

Opportunities for delivery of agri-environmental public goods in Bulgarian agriculture through performance-based contracts

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Abstract

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The provision of public goods is associated with major challenges, such as trade-offs between environmental performance and farm profitability, time interval between action and impact, and potential mismatch between scales of action and effects. As a result, several public goods in rural areas, such as water and air quality, soil erosion control, carbon capture, animal and plant biodiversity and recreation, are characterized by insufficient provision. EU agricultural policy, has partially refocused its goal on providing public goods in rural areas, taking into account today's societal requirements. The goal of this paper is to analyze possible implementation of different environmental contract solutions to improved delivery of agri-environmental public goods (AEPGs) in Bulgaria. The results of this study aim to search for innovative mechanisms enabling to boost farmers' provision of agri-environmental climate public goods. The novelty of this study is the exploration of improved contract solutions and their future implementation in Bulgarian farms for fulfillment of lack of public funding and environmental deterioration. The analysis is based on the survey with 96 farmers conducted in the period January – March 2021. The result from the survey shows that Bulgarian farmers adopt to a highest extent measures regarding soil resources, where measures for water resources represent a very narrow percentage. However, future intentions of respondents show high willingness to adopt measures regarding water resources and carbon storage. From different environmental contracts analyzed in the paper, the result-based contracts are the most well accepted among farmers and represent a future alternative for agri-environmental contracts.

Keywords: agri-environmental; public goods; contracts

Introduction

Agricultural policy in the EU has partially re-oriented its objective towards the provision of public goods in rural areas acknowledging today's societal demands (Erjavec and Erjavec, 2015). In the legislative proposal for the next CAP programming period, it is foreseen to pursue this path further. The recent Green New Deal by the European Commission, and follow up initiatives (Farm to Fork strategy) tend to strengthen and to qualify this orientation.

The legislative proposal for the next CAP programming period (2022-2027), envisages continuing providing public

goods in rural areas. At this stage they are still considered unsatisfactory in terms of durability, efficiency and effectiveness (e.g. see European Court of Auditors 2011, p. .7). Improvements can come from a flexible combination of promising new instruments, such as new environmental ownership systems (e.g. environmental leasing), performance-based payments, or collective approaches, as well as better value chain strategies, but they have so far been poorly tested in practice in the country. Effective implementation of these solutions requires a coherent multi-level contractual framework that takes into account contextual variables, such as compatibility with market goods, price systems, business networks, social capital, farm-

ers' expertise and EU / national / local framework legislation. It must also take into account social (e.g. multi-stakeholder projects in some areas), organizational and technological innovation processes, as well as the local specificities of the desired results. Finally, feasibility may depend on the wider implications of different approaches, e.g. compliance with the green box and budget constraints.

The aim of this paper is to analyze possible implementation of different types of environmental contract solutions to improved delivery of agri-environmental public goods (AEPGs) in Bulgaria. One of them is result-based approaches connect payments to environmental effects or the amount of AEPGs provided (environmental outcomes and benefits). In result-oriented contracts the payment may depend on a simplified measurement based on models, or a point system linking a set of practices to expected outcomes. The improved design of innovative contracts can reduce the policy failures due to asymmetric information. The novelty of the paper is focused on the trade-off between an accurate design of agri-environmental schemes and the related administrative burden, highlighting the needs for a better understanding of the role of mechanisms design into the policy cycle. The paper is based on the results, obtained in the project 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.

While there is already a large literature (e.g., Cooper et al., 2009; Jones, et al., 2015) and long experience in the EU with Agri-Environmental Schemes (AES), the actions aimed at the delivery of AEPGs are still considered unsatisfactory in terms of longevity, effectiveness and efficiency (e.g. see European Court of Auditors, 2011) anatomical results. Results: The mean follow up was 40 months (range: 13-67 months). Insufficient information can lead to inefficiency as a consequence of either an over-compensation of some farmers' groups with consequent waste of funding, or under-compensation of practices that can provide higher environmental benefits (Bartolini, et al., 2007). Asymmetric information is very common in agri-environmental regulation and can reduce the provision of public goods through agriculture (Bartolini, et al., 2020). Improvements may come from a flexible mix of promising new instruments (Herzon et al., 2018), such as new environmental-related tenure systems (e.g. environmental lease), result-based payments, or collective approaches, as well as by better value chain strategies, but these have been so far poorly tested in practice in the EU (Schilizzi and Latacz-Lohmann, 2016). One of the main failures of the current agricultural policy stems from the policy makers' inability to cope with the heterogeneity

of private costs of producing environmental benefits, within and among farms (Armsworth, et al., 2012).

For AES 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 define and measure the result indicators. It is also important to consider how to pay for the objectives achieved. That is strictly linked to identifying indicators and adding transaction costs to the calculation of payments.

Methods and data

For the purposes of this study, structured interview was performed. In the current study, respondents have been asked to assess four different types of environmental contracts – result-based, collective, value chain and land tenure. For the purposes of the study, we define these contracts as follows:

a) Result-based contracts – payment is based on the delivery of specific environmental, or climate results, depending on the efforts of the farmers for achieving these results. The latter serve as a reference parameter for payment. The farmer has the access to training regarding his participation and implementation of specific measures and he is also involved in the monitoring process. The result-based contracts are one of the most promising substitutes of action-based approach, because of its direct connection between environmental results and price paid for them (Burton, et al., 2013; Russi, et al., 2016). This kind of contracts are still new for farmers in Europe and are not so common as the payment-based contracts.

b) Collective contract – applying for environmental measures is only possible if the farmer participates in a group of land managers, where decision for locating the measures on the farmland is jointly decided. Collective approach is important to widen the diffusion of AESs and also because it can partially overcome the problem of high transaction costs characterizing the previous instruments (Hodge, 2007; Riley, et al., 2018). In this kind of contract, farmers voluntary decide to join a collective partnership with the main goal for addressing provision of public goods on a landscape level (not on a single farmer plot).

c) Value-chain contract – farmers receive payment for their efforts through the value chain. The value chain contract solution refers to a type of funding related to the input and output of stakeholders involved in the supply of AEPGs. Processor, or retailer pays the farmer if he accom-

plishes certain environmental requirements on his farmland. This type of contract is usually utilised in product supply chains to create an optimal distribution of the value among participants. The idea of this kind of contract is to use price premiums and use of specific brands to support the environmental efforts of farmers.

d) Land tenure – this kind of contract farmers have a lower lease payment in return for committing to adopt certain environmental measures beyond the legal requirements. The land manager will enter into the contract only if he implements environmental measures beyond legal requirements when producing on the leased land. Improvement of the land tenure contracts and increasing their security stimulate farmers to invest on soil quality and leads to a significant increase in efficiency (Akram, et al., 2019).

Survey with 96 farmers in Bulgaria has been conducted in the period January – March 2021 as part of the activities in the European research project – CONSOLE. Farmers have been interviewed from 37 municipalities in Bulgaria. Predominant group of the respondents is above 41 years of age (72 people), where younger farmers were 24 from all respondents. Education level for 72% of farmers is specialized high school diploma or above (bachelor and master's degree), from which 61% have a completed agricultural education. Regarding specialization of the holding, farmers' responses are as follows: 1) specialist cereals, oilseed, and protein crops – 40%, 2) various permanent crops – 18%; 3) general field cropping – 17%; 4) horticulture – 11%; 5) various crops and livestock – 9%; 6) vineyards – 7%; and 7) mixed farming – 3%. The farmland is predominantly rented with size between 10 and over 500 ha, where the largest share of responses show size between 100-500 ha (40%). Fewer respondents state that they only have owned agricultural land, which is mostly area under 100 ha (20%).

3. Results

3.1. Attitudes of farmers towards environmental aspects

Adoption of contract solutions in farmlands aims at improving environmental aspects such scenery, habitat diversity, increasing water retention, etc. According to the respondents most measures have been adopted regarding improving soil quality and health – 80% of farmers indicated that they have carried measures regarding the state of soil resources (Figure 1). Compared to the other environmental aspects, soil conservation has a direct impact on the production on farmland, therefore recognizing the need to increase soil health is easily accepted by farmers as environmental effort. Interestingly, 73% of respondents stated that they haven't

adopted any measures regarding water quality. Comparing both resources – soil and water – the second one is more difficult to observe on an individual farm plot since water is movable resource. Measures regarding biodiversity are the second most unadopted followed by landscape and carbon storage. Those aspects of the environment are probably not recognized by farmers as most important and currently adoption of such measures is not very popular in Bulgaria.

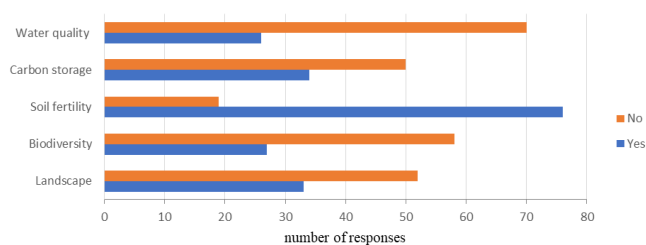


Fig. 1. Responses of Bulgarian farmers regarding environmental measures adopted in the last 5 years

Source: Own calculations, CONSOLE project database

Another question, part of the Bulgarian survey, was regarding farmers' willingness to adopt environmental measures in the next 5 years (Figure 2). Although measures regarding water resources have not been popular among respondents so far (Figure 1), farmer's express plans to adopt such measures. Interestingly, carbon storage is another aspect that farmers recognize for future adoption. Given the fact that more and more attention is given to the role of agriculture to mitigate climate change, it is not a surprise that farmers begin to recognize their role in this regard.

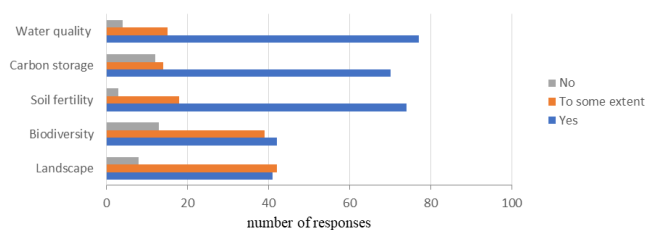


Fig. 2. Responses of Bulgarian farmers regarding future adoption of environmental measures

Source: Own calculations, CONSOLE project database

3.2. Characteristics of environmental contracts

The agri-environmental contracts are very specific in their nature and features compared to regular contracts in agriculture. There are many different characteristics that might increase or decrease the willingness of farmers to enroll in environmental contract or program. Figure 3 presents the opinions of Bulgarian farmers regarding 13 features of environmental contracts.

According to the Bulgarian respondents, one main characteristic does not have an effect on the willingness to adopt environmental contracts: authority control (53%).¹

Three others have a prevalent part of the opinions as being either somehow decreasing or decreasing considerably the willingness of farmers:

- paid by customers (49%)²
- common payment (64%)³
- collective agreement (61%)⁴

Another three factors show positive effect on farmer’s willingness (either decrease considerably or somewhat increases willingness):

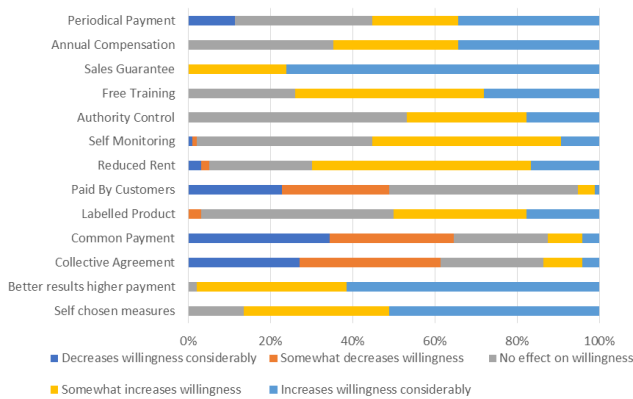


Fig. 3. Factors affecting willingness of Bulgarian farmers to adopt environmental contracts (% of responses)
 Source: Own calculations, CONSOLE project database

- Sales guarantee – all respondents stated positive effect on willingness⁵
- Better results, higher payment (97%)⁶
- Free training (74%)⁷

¹ ‘Authority control’, means that the environmental results farmers achieve are regularly controlled by authorities who inspect the farm once a year

² ‘Paid by customers’, means that the contract is not paid by public money, but the compensation that farmers get for environmentally friendly production is paid by buyers of their products

³ ‘Common payment’ is a payment, made to land managers collectively. Division of the payment for individual land managers is agreed collectively

⁴ ‘Collective agreement’, means that farmers collectively agree on environmental targets and measures at landscape-level together with other land managers

⁵ ‘Sales guarantee’, means that farmers get a sales guarantee from a processor, or retailer in return for implementing environmental measures.

⁶ ‘Better results, higher payment’, means that the payment gets higher, the better farmers’ environmental results are.

⁷ ‘Free training’, means that farmers are offered free training and

- Reduced rent (70%)⁸

3.3. Types of environmental contracts

In the current study, respondents have been asked to assess four different types of contracts – result-based, collective, value chain and land tenure. All these contracts aim at achieving certain environmental and climate results and improvements.

In the following section, opinions are presented regarding three main aspects of these contracts:

- how easy is to understand and manage the contract,
- applicability – technical aspects of implementation,
- economic benefits.

Opinions from Bulgarian farmers are presented on Figure 4, 5 and 6. Most respondents find result-based contracts easy to understand (83%), followed by value chain and land tenure contracts (Figure 4). Almost 24% of the respondents state that they find collective contracts difficult to understand. The opinion of farms on the applicability of these four contracts (Figure 5) shows similar results – respondents find result-based contracts to be most applicable to their farm (67%) and collective contract – least applicable (42%).

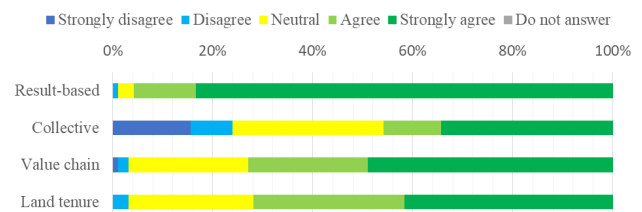


Fig. 4. Aspects of environmental contracts – Easy to understand

Source: Own calculations, CONSOLE project database

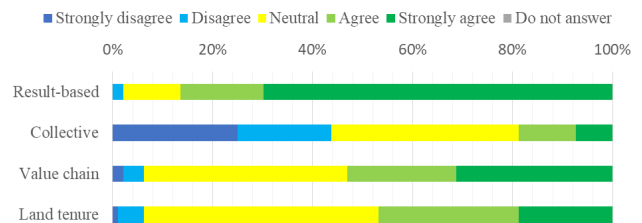


Fig. 5. Aspects of environmental contracts – Applicable to farm

Source: Own calculations, CONSOLE project database

advice that enables them to reach the environmental targets.

⁸ ‘Reduced rent’, means that farmers can lease land with a reduced rent, if they agree to follow environmental management part of the lease contract

Opinions, regarding the economic benefits from the contracts (Figure 6), show almost identical results as with the applicability of the contracts. In this regard, it is worth mentioning what is the previous experience of Bulgarian farmers with the four contracts. The survey showed that result-oriented contract is the one, with which 35% from all respondents have former experience. However, environmental contracts like collective contracts, land tenure and value chain were predominantly not adopted previously by farmers. Therefore, opinions regarding the three aspects of the environmental contracts discussed previously, might be formed as a result of farmers' experience.

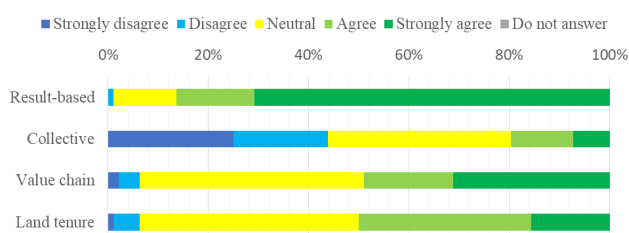


Fig. 6. Aspects of environmental contracts – Economic benefits

Source: Own calculations, CONSOLE project database

Results from all countries involved in the project are similar. The main difference is regarding neutrality – bigger part of Bulgarian respondents shows neutrality/uncertainty regarding the aspects of the contracts, with lowest neutrality regarding the aspect ‘easy to understand’. For the other two, neutrality is almost half of the opinions, especially for value-chain and land tenure contracts.

3.4. Future intentions

Farmers were asked to express their future intentions regarding implementation of any of the four contracts (Figure 7). As with the previous discussion, their intentions follow the pattern of choosing result-based contracts with highest possibility (71% state that they are either likely or very likely to adopt this contract in the future). Land tenure is the second type of contract, which would be adopted by 38% of all respondents. Collective and value chain contracts are unlikely to be adopted by more 36% of respondents. Only 37% and 21% of respondents would adopt land tenure and value chain contracts, respectively. Results from all partners (all 13 countries) show similar results. Difference is that apart for result-based contracts, more than 1/3 of all respondents in Bulgaria show neutrality, or uncertainty regarding the environmental contracts, with the highest one for value-chain contract (41%) and land tenure (39%). Results for all European countries involved in the project show neutrality of about 26-30% of all respondents.

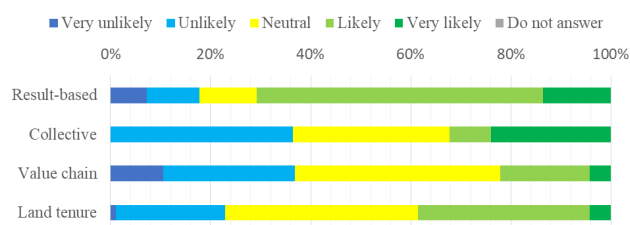


Fig. 7. Future intentions for adoption of environmental contracts

Source: Own calculations, CONSOLE project database

Conclusions

The results from the survey with Bulgarian farmers give several insights regarding the adoption of contracts for agri-environmental public goods. Based on the outcomes, it can be concluded that Bulgarian farmers adopt to a highest extent measures regarding soil resources, where measures for water resources represent a very narrow percentage. However, future intentions of respondents show high willingness to adopt measures regarding water resources and carbon storage. Regarding farmers' willingness to participate in environmental contracts, characteristics, such as increasing payments for higher environmental outcomes, free trainings and reduced rent appear to have positive effect. On the contrary, common payments and collective agreement decrease willingness for predominant part of the respondents.

Regarding features of the four types of contracts, it can be concluded that result-based contract is the easiest to understand, apply on farm and with economic benefits according to Bulgarian respondents. On the other hand, collective contract is the least applicable and with least economic benefit for farmers. Collective contracts show unwillingness for future adoption not only among Bulgarian farmers, but in all countries involved in the project. They are also least applicable and with least economic benefit according to responses from all partners. Regarding future intentions farmers are most willing to adopt result-based contracts, and least willing to adopt collective and value – chain contracts. Bulgarian farmers have less experience with value-chain and land tenure contracts, which shows their neutrality/uncertainty regarding key aspects of the contracts or future intentions for adoption.

This study can give an insight and better understanding of farmers' perceptions on different contract solutions for AEPGs. The results can help policy makers in their efforts on promoting one, or more of the contract solutions presented in this paper, in order to increase the participation of farmers in provision of AEPGs.

Acknowledgements

The paper is based on the results, obtained in the project 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.

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