

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

Draft framework

Authors: Viaggi, D., Raina, N., Targetti S.

Contributors: Schaller L., Blanco Velazquez F. J., Paillard H., Runge T., De Geronimo G., Eichhorn T., Delaunay S., Langlais-Hesse A.

Quality check: The document went through 2 rounds of internal review, comments, and additions by partners between July 2019 and February 2022.

Project	CONSOLE
Project title	CONtract Solutions for Effective and lasting delivery of agri-environmental-climate public goods by EU agriculture and forestry
Work Package	WP1
Deliverable	D1.4
Period covered	M12-M22
Publication date	
Dissemination level	Public

Project Consortium

N°	Participant organisation name	Country
1	ALMA MATER STUDIORUM - UNIVERSITA DI BOLOGNA	IT
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
11	ASOCIACIÓN AGRARIA JÓVENES AGRICULTORES DE SEVILLA	ES
12	UNIVERSIDAD POLITECNICA DE MADRID	ES
13	LUONNONVARAKESKUS	FI
14	ASSEMBLEE DES REGIONS EUROPEENNES FRUITIERES LEGUMIERES ET HORTICOLES	FR
15	ASSOCIATION TRAME	FR
16	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS	FR
17	INSTITUT NATIONAL DE LA RECHERCHE AGRONOMIQUE	FR
18	UNIVERSITY COLLEGE CORK - NATIONAL UNIVERSITY OF IRELAND, CORK	IE
19	UNIVERSITA DI PISA	IT
20	ZEMNIEKU SAEIMA	LV
21	STICHTING VU	NL
22	STICHTING HET WERELD NATUUR FONDS-NEDERLAND	NL
23	SZKOLA GLOWNA GOSPODARSTWA WIEJSKIEGO	PL
24	UNIVERSITY OF LEEDS	UK

Contents

Short design guide for practitioners.....	5
1 Introduction	5
1.1 Objective.....	5
1.2 Potential use of the document.....	7
1.3 Outline of the document.....	8
2 Framework	8
3 Main sources of information	9
3.1 Case studies	9
3.2 Feasibility of new contract solutions for practitioners.....	12
4 Model Contracts.....	13
4.1 Model contracts and their features.....	15
5 Design guide: list of potential parameters and options	22
5.1 Actors/parties involved	22
5.2 Payment characteristic	30
5.3 Object of contract solution: AECPG type and others.....	37
5.4 Contract length.....	40
5.5 Monitoring & enforcement.....	43
5.6 Sanctions	49
5.7 Flexibility	49
5.8 Information as a part of the scheme/role	51
5.9 Eligibility/ Conditions for participation.....	53
6 Design guide - decision trees for innovative contract types.....	55
6.1 Choice of contract solution	55
6.2 Result-based schemes	56
6.3 Collective schemes	57
6.4 Value chain schemes.....	58
6.5 Land tenure schemes.....	59
7 Discussion, Conclusion, and the next steps	61
7.1 Discussions and next steps.....	61
7.2 Tasks ahead	61
7.3 Conclusions	62
8 Appendix	62
8.1 Glossary.....	62
9 References.....	66
10 Acknowledgment.....	66

List of figures

Fig 1: Outline of CONSOLE work packages.....	6
Fig 2 General framework for contract design	9
Fig 3 Case study analysis	10
Fig 4 Potential combinations of selected contract features.....	13
Fig 5 Decision tree for contract type	56
Fig 6 Decision tree for designing result-based schemes	57
Fig 7 Decision tree for designing collective schemes.....	58
Fig 8 Decision tree for designing value chain schemes	59
Fig 9 Decision tree for designing land tenure schemes	60

List of tables

Table 1: List of case studies in CONSOLE.....	11
Table 2 Model contracts and their features.....	16
Table 3 List of actors involved	23
Table 4 Payment types and characteristics.....	31
Table 5 AECPG types and characteristics.....	38
Table 6 Contract length characterization.....	41
Table 7 Monitoring types and characteristics.....	44
Table 8 Types of sanctions	49
Table 9 Flexibility types in contracts.....	50
Table 10 Availability of advice and information in contracts	52
Table 11 List of conditions for participation.....	53

Short design guide for practitioners

The Short Design Guide for Practitioners is an independent document that provides a support for decision-makers by means of condensed information and simple illustrations of decision trees.

1 Introduction

1.1 Objective

This document reports on the Draft framework for the provision of AECPGs developed in the CONSOLE project. The report illustrates the characteristics and draft contents of the framework, including first solutions to make it usable in a decision-making context and first online implementation.

It is the outcome of Task 1.3 of the project, which is described as follows:

Task 1.3 Development of draft framework practical solutions catalogue (M12-M22)

Leader: UNIBO; **Co-Leader:** ASAJA.

Contributors: RER, BOKU, ECORYS, ELO asbl, IAE, TI, EVENOR, UPM, LUKE, AREFL, TRAME, CNRS, INRA, UCC, UNIPI, ZSA, VUA, SGGW, UoL, UNIFE

This task will focus on developing parts a) and b) of the framework, i.e., respectively the catalogue showcasing existing successful experiences and good practices and improved AECPGs contracts solutions. Using task 1.1. as a conceptual basis this task will take stock of information basis arising from tasks 2.1, in order to develop a draft part a) of the framework; based on this it will develop a range of improved contract solutions to meet the objectives of the project and build up part b) of the framework. These will be fed and refined during the task benefiting of additional results from the tasks 2.2, 2.3 and intermediate lessons learned in task 2.5. This will be done through a framing and structuring workshop (WEU1.1), including the invitation of key external experts and stakeholders. The outcome of this task will feed task 1.3 and WP3.

This document is part of CONSOLE's WP1 which focuses on the development of the AECPG contractual framework, including model contracts, which is at the core of the project, through a deep involvement of the relevant Community of Practice (discussed in WP5). This work package aims to produce a consolidated report wherein the inputs from other WPs will be incorporated in a process of co-constructed knowledge accumulation and operationalization, as can be seen below (Fig 1).

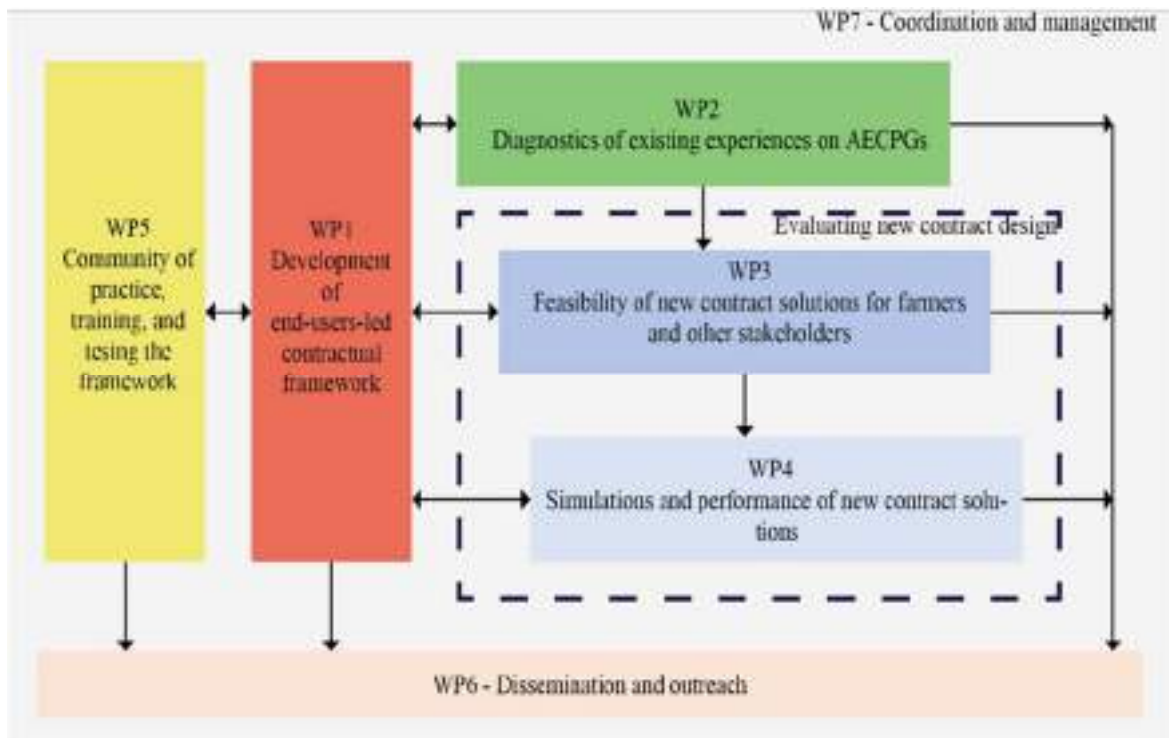


Fig 1: Outline of CONSOLE work packages

This document was preceded by Deliverable D1.1 which aimed to build a preliminary conceptual framework for the project CONSOLE. The initial draft defined the new contractual solutions and was the basis for initial coordination among WPs. It was followed by deliverables of WP2 wherein empirical evidence on existing initiatives were identified to showcase successful implementation of improved solutions. These successful cases were a basis for designing surveys in WP3 and for modelling innovative contract solutions in WP4. The lessons derived from all the WPs about contract performance and farmers' perception towards them has been consolidated into this guide document, which overviews the different contract designs and enabling conditions for practitioners' and stakeholders' choice.

Further studies will also continuously feed the framework development with insights from legal and technical feasibility. It will also contribute to identify data needs and data management issues for the implementation of the developed approaches.

The final version of the framework will include the following:

- a) a catalogue showcasing existing successful experiences and good practices in AECPGs contracting based on the case studies developed in WP2 and presented in a usable form as examples for practitioners including hints for replication.
- b) improved AECPGs contracts solutions suitable to be used as models for future design, including their assessment and the role of different levels of governance (from local to EU) and implementation.

c) a “design guide” intended as a systematic comprehensive process for the design of AECPG contracts, including the conceptual framework, design variables, determinants, legal and technological aspects and roles of different governance levels in implementation.

d) documentation, training and supporting materials.

This document will provide contents for the framework in view of the testing (T5.2), while the practical implementation into easily accessible solutions will be done in WP6 in relation with the project website and hub.

1.2 Potential use of the document

This document emanates from WP1, 2, 3, and 4, wherein the newly designed contract solutions were defined through intensive evaluation of EU-wide case studies compiled as factsheets and evaluated based on the acceptance of farmers and other stakeholders, and through modelling and simulation. This document aims to serve as a guide by related actors using the framework in real-life decision-making contexts. This will provide a strong evidence basis for showcasing well documented solutions to be disseminated for delivering real life impact and supporting policies.

The document can be used in different ways:

- To choose among potential new contract solutions as alternatives to or combinations with the today dominating practice- / action-based approaches
- To design contract solutions from the preparatory phase up to contract conclusion and measure implementation
- To consider adding customized prescriptions to

Some of the impacts that the framework and design guide could have and that have also been proposed in the grant agreement are:

1. *“Unlock and improve economic viability of agri-environment-climate initiatives through a renovated and coherent agri-environment-climate contractual framework.”*

This framework hopes to encourage the flexible design of contracts aligned with the local context needs (legal, social, economic, environmental), market prices of competing productions and market valorisation of environmental features, hence ensuring the uptake and viability of different contract solutions.

2. *“Provide support to policy makers and stakeholders (set of incentives/legal/economic instruments) by sharing the good practices at national and regional level.”*

This document has been developed in close collaboration with policy makers, stakeholders as well as farmers and forest owners. It encompasses the responses and perceptions of the farming community involved in the project

and thus, also represents the key categories of end-users. This framework intends to be flexible to future additions and hence suitable to further development of efficient and lasting agri-environmental measures using new concepts in contract design and implementation.

3. The document also represents a review of current knowledge on new AEC contracts that support the identification of research avenues relevant for improving the design and implementation policies.

1.3 Outline of the document

The document is arranged as follows: section 2 and 3 describe the previously achieved deliverables that will assist in designing this framework. Specifically, section 2 describes the framework and links to individual factsheets and section 3 describes the case studies and the steps ahead for the results of survey conducted with farmers, forest owners and other stakeholders to test the feasibility of new contract solutions. Section 4 describes model contracts and their characteristics. We discussed potential classification of contract types based on several features (features shown in Fig 2). Sections 5 and 6 are the core of the framework, i.e., the design guide, which is intended as a systematic comprehensive process for the design of AECPG contracts, including the conceptual framework, design variables, determinants, legal and technological aspects, and roles of different governance levels in implementation. Section 6 illustrates the whole framework via decision trees that will help practitioners to select and utilize different contractual solutions according to their needs. This document concludes with Section 7 Discussion, and the next steps and the Appendix.

2 Framework

After careful consideration and analysis of each feature through other work packages (as described in Section 3), we segregated the contract features into specific and general features and modified the initial framework that we had proposed in D1.1. The framework derived the innovative solutions from the specific contract features, as explained in D1.1 with examples from literature. We modified the specific features in the new framework to indicate how the feature relates to the contract type, as given below (Fig 2):

1. Tenure-related environmental prescriptions (qualifying land tenure contracts): Land prescriptions can be related to tenure.
2. Reference parameter for payment (qualifying result-based approaches): Payments to farmers for the provision of AECPGs may be calculated in different ways. In general, the payment can be divided into a fixed component and a variable component. The latter can consider the actual results (in terms of PG provision) of the actions taken by the farmers.

3. High degree of cooperation among farmers/actors (qualifying collective approaches): Interplay among farmers and/or other actors can take different forms and degree. In a broad sense, collective approaches are schemes for which the individual rewards depend on the design of actions/decisions taken collectively.
4. Full connection with private goods provision (qualifying value-chain approaches): Production of public goods may have different degrees and types of connection with the provision of private goods. High degree of private good provision is typical for value chain approaches in which consumers of a private good also accept to pay for some attached public good.
- 5.

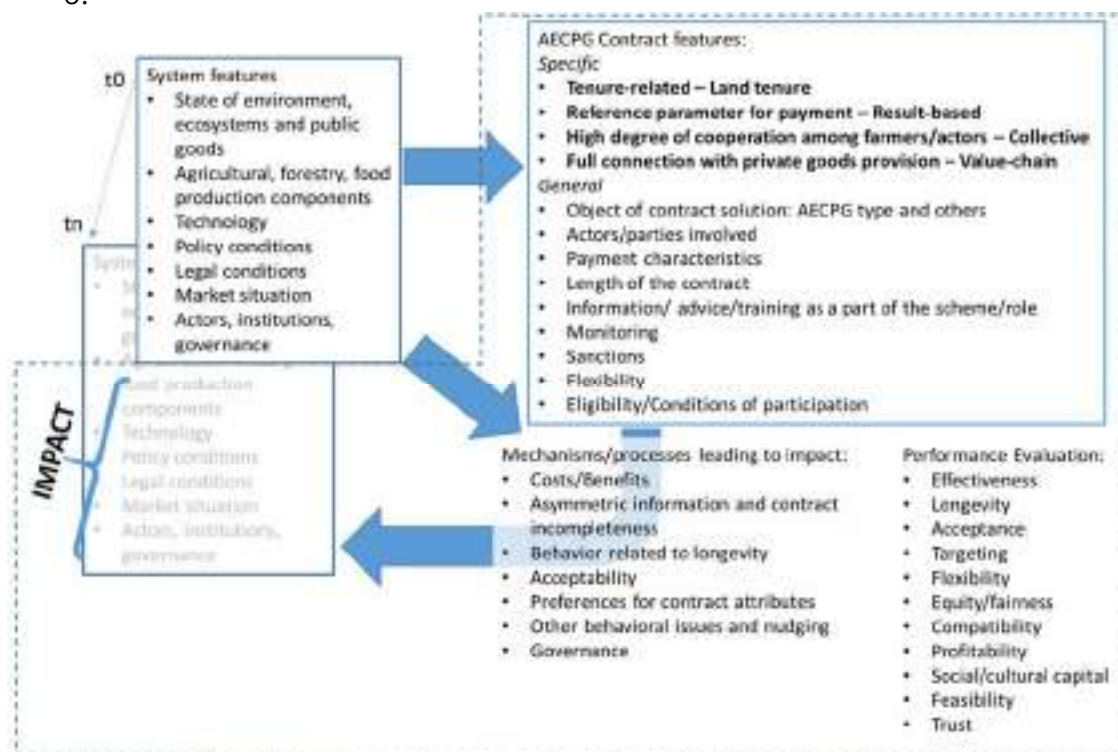


Fig 2 General framework for contract design

3 Main sources of information

3.1 Case studies

The list of case studies referenced below is reported here for ease of access (Table 1).

A catalogue of case studies has been collected from across the EU, especially from the partner countries and scanned to identify approaches that match with the contract features targeted in CONSOLE conceptual framework (Fig 2 above). These case studies highlight potential options/ initiatives that can help to overcome weaknesses and/or hurdles for the implementation of the innovative contract types. Accordingly, four main categories were identified

Each case study had 4 major points: case study description, data/facts of the contract, context information, and reasons for success, as shown below (Fig 3). These common points made the case studies uniform to read and easy to analyze.

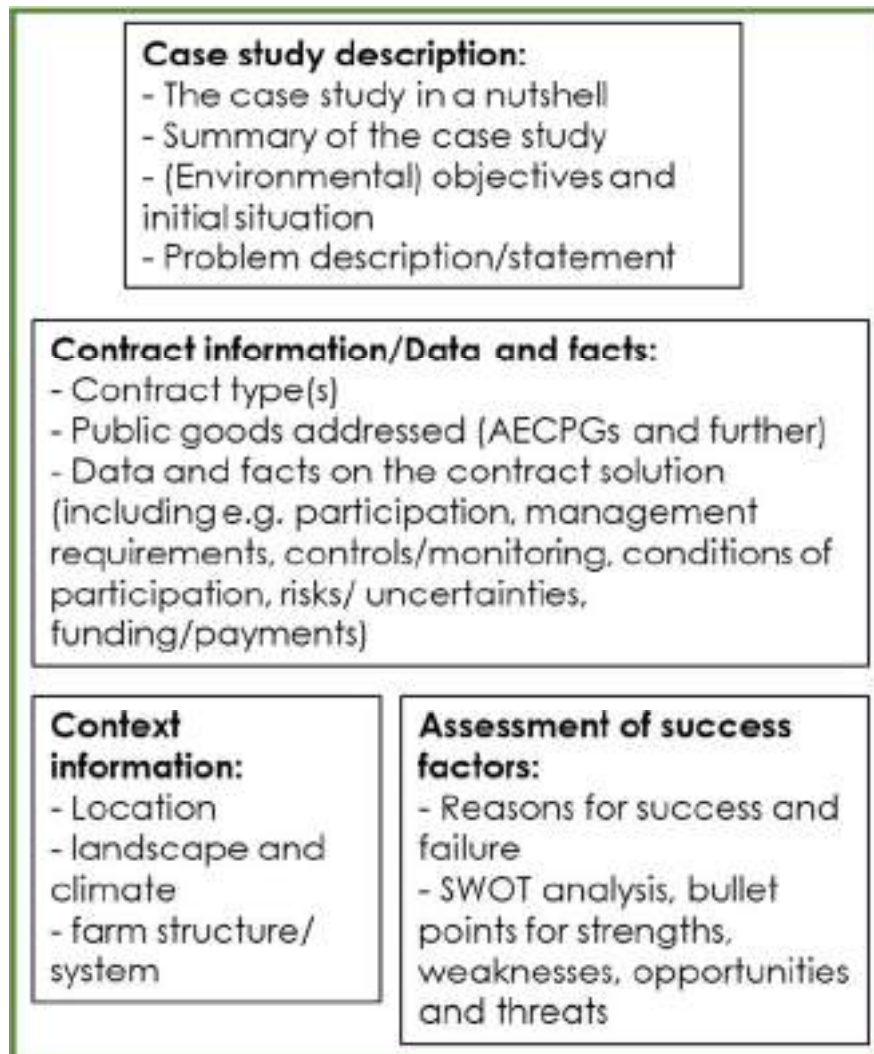


Fig 3 Case study analysis

The case studies have been reported and analysed in-depth in [D2.1](#), [D2.2](#), [D2.3](#), and [D2.4](#). They are also available on the website as individual factsheets for public information (link: <https://console-project.eu/>). The case studies highlighted the different contract types, some of them included hybrid solutions as can be seen from Table 1 below.

Table 1: List of case studies in CONSOLE

MS	ID	Title	Contract types*			
			RB/RO	CO/COP	VC	LT
AT	AT2	Biodiversity monitoring with farmers	X			
AT	AT3	Result-based Nature Conservation Plan	X			
AT	AT4	The Humus Program of the Ökoregion Kaindorf (Carbon market)	X			
FI	FI6	Nature value bargaining (Luonnonarvokauppa)	X			
FR	FR4	ECO-METHANE – Rewarding dairy farmers for low GHG emissions in France	X			
IRL	IRL2	RBAPS - The Results-based Agri-Environment Payment Scheme (RBAPS) Pilot in Ireland	X			
IT	IT5	Farmers as Custodian of a Territory	X			
LV	LV3	Bauska Nature Park tidy up of territory	X			
NL	NL3	Biodiversity monitor for dairy farming	X		X	X
NL	NL4	Biodiversity monitor for ARABLE farming	X		X	X
FR	FR2	Terres de Sources - Public food order in Brittany, France	X		X	
DE	DE2	Organic farming for biodiversity	X		X	
BE	BE1	Participation of private landowners to the ecological restoration of the Pond area Midden-Limburg/ the 3watEr project	X	X		
BE	BE3	Wildlife Estates Label in Flanders	X	X		
BE	BE4	Flemish nature management plan	X	X		
DE	DE1	Viticulture on steep slopes creates diversity in the Moselle valley	X	X		
DE	DE4	Agro-ecological transition pathways in arable farming	X	X		
FR	FR5	HAMSTER – Collective AECM to restore habitats of the European Hamster in Alsace (France)	X	X		
IRL	IRL1	BurrenLife Project	X	X		
IRL	IRL3	BRIDE - Biodiversity Regeneration in a Dairying Environment	X	X		
FI	FI2	Protected areas of private forests as tourism destination	X	X		X
BE	BE2	FLANDERS– Flemish Forest Group		X		
DE	DE6	Forest conversion from coniferous to deciduous stands – an eco-account case		X		
IT	IT1	Incentives for collective reservoirs		X		
IT	IT2	Cooperation in Natura 2000 area benefiting biodiversity		X		
IT	IT6	Integrated territorial projects		X		
UK	UK1	Delivering multiple environmental benefits in the South Pennines		X		
UK	UK2	Using natural flood management to achieve multiple environmental benefits in Wharfedale		X		
UK	UK3	Building natural flood management knowledge and capacity in Wensleydale		X		
UK	UK4	Natural Flood Management in the River Swale catchment in Yorkshire		X		
UK	UK5	Environmental improvement across a whole catchment: Esk Valley		X		
NL	NL1	Kromme Rijn Collective management		X		
LV	LV1	NUTRINFLOW		X		
LV	LV4	Forest Management		X		

PL	PL1	Natural grazing in Podkarpackie Region		X		X
PL	PL2	Program "Sheep Plus"		X		X
FI	FI1	Forest Bank – a forest conservation program in Indiana and Virginia, US		X		X
FI	FI5	Green jointly owned forest - TUOHI		X	X	X
NL	NL2	Green Deal Dutch Soy		X	X	
AT	AT1	ALMO – alpine oxen meat from Austria			X	
BG	BG2	Organic honey from Stara Planina mountain sites			X	
BG	BG3	"The Wild Farm" organic farmers			X	
FR	FR3	Esprit Parc National - Food and services in the national park of Guadeloupe			X	
PL	PL3	Program "Flowering meadows"			X	
PL	PL4	Bio-Babalscy – Organic Pasta Chain Preserving Old Varieties of Cereals			X	
DE	DE5	Water protection bread (Wasserschutzbrot)			X	
IT	IT4	"Carta del Mulino" – Barilla			X	
ES	ES1	Cooperative rice production in coastal wetlands in Southern Spain			X	
ES	ES2	Organic wine in Rueda, Spain (Rueda)			X	
ES	ES4	Integrated production in the olive groves			X	
FI	FI3	Carbon Market (Hiilipörssi) – a marketplace for the restoration of ditched peatlands		X	X	
BG	BG1	Conservation of grasslands and meadows of high natural value through support for local livelihoods				X
BG	BG4	Conservation and restoration of grasslands in Strandzha and Sakra mountains for restoring local biodiversity and endangered bird species				X
DE	DE3	Collaboration for sustainability between institutional landowners and tenant farmers				X
FI	FI4	Pasture bank - a platform for pasture leasing				X
FR	FR1	Eco-grazing - Grazing for ecological grasslands maintenance in the green areas of Brest Metropole				X
IT	IT3	Rewilding of detention basin in Massa Lombarda				X
LV	LV2	DVIETE LIFE				X
*Contract types: RB/RO: Result-based/result-oriented contracts; CO/COP: Collective implementation/cooperation; VC: Value chain-based contracts; LT: Land tenure-based contracts						

3.2 Feasibility of new contract solutions for practitioners

The project's work package 3 (WP3) focused on assessing the feasibility, including acceptability and implementability of the innovative contract solutions through surveys involving a wide range of farmers, rural landowners, and other key stakeholders in the 12 participating EU Member States. Acceptability, preferences, technical constraints and economic perception, as well and likely behavior (and its drivers) by farmers, forest owners and other actors potentially involved in innovative AECPGs contracts is being investigated through a collection of secondary data (T3.1) and through surveys aligned/coordinated across the project partner countries (T3.2 and T3.3). The results of these activities are being further evaluated, validated, and synthesized through a series of local workshops (T3.4). Preliminary results will be used as inputs in this document. The final analysis will assist in designing the final framework (D1.7).

4 Model Contracts

We term “Model contracts” the combinations of features that can be considered a prototype (model) for each contract type based on the most frequent combinations of design features observed in practice. The most frequent qualifying features for the contract types above are illustrated in the figure below (Fig 4) (details available in D1.4, section 4).

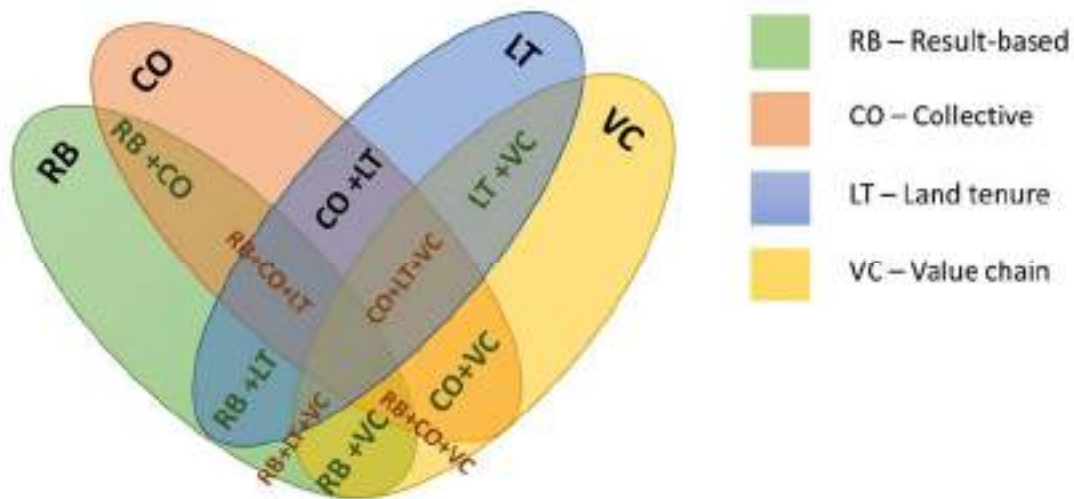


Fig 4 Potential combinations of selected contract features

When one of the four features above is prevailing, four corresponding types may be identified: result-based contracts, collective contracts, value-chain contracts, and land tenure contracts. However, frequently occurring combinations can be identified, which may be labelled as “hybrid types.” (See D2.3 and D2.4 - case study analysis for more details). Some combinations are particularly interesting, for example, hybrid forms with some result-based and some collective elements. However, the most suitable mix can only be evaluated depending on local needs. In D1.1, we identified specific features characterizing selected AECPG contract typologies, these being:

1. Result-based contracts (RB)

Result-based contract solutions are based on contracts specifying a result rather than the implementation of management measures (e.g., the delivery of a specific AECPG is subject of the contract and serves as a reference parameter for payment). A distinction is made between result-based and result-oriented contract solutions. In true result-based contract solutions, farmers or management bodies are paid if they achieve certain precisely defined ecosystem/environmental objectives. In result-oriented measures, it is sufficient if a certain form of result-orientation is included, but the payment level does not directly relate to the visible improvement of an environmental objective or the result itself is not necessarily basis for the payment. Nonetheless, the lines are

blurred, and a clear demarcation is difficult. In our framework, we put result-oriented and result-based contract features under the result-based category.

2. Collective contracts (CO)

In contract solutions based on collective implementation and/or cooperation, farmers and/or private/public landowners voluntarily enter a joint, collective partnership to commonly deliver a specific AECPG goal. That means that farmers, foresters (and other stakeholders) cooperate (by establishing an entity with or without legal personality) to achieve a certain (AECPG) target. Contract solutions putting forward collective implementation or cooperative/collaborative elements, often address a territorial/landscape level of AECPG provision and therefore mostly target a broader bundle of AECPGs. Beyond that, from the CONSOLE case studies it becomes evident that such solutions are particularly applied to AECPGs being delivered “across field borders”, meaning AECPGs which can hardly be improved by measures on singular fields and plots (e.g., water quality, maintenance of habitats). In general, collective and cooperative/collaborative approaches can be used to address problems that cannot be solved individually or to achieve certain environmental improvements that can better be reached by working together.

Collective contracts can be executed with varying degrees of rigour. Very narrowly defined, collective contracts mean that a group of landowners/farmers/foresters join by establishing a formal entity and commonly apply for an AES. The payment for the activities carried out to enhance AECPGs is then made to the group and not to the individual farmer. However, many successful contractual solutions collected under CONSOLE contain strong elements of collaboration and cooperation, while not fulfilling the element of collective payment. In such cooperative/collaborative contract solutions, individuals work together to achieve a common goal (e.g., the creation of a specific habitat), while collective payments are not issued.

3. Land-tenure contracts (LT)

Land tenure contracts feature clauses for the improvement or conservation of environmental assets. That is, landowners (private or public) lease their land to farmers, foresters or third parties under certain conditions. These conditions serve to achieve some form of ecological or environmental improvement. Such contracts fall under the category of land tenure approaches with environmental clauses.

4. Value chain contracts (VC)

Some contract solutions consider the production of AECPGs in connection with the production of private goods. These solutions are motivated by engaging all the value chain and the environmental benefits provided by the supplying farms are often part of the food companies'/retailers' marketing strategies. The farmers get monetary support through finance by market actors. In such contracts, certain environmental requirements have to be met by the producers. For instance, reduced use of nitrogen, higher animal welfare standards, preservation of biodiversity, organic farming, etc. Value chain related contracts for the

producers might lead to sale guarantees, price premiums and/or the use and marketing of products under specific brands. Moreover, some value-chain related contractual solutions provide an example of a way of better supporting and marketing organic production.

5. Hybrid contract types

Hybrid contract types are an intersection of different contractual solutions. They are usually characterized by one contract type with additional characteristics of other contract types.

Literature supports that hybrid approaches are helpful tools for reducing risks to farmers, increasing collaborative approaches, and supplying multitude of public goods (Cullen et al., 2018; Derissen & Quaas, 2013; etc.). Though, most of the hybrid solutions that have been tested through studies are result-based payments with collective or value-chain approaches (like in Life+ and RBAPS projects), CONSOLE provides an array of hybrid approaches with real-life examples that can be studied further and tested upon in field. While Fig 4 shows all possible overlaps of the four innovative contract solutions, some of them are more likely than others as evidenced in the CONSOLE case studies.

Result outputs of WP2 and WP3 indicated that very often the innovative typologies occur as hybrid contracts. These hybrids are explained in D2.3 and D2.4 (case study analysis). In particular, hybrids between result-based and collective contracts were the most common form. E.g., the BurrenLife Programme (IRL1) is a hybrid case, combining result-based and collective approaches, whereby participating farmers are rewarded annually for their individual environmental performance (RB) while also having access to a common fund to carry out self-nominated 'conservation support actions' (CO) to help improve this performance over time. Support from the literature and previous project deliverables have been used to define the hybrid contracts in-detail below. Another interesting form of RB / CO hybrid is the joint-liability contract featuring a collective uptaking a payment for results. The innovative part lies in the measurement of the result that is performed on a sample of the collective farms (not in each farm) and therefore facilitate the monitoring. Quite interesting, that hybrid form also allows for economies of scale (bigger collective allows lower monitoring costs).

The sub-section below describes all contract features of the innovative contractual types, including hybrid types.

4.1 Model contracts and their features

We term "Model contracts" the combinations of features that can be considered a prototype (model) for each contract type based on the most frequent combinations of design features observed in practice. The most frequent qualifying features for the contract types above are illustrated in the table below (Table 2) for each contract type and their "hybrids" (definitions and details of all contract types and hybrids is available in D1.4, section 4).

Table 2 Model contracts and their features

Contract type	AECPG Type	Actors involved	Payment type and characteristics	Length of contract and renewal	Information, advisory, or training in scheme	Funding	Monitoring	Sanctions	Flexibility	Conditions of participation
Result-based	- Biodiversity - Climate regulation	- Farmers/ forest-owners - Non-profit organisations - Private companies and market players - Government bodies - Research project teams - Ecologists/ researchers - Consumers - Banks - Shareholders	- Non-tradable emission certifications - Incentive payments (like vouchers, one-time bonus, etc.) - payment for label or brand - Payment for product - Combination of incentive payment and product price	Mostly long-term; Can be medium- and short-term too. Renewal is possible	Advice & training given for free by public body, private experts, NGOs, etc.	Public funding (incl. from EU) + private funding	- Monitoring of selected indicators by public bodies or private bodies hired by the financing bodies - well-trained staff is needed to carry out the controls and monitoring of compliance and the measurement of results	- compliance is crucial for successful implementation of the contract and fair payments - non-compliance can lead to termination of contract or reduction of payments	High degree of flexibility in choosing management practices, contract duration and contract areas. However, objectives need to be met	- Some RB approaches do not allow farmers to participate in other AES (to avoid double funding)

Collective	<ul style="list-style-type: none"> - water-related AECPGs (quantity and quality) - resilience to natural hazards - specific habitats 	<ul style="list-style-type: none"> - Farmers and landowners association - community organizations - government bodies (center/state/municipalities) - Private associations (like forest groups) - Private companies and market players 	<ul style="list-style-type: none"> - Compensation payments: paid by rate per area, length, or quantity - Incentive payments - Payment for product 	Short- or medium-term contracts. Renewal is possible for longer periods	Advisory always available within collectives or cooperatives. Helps build trust among the actors involved	Public funding (incl. from EU), rarely private funding	Nature management contracts are monitored by government or private experts. Some collective agreements have no monitoring	<ul style="list-style-type: none"> - Varied degrees of compliance - one of the stakeholders is responsible for monitoring and ensuring compliance - non-compliance can lead to termination of contract 	High flexibility to collectives unless it is a hybrid. In that case, flexibility can decrease.	- A minimum number of farmers need to participate
Value Chain	Environmental benefits alongside with quality and security of products	<ul style="list-style-type: none"> - Private companies and market players - citizens or consumers - Non-profit organizations - Animal welfare associations 	<ul style="list-style-type: none"> - Payment for Label or Brand - payment for product - online donations - Combination of incentive payment and product price 	Mostly long-term contracts between farmers and processors. They can be profitable but risky. Renewal is possible after evaluation	Training and advisory provided for free by private actors. Monitoring bodies also provide advisory	Private funding	Strict monitoring for quality of products. Monitoring done either by processors themselves or private bodies hired by the market	<ul style="list-style-type: none"> - non-compliance can lead to prohibition of the brand use 	<ul style="list-style-type: none"> - Higher flexibility of management practices and contract area and duration. - Low flexibility for quality of the product to be delivered 	<ul style="list-style-type: none"> - Limitations for using brand name or labelling - Some VC contracts exclusively for farmers with organic certification

							actors. The hired bodies can include certification organizations, non-profits or private experts.		- Farmers can enter multiple AES	
Land-tenure	<ul style="list-style-type: none"> - Biodiversity & habitats - Landscape & scenery 	<ul style="list-style-type: none"> - Non-profits and NGOs, private organizations - Government bodies - Landowner association - Private companies and market bodies 	<ul style="list-style-type: none"> - Compensation payment usually in form of lease reduction: paid by rate per area, length, or quantity - Land lease 	<p>Medium- to long-term contracts. Contracts can be long-term if they are hybrid (like have collective and result-based approaches). Contracts can be fixed. Renewal only allowed after long-term or no renewal in some cases.</p>	<p>Training and advisory by land managers, project stakeholders, etc.</p>	<p>Private funding, rarely public funding (for communal land?)</p>	<p>No controls or only self-monitoring by landowners . Only nature management plans are monitored by either private experts or NGOs and non-profits.</p>	<p>High flexibility of choosing management practices and no strict conditions for participation.</p>	<p>- Some LT contracts require farmers to participate for a fixed duration (usually long periods)</p>	

HYBRID CONTRACTS

Hybrid contract type	AECPG Type	Actors involved	Payment type	Length of contract and renewal	Information, advisory, or training in scheme		Monitoring	Sanctions	Flexibility	Conditions of participation
Value chain + result-based or result-oriented VC + RB/ RO E.g.: FR2, DE2	- Biodiversity - landscape & scenery - product quality	- local government - local businesses - farmers/ landowners	Incentive + product price	Usually short contract duration (1 – 5 years)	Advice and training are either freely available, or farmers may get money for training and consultation		Strict monitoring using indicators	Suspension or termination of contract on non-compliance	Farmers can choose their farm management conditions	- contracting parties can determine their own conditions and measures - high product quality is an important condition
Collective + result-based CO + RB E.g., FR5, IRL1, IRL3	- Biodiversity - recreational access - cultural heritage - landscape & scenery - soil quality - water quality	- public bodies - government - farmers	- incentive - fee for label - subsidies	Can be medium or long (5 years or more)	Advisory is available through stakeholders of the collective or hired farm advisors		- monitoring by financing bodies (govt.) or by contracted farm advisors - self monitoring by stakeholders and farmers	Non-payment for non-compliance	Farmers cannot enter other contracts	- All stakeholders must agree to the contract conditions - There should be consensus among farmers over measures

<p>Collective + Land tenure CO + LT E.g., PL1, PL2</p>	<ul style="list-style-type: none"> - Biodiversity - landscape & scenery - cultural heritage - animal health & welfare 	<ul style="list-style-type: none"> - govt/ public bodies - farmer associations - landowners & landowner associations - NGOs and non-profits - private associations (like Life+ partners) 	<ul style="list-style-type: none"> - incentive - land lease 	<ul style="list-style-type: none"> - short-term (1 season, 1 year, etc.) 	<p>Contracted NGOs and non-profits provide training</p>			<p>Partial monitoring by external actors or self-monitoring by collectives</p>		<ul style="list-style-type: none"> - the area of contract is pre-determined by the financing parties
<p>Land tenure + value-chain LT + VC E.g., F11, F15</p>	<ul style="list-style-type: none"> - Landscape & scenery - soil quality - climate regulation (carbon storage) 	<ul style="list-style-type: none"> - Market actors - Forest owners - Local municipalities - shareholders 	<ul style="list-style-type: none"> - Tradable emission certificates - price for forest resources (like timber harvests) - carbon credits 	<ul style="list-style-type: none"> - Fixed or permanent (e.g., F15 is a permanent contract for 99 years) - withdrawal is possible 			<ul style="list-style-type: none"> - annual third-party audits - internal monitoring by stakeholders 	<p>Flexibility to choose management practices</p>	<ul style="list-style-type: none"> - Farmers/ foresters entering the contract should already have FSC certificate or other green label of their forests 	
<p>Result-based + land tenure RB + LT + CO E.g., F12</p>	<ul style="list-style-type: none"> - Landscape & scenery - recreational access - rural viability & vitality 	<ul style="list-style-type: none"> - private forest owners - private nature-based tourism enterprise 	<ul style="list-style-type: none"> - profits from tourism (product price, product being tourism) 	<p>Flexible</p>			<p>No monitoring, contract is based on trust</p>	<p>Flexibility of choosing contract duration and renewal</p>	<p>Forest owners should be aware that only limited resources are available while entering the contracts</p>	

Value chain + collective VC + CO E.g., F13	- Climate regulation (carbon storage) - biodiversity - water quality	- landowners/ landowner association - carbon market - investors/ donors	- donations - investments	Permanent			Self-monitoring			Landowners should collectively agree to contract measures
Result-based+ Value-chain+ Land tenure RB+VC+ LT NL3, NL4	- Biodiversity - landscape & scenery - Soil & water quality - Climate regulation (carbon storage + GHG emissions)	- government - market sector - NGOs and non-profits	- product price - loan interest discounts - subsidy - favorable land lease conditions - CAP rewards	Usually short contract duration (1 – 5 years). Can be open-ended	Advice and training are either freely available, or farmers may get money for training and consultation		Strict monitoring using indicators. - E.g., NL3 uses key performance indicators for monitoring	Suspension or termination of contract on non-compliance	Farmers can choose their farm management conditions	- contracting parties can determine their own conditions and measures - high product quality is an important condition

5 Design guide: list of potential parameters and options

5.1 Actors/parties involved

Actors are the parties involved in a contract can be classified according to the institution involved. For instance, a typical form of agri-environmental scheme involves a public institution (payer) and an individual (the farmer receiving the payment). Other forms of contracts where only private parties are involved are attracting a relevant interest as in the case of many value-chain contracts. A further issue concerns whether the involved actors are individuals or collectives. That is relevant in collaborative and cooperative forms of contracts (to explain the role of cooperation among farmers/actors). Finally, introducing an intermediary as an additional actor in a contract seems to be a relevant condition for success in particular for the implementation of more articulated forms of contracts. Scale of the contract, e.g., farm level, landscape level, watershed, region, etc. is also important in connection with the parties involved. Table 3 below lists all the possible actors and parties that can be involved within different types of contracts and AES.

Table 3 List of actors involved

Type of actor/party	Roles	Benefits from involvement	Points of attention	Case study example	Evidence from the survey
Farmers	Farmers are the main actors in AES transactions	Farmers' environmental attitudes often determine the effectiveness of agri-environmental policy. Engaging the farmers in the evaluation process of an AES helps improve the current schemes as well as gather local opinions on future directions of agri-environmental policy.	AES depend on farmers' acceptance and participation for their implementation		
Farmer Association(s)	Farmer cooperatives are important tool for the survival of rural areas, competing against current trends in business concentration and maintaining social cohesion	<ol style="list-style-type: none"> 1. Individual farmers can be more connected to the market 3. Secure economic viability of small & medium farmers 	<ol style="list-style-type: none"> 1. Risk of following hard measures and risk of losing contracts or certification 2. While selling to market players, certification requirements should have been met 	E.g., <ol style="list-style-type: none"> 1. 400 Austrian mountain farmers are a part of the ALMO Association (AT1) 2. 1100 farmers created The Arrozua program for producing and marketing higher quality rice (ES1) 3. 249 farmers are involved in the contract solution to ensure a stable water supply in farms in case IT1 	
Landowners' organization(s)	- Enrolling land in a contract	Technical and administrative support	Landowners and landowners' associations usually	E.g., Landowners can enrol their lands in the Wildlife Estate (WE) label across EU like many farms in Flemish	

	- Associating to other stakeholders (public-private-civil society partnerships)		demand increased compensation in exchange for increased control and monitoring.	region of Belgium (case study BE3). Also, ELO (case study BE4) mediates this association	
Civil society - Non-profit organisation	1.Coordination for funding, selling to private associations, with local municipalities, etc. 2.Certification	1. Direct contact of farmers and consumers 2.Certification provides incentive 3. No obligatory requirements for farmers/ flexibility in participation and measures	Certification for marketed brands can have higher requirements	E.g., 1. Bleu-Blanc-Coeur in case study FR4 2. Manging humus certification by Ökoregion Kaindorf in AT4 3. Managing the 'Greifswalder Agrarinitiative' by the Michael Succow foundation (DE3)	
Civil society - non-governmental organisation	1. Monitoring (delegated by government) 2.Administrative and technical support 3. facilitating collaboration between private and public actors 4. May also provide financial help (through fund raising)	1. Reduces administrative barriers 2. Streamline consultation between all stakeholders	Since measures are monitored based on results, a risk of not reaching the objectives can emerge	E.g.: 1. species monitoring and providing data to governmental websites by Collectief Utrecht Oost in NL1 2. Forest management by the collection of NGOs called De Bosgroepen in BE2 3. Biodiversity conservation by Bulgarian Society for Protection of Birds (BG1) 3. local NGO Burrenbeo Trust is closely aligned with farmers in BurrenLife project (IRL1) 4. NGO Farmers' Parliament (ZSA) financed 10% of the project in case study LV1 5. NGOs raise funds for statutory activities and management of priority areas in case studies PL1 and PL2	

Civil society – Community organizations	- Enhancing cooperation among different actors and farmers/ foresters			E.g., Kuusamo cooperation network enables contracts between private forest owners and tourism entrepreneurs (FI2)	
Civil society - Cooperatives	- act as a marketing channel for private specialists and companies	- enhance farmers' intention to participate by facilitating the application of AES and by generating group pressure - act as the facilitators of collective AES	Development of the contract is dependent on project funding	E.g., 1. ProAgria is a Finnish expert organization that provides an extensive network of specialists and other services to rural entrepreneurs (FI4). They also help in other EU-cases (LV1) 2. Agriculture cooperatives are involved in Integrated Territorial Project in Tuscan archipelago contracts (IT6)	
Government (Centre/ state/ municipalities)	1. Goal setting 2. Monitoring 3. Technical training	1. National certification 2. Encourage collective participation	1. Rigid result-based measures and non-compliance can lead to termination of the contract 2. there can be a lack of funding	E.g., 1. Kromme Rijn province in NL1 2. Regional Forest Centre monitored the characteristics of protected forests in FI6 3. State limited company "Ministry of Agriculture, Real Estate" control and monitor the results of the contract in case study LV1 4. Countryside Stewardship Facilitation Fund (CSFF) Group is a special rural payments agency set up by Forestry Commission, England to environmentally enhance vulnerable areas across the country (like moor restoration, improving biodiversity, managing natural floods, improving	

				water quality across catchments, etc.) (case studies UK1, UK2, UK3, UK4 and UK5)	
Private companies/ Market Players (Buyers, Processors, Retailers, etc.)	<ol style="list-style-type: none"> 1. Private contracts 2. Organizes certificate trading/ buys certificates 3. May monitor the certification requirements 4. Can include carbon markets for funding 	Finance the agri-environmental measures through selling product/ buying market shares/ selling carbon	<ol style="list-style-type: none"> 1. Uncertainty in long-term maintenance of the contract 2. Companies might lose interest in certificates 3. Buyers procure organic/ certified products from farmers 	<p>E.g.,</p> <ol style="list-style-type: none"> 1. Lidl (Salzburg) buys humus certificates from Ökoregion Kaindorf in AT4; Private contracts are with OVML vzw in BE1 2. the meat processing company 'Schirrhofer' in AT1 3. Distributors of organic honey 'Harmonica' in BG2 3. Bakeries and Mills that acquire wheat from farmers in case study DE5 4. Retailers that acquire high quality rice in case study ES1 5. Winery 'Herederos del Marqués de Riscal, S.A' buy ecologically produced grapes and produce wine according to two high-valued labels (ES2) 5. The Carbon Market (Hiilipörssi) in FI3 has no payments for the landowner rather provide money for peatland restoration 6. "Carta del Mulino" program is a value-chain contract by Barilla that buys soft wheat from farmers (IT4 case) 7. Agrifirm, a soy processor, is the key partner in setting up value chains and designing farmer contracts in case study NL2 	Getting a sales guarantee from a processor or retailer in return for implementing environmental measures increases the willingness of respondents from all partner countries except for respondents from Netherlands.

				8. Żywiec Zdrój S.A manages and finances the program 'Flowering meadows' in threatened mountain regions of Poland under its CSR policy (PL3)	
Private Associations	Act as a mediator between farmers/ foresters and government	<ol style="list-style-type: none"> 1. Designing the contracts as per needs of all stakeholders 2. Ensure quality of products 3. Ensure commitments are met 3. Free technical support 	<ol style="list-style-type: none"> 1. Fragmentation of interests can occur 2. Sustaining a collective approach over long-term can be a challenge 3. Dependence on public financing 	E.g., the Flemish Forest Group in BE2, also private nature management companies in case study NL1 and Agentschap voor Natuur en Bos in BE1	
Animal Welfare Organizations/ Veterinarians	- Farmer advisory for maintaining animal health and reducing carbon footprint of the animals	<ol style="list-style-type: none"> 1. may help certify products 2. may help in monitoring 		E.g., the animal welfare organization, 'Vier Pforten' that is part of ALMO Association in case study AT1	
Research Project teams	<ol style="list-style-type: none"> 1. Professional execution of project 2. Can be a focal point between different stakeholders 3. Can support project funding 	<ol style="list-style-type: none"> 1. Lack of strict monitoring 2. Agreements with farmers/ landowners might not be legally binding 3. Project might be for short-term only 	Project stakeholders usually rely on previous research and might not have practical experience	<p>E.g.,</p> <ol style="list-style-type: none"> 1. project partners such as Austrian Council for Agricultural Engineering and Rural Development, environmental consultancy, landscape planners, ecologists in AT2 case study 2. WWF Germany is the project lead of the initiative 'Landwirtschaft für Artenvielfalt' in case study DE2 3. Latvian Fund for Nature (LDF) was the team lead for European Commission's (EC) Life+ Programme for restoration of Corncrake habitats 	

				in Dviete floodplains grasslands (LV2). LDF co-funded the project with EC	
Academicians/ Universities/ Research institutes/ Students	- Scientific Support - Monitoring of environmental performance using novel technologies			E.g., 1. university of Greifswald (DE3) 2. Thunen Institute (DE4) 3. ASAJA (Spain, case study ES3) provides digital technologies such as crop monitoring and yield forecasting	
Ecologists/ Researchers	Train farmers to observe, count and document according to a certain monitoring design	1. Carry out monitoring 2. Carry out assessments	- Reliance is on short-term funding mechanism from project	E.g., 1. Team of ecologists/ researchers funded by the EU worked with 35 farmers on RBAPS pilot scheme in two regions of Ireland (case IRL2) 2. Bride project ecologists carry out the monitoring on an annual basis (IRL3)	
Citizens/ Consumers	Agri-environment supply chains include citizens as consumers, voters, and recreationists. Consumers are willing to pay for nature-inclusive farming and private goods, that can lead to delivery of multiple public goods.	- Encourage agro- tourism - Consumers are integral part of supply chain		AT1, ES2,	
Shareholders	Have same responsibilities as farmers and	Contract objectives can be divided between shareholders	1. investments risks exist 2. loss of investors	E.g., involved parties are individual entrepreneurs who perform cutting operations in jointly-owned forests in Finland (FI5 case study)	

	landowners in the contract.				
Banks (Private or Public)	Can be a potential agricultural financier. Also, the involvement can give corporate responsible image to the bank	- financial risks minimalization		E.g., Rabobank finances and designs the contracts for the Biodiversity Monitor case (NL3 and NL4)	

5.2 Payment characteristic

Payments to farmers for the provision of AECPGs may be calculated in different ways. In general, the payment can be divided into a fixed component and a variable component. In the result-based approach for instance, the latter take into account the actual results in terms of PG provision (cfr. 'Reference-parameter for payment' in the glossary). Besides the way the payment is connected to output and input, also other characteristics may be relevant. The most widespread parameter relevant for decision making is the level of payment. In addition, there could be other issues, such as the presence of bonuses and the timing of payment delivery (relevant for farm finance). Table 4 below lists different types of payments and their characteristics for different contract types with case studies cited as examples.

Table 4 Payment types and characteristics

Payment type	Advantages	Disadvantages	Points of attention	Case study example	Evidence from the survey
Compensation payments/ incentives paid by rate per area, length, or quantity	<ul style="list-style-type: none"> - Farm supplies (like sowing seeds) are pre-arranged for the farmers - farmers need not put monetary inputs 	<ol style="list-style-type: none"> 1. Monitored rigorously 2. Fixed indicators 	<ul style="list-style-type: none"> - Strict targets - Written Agreement 	<p>E.g.,</p> <ol style="list-style-type: none"> 1. Payment ranges from 115.55€/ha for application of dry animal manure to 2527.39€/ha for establishment of species/herb-rich cropland field margins in case study NL1 2. Some measures are paid per piece like per small pools or per individual trees as in NL1 3. The payment for the eco-grazing is 350 euros/ha/year 	<ul style="list-style-type: none"> - Compensation on an annual basis is preferred by respondents of all partner countries and it also increases their willingness to enrol
Subsidies and tax benefits	<ul style="list-style-type: none"> - Paid annually - Financing depends on level of objectives 	<ul style="list-style-type: none"> - Subsidies could differ from the real costs the farmers incur 	<ul style="list-style-type: none"> - Amounts are fixed per nature objective - result-oriented payments 	<p>E.g.,</p> <ol style="list-style-type: none"> 1. Subsidies paid in case study BE4 2. 	

<p>Non-tradable emission certifications</p>	<p>- no obligatory requirements such as mandatory management measures</p>	<p>- Farmer may need to pay for participation in the program - Farmers also might have to invest for changes in management styles to reach the targets of certification</p>	<p>- Certificates can be sold out which limits participation - risk with organic certification process can lead to slower payments</p>	<p>E.g., Farmers receive a success fee of currently 30 € per ton of CO₂ in the Humus Project in AT4</p>	
<p>Tradable emission certificates</p>	<p>Is another name for carbon credit, wherein the certificate represents a <i>"permit that allows the holder to emit one ton of carbon dioxide"</i></p>		<p>- Offsetting projects mostly bring short-term benefits to agribusiness companies, but not long-term benefits to local communities or the environment</p>	<p>E.g., the scheme is self-funded, so income is mostly from timber harvests and carbon credits in FI1</p>	
<p>Payment for Label or Brand</p>	<p>- Voluntary association to a label or brand - Consumer-oriented schemes</p>	<p>- Even though farmers may get a price higher than standard, there is a risk that it would not cover cost of environmental efforts and other transaction costs (like the cost of fee paid for membership)</p>	<p>Usually for a specific product or service</p>	<p>E.g., 1. Lump sum fee for WE label in BE3 2. 'Esprit Parc National' is a brand that is exclusively granted to products or services from economic activities that preserve the biodiversity and heritages (case FR3)</p>	<p>Most of the respondents from all partner countries are willing to enrol in contracts that can offer "Environmental-friendly label"</p>

		<ul style="list-style-type: none"> - Payments come from consumers so there is a market risk -uncertainty on the added-value distribution along the chain (i.e., bargaining power of intermediaries and suppliers is higher than farmers') 			
<p>Conditional bonus payments (like vouchers/ one-time bonus/ etc.)</p>	<ul style="list-style-type: none"> - low financial risk - no penalty in case of non-compliance - can be paid in addition to contract compensation 	<ul style="list-style-type: none"> - no fixed price - payments can be quite low and may not represent a necessary revenue for the farmers - funding can be short-term 	<ul style="list-style-type: none"> - Incentives are more symbolic than a proper payment - result-based payments 	<p>E.g.,</p> <ol style="list-style-type: none"> 1. farmers are paid for GHG emissions saved in FR4, farmers are paid allowance for monitoring in AT2 and AT3 case study 2. Farmers are incentivized (255,67 €/plot) if their plot contains at least 1 European hamster burrow assessed during the yearly counting In case study FR5. 3. Depending on the performance of the agreed biodiversity measures, the farmer receives up to €3,000 	

				per annum in case study IRL3	
Payment for product/ Private contracts	<ul style="list-style-type: none"> - Fixed price offered - Might be higher than market price - Demand for 'sustainable' or 'organic' food is rising which leads to better opportunities for the farmers - The focus of the contract is regional value chain 	<ul style="list-style-type: none"> - supply chain might be short which narrows the market share - Dependency on retailer for the premium price - contracts might not be binding 	<ul style="list-style-type: none"> - Payment for product poses risks to farmers under uncertain yields - value-chain based payments - There might not exist a premium market for the products 	<ol style="list-style-type: none"> 1. AT1 2. price provided to the farmers from the distributor 'Harmonica' is higher compared to the price from doesn't incur the farmers loss due to yield risks other producers of organic honey in Bulgaria (BG2) (6.50-11 euro per kg of honey) 3. Farmers get a premium by the retailer EDEKA for organic products in DE2 4. Farmers don't receive economic benefits or payment, they only get a higher market price for their olives (ES4) 5. forest owners are paid for nature-based tourism (FI2) 6. Agrifirm, a soy processor, and farmers set a price based on global market prices of soy. A premium for non- 	<ul style="list-style-type: none"> - Most of the respondents of all partner countries have high willingness to receive their payments by buyers of the products, instead of public money, except respondents from Bulgaria and Latvia

				GMO soy is €500-550/ton of dry soybeans (NL2) 7. Bio-Babalscy company cooperates with about 90 farmers for organic cereals in case study PL4. However, the agreement is verbal.	
Land lease/ Land tenure contracts	1. Payment can in be form of rent or investments for land acquisition	1. Need for additional funding sources for the nature protection and environmental measures as land lease payments might not be sufficient 2. Could be a financial risk	- Land for lease is awarded to agricultural holdings willing to cooperate and commit to farming guidelines	E.g., 1. Land tenure contracts with adjusted lease payments as in DE3 2. In FI4 case study, landowners and domestic animal herders can find each other and agree on a land-tenure contract for leasing pastures or grazing animals	Most respondents are willing to enter a contract of leased land with a reduced rent, provided they agree to follow environmental management clauses as specified in the lease contract, except respondents from Austria and Finland
Online donations for conservation/ Crowdsourcing	- Market based funding so no need for public funding - attracts investors/ donors	- No direct monetary incentives to farmers/ landowners		E.g., In FI3 anyone can make online donation or investment of maximum 50 euros which funds the restoration of 600 m ² of peatland, capturing a minimum 45 kilos of carbon annually.	

	- Can be a huge funding potential for private companies				
Combination of incentive payments and product price	Farmers are incentivised with a bonus for meeting environmental conditions and are also paid market prices for their produce	Farmers may already be involved in other food supply chains and might already have acquired other labeling and certifications (like organic farming, high environmental value certification, etc.) and it can compete with this kind of approach	Usually done for specific products that the government or private actors need for sale	E.g., 1. Local governments in the city of Rennes and other municipalities from Rennes urban area pay farmers price for food and an additional bonus payment for environmental services (FR2).	

5.3 Object of contract solution: AECPG type and others

The object of a contract is one or more AECPGs. Even though a contract solution could in theory target any AECPG, it is commonly acknowledged that specific contracts are fitting or necessary for specific AECPG. For instance, collective approaches are crucial for landscape level AECPGs such as water quality. Result-based contracts are useful for improving biodiversity or other AECPGs that require parcel-level practice adjustments. Value chain contracts are not linked to a specific AECPG. Nevertheless, these contracts are likely effective for AECPGs that attract consumers' interest (e.g., iconic species or ecosystem services such as potable water). Land-tenure contracts are effective for AECPGs that require long-term commitments.

The object of the contract can be mainly defined based on the PG intended to be produced. It can be any of those listed in Table 5. The AECPG(s) intended to be produced are important as there is a connection with the performance and suitability of the different contract types/features discussed above. For example, result-based solutions may be more suitable for some biodiversity parameters and carbon stocks.

Table 5 AECPG types and characteristics

Public Goods	Contract solution types	Points of attention	Case study examples	Evidence from the survey
Biodiversity	- Result-based/ result-oriented	functional agrobiodiversity, diversity of landscape, diversity of species, and regional biodiversity, are reflected in key performance indicators connected to farm-level agricultural management, such as percentage of grassland, regional protein input, nitrogen soil surplus, etc.	AT3, NL3, IRL2, BE3	- Farmers from Austria, Germany, Ireland, Netherlands, and UK are involved in biodiversity-related agri-environment measures for the past 5 years - Most of the respondents in all partner countries are interested in improving biodiversity in their countries
Climate regulation (carbon sequestration and/or GHG emission regulation)	Result-based/ result-oriented		AT4, FR4, FI3	- Farmers from Germany, Italy, Poland, Netherlands, and UK are involved in climate regulation-related agri-environment measures for the past 5 years - Most of the respondents in all partner countries are interested in increasing carbon sequestration in their countries
Water related AECPGS (quantity and quality)	Collective implementation/ cooperation contract-solutions		IT1, IT6, UK1, UK3, LV1	- Farmers from Austria, Germany, Ireland, Italy, Poland, Netherlands, and UK are involved in water-related agri-environment measures

				(water quantity and quality) for the past 5 years - Most of the respondents in all partner countries are interested in improving their water-related AECPGs
Resilience to natural hazards	Collective implementation/ cooperation contract-solutions		IT6, UK1, UK3, BE1, FI5	
Quality and security of products	Value-chain solutions	Organic certification indicators like specific variety selection, certified seeds, non-use of fertilizers, organic slaughterhouses, etc.	BG3, PL4, ES2	
Landscape & scenery	Land tenure	conservational and sustainable maintenance of the landscapes (mostly pastures)	FR1, BG4	- Farmers from Germany, Latvia, Italy, Ireland, and UK are involved in landscape and scenery-related agri-environment measures for the past 5 years - Only the respondents of Germany, Ireland, Italy and Latvia are interested in improving the landscape and scenery of their countries

5.4 Contract length

A contract is a formal agreement signed between two or more parties. Contracts are defined/qualified by a set of different features arranged in different combinations that outline several alternatives. The length of a contract is a specific feature of a contract that discriminates between different contract types and AECPG targets. Longer contracts are usually required to reach a range of environmental and climate targets. However, farmers' acceptability and contract duration are usually inversely related. In some cases, however, long contracts can be preferred by farmers when these ensure additional benefits such as reduced land rents (e.g., in land tenure-related contracts).

Time-horizon (length) is the duration of the contract which has been further defined through case study examples in Table 6. Long-term contracts may have different environmental effects but also different preferability for farmers than short-term contracts. For example, barriers to participation may be faced by tenant farmers who only have short-term security concerning land availability (which may be also an explicit legal requirement).

Table 6 Contract length characterization.

Length of the contract	Benefits	Disadvantages	Renewal	Case study examples	Evidence from the study
Long-term	<ul style="list-style-type: none"> - High acceptance of the contract - Market security - long-term behaviour change can occur - Farmers gain knowledge due to long-term collaboration between advisor and farmer 	<ul style="list-style-type: none"> - Dependence on a single large processor/retailer - participation may change hands - change in national policies can lead to legal uncertainties 	<ul style="list-style-type: none"> - Renewal possible (BE1) - participation is transferrable (BE4) 	E.g., <ul style="list-style-type: none"> - AT1: Some oxen farms are working under ALMO for 30 years - Flemish nature management plan participation is 24 years (case study BE4); however, participation is transferrable - Forest bank contracts in Indiana and Virginia are 99 years long 	
Short-term	<ul style="list-style-type: none"> - 1 to 5 years 	<ul style="list-style-type: none"> - Results may not be pronounced and it's harder to evaluate if environmental objectives have been met or not 	<ul style="list-style-type: none"> - Either no renewal or - Renewal is possible for longer periods (BG1) 	E.g., BG1 requires farmers to participate for 3 years <ul style="list-style-type: none"> - FR2 is a hybrid contract that farmers can participate in for 3 years - IRL2 - NUTRINFLOW, LV1, is a 2-year contract 	Most of the respondents preferred 5-year contract length. However, majority of respondents from Bulgaria preferred 1 year contract length. 10-year or longer contract length was only preferred
Medium-term	<ul style="list-style-type: none"> - 5 to 10 years 		<ul style="list-style-type: none"> - Renewal is possible after evaluation - Renewal can be annual 	E.g., BE3, FR4, IRL1	

					by only a few respondents
Flexible	<ul style="list-style-type: none"> - Open-ended contracts - Could be voluntary - Could be market-based contracts 	<ul style="list-style-type: none"> - Risk of not receiving the payment in due term of the contract - Objectives maybe time consuming to achieve; thus, not giving farmer flexibility to leave 	<ul style="list-style-type: none"> - The contract can be renewed easily - some contracts cannot be terminated (LV4) 	<p>e.g., in case AT4, slow process of humus accumulation binds farmers in their contract for a long time, even though the contracts are open-ended</p> <ul style="list-style-type: none"> - In case study FI4, the length of a contract is dependent on the partners. The landowners agri-environment support from EU, if the circumstances fulfil the demands. In this case, the length of the contract is five years. 	
Fixed	<ul style="list-style-type: none"> - Contract duration may be open-ended or fixed; however, leaving the contract can lead to termination - Some contracts are permanent; however, withdrawal is possible 	<ul style="list-style-type: none"> - If there is a change in climate or socio-economic aspects, the farmer does not want to be enrolled in the contract 	<ul style="list-style-type: none"> - Renewal is difficult; might be possible after a long duration - Termination can result in financial penalties or non-renewal - In case of permanent contract, no renewal is needed 	<p>E.g.,</p> <ul style="list-style-type: none"> - In case ES1, contract is terminated if farmers exit the cooperative - renewal is possible every 30 years in case study FI1 	

5.5 Monitoring & enforcement

Monitoring and enforcement activities are necessary to ensure that farmers carry out the conservation measures for which they receive payments. Monitoring refers to surveying the implementation of measures farmers agreed upon when they committed themselves to participation in a network project. Enforcement refers to procedures and sanctions that are applied in case of non-compliance. In this context, monitoring should not be confused with monitoring programs aimed at studying/assessing the environmental impact of a specific agri-environmental scheme.

Table 7 Monitoring types and characteristics

Monitoring	Benefits	Disadvantages	Points of attention	Case study examples	Evidence from the survey
Private bodies hired by the market actors or by market actors themselves	- Costs of inspection are borne by the retailer/processor			E.g., AgroVet GmbH monitor and certify ALMO farms in AT1 - In IT4, Barilla hires independent third-party control bod to annually audit farmers subscribed to the “Carta del Mulino” project - In NL2, the processor controls the end product	
Private bodies hired by the govt.	- they do not have the final call on objectives		- The consequence for non-compliance could be termination of payments	E.g., - BE1 contract monitoring is handled by an independent body by means of a public tender - in case study BG1, to be a part of NATURA 2000 site, the Bird association monitors and determines the participation and payments for the farmers	
Public bodies	- No sanctions for non-compliance - Check of the area objectives can be seen as an additional	- There is a risk that the control criteria will not be met, but the risk is reduced by the non-sanctioned area objectives	- Control criteria and their indicators are sanctioned in the event of non-compliance	E.g., control of RNP farms is carried out by national control authority (AgrarMarkt Austria – AMA) in AT3 - Results of LV1 case study, NUTRINFLOW, is controlled and	

	<p>support for the farmers</p> <ul style="list-style-type: none"> - Can be public bodies hired by government, thus eliminating private intermediaries - monitoring could be locally led 		<ul style="list-style-type: none"> - Fines can also be assigned to the landowners in case of law infringement 	<p>monitored by state limited liability company</p>	
<p>Certification organizations</p>	<ul style="list-style-type: none"> - For market-based organic products - The certification provides premium price in market 	<ul style="list-style-type: none"> - Strict controls and monitoring of the products 	<ul style="list-style-type: none"> - Consequence for non-compliance could be termination of the contract (BG2) 	<p>E.g.,</p> <ul style="list-style-type: none"> - in case study ES2, there is strict control by the certification authorities for organic grapevine production - In case FI1, annual third-party audits by FSC group certification were done and managed by the non-profit organization TNC. - FR4, Bleu-Blanc-Coeur association certifies the milk if it meets the product requirements 	
<p>NGOs and non-profits</p>	<ul style="list-style-type: none"> - Not as strict requirements like government or market bodies - 			<p>E.g.,</p> <ul style="list-style-type: none"> in case study BG4, the NGO, Bulgarian Society for Protection of Birds, manages and monitors the project - in case study DE5, farmers are checked for compliance with the conditions of participation either 	

				by the local water supplier or by the non-profit FiBL, Germany - Provinces and national government delegate species monitoring to NGOs in case NL1	
Private experts	- Experts might help in recognizing biodiversity in addition to monitoring - Expert monitoring can be used for training and advisory			E.g., In case BG1, monitoring is done by biodiversity experts several times per year - In case DE1 winegrowers take advantage from the monitoring to get the local flora and fauna near their vineyards better known	
Self-monitoring	- Voluntary - mostly collective contracts	- Farmers might not be able to monitor effectively, and hence may not meet the objectives and lose the payments - Farmers have to bear the amount needed for monitoring	- there might be follow-up checks by experts - usually not value-chain contracts	E.g., - in case study AT4, decreases in humus content could lead to partial or complete refund of the success fee - In case BE2, a Forest Group coordinator and his team follow-up on the specific objectives as agreed upon by the different forest owners - In case ES1, monitoring is undertaken by Arrozu cooperative, which is indirectly paid by the farmers that are members of the cooperative	Willingness to enrol isn't affected by the option of self-monitoring for most of the respondents. Only for majority of the UK respondents' willingness to enrol increases considerably if the contract

				<ul style="list-style-type: none"> - In case FI3, experts of the Carbon Market make self-monitoring when resources allow -In FI5, monitoring is through internal control mechanism (e.g., annual partnership's meeting of all shareholders - IRL3, BRIDE project, farmers monitor themselves, however, annual checks are carried out by ecologists - In IT5 and IT6, final report needs to be submitted to financing parties 	offers self-monitoring
No controls	<ul style="list-style-type: none"> - Integration of local knowledge to promote agro-ecological transitions - Even though the commitments are not legally binding, the signatories have to respect certain rules 			<p>E.g.,</p> <ul style="list-style-type: none"> - In case study DE4, there is no monitoring, instead, detailed documentation of one representative field for each crop grown is required from each participating farm - In case study FI2, the agreement between private forest owners and nature-based tourism enterprises is based on trust - Case FI4, the contracts are maintained by an online service 	
Monitoring using special indicators	<ul style="list-style-type: none"> - Fixed indicators are used to monitor the 	<ul style="list-style-type: none"> - indicators need to be changed/ updated as per th changing socio- 		<p>E.g., in case study FR2, farms are given a farm score using the French IDEA method (which includes 42 sustainability</p>	

	quality of farms/ forests/ products -	economic or market conditions -		indicators) by a government association called EBR	
Monitoring for product category regulation	- Assurance of high quality of products	- Reductive in terms of environmental benefits - Regional references and numeric parameters should be updated	- Each product has different criteria - The farmer has to prove, using invoices, vegetation or field indicators, etc. that the criteria for the product are met	E.g., FR3 - In FR4, farmers can get certification from Bleu-Blanc- Coeur only after their milk is analyzed	
Monitoring farm performance (annually)				E.g., in FR5 Hamster Program, the Departmental Directorates of Territories monitors the annual management plan and follows with a field check	

5.6 Sanctions

Sanctions are clauses of a contract specifying the rules in case of non-compliance with the contract terms. Very often, in result-based contracts fines are not included in case the farmers do not meet the target, but differences may arise, for instance if a fixed payment rate in the contract is present. Different types of sanctions and their case study examples are given in Table 8 below.

Table 8 Types of sanctions

Sanctions (In case of non-compliance)	Points of attention	Case study examples
Termination or reduction of payments		FR4 - In case IRL2, payments to farmers were conditional on achieving biodiversity targets - In case LV1, requirements are not respected, landowners can be penalized which can lead to reduction of direct payments
Termination of contract	- due to non-compliance of contract rules	BG2, IT4
Non-renewal of contract in case of non-compliance		
Sanctioning of control criteria and their indicators in case of non-compliance		AT3

5.7 Flexibility

'Flexibility' concerns the possibility to customize to local/individual cases a contract. The flexibility is relevant as it usually allows to increase the acceptability of a contract. For instance, the possibility for a farmer to adapt a contractual framework to his farm situation increases the uptake of a scheme. On the other hand, the flexibility increases the transaction costs adding a bargaining process and potential trade-offs. Flexibility is also a core aspect of result-based contracts. Indeed, the philosophy of such contracts is based on leaving to the farmers a complete freedom of choice (i.e., perfect flexibility) to reach the result of interest. The drawback of such flexibility is however the introduction of a critical aspect connected to the risk for the farmers to fail to achieve the result.

Flexibility is an important characteristic of the contract. Flexibility may apply to several parameters, such as the length of contracts, the selection of measures, the prescriptions to be undertaken, the area under contract, etc. as explained in Table 9 below.

Table 9 Flexibility types in contracts

Flexibility in contract	Benefits	Disadvantages	Points of attention	Case study examples	Evidence from the survey
High Flexibility for management practices	<ul style="list-style-type: none"> - Farmers can see and record the results of their management practices in the fields and can decide which management activities they choose - Usually, farmers work as a cooperative 	<ul style="list-style-type: none"> - Achievement of the objectives could be low - High flexibility in management measures can lead to wrong decisions - Low monitoring - Farmers have to bear costs of changing the management practices 	<ul style="list-style-type: none"> - Fixed control indicators needed if there is high flexibility in contract 	<p>E.g., in case study AT4, application of organic and synthetic fertilizers not based on plant and soil demand produce huge N-losses</p> <ul style="list-style-type: none"> - Farmers organize themselves in Organization of producers for organic honey (BG2 case study) - In FR1 case study, the breeder adjusts the number of animals to be deployed according to his own idea of the feed availability of each plot at a given time 	<p>Respondents of all countries have high willingness to enrol if the respondents are free to decide about the management practices to achieve the specified environmental result</p>
Flexibility to choose contract duration or leave program	<ul style="list-style-type: none"> - Voluntary association as per farmers' will 	<ul style="list-style-type: none"> - Not meeting the objectives and receiving the payments in due time 	<ul style="list-style-type: none"> - Renewal might also be voluntary 	<p>E.g., In FI2, contract parties can agree upon the length of the contract</p>	
Flexibility over areas to enroll		<ul style="list-style-type: none"> - the area is only temporarily protected 		<p>E.g., In case FI6, there was flexibility regarding the characteristics of forest areas that could be accepted for the contract</p>	
Flexibility to enter other contracts	<ul style="list-style-type: none"> - more payments for farmers - multiple AECPGs delivered, and more environmental objectives met 	<ul style="list-style-type: none"> - Farmers' loyalty is questionable 	<ul style="list-style-type: none"> - usually, farmers cannot enter into same contract with same rules as existing one if it is a value-chain contract - farmers can enter multiple nature management contracts 	<p>E.g., The biodiversity monitor, case NL3, allows farmers to be enrolled in multiple contracts with different parties, and all parties can give the financial rewards for good performance based on same set of key performance indicators</p> <ul style="list-style-type: none"> - Farmers enrolled in Humus Program (AT4 case study) are free to participate in other agro-ecological programs (e.g., GAP, ÖPUL, AMA, etc.) - In BE2, forest groups enroll members that are already participating in other nature management plans 	

5.8 Information as a part of the scheme/role

Information and advice may be provided to farmers as part of the scheme. Information provision may interact with other contract features.

Several inefficiencies attributed to agri-environmental schemes are linked to an information problem. We can distinguish between information asymmetries where the land manager has more information of the payer concerning costs, "spatial targeting" issues where local scale features affect the environmental effectiveness of different practices and farmers' knowledge about efficacy of environment friendly practices. To cope with information gaps, two main strategies have been proposed: i) monitoring programs and ii) technologies to improve spatial targeting. Auctions and result-based contracts are on the other hand proposed to tackle information asymmetry, but their mechanisms are different. For instance, the periodic measurement of results entailed in the result-based approach is acknowledged to allow a long-term endogenous reduction of information gaps thanks to potential learning processes that could affect the farmers involved. In auctions, the regulator indirectly gains information signals on the costs incurred by farmers and therefore the information gap between regulator and farmers is potentially eliminated. Further information for information and advisory in contracts can be found in Table 10 below.

Table 10 Availability of advice and information in contracts

Availability of advice and information	Benefits	Disadvantages	Points of attention	Case study examples
Advice & training by public body	<ul style="list-style-type: none"> - Advice by involved public body - Reliable 	<ul style="list-style-type: none"> - Resource intensive to operate 	<ul style="list-style-type: none"> - Usually a feature of public-public contracts 	E.g., In FI6, the forest owners could ask advice from Forest Management Associations for forest management, decision-making, and operations
Advice & training by private bodies			<ul style="list-style-type: none"> - can be hired by public bodies or market actors 	E.g., in AT3, an environmental consultancy agency is hired to provide advice and expertise to farms
Advice and training by experts	<ul style="list-style-type: none"> - Evaluates existing nature deficits - Can help recognize new and rare species 		<ul style="list-style-type: none"> - If payment is in terms of product premium, advice and support at individual farm level becomes necessary 	E.g., <ul style="list-style-type: none"> - In IRL2, farmers received advice and support from the RBAPS Pilot team - DE2
Advice and training by NGOs/ non-profits	<ul style="list-style-type: none"> - Expert education and training - Can connect to other stakeholders for more information and training 	<ul style="list-style-type: none"> - Hiring NGOs and non-profits for advisory can reduce the compensation amounts farmers receive 	<ul style="list-style-type: none"> - Work in conjunction with financing bodies such as public bodies or market actors 	E.g., In case study LV1, the collaborating NGO, Union Farmers Parliament, has the objective to train and educate farmers <ul style="list-style-type: none"> - In PL1, contracted NGOs must organize at least 4 trainings for farmers, beekeepers, and school pupils concerning specific topics related to biodiversity and ecological awareness
Free advice by participating stakeholders	<ul style="list-style-type: none"> - Free advice without engagement - locally-led initiatives 	<ul style="list-style-type: none"> - Risk about the quality of advice - loss of key personnel can delay farmers' support and advisory 	<ul style="list-style-type: none"> - Already part of the project, so their budget is already accounted for 	E.g., In BE2, the forest group team provides the foresters with free advice <ul style="list-style-type: none"> - In IRL1 case study, farmers are trained and supported by designated farm advisors
Grant money for advice and training	<ul style="list-style-type: none"> - funding parties do not need to hire experts for advisory and training 	<ul style="list-style-type: none"> - grant money could be misused 		E.g., in NL3, farmers get 1,500 euro per farm (one time only) for education and consult about sustainable farm management

5.9 Eligibility/ Conditions for participation

Contracts always include conditions for participation that depend for instance on the legal status. E.g., AECM are targeted to farmers. More specifically, value chain contracts often include clauses that limit the participation to farmers in specific areas (like, PDO for instance), collectives may include clauses of contiguity between the collective participants, etc.

Table 11 List of conditions for participation

Eligibility/ conditions for participation	Benefits	Disadvantages	Points of attention	Case study examples
No special conditions		- non-compliance of general conditions can lead to non-payment or termination		E.g., FR1, - In UK1 case study, there are no conditions for participation; however, landowners are required to submit progress reports every quarter along with expenses claims
Limitations to using the brand name/ labelling		- non-compliance can lead to interdiction of the brand use	- product category has to meet the criteria set	E.g., in FR3, farmers have to respect the commitments in order to use the 'collective brand' name
Farmers/ stakeholders should have consensus over measures				- FR5, IRL3
Agreement on environmental targets and action plan beforehand		- payment is based on agreed upon targets which could be risky		E.g., IRL1 - In case study IRL4, one key requirement for participant farmers is submission of a complete spreadsheet of farm operational data - FI3
Not be participating in other AES	- to avoid potential double payments with other AES			E.g., - It is not possible to enter other contracts while being enrolled in European hamster protection program (FR5) -In IRL2 lands entered to other AES were excluded from

				entering the RBAPS Pilot
A fixed duration of participation				E.g., For participating in IT3, farmers need to commit to the contract for 20 years
Minimum number of farmers need to participate	- promotes active participation	- The strong interdependence of the farmers can cause failure, if someone does not meet expectations		E.g., In case study IT6, minimum of 15 and maximum of 100 farmers have to be participating for each ITP proposal - In NL1, there needs to be a minimum of 2 farmers to join a collective - In BE2, a minimum number of members need to be present for legally constituting a private association
Organic certification of enrolled farms	- already certified farms ensure high quality products - no money is spent on checking the farm status - Organic farms can form associations and transfer knowledge	- farmers will have to spend their own money on organic certification/ or organic status of the farms	- mostly a requirement for value chain contracts where farmers are paid market-based premiums on products	E.g., In PL4, Bio-Babalscy case, participating farms must be certified as organic - in AT3, only farmers which already participated in measures such as "Organic farming" of the Austrian AES 'ÖPUL' are allowed to participate - In BG1, enrolled agricultural land has to be a part of NATURA 2000 sites - in ES2, farms should have organic certified grapevines for producing premium quality wines

6 Design guide - decision trees for innovative contract types

The following section aims to serve as a design guide for choosing and designing novel contractual solutions for the provision of public goods, in particular environmental ones. It is prepared for on-ground application by all actors involved in the design, implementation, financing of voluntary measures where farmers, landowners, and other stakeholders are contractual partners. Specifically, the design guide is intended to be a comprehensive systematic process for designing AECPG contracts, including design variables, determinants, legal and technological aspects, while considering the various roles at different governance levels during implementation process.

6.1 Choice of contract solution

Deciding upon the appropriate voluntary scheme depends on some essential steps. Each step poses critical questions that need to be answered before selecting the suitable contract type). These are:

A. Targeted public good(s): What are the public goods/ ecosystem services/ environmental and climate objectives being targeted? What are the expected ecological achievements?

B. Decision context: What are the different instruments and contractual solutions available for achieving the objectives?

C. Technical feasibility: Availability of expertise and training and development staff? Scale?

D. Actors involved: Stakeholder involvement and motivations? Farming community reaction?

E. Funding: Sources of funding? Calculation of the payments? Administrative support?

F. Other factors: Cost-effectiveness. Market Preferences.

G. Legal Framework: Factors for implementation (like environmental legislation)? Mandatory requirements?

Below is a flowchart incorporating the main necessary steps to be evaluated while choosing an instrument (Fig 5). The result of choice can be one of the contract types studied here, mixed, or another type (e.g., individual practice-based) or even none. One of the critical steps in the implementation of innovative contract types is to detect if the new contract type is a better option or not compared with what is in place.

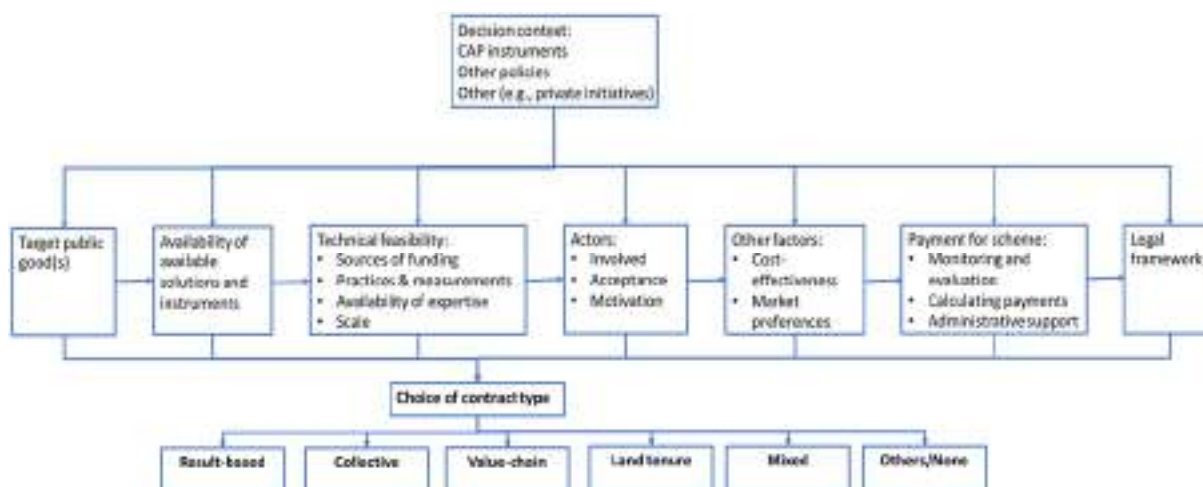


Fig 5 Decision tree for contract type

We further elaborated the choice of different contract types through decision trees that can help practitioners and other stakeholders to make effective decisions about design and implementation.

6.2 Result-based schemes

For result-based payments, it is necessary first to identify the availability, source, and type of funding and, if this is public funding, to check if the scheme can comply with funding requirements. Then the availability of knowledge, skills, and institutional capacity must be considered. It is crucial to assess if the expected response and uptake by the target farmers will be sufficient to achieve the environmental objectives and, if relevant, whether farmers will co-operate with other stakeholders to achieve result indicators that apply at a landscape scale. It is also important to consider how to pay for the objectives achieved. It also requires verification of results through evaluating indicators and adding transaction costs to the calculation of payments¹. We illustrated a decision tree below (Fig 6) to design result-based schemes efficiently.

¹ Section 4.7.4 of DG AGRI Guidance document: technical elements of agri-environment-climate measure in the programming period 2014-20 (version November 2014). Brussels.

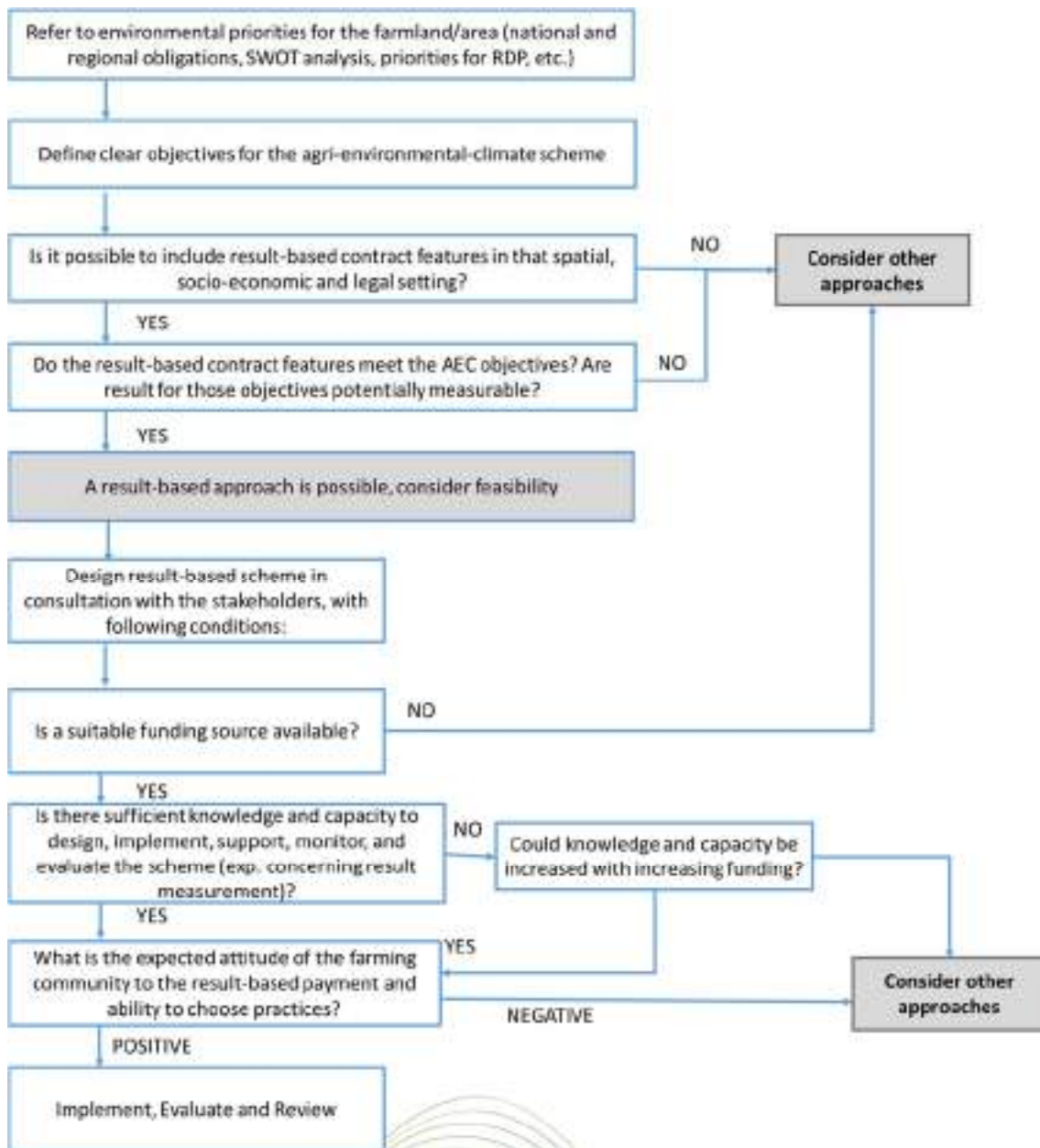


Fig 6 Decision tree for designing result-based schemes

6.3 Collective schemes

A vital design step in collective schemes is the role of specific actors in and implementing the scheme, especially collectives and associations of farmers and foresters. Also, studies show that farmers are not highly accepting of collective and collaborative features in a scheme like collective payments or collective decision-making, so it is important to consider the feasibility of a collective scheme and provide the practitioners with the flexibility to modify the scheme design per collective choices. So, the decision tree given below (Fig 7) mainly includes a loop for decision-making and flexibility before designing a collective scheme.

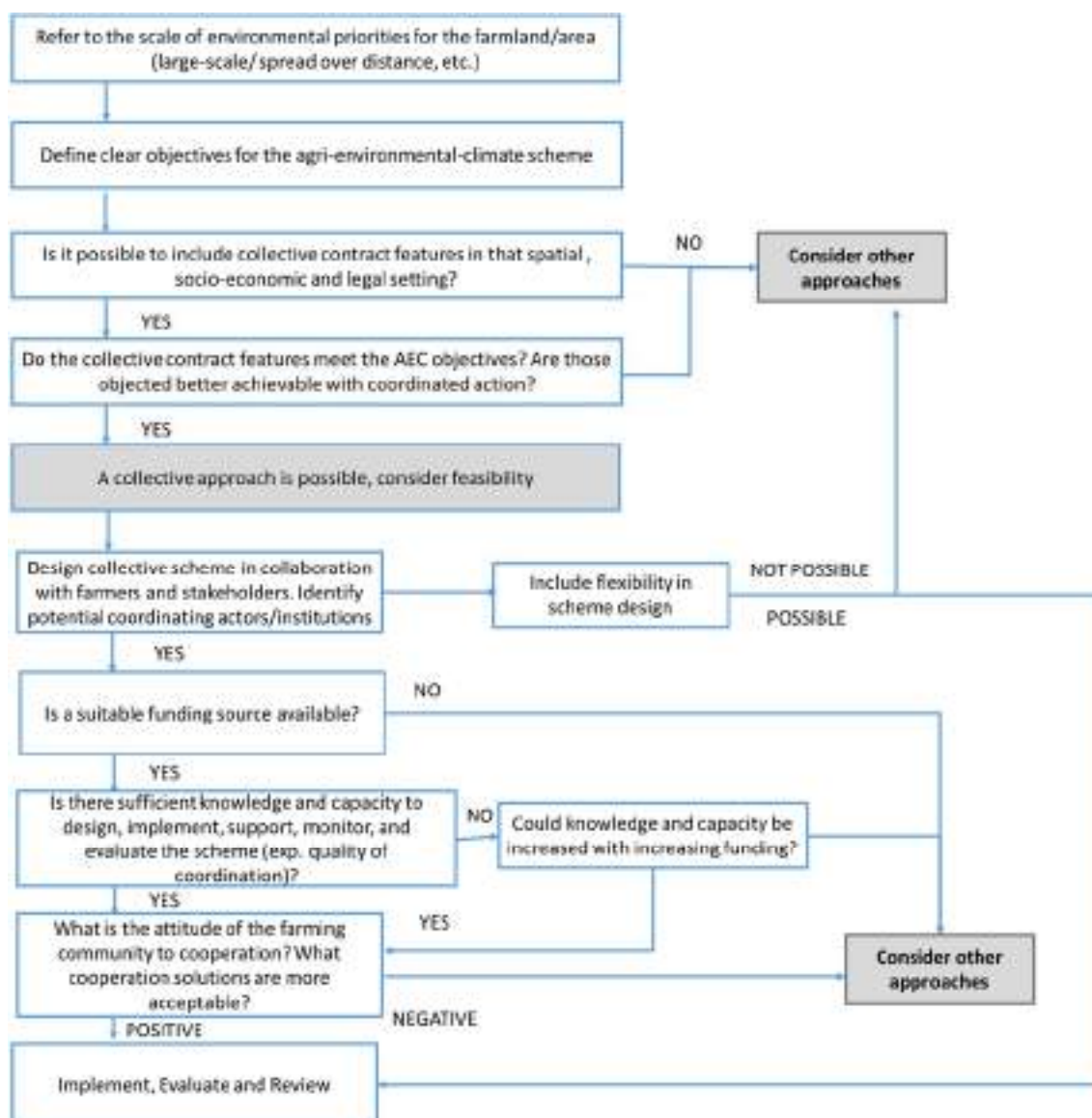


Fig 7 Decision tree for designing collective schemes

6.4 Value chain schemes

Value chain contract types usually pay the farmers in exchange for a particular product derived by environmental prescriptions attached to a contract for the provision of a private good, assuming consumers are willing to pay for the public good when purchasing the private good. So, the role of the market, market players, and buyers/consumers are important in designing a value-chain contract type. Thus, before choosing to design and engage in a value chain contract, it is critical to check the market conditions and product requirements and then match them to the environmental objectives they intend to meet with the product. If the market conditions are unsuitable, practitioners should consider using other contract solutions. Given below (Fig 8) is a decision tree that helps guide practitioners on steps to choose and design a value chain-based scheme.

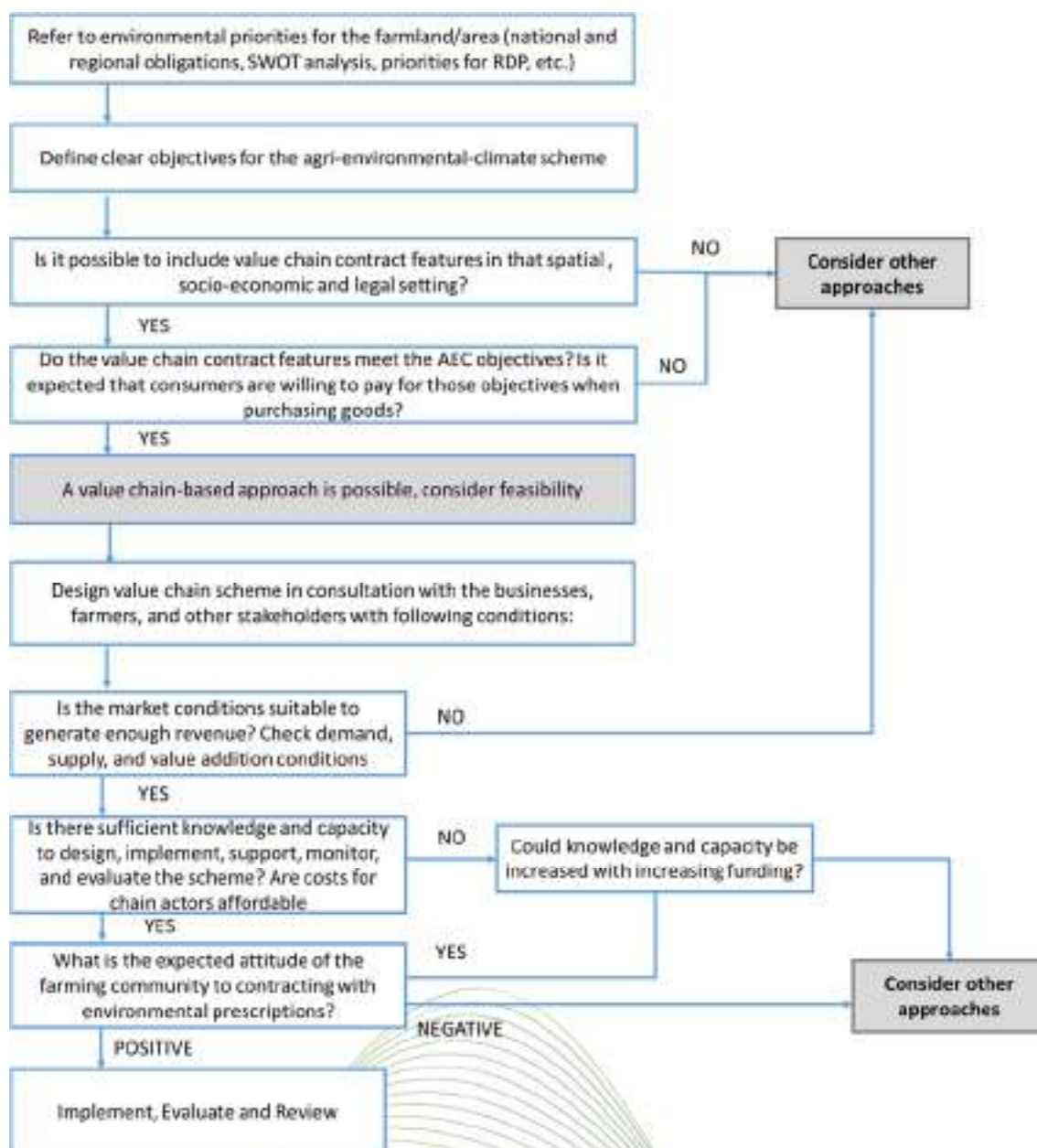


Fig 8 Decision tree for designing value chain schemes

6.5 Land tenure schemes

An important step in designing the land tenure contract solutions is engaging with landowners as primary stakeholders; in particular, it is important to detect landowners interested in promoting tenure solutions that provide public goods (e.g., public owners, etc.). Land tenure-related contracts are also strongly

determined by the legal framework. Figure below (Fig 9) will guide practitioners on how to design a land tenure contract.

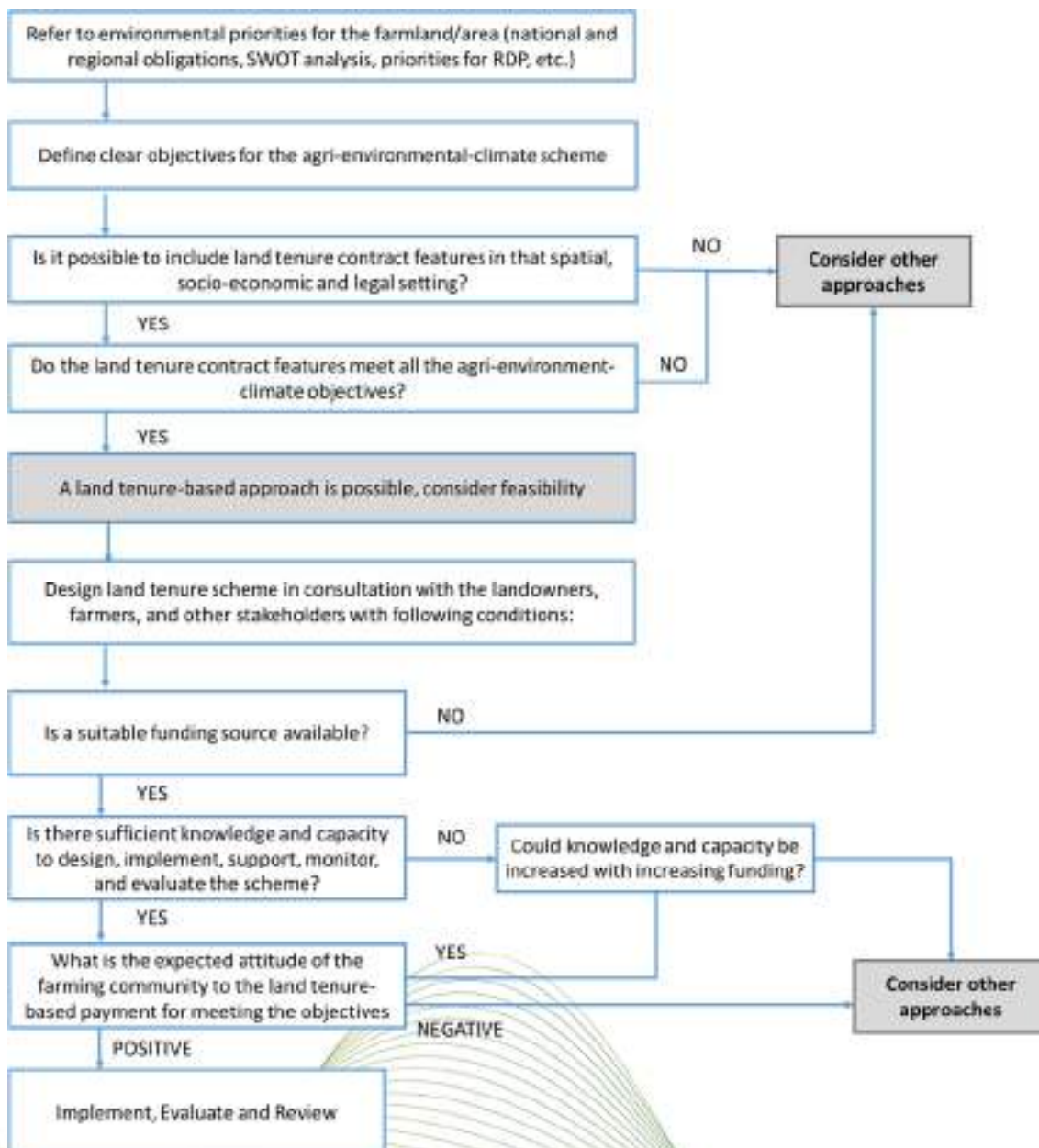


Fig 9 Decision tree for designing land tenure schemes

7 Discussion, Conclusion, and the next steps

7.1 Discussions and next steps

This document presents insights from the review of literature and data, results and contents from WP1, WP2, and WP3. The draft CONSOLE framework along with the short design guide will be tested in real decision-making contexts and will be shared among practitioners and developed into a supporting tool for actors in the field, enabling the delivery and sustainability of AECPGs. Insights will improve policy design towards the achievement of the Sustainable Development Goals, in particular through environmental policies and the post-2020 CAP. The design of the draft framework will continue along the project activities. All WPs will eventually input and enrich D1.4 to develop D1.7 “Final AECPG contractual framework and practical solutions catalogue”. The short design guide is a condensed version of the draft framework. It includes the model of the contracts and their features as well as decision trees for choosing the type of schemes to apply and a general flowchart for designing the same. The short design guide also provides suitable visual solutions for the application of different contract types. This draft framework will further be tested in WP5 (Task 5.2 “Ground-truth real-life testing of draft framework and solutions catalogues”). Other tasks also depend on this framework and its robust testing as explained below.

7.2 Tasks ahead

In WP5, Task 5.2, the framework and the design guide will be tested and assessed by the Community of Practice (CoP), including project partners. A guideline for testing the solutions catalogue will be prepared in order to anticipate socio-economic, technological, policies, and environmental barriers to testing/adoption, to clarify which indicators to assess and how measure them. Partners testing the framework will collect internal feedback to analyze the usefulness of the framework and suggestions for final refinements, as well as policy-relevant feedbacks through vigorous workshops. Further ahead, in Task 5.3 training will be provided to stakeholders and other invitees about the CONSOLE framework and how to test it practically. Entities from outside the project will be addressed on the use of the framework and innovative concepts in AECPG contracts during training sessions held for task 5.3 towards the end of the project.

Deliverables linked to the draft framework:

- **D5.2** – Guideline for testing the solutions catalogue by CoP and partners
- **D5.5** – Report on ground-truth testing of the framework in real life and lessons learned from testing

7.3 Conclusions

The draft framework presents and analyzes the individual components of result-based, collective, value-chain and land tenure contracts. The implementation of such innovative solutions is not an easy task, and the decision trees facilitate decision-makers in that formidable endeavor. This includes the option to consider attentively whether the reviewed innovative contracts are an efficient solution for the socioeconomic contexts in which they operate. Indeed, one of the specific messages delivered by this document warns against the reproduction of successful examples without considering a range of aspects such as traditions, social and cultural capital and consumers' attention towards public goods. The analytical approach presented in the framework also helps the identification of parts or components of the different contracts that act as "weak link" and the potential to combine different contract typologies. That approach facilitates the development of customized AEC schemes that fit at best to different contexts.

8 Appendix

8.1 Glossary

The glossary provides definitions of terms and concepts included in the CONSOLE Project and in particular in the conceptual framework.

Academic version

Tenure-related -> feature of a contract affecting the property rights on a land. Tenure-related contracts can be differentiated according to whether land use rights on communal resources are granted to a third party (e.g., grazing rights granted to farmers conditional to specific herd/flock management – case study BG1) or whether a landowner agrees to give-up part of his land-use rights to achieve an environmental target (e.g., Forest bank case study [FI1](#)). Typically, land tenure contracts span on a long-time range and therefore are acknowledged to fit better than conventional incentive-based schemes to achieve a range of environmental targets.

Reference-parameter for payment -> a variable (e.g., number of birds, hectares under a prescribed practice, etc.) on which the payment of an agri-environmental scheme is linked. Parameters can be related to a specific environmental variable (e.g., higher species density, higher soil organic matter, etc.) or to a specific management action (e.g., delay of mowing, hedge planting, etc.) thought to lead to an environmental outcome. The former case characterizes result-based schemes, whereas the latter defines action-based schemes (Hanley et al., 2012). The reference-parameter can also be classified according to the type of indicators that can be calculated. For instance, direct indicators of biodiversity relate to some kind of species sampling (e.g., number of spiders, earthworms, etc.). Indirect indicators of biodiversity are based on parameters with a link to biodiversity such as habitat diversity. Indirect indicators

can also originate from models that are developed to assess an environmental outcome on the basis of a set of variables. In a strict sense, result-based schemes entail one or more direct indicators, whereas indirect indicators are employed in result-*oriented* schemes.

Role of cooperation among farmers/actors -> two or more farmers/actors working together towards the achievement of a common goal identifies a cooperation or a collaboration. The role of cooperation can take different forms according to its structure and level of interaction between the parties. Cooperative institutions can be structured as a single entity represented by an intermediary. For instance, collaborative contracts are agreed with Sami villages for the conservation of predators in Sweden (Zabel & Holm-Müller, 2008). In that case, the village chief is the intermediary that acts as the liaison with the paying agency, manages controversies and the distribution of the payment to the community. Such an organization also involves that failing to achieve the environmental goal is a responsibility of all the members. That has relevant effects on transaction costs, monitoring and enforcement. For instance, in the so-called joint liability approach, the environmental result achieved by a random member of the community is taken as reference for evaluating the achievement of the whole community (Cranford, 2014). In other collaborative forms, the members agree a plan of activities related to specific practices or interventions to achieve a (environmental) goal that requires a collective approach. However, no formal hierarchical structure is present, and each member is individually responsible toward the paying agency. Such forms of collaboration can also be defined as "networks" like in the case of the "Fruit orchard Farnsberg" project in Switzerland.

Degree of connection with private goods provision -> the connection with private goods of AECPGs contracts concerns different topics such as jointness, multifunctionality and ecosystem services. The jointness concerns the *quantity* of a public good that is provided in connection with the production of a private good. That is relevant for the estimation of the additionality for instance. The multifunctionality is usually targeted to the design of a farming system that aims to optimize the synergies between several functions such as food production, recreation, environmental quality, etc. Multifunctionality is closely related to the ecosystem services approach, but the latter also involves a relevant attention towards the socio-ecological processes transforming an ecosystem function in a service for (different sectors of) the society.

Contract and length of contract -> a contract is a formal agreement signed between two or more parties. Contracts are defined/qualified by a set of different features arranged in different combinations that outline several alternatives. The length of a contract is a specific feature of a contract that discriminates between different contract types and AECPG targets. Longer contracts are usually required to reach a range of environmental and climate targets. However, farmers' acceptability and contract duration are usually inversely related. In some cases, however, long contracts can be preferred by

farmers when these ensure additional benefits such as reduced land rents (e.g. in land tenure-related contracts).

Object of contract solutions -> the object of a contract is one or more AECPGs. Even though a contract solution could in theory target any AECPG, it is commonly acknowledged that specific contracts are fitting or necessary for specific AECPG. For instance, collective approaches are crucial for landscape level AECPGs such as water quality. Result-based contracts are useful for improving biodiversity or other AECPGs that require parcel-level practice adjustments. Value chain contracts are not linked to a specific AECPG. Nevertheless, these contracts are likely effective for AECPGs that attract consumers' interest (e.g., iconic species or ecosystem services such as potable water). Land-tenure contracts are effective for AECPGs that require long-term commitments.

Actors/parties involved -> the parties involved in a contract can be classified according to the institution involved. For instance, a typical form of agri-environmental scheme involves a public institution (payer) and an individual (the farmer receiving the payment). Other forms of contracts where only private parties are involved are attracting a relevant interest as in the case of many value-chain contracts. A further issue concerns whether the involved actors are individuals or collectives. That is relevant in collaborative and cooperative forms of contracts (cfr. Role of cooperation among farmers/actors). Finally, introducing an intermediary as an additional actor in a contract seems to be a relevant condition for success in particular for the implementation of more articulated forms of contracts.

Information as a part of the scheme/role -> several inefficiencies attributed to agri-environmental schemes are linked to an information problem. We can distinguish between information asymmetries where the land manager has more information of the payer concerning costs and efficacy of environment friendly practices and information gaps where local scale features affect the environmental effectiveness of different practices. To cope with information gaps, two main strategies have been proposed: i) monitoring programs and ii) spatial targeting. Auctions and result-based contracts are on the other hand proposed to tackle information asymmetry. Nevertheless, the periodic measurement of results entailed in the result-based approach is acknowledged to allow a long-term reduction of information gaps thanks to potential learning processes that could affect the farmers involved.

Monitoring and enforcement -> Monitoring and enforcement activities are necessary to ensure that farmers carry out the conservation measures for which they receive payments (Wätzold & Schwerdtner, 2005). Monitoring refers to surveying the implementation of measures farmers agreed upon when they committed themselves to participation in a network project. Enforcement refers to procedures and sanctions that are applied in case of non-compliance. In this context, monitoring should not be confused with monitoring programs aimed at

studying/assessing the environmental impact of a specific agri-environmental scheme.

Flexibility -> in general, the flexibility concerns the possibility to customize to local/individual cases a contract. The flexibility is relevant as it usually allows to increase the acceptability of a contract. For instance, the possibility for a farmer to adapt a contractual framework to his farm situation increases the uptake of a scheme. On the other hand, the flexibility increases the transaction costs adding a bargaining process and potential trade-offs. Flexibility is also a core aspect of result-based contracts. Indeed, the philosophy of such contracts is based on leaving to the farmers a complete freedom of choice (i.e., perfect flexibility) to reach the result of interest. The drawback of such flexibility is however the introduction of a critical aspect connected to the risk for the farmers to fail to achieve the result.

Public good -> in economics, a public good is non-rivalrous and non-excludable whereas private goods are both excludable and rivalrous. Those aspects entail those public goods have not a market of reference and are usually underprovided. Nonetheless, *pure* environmental public goods responding exactly to those conditions are not common. For instance, a landscape is a typical public good, but the non-rivalrous condition might be affected by overcrowding. Thus, different possible cases are typically classified as club goods (non-rivalrous but excludable) and common goods (non-excludable but rivalrous).

Externality -> when an economic process generates a secondary (and usually unintended) impact affecting a third party. Externalities can be positive (benefits) or negative (costs). The concept of environmental externality is particularly important for the design of agri-environmental schemes as these are usually focused on reducing negative environmental externalities typically related to agricultural activities. In some cases, incentives are designed to facilitate the permanence of a positive externality (e.g., landscape conservation) but it is to notice that the incentive retribution is usually based on the cost of the action deemed necessary to avoid/ facilitate the externality and not on the actual cost/benefit of the externality.

Value-chain contract approach -> the feature of this solution concerns the valorization of a specific food supply chain according to the public good(s) that is delivered by its components. Typically, information on public goods delivered by supplier farms is transferred all along the value chain up to the final consumers of the food product. The rationale of the approach is based on the competitive advantage attributed to the product and to the firms (e.g., consumer trust) involved in the value chain. Example: water protection case study DE5.

9 References

- Cranford, M. (2014). *Positive incentives for ecosystem services*. The London School of Economics and Political Science (LSE).
- Cullen, P., O'donoghue, C., Ryan, M., Kilgarriff, P., & Hynes, S. (2018). *The Economics of Agri-environment Scheme Design*.
- Derissen, S., & Quaas, M. F. (2013). Combining performance-based and action-based payments to provide environmental goods under uncertainty. *Ecological Economics*, 85, 77–84. <https://doi.org/10.1016/j.ecolecon.2012.11.001>
- Hanley, N., Banerjee, S., Lennox, G. D., & Armsworth, P. R. (2012). How should we incentivize private landowners to 'produce' more biodiversity? *Oxford Review of Economic Policy*, 28(1), 93–113.
- Wätzold, F., & Schwerdtner, K. (2005). Why be wasteful when preserving a valuable resource? A review article on the cost-effectiveness of European biodiversity conservation policy. *Biological Conservation*, 123(3), 327–338.
- Zabel, A., & Holm-Müller, K. (2008). Conservation performance payments for carnivore conservation in Sweden. *Conservation Biology*, 22(2), 247–251.

10 Acknowledgment

