variable expressing the hectares of UAA;
- *organic production*, dummy variable indicating whereas the holding is organic (1) or not (0);

- *previous enrolment*, dummy variable indicating whereas the agricultural/forest holding has been already enrolled in the considered contract solution/is actually enrolled (1), or not/never been (0);
- *easy to understand*, ordinal variable indicating if the proposed contract solution is perceived as "easy to understand": 1–"strongly disagree", 2–"disagree", 3–"neutral", 4–"agree", 5–"strongly agree";
- *applicable*, ordinal variable indicating if the proposed contract solution is perceived as "applicable for the respondent's holding": 1–"strongly disagree", 2–"disagree", 3–"neutral", 4–"agree", 5–"strongly agree";
- *economically beneficial,* ordinal variable indicating if the proposed contract solution is perceived as "potentially economically beneficial for the respondent's holding": 1–"strongly disagree", 2–"disagree", 3–"neutral", 4–"agree", 5–"strongly agree".

Due to data sparsity and data consistency issues, the sample of respondents considered for the analysis do not include the respondents from Ireland (n=210), nor those from the United Kingdom (n=194). Moreover, in relation to the model on result-based contract solution, Finnish respondents (n=794) are not included neither. This, due to the fact that the question about the previous enrolment of the holding in such contract has not been asked to them. Therefore, from the initial 2,721 respondents, the potential number of observations to be considered for modelling, the information set is reduced to 1,523 for the result-based contract solution and 2,317 for collective, value chain and land tenure ones, respectively. In addition, depending on the modelling exercise, further drops in observations are due exclusively to missingness constraints.

Tables 4-7 depict the results from the models referred to result-based, collective, value chain and land tenure contract solutions, respectively. Each table shows the estimated coefficients (and the related standard errors), the confidence intervals of the estimates, the odds ratio (i.e., the exponentiated coefficients, suitable for the interpretation of the results) and the p-values with the respective statistical significance.

Considering the result-based contract solution (see Table 4), few country-level differences among the respondents do hold. For example, Polish respondents have 1.5 times the odds of being very likely (versus likely, neutral, unlikely and very unlikely) to enrol in such a contract solution, compared to the other respondents, given that all the other variables are held constant. However, in spite of the existing differences among the perceptions of the respondents per country, the statistically significant factors that positively influence the highest level of the willingness to enrol in such a contract (versus the lower levels) are linked, mainly, to the previous enrolment status as well as to the greater agreement on the respondent's perception that the result-based contract is both applicable in the holding and potentially economically beneficial for it. Moreover, organic holdings are slightly inclined to enrol very likely (versus likely, and the lower categories) compared to the non-organic ones. Finally, farms specialized in

horticulture have 1.7 times the odds of being very likely to enrol compared to the arable farms.

Table 4. Ordered logistic regression results – Willingness to enrol in result-based contract

	Coefficient (Std. Error)	95% Confidence Interval		Odds ratio (Std. Error)	95% Confidence Interval		p-value	
Country								
Finland	–	–	–	–	–	–	–	–
Austria	-.00858 (.20444)	-.40926	.39211	.99146 (.20269)	.66414	1.48010	0.967	
Bulgaria	-4.53684 (.30850)	-5.14149	-3.93220	.01071 (.00330)	.00585	.01960	-14.71	***
Germany	-.20697 (.20547)	-.60968	.19574	.81304 (.16705)	.54352	1.2162	-1.01	
Spain	-.49978 (.27274)	-1.03432	.03478	.60667 (.16546)	.35547	1.03539	-1.83	*
France	.15836 (.31757)	-.46406	.78078	1.17159 (.37206)	.62872	2.18317	0.50	
Latvia	-.74473 (.24178)	-1.21861	-.27086	.47486 (.11481)	.29564	.76273	-3.08	**
Netherlands	-.26217 (.22784)	-.70873	.18440	.76938 (.17530)	.49227	1.20249	-1.15	
Poland	.38998 (.16854)	.05966	.72031	1.47696 (.24892)	1.06148	2.05507	2.31	**
Membership								
Farmers union(s)	.08402 (.12830)	-.16745	.33549	1.08765 (.13955)	.84582	1.39862	0.65	
Both farmers union(s) and nature conservation organization(s)	.27823 (.17901)	-.07262	.62908	1.32080 (.23643)	.92996	1.87589	1.55	
Direct payments[1]	.05612 (.16920)	-.27551	.38775	1.05772 (.17897)	.75918	1.47367	0.33	
RDP payments[1]	-.18109 (.11828)	-.41291	.05073	.83436 (.09869)	.66172	1.05204	-1.53	
Specialization								
Horticulture	.54550 (.26379)	.02848	1.06251	1.72547 (.45516)	1.02889	2.89363	2.07	**
Permanent	-.09058 (.17653)	-.43658	.25541	.91340 (.16125)	.64624	1.29110	-0.51	
Herbivores	.00041 (.15329)	-.30004	.30086	1.00041 (.15336)	.74079	1.35103	0.00	
Granivores	-.09098 (.33947)	-.75633	.57437	.91304 (.30995)	.46939	1.77601	-0.27	
Mixed	.09131 (.16176)	-.22574	.40835	1.09560 (.17722)	.79793	1.50433	0.56	
Forestry	.10556 (.34879)	-.57805	.78917	1.11133 (.38762)	.56099	2.20157	0.30	
Utilized agricultural area[2]	.00006 (.00009)	-.00012	.00024	1.00006 (.00009)	.99988	1.00024	0.66	
Organic production[1]	-.23006 (.13483)	-.49432	.03420	.79449 (.10712)	.60998	1.03479	-1.71	*
Previous enrolment[1]	.58172 (.15961)	.26889	.89456	1.78912 (.28557)	1.30851	2.44626	3.64	***
Easy to understand								
Disagree	-.50828 (.41782)	-1.32719	.31063	.60153 (.25133)	.26522	1.36428	-1.22	
Neutral	-.24875 (.38024)	-.99401	.49651	.77978 (.29650)	.37009	1.64297	-0.65	
Agree	.13791 (.38073)	-.60832	.88412	1.14786 (.43703)	.54426	2.42086	0.36	
Strongly agree	.49715 (.40486)	-.29636	1.29065	1.64403 (.66560)	.74352	3.63516	1.23	
Applicable								
Disagree	1.27247 (.39105)	.50602	2.03892	3.56967 (1.39593)	1.65868	7.68234	3.25	***
Neutral	1.66056 (.39489)	.88658	2.43454	5.26225 (2.07803)	2.42682	11.41053	4.21	***
Agree	2.25944 (.40377)	1.46805	3.05082	9.57768 (3.86722)	4.34077	21.13261	5.60	***
Strongly agree	2.66752 (.44135)	1.80248	3.53256	14.40417 (6.35733)	6.06467	34.21126	6.04	***
Economically beneficial								
Disagree	1.07346 (.35887)	.37009	1.77683	2.92548 (1.04986)	1.44786	5.91106	2.99	**
Neutral	1.65520 (.35103)	.96720	2.34320	5.23413 (1.83731)	2.63058	10.41450	4.72	***
Agree	2.34635 (.36607)	1.62887	3.06383	10.44738 (3.82445)	5.09812	21.40940	6.41	***
Strongly agree	2.85825 (.40426)	2.06591	3.65060	17.43100 (7.04674)	7.89244	38.49755	7.07	***
Number of observations							1,344	
Chi-squared (33)							658.11	***
Pseudo-R[2]							0.171	

Note: [1] Dummy variable (0= No, 1= Yes). [2] UAA (in hectares). Statistical significance: '***': 0.01; '**': 0.05; '*': 0.1.

In relation to collective contracts (see Table 5), country-level differences among respondents' behaviour are more relevant than the ones holding for the result-based contracts. Moreover, being member of farmers union(s) results in having 1.2 times the odds of being very likely (versus likely, and the lower categories) to enrol in such a contract, compared to the land managers and forest holders not being member of any farmers union(s), given that all the other variables are held constant. In addition, being member of both farmers union(s) and nature conservation organization(s) results in having 2.3 times the odds of being very

likely (versus likely, and the lower categories) to adopt a collective contract. As per the result-based contract solution, organic production positively influences the willingness to enrol, while the previous enrolment status has a greater influence on it. Statistically significant factors that positively influence the increase in the willingness to enrol in such a contract are linked then to the respondent's perception that the contract solution is both applicable in the holding and potentially economically beneficial. Agreeing with the fact that the collective contract is easy to understand also positively influences the willingness to "very likely" enrol.

Table 5. Ordered logistic regression results – Willingness to enrol in collective contract

	Coefficient (Std. Error)	95% Confidence Interval		Odds ratio (Std. Error)	95% Confidence Interval		p-value	
Country								
Finland	-.50824 (.17679)	-.85475	-.16173	.60155 (.10635)	.42539	.85067	-2.87	***
Austria	-.62016 (.21160)	-1.03489	-.20543	.53786 (.11381)	.35527	.81430	-2.93	***
Bulgaria	-.30247 (.25831)	-.80875	.20382	.73899 (.19089)	.44541	1.22608	-1.17	
Germany	-.74251 (.20840)	-1.15097	-.33405	.47592 (.09918)	.31633	.71602	-3.56	***
Spain	-.53650 (.28921)	-1.10334	.03033	.58479 (.16913)	.33176	1.03080	-1.86	*
France	-.31582 (.32269)	-.94827	.31664	.72919 (.23530)	.38741	1.37251	-0.98	
Latvia	-.74473 (.24178)	-1.32296	-.37661	.42751 (.10321)	.26635	.68618	-3.52	***
Netherlands	-.47122 (.23545)	-.93270	-.00975	.62424 (.14698)	.39349	.99030	-2.00	**
Poland	-.13269 (.16742)	-.46083	.19544	.87573 (.14661)	.63076	1.21585	-0.79	
Membership								
Farmers union(s)	.19439 (.11961)	-.04004	.42882	1.21457 (.14527)	.96075	1.53544	1.63	*
Both farmers union(s) and nature conservation organization(s)	.82722 (.18116)	.47216	1.18227	2.28694 (.41429)	1.60345	3.26178	4.57	***
Direct payments[1]	.24508 (.16906)	-.08627	.57644	1.27773 (.21601)	.91735	1.77969	1.45	
RDP payments[1]	-.15895 (.11819)	-.39060	.07269	.85304 (.10082)	.67665	1.07540	-1.34	
Specialization								
Horticulture	-.17726 (.25013)	-.66750	.31299	.83756 (.20950)	.51299	1.36751	-0.71	
Permanent	-.01049 (.15672)	-.31765	.29667	.98957 (.15508)	.72786	1.34537	-0.07	
Herbivores	-.12245 (.14561)	-.40785	.16294	.88475 (.12883)	.66508	1.17697	-0.84	
Granivores	-.02143 (.29003)	-.58989	.54702	.97879 (.28388)	.55439	1.72810	-0.07	
Mixed	-.17547 (.15554)	-.48032	.12939	.83907 (.13051)	.61858	1.13814	-1.13	
Forestry	-.24310 (.37864)	-.98521	.49902	.78420 (.29693)	.37336	1.64710	-0.64	
Utilized agricultural area[2]	.00003 (.00009)	-.00014	.00021	1.00003 (.00009)	.99986	1.00021	0.38	
Organic production[1]	.37672 (.12124)	.13909	.61435	1.45749 (.17671)	1.14922	1.84846	3.11	***
Previous enrolment[1]	1.78797 (.22367)	1.34958	2.2263	5.97728 (1.3369)	3.85581	9.26597	7.99	***
Easy to understand								
Disagree	.35451 (.22814)	-.09264	.80166	1.42548 (.32521)	.91153	2.22924	1.55	
Neutral	.28816 (.22565)	-.15410	.73042	.33398 (.30101)	.85719	2.07596	1.28	
Agree	.40544 (.22602)	-.03757	.84844	1.49996 (.33903)	.96313	2.33599	1.79	*
Strongly agree	.51272 (.25214)	.01852	1.00691	1.66982 (.42103)	1.01870	2.73713	2.03	**
Applicable								
Disagree	1.12590 (.21469)	.70511	1.54669	3.08298 (.66189)	2.02406	4.69588	5.24	***
Neutral	1.74158 (.23232)	1.28623	2.19692	5.70633 (1.32571)	3.61912	8.99727	7.50	***
Agree	2.62486 (.25815)	2.11890	3.13082	13.80265 (3.56314)	8.32197	22.89282	10.17	***
Strongly agree	2.41542 (.39445)	1.64231	3.18853	11.19446 (4.41567)	5.16708	24.25273	6.12	***
Economically beneficial								
Disagree	1.07919 (.22252)	.64307	1.51531	2.94230 (.65471)	1.90231	4.55084	4.85	***
Neutral	1.86687 (.23089)	1.41433	2.31942	6.46805 (1.49344)	4.11373	10.16976	8.09	***
Agree	2.49239 (.26149)	1.97987	3.00490	12.09009 (3.16145)	7.24182	20.18419	9.53	***
Strongly agree	3.34874 (.38961)	2.58511	4.11236	28.46678 (11.09101)	13.26477	61.09097	8.60	***
Number of observations							1,660	
Chi-squared (34)							1205.10 ***	
Pseudo-R[2]							0.240	

Note: [1] Dummy variable (0= No, 1= Yes). [2] UAA (in hectares). Statistical significance: '***': 0.01; '**': 0.05; '*': 0.1.

The willingness to enrol in value chain contracts (see Table 6) is significantly influenced by the farmers' membership; indeed, the odds of union(s) members of being very likely (versus likely, neutral, unlikely and very unlikely) to enrol in such contract are 1.4 greater than non-member farmers, given that all the other variables are held constant. In addition to the positive influence that adopting the organic production and being previously enrolled in such contract have on the increase in the willingness to enrol, a greater willingness is relevantly linked to the respondent's perception that the contract solution is both applicable in the holding and potentially economically beneficial for it. Another statistically significant determinant is represented by the hectares of utilized agricultural area; one unit increase determines slightly greater odds of willing to enrol very likely, versus the lower categories of the response variable.

Table 6. Ordered logistic regression results – Willingness to enrol in value chain contract

	Coefficient (Std. Error)	95% Confidence Interval		Odds ratio (Std. Error)	95% Confidence Interval		p-value	
Country								
Finland	-.62661 (.18543)	-.99005	-.26317	.53440 (.09909)	.37156	.76861	-3.38	***
Austria	.01629 (.20939)	-.39411	.42669	1.01642 (.21283)	.67428	1.53218	0.08	
Bulgaria	-.59832 (.27341)	-1.13419	-.06246	.54973 (.15030)	.32168	.93945	-2.19	**
Germany	-.08624 (.21711)	-.51177	.33930	.91738 (.19918)	.59943	1.40396	-0.40	
Spain	-.21836 (.28819)	-.78321	.34649	.80384 (.23166)	.45694	1.41409	-0.76	
France	.05851 (.32980)	-.58788	.70491	1.06026 (.34967)	.55550	2.02367	0.18	
Latvia	-.86869 (.23886)	-1.33685	-.40053	.41950 (.10020)	.26267	.66997	-3.64	***
Netherlands	-.03241 (.24296)	-.50861	.44378	.96811 (.23521)	.60133	1.55859	-0.13	
Poland	.12902 (.18134)	-.22639	.48444	1.13772 (.20631)	.79741	1.62326	0.71	
Membership								
Farmers union(s)	.30376 (.12184)	.06494	.54253	1.35491 (.16508)	.84582	1.39862	2.49	**
Both farmers union(s) and nature conservation organization(s)	.05925 (.18332)	-.30004	.41855	1.32080 (.23643)	.92996	1.87589	0.32	
Direct payments[1]	.45210 (.17325)	.11254	.79165	1.05772 (.17897)	.75918	1.47367	2.61	***
RDP payments[1]	-.31945 (.12149)	-.55757	-.08134	1.06104 (.19451)	.74079	1.51975	-2.63	***
Specialization								
Horticulture	.32039 (.25718)	-.18367	.82446	1.37767 (.35431)	.83221	2.28065	1.25	
Permanent	-.04113 (.15916)	-.35308	.27082	.95970 (.15275)	.70252	1.31104	-0.26	
Herbivores	-.16780 (.14631)	-.45456	.11896	.84552 (.12371)	.63473	1.12633	-1.15	
Granivores	.18540 (.28810)	-.37927	.75007	1.2037 (.34679)	.68436	2.11715	0.64	
Mixed	-.03284 (.15878)	-.34405	.27837	.96769 (.15365)	.70889	1.32098	-0.21	
Forestry	.03476 (.35411)	-.65929	.72880	1.03537 (.36663)	.51722	2.07259	0.10	
Utilized agricultural area[2]	.00021 (.00009)	.00003	.00039	1.00021 (.00009)	1.00003	1.00039	2.32	**
Organic production[1]	.28125 (.12272)	.04071	.52178	1.32478 (.16258)	1.04155	1.68502	2.29	**
Previous enrolment[1]	1.62698 (.15323)	1.32666	1.92730	5.08849 (.77970)	3.76843	6.87094	10.62	***
Easy to understand								
Disagree	.34654 (.32322)	-.28695	.98004	1.41418 (.45708)	.75055	2.66456	1.07	
Neutral	.19546 (.30433)	-.40101	.79193	1.21587 (.37002)	.66965	2.20765	0.64	
Agree	.46045 (.30199)	-.13144	1.05234	1.58478 (.47859)	.87683	2.86434	1.52	
Strongly agree	.41674 (.32208)	-.21452	1.04801	1.51702 (.48860)	.80693	2.85196	1.29	
Applicable								
Disagree	.71959 (.34954)	.03451	1.40468	2.05360 (.71782)	1.03511	4.07423	2.06	**
Neutral	1.23993 (.36804)	.51860	1.96127	3.45538 (1.27170)	1.67967	7.10834	3.37	***
Agree	1.89137 (.38119)	1.14426	2.63849	6.62846 (2.52669)	3.14011	13.99202	4.96	***
Strongly agree	2.90988 (.42770)	2.07161	3.74816	18.35462 (7.85031)	7.93752	42.44302	6.80	***
Economically beneficial								
Disagree	1.20090 (.34102)	.53252	1.86928	3.32309 (1.13323)	1.70321	6.48361	3.52	***
Neutral	2.12011 (.35139)	1.43141	2.80882	8.33206 (2.92777)	4.18458	16.59026	6.03	***
Agree	3.04740 (.36538)	2.33126	3.76353	21.06041 (7.69513)	10.29086	43.10048	8.34	***
Strongly agree	3.66121 (.40901)	2.85959	4.46283	38.90848 (15.91350)	17.45437	86.73298	8.95	***
Number of observations							1,657	
Chi-squared (34)							1339.51	***
Pseudo-R[2]							0.268	

Note: [1] Dummy variable (0= No, 1= Yes). [2] UAA (in hectares). Statistical significance: '***': 0.01; '**': 0.05; '*': 0.1.

Table 7 depicts the results related to land tenure contract solutions. The odds of union(s) members of being very likely to enrol in such contracts (versus likely, and the lower categories) are 1.2 greater than non-member farmers, given that all the other variables are held constant. In addition, having received direct payments in the previous year, as well as the organic production do influence the willingness to enrol. Respondents from holdings that were previously enrolled in such land tenure contracts have 2.7 times the odds of being very likely (versus likely, and the lower categories), compared to land managers and forest holders who did not enrol in the past, given that all the other variables are held constant. In line with the results of the aforementioned models, the increase in the willingness to enrol is relevantly linked to the respondent's perception that the contract solution is both applicable in the holding and potentially economically beneficial for it. Finally, statistically significant differences exist among the holdings' specializations.

Table 7. Ordered logistic regression results – Willingness to enrol in land tenure contract

	Coefficient (Std. Error)	95% Confidence Interval		Odds ratio (Std. Error)	95% Confidence Interval		p-value	
Country								
Finland	-.95553 (.17562)	-1.29974	-.61131	.38461 (.06755)	.27260	.54264	-5.44	***
Austria	-.39994 (.20433)	-.80041	.00054	.67036 (.13697)	.44914	1.0005	-1.96	**
Bulgaria	-1.36654 (.26332)	-1.8826	-.85045	.25499 (.06714)	.15219	.42722	-5.19	***
Germany	-.21471 (.21031)	-.62691	.19748	.80677 (.16967)	.53424	1.21833	-1.02	
Spain	-.38453 (.29178)	-.95640	.18734	.68077 (.19863)	.38427	1.20604	-1.32	
France	-1.08438 (.32558)	-1.72251	-.44626	.33811 (.11008)	.17862	.64002	-3.33	***
Latvia	-.52952 (.23602)	-.99211	-.06694	.58889 (.13899)	.37079	.93525	-2.24	**
Netherlands	.01825 (.23581)	-.44393	.48043	1.01842 (.24015)	.64151	1.61677	0.08	
Poland	.19902 (.16905)	-.13230	.53035	1.22021 (.20627)	.87608	1.69952	1.18	
Membership								
Farmers union(s)	.20722 (.11881)	-.02564	.44008	1.23025 (.14616)	.97468	1.55283	1.74	*
Both farmers union(s) and nature conservation organization(s)	.28487 (.17573)	-.05957	.62930	1.32958 (.23365)	.94217	1.87629	1.62	
Direct payments[1]	.33204 (.16597)	.00674	.65733	1.39380 (.23133)	1.00676	1.92964	2.00	**
RDP payments[1]	-.02233 (.11946)	-.25647	.21180	.97791 (.11682)	.77378	1.23590	-0.19	
Specialization								
Horticulture	.02121 (.24683)	-.46257	.50499	1.02144 (.25212)	.62966	1.65697	0.09	
Permanent	-.47185 (.15685)	-.77927	-.16442	.62385 (.09785)	.45874	.84838	-3.01	***
Herbivores	.04757 (.14454)	-.23572	.33086	1.04872 (.15158)	.79000	1.39217	0.33	
Granivores	.18607 (.27692)	-.35667	.72882	1.20451 (.33355)	.70000	2.07263	0.67	
Mixed	-.30891 (.15552)	-.61373	-.00410	.73424 (.11419)	.54133	.99591	-1.99	**
Forestry	-.54058 (.35132)	-1.22916	.14799	.58241 (.20461)	.29254	1.15950	-1.54	
Utilized agricultural area[2]	.00005 (.00009)	-.00012	.00022	1.00005 (.00009)	.99988	1.00022	0.61	
Organic production[1]	.09296 (.12040)	-.14302	.32895	1.09742 (.13213)	.86673	1.38951	0.77	***
Previous enrolment[1]	.98885 (.16673)	.66207	1.31563	2.68813 (.44818)	1.93880	3.72708	5.93	***
Easy to understand								
Disagree	.38262 (.29525)	-.19605	.96129	1.46611 (.43287)	.82197	2.61507	1.30	
Neutral	.34494 (.28911)	-.22170	.91158	1.41191 (.40819)	.80116	2.48826	1.19	
Agree	.37910 (.28552)	-.18052	.93871	1.14786 (.41714)	.83484	2.55668	1.33	
Strongly agree	.80485 (.30811)	.20096	1.40873	2.23635 (.68904)	1.22258	4.09076	2.61	***
Applicable								
Disagree	.67633 (.24099)	.20400	1.14867	1.96665 (.47395)	1.22630	3.15399	2.81	***
Neutral	1.19205 (.25648)	.68936	1.69475	3.29384 (.84481)	1.99243	5.44529	4.65	***
Agree	1.93259 (.25815)	1.40657	2.45860	6.90737 (1.85380)	4.08195	11.68848	7.20	***
Strongly agree	2.63680 (.32922)	1.99154	3.28206	13.96842 (4.59872)	7.32677	26.63065	8.01	***
Economically beneficial								
Disagree	.93622 (.24708)	.45195	1.42050	2.55033 (.63014)	1.57137	4.13918	3.79	**
Neutral	1.56056 (.25957)	1.05182	2.06931	4.76150 (1.23594)	2.86284	7.91934	6.01	***
Agree	2.46701 (.27634)	1.92539	3.00864	11.78720 (3.25731)	6.85784	20.25977	8.93	***
Strongly agree	3.00796 (.33727)	2.34693	3.66898	20.24595 (6.82826)	10.45339	39.21201	8.92	***

Number of observations	1,651
Chi-squared (34)	1160.18 ***
Pseudo-R^2	0.228

Note: [1] Dummy variable (0= No, 1= Yes). [2] UAA (in hectares). Statistical significance: '***': 0.01; '**': 0.05; '*': 0.1.

2.6 Conclusions

The main aim of the landowner survey was to investigate the acceptance and the farmers/forest owners' behaviour towards the contract solutions proposed in WP1 from the potential contractors.

The final number of observations presenting a completed questionnaire is 2,721. The majority of respondents in the sample come from Finland (794 individual, split between farmers and foresters), followed by Italy (399) and Poland (279), down to Bulgaria and Spain that have a number of respondents that completed the questionnaire equal to 96 and 60 observations, respectively.

Beyond the peculiar socio-demographic characteristics that differentiate the respondents in each country and the peculiarities of their agricultural/forest holdings, the land managers and forest owners interviewed, generally, showed a preference for result-based and, secondly, value chain contract solutions. Indeed, these contract solutions are perceived as both easier understandable and easier applicable in their holdings, as well as more economically beneficial (at least potentially). In contrast, land tenure and collective contract solutions are considered less easy understandable, applicable, and less economically beneficial for the holdings. These perceptions related to the main features of the contract solutions are reflected also by the levels of the willingness to enrol in the proposed contract solutions in the future.

Considering the individual, specific features potentially characterising a contract solution, annual compensation, technical assistance/training offered to the farmers/forests' owners by the authority as well as the flexibility in determining the measures to adopt within the contract, and the idea that better results bring higher payment, are among the most appreciated characteristic that a contract solution should have. Instead, characteristics that are considered as less relevant are the payment to be shared within a group and its periodical nature.
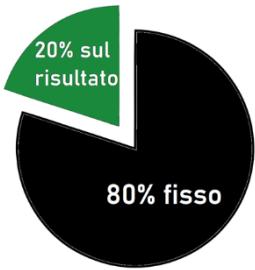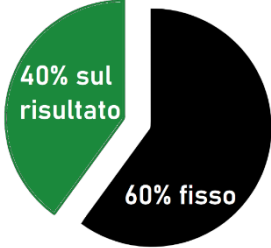
Finally, previous enrolment and/or previous knowledge of the contract solutions as well as a higher agreement with the statements on acceptability, generally, do hint at higher propension towards the contract evaluation.

3 Case studies focus: results from additional analysis
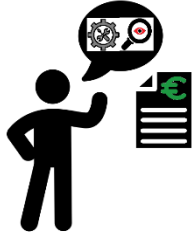
3.1.1 Italy – Emilia-Romagna Region

In the first interview there was an opportunity to voluntary leave the e-mail for being contacted to take part in an additional survey. About 100 of farmers were contacted again for a Choice Experiment (details in the table 8). The aim was to deeper investigate about the preference of features of contract focused on increase the soil organic matter. The respondents were only 25 that make not possible a robust and representative analysis.

Table 8. List of attributes and attribute levels of the choice experiment

Feature	Description	Option	Graphic representation
SHARE OF RESULT-BASED PAYMENT	Each year, the payment can be fixed, or a percentage of the payment can be calculated in proportion to the environmental result achieved, based on the measurement of the soil organic matter present in your farm.	100% of fixed payment; no share based on the measurement of the soil organic matter.	100% fisso
		80% of fixed payment and 20% based on the measurement of soil organic matter.	20% sul risultato / 80% fisso
		60% of fixed payment and 40% based on the measurement of soil organic matter.	40% sul risultato / 60% fisso
CALCULATION OF THE RESULT-BASED PAYMENT	The calculation of the result-based can be defined by comparing the percentage of soil organic matter present in your farm	The payment is fixed and not based on the soil organic matter present in your farm	**Solo pagamento fisso**
		The share of the result-based payment is calculated by comparing with the soil organic matter in the soil of your farm	**Proporzionale all'aumento di sostanza organica misurato nella sua azienda (fino ad un MAX del 3%)**

109	with different baselines (the same farm before the contract, a predetermined target, the average value in the farms of the municipality)	before and after the contract uptake. The result-based payment is proportional to the increase in the soil organic matter, up to a maximum increase of 3%.	
		The share of the result-based payment is proportional to the 3% target of soil organic matter. The more the target of 3% is approached in your farm, the higher the payment (if soil organic matter exceeds the target no additional payment will be granted).	Proporzionale all'avvicinamento del target del 3% di sostanza organica
		The share of the result-based payment is calculated by comparing the soil organic matter in your farm after the contract uptake with the average value of soil organic matter in the farms of your municipality: The higher the percentage difference in respect to the average, the higher the	Proporzionale alla differenz di sostanza organica misurata nella sua azienda la media delle aziende del suo comune (fino ad un MAX del 3%)

		payment up to a maximum of 3%.	
TECHNICAL SUPPORT	The contract includes technical assistance both for the implementation of the contract in the farm (for example the choice and application of practices for enhancing soil organic matter) and for the measurement of the results.	No technical assistance provided	Nessuna consulenza
		Technical assistance is provided for the implementation of the contract and for the measurement of soil organic matter.	Consulenza per attuazione e monitoraggio
MAXIMUM PAYMENT PER HECTARE	The payment indicates the maximum premium per hectare for each year that is paid to the farm under the contract.	€180 per hectare for each year	180 €
		€210 per hectare for each year	210 €
		€240 per hectare for each year	240 €
		€270 per hectare for each year	270 €
		€300 per hectare for each year	300 €

3.1.2 Finland

In Finland, the choice experiment was carried out alongside with the CONSOLE's surveys on contract types for farmers and forest owners separately. The aim of the choice experiment surveys was to contribute to the knowledge on the landowners' acceptance and preferences for selected contract attributes in results-based climate mitigation programme. Thus, in the both surveys, the

choice experiment part concentrated on results-based contract type. The scenarios were developed by the Luke personnel working in the CONSOLE project. In addition, some experts were consulted on special issues, for example on carbon measurement techniques.

In the **farmer** survey's choice experiment scenario, the farmers would get payment based on the carbon stored in the soil. The survey included an information section on the soil carbon dynamics in conventional farming and information on farming practices that could be used to increase the amount of carbon sequestered in the soil. The proposed contract included a payment in the beginning of the contract period, and a payment based on the amount of the stored carbon in every fifth year. Farmer could choose the practises to increase the soil carbon themselves. The measurements would be conducted by authorities (10 measurements/ ha) without any extra cost for the farmer. If the soil carbon is at the initial measurement at the lower level than usually with conventional farming measures, the amount of carbon has to be increased to the conventional level before farmer can receive any carbon payments. On the peat soils, the carbon payment was based on the laser scanning of the field surface, so that the lowering of the surface can be detected. The farmers of the peat soils would get the carbon payment if they slow down the peat degradation and thus cut down the carbon emissions from the soil. The attributes attribute levels are presented in Table 9.

Table 9. List of attributes and attribute levels in the choice experiment for farmers

Attributes	Attribute levels
Plan for carbon farming by an expert	No plan
	Free carbon farming plan at the beginning of the contract period
	Free carbon farming plan that is updated in every five years
Length of the contract	5 years
	10 years
	15 years
Payment at the begin of the contract period	10 €/ha
	50 €/ha
	100 €/ha
Carbon payment	5 €/t
	12 €/t
	25 €/t
	37 €/t
	50 €/t

The choice experiment design was generated with Ngene software (ChoiceMetrics, 2018, 1.2.1). First version of the experiment design was an efficient design in which the priors were based on earlier literature. The choice experiment was piloted with 27 respondents. The results of the pilot were used to generate a Bayesian D-efficient design optimized for D-efficiency for the multinominal (MNL) model. The 35 choice sets were divided into five blocks, so

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each questionnaire version included six choice sets. The data collection took place in April 2021 and the data collection was carried out by market research company Taloustutkimus (cf. 2.4.2.).

For the analysis, the respondents who had chosen status quo (25% of respondents) in all choice sets and had more than two protest characteristics, were removed from the data. This reduced the data from 408 to 366 usable responses. The protesters were identified with six statements (5-point Likert scale). The statements and the percentage of respondents who somewhat or completely agreed with them are presented in the Table 10.

Table 10. Statements for protest identification and the percentages of farmers who somewhat or completely agree with the statement (n=408)

Statement	percentage of respondents
I do not trust the described carbon measurement	13
I do not want to make a contract concerning the whole estate	18
I do not want to make a long contract	30
I support the carbon payment system for landowners, but not such system that was presented in this survey	9
Change in the ownership in near future made it difficult to commit to the contract	9
I could not estimate the impact of certain measures on the expected carbon payments	14

In the preliminary analysis, we used fixed effects random parameter logit model for the estimation (NLOGIT 6) (Table 11). The results showed that Finnish farmers have clear preferences for the characteristics of the results-based carbon payment contract. The statistically significant and positive coefficient of the no contract -constant implies that there is some amount of status quo preference in the data. All attributes were statistically significant and had expected signs. According to the results, the respondents preferred having a carbon farming plan over not having one, and slightly preferred the plan that was updated regularly. The respondents had clear preference for the shorter contract period. The larger payment in the beginning of the contract period increased the attractiveness of the carbon contract.

The marginal willingness-to-accept (WTA) estimates based on the model coefficients are presented in the Table 12Table 11. The respondents required on the average 38.8 euros higher compensation for the contract alternatives than for the no contract alternative. The free carbon farming plan decreased the required compensation with 11.8 euros if the plan was offered only in the beginning of the contract period, and with 17.4 euros if the plan was updated in every five years. The respondents' WTA for 10 year contract period was 21.6 euros

higher, and for 15 year 34.6 euros higher, than for five years contract. An increase of one euro in the payment in the beginning of the contract period decreased the required carbon payment on the average by 0.3 euros.

Table 11. Fixed effects random parameters logit model results for Finnish farmers

Variable	Coefficient	Standard error	p-value
Constant (no contract)	1.917	0.246	0.000
Plan: free at the beginning	0.580	0.094	0.000
Plan: free, updated	0.861	0.105	0.000
Duration: 10 years	-1.067	0.113	0.000
Duration: 15 years	-1.711	0.116	0.000
Payment in beginning of the contract period	0.014	0.001	0.000
Carbon payment	0.049	0.004	0.000
Chi-squared	1328.577		
Log-likelihood	-1748.264		
Observations	366		

Table 12. Marginal willingness-to-accept (WTA) estimates, euros per hectare, calculated with the Wald-function of NLOGIT6

Attribute	WTA	95% confidence interval	
Constant (no contract)	38.78	29.23	48.32
Plan: free at the beginning	-11.74	-15.41	-8.078
Plan: free, updated	-17.43	-20.78	-14.08
Duration: 10 years	21.60	16.73	26.47
Duration: 15 years	34.63	31.94	37.32
Payment in beginning of the contract period	-0.29	-0.33	-0.26

The structure of the **forest owners'** choice experiment was similar to the farmers' survey. In the both cases, we analysed the landowners' acceptance and preferences for increased carbon sequestration in the results-based carbon programme. In the forest owners' version, the payment was based on the timber volume that exceeded the volume in the business-as-usual scenario. The timber volume would be measured in the beginning of the contract period. To set a baseline for the carbon storage, the projected forest growth and timber volume in the future would be estimated based on the forest structure in the beginning. In the estimation of the future baseline, the assumption was that the forest would be managed according to the conventional and most used forest management

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regime. In Finland that would mean even aged forest management, and includes measures like preparation of soil, planting, seedling stand improvement, young stand improvement, thinning and final felling.

The attributes of the forest owners' choice experiment are presented in Table 13. The main difference compared to the farmers' choice experiment is that the contract length was considerably longer due to longer time scale.

Table 13. List of attributes and attribute levels in the choice experiment for forest owners

Attributes	Attribute levels
Carbon forest plan by an expert	No plan
	Free plan at the beginning of the contract period
	Free plan that is updated in every ten years
Length of the contract	20 years
	30 years
	40 years
Payment at the begin of the contract period	10 €/ha
	50 €/ha
	100 €/ha
Carbon payment, euros/m^3 of additional timber volume compared to the baseline	2 €/m^3
	5 €/ m^3
	10 €/ m^3
	15 €/ m^3
	20 €/ m^3

The respondents who had chosen status quo (51% of respondents) in all choice sets and had more than two protest characteristics Table 14, were removed from the data similarly to the farmer survey. This reduced the data from 386 to 356 usable responses. The protesters were identified with six statements (5-point Likert scale). The statements and the percentage of forest owners who somewhat or completely agreed with them are presented in the Table 14.

Table 14. Statements for protest identification and the percentages of the forest owners who somewhat or completely agree with the statement (n=386)

Statement	Percentage of respondents
I do not trust the described carbon measurement	8
I do not want to make a contract concerning the whole estate	29
I do not want to make a long contract	39
I support the carbon payment system for landowners, but not such system that was presented in this survey	7
Change in the ownership in near future made it difficult to commit to the contract	12

I could not estimate the impact of certain measures on the expected carbon payments	11

The preliminary analysis of the forest owners' choice experiment was carried out with fixed effects random parameter logit model for the estimation, similarly to the analysis of the farmer data (NLOGIT 6) The forest owners' WTA estimates based on the model coefficients are presented in Table 16Table 11. The respondents required on the average 42.4 euros higher compensation for the contract alternatives than for the no contract alternative. The free carbon forest plan decreased the required compensation with 7.9 euros if the plan was offered only in the beginning of the contract period, and with 10.4 euros if the plan was updated in every ten years. The respondents' WTA for 30 years contract period was 10.8 euros higher, and for 40 year 17.9 euros higher, than for 20 years contract. An increase of one euro in the payment in the beginning of the contract period decreased the required carbon payment on the average by 0.1 euros.

Table 15. There was strong preference for choosing the no contract alternative. The model result is in line with the high share, 51 percent, of the respondents who chose no contract alternative in all six choice tasks. Similarly to the farmers' results, the free carbon forest plan increased the probability to choose a contract alternative, whereas longer duration of the contract decreased this probability. Respondents preferred the alternatives with the higher payments in the beginning of the contract period.

The forest owners' WTA estimates based on the model coefficients are presented in Table 16Table 11. The respondents required on the average 42.4 euros higher compensation for the contract alternatives than for the no contract alternative. The free carbon forest plan decreased the required compensation with 7.9 euros if the plan was offered only in the beginning of the contract period, and with 10.4 euros if the plan was updated in every ten years. The respondents' WTA for 30 years contract period was 10.8 euros higher, and for 40 year 17.9 euros higher, than for 20 years contract. An increase of one euro in the payment in the beginning of the contract period decreased the required carbon payment on the average by 0.1 euros.

Table 15. Fixed effects random parameters logit model results for Finnish forest owners

Variable	Coefficient	Standard error	p-value
Constant (no contract)	4.131	0.417	0.000
Plan: free at the beginning	0.772	0.133	0.000
Plan: free, updated	1.010	0.147	0.000
Duration: 30 years	-1.054	0.143	0.000
Duration: 40 years	-1.748	0.131	0.000

Payment in beginning of the contract period	0.010	0.001	0.000
Carbon payment	0.098	0.012	0.000
Chi-squared	2175-214		
Log-likelihood	-1259.029		
Observations	356		

Table 16. Marginal willingness-to-accept (WTA) estimates, euros per hectare, calculated with the Wald-function of NLOGIT6

Attribute	WTA	95% confidence interval	
Constant (no contract)	42.36	33.01	51.72
Plan: free at the beginning	-7.92	-10.71	-5.12
Plan: free, updated	-10.36	-12.98	-7.75
Duration: 30 years	10.81	7.10	14.51
Duration: 40 years	17.93	15.28	20.58
Payment in beginning of the contract period	-0.10	-0.12	-0.08

3.1.3 Austria

BOKU also conducted a survey to identify the factors influencing the intention of Austrian farmers to perform results-based contracts by means of a structural equation model. The questionnaire was developed and tested in spring 2021. Two pretests were conducted. The first pretest was conducted with other researchers and two farmers and focused on the content of the questionnaire and comprehensibility. In a second pretest, 31 farmers were asked to answer the questions. Based on the answers of this pretest, a check of the validity and reliability of the questionnaire and its variables was made. The questionnaire was then further developed taking into account the results of the two pretests. In the summer of 2021, the main survey was conducted with the help of a market research institute. In total, 267 responses from farmers were received, 235 responses were valid for the main analysis.

Research objective:
- Determine the factors influencing the acceptance of farmers according to an innovative result-based contract solution in Austria.

Method: A Structural Equation Model (SEM) was designed and tested to identify the factors influencing Austrian farmers' intention to perform a result-based contract solution. First, a model was built taking the results from the first analysis (results from CONSOLE-deliverables 2.3 and 2.4) and the literature into account. Second, an SEM was conducted. Socio-psychological factors were integrated into the model in addition to structural factors. There are already models from

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the literature that can serve as a basis to explain acceptance and factors on the decision. One of the best-known models for determining acceptance is the Technology Acceptance Model (TAM) developed by Davis et al. in 1989 for the introduction of new information technologies. The TAM is recognized as an empirically validated and effective model for capturing and explaining different behaviours (Venkatesh and Davis, 2000; King and He, 2006). Moreover, it is also a simple model that can be modified or extended in various directions (Rezaei et al. 2020). The TAM is derived from the TRA (Theory of reasoned actions) and the TPB (Theory of planned behavior). There are already studies that apply the TAM in an agricultural context (Naspetti et al. 2017; Rezaei et al. 2020; Schulze and Spiller 2010; Michels et al. 2019), as well as studies that use it specifically for policy questions (Pierce et al. 2014; Zhu et al. 2016). In our study, the TAM is used as a basic model extended by socio-psychological factors, such as "social influence", "social efficacy" and "perceived risk". Furthermore, external stimuli are considered, such as economic factors, farm structure, farmer characteristics, and dispositional factors. The structural model including the measurement model is illustrated in Figure 52.
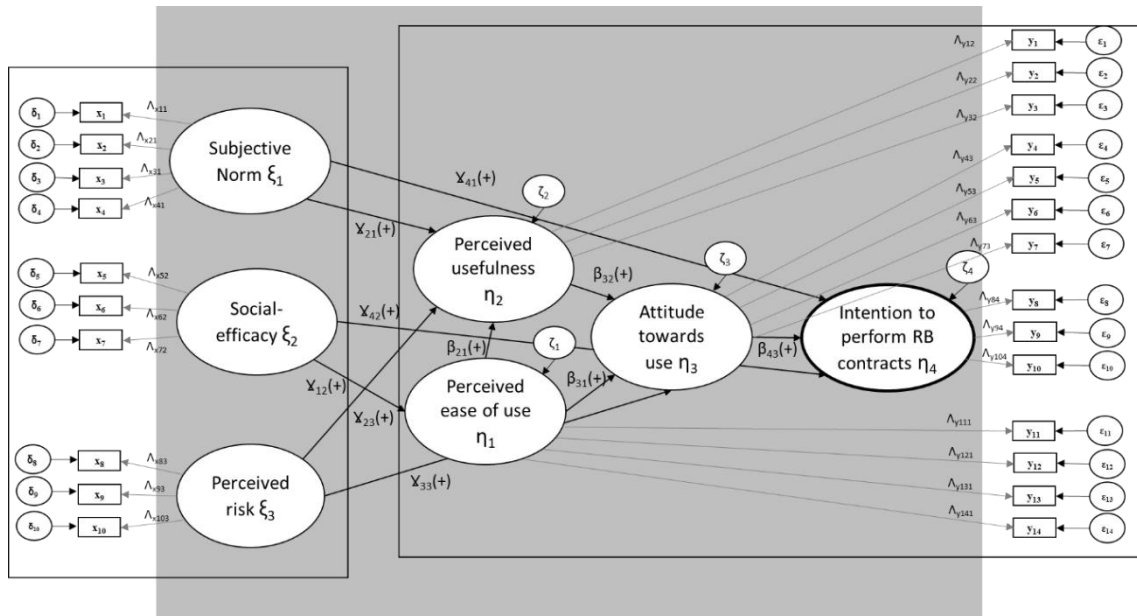
Figure 52. Structural and measurement model

Results: The data were analysed using IBM SPSS Statistics 27 and IBM SPSS AMOS 27. Regarding the results, we are at a preliminary stage of analysis. The tests also about the validity and reliability of the main survey data have not yet been completed at this point. However, the preliminary results indicate that "Attitude towards use" influences "Intention to perform result-based contracts". Furthermore, "Perceived ease of use" and "Perceived usefulness" influence the latent variable "Attitude towards use". There also seems to be an influence in the direction of "Perceived ease of use" on "Perceived usefulness". The additionally included factor "Subjective norm" has an influence on the "Intention to perform" and on the "Perceived usefulness" directly. Likewise, the factor "Social efficacy"

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influences "Perceived ease of use" and "Intention to perform". Regarding the construct "Perceived risk" no influence could be proven.

3.1.4 France

A choice experiment on farmers' acceptability of contract solutions with mixed-payments (individual action-based + bonus conditioned to a collective element) targeting the improvement of water ecological quality was conducted. INRAE and TRAME collaborated closely in designing the experiment (choices on the public good targeted, attributes tested, attributes levels definition), finding respondents and collecting the data.

Assuming a 5-year contract with compliance at the farm level, we tested preferences for 4 attributes: *i)* % of the year when soil is covered, i.e., not left as bare soil, *ii)* meters of anti-erosion multi-species multilayer hedgerows per hectare, *iii)* amount of individual action-based payment, *iv)* possibility to receive a bonus conditioned to a collective element (individual "sponsor bonus" per farmer each time a new farmer of the eligible territory is sponsored into entering the scheme and a collective "result-based bonus" per hectare if the ecological status of the river (as defined by the water quality framework) is increased to the next category. The 2 bonuses were designed as a way to favour environmental results at the landscape scale. Based on this work, INRAE constructed an optimal design of choice sets to measure farmers' preferences and prepared a questionnaire for the data collection.

The choice experiment was conducted together with the CONSOLE landowner survey, as a third part of the questionnaire. Interviews were carried out face-to-face, and answers were collected on Limesurvey. Respondents were first introduced to the context and objective of the experiment, the "rules of the game", and the different contracts parameters (those fixed and those varying from one alternative to the other). Second, we asked some additional questions to help the respondents in estimating the current levels of the management requirements (average soil cover and meters of hedgerows) on their farm and therefore their individual status-quo. Finally, each farmer was asked 9 times to choose her/his preferred option among 2 contract alternatives and the status-quo (keeping her/his current practices).

We collected data from 130 respondents from 3 regions in the northwest of France (Brittany, Normandy, and Pays de la Loire). Descriptive statistics show an overrepresentation of organic, dairy and highly educated farmers. This bias is explained by the difficulty to obtain contact information from a random sample of farms. How farmers were contacted is detailed in section 2.4.7.

Our preliminary findings are that farmers have a positive willingness to accept contracts with an individual bonus for sponsoring peers but show a lower interest when this sponsor bonus is associated with a collective bonus conditioned to reaching an environmental result at the landscape scale. It suggests that farmers might exhibit higher preferences for a bonus valuing their individual performance rather than a collective performance.

3.1.5 Italy – Liguria Region

We developed a Choice Experiment (CE) only within the landowner survey. The farmers were proud to participate in an innovative instrument to test and simulate different contract solutions for carbon farming. Indeed, we collected data from 130 respondents from the south-western Liguria region.

The preliminary results show that the farmers have positive opinions about the result-based and collective implementation instruments, while we found less interest among farmers for the other two categories. This divergence is probably because they are not so easy to understand.

The CE was related to the "Carbon farming" measures. We define carbon farm as "*farm activities having an effect to carbon stocks in soils and vegetation, at farm level and with the purpose of decreasing emissions, increasing carbon removal and storage, and protect C-rich soils (climate mitigation with land management practices). Carbon Farming is based on relevant agricultural practices to increase carbon sequestration and reduction of GHG emission"*. The definition we made include the following practices:

- Conservation agriculture (no ploughing and reduced tillage)

- Soil cover with covercrops, trees, landscape elements

- Afforestation with native species to create a species-rich forest that is resilient, also to climate change

- Appropriate management of dried peatland (e.g., rewetting, rewetting with paludiculture, higherwater table)

- Conversion of arable land to grassland-Grassland management, for instance switching to multisward grasslands"

Four attributes were utilised in the choice experiment. They were the participation in the measure, the justification of payments, the level of payments and, the impact on business income or the level of requirements (table 16 provides the description).

Table 17. List of attributes and attribute levels in the choice experiment for farmers

Attributes	Description	Levels
Participation in the measure	Contractual obligation	1) Individual
		2) Only with other farmers
		3) Only with other supply-chain actors
Type of payment	Type of payment based on justification	1) Only based on compensation costs

		2) 50% of compensation cost + 50% based on results
		3) 100% based on results
Level of payments	Hypothetical remuneration per hectares unrolled under the measure	1) 0 €
		2) 100 €
		3) 200€
Level of prescription	Expected annual cost to participate in the measure	1)Low
		2) Medium
		2) High

The preliminary analysis of the carbon owners' choice experiment was carried out using conditional logit model using STATA 17 software.

The forest owners' WTA estimates based on the model coefficients are presented in Table 16Table 11. The respondents required on the average 42.4 euros higher compensation for the contract alternatives than for the no contract alternative. The free carbon forest plan decreased the required compensation with 7.9 euros if the plan was offered only in the beginning of the contract period, and with 10.4 euros if the plan was updated in every ten years. The respondents' WTA for 30 years contract period was 10.8 euros higher, and for 40 year 17.9 euros higher, than for 20 years contract. An increase of one euro in the payment in the beginning of the contract period decreased the required carbon payment on the average by 0.1 euros.

Table 15 and table 15 present the preferences with and without interaction among contract types. Conditional logit model shows that there is a significant preference for results-based contracts or hybrid form (50% payments based on results and 50% based on compensation costs), while at the opposite there are less probability to choose a collective contract (i.e. payment shared with other farmers or with other supply chain actors). Adding interaction among the component (i.e. results based and collective), we found a negative probability to adopt it for the farmers.

Table 18. Conditional logit model results for Carbon Farming (without interaction)

Variable	Coeff.	Sign.
pay_level	0.0175	***
effort_low		n.s.
effort_high	-0.9236	***
Collective farms	-4.8616	***
Collective actors	-5.8161	**
hybrid	1.4491	***
result_based	1.5280	***
Pseudo R2		0.2101
Log-likelihood		-544.042
Observations		1332

Table 19. Conditional logit model results for Carbon Farming (with interaction)

Variable	Coeff.	Sign.
pay_level	0.0155	***
effort_low	0.5761	*
effort_high	-1.0862	***
Collective farms	-4.7089	***
Collective actors	-5.1456	***
hybrid	1.0652	***
result_based	1.8932	***
collective#result_based	-1.12664	***
supply#result_based	n.s.	
individual#result_based	n.s.	
Pseudo R2	0.2377	
Log-likelihood	-532.055	
Observations	1332	

The farmers' WTA estimates based on the model coefficients are presented in Table 16Table 11.

Table 20. Marginal willingness-to-accept (WTA) estimates (euros per hectare)

Variable	WTA	95% confidence interval	
Effort medium	0.3271	0.1721	0.4821
Collective	248.9668	214.6082	283.3253
Individual	161.4746	117.2395	205.7096
Supply	304.2069	260.621	347.7929
Hybrid	-81.3697	-116.6	-46.1392
Result_based	-86.8233	-123	-50.6471

The respondents required on the average a very high amount per hectare to receive collective payments. For example, collective payment with payments shared with other farmers required a compensation with 248 € per hectare per years, and with 304 euros if the payments is shared with supply chain actors. Hybrid forms and result-based payments show a negative WTA.

3.1.6 Poland

1. Modelling determinants of farmers participation in agri-environmental-climate contracts

Agri-environmental programmes are one of the key instruments of EU agricultural policy aimed at encouraging farmers to do so. Due to their voluntary nature and involvement of farmers in these activities, there has been a scientific discussion for a long time on the factors determining the participation of farmers in these programmes. Numerous analyses carried out mainly for agriculture of Western

European countries, do not give unequivocal answers on the factors which influence the involvement of farmers in agri-environmental measures, which additionally might be different for Central-Eastern Europe. It was assumed that the ability of AES adoption depends on certain farm characteristics (ability), and farmers' willingness to adopt AES, which in line with the random utility theory is determined by expected farmers' utility from undertaking additional commitments. Farmers' expected utility is determined by several groups of factors, though we assumed that the final decision depends on farmers' characteristics (socio-demographic and behavioral factors) and economic factors described by the results of past activities and expected outcome of future actions (e.g., payments from AES).

In the analysis, that was inspired by the CONSOLE research activity, we used a popular approach involving the use of econometric discrete choice models. The logistic regression model was used to determine the impact of the analyzed factors on the farmers' accession to AES contracts. The dependent variable explained in the model was the farmer's declared participation in the agri-environmental contracts (AES). An innovative approach, previously not used to solve similar problems, was the use as explanatory variables of accounting data collected in the FADN database, associated with data from interviews with 594 farmers. As a result, the accounting information from the FADN database was supplemented with data on farmers' attitudes, their beliefs and practices used in farm management collected in the survey.

The results of our analyses, based on data from a representative sample of Polish farmers, indicate that, as in most other countries studied, the probability of participation in AES is positively affected by an extensive production model, especially characterized by large areas of permanent grassland. Besides, greater interest in participation could be seen in non-specialized farms (crop, mixed), less well-equipped with production factors. On the other hand, "more efficient" farms (e.g., with a better ratio of actual output to average (standard output) or higher income per UAA / hectare) are less likely to participate in AES. At the same time, the share of non-farm income in the household budget has also significantly increased the chances of farmers participating in AES, which shows that implementation of programs is more likely by farmers whose maximization of agricultural income is not the only priority.

The observations above are supplemented by adding the impact of behavioural factors. One of the most significant is the impact of risk aversion characterizing individual farmers (expressed by Arrow-Pratt's risk aversion ratio) to the analysis of participation in AES. Farmers who had a lower risk aversion (risk takers) were less likely to participate in AES, while farmers with higher aversion were more likely to use this tool. This leads to the conclusion, confirming our hypothesis, that the use of programmes can be seen by farmers as part of risk management, because by joining AES they give up part of their income agreeing to reduce production, but in return for which they receive a guaranteed amount of payment. As a result, however, this leads to a reduction in subsidies, especially on relatively extensive

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farms. This is due, inter alia, to a favorable mechanism for setting bids based on the average benefits lost in participation in AES. As a result, well-functioning specialized farms run by relatively young farmers with relatively high production outputs and, as a result, relatively high income remain outside the reach of AES. Our study also indicates that other behavioral aspects considered in the study, relating to the attitudes and beliefs of farmers, turned out to be of relatively minor importance in explaining farmers' participation in AES. Thus, we conclude that the issue of economic factors influencing participation in AES seems to be of key importance for Polish farmers. Progressive climate change will potentially result in a significant reduction in the production potential of agriculture; hence there is a need to look for solutions enabling the effective implementation of climate policy (environmental protection) goals without significantly reducing the productivity of agriculture (this is manifested, for example, in the growing discussion on the concept of "sustainable intensification"). It seems that a certain solution to this issue may be a change of the AES model from input to output-oriented, which is being emphasized more and more in recent years. The effect should be to reward farmers for environmental effects they achieved. The possibility of maximizing environmental effects, and thus obtaining subsidies greater than average lost benefits, could be an incentive for more efficient farms to take action to protect nature. Given the volume of production, produced on intensive and specialized farms, the environmental benefits of introducing such practices can be significant compared with reducing production on extensive farms. Of course, result-based activities carry some risk for farmers (if the goal is not achieved), though, as our research indicates, there is a chance that they can accept them (they represent a greater risk propensity). This approach is one of the assumptions of the new CAP, but the construction of a specific programme for a given country requires good recognition of its socio-environmental conditions. Considering that the EU area is very diverse in terms of environmental conditions and problems, such tools must be even more adapted to the conditions of the given country or even region. For this reason, an important element of the actions undertaken should be recognition of factors (characteristics of farms and farmers) determining participation in current and "new/future" AES.

2. **Potential involvement of dairy farmers in contracts aimed at reducing methane emissions (based on the survey in 387 farms)**

In the study we attempted to analyze possibilities of implementation of contracts aimed at reducing methane emissions from dairy farming. Data collection in Poland was based on the face-to-face survey distributed and assisted by the extension service advisors (September 2020- May 2021, in 3 leading regions of Poland (mazowieckie, podlaskie, wielkopolskie). The total 387 complete questionnaires were received.

The main hypothesis tested in the study was that willingness to introduce practices aimed at reducing methane emissions from dairy farming is driven by environmental awareness of farmers. We referred here to the Theory of Planned Behavior, and tested how much farmers' behavior is determined by several

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factors, including farm characteristics, farmers environmental awareness, and performed management practices. In the analysis, we used a popular approach involving the use of econometric discrete choice models. The dependent variable explained in the model was the farmer's willingness to introduce practices aimed at reducing methane emissions. We tested few versions of the model, choosing different measures presented in the questionnaire as dependent variable (vaccine reducing emissions from cattle, feed additives, and a group of 3-7 measures).

The preliminary results of our analyses only partly confirm our hypothesis. The farmers awareness of the impacts of agricultural production on the environment was not significant in the models (except polluting ground waters through N ana P leaching). Understanding of harmfulness of CH4 and N2O was significant for the implementation of methane-reducing practices. We observed also that farmers who already introduced some environmental practices have a stronger positive attitude towards introducing methane reduction measures.

The level of environmental awareness of farmers was generally assessed as relatively low on average. What is more, majority of farmers presented incoherent opinions regarding the impacts of agricultural production on the environment, as well as differentiated views on methane reducing practices. Very likely, this is because farmers are lacking knowledge on environmental issues (e.g. poor recognition of harmfulness of specific GHGs) but also many of them they are not very sensitive to environmental problems. Lack of knowledge and poor environmental awareness might be a strong factor preventing farmers from implementing AECPG contracts and accepting pro-environmental policies in general (unless „bribed" with policy payments). A reason for a poor response of farmers to the idea of implementing methane emission reducing measures may be of a financial nature. Possibly farmers decisions are driven mainly by expected financial benefits what is confirmed by many studies. Unfortunately, this was not examined in our survey, which is a shortcoming. Other results of the study are being processed.

3.1.7 United Kingdom

In the UK, a Choice Experiment was carried out alongside the farmer survey. Its aim was to inform the consultation process for the post-Brexit agri-environment schemes (AES), the Environment Land Management (ELM) scheme. The design of the CE was informed by the Policy Discussion document[29] available at the time, which was open for public consultation. Preliminary versions of the whole farmer questionnaire and CE section were presented to government policymakers (Defra) responsible for the design of ELM schemes during a workshop in August 2020 who also participated in the co-designing of relevant attributes, levels and phrasing.

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[29] Defra (2020). Environmental Land Management: policy discussion. Available at: https://consult.defra.gov.uk/elm/elmpolicyconsultation/ (last accessed 14/06/2020).

The four non-monetary attributes selected reflect broadly the 3-tiered approach ELM schemes intended to employ, at the time of the survey. Tier 1 aims at farm-level interventions with a combination of prescribed actions (i.e., voluntary schemes) and result-based actions. Tier 2 aims at a wider-scale interventions, aiming at bringing bigger environmental and biodiversity improvements. Tier 3 aimed at landscape-wide interventions, brought about wither through committed actions, results-based or a combination of the two, while encouraging collaboration between neighbouring land managers. These were reflected in the three levels of the CONTRACT attribute. Carbon storage was identified as the most relevant agri-environmental climate public good of most relevance, and the three CARBON levels in Table X below reflect proportionate interventions to reduce loss of carbon in managed soils, achieve carbon balance and increase carbon storage, respectively. An attribute reflecting collaboration activity between land managers and at the designing of schemes was also introduced (COLLAB), as well as the option and type of advice to land managers after enrolling in the hypothetical ELM schemes. These two attributes were selected after the consultation with policymakers and with members of the Community of Practice (CoP), formed under Work Package 5 mandates, with farmers from West Yorkshire's UKE4 NUTS2 region. The payment levels used reflect broadly the payment levels of current agri-environment payments in the UK in schemes aimed at biodiversity improvement, woodland and peatland protection and protection of water quality.

Table 21. List of attributes and description (attributes in bold are the base levels)

Attributes	Levels
CONTRACT	1. You carry out actions to protect the environment
	2. You carry out some actions to protect the environment AND you partly achieve results that protect the environment
	3. You achieve results that protect the environment
CARBON	**1. The same actions as now. This may lead in net carbon loss in soil**
	2. Additional actions to protect soils and achieve carbon balance
	3. Further additional actions to increase carbon stored in soil
COLLAB	**1. No contractual obligation to collaborate with other nearby land mangers**
	2. A contractual obligation to collaborate with other nearby land managers on projects pre-established by the regulator
	3. contractual obligation to collaborate with other nearby land managers on projects pre-established by land managers themselves
ADVICE	**1. No free advice**
	2. Free advice provided via demonstration farms
	3. Free advice from an independent adviser
COMPENSATION	£50, £100, £250, £350, £500, £700/hectare/year

An efficient design with fixed priors with 2 blocks of six choices was designed in Ngene (ChoiceMetrics, 2012, Version 1.1.1.) pretested with members of the CoP in January-February 2020 and the results were used to generate a Bayesian D-efficient design with a final D-error of 0.0846. Data collection took place in the month of February 2021 through a convenience UK sample obtained from the online panel provider Qualtrics. A total of 196 responses were provided through Qualtrics. Speeders (those taking twice less time than the median), protestors (those stating that their choices made in the CE section were not to the best interest of their farm in follow-up questions or the respondents choosing the status quo in all six of their choices) and incomplete responses were removed from the analysis, resulting in 154 usable responses.

To account for the heterogeneity of preferences between respondents a mixed logit model was employed. The results are presented in Table XI below, with the base level (designed to reflect the current situation) being CARBON1, COLLAB0 and ADVICE1 set as fixed at zero. The combination of these levels corresponds to the current situation of a UK farmer, receiving payment under the Basic Payment Scheme (BPS) but no payments for agri-environment schemes. All attributes are normally distributed, and the model is estimated in preference-space while COMPENSATION is considered to be fixed across respondents. The model presents interaction terms with key sociodemographic characteristics from the previous sections of the questionnaire to capture their potential impact on preferences for different levels of the CE.

Table 22. Mixed logit model results for UK farmer sample

	Coefficient	Standard Error	p-value
COMPENSATION	0.001	0.001	0.062
CONTRACT1	1.855	0.737	0.012
CONTRACT2	2.164	0.757	0.004
CONTRACT3	2.130	0.746	0.004
CARBON2	0.655	0.338	0.052
CARBON3	0.644	0.313	0.040
COLLAB1	0.004	0.121	0.977
COLLAB2	0.143	0.132	0.277
ADVICE2	0.191	0.146	0.191
ADVICE3	0.066	0.124	0.598
Standard Deviations			
CONTRACT1	-0.322	0.234	0.168
CONTRACT2	0.663	0.193	0.001
CONTRACT3	-0.080	0.582	0.891
CARBON2	0.803	0.216	0.000
CARBON3	-0.477	0.227	0.036
COLLAB1	0.506	0.177	0.004
COLLAB2	-0.178	0.268	0.508
ADVICE2	0.585	0.258	0.024
ADVICE3	0.576	0.220	0.009
Interaction terms			
CONTRACT1*YOUNG	0.429	0.628	0.495
CONTRACT2*YOUNG	0.295	0.641	0.646
CONTRACT3*YOUNG	0.013	0.627	0.983
CONTRACT1*AES_EXP	0.267	0.597	0.655
CONTRACT2*AES_EXP	0.108	0.619	0.861

CONTRACT3*AES_EXP	0.403	0.600	0.502
CARBON2*AES_EXP	-0.335	0.361	0.354
CARBON3*AES_EXP	-0.353	0.332	0.289
Chi-squared			0.0896
Log-likelihood			-717.7475
Observations			154

Results show that UK land managers have strong but heterogenous preferences, as is evident from the large relative sings of the standard deviations of the attributes. Respondents have strong preferences to move away from the status quo (not enrolled in AES) and enrol in any of the three types of schemes offered (actions/voluntary, combination of actions and results, results-based). These preferences are stronger for results based and actions and results schemes. Additionally, moving away from the status quo (including practices that result in net carbon emissions from soils) is also preferred for schemes aiming to balance carbon (CARBON2) and increasing carbon storage (CARBON3). The attributes examining collaboration (COLLAB) and types of advice (ADVICE) were not statistically significant from the base level. This can be attributed to past documented strong reluctance of UK land managers to cooperate with neighbouring farmers[30] and with frictions existing between land managers and farm advisors (Hejnowicz et al., 2016), Finally, the payment level (COMPENSATION) was statistically significant and positive, as expected from welfare economic theory. Interaction terms with key socio-demographics (FARMER_YOUNG taking the value 1 if a respondent was 40 years old or younger, 0 otherwise, AES_EXP taking the value 1 if the respondent had enrolled in AES in the past, 0 otherwise) did not yield statistically significant results.

The marginal rate of substitution, the shadow price (marginal willingness to accept, WTA) of each level of the choice experiment was estimated with the Delta method and the Confidence Intervals are presented in Table XII below.

Table 23. Marginal willingness to accept, per hectare, per five years

	Willingness to Accept		95% Confidence Intervals	
CONTRACT1	-£	4,427	-38281	12020
CONTRACT2	-£	5,165	-43372	14904
CONTRACT3	-£	5,084	-41744	8454
CARBON2	-£	1,564	-11264	3809
CARBON3	-£	1,537	-9579	3703
COLLAB1	-£	9	-1353	1029
COLLAB2	-£	341	-2509	1098
ADVICE2	-£	455	-3303	786
ADVICE3	-£	156	-1377	1415

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[30] Source: Defra (2021b). What we're learning about collaboration through tests and trials. Available at: https://defrafarming.blog.gov.uk/2021/09/07/what-were-learning-about-collaboration-through-tests-and-trials/ (last accessed: 06/09/2021).

Marginal WTA levels scale broadly with the (annual) levels of payments under the current AES payments of Countryside Stewardship Scheme[31]. Overall, UK land managers are willing to offer discounts when it comes to enrolling in any of the three types of AES or in AES achieving net carbon stocks in soils and/or increasing carbon storage in UK soils. The fact that the mean value straddles zero gives less confidence in the robustness of the estimates.

[31] Source: Defra (2020) Countryside Stewardship: Higher Tier Manual. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920470/CS_Higher_Tier_v2.0.pdf (last accessed:05/08/2021).

4 Stakeholders survey – Task3.3

4.1 Introduction

The aim of Task 3.3 "Survey of other key actors and stakeholders" was at first to is to identify key stakeholders and key actors different from land managers who are likely to be involved in the contract solutions that were examined in Task 3.2, also benefiting of the network built in Task 5.1. After this, a survey involving the identified stakeholders and actors was performed using a common questionnaire, identifying acceptability, motivations, and obstacles from the use of the identified contract solutions. The target sample size of these surveys is between 30 and 100 respondents in each country. A PESTLE framework, that is commonly used in marketing studies is used in all countries aiming at survey those Political, Economic, Social, Technological, Legal & Environmental aspects that affect the implementation of the result-based contract type. The questionnaire has been translated to the respective native language and conducted using the most appropriate means in each country.

4.2 Data collection

4.2.1 Questionnaire overview

The questionnaire for the stakeholders and key actors (see Annex B) is structured on a preliminary section (that was not shown to the respondent) dedicated to Project partners only. This section describes the questionnaire structure, the main aims, and the target population to address. An introduction contains then the presentation of the questionnaire to be shown to the respondents.

The questionnaire was structured in three parts. Part 1 was dedicated to the "Background questions" where the main information about the organization of the interviewed stakeholder, his/her main responsibilities and main areas of interest were questioned. Part 2 hosts the questions on the "Acceptability of new contract solutions", substantially replicating the Part II questions of the land managers survey questionnaire. For example, there were questions about the contracts characteristics that are expected to influence the land managers' willingness to enrol in an environmental programme, as well as specific acceptability questions on the four contract types investigated: result-based, collective, value chain and land tenure. Furthermore, in Part 3, stakeholder views on the macro-environmental factors of operational environment that might affect to the adoption and implementation of the result-based contract type were inquired (PESTLE -factors). These are reported in the project Deliverable D3.3.

4.2.2 Sampling and data collection approach

Table 11 depicts the main information related to the data collection procedure adopted. Most partners collected data from the stakeholders and key actors during the period between February and June 2021. The range of sample sizes per country, despite the COVID-19 outbreak and the limitations and constraints in organizing in-person stakeholders' meetings, lies between 20 and 50

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respondents. The main strategy for data collection was based on online surveys implemented e.g., with Qualtrics, LimeSurvey or Webropol software, resorting to private and/or institutional e-mail and telephone contacts of practitioners, public administration personnel, technical advisors, etc.

Table 24. Data collection – Stakeholders survey

Partner ID	Partner	Country	Nr. of respondents contacted	Nr. of questionnaires collected	Nr. of completed answers	Questionnaire way (tool)	Survey advertised/promoted by	Timing
1	UNIBO	Italy	95	56	56	online (Qualtrics)		Feb-Apr 2021
2	LUKE	Finland	74	39	39	online		May 2021
3	BOKU	Austria	≈80	34	34	online		May 2021
4	IAE	Bulgaria			51	online; by phone		Mar-Apr 2021
5	TI	Germany	142	51	51	online (LimeSurvey)		Apr-May 2021
6	EVENOR, ASAJA, UPM	Spain	50	11	11	online		Apr 2021
7	TRAME, INRA	France		35	25	face-to-face; video conference	TRAME	May-Jun 2021
8	UCC	Ireland	≈50		16	online	social media; European Innovation Networks; mailing lists of stakeholder groups	Mar-Apr 2021
9	UNIPI	Italy	29	29	29	online		Apr-Jun 2021
10	ZSA	Latvia	≈70	34	34	online		Apr 2021
11	VUA	Netherlands	120	23	20	online (Qualtrics)	stakeholder organizations private/institutional contacts; Terra Nova Foundation	May-Jul 2021
12	SGGW	Poland	133	118	101	online (LimeSurvey)		Mar-Jul 2021
13	UoL	United Kingdom	284	44	28	online		May-Jun 2021
14	ARELFH	France	80	18	18	online		Feb-May 2021

4.3 Survey results

4.3.1 Whole sample characteristics

The final number of respondents with a completed stakeholder questionnaire is 486. The majority of the respondents in the data are from Poland (101), followed by Italy (59), Bulgaria (51) and Germany (51). Figure 53 shows the share of respondents by country.

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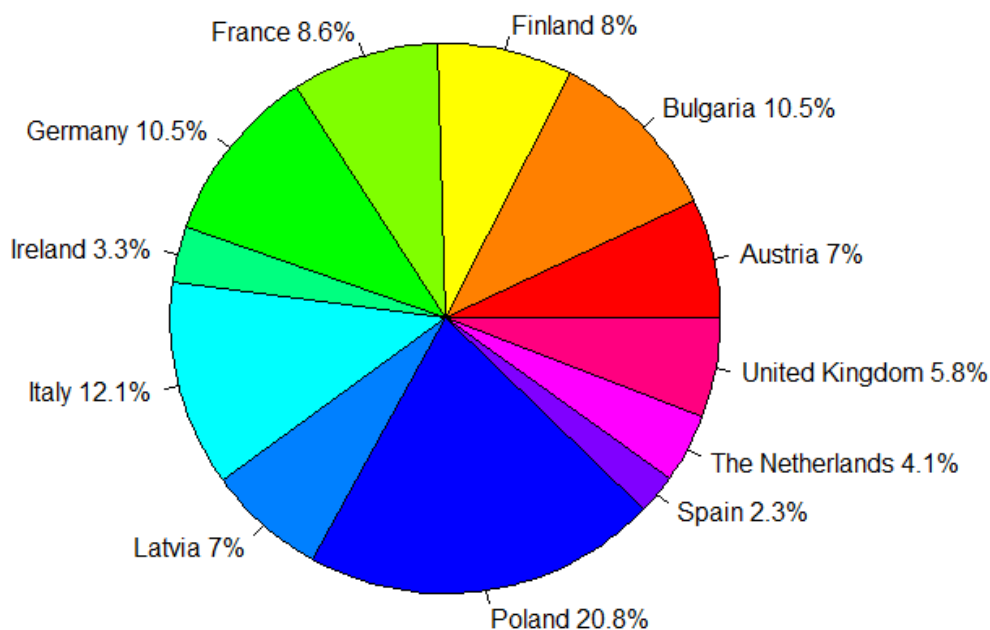
Figure 53. Share of respondents by country – Stakeholder survey (N=486)

Table 12 shows the descriptive statistics related to the most relevant information retrieved in Part I questions of the stakeholder survey. As the respondents from Finland represented the forest sector, the results are presented separately for agricultural and forestry sectors.

First, the results are presented for agricultural sector. Almost 75% of the stakeholders worked at national level and at regional level, (and the rest in international or local levels). Almost 30% worked at organizations with commercial interests, and around 20% of the stakeholders' background organizations were governmental. Respondents were able to select all the relevant areas of their responsibility, as well as their roles or areas of interest from the predefined lists. More than 70% of stakeholders had agriculture as one area of responsibility, while one third of them marked environmental protection and nature conservation as their area of responsibility. Half of the stakeholders considered their role as provider of information and advice. Only 26% of the stakeholders worked as processor of agricultural or forest products.

Almost one-third of the forestry sector stakeholders had governmental background organization. The second largest group was the stakeholders working in the organizations with commercial interests. As the questionnaire was directed to the stakeholders related to forestry sector, it is not surprising the almost 70% of them had forestry as area of responsibility. Like the stakeholders in the agricultural sector one third of stakeholders in forestry sector marked

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environmental protection and nature conservation as their area of responsibility. Also, one third of the stakeholders marked training and advice as their responsibility. Furthermore, half of the stakeholders considered their role as provider of information and advice. Only 23% of the stakeholders worked in the forest harvesting and wood processing. The results are presented in the chapter 3.3.2. Per country characteristics.

Table 25. Descriptive statistics – Stakeholder survey

Variable		Agricultural sector		Forestry sector[1]	
		Count (%) (n = 447)		Count (%) (n = 39)	
Regionality of the respondent work	International	5	(1.1%)		
	National	193	(43.2%)		
	Regional	141	(31.5%)		
	Local	83	(18.6%)		
	Not asked	25	(5.6%)	39	(100%)
	NA	0	0		
Background organization	Governmental organization, state level	30	(6.7%)	5	(12.8%)
	Governmental organization, regional or local level	63	(14.1%)	6	(15.4%)
	Non-governmental organization (interest group)	64	(14.3%)	8	(20.5%)
	Non-profit organization (e.g., foundation, association)	43	(9.6%)	4	(10.3%)
	Private company	111	(24.8%)	7	(17.9%)
	Public enterprise	21	(4.7%)	2	(5.1%)
	Academic (e.g., university, research institute)	48	(10.7%)	6	(15.4%)
	Civil society / Private individual	26	(4.7%)	0	(0%)
	Other	30	(6.7%)	1	(2.6%)
	NA	0	0	0	0
Special area of responsibility	Agriculture	318	(71.1%)	0	
	Forestry	55	(12.3%)	27	(69.2%)
	Food sector	62	(13.9%)	0	
	Environmental protection / nature conservation	141	(31.5%)	14	(35.9%)
	Water management	51	(11.4%)	8	(20.5%)
	Land use policy and planning	57	(12.8%)	5	(12.8%)
	Training and advice	64	(14.3%)	13	(33.3%)
	Research and development	85	(19.0%)	11	(28.2%)
	Public administration	51	(11.4%)	3	(7.7%)
	Community development	26	(5.8%)	6	(15.4%)
	Other	20	(4.5%)	3	(7.7%)
	NA	0	0	0	
Role or area of interest	Processor of agricultural or forest products	116	(26.0%)	9	(23.1%)
	Provider of information to the public	178	(39.8%)	17	(43.6%)
	Provider of information/advice to farmers or forest owners	238	(53.2%)	20	(51.3%)
	Regulation and enforcement	98	(21.9%)	8	(20.5%)
	Equipment and/or tool provision	45	(10.1%)	0	
	Providing finance to land managers/owners/workers	53	(11.9%)	3	(7.7%)
	Providing/leasing land to land managers	48	(10.7%)	0	
	Assistance for public funding of land management	69	(15.4%)	14	(35.9%)
	Lobbying, campaigning	77	(17.2%)	9	(23.1%)
	Community leader	59	(13.2%)	4	(10.3%)
	Supervisory authority	34	(7.6%)	4	(10.3%)
	Product certification body (e.g. organic, FSC, PEFC,...)	20	(4.5%)	2	(5.1%)
	Other	107	(23.9%)	9	(23.1%)
	NA	0			

Note: [1] Stakeholder questionnaire was directed to forestry sector only in Finland.

Approximately half of the stakeholders considered characteristics such as 'Sales guarantee', 'Annual compensation' and 'Better results higher payment' would considerably increase farmers willingness to participate for the agri-environmental contracts, whereas 'Common payment', 'Authority control' and

Periodical payment were considered as characteristics that would decrease farmers' willingness to participate for the contracts (Figure 54).
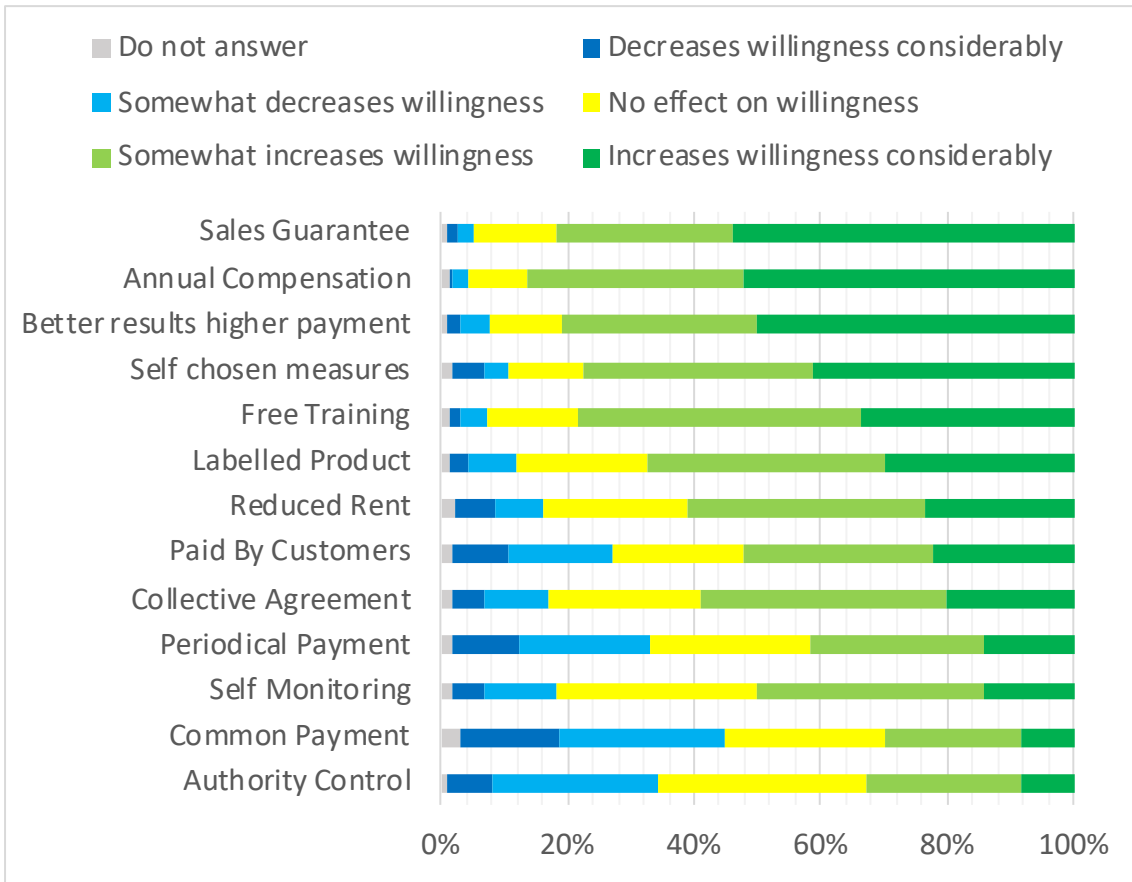
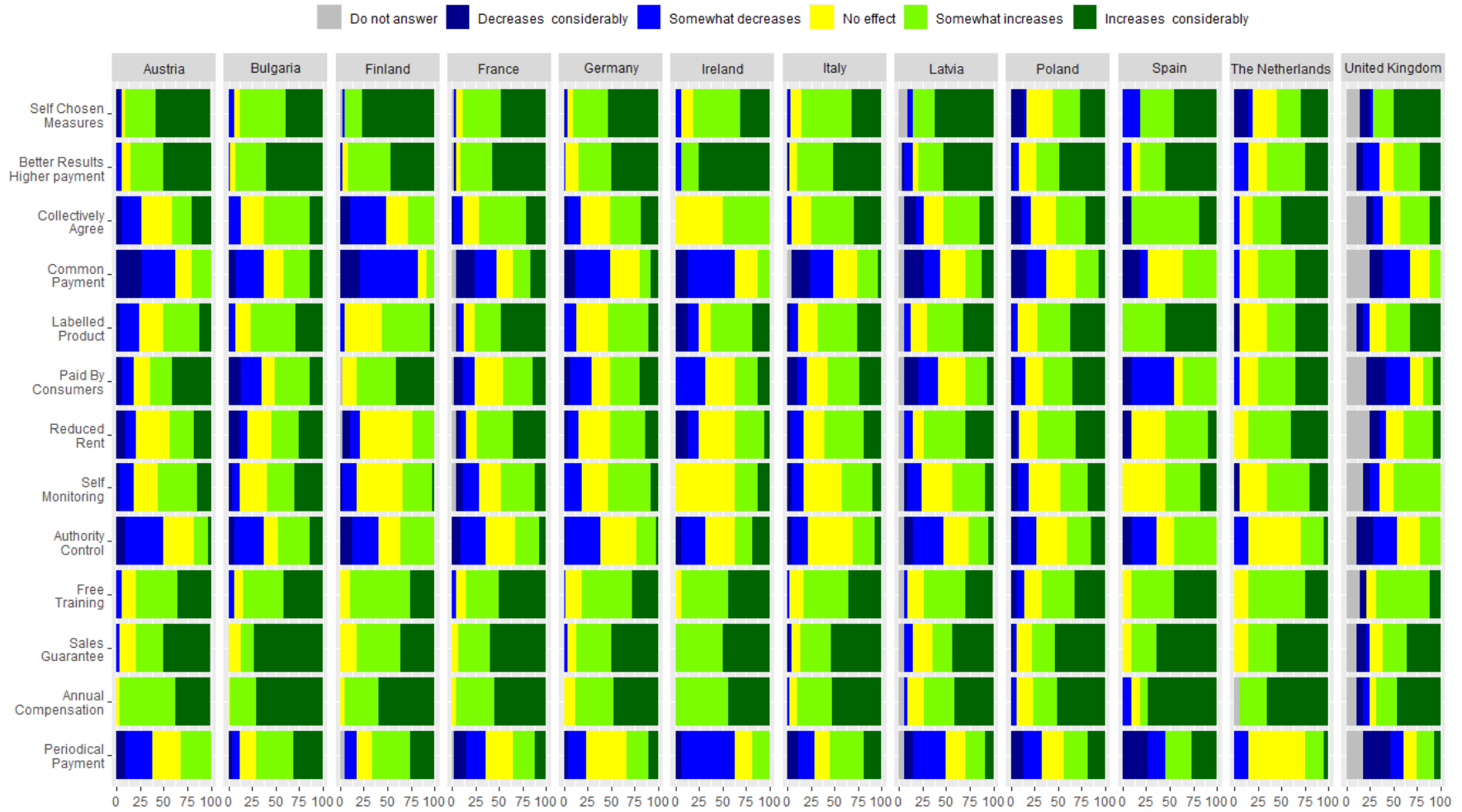*Figure 54. Acceptability of the characteristics of the agri-environmental contracts*
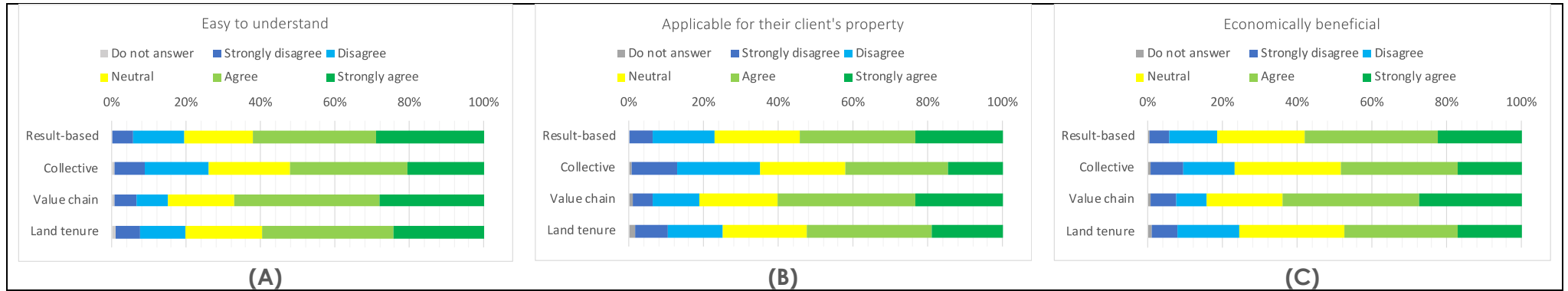
Figure 55. Stakeholders' perception of "understandability" (A), "applicability" (B), "economic beneficial" (C) of different contract solutions

Stakeholders considered Value chain contract type easiest to understand, most applicable and economically most beneficial for the farmers (Figure 55). However, the differences between the contract types were not remarkable great. On the other hand, the stakeholders considered the result-based contract type most popular among the land managers in their area (Figure 56). The collective contract type was seen most suitable for providing landscape and scenery or water quality and quantity (Figure 57). Result-based contract type was seen most suitable for providing biodiversity. Both land tenure and result-based were seen to be suitable for providing soil health and quality. Value chain type of contracts were not seen as better than other contract type.
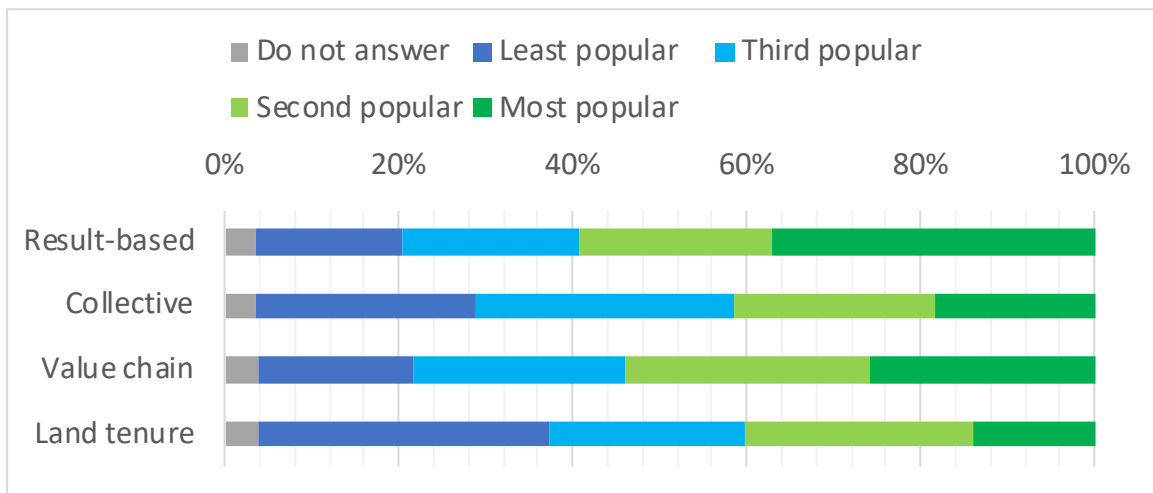
Figure 56. Popularity of the contract solutions among the land managers in stakeholders' area
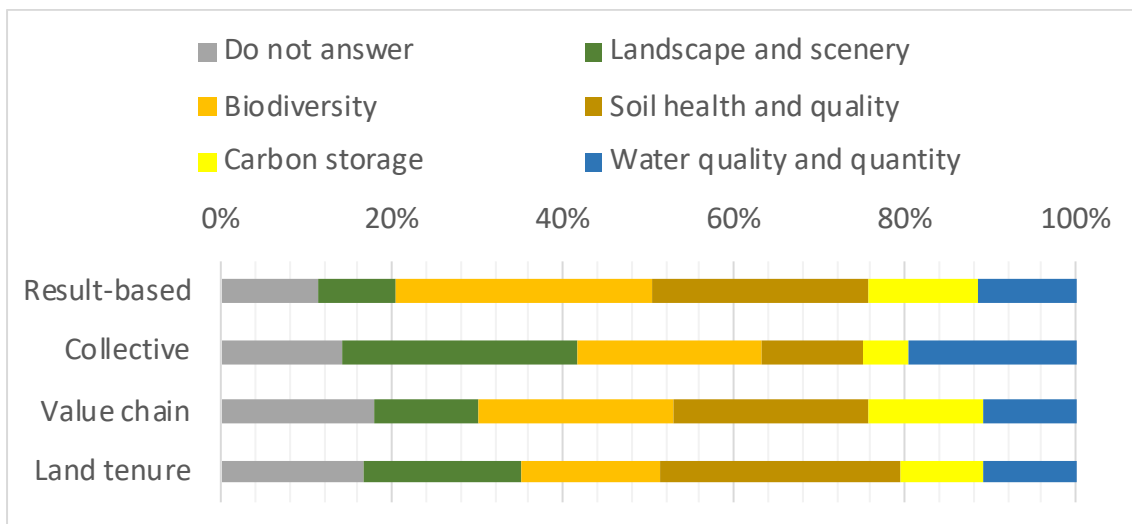
Figure 57. Sustainability of the contract solutions for the environmental objective provision

4.3.2 Per country characteristics

There were differences between countries when considering the background information of the interviewed stakeholders (organization, main responsibilities and the main areas of interest). Approximately 40% of the stakeholders in France and Poland worked at local level, whereas all the respondents in Bulgaria, Spain

and UK worked at national level (Table E1). The background organization of the stakeholders' varied and had no clear trend (Table E2). In Poland, special area of responsibility of the stakeholders reached was agriculture, whereas in the other countries, stakeholders reached had also other special areas of responsibility (Table E3). However, the role and area of interests varied and did not show any significant differences (Table E4).

In most of the countries, the characteristics 'Self chosen measures', 'Better results higher payment', 'Sales guarantee' and 'Annual compensation' were most often considered to increase willingness to enrol for the agri-environmental contracts (Figure 58). 'Common payment', 'Paid by consumers', 'Authority control' and 'Periodical payment' were considered as characteristics that decrease willingness to enrol.

In evaluating result-based contract type easiness understand, applicability and potential to be economically beneficial varied most between different countries (Figure 59).

The result-based contract type was considered most popular among the land managers in the stakeholder's area in Ireland, Germany, Finland (forestry) and UK (Figure 60). Only in Italy, the collective contract type was considered most popular, while value chain contract types were most popular in Austria, Bulgaria and Spain. Land tenure contract type was not considered popular in general.

The collective contract type was considered most suitable for provisioning landscape and scenery in most countries (Figure X9). In most of the countries, the most suitable for provisioning biodiversity was result-based type of contracts. However, in Finland the value chain contract type was considered most suitable for provisioning biodiversity in forestry sector. Both land tenure and result-based were seen to be suitable for provisioning soil health and quality in many countries. In Ireland, value chain type of contracts were considered suitable for provisioning the carbon storage, while in Finland result-based type was suitable for carbon provisioning in forestry sector. In most of the countries, collective type of contracts were considered suitable for provisioning water quality and quantity.

Figure 58. Acceptability of the characteristics of the agri-environmental contracts, by country

Figure 59. Stakeholders' perception of of "understandability" (A), "applicability" (B), "economic beneficial" (C) of different contract solutions
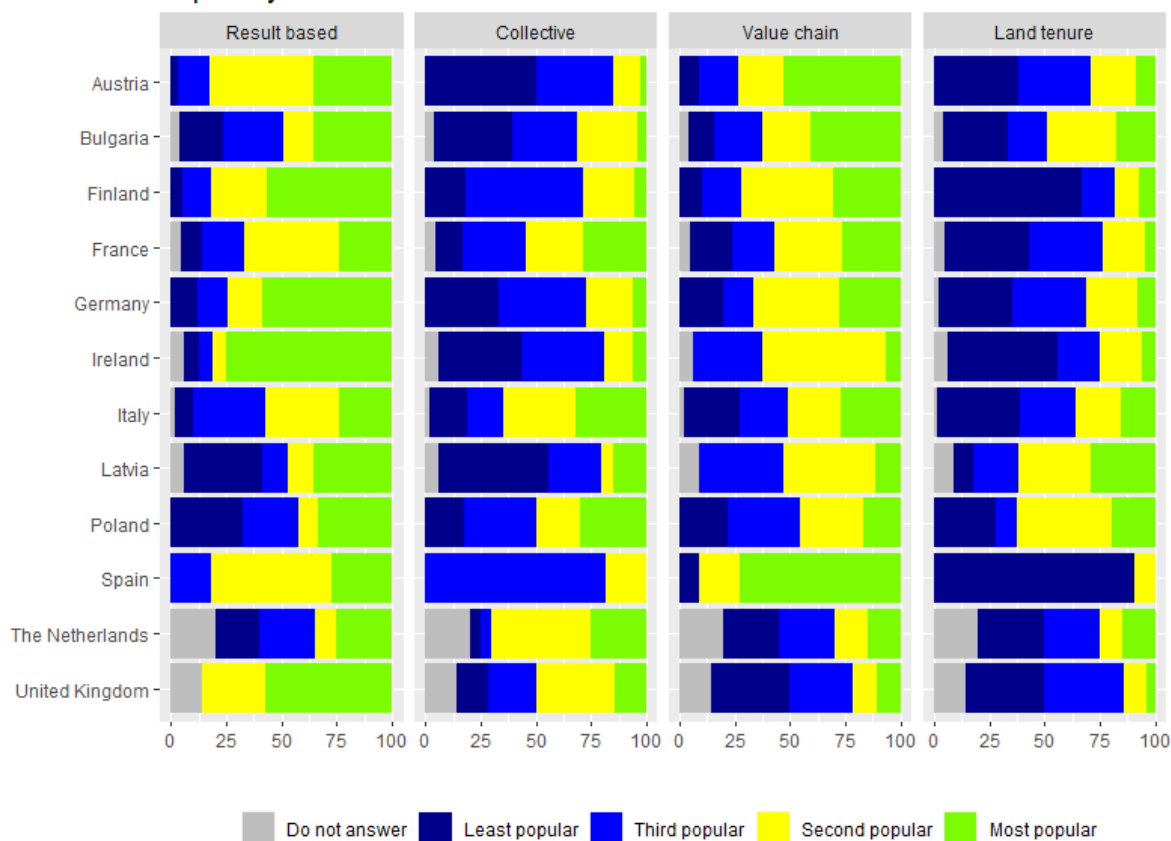
Figure 60. Popularity of the contract solutions among the land managers in stakeholders' area, by country

Suitability of the contract types for environmental Objectives

Legend: Do not answer | Landscape and scenery | Biodiversity | Soil health and quality | Carbon storage | Water quality and quantity

Figure 61. Suitability of the contract solutions for environmental objective provision, by country

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4.4 Conclusions

One of the aims in stakeholder survey was to reach large spectrum of different stakeholders. Altogether 486 respondents were reached from different levels, different organizations, and areas of responsibility. The highest share of the responses was from Poland (20%), but otherwise the distribution between different countries was quite even.

According to the stakeholders, result-based and value chain contracts would be the most popular among the land managers, while land tenure and collective contract types would gain less popularity. Result-based characteristics such as 'Self-chosen measures' and 'Better results higher payment' were among the most wanted characteristics. Moreover, value-chain related characteristic 'Sales guarantee' was among the most wanted characteristics, while popularity of the characteristic 'Paid by consumers' differed among respondents from different countries. 'Collective payment' was the least accepted characteristic. Popularity of Land tenure contract, and its characteristic 'Reduced rent' differed between countries.

Result-based type of contract was thought to fit especially for protection of biodiversity as well as soil health and quality protection. Collective contracts were thought to fit especially for water quality and quantity provision.

However, stakeholders in different countries considered contract types and their characteristics through the national traditions, practices, and regulations. These results will be evaluated in workshops with stakeholders. Stakeholders' views about possibilities to increase the adoption of different contract types as well as the results of PESTLE analysis regarding result-based contract type will be presented in deliverable D3.3.

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CONSOLE

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

Research and Innovation action: H2020 - GA 817949

Task 3.2 Pan-EU survey of farmers and other rural landowners

PRELIMINARY NOTE (TO BE REMOVED IN THE FINAL VERSION)

When it is ready, the questionnaire has to be translated in your own national languages and, eventually, adapted to national specificities. In addition, a proper introduction, suitable for the needs of the target group and data collection method, needs to be added.

INTRODUCTION (FOR PARTNERS)

The questionnaire aims to identify acceptance and landowners' behaviour towards the contract solutions proposed in WP1 from the potential contractors. The questionnaire focuses on land managers' background variables such as existing tenure situation and agri-environmental-climate public goods (AECPG) arrangements, as well as the vision and potential response of landowners about the proposed contract solutions and their design parameters (e.g. length, collective features, parameters for result verification and control, distribution of risk).

The questionnaire is structured on four main sections:

1. Characteristics of landowners and their farm/forestry holdings (**compulsory for all**)
2. Acceptability of new contracts solutions, farmers' reaction to new contract typologies and/or characteristics (**compulsory for all**)
3. Choice Experiment (CE) (**optional, pending**)
4. Other issues, i.e. some country specific questions (**optional**)

The third section (CE exercise) is not compulsory and each partner can autonomously decide to carry out it or not, but for those willing to it is important that this choice is discussed together in order to check possibilities for common exercises across clusters countries (e.g. same public good, same design). This is already under way with interested partners. The fourth section aims to collect

national specificities and can be added by each partner and structured autonomously.

"Surveys will be addressed to the target groups of farmers and/or forest owners in 12 countries involved in the project. The target sample size of the surveys will be in the range between 100 and 300 farmers/foresters/landowners per country and will be reconsidered during the project depending on the precise survey design." (CONSOLE DoA, p. 23). However, if you want to publish results from your own country e.g. in scientific papers and want to gain more reliable results, larger sample size is recommended.

The type of the survey (e.g. mail questionnaire, telephone, web, face-to-face) and whether the type of the survey can vary between countries will be discussed with partners. For example, Choice Experiment (CE) is almost impossible to implement by phone.

SAMPLING AND TARGET POPULATION

We are aware of the fact that each partner/case study has its own features in terms of land/forest owners, managers, tenants, etc. (this came out especially, but not limitedly, in relation to the UK team's comments during the last internal WP3 survey workshop).

Nevertheless, from all the previous discussions that we had, each partner has to decide the target region/area as well as the target population/sub-population interested by the survey.

Obviously, each decision has to be taken with the final goal to collect relevant information about contract solutions.

Some common principles are (from previous discussion and deliverables):

- Target a population that allows upscaling/mainstreaming of the instruments (depending on the potential/interest of your region/country)
- no (just) population of case studies
- widely used specialisation(s) in your area
- including farmers not previously participating in AES
- including enough heterogeneity to allow to understand the role of the main explanatory variables.

INTRODUCTION (FOR RESPONDENTS)

We kindly ask you to respond to the present questionnaire.

This questionnaire addresses different voluntary contracts offered for land managers. These contracts aim to increase supply of in environmental and climate-related benefits such as water protection, landscape improvement, biodiversity or carbon sequestration.

With this questionnaire we would like to know what You think about alternative types of contracts and their characteristics. In section 1, we ask about your individual characteristics and agricultural/forest holding features. In section 2, we are interested in your opinion about the acceptability of new kinds of contract solutions.

This questionnaire is part of a pan-EU survey carried out in the context of the CONSOLE – *CONtract Solutions for Effective and lasting delivery of agri-environmental-climate public goods by EU agriculture and forestry* H2020 EU-Project.

Fulfilling the interview will take around 20-30 minutes.

Privacy and data confidentiality statement

TO BE ADDED, IN LINE WITH NATIONAL DEMANDS

Consent question(s)

TO BE ADDED, IN LINE WITH NATIONAL DEMANDS

PRELIMINARY INFORMATION

a) Questionnaire number: _____
b) Name of interviewer: _____
c) Date: _____

CONTACT DETAILS AND GENERAL INFORMATION

a) Municipality: _____
b) Post code: _____

2 Individual characteristics and agricultural/forest holding features

2.1 Could you please state your gender:

a) Male
b) Female
c) Other (optional): _____

2.2 Could you please indicate your age (years):

a) 18-20
b) 21-30
c) 31-40
d) 41-50
e) 51-60
f) 61-70
g) 71-80
h) More than 80

2.3 Could you please indicate your highest completed education level:

a) Primary (elementary school) or lower secondary (primary school)
b) Upper secondary education (high school)
c) Post-secondary non-tertiary education or short-cycle tertiary education
d) Bachelor's or equivalent level
e) Master's or equivalent level
f) Doctoral or equivalent level
g) Not elsewhere classified
    Please, specify: _____
h) No education

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2.4 Do you have a formal completed agricultural or forestry education (multiple answers allowed)?
   a) Yes, in agriculture
   b) Yes, in forestry
   c) Other education linked to the management of the holding
         Please, specify: _____
   d) None

2.5 Would you define your role in the holding as:
   a) Single owner
   b) Co-owner
   c) Tenant

2.6 Are your responsible for the management of the farm?
   a) Yes
   b) No

2.7 Would you define the legal status of the holding as:
   a) Individual (family) holding
   b) Partnerships
   c) Other
         Please, specify: _____

2.8 What is the main specialisation of the holding (only one answer allowed):

   a) Specialist cereals, oilseed and protein crops
   b) General field cropping
   c) Specialist horticulture
   d) Specialist vineyards
   e) Specialist fruit and citrus fruit
   f) Specialist olives
   g) Various permanent crops combined
   h) Specialist dairying
   i) Specialist cattle-rearing and fattening
   j) Cattle-dairying, rearing and fattening combined
   k) Sheep, goats and other grazing livestock
   l) Specialist granivores (e.g. poultry)
   m) Mixed farming
   n) Mixed livestock, mainly grazing livestock
   o) Mixed livestock, mainly granivores
   p) Field crops-grazing livestock combined
   q) Various crops and livestock combined
   r) Forestry
   s) Other

Please, specify: _____

2.9 Does the agricultural holding produce certified organic products?

a) Yes, all products from farm are organic or in conversion to organic
b) Yes, some part of the products from farm are organic or in conversion to organic
c) No

2.10 Could you please indicate how many holding hectares are:

a) Agricultural land (UAA) owned: _____ hectares
b) Agricultural land (UAA) rented-in: _____ hectares
c) Agricultural land (UAA) rented-out: _____ hectares
d) Forest land owned: _____ hectares
e) Forest land rented-in: _____ hectares
f) Forest land rented-out: _____ hectares

2.11 How many workers does the holding has (including yourself):

a) Family workers: Nr. full-time: _____
b) Family workers: Nr. part-time:_____
c) External workers: Nr. full-time: _____
d) External workers: Nr. part-time_____
e) Seasonal workers: Nr. full-time: _____
f) Seasonal workers: Nr. part-time: _____

2.12 Is the holding regularly assisted by a (paid) advisory/extension service (multiple answers allowed)?

a) Yes, with a specific environmental-related focus
b) Yes, generical or technical advisory/extension service
c) Yes, with an accounting-related focus
d) No

2.13 What are your most important sources of information with environment-related focus (multiple answers allowed):

a) (Own) internet search, social media, apps (e.g. to identify weeds, animal species, etc.), professional journals
b) Family members
c) Other/Neighbouring farms
d) Farmers' union(s)
e) Public advisory (e.g. chamber of agriculture)
f) Private/independent advisory
g) Nature conservation/environmental organisation

h) Other

        Please, specify: _____

2.14 Are you a member of these organisations (multiple answers allowed):

a) Farmers union(s) or any other agriculture or forestry interest group
b) Nature conservation organisation or other environmental organisation
c) No

2.15 Did you start a new activity in the holding during the past 5 years and/or have you made any investments?

a) Yes

        Please, specify: _____

b) No

2.16 Thinking about the future, for how many years would you, as a responsible person for the holding, continue the activity on the agricultural/forest holding:

a) Less than 1 year
b) Between 1 and 5 years
c) Between 5 and 10 years
d) More than 10 years
e) Does not know/Never thought about it

2.17 (-FILTERED QUESTION- Only if Q1.16 is equal to *a* or *b*, then ask:) Thinking about the future, do you already have an idea about the holding successor (after yourself)?

a) Yes, a successor in my family
b) Yes, a successor not in my family
c) No, not been able to find a successor
d) Not decided yet/Never thought about it

2.18 Could you please indicate how much of your total household gross revenue comes on average from farming/forestry:

a) Less than 10%
b) 10-29%
c) 30-49%
d) 50-69%
e) 70-89%
f) More than 89%

2.19 Could you please indicate to whom and to what proportion the holding sells its products/harvest (i.e. to which customer)? (Please fill in the numbers so that your total adds up to 100; a rough estimate is sufficient)

Customer	Percentage (0-100%)
a) Processor	
b) Private wholesaler/retailer	
c) Cooperative wholesaler or retailer/cooperative	
d) Direct to final consumer	
e) Other farm(s)	
f) Other (Please, specify: _____)	

2.20 Did you receive any agricultural subsidies / payments in 2019 and if so, how much?

a) Yes, as direct payments
   Please indicate the amount (in Euro, estimated): _____
b) Yes, as Rural Development Program payments
   Please (in Euro, estimated): _____
c) No payments received

2.21 (-FILTERED QUESTION- Only if Q1.20 is equal to *b*, then ask:) Could you please state how many hectares/number of livestock heads of the holding were covered by environmental contract/programme in 2019?

a) Area entered into agri-environment and climate measures (in hectares): _____
b) Area entered into measures for organic farming conversion or maintenance (in hectares): _____
c) Number of livestock heads: _____

3 Contract types for improving environmental benefits and their acceptability

3.1 Improving the environment of your farm/forest holding.

	1. Have you in the last five years carried out any measures on your farm to improve the state of the following environmental aspects?		2. Are you interested in improving the following environmental aspects on your land in the following five years?		
	Yes	No	Yes	Somewhat	No
a) Landscape and scenery	□1		□1	□2	□3
b) Biodiversity (e.g. species diversity, habitat diversity)	□1		□1	□2	□3
c) Soil quality and health (e.g. crop diversification)	□1		□1	□2	□3
d) Carbon storage in soils (e.g reduced tillage, organic matter enrichment) (forest owners: wood biomass)	□1		□1	□2	□3
e) Water quality and quantity (e.g. fertilisation according to need, water retention)	□1		□1	□2	□3

3.2 How much would the following characteristics of agri-environmental contracts increase or decrease your willingness to enrol to an environmental contract or programme?

Characteristics	Decreases my willingness considerably	Somewhat decreases my willingness	No effect on my willingness	Somewhat increases my willingness	Increases my willingness considerably
1. In the contract, you are free to decide about the management practices to achieve the specified environmental result	□1	□2	□3	□4	□5
2. The payment gets higher, the better your environmental results are	□1	□2	□3	□4	□5
3. You can collectively agree on environmental targets and measures at landscape-level together with other land managers	□1	□2	□3	□4	□5
4. You and other land managers (farmers) receive a common payment. You jointly agree on the distribution of the payment .	□1	□2	□3	□4	□5
5. You sell your farm's products labelled as environmentally friendly (e.g. animal welfare products, climate friendly products) when following management measures as prescribed in a processor or retailer contract	□1	□2	□3	□4	□5
6. The contract is not paid by public money, instead the compensation that you get for environmentally friendly production is paid by buyers of your products.	□1	□2	□3	□4	□5
7. You can lease land with a reduced rent, if you agree to follow environmental management clauses as specified in the lease contract	□1	□2	□3	□4	□5
8. You can do the monitoring of the environmental results	□1	□2	□3	□4	□5

yourself (e.g. count specific plants)					
9. The results that you achieve are regularly controlled by the competent authority coming onto your farm e.g. once a year	□1	□2	□3	□4	□5
10. You are offered free training and advice that enables you to reach the environmental targets	□1	□2	□3	□4	□5
11. You get a sales guarantee from a processor or retailer in return for implementing environmental measures.	□1	□2	□3	□4	□5
12. You get environmental compensation payment on an annual basis.	□1	□2	□3	□4	□5
13. You get half of the environmental payment at the beginning of the five-year contract period, and half at the end of it.	□1	□2	□3	□4	□5

3.3 What would be the contract length that you prefer?

Agriculture

a) The contract is for a one year
b) The contract has the length of a common AES (5 years)
c) The contract is for 10 years

Forestry

a) The contract is for 10 years
b) The contract is for 20 years
c) The contract is for 30 years

In the following, four different types of contracts are shortly described. After each contract type description, you are asked to evaluate its suitability and desirability from your point of view.

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Result-based contract

*In a result-based contract you receive a **payment only for the delivery of environmental or climate results**. You are **free in your decision about the management practices**, e.g. how to contribute to water protection, landscape improvement, biodiversity or to sequester carbon. Selected indicators and scoring systems to monitor environmental or climate results are often used, and they will be exactly defined in the contract. You have access to free advice or training when you participate in this contract and you can voluntarily engage in the monitoring activity.*

3.4 How do you see this contract type? Do you agree or disagree with the following statements?
Please circle the number that describes your opinion most closely.

Statement **Result-based contract is...**	Measurement scale				
	strongly disagree		*neutral*		*strongly agree*
1. Easy to understand.	1	2	3	4	5
2. Applicable for my farm.	1	2	3	4	5
3. Potentially economically beneficial for my farm.	1	2	3	4	5

3.5 Are you already enrolled in a result-based contract type?
a) Yes
b) No
c) Not currently, but have been earlier

3.6 How likely is that you would enroll in a result-based contract type in the future?
a) Very likely
b) Likely
c) Neutral
d) Unlikely
e) Very unlikely

3.7 How would you improve result-based contract to better match your needs or views?

Contract with collective implementation

*You become **a member of** a **group** of land managers (farmers or foresters) who **applies jointly for compensation in order to implement environmental or climate activities**, e.g. water protection, carbon sequestration, biodiversity or landscape improvement. A minimum number of group members (e.g. 5) from your region is required to **collaborate in order to get a payment**. The group members decide about the implementation and locating the measures, and the distribution of the payment. Within the group, peer land managers and advisors share knowledge and support the achievement of the environmental objectives.*

3.8 How do you see this type? Do you agree or disagree with the following statements?
Please circle the number that describes your opinion most closely.

Statement	Measurement scale				
Collective contract is…					
	strongly disagree		neutral		strongly agree
1. Easy to understand.	1	2	3	4	5
2. Applicable for my farm.	1	2	3	4	5
3. Potentially economically beneficial for my farm.	1	2	3	4	5

3.9 Are you already enrolled in a collective contract type?
a) Yes
b) No
c) Not currently, but have been earlier

3.10 Would you enroll in a collective contract type in the future?
a) Very likely
b) Likely
c) Neutral
d) Unlikely
e) Very unlikely

3.11 How would you improve collective contract to better match your needs or views?
_____

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Contract along the value chain

*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.*

3.12 How do you see this contract type? Do you agree or disagree with the following statements?

Please circle the number that describes your opinion most closely.

Statement　　　　　　　　　　　　　　**Measurement scale**

Value chain contract is...

	strongly disagree		neutral		strongly agree
1. Easy to understand.	1	2	3	4	5
2. Applicable for my farm.	1	2	3	4	5
3. Potentially economically beneficial for my farm.	1	2	3	4	5

3.13 Are you already enrolled in a value chain contract type?
a) Yes
b) No
c) Not currently, but have been earlier

3.14 Would you enroll in a value chain contract type in the future?
a) Very likely
b) Likely
c) Neutral
d) Unlikely
e) Very unlikely

3.15 How would you improve value chain contract to better match your needs or views?
_____

Land tenure contract with environmental clauses

*You enter into a land-tenure contract where you **commit to give particular attention to environmental aspects beyond legal requirements when producing on the leased land**. The landowner accepts a lower **lease payment** than for comparable land under usual land tenure agreements to compensate your additional efforts. In the contract environmentally friendly management practices on the leased land are prescribed in order to maintain or improve environmental targets, e.g. water protection, landscape and biodiversity improvement or carbon sequestration or alternatively.*

3.16 How do you see this contract type? Do you agree or disagree with the following statements?
Please circle the number that describes your opinion most closely.

Statement   **Measurement scale**

Land tenure contract is...

	strongly disagree		neutral		strongly agree
4. Easy to understand.	1	2	3	4	5
5. Applicable for my farm.	1	2	3	4	5
6. Potentially economically beneficial for my farm.	1	2	3	4	5

3.17 Are you already enrolled in a land tenure contract type?
a) Yes
b) No
c) Not currently, but have been earlier

3.18 Would you enroll your forest/agricultural land in a land tenure contract type in the future?
a) Very likely
b) Likely
c) Neutral
d) Unlikely
e) Very unlikely

3.19 How would you improve land tenure contract to better match your needs or views?
_____

7 Annex B: Questionnaire for stakeholders survey

CONSOLE

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

Research and Innovation action: H2020 - GA 817949

Survey for stakeholders and other key actors

PRELIMINARY NOTE (TO BE REMOVED IN THE FINAL VERSION)

The questionnaire has to be translated in your own national languages and, eventually, adapted to national specificities. In addition, a proper introduction, suitable for the needs of the target group and data collection method, needs to be added.

INTRODUCTION (FOR PARTNERS)

The number of respondents for this survey should be from 30-100, consisting of relevant stakeholders in your country/study region.

The survey is structured on 3 sections that are all compulsory:

1. The background characteristics of the respondents
2. Acceptability of new contracts solutions
3. Macro-environmental factors of operational environment (PESTLE) that are fostering or hindering the adoption of result-based contracts.

SAMPLING AND TARGET POPULATION

- Aim to reach respondents from different background organizations in local, regional and state level (question number 1.1)

- Aim to reach respondents who are acting in different roles or having different areas of interest (question number 1.3)
- Select the stakeholders so that they are relevant from your landowner survey perspective, especially if you have selected certain study region for the landowner survey.

INTRODUCTION

Dear participant,

We kindly ask you to respond to the present questionnaire. This survey deals with novel voluntary contracts. These contracts aim to increase supply of environmental and climate-related benefits such as water protection, landscape improvement, biodiversity, carbon sequestration or soil health. We are interested in gathering your opinion regarding different voluntary contracts for land managers.

In section 1, we kindly ask about you to tell us your professional background and role in the design, implementation and/or accompaniment of agri-environmental activities.

In section 2, we would like to get your feedback on four selected types of contracts and their characteristics and how you think these influence the willingness of land managers to engage. You may take your area of work as reference.

In section 3, we would like you to focus explicitly on one contract type, namely result-based. We are interested to know more about the macro-environmental, societal factors (environmental, political, economic, social, technological, legal) that you think are fostering or hindering the adoption of result-based contracts.

This questionnaire is part of a pan-EU survey that is being carried out as part of the European project CONSOLE – *CONtract Solutions for Effective and lasting delivery of agri-environmental-climate public goods by EU agriculture and forestry*.

We would appreciate if you take the time to answer the following questions which will take approximately 20 minutes.

We thank you very much in advance for your support!

PRELIMINARY INFORMATION

    d) Questionnaire number: _____
    e) Name of interviewer: _____
    f) Date: _____

4 Background questions

4.1 What is your background organization?

a) Governmental organization, state level (e.g. ministry) ☐
b) Governmental organization, regional or local level ☐
c) Non-governmental organization (interest group) ☐
d) Non-profit organization (e.g. foundation, association) ☐
e) Private company ☐
f) Public enterprise ☐
g) Academic (e.g. university, research institute) ☐
h) Civil society / Private individual ☐
i) Other, please specify _____ ☐

4.2 What is your special area of responsibility? Please tick all that apply.

a) Agriculture ☐
b) Forestry ☐
c) Food sector ☐
d) Environmental protection / nature conservation ☐
e) Water management ☐
f) Land use policy and planning ☐
g) Training and advice ☐
h) Research and development ☐
i) Public administration ☐
j) Community development ☐
k) Other, please specify_____ ☐

4.3 What is your role or areas of interest? Please tick all that apply, and then choose the one that you consider the most important.

	All that apply	Most important
a) Processor of agricultural or forest products	☐	☐
b) Provider of information to the public	☐	☐
c) Provider of information/advice to farmers or forest owners	☐	
	☐	
d) Regulation and enforcement	☐	☐

e) Equipment and/or tool provision ☐ ☐
f) Providing finance to land managers/owners/workers ☐
☐
g) Providing/leasing land to land managers ☐ ☐
h) Assistance for public funding of land management ☐
☐
i) Lobbying, campaigning ☐ ☐
j) Community leader ☐ ☐
k) Supervisory authority ☐ ☐
l) Product certification body (e.g. organic, FSC, PEFC,…) ☐ ☐
m) Other, please specify: _____ ☐
☐

5 Acceptability of new contract solutions

When filling out the following questions, we kindly ask you to give us your point of view what aspects influence the provision of agri-environmental or climate benefits by land managers.

5.1 How much do you think would the following characteristics of agri-environmental contracts <u>influence land managers' willingness to enrol</u> to an environmental contract or programme?

Characteristics	Decreases willingness considerably	Somewhat decreases willingness	No effect on willingness	Somewhat increases willingness	Increases willingness considerably
14. In the contract, land managers are free to decide about the management practices to achieve the specified environmental result	☐	☐	☐	☐	☐
15. The payment gets higher, the better the land managers' environmental results are	☐	☐	☐	☐	☐
16. Land managers can collectively agree on environmental targets and measures at landscape-	☐	☐	☐	☐	☐

level together with other land managers					
17. Land managers receive a common payment. They jointly agree on the distribution of the payment	□	□	□	□	□
18. Land managers sell their farm's products labelled as environmentally friendly (e.g. animal welfare products, climate friendly products) when following management measures as prescribed in a processor or retailer contract	□	□	□	□	□
19. The contract is not paid by public money, instead the compensation that land managers get for environmentally friendly production is paid by buyers of the products	□	□	□	□	□
20. Land managers can lease land with a reduced rent, if they agree to follow environmental management clauses as specified in the lease contract	□	□	□	□	□
21. Land managers can do the monitoring of the environmental results themselves (e.g. counting specific plants)	□	□	□	□	□
22. The results that land managers achieve are regularly controlled by the competent authority coming onto the farm e.g. once a year	□	□	□	□	□
23. Land managers are offered free training and advice that enable them to reach the environmental targets	□	□	□	□	□
24. Land managers get a sales guarantee from a processor or retailer in return for implementing environmental measures	□	□	□	□	□

25.Land managers get environmental compensation payment on an annual basis	☐	☐	☐	☐	☐
26.Land managers get half of the environmental payment at the beginning of the five-year contract period, and half at the end of it	☐	☐	☐	☐	☐

5.2   What contract length would land managers prefer?

Agriculture

- d) The contract is for a one year
- e) The contract has the length of a common agri-environmental programme (5 years)
- f)   The contract is for 10 years

Forestry

- d) The contract is for 10 years
- e) The contract is for 20 years
- f)   The contract is for 30 years

Four different types of contracts are briefly described below. After each contract type description, you are asked to evaluate their suitability and desirability from land managers' point of view.


Result-based contract

In a result-based contract, land managers receive a **payment only for the delivery of environmental or climate results**. Land managers are **free to decide about the management practices**, e.g. how to contribute to water protection, landscape improvement, biodiversity or to sequester carbon. Selected indicators and scoring systems to monitor environmental or climate results are often used, and they will be exactly defined in the contract. Land managers have access to free advice or training when they participate in this contract and they can voluntarily engage in the monitoring activity.

5.3 How do you see this result-based contract type? Do you agree or disagree with the following statements?

Please circle/tick the number that describes your opinion most closely.

Statement	Measurement scale				
For the land managers, a result-based contract is…					
	strongly disagree		*neutral*		*strongly agree*
1. Easy to understand	1	2	3	4	5
2. Applicable for their farm	1	2	3	4	5
3. Potentially economically beneficial for their farm.	1	2	3	4	5

5.4 How would you improve result-based contract described above?

_____

Contract with collective implementation

Land managers become members of **a group who applies jointly for compensation in order to implement environmental or climate activities**, e.g. water protection, carbon sequestration, biodiversity or landscape improvement. A minimum number of group members (e.g. 5) from the region is required to **collaborate in order to get a payment**. The group members decide about the implementation and locating the measures, and the distribution of the payment. Within the group, peer land managers and advisors share knowledge and support the achievement of the environmental objectives.

5.5 How do you see this collective contract type? Do you agree or disagree with the following statements?

Please circle/tick the number that describes your opinion most closely.

Statement	Measurement scale				
For the land managers, a collective contract is…					
	strongly disagree		*neutral*		*strongly agree*
4. Easy to understand	1	2	3	4	5
5. Applicable for their farm	1	2	3	4	5

6. Potentially economically beneficial for their farm.	1	2	3	4	5

5.6 How would you improve the collective contract described above?

_____

Contract along the value chain

As producers, land managers are part of the value chain (producer, processor, retailer, distributor). Land managers engage in a contract where they 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. Land managers are **paid** for it **by the market,** mainly through a premium price paid by the processor or retailer.

5.7 How do you see this value chain contract type? Do you agree or disagree with the following statements?

Please circle/tick the number that describes your opinion most closely.

Statement	Measurement scale				
For the land managers, a value chain contract is…					
	strongly disagree		*neutral*		*strongly agree*
4. Easy to understand	1	2	3	4	5
5. Applicable for their farm	1	2	3	4	5
6. Potentially economically beneficial for their farm.	1	2	3	4	5

5.8 How would you improve the value chain contract described above?

_____

Land tenure contract with environmental clauses

Land manager enters into a land-tenure contract where they **commit to give particular attention to environmental aspects beyond legal requirements when producing on the leased**

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land. The landowner accepts a lower **lease payment** than for comparable land under usual land tenure agreements to compensate land manager's additional efforts. In the contract environmentally friendly management practices on the leased land are prescribed in order to maintain or improve environmental targets, e.g. water protection, landscape and biodiversity improvement or carbon sequestration or alternatively.

5.9 How do you see this land tenure contract type? Do you agree or disagree with the following statements?

Please circle/tick the number that describes your opinion most closely.

Statement   **Measurement scale**

For the land managers, a land tenure contract is…

	strongly disagree		neutral		strongly agree
7. Easy to understand	1	2	3	4	5
8. Applicable for their farm	1	2	3	4	5
9. Potentially economically beneficial for their farm.	1	2	3	4	5

5.10 How would you improve the land tenure contract described above?

_____

5.11 Altogether four types of contracts targeting environmental or climate benefits have been presented: result-based, collective implementation, value chain and land tenure. In your opinion, how popular would them be among the land managers in your area? Please rank them.

Give a score 1-4 for each contract type (1 = most popular… 4 = least popular).
Give each score only once.

	1.Result-based	2.Collective implementation	3.Value chain	4.Land tenure
Score				

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5.12 In your opinion, for which environmental objective provision would the four introduced contract types be the most suitable? Choose only one environmental objective in each row.

	Landscape and scenery	Biodiversity	Soil health and quality	Carbon storage	Water quality and quantity
1. Result-based	☐	☐	☐	☐	☐
2. Collective implementation	☐	☐	☐	☐	☐
3. Value chain	☐	☐	☐	☐	☐
4. Land tenure	☐	☐	☐	☐	☐

6 Macro-environmental factors of operational environment in the adoption of the result-based contract type

Let's assume that a new **result-based** contract type would be introduced in your country.

<div style="border:1px solid">

Result-based contract

In a result-based contract, land managers receive a **payment only for the delivery of environmental or climate results**. Land managers are **free to decide about the management practices**, e.g. how to contribute to water protection, landscape improvement, biodiversity or to sequester carbon. Selected indicators and scoring systems to monitor environmental or climate results are often used, and they will be exactly defined in the contract. Land managers have access to advice or training when they participate in this contract and they can voluntarily engage in the monitoring activity.

The two contract parties are voluntary land managers and a "local authority". The "local authority" is responsible of making contracts, payments and controlling the contracts.

</div>

We would like you to evaluate **the macro-environmental, societal factors in your country or on a regional level** that affect the feasibility of result-based contract type.

These factors cover 1) environmental factors such as climate and climate change, 2) political factors, such as governance and regulations, 3) economic development, 4) social and cultural norms and values, as well as the structure of population, 5) technological development and innovations and 6) legal aspects.
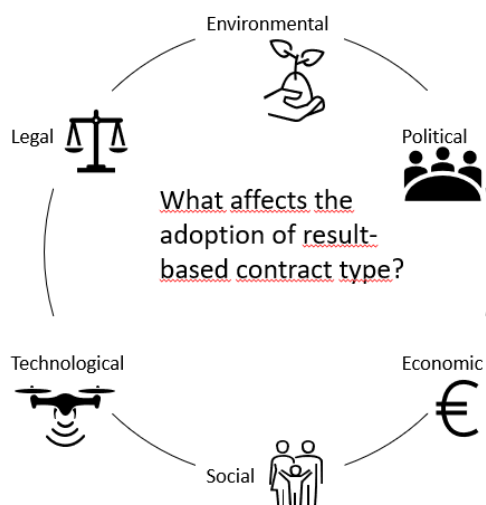
6.1 Please, ponder the macro-environmental factors in your country. What are important topics, phenomena, aspects, or trends under these six factors mentioned above that exist in the operational environment in your country or region, that would affect the of result-based contract type? Please, list five of these topics in the table below.

6.2 Mark if these topics are promoting or hindering (+/-) the adoption of result-based contract type.

6.3 Select one, most important topic that affects to the adoption of result-based contract type among the ones you listed.

Your list of topics	Is the topic promoting or hindering the adoption of result-based contract type?		The most important (only one)
	promoting +	hindering -	
1.	☐	☐	☐
2.	☐	☐	☐
3.	☐	☐	☐
4.	☐	☐	☐
5.	☐	☐	☐

6.4 Do you have any further comments e.g. about the presented contract types or their characteristics? You can also comment on this survey.

ADD HERE PROPER THANK YOU -WORDS FOR ANSWERING THE SURVEY!

8 Annex C: Land managers results; relevant groups characteristics – figures and tables

Figure C1. Environmental aspects considered by the measures adopted by the holding in the last 5 years: (A) Landscape; (B) Biodiversity; (C) Soil quality; (D) Carbon storage; (E) Water quality and quantity, per aggregated specialization
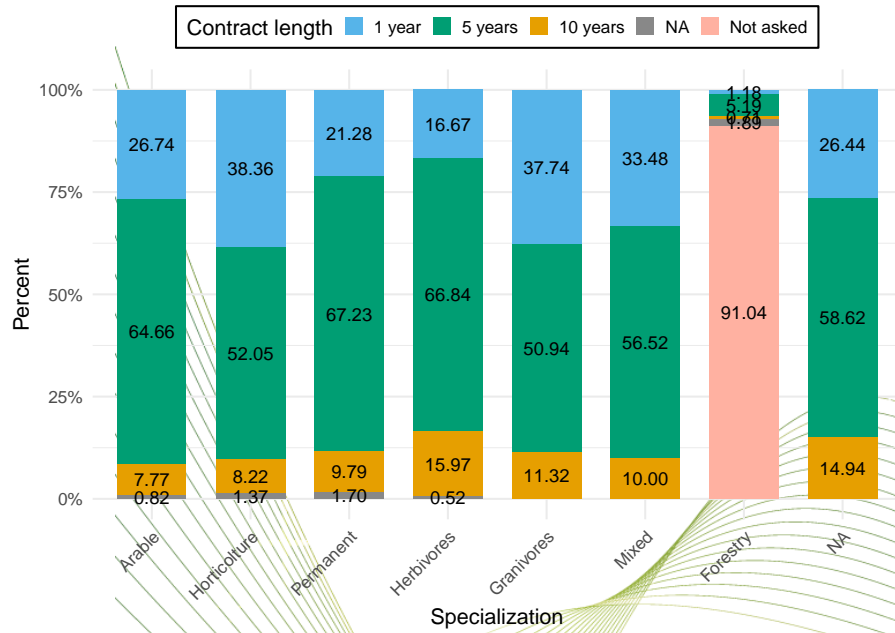
Figure C3. Preferred contract length for AECM in agriculture

Figure C4. Preferred contract length for AECM in forestry

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Figure C5. Respondent's perception of "understandability" (A), "applicability" (B), "economic beneficial" (C) on the result-based contract, per aggregated specialization

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Figure C6. Willingness to enrol in a result-based contract per aggregated specialization
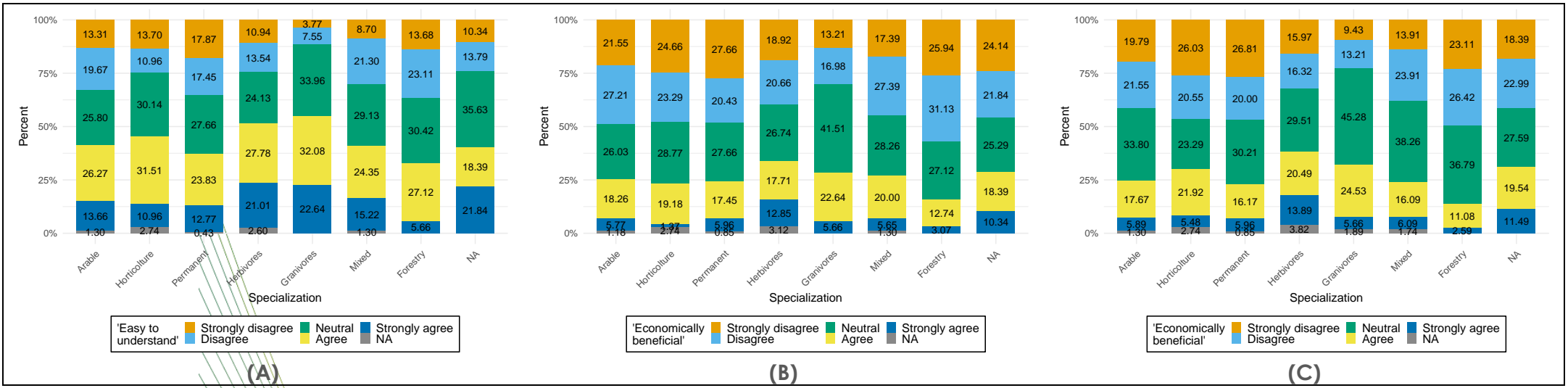
Figure C7. Respondent's perception of "understandability" (A), "applicability" (B), "economic beneficial" (C) on the collective contract, per aggregated specialization

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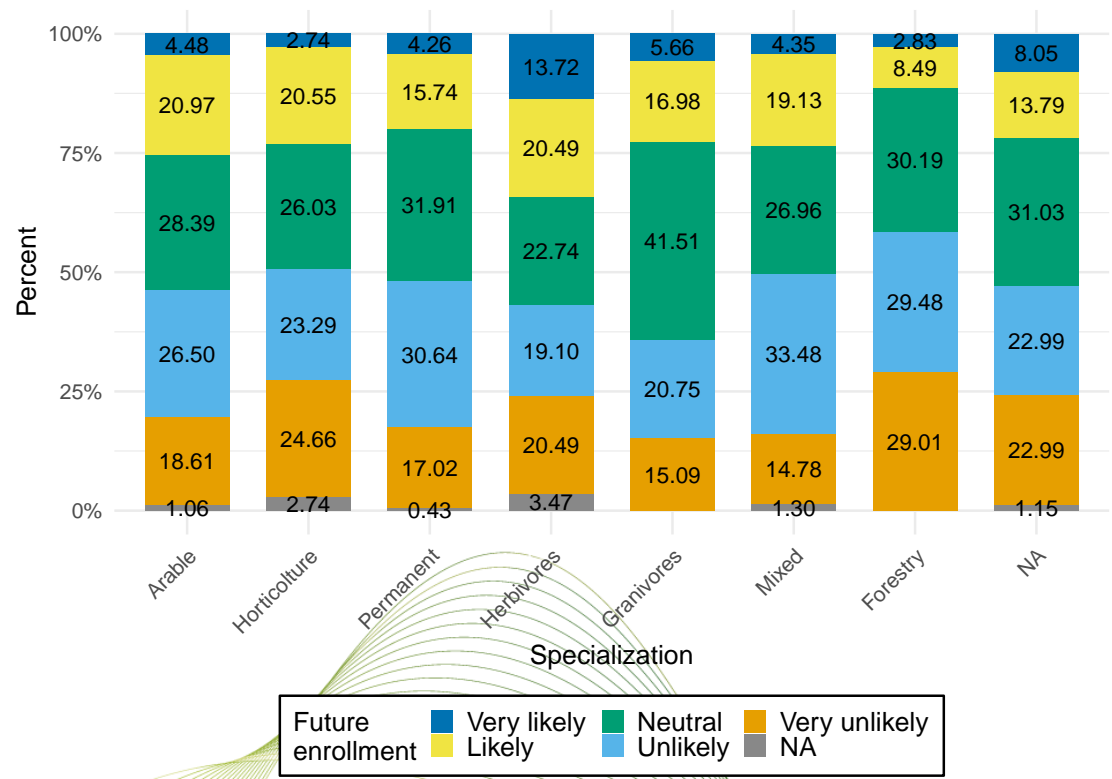
Figure C8. Willingness to enrol in a collective contract per aggregated specialization
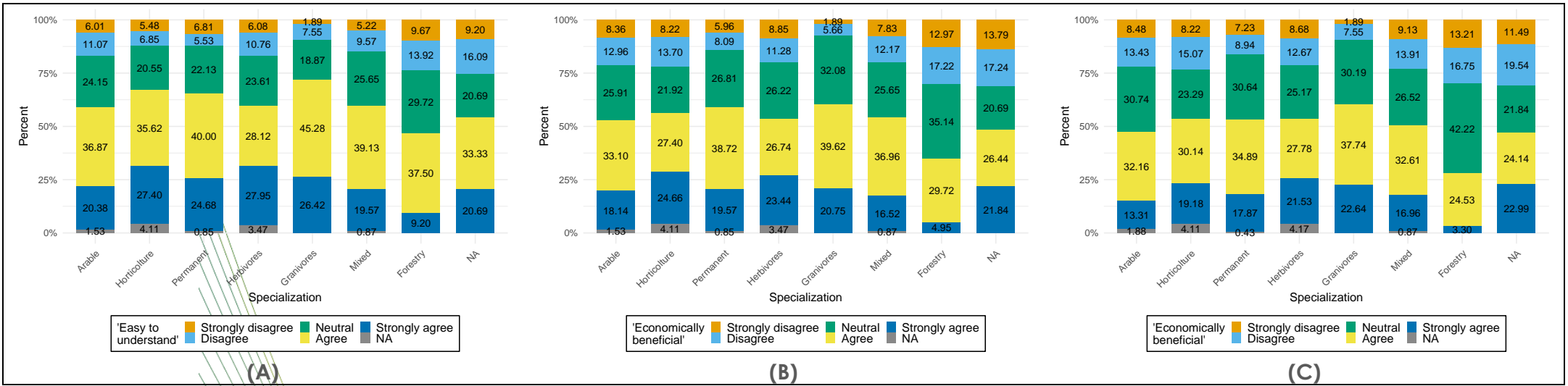
Figure C9. Respondent's perception of "understandability" (A), "applicability" (B), "economic beneficial" (C) on the value chain contract, per aggregated specialization
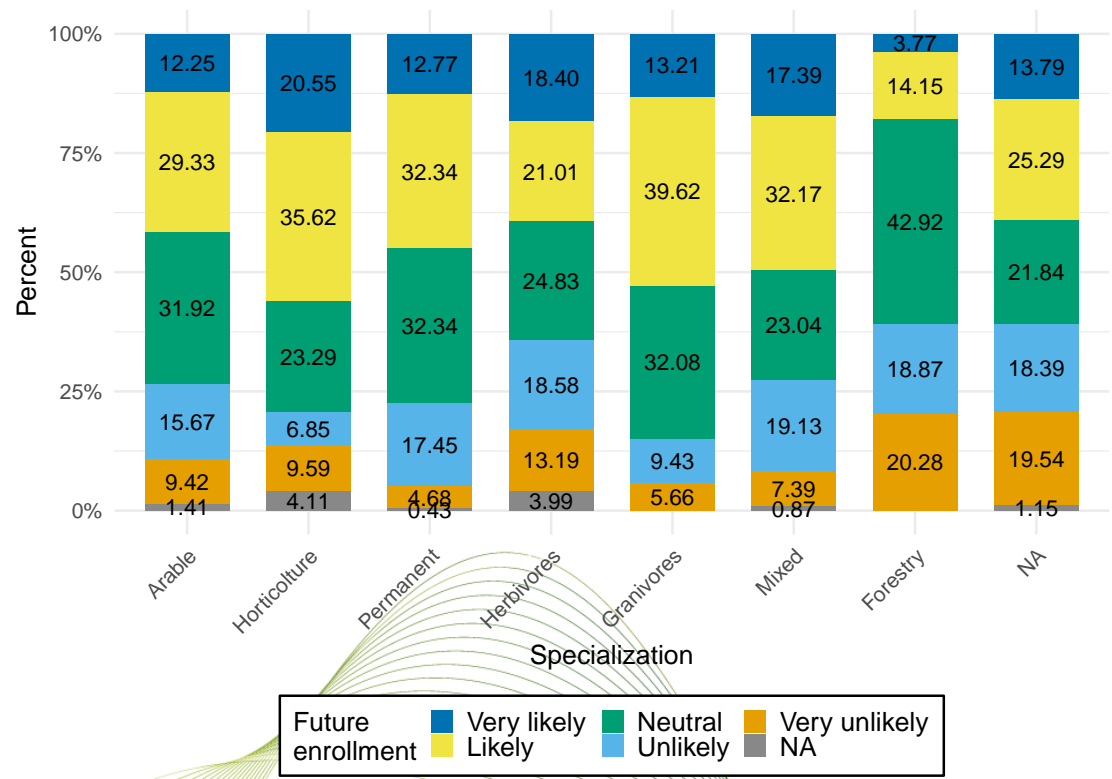
Figure C10. Willingness to enrol in a value chain contract per aggregated specialization
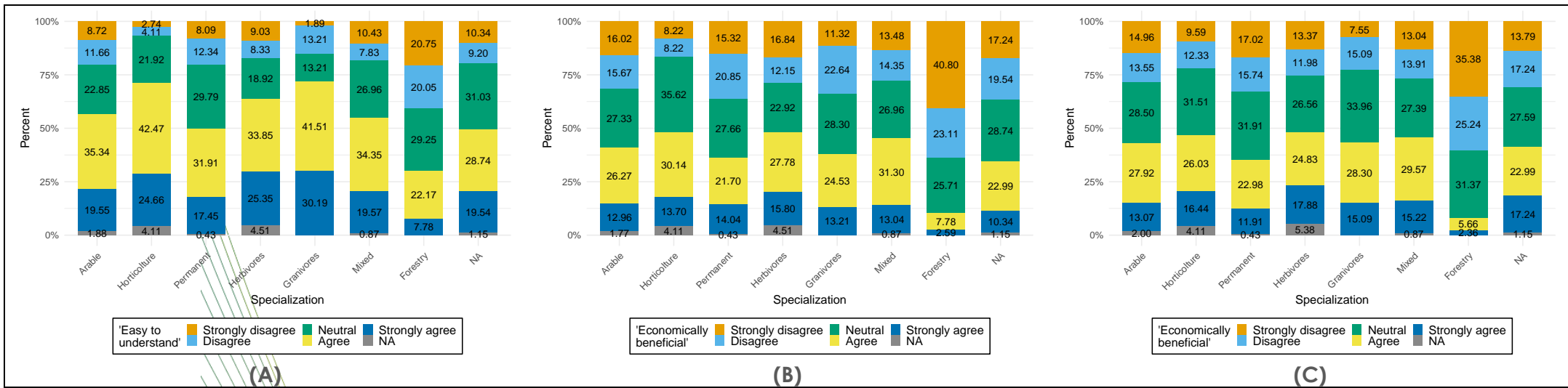
Figure C11. Respondent's perception of "understandability" (A), "applicability" (B), "economic beneficial" (C) on the land tenure contract, per aggregated specialization

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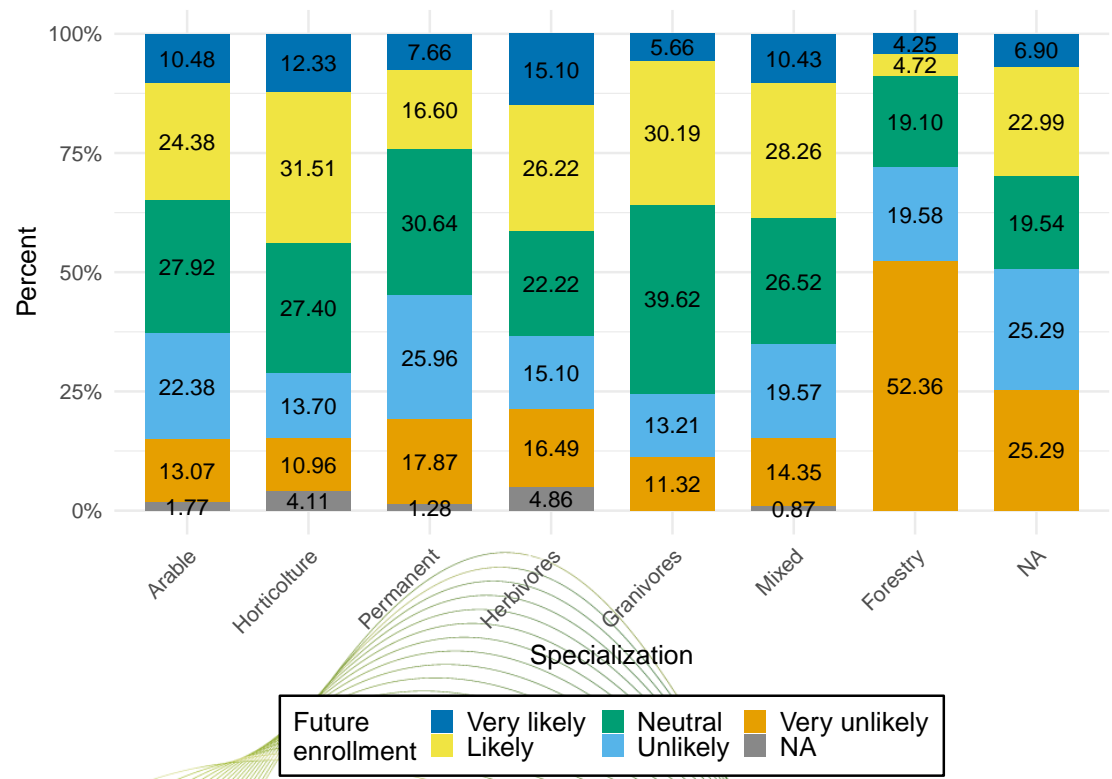
Figure C12. Willingness to enrol in a land tenure contract per aggregated specialization

9 Annex D: Land managers survey results; per country characteristics – figures and tables
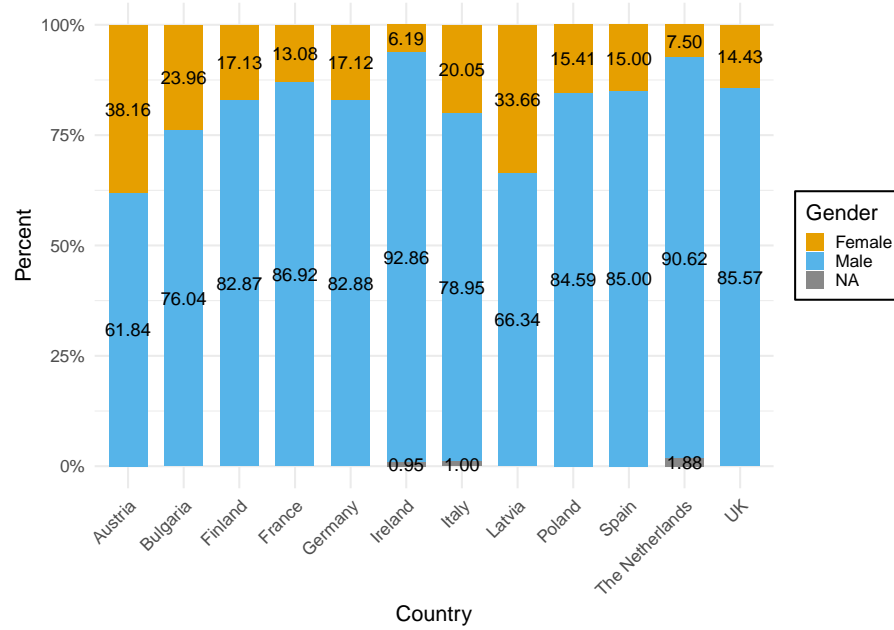
FIGURE D1. GENDER OF RESPONDENT
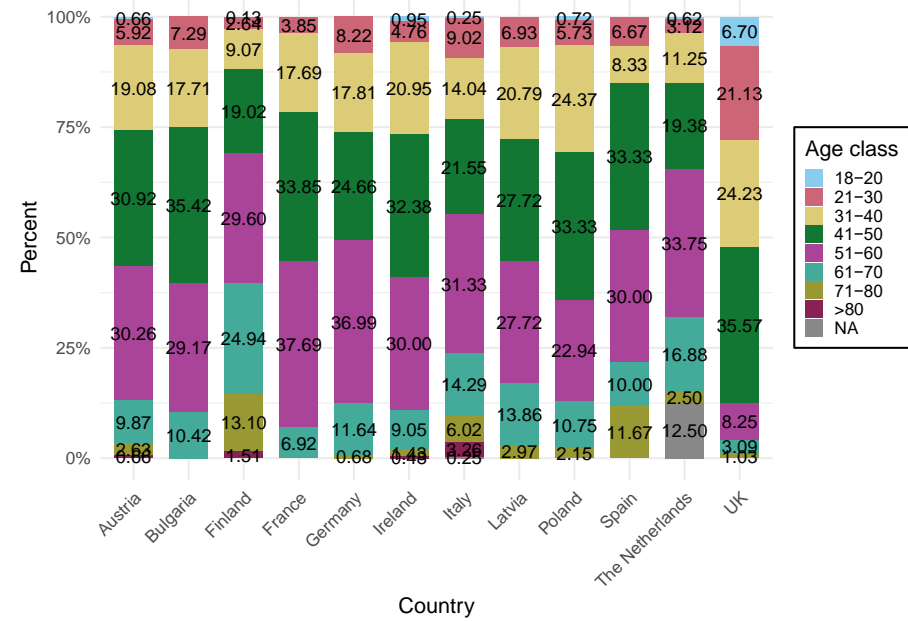
FIGURE D2. AGE (IN CLASSES) OF RESPONDENT
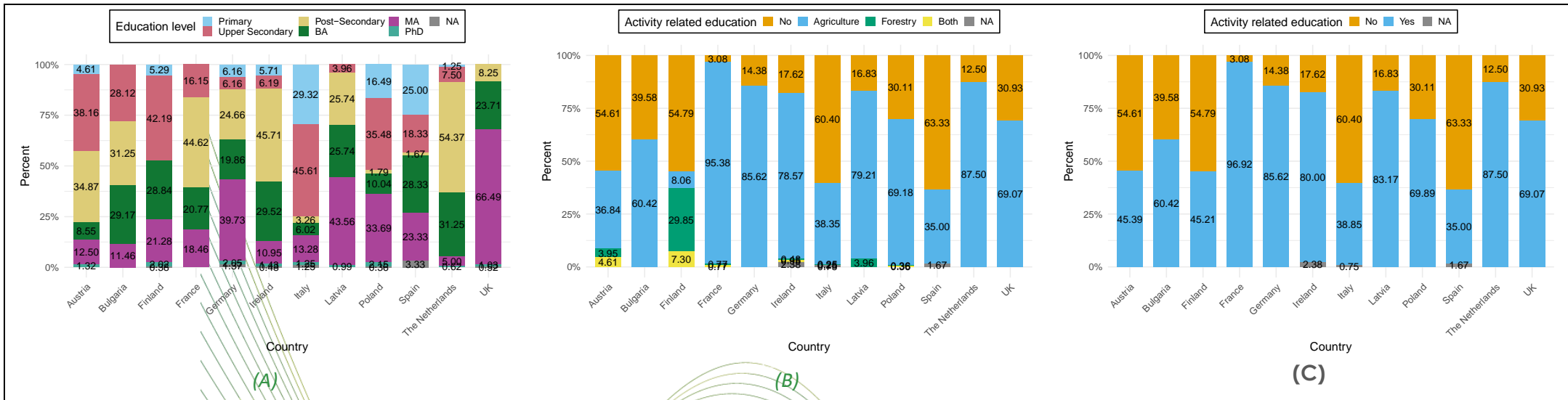
Figure D3. (A) Education level of respondent. (B) Respondent having a specific education in agriculture, silviculture (or both). (C) Respondent having a specific education (either in agriculture, silviculture, or both)
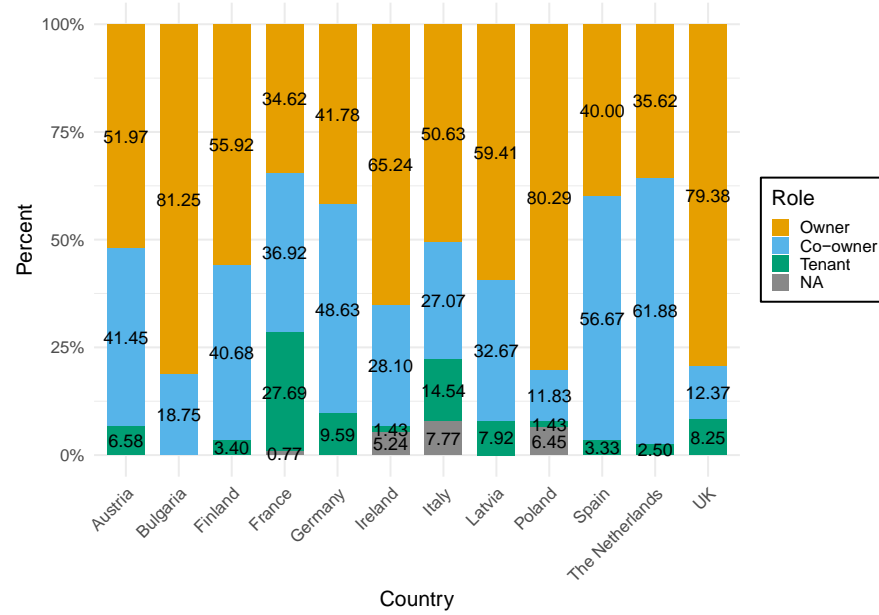
Figure D4. Respondent role in the holding
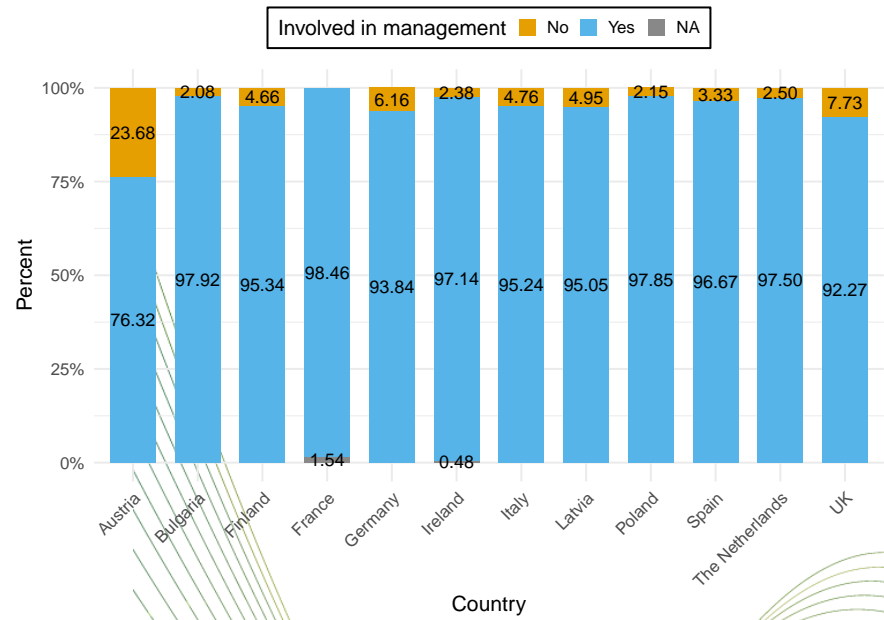
Figure D5. Respondent being actively involved in the holding management
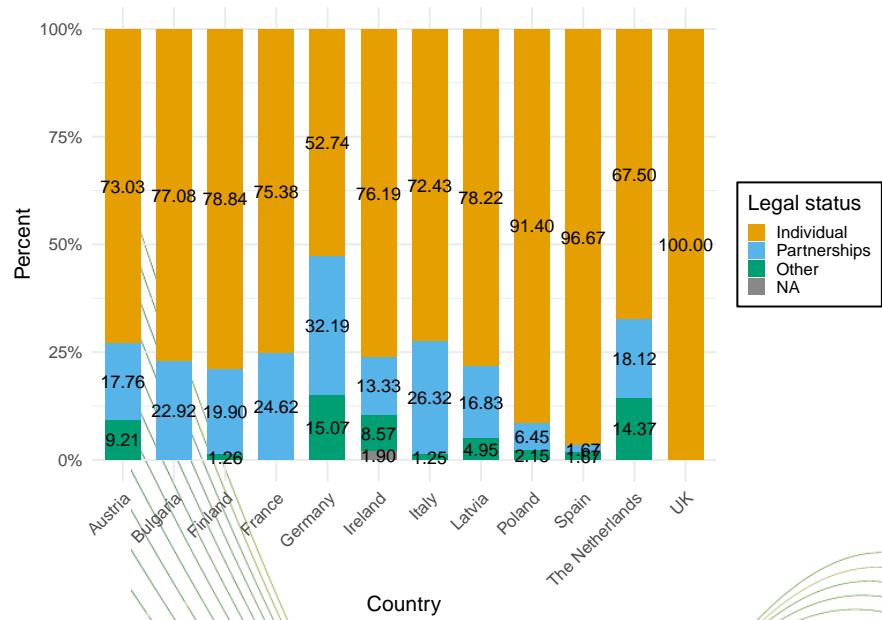
Figure D6. Legal status of the holding
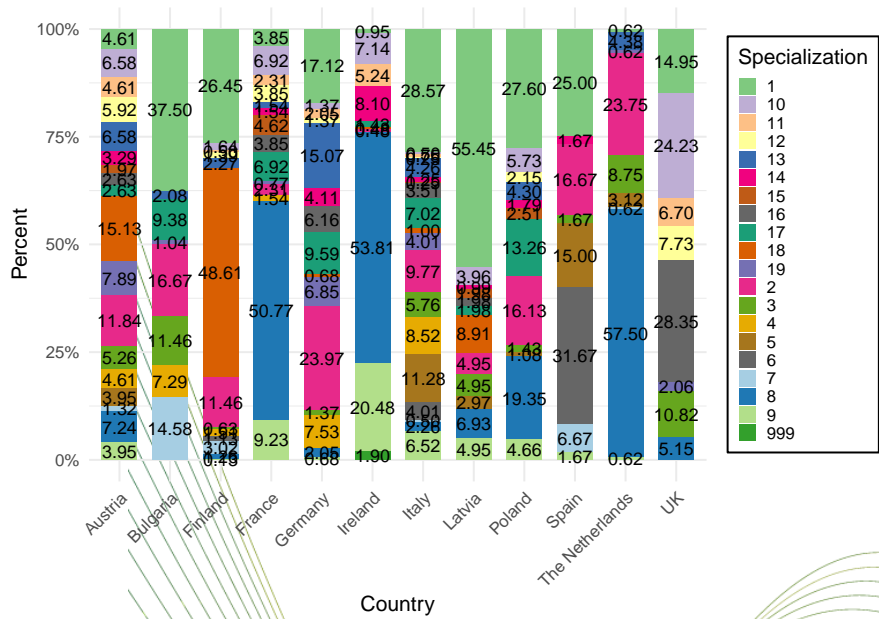
Figure D7. Holding specialization
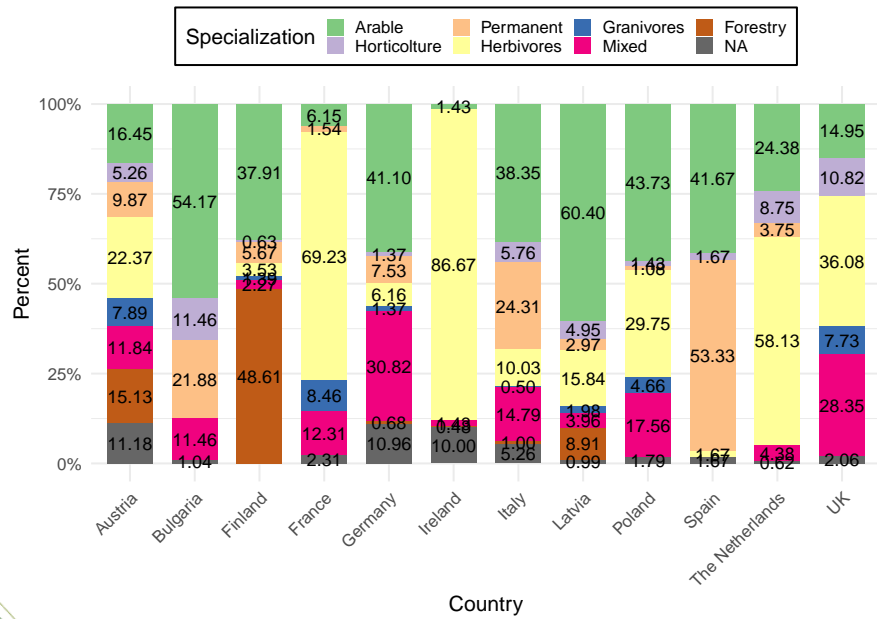
Figure D8. Holding specialization (main, aggregated)

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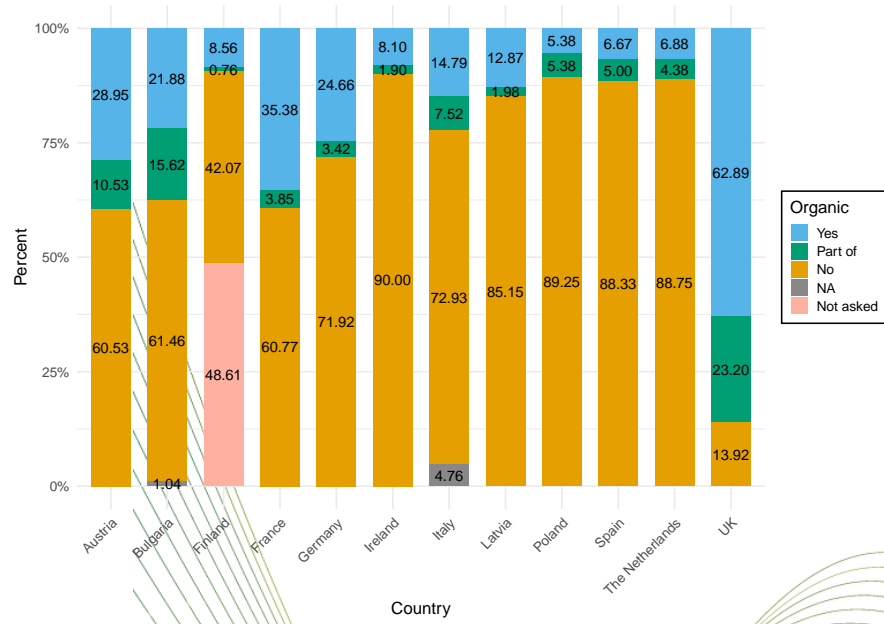
Figure D9. Organic holding
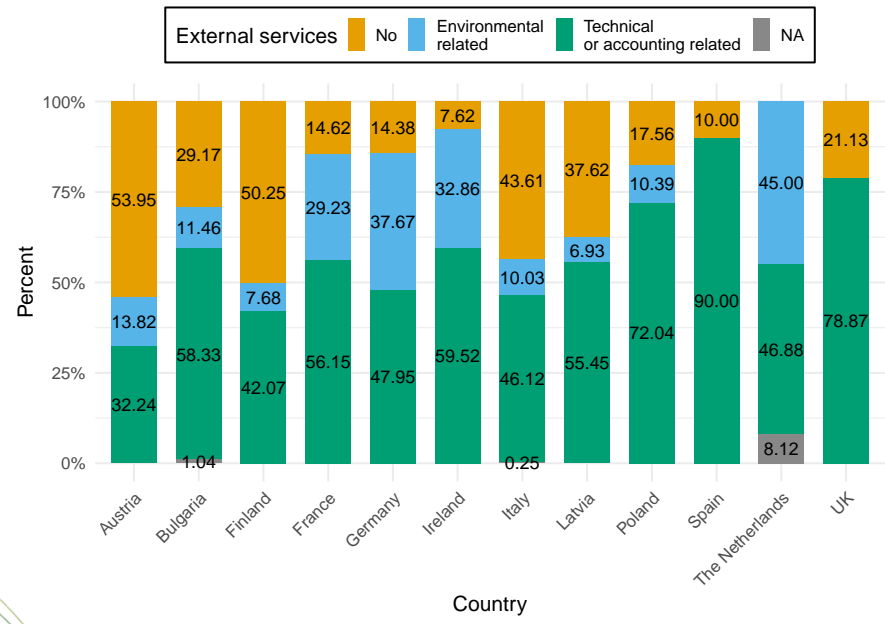
Figure D10. Holding paying for external services or assistance
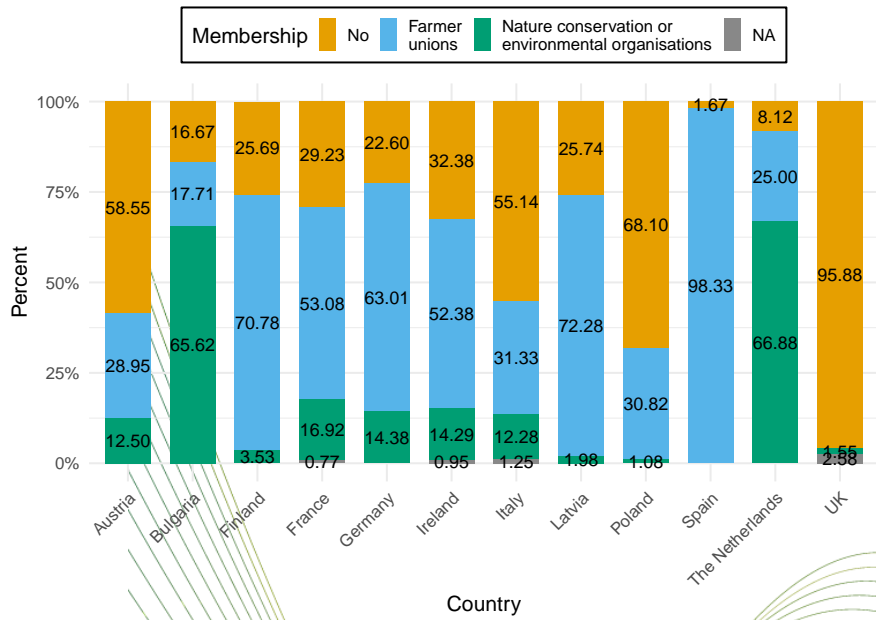
Figure D11. Membership of respondent
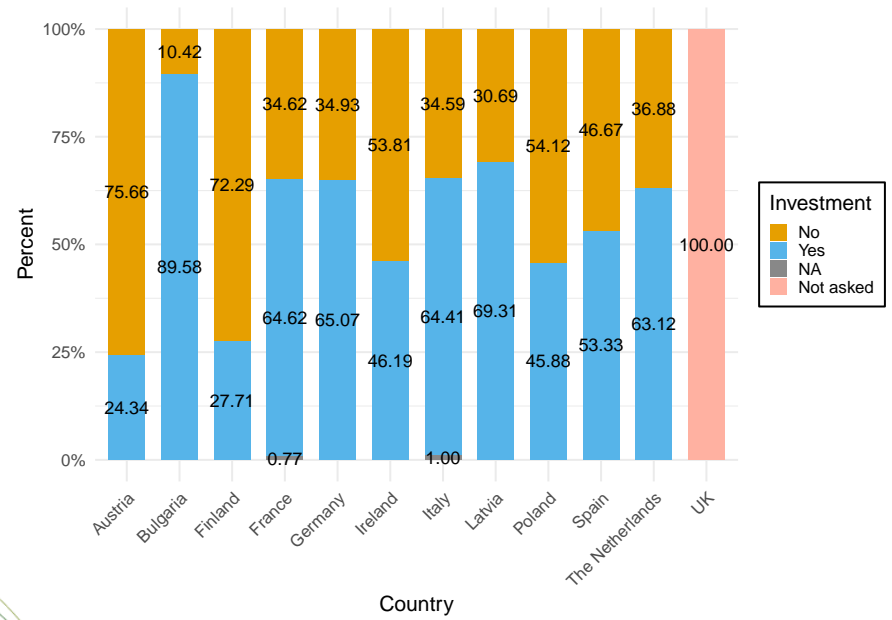
Figure D12. Respondent having invested in the holding in the last 5 years

193
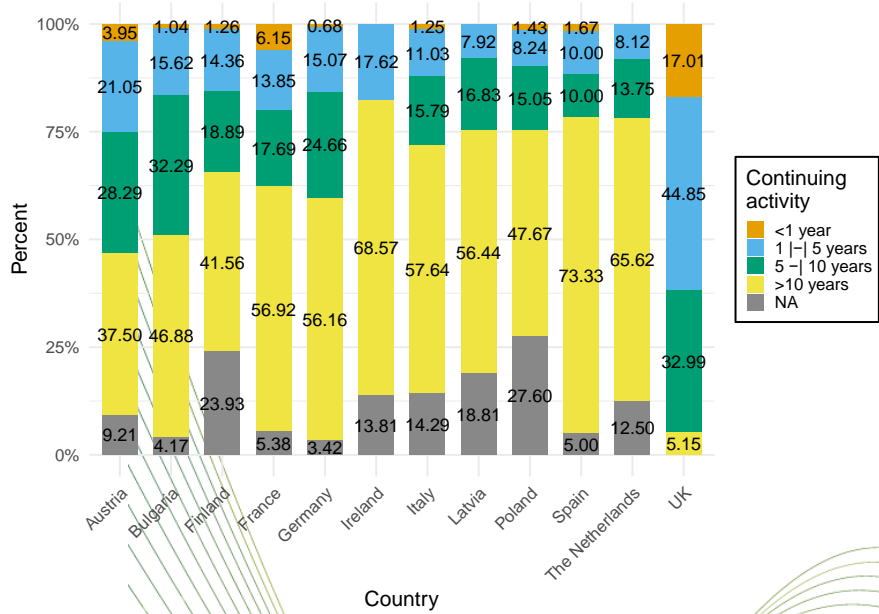
Figure D13. Respondent intention of continuing the holding activity
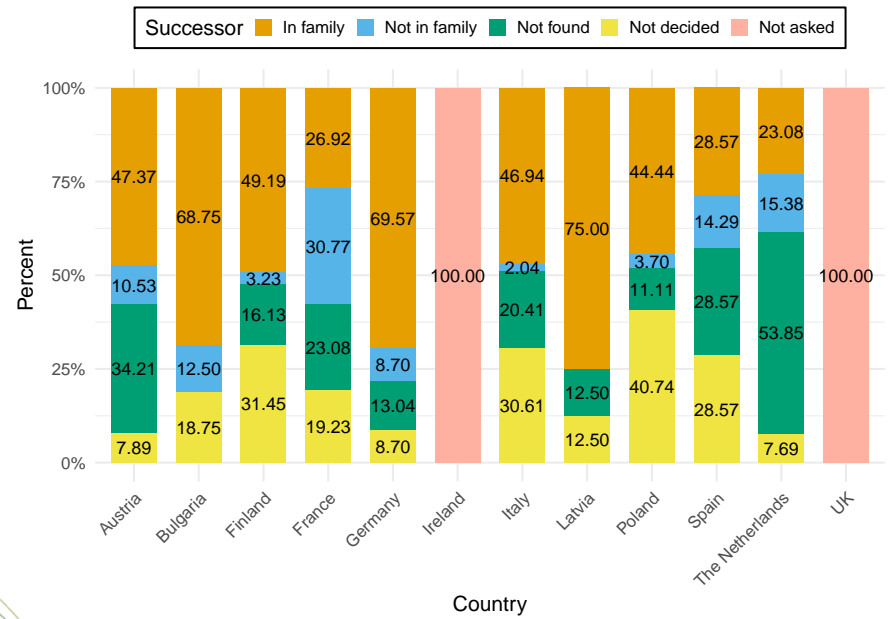
Figure D14. Successor designed for continuing the holding activity (asked only to respondents declaring that the activity will stop within 5 years)
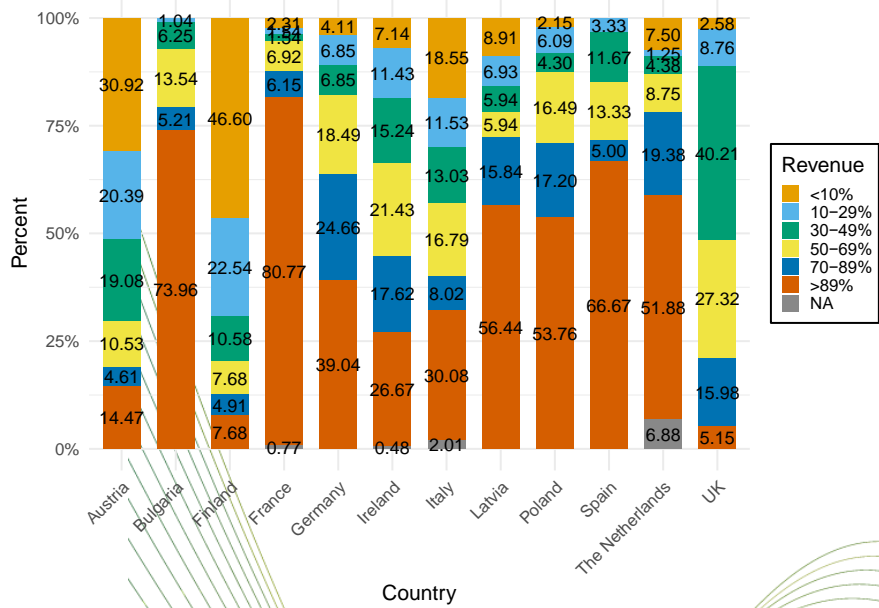
Figure D15. Share of the household income coming from the holding activity
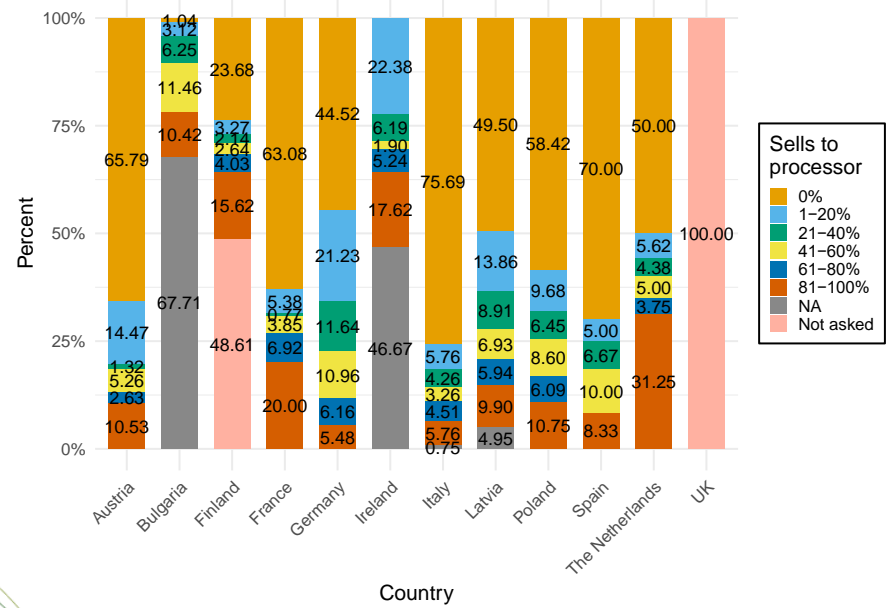
Figure D16. Share of the holding sells to processors

195
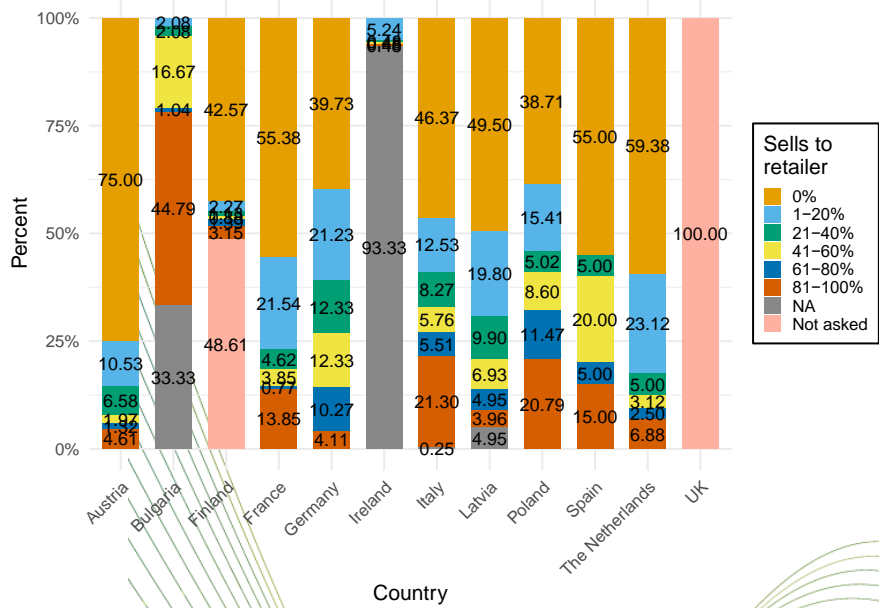
Figure D17. Share of the holding sells to private retailers
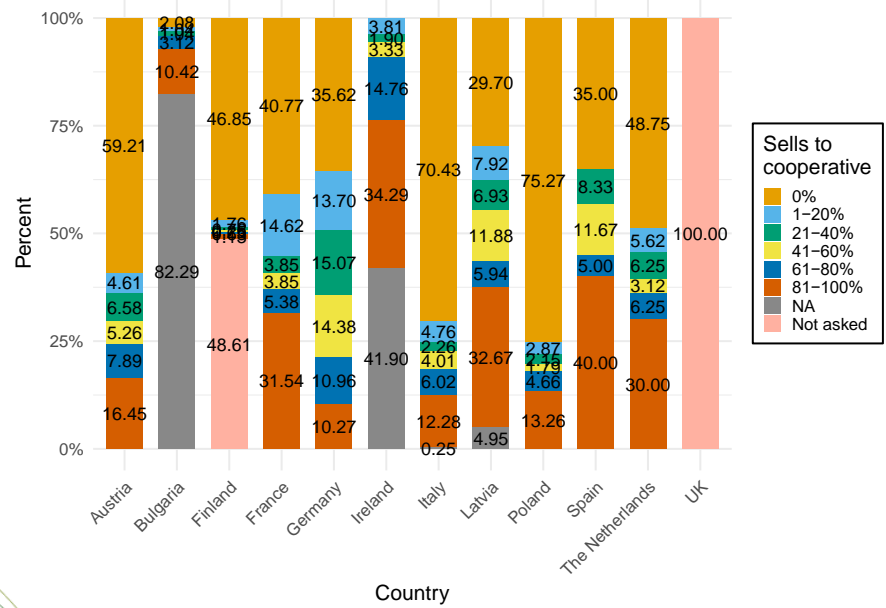
Figure D18. Share of the holding sells to cooperatives
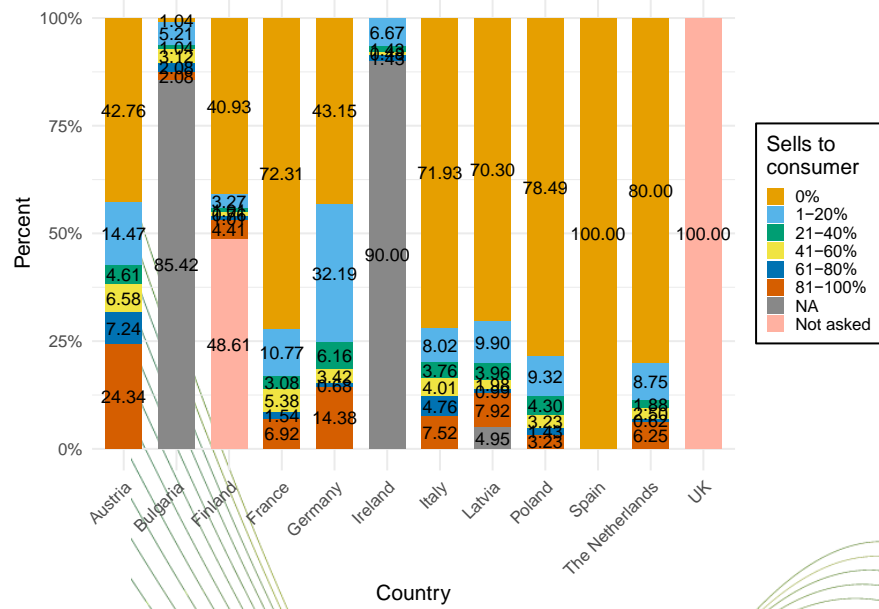
Figure D19. Share of the holding direct sells
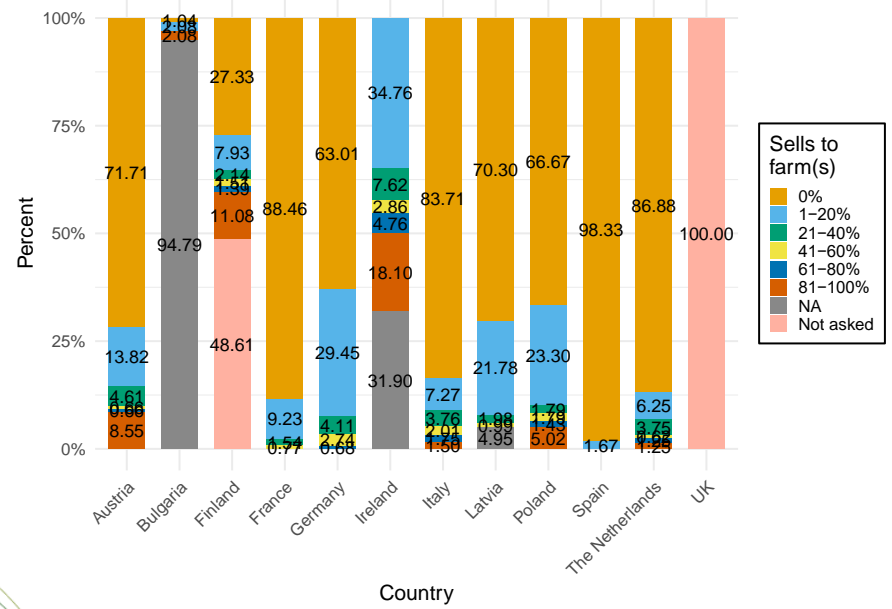
Figure D20. Share of the holding sells to other farms

197
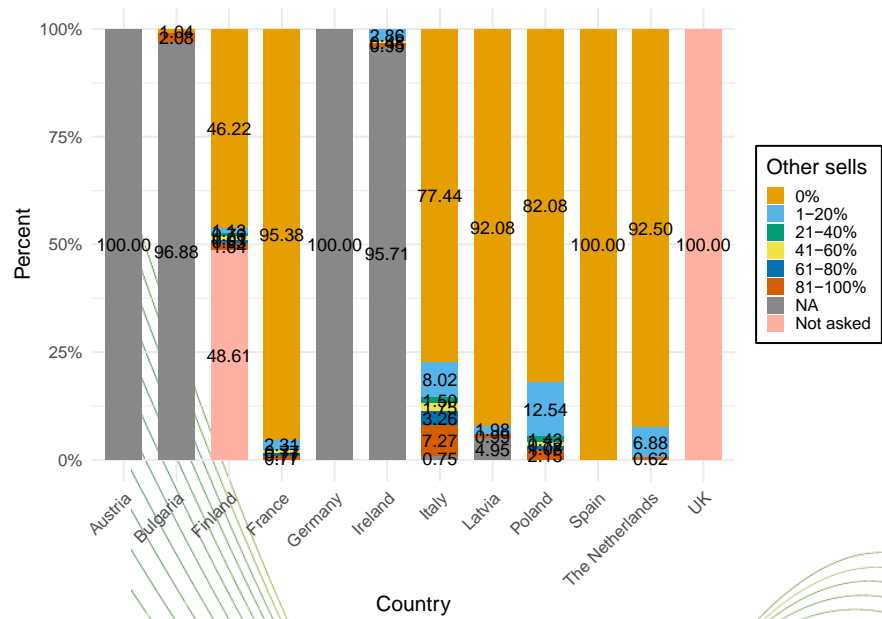
Figure D21. Share of the holding sells to other clients
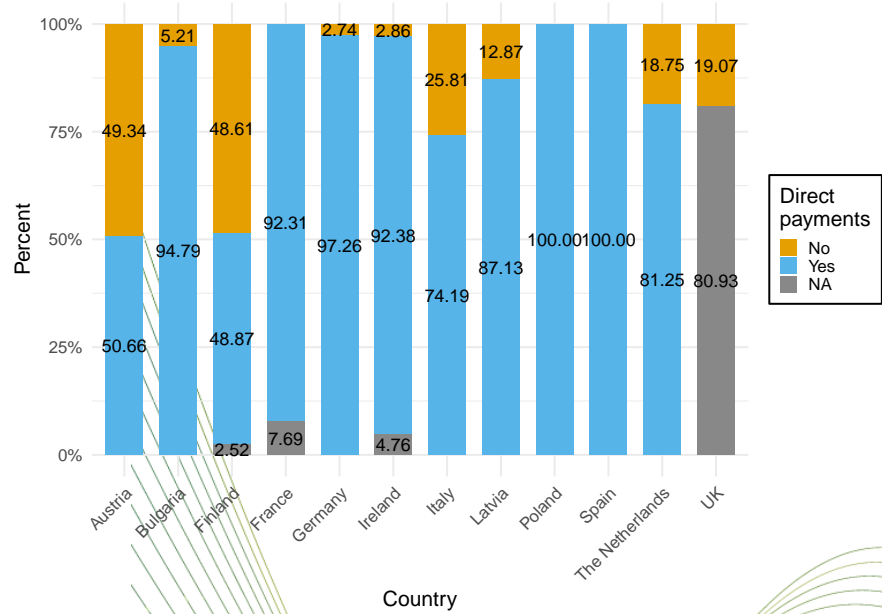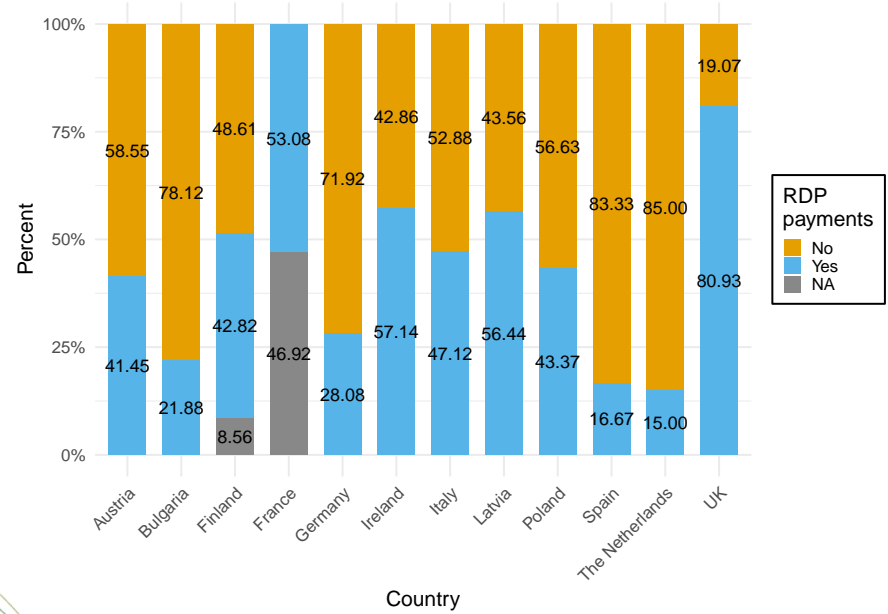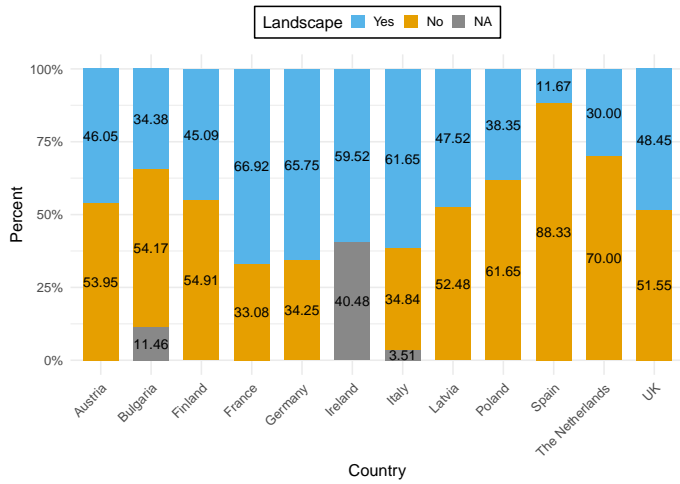
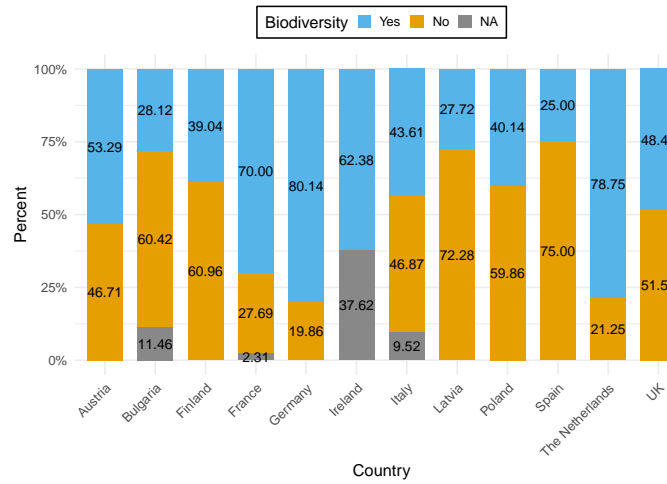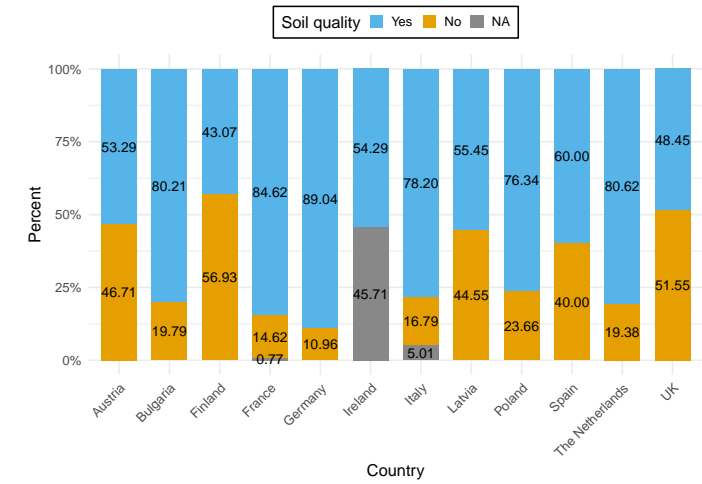Figure D22. Holding receiving direct payments

Figure D23. Holding receiving RDP payments

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(A)

(B)

(C)
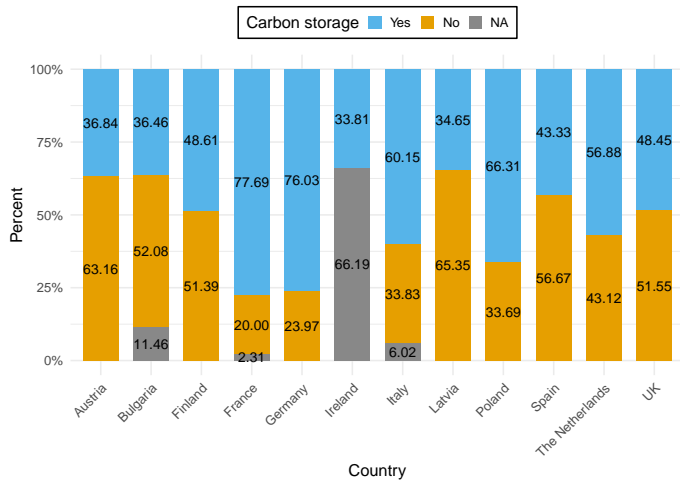
(D)
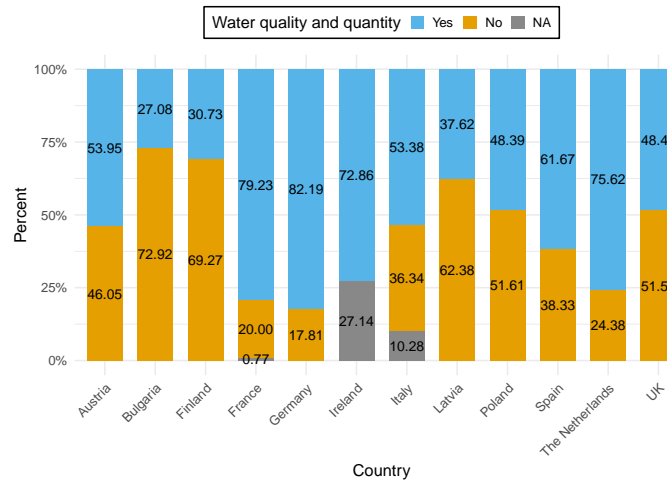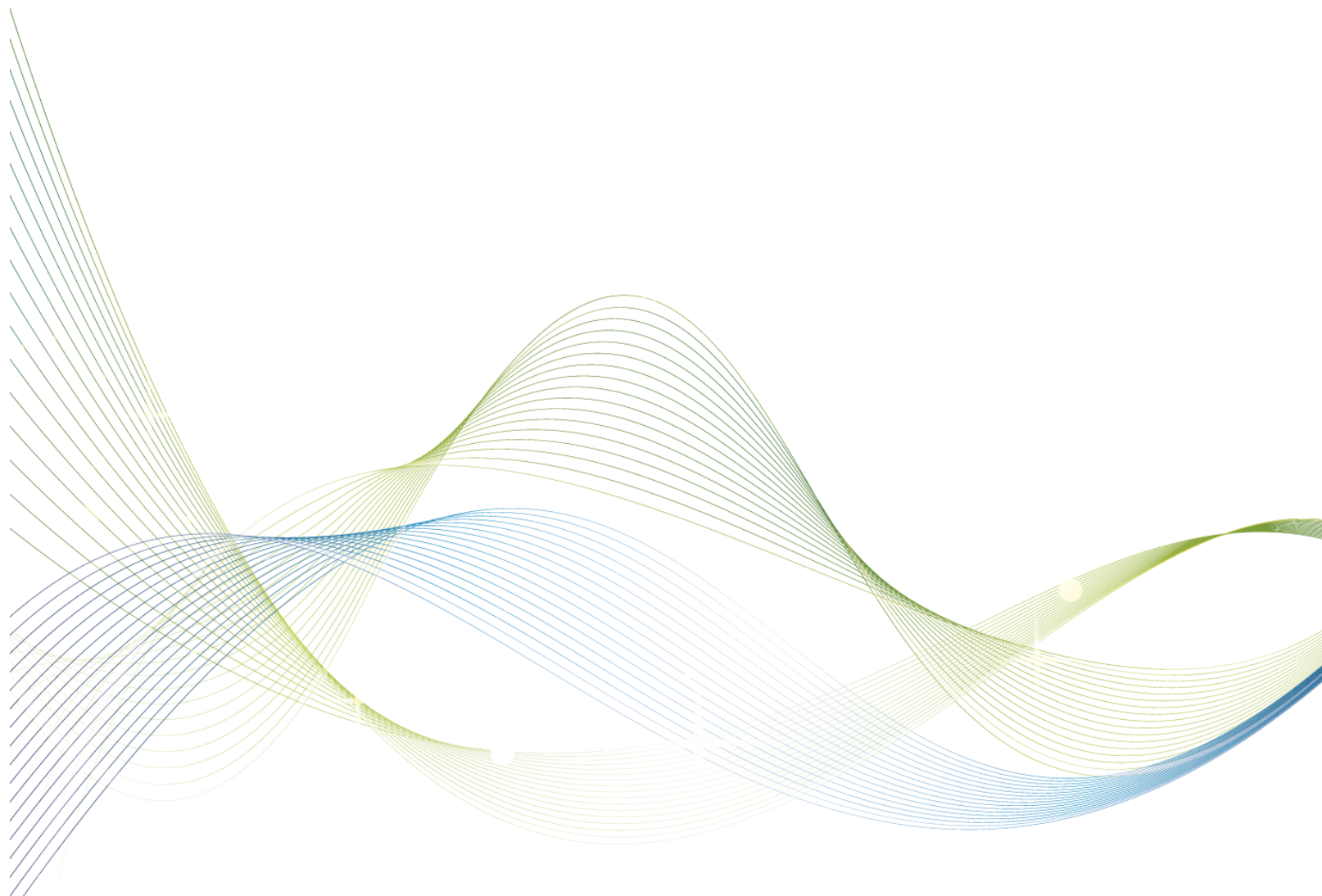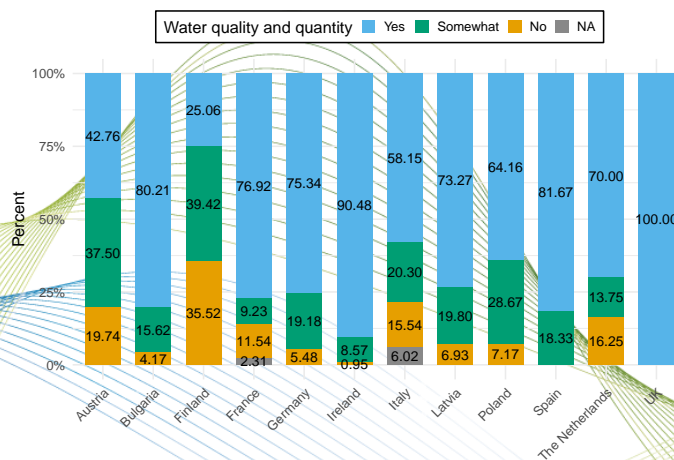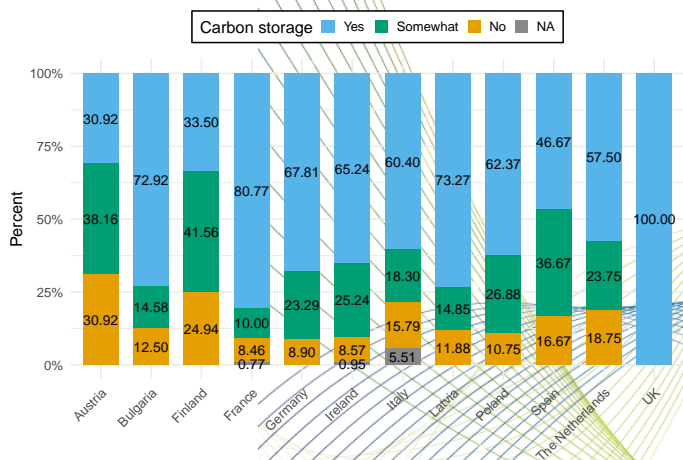
(E)

Figure D24. Environmental aspects considered by the measures adopted by the holding in the last 5 years: (A) Landscape; (B) Biodiversity; (C) Soil quality; (D) Carbon storage; (E) Water quality and quantity
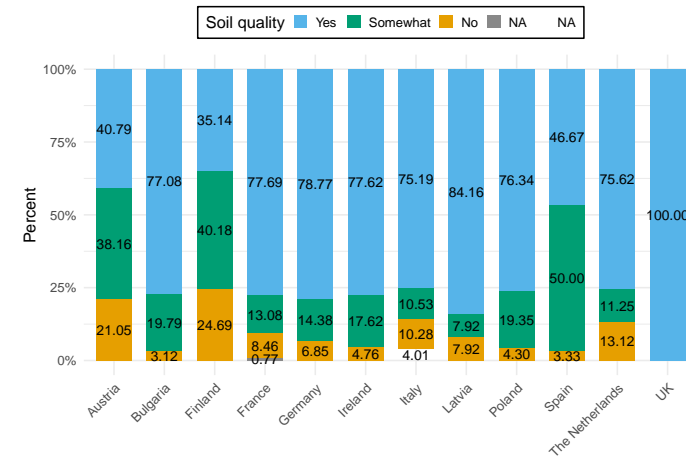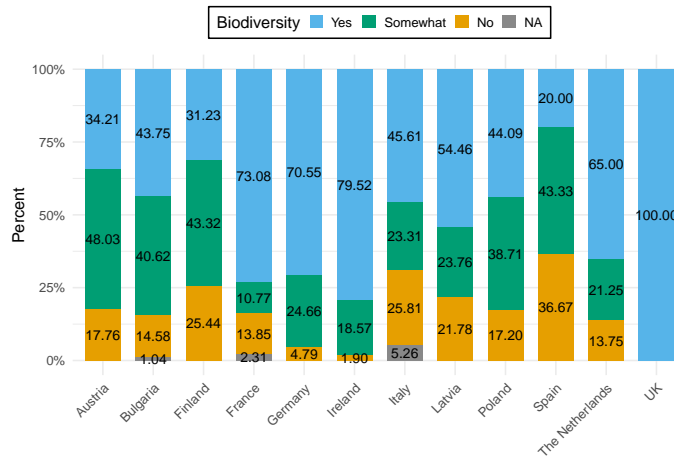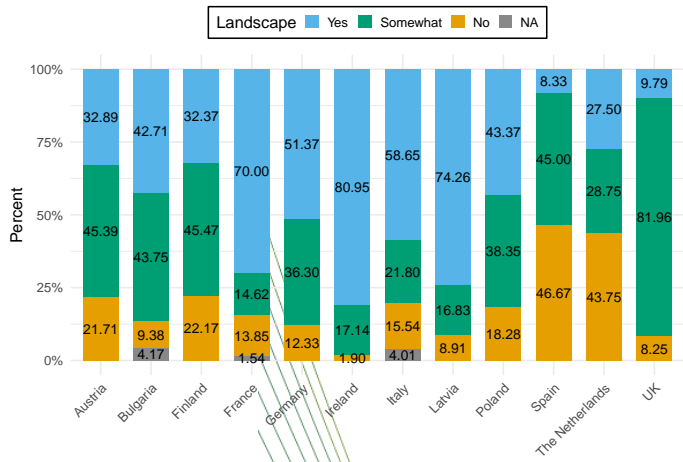
Figure D25. Environmental aspects of interest characterising the measures that the holding is willing to adopt in the next 5 years: (A) Landscape; (B) Biodiversity; (C) Soil quality; (D) Carbon storage; (E) Water quality and quantity

Figure D26. Preferred contract length for AECM in agriculture

Figure D27. Preferred contract length for AECM in forestry

10 Annex E: Stakeholders survey results – tables

Table E1. Regional level of the respondents background organisation if specified

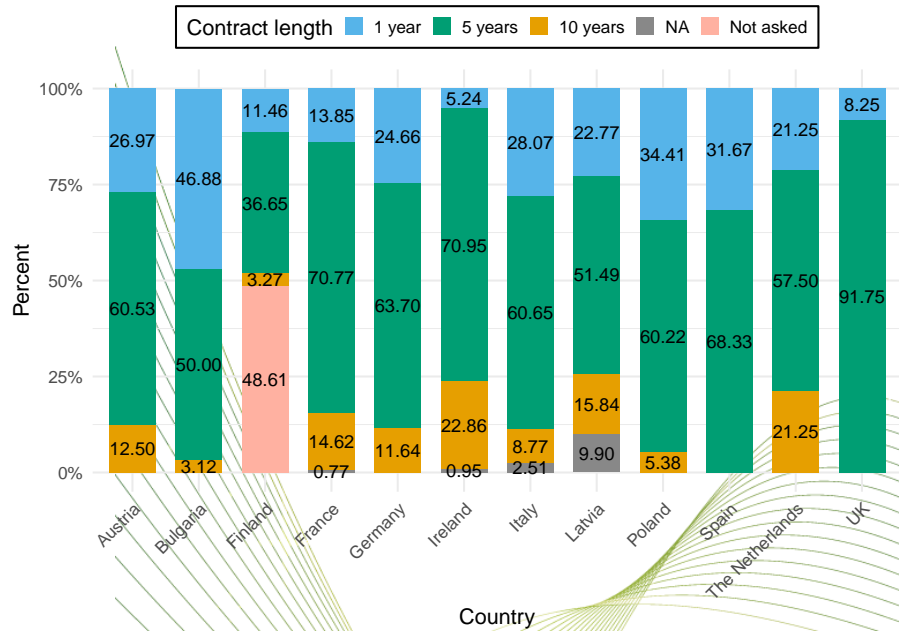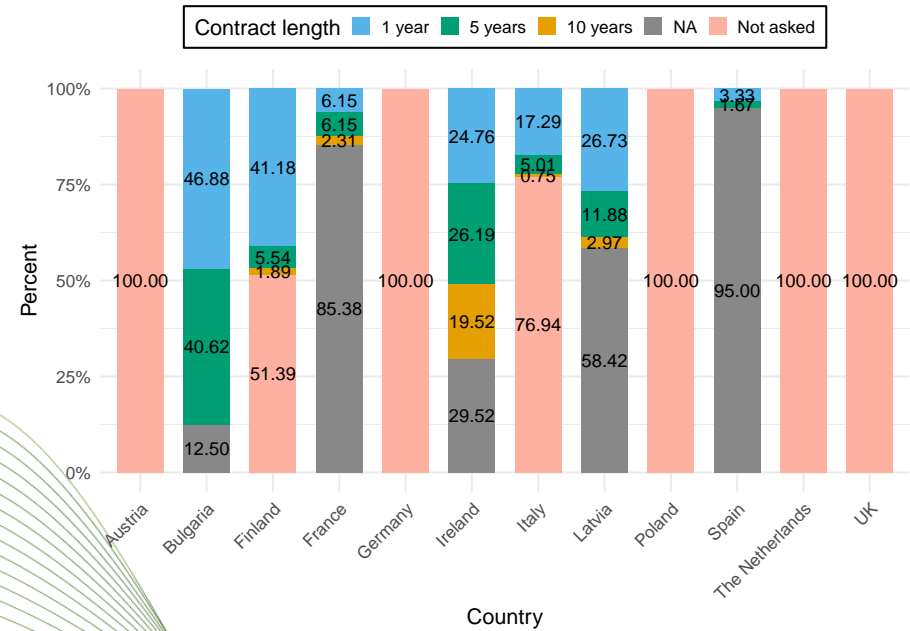| Country	Local	Regional	National	International	Not asked	Total	Total-%
Austria	0	7	22	5	0	34	7.6
Bulgaria	0	0	51	0	0	51	11.4
France	16	20	6	0	0	42	9.4
Germany	7	30	14	0	0	51	11.4
Ireland	0	0	0	0	16	16	3.6
Italy	6	45	8	0	0	59	13.2
Latvia	8	5	21	0	0	34	7.6
Poland	44	30	27	0	0	101	22.6
Spain	0	0	11	0	0	11	2.5
Netherlands	2	4	5	0	9	20	4.5
United Kingdom	0	0	28	0	0	28	6.3
Total	83	141	193	5	25	447	100
Total-%	18.6	31.5	43.2	1.1	5.6	100	100

Table E2. Respondent's organisation

Country	Governmental organization, state level	Governmental organization, regional or local level	Non-governmental organization (interest group)	Non-profit organization (e.g., foundation, association)	Private company	Public enterprise	Academic (e.g., university, research institute)	Civil society / Private individual	Other
Austria	3	0	3	3	11	6	6	0	1
Bulgaria	5	11	6	5	6	0	17	2	0
France	1	10	3	13	6	1	0	0	2
Germany	4	10	4	4	9	4	4	2	7
Ireland	5	0	1	5	3	0	5	1	0
Italy	1	10	3	1	26	4	3	1	11
Latvia	5	7	6	5	8	3	1	3	0
Poland	3	4	29	3	33	1	5	14	6
Spain	0	1	0	0	3	1	5	0	1
The Netherlands	0	3	2	0	3	0	1	3	0
United Kingdom	3	7	7	4	3	1	1	0	2
Total	30	63	64	43	111	21	48	26	30
Total-%	6.7	14.1	14.3	9.6	24.8	4.7	10.7	5.8	6.7

Table E3. Special area of responsibility (multiple answers possible)

Country	Agriculture	Forestry	Food sector	Environmental protection/nature conservation	Water management	Land use policy and planning	Training and advice	Research and development	Public administration	Community development	Other
Austria	27	12	10	19	4	4	9	6	5	0	0
Bulgaria	21	7	8	16	7	8	19	16	10	2	2
France	35	7	19	22	10	7	12	15	6	2	4
Germany	47	9	1	20	5	8	2	7	8	3	1
Ireland	14	2	2	11	5	6	3	6	1	1	2
Italy	47	5	11	7	2	8	6	18	6	5	5
Latvia	20	7	2	5	1	6	3	3	4	2	0
Poland	71	0	5	5	0	0	2	4	7	3	4
Spain	5	2	1	5	2	3	3	3	4	1	1
Netherlands	17	0	2	15	6	2	1	4	0	6	1
United Kingdom	14	4	1	16	9	5	4	3	0	1	0
Total	318	55	62	141	51	57	64	85	51	26	20
Total-%	71.1	12.3	13.9	31.5	11.4	12.8	14.3	19	11.4	5.8	4.5

Table E4. Role (multiple answers possible)

Country	Processor of agricultural or forest products	Provider of information to the public	Provider of information/advice to farmers or forest owners	Regulation and enforcement	Equipment and/or tool provision	Providing finance to land managers/owners/workers	Providing/leasing land to land managers	Assistance for public funding of land management	Lobbying, campaigning	Community leader	Supervisory authority	Product certification body (e.g., organic, FSC, PEFC)	Other
Austria	4	20	24	3	3	4	5	5	7	2	4	0	22
Bulgaria	12	33	30	10	3	4	12	11	7	6	5	1	7
France	13	21	30	16	9	7	5	9	12	6	4	6	10
Germany	5	22	26	9	8	7	4	9	17	2	2	0	29
Ireland	1	6	9	5	1	4	0	1	1	0	0	0	8
Italy	24	17	25	22	4	11	5	10	9	15	7	2	16
Latvia	9	9	13	13	5	2	5	2	4	2	2	0	3
Poland	36	30	49	8	4	0	2	1	6	15	7	1	0
Spain	9	10	8	9	7	9	9	9	9	9	0	9	0
Netherlands	1	9	16	1	0	4	1	10	3	2	3	1	3
United Kingdom	2	1	8	2	1	1	0	2	2	0	0	0	9
Total	116	178	238	98	45	53	48	69	77	59	34	20	107
Total-%	26	39.8	53.2	21.9	10.1	11.9	10.7	15.4	17.2	13.2	7.6	4.5	23.9