Report on EBA incentives, drivers and key determinants of uptake of biodiversity management by farmers

Deliverable D2.2 (D9)

31 March 2022

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SHOWCASE

SHOWCASing synergies between agriculture, biodiversity and Eco-system services to help farmers capitalising on native biodiversity

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Review of contents

To ensure the quality and consistency of this deliverable, we implied an internal review and validation process. The deliverable was drafted by the work package leader (BOKU) and the co-leader (ZALF). All SHOWCASE EBA partners having carried out the interviews reviewed the draft D2.2 document and had the chance to make amendments and comments, which were then integrated by the workpackage leader. Finally, the draft version was submitted to the project coordinator, for final review and validation.

Acknowledgments

We thank all SHOWCASE EBA partners for carrying out task 2.2 and delivering the qualitative data necessary to compose the analyses and this deliverable. Moreover, we thank all partners for reviewing the deliverable and supporting us with comments and amendments. Last but not least we thank all farmers and external experts for providing time and information and supporting the data collection process.

SUMMARY

This document represents Deliverable 2.2 "Report on EBA incentives, drivers and key determinants of uptake of biodiversity management by farmers" within WP2 „Identifying incentives to promote biodiversity and ecosystem services in agricultural landscapes" of the EU Horizon 2020 project SHOWCASE. It reports the outcomes of WP2 Task 2.2 "Determinants for the implementation of regulatory frameworks and private and public incentives targeting biodiversity in SHOWCASE EBAs".

In **chapter 1**, this report introduces the objectives and the tasks addressed. Additionally, it includes a short outline of this report.

In **chapter 2**, the methodological approach is presented. The chapter comprises the methodological approach of the farmers' interviews as well as the expert consultations, gives insights into the study preparation, outlines the corresponding study areas, and describes the preparation and analysis of the data generated. The chapter pinpoints that task 2.2 is based on primary data, gathered by five face-to-face in-depth interviews with farmers in each EBA country (i.e. Estonia, France, Hungary, Portugal, Romania, Spain, Sweden, Switzerland, the Netherlands, and UK), and by consultations with relevant agricultural experts in each EBA. The chapter also describes the interview processes: farmers and experts were interviewed by local EBA research partners in the respective local language, following a pre-defined structure determined by an interview guideline. As regards the farmer interviews, the interview guideline consisted of 5 parts, addressing farmers' and farm characteristics, farmers' understanding of biodiversity, hindering/enabling factors for implementing biodiversity interventions, relevant biodiversity management interventions carried out, related regulatory frameworks and private and public initiatives existing in the EBAs, and, last but not least, the roles played by specific stakeholders in the famers' environment and by social pressure, influencing farmers' biodiversity-related decision-making. The chapter also details on the specific Sub-Part for the in-depths EBAs in Estonia, Romania, the Netherlands, and UK, investigating favourable design features of policy instruments and setting the instruments are embedded in. As regards the expert consultations, the Chapter presents the contents of the expert consultation guideline, consisting of generic questions applicable to all EBAs as well as questions specifically tailored to the EBAs, which have been based on preliminary findings of the farmer interviews. Finally, Chapter 2 also gives an insight into data analysis, which was done by means of applying both quantitative and qualitative methods, such as univariate data analyses, thematic analysis, and content-wise clustering.

In **chapter 3**, the farmers interviewed and experts consulted are characterized applying descriptive statistics. This chapter not only serves to better understand farmers' demographic and experts' institutional background. It also provides information on potential biases in the corresponding samples. Overall, this information facilitates the interpretation of the results presented in chapter 4 and also highlights potential limitations that need to be considered.

Chapter 4 presents the results of the farmer interviews. To provide a clearer overview of the extensive findings, the four sub-chapters of chapter 4 shall be summarized as follows:

Chapter 4.1 gives an overview of the farms reflected in this study. It shows a great variation in the natural preconditions as well as the economic and management characteristics of the farms. Depending on the aspect under question, this variation can be observed both between and within the EBAs investigated.

Chapter 4.2 reports about the status quo in the SHOWCASE EBAs as regards the (4.2.1) implementation of pro-biodiversity management interventions, the (4.2.2) private and public incentives activated, and the (4.2.3) regulatory frameworks determining and/or supporting the implementation of biodiversity management in each EBA. For incentives and regulatory frameworks, farmers' interviews have been analysed also with regard to the chances and challenges

of an integration of regulatory frameworks and incentives into the farms business design. The results presented in Chapter 4.2 show that the interviewed EBA farmers implement a broad bundle of biodiversity interventions and are mostly able to activate payment schemes in support of these interventions. The chapter also shows that in many cases public compensation payments have been evaluated as attractive and needed to foster biodiversity management. Nevertheless, as regards the public incentive schemes it also becomes clear that in parts they are either still lacking or not consistent enough for farmers to really trust particularly in their longevity. The analysis of the farmers' interviews also revealed that economic profitability and market access, for both public and private funding opportunities, are the decisive factor to step into biodiversity programmes. Besides payment schemes, the analysis also showed that self-motivation can be an important driver for implementing biodiversity interventions. As regards regulation, the analysis reveals that many regulatory frameworks are in place, having direct or indirect effects on biodiversity. Besides regulation baselines obligatory for receiving direct payments (e.g. cross compliance), mainly Natura 2000 and local nature conservation regulation were mentioned as of high importance. Here, on the one hand, the interview results reveal that many of the interviewed farmers seem to be able to cope well with the challenges of implementing regulatory requirements, while, on the other, from the farmers' point of view also a broad number of challenges result from integrating the rules set by regulatory frameworks into the management strategies of the farms.

Chapter 4.3 deals with the perspectives for the effective implementation of biodiversity interventions in the SHOWCASE EBAs. The chapter first gives an overview on (4.3.1) general factors motivating or hindering implementation of biodiversity interventions. It then presents the results on the farmer interviews as regards (4.3.2) the perceived effectiveness of current public incentives and regulatory frameworks in enhancing biodiversity, revealing some potentials for improvement. These potentials are then specified more in-depth by eliciting (4.3.3) design features of instruments to support the implementation of biodiversity interventions. Last but not least, chapter 4.3 provides a deeper look at (4.3.4) the potential of result-based incentive approaches for enhancing biodiversity in the SHOWCASE EBAs, elaborating advantages farmers' see in result-based approaches, particularly considering their effectiveness of enhancing biodiversity provision in their EBA region, in comparison to current mostly action-based approaches. Also challenges and risks foreseen by the farmers when implementing such result-based payment on their farms are presented and the farmers' view on the option of self-monitoring, as one specific design feature of such programmes are presented. The results presented in Chapter 4.3 show that a variety of factors exist, motivating or hindering farmers to implement biodiversity interventions. These diverse factors are influencing the decisions for or against pro-biodiversity management on different scales and levels, ranging from intrinsic to external factors, from social influences by interacting with e.g. the local community, to the operational dimension, such as the applicability of interventions, or related costs. The results on the perceived effectiveness of private and public incentive schemes then show, that most of the interviewed farmers have a positive view on the public programmes available as regards their "biodiversity effectiveness". Nevertheless, also some potentials for improvement become obvious, particularly through the statements of farmers being skeptical about the existing schemes. Such areas for improvements are e.g. inflexible design, wrong targeting or lack of monitoring and evaluation. As regards the design features of instruments to support the implementation of biodiversity interventions, we identified several potentials for further development of instruments from the farmers' perspective, by strengthening marketing opportunities and labelling, where currently especially the eco/organic label is perceived as important, or by further fostering co-operation and collaboration with other institutions or actors regarding biodiversity management. Additionally, including farmers in a co-design process of biodiversity measures and allowing some flexibilisation of the contracts would support the implementation of biodiversity measures. Finally, the results on result-based schemes indicate, that a majority of the interviewed farmers see advantages in result-based remuneration compared to the classical action-based payment schemes. Particularly the higher flexibility of management decisions is perceived as contributing to both farmers' motivation to participate and to a higher effectiveness due to better adaptation of management measure to the farming reality as well

as to the local context. Nevertheless, the results also show that farmers see some risks and challenges of an implementation, such as the insecurity of payments, the risk of not being able to control outcomes, e.g. due to external factors such as weather, the problem of sound indicators and fair monitoring, and, last but not least, the farmers' own lack of knowledge about how to enhance biodiversity by suited measures.

Chapter 4.4 deals with the question of farmers' biodiversity-related decision-making. It hereby takes a specific look at (4.4.1) the role of stakeholders and (4.4.2) the role of social pressure. As regards the stakeholders' roles in farmers' biodiversity-related decision-making, on the one hand, chapter 4.4 comprises a list including stakeholders and corresponding mechanisms through which decision-making is potentially affected in the EBAs. This list gives a multi-faceted impression of a) the different roles between the stakeholders and b) the different roles of stakeholders between the EBAs. On the other hand, it is reported how farmers perceive these stakeholders' effect in their decision-making. Here, a starting point to identify possibly powerful stakeholders was generated highlighting the potential of, above all, researchers, advisory services, end-consumers and the social environment in motivating farmers' pro-biodiversity management. As regards the role of social pressure, findings from both farmers' quantitative assessment and qualitative follow-up questions regarding social pressure are presented. Statistical analyses indicate relatively low social pressure felt by the farmer sample. Based on the qualitative comments, five factors were observed particularly affecting the perceived intensity of social pressure, i.e. (social) media, the existence of already implemented pro-biodiversity management or considerations, society's understanding of biodiversity and farm management, market-related forces as well as society's social behaviour and thinking.

Chapter 5 provides the results of the expert consultation, and therefore takes a deeper look at determinants for the implementation of biodiversity friendly management beyond the level of the individual farms. The chapter first deals with (5.1), motivating and hindering factors, which from the experts' point of view influence farmers' willingness to implement pro-biodiversity management. It then reports on the experts' point of view on the (5.2) impact of social pressure and on the (5.3) role and effect of stakeholders' in farmers' decision-making processes. As regards subchapter 5.1, a variety of both motivating and hindering factors are outlined, highlighting, inter alia, the strong effect of the agri-environmental programmes' and subsidies' design, of economic and management considerations and of the availability of know-how. In subchapter 5.2, social pressure was rated widely similar as from the farmers' point of view with society as a whole, consumers/buyers and state institutions being named as most powerful, pressurizing actors. As regards the point of view of the experts on the role of stakeholders, the results presented in subchapter 5.3 reveal that most stakeholders considered were assigned a positive effect on farmers' biodiversity-related decision-making process. Again, stakeholders such as researchers and advisory services are, also from the experts' point of view, perceived as most positively effective.

Chapter 6 closes the Deliverable by giving an outlook on the further use of the results for scientific analyses within SHOWCASE, supporting mainly the work of developing surveys and model designs in the remaining tasks of WP2, as well as providing a basis for communication and policy recommendation material for WP4.

1 Introduction

1.1 Objective

The overall objective of the SHOWCASE project is to make biodiversity an integral part of European farming by identifying effective incentives to invest in biodiversity in diverse socio-ecological contexts, providing the evidence that these incentives result in biodiversity increases and biodiversity-based, socio-economic benefits, and communicating both the principles and best practices to as wide a range of stakeholders as possible.

Within the SHOWCASE project structure, Work Package 2 (WP2) is specifically devoted to incentives that successfully steer agricultural farm management in a direction which enhances biodiversity and the associated ecosystem services on farmed land and in the surrounding landscape. The WP2 explores farm incentives in a wide sense, aiming to provide a critical evaluation of different pathways to biodiversity targeted management. It thus analyses regulatory frameworks and private and public incentive instruments and their combinations from different perspectives, including farmers' willingness to adapt their management, the efficiency and costs of implementation, as well as the timing and monitoring of outcomes.

The overall objective of the Deliverable D2.2 at hand, is to report the outcomes of WP2 Task 2.2 *"Determinants for the implementation of regulatory frameworks and private and public incentives targeting biodiversity in SHOWCASE EBAs"* (M1-M15). As indicated by the title, Deliverables 2.2 aims at providing a "*Report on EBA incentives, drivers and key determinants of uptake of biodiversity management by farmers*.

1.2 Aim of task addressed

Task 2.2 "Determinants for the implementation of regulatory frameworks and private and public incentives targeting biodiversity in SHOWCASE EBAs (M1-M12)"

Leader: BOKU; Co-Leader: ZALF, WWF EPO Contributions: all EBA partners

The aim of Task 2.2 was to gather first qualitative information about the situation in the SHOWCASE EBAs regarding the implementation of biodiversity friendly, agricultural management practices. Hereby, the focus was to examine which regulatory frameworks and private and public initiatives targeting biodiversity might already exist in the EBAs and which key factors might impact on farmers' decision to implement biodiversity friendly management. Specific emphasis was put on the potential implementation of result-based incentive approaches, as well as on the role specific stakeholders, and society as a whole, might play, in influencing farmers' decision making as regards the implementation of biodiversity friendly interventions. Beyond the farmers' perspective and the farm level determinants of implementation, also factors beyond farm, hindering or fostering agricultural biodiversity management and the implementation of respective incentives, were examined.

1.3 Outline

Deliverable D2.2 is structured as follows:

In the 1st chapter, the report gives a short introduction of the deliverable's objectives, the tasks addressed and the report's outline.

Chapter 2 gives an overview of the methodological approach chosen in this study.

Chapter 3 shows the characteristics of the farmers and the experts interviewed focusing on demographic data and, respectively, their institutional background.

Chapters 4 and 5 present the results from this study. Chapter 4, based on the farmer interviews, inter alia, comprises findings on existing regulatory frameworks, private and public initiatives and self-motivated action within the EBAs, on key factors and challenges for farmers' integration of pro-biodiversity management practices, on stakeholders' roles in farmers' biodiversity-related decision-making and on farmers' perceptions of social pressure regarding their biodiversity management. Chapter 5, based on the expert consultations, includes findings on factors beyond the farm motivating and hindering farmers to implement biodiversity-friendly management practices and portrays the re-assessment of social pressure and stakeholders' effect in the context of biodiversity-related decision-making from the experts' point of view.

Chapter 6 provides an outlook on the further use of Deliverable 2.2. for scientific analyses.

Chapter 7 includes the list of references.

2 Methodological approach

The analyses carried out in task 2.2 were all based on primary data, collected by the SHOWCASE EBA partners in each EBA. Data was gathered by means of face-to-face in-depth interviews with five farmers in each EBA, as well as in consultations with most relevant agricultural experts, again in each EBA. Basis for the development of the farmer interviews and expert consultations was the literature review carried out in T2.1, reported in Deliverable D2.1.

2.1 Farmer interviews

2.1.1 Study area

Farmers interviews were conducted in the EBAs of ten countries (Estonia, France, Hungary, Portugal, Romania, Spain, Sweden, Switzerland, the Netherlands, UK). Since data from France arrived too close to the deadline of this deliverables, findings derived from the interviews with French farmers could not anymore be included in all parts of this report.

2.1.2 Study preparation

To guarantee that the multiple EBAs' local context is considered when designing the interview questions for the farmers' interviews, a pre-survey was conducted. By means of open questions, the local EBA research partners were asked to provide insights on which determinants - potentially influencing the EBA farmers' decision-making - need special mention from their EBA-specific point of view. To give an example, the pre-survey helped to identify for example common biodiversity interventions, or also typical stakeholders (e.g. extension services, consumers and local communities, farm-input providers, food-chain operators) with strong influence on the EBA farmers, as a basis for designing more accurately the study on the roles played by such stakeholder. All in all, research partners from Estonia, Hungary, the United Kingdom, the Netherlands, Portugal, Spain, Romania, Switzerland, and Sweden participated in this pre-survey. The pre-survey was analysed qualitatively.

Based on the pre-survey's findings and on the results of Task 2.1, an interview guideline was elaborated and provided to the research partners of the EBAs. In September 2021, a workshop was held with EBA partners to explain the guideline and to answer questions. The guideline includes a questionnaire for interviewing the farmers, which itself included five parts, two of which were devoted to structural farm and farmer information, and three of which were devoted to the main foci of the interviews, namely farmers' attitude, implementation of interventions and incentives, and the role of external influences. The interviews included different means of data collection, reaching from closed to open qualitative interview questions to more quantitative methods in form of a repertory grid analysis to be fulfilled. The interview guideline for the farmers' interviews was reported in Milestone MS9.

2.1.3 Interviews

To gather the data from the farmers, structured interviews were applied, which were conducted by the local EBA partners in the respective local language. For this, a structured guideline was developed, which enabled EBA partners to perform a qualitative characterisation of context-specific determinants of the implementation of biodiversity interventions in the single EBAs. The guideline consisted of five different parts:

- **Part I** contained closed, semi-open and open questions addressing general farmers' and farm characteristic. Potential sensitive questions were placed to the end of the interview (**Part V**). The answers of these parts were noted down by the researchers.
- The purely qualitative section (**Part II**) of the interview guideline included, except from one Likert scale, only open questions for assessing the farmers' understanding of biodiversity as well as hindering/enabling factors for implementing biodiversity interventions. In order to capture all information in its original wording, this part of the interviews was audio-recorded.

- In **Part III**, farmers were first asked about the implementation of pro-biodiversity management practices in the SHOWCASE EBAs. In this part, it was moreover surveyed which regulatory frameworks and private and public initiatives are present in the EBAs, how they are integrated into the farming concepts, and which challenges exist as regards the integration. Within this block of questions, three questions specifically addressed result-based incentive approaches. In Part III, moreover specific questions for the in-depths EBAs in Estonia, Romania, the Netherlands, and the United Kingdom were dealing with favourable design features of policy instruments and setting the instruments are embedded in. This subsection of Part III served as a preparation for Task 2.4 which will be conducted in these four EBAs. Answers, again, were written down by the interviewers.
- To specifically investigate the role played by specific actors along the value chains in the implementation of biodiversity interventions, the influences on farmers' biodiversity-related decision-making originating from their social environment were assessed. To gather the necessary data, **part IV** comprised mainly closed questions including quantitative rating exercises implemented as Likert scales. These exercises were followed by qualitative questions asking for background information on the ratings. Focus was put on both farmers' close and wider social environment, i.e. stakeholders whom farmers directly get in touch with as well as society as a whole. Answers were written down by the interviewers.

2.1.4 Data preparation

All answers that were noted down were translated by the interviewers. The audio files of Part II were handed over to an external company for transcribing in the original language with scientific editing and double checking. The returned transcripts were translated via a machine translation software (DeepL, https://deepl.com) into English. Both the original and English transcripts were then reviewed by the respective local interviewers for correcting mistakes and clarifying misunderstandings.

2.1.5 Data analysis

Part I and V: Univariate data analyses was applied comprising measures of central tendency, e.g. means, modes and medians. Data from qualitative comments was included as exemplary statements to provide more detailed insights into quantitative information provided by respondents and to consider answers diverging from pre-defined answer categories.

Part II and III: To conceptualize farmers' perspectives, thematic analysis has been decided as the appropriate method to process responses. The data was analysed for motivations, factors, and incentives and, following the methods of Braun & Clarke (2006, 2012), codes of patterns and themes were generated, scaling up toward broader frameworks and understandings. The themes were identified based on the findings of both the interviews and the literature review presented in the SHOWCASE deliverable D2.1. The coding and text analysis of the transcripts was conducted by using the software MAXQDA (https://maxqda.com).

Part IV: With regards to the quantitative questions, univariate analyses were applied comprising measures of central tendency, particularly means, medians and modes. Data from qualitative follow-up questions was clustered content-wise to explain quantitative findings.

2.2 Expert consultations

To complement the farmer interviews, experts were consulted to identify which factors beyond the farm influence farmers' biodiversity-related decision-making. To elicit if the individual views provided by the interviewed farmers substantially differ from the public opinion in the EBAs, experts were also re-asked specific questions from the farmer interviews, in particular from part IV. Additionally, certain preliminary findings from the farmer interviews were re-discussed

with the experts, as a backup to prepare for the eventuality of identifying substantial differences as explained before.

2.2.1 Study area

The expert consultations were carried out in the EBAs of ten countries, namely Estonia, France, Hungary, Portugal, Romania, Spain, Sweden, Switzerland, the Netherlands, and the United Kingdom. Since data of farmer interviews was missing from the French EBA, expert consultations partly referring to farmers' responses could be conducted. Also, general data form the expert consultations was received too close to the deadline of this deliverable and could therefore not be included in the expert consultation analysis anymore.

2.2.2 Study preparation

Again, the EBA research partners were provided with an English interview guideline in January 2022. In this case, the guideline was implemented as an interactive online survey allowing for standardized reporting. In the EBAs, the research partners were asked to, if necessary, translate the guideline and further prepare by identifying relevant respondents, i.e. experts who are capable to present the viewpoint of the main actors influencing the implementation of the local regulatory frameworks and private and public incentive initiatives.

2.2.3 Consultations

To gather the data from the experts, structured interviews, which were conducted by the EBA research partners in the respective local language, were carried out. The expert consultations included generic questions, i.e. questions applicable to all EBAs. Topics included factors beyond the individual farm hindering or motivating farmers to implement biodiversity-friendly management practices, the effect of multiple stakeholders along the agricultural value chain on farmers' biodiversity-related decision-making as well as experts' perception of social pressure on farmers regarding their biodiversity management. Additionally, EBA specific questions were included, relating to the interaction between stakeholders and farmers as reported in the precedent interviews.

The EBA research partners were free to choose whether to conduct the consultations in person or virtually (phone/video conference). The EBA research partners translated the experts' answers into English and reported via the online survey form. One EBA research partner sent the answers back via e-mail; one Romanian expert filled in the online survey form on their own in Romanian.

2.2.4 Data preparation

Because of the standardized reporting procedure, the majority of answers was directly accessible. The answers sent back via e-mail were added manually and, in the case of the individually filled-in form, translated into English by a local EBA research partner and added manually then.

2.2.5 Data analysis

For quantitative data collected, univariate analyses were applied including the calculation of measures of tendency, e.g. means, modes and medians. For qualitative data collected, the information was clustered content-wise and reported for itself or exemplarily to explain quantitative findings.

3 Descriptive statistics of interviewed farmers and consulted experts

3.1 Farmers

Age and Gender

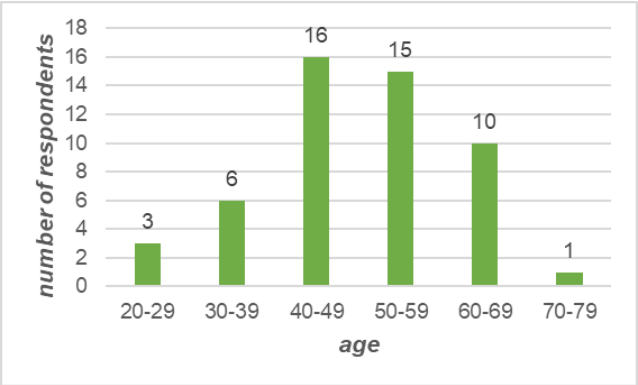

Figure 1: Distribution of respondents' age (n = 51); compiled by the authors, 2022

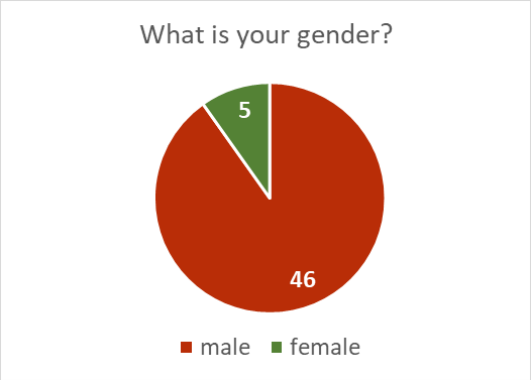

Figure 2: Distribution of respondents' gender (n = 51); compiled by the authors, 2022.

Overall, 51 farmers[1] from 50 farms across 10 countries (as described in 2.1.1) were considered in this study. Respondents' **age** (Figure 1) shows relatively normal distribution with most respondents (n = 31) being aged 40 to 59 years. Both relatively young (20-29) as well as relatively old (60-79) farmers are also represented in the sample. Respondents' **gender** (Figure 2) is predominantly male which, in the agricultural sector, not necessarily indicates bias.

Education

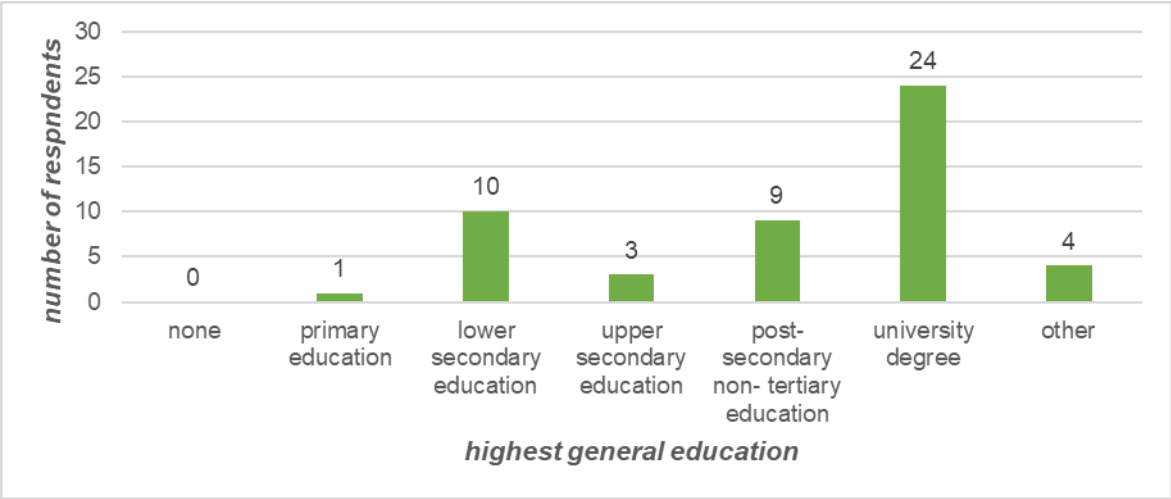

Figure 3: Highest general education of respondents (n = 51), compiled by the authors, 2022.

With regards to **highest general education received** (Figure 3), nearly half of the respondents holds a university degree (n = 24), i.e. having completed tertiary education. In comparison with the EU average and a share of 35.9/21.8 % of the population having completed tertiary

[1] Originally, 50 farmers were intended to conduct an interview with. On one holding, however, two farmers filled in the survey. For demographic data, 51 answers are therefore reflected. This does not apply for the holding-/farm-specific data as outlined in chapter 4.1 since these two farmers manage one and the same farm.

education (for 25 to 54 years and, respectively, 55 to 74 years) (European Union, 2020), this sample shows a bias with highly educated respondents being over-represented.

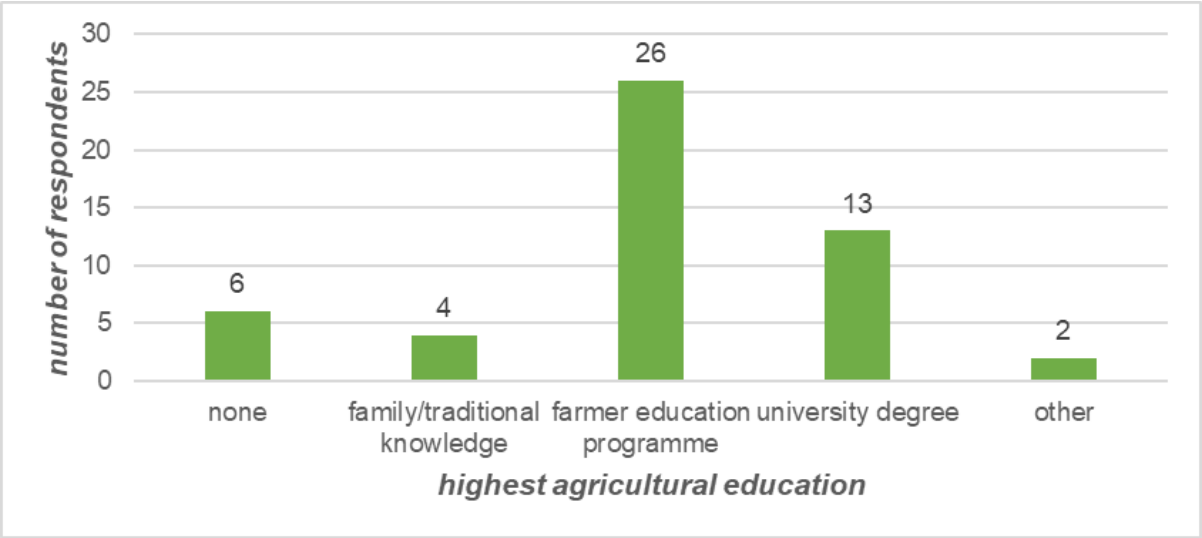

Figure 4: Highest agricultural education of respondents (n = 51), compiled by the authors, 2022.

Regarding the **highest agricultural education received** (Figure 4), the majority of respondents has completed a farmer education programme (n = 26). 10 respondents, i.e. around 19.6 %, received no specific agricultural education or base their management on family or traditional knowledge. This indicates that, under the aspect of agricultural education, the sample is even more strongly biased towards high education: In the EU average, the share of farmers only having practical experience is around 70 % (European Union, 2013).

3.2 Experts

Overall, 40 experts were interviewed in 10 EBAs to give further insights into the main determinants beyond the farm, influencing the implementation of pro-biodiversity regulatory frameworks, private and public initiatives and complementing/further explaining the findings from the farm interviews. The experts were chosen by the EBA research partners based on their capacity to present the viewpoint of the main actors influencing the implementation of the pro-biodiversity endeavours named above.

In the sample and as shown in Figure 5, representatives of the government (local/regional/national) form the largest group (n = 14) followed by farm advisors (n = 7) and representatives from farmers' associations (n = 7). Additionally, researchers (n = 5) and NGOs or other nature organisations (n = 4) are comprised in the expert sample. Moreover, two experts from a producer organisation and one expert representing an agricultural chemistry input supplier have been consulted.

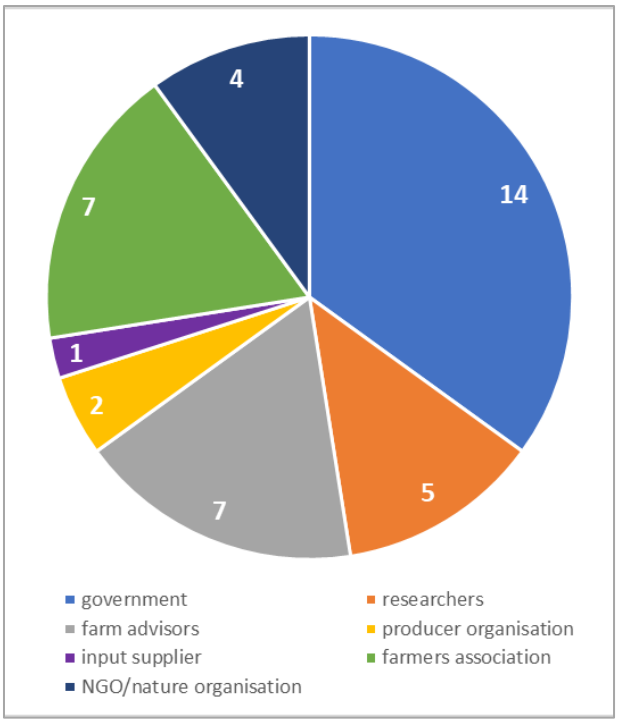

Figure 5: Background of experts included in expert consultations (n = 40); compiled by the authors, 2022.

4 Results from the farmer interviews

4.1 Characteristics of respondents' farms

To gain a first impression of the EBAs considered in the following chapters and also included in further SHOWCASE studies, the characteristics of the interviewed EBA farmers' holdings are outlined and analysed below. The overview of the farms being covered by the interviews includes characteristics relating to farm type, farm size, farm management, farming intensity, soil condition as well as yield potential of the farmland, as well as off-farm income and sales strategies of the farmers. To assess corresponding data, the interviewed EBA farmers answered to closed-ended questions, partly complemented through qualitative follow-up questions. Whereas the following section provides valuable insights potentially helping to understand the context of the EBA farmers and their farming reality, it does not make demands to be representative for the entire EBA due to the small sample size and demographic biases as argued before.

Farm type

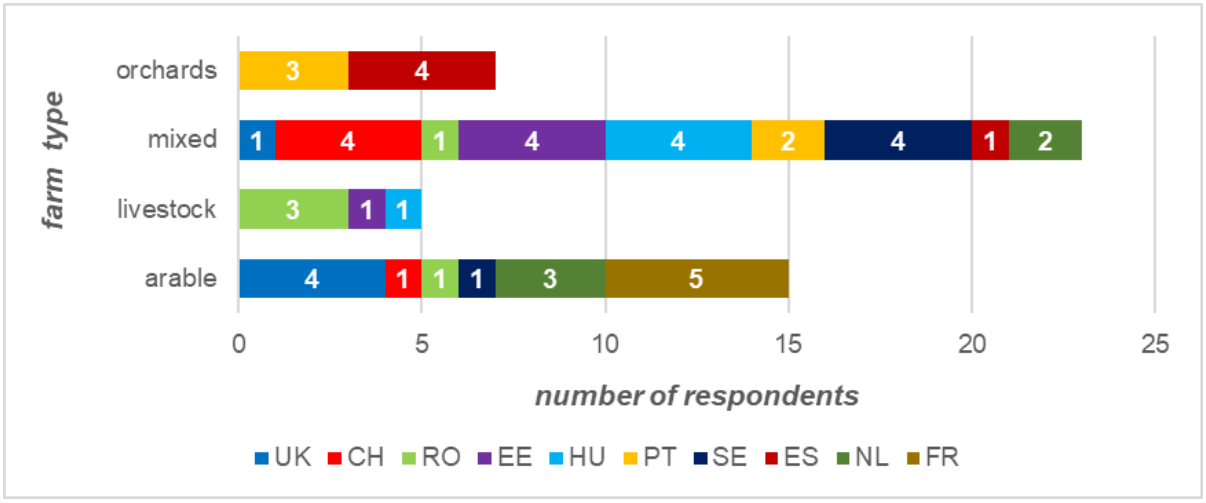

Figure 6: Farm type of respondents (n = 50), compiled by the authors, 2022.

Most respondents in the sample indicated, as shown in Figure 6, that they manage a mixed farm (n = 23), and, with the exception of France, for nearly all EBAs considered in this study, a mixed farm is included. Particularly in the Swedish, the Swiss, the Estonian and the Hungarian EBA, the majority of interviewed farmers reported to be managing mixed farms. Arable farming is widely reflected through respondents from particularly the French, but also the UK and the Dutch EBA, while orchard farming is reflected through respondents from the two EBAs on the Iberian Peninsula (Portugal and Spain) only. Specialised livestock farming is reflected through respondents from Eastern EBAs (Romania, Estonia and Hungary) only, while in the Romanian EBA the majority of interviewed farmers reported to be specialised in livestock farming. For all EBAs, at least two farm types are considered.

Farm size

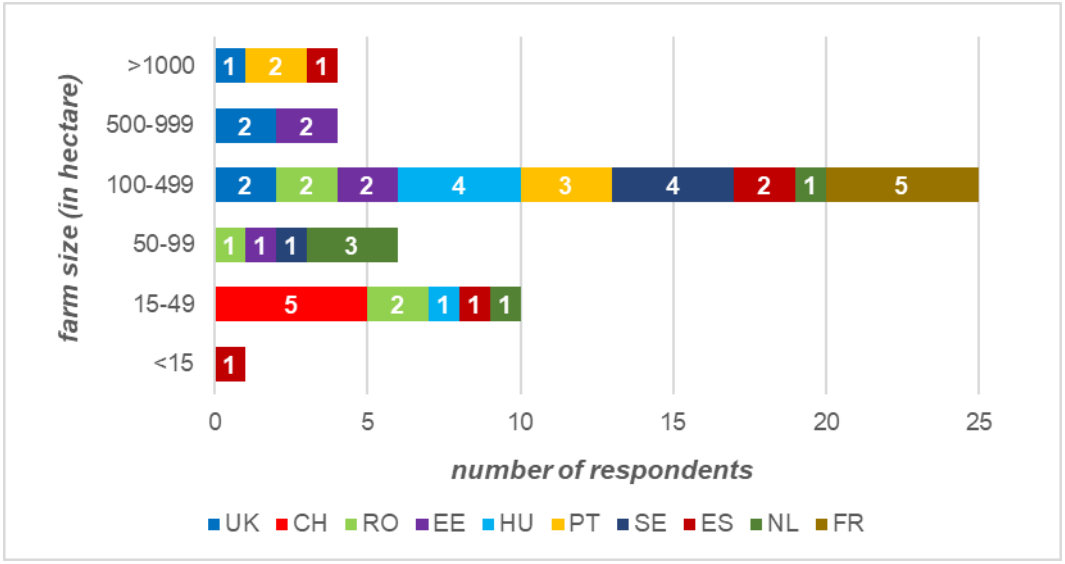

Figure 7: Farm size of respondents (n = 50), compiled by the authors, 2022.

As regards size of the holdings, as shown in Figure 7, this sample includes respondents managing farms of highly varying farm sizes, i.e. from less than 15 to more than 1.000 ha. The farm size indicated most frequently is 100 to 500 ha (n = 25). More than half of respondents (n = 33) indicated a farm size of 100 ha and higher. Considering the average farm size of 16.6 ha and only 15 % of the farms being larger than that in the EU (European Union, 2016), large farms are over-represented in this sample. The largest farms in our sample can be found in the Portuguese and UK EBAs. For the interviewed Estonian EBA farms, also a tendency towards larger farm sizes can be observed. Interestingly, the considered Swiss EBA farms are highly similar with all having a size ranging from 15 to 50 ha, and also all interviewed French EBA farmers fall into one size category.

Farm management

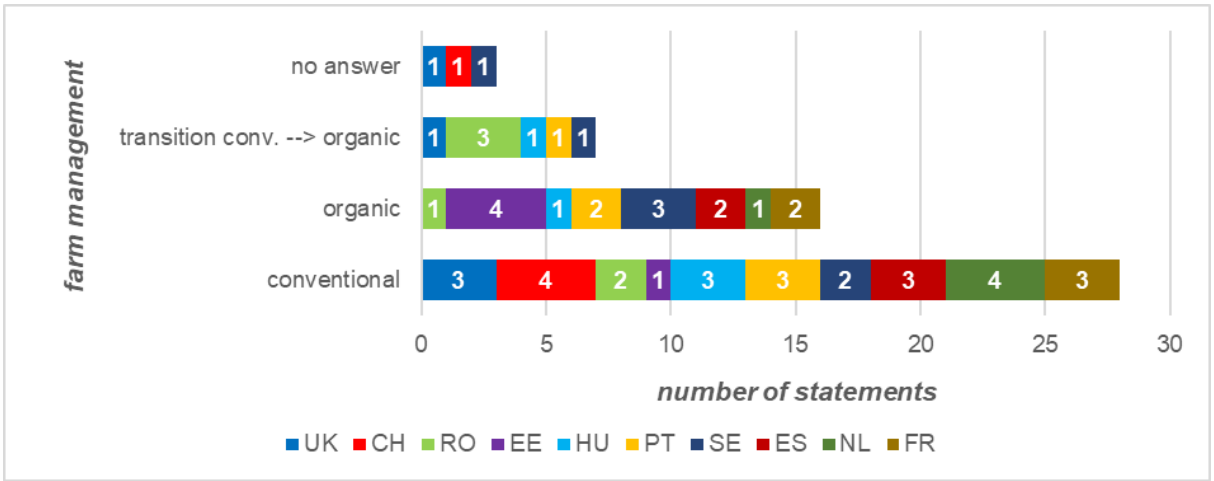

Figure 8: Farm management of respondents (n = 50), compiled by the authors, 2022.

Conventional farm management is, as shown in Figure 8, applied on most of respondents' farm holdings (number of statements = 28). Around half of the respondents indicated that they apply organic farm management practices ("organic" + "transition conventional → organic"; number of statements = 23). Considering that in the EU only 7.5 % of the land used for agriculture is farmed organically (European Parliament, 2018), this sample is assumed to be biased towards non-conventional farming. When looking at the results EBA-wise, one can observe that respondents from the Dutch EBA mainly farm conventionally. Still, in no EBA, exclusively *one*

type of farm management is applied. This guarantees a certain variety in the sample regarding farm management. Since some respondents indicated to have both conventional and organic or transition plots, the number of statements (54) is higher than the sample size (50).

Perceived farming intensity

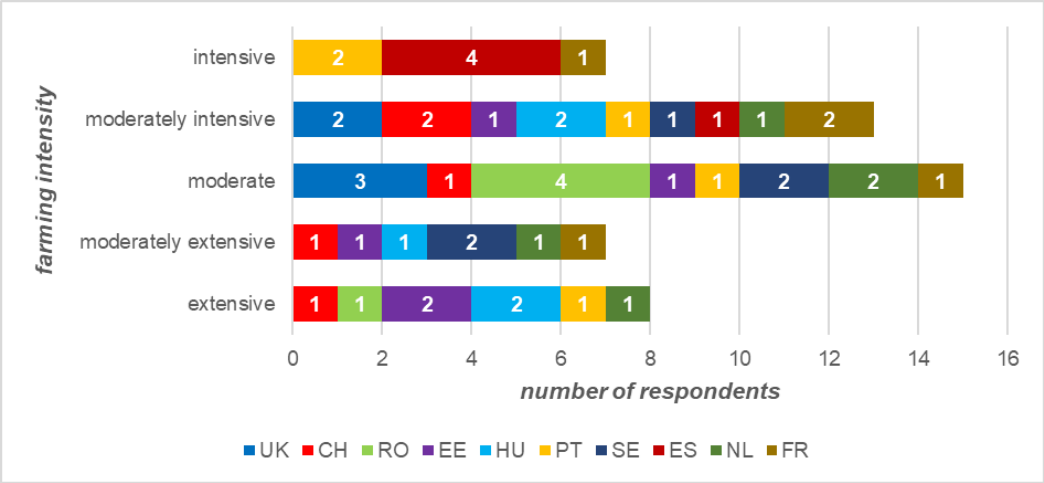

Figure 9: Perceived farming intensity of respondents (n=50), compiled by the authors, 2022.

The farming intensity indicated by the respondents for their management shows relatively even distribution (see Figure 9): 15 farmers indicate moderate farming intensity, 15 (7 + 8) farmers indicate moderately extensive or extensive farming intensity and 20 (13 + 7) farmers indicate moderately intensive or intensive farming. All in all, this sample reflects a relatively wide variety of different farm intensities in almost all EBAs investigated, with only the UK and Spanish EBA being an exception: Whereas the interviewed farmers from the UK (predominantly moderate farming with a tendency to intensive farming) and the Spanish EBA (predominantly intensive farming) answered relatively consistently indicating similar farming intensity on their respective holdings, farming intensity seems to differ more widely on the holdings of the remaining farmers in the other EBAs. Also, the results show that in none of the EBAs, many farmers indicated to farm extensively or extensively-moderate. The informative value of the farmers' statements as regards farming intensity must be treated with caution – particularly when comparing the individual EBAs. Farmers will in their answer most probably refer to an "average" of farming intensity they know rather well, so this might be a regional or even national, but for sure not an European average. For example, the interviewer from the Dutch EBA reported that the EBA farms compare themselves to different regions in the Netherlands, especially the marine clay regions & 'polders' (drained land) with much larger fields, yet higher inputs & no landscape elements. Several interviewees actually made this comparison during the interview. The intensity on the farms represented by the interviewed farmers might therefore be still rather high, however lower compared to other even more intensive farms. If compared to other countries' EBAs, e.g. the semi-natural habitats in the Estonian EBA, this discrepancy might even be higher. Another point to be mentioned, when asking farmers about intensity, might be social pressure. For example, again in the Dutch EBA, the interviewer hinted to the strong debate on farming intensity in the Netherlands, which could lead to the fact that farmers are less inclined to call themselves intensive.

Soil Conditions

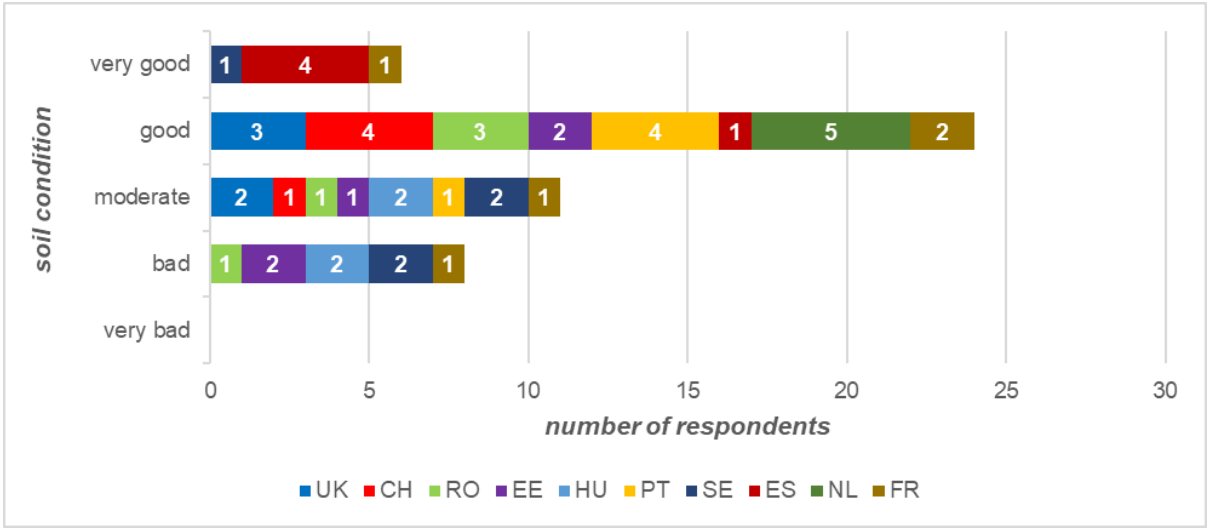

Figure 10: Soil condition on respondents' farmland (n = 49); compiled by the authors, 2022.

As shown in Figure 10, 30 respondents assessed the condition of their farmland soils as positive (i.e. “good” or “very good”) whereas only 8 respondents indicated that their farmland soil is in “bad” condition. Most EBAs are represented in several categories of soil condition through the corresponding respondents. Particularly in the French EBA, variety of soil conditions seem to vary a lot. Only respondents from the Dutch EBA entirely assess their farmland soil’s condition consistently. This means that they are represented in only one category of soil condition, namely “good”. However, respondents from most EBAs chose relatively similar, i.e. non-opposed, categories, e.g. “good” and “moderate” or “moderate” and “bad”. This indicates widely convergent perceptions of soil condition within the EBAs. Respondents from the Swedish and Hungarian EBAs assess their farmland soil’s condition most negatively when comparing respondents’ answers between the EBAs. In contrast, respondents from the Spanish EBA assess their soil condition most positively. Since one farmer did not indicate the farm’s soil condition, the sample size is n = 49 here.

Yield potential of farmland

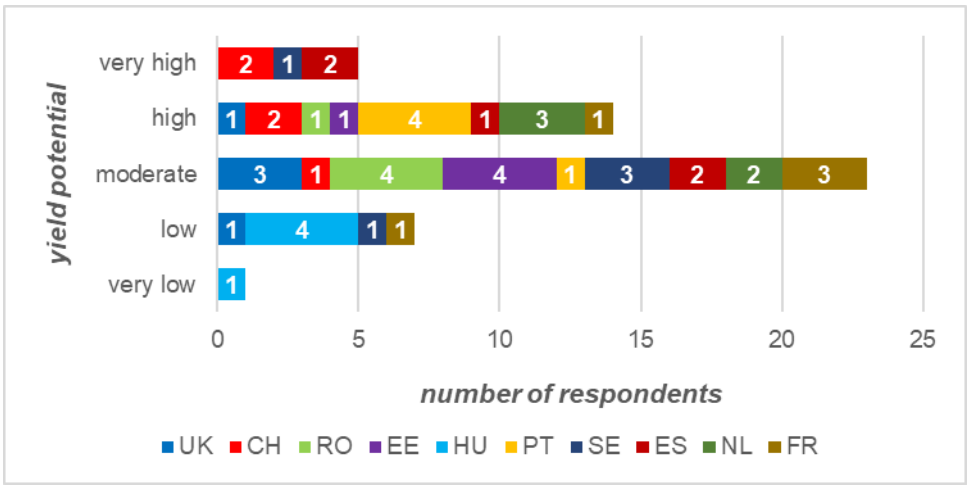

Figure 11: Yield potential of respondents' farmland (n = 50); compiled by the authors, 2022

In contrast to the soil conditions, only 19 respondents assess the yield potential of their farmland as very positive (i.e. “high” or “very high”) (see Figure 11). Here, the predominant category is “moderate” (n = 23). Still, only 7 respondents indicated that the yield potential of their farmland is “low” or “very low”. For several EBAs, holdings are assigned to at least two categories of yield potential. Still, yield potential does not vary greatly within most EBAs since respondents

from one EBA mostly chose similar, i.e. non-opposite, categories (e.g. “high” and “moderate”). Again, this indicates relatively convergent perceptions of yield potential within the EBAs as for the soil condition outlined above. In comparison between the EBAs, Hungarian respondents assess the yield potential of their farmland most negatively and Spanish and Swiss respondents assess it most positively.

Off-farm income and non-agricultural activities on farm

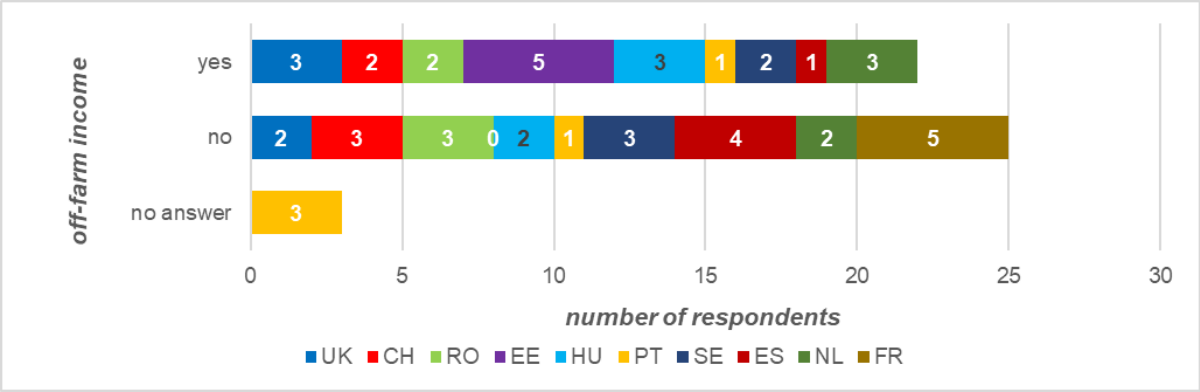

Figure 12: Respondents (not) earning off-farm income (n = 50); compiled by the authors, 2022.

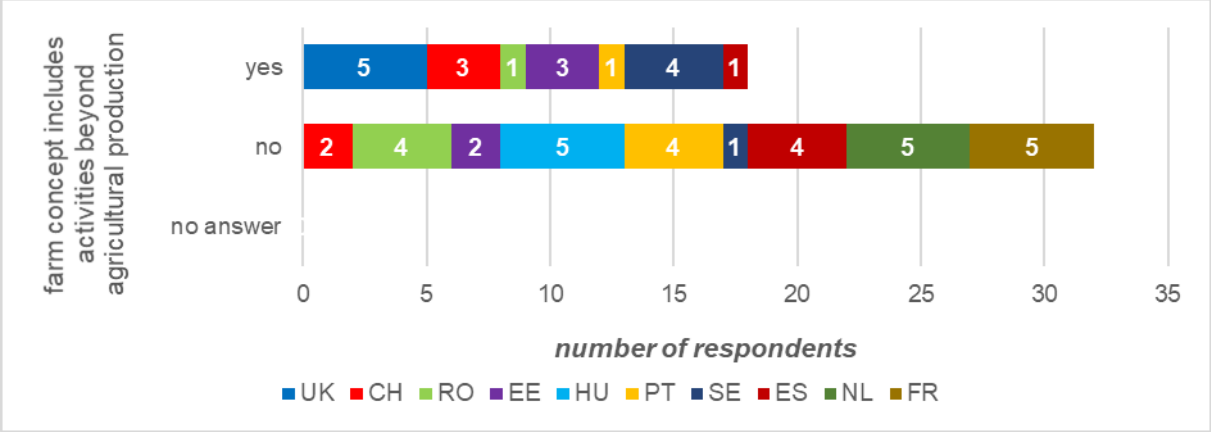

Figure 13: Respondents (not) including non-agricultural activities on farm (n = 50), compiled by the authors, 2022.

Earning off-farm income is common among the farmers interviewed for this study (see Figure 12). The share of respondents indicating that they themselves or their partner draw income from off-farm sources is with 22 of 50 famers quite high and not much lower than the share of respondents indicating to solely earning income from on-farm activities. As sources of off-farm income, respondents mentioned e.g. to work for interest associations, rent for residential lettings or teaching. When looking at the results EBA-specifically, one can observe that, in the Estonian EBA, several respondents earn off-farm income whereas, for example, in the French and the Spanish EBA, all, or most respondents respectively, do not. Amongst the respondents in the remaining EBAs, earning off-farm income is about as common as not.

Carrying out non-agricultural activities on the farm is only partly common among the respondents, while the majority of interviewed farmers have no other activities beyond agricultural production (see Figure 13). Of the 50 respondents, 18 reported non-agricultural activities on their farms, including, for example, offering lets for residence or tourism as well as energy generation. Particularly amongst the respondents from the UK and Swedish EBA, carrying out such activities is very common. In contrast, respondents in the Hungarian, Dutch and French EBA again, but also the Romanian, Portuguese and Spanish EBA, mainly reported no other activities beyond agricultural production.

Sales strategies

Figure 14: Respondents' sales strategies (n = 50); compiled by the authors, 2022.

Table 1: Respondents' sales strategies by EBA (n = 50); compiled by the authors, 2022.

Selling to…	…end consumers directly at farm/farmers' market (or similar)	… producer organization(s)	… food processor(s)	… food retailer(s)	… intermediate trader(s)	… others
UK	1	1	1	3	5	0
CH	3	4	3	1	3	2
RO	4	1	0	0	0	1
EE	1	3	1	0	4	2
HU	2	0	0	0	5	0
PT	1	2	0	3	0	0
SE	4	4	2	3	1	3
ES	1	2	0	0	0	2
NL	2	5	2	1	2	0
FR	0	4	0	0	3	0
Sum	19	26	9	11	23	10

Respondents' sales strategies differ widely with no buyer being unambiguously dominant (see Figure 14 and Table 1). Most frequently, respondents sell their products to producer organizations (n =26), to intermediate traders (n = 23) or end consumers buying directly at the farm (n = 19). Farmers indicating "others" refer to, for example, selling their products to other farmers or not selling their products but use them as feed on farm. Looking at Table 1, one can observe that, for the UK and the Hungarian EBA, all respondents sell their products to intermediate traders whereas no respondents from the Romanian, Portuguese, or Spanish EBA do. In the Dutch EBA, several respondents sell their products to producer organizations whereas no respondents from the Hungarian EBA do. In contrast, respondents from all EBAs directly sell their products to end consumers but not a single respondent only applies this sales strategy. This again highlights the great variety of sales strategies reflected through the farmers included in this sample.

4.2 Status quo: The implementation of pro-biodiversity management interventions in the SHOWCASE EBAs

One of the major objectives of Task 2.2 was to gather first qualitative information about the situation in the SHOWCASE EBAs, regarding the implementation of biodiversity-friendly, agricultural management interventions. Hereby, the focus was also to examine which context-specific regulatory frameworks and private and public incentives targeting biodiversity might already exist in the SHOWCASE EBAs.

4.2.1 Biodiversity interventions in the EBAs – what is there?

In the survey, 3 questions aimed at gathering information about (1) which interventions are already carried out by the interviewed farmers, (2) if these interventions are part of any private or public agri-environmental incentive schemes or carried out due to self-motivation and (3) which regulations exist, fostering or hindering the implementation of biodiversity friendly management. Last but not least, a 4th question asked if farmers perceive (4) the existing private and public incentives as well as the regulatory frameworks as successful and effective in enhancing the biodiversity in the EBA region.

At this point we want to mention again hat for task 2.2 also many SHOWCASE "intervention farms" have been interviewed. Besides the biases already addressed earlier, there is obviously a bias in the results regarding the overall attitude of the interviewed farmers in carrying out biodiversity-friendly farming interventions, compared to other farms from the region not involved in SHOWCASE. Nevertheless, the results show which interventions are potentially possible in the agricultural context situation of the EBAs and also which incentive schemes are available.

For the first question (1), farmers were asked to provide information based on a list of 14 predefined common biodiversity interventions, elicited and summarized from the pre-survey involving local research partners in order to guarantee that the local agricultural context of each EBAs is reflected. The final list of exemplary interventions included:

- Organic or bio-dynamic farming (certified),
- Biodiversity-friendly sowing (e. g. adapted sowing time and density),
- Biodiversity-friendly choice of crops (e. g. change of crops, crop rotation, no monocultures, N-fixing crops, flowering crops, intercropping),
- Biodiversity-friendly soil cultivation (e. g. reduced tillage),
- Biodiversity-friendly harvesting (e. g. improved techniques),
- Biodiversity-friendly grazing (e. g. adapted grazing density and period, continuity, aftermath grazing, focus on flowers and herbs),
- Biodiversity-friendly mowing (e. g. phased mowing, delayed mowing, aftermath mowing, focus on flowers and herbs),
- Biodiversity-friendly application of fertilizers and soil amendments,
- Biodiversity-friendly application of pesticides,
- Biodiversity-friendly application of livestock medication,
- Installing nest boxes, bat shelters and insect hotels,
- Creating or maintaining further habitats & green infrastructure (e. g. planting certain habitat species, implementing groups of trees, hedges, flowering or grass strips, ponds, skylarch plots, ground cover, beetle banks, non-harvested field margins),
- Maintaining or restoring water structures and improving water use
- Removal of plants that endanger biodiversity

For these interventions, farmers had the option to indicate if they already implement such interventions, if the interventions might not be applicable on the farm, or if these interventions would completely be discarded implementing. Table 2 shows the number of farms per EBA

having indicated to already implement (some of) the individual, predefined biodiversity interventions, at least on single plots.

The results reveal that many of the predefined interventions are actually implemented to some degree on the interviewed farms. Most frequent biodiversity measures applied throughout all EBAs are biodiversity-friendly choice of crops, biodiversity-friendly soil cultivation, biodiversity-friendly mowing, Biodiversity-friendly application of fertilizers and soil amendments and, with the highest number of farms carrying out these interventions, the creating or maintaining further habitats & green infrastructure. In contrast, the least common interventions applied were biodiversity-friendly harvesting and the removal of plants endangering biodiversity. As regards the latter, several farmers stated that such plants are not present in the EBA (specific measures are set against Jacobaea, however, being a native species). As regards certified farming approaches, 21 of the 50 farms analysed stated to conduct certified organic or bio-dynamic farming, which of course represents a very high share and supports the earlier statement about the biased sample of farms interviewed.

Table 2: Number of farms carrying out specific biodiversity interventions per EBA (total number of farms interviewed per EBA = 5); compiled by the authors, 2022.

	Organic or bio-dynamic farming (certified)	Biodiversity-friendly sowing	Biodiversity-friendly choice of crops	Biodiversity-friendly soil cultivation	Biodiversity-friendly harvesting	Biodiversity-friendly grazing	Biodiversity-friendly mowing	Biodiversity-friendly application of fertilizers and soil amendments	Biodiversity-friendly application of pesticides	Biodiversity-friendly application of livestock medication	Installing nest boxes, bat shelters and insect hotels	Creating or maintaining further habitats & green infrastructure	Maintaining or restoring water structures and improving water use	Removal of plants that endanger biodiversity	
EE	4	4	4	2	2	5	5	4	0	4	2	4	2	0	42
NL	1	2	5	5	2	3	4	3	3	2	4	5	2	1	42
UK	1	4	5	5	0	2	3	5	5	2	4	5	3	2	46
RO	2	2	4	2	2	4	4	2	2	4	1	3	3	2	37
HU	2	3	2	3	4	5	4	4	2	3	0	4	3	5	44
ES	2	2	4	5	4	1	3	4	5	1	3	5	5	0	44
PT	3	3	4	5	5	3	2	5	5	2	3	5	5	4	54
CH	0	3	5	5	0	2	5	3	4	3	4	5	0	4	43
SE	4	2	5	4	2	5	3	4	2	3	3	4	4	2	47
FR	2	2	5	3	1	0	3	5	3	0	4	4	1	1	34
	21	27	**43**	**39**	22	30	**36**	**39**	31	24	28	**44**	28	21	

In the interviews, farmers have also been asked which of the interventions on the list are their Top 3 interventions, which they would want to implement also in the course of the next 10 years. Here, two interventions already widely adopted revealed to be met with most acceptance and motivation across all EBAs again, namely 1.) the ***implementation of biodiversity-friendly choicees of crops***, such as a change of crop varieties or crop rotation, the avoidance of monocultures, the inclusion of N-fixing and flowering crops, as well as the use of intercropping, and 2.) the ***implementation of approaches of biodiversity-friendly soil cultivation*** such as reduced tillage. With some clear distance from these two interventions, creating or maintaining further habitats & green infrastructure was the third priority, followed by the

installation of nest boxes, bat shelters and insect hotels and the implementation of biodiversity-friendly grazing and fertilisation.

Some interventions, such as biodiversity-friendly grazing, were not applicable on a number of farms without animal husbandry, also biodiversity-friendly use of pesticides was not applicable on farms with organic certification. As regards the intervention of livestock medication, being the intervention with the highest numbers of farms stating that such intervention is not applicable, this intervention was of course only an option on farms with animal husbandry. Farms with animal husbandry implementing biodiversity-friendly livestock medication mostly stated that they apply minimal (not none) medication to farm animals.

In general, none of the predefined interventions were strongly rejected by the interviewed farmers across all EBAs. The two interventions met with some rejection among farmers was stepping into organic or bio-dynamic farming approaches (11 farmers) and the biodiversity-friendly application of pesticides (4 farmers). No overall explanations could be derived why particularly organic/bio-dynamic farming was rejected, two farmers however stated that they have a general mistrust in certifications and labels.

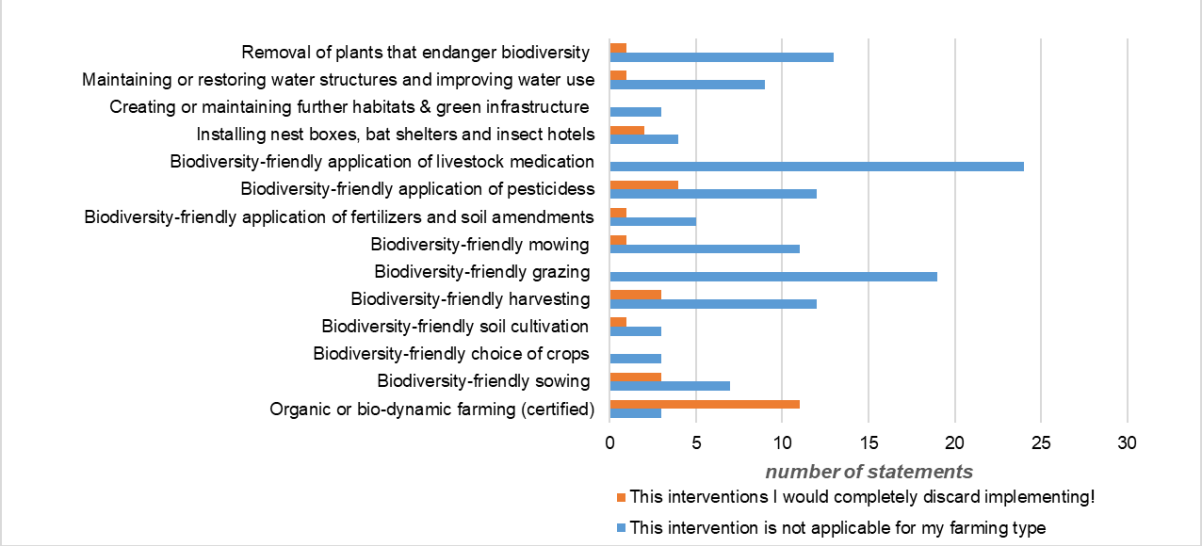

Figure 15: Biodiversity interventions – applicability and acceptance (n = 50), compiled by the authors, 2022.

4.2.2 Private and public incentives or self-motivation – what is there and what are the challenges?

The biodiversity interventions carried out by the interviewed EBA farmers are to a large part incentivised by different mechanisms (see Table 3).

Interventions are mostly carried out under public agri-environmental schemes, which are hereby designed either as “classical” action-oriented farm- or plot-level compensation payments, or as compensation payments in line with the management plans of nature collectives (in the Dutch EBA). Farming under integrated production systems fosters the implementation of biodiversity interventions particularly in the EBAs of Spain, Switzerland and Portugal. Also, private incentives provided by the value chain play a role in some EBAs, e.g. in form of labelling, or payments for ecosystem services provided by, for example, water companies (e.g. UK). Certification under organic farming or other programmes plays a role in half of the EBAs.

Table 3: Incentive mechanisms in the EBAs; compiled by the authors, 2022.

EBA	Agri-environmental, action-oriented compensation schemes (local, national, EU)	organic production	integrated production system	Payments for ecosystem services (water suppliers/	Certification/ value chain	Projects/ operative groups	no compensation/ self-motivation
EE	4	4					
NL	4	1			1		1
UK	5			2	1		
RO	2	1					3
HU	5						4
ES	2	2	2		2	1	
PT		2	3			1	
CH	2		4		5	1	
SE	1					1	3
FR	3			5	1		

In the Estonian EBA, public compensation payments for organic farm management are important. Farmers moreover report that biodiversity interventions are carried out in line with compensation payments provided under different public environmental programmes, such as environmentally-friendly farming and support for the grazing and maintenance of semi-natural habitats (e.g. floodplain meadows). As regards the management of semi-natural habitats, grass needs to be low-cut or grazed on 50% of the area to receive payments. Besides incentives, also the requirements for receiving single-area payments are of importance, as these are only provided for managed, open area without trees, shrubs etc.

In the Dutch EBA, four farmers report to receive public subsidies and compensation payments for biodiversity interventions from the regional agricultural management body (Natuurrijk Limburg). These public subsidies support several interventions, particularly focussing on the management of landscape elements, such as hedges, steep field sides, extensive grasslands and flower strips. The role of this incentive is described as very important, for instance one farmer explained that *"Without this compensation, maintaining these things would still have my interest but would be harder in practice."* [NL3] Nevertheless, also critical statements were made, although these also underline how important the scheme potentially is to maintain biodiversity-friendly measures. One farmer stated that "[…] *compensation payment through Natuurrijk Limburg is becoming harder and harder to maintain. The programme has been exploited, some areas got interventions everywhere, and now they are very selective" [NL2].* Moreover, the same farmer reported scepticism about the longevity of the programme, stating that "*we still have some high-stem fruit trees and a hedge here at the courtyard, but we are sceptical on whether we will keep the compensation, this may well end totally." [NL2]* Another programme mentioned by one farmer in the Dutch EBA is a sustainable groundwater programme. This programme was obviously more intensive in the past, including giving advice to farmers, conducting measurements and offering compensation. Nevertheless, the farmer reported that this programme is now mostly limited to advice but doesn't induce extra requirements next to what is already demanded, given the fact that the farm is located in a groundwater protection area. Also potentially interesting in the Dutch EBA is the private value chain incentive of the "Planet-proof certificate". Under this certification, a higher price is offered for specific crops (in this case for potatoes & onions), an incentive which the farmers states is profitable [NL5]. The certification is based on criteria related to crop protection management, where the use of active supplements, up to a certain maximum, can be compensated with 'bonus points' for landscape elements. From the point of view of the farmer, this incentive enhances the farmers' awareness towards their pesticide use. The farmer highlights that the planet-proof products go to a local supermarket rather than being sold by big brands, which the farmers regard as a plus since the local supermarket is perceived as more trustable than the big brands. Nevertheless, the farmer also hinted to the risks of this scheme: If criteria are not met (e.g. due to external conditions such as the weather), the high costs of implementation are not compensated. Last but

not least, one farmer in the Dutch EBA reported that they implement all biodiversity interventions as self-motivated action, not under any commitment, while also the disappointment with the existing incentives was expressed. The farmer stated: "*I am willing to promote biodiversity in multiple ways but I don't want nature management programmes. We have done this in the past, but then the compensations were ended and we couldn't maintain it anymore. That's how it always goes to my opinion: it starts nice and friendly but backfires later." [NL4]*

In the UK EBA, most interventions implemented are funded by public schemes. Hereby, the most important governmental programme mentioned by the interviewed farmers is the Countryside Stewardship (CS) programme, providing financial incentives for farmers and land managers to look after and improve the environment. Focus of the programme is conserving and restoring wildlife habitats, flood risk management, woodland creation and management, reducing widespread water pollution from agriculture, keeping the character of the countryside, preserving historical features in the landscape and encouraging educational access. The programme offers different incentive schemes; mentioned in the interviews was specifically "Mid Tier", being a competitive scheme with funding awarded to those who make the biggest environmental improvements in their local area and demonstrate the best value for money. Besides the public programme of CS, two farmers reported to receive private sector compensation payments for cover crops in form of payments for environmental services provided by two different water companies. Also an important private incentive for fostering biodiversity-friendly agriculture in the UK EBA is LEAF Marque certification. LEAF (Linking Environment And Farming) is an organisation focussed on delivering more sustainable food and farming. LEAF Marque is a global assurance system recognising more sustainably farmed products. Certified businesses have to meet rigorous standards of sustainable farming practice which are independently verified. Also principles of Integrated Farm Management (IFM) are part of the requirements of LEAF Marque certification. For the partaking farmers, certification results in price premiums for their products. Besides direct public and private support, one farmer moreover stated that the biodiversity-friendly practices carried out on the farm support the marketing of their own tourism activities, and, as a future prospect, the same farmer stated that new business solutions could open in line with the opportunities of a developing carbon market where measures are paid by buyers of carbon credits.

In the Romanian EBA, three out of the five interviewed farmers reported not to receive any financial incentives for their biodiversity interventions but rather act due to self-motivation. About one farmer the interviewer stated that *"he did it from his own initiative, because he learned about bio-agriculture from a trip to Denmark and he also desires to have good quality products, even if that means that he has a lower production"*. [RO1] About another farmer not receiving any financial support it was stated that *"he used those farm management methods because they are enough for him, and he produces enough products to live well." [RO3]* The incentives received by the remaining two farmers were both public programmes, on the one hand the programme for organic farming, on the other programmes for agri-environmental measures established by the Ministry of Agriculture and implemented by the payment agency. Here it was highlighted that the payment for extensive farming on permanent grasslands is obviously very attractive [RO5].

Also in the Hungarian EBA, financial incentives have been reported to be received by five farmers. They participate in an agri-environmental support programme (agrár-környezetgazdálkodási támogatás), which is optional and farmers can choose in which measures they wish to participate. One farmer also participates in a bustard protection programme, which involves the management of the birds' grassy, swardy habitat. Beyond the agri-environmental support programme, also self-motivation plays a role in the EBA. In this sense, the interviewer stated about one farmer that *"he does certain things because he believes in them; plus those are obligatory for him, because his farm is located in National Park area. He sees that other farmers are acting according to the regulations, but without being enthusiastic about biodiversity and nature conservation." [HU4]* Nevertheless, the comment of one farmer indicates that more

(public) incentives would still be appreciated. Here, the interviewer reported about one interviewee that *"he manages his farm as organic, but he has no certification, because the market doesn't confirm that. However, he wishes it." [HU1]*

All interviewed farms in the Spanish EBAs are orchard farms (stone fruits, citrus fruits, olives), making all use of financial incentives, which are often market oriented, to support their biodiversity management measures. Particularly, participation in a cooperation plays an important role, also in combination with certification schemes: Three of the five interviewed farmers are in some form part of a cooperation/cooperative, which are also characterised by participating in certification schemes. One farmer is part of a cooperative where farmers are incentivised when being certified by Globalgap; another farmer is part of a fruit and vegetable producers' organisation, and within this again in an operational group which receives the 4% of the marketable value. This farmer also reports to be certified by Globalgap and TESCO certification, among other certification schemes less common. The third farmer is also part of an operative group. Certification is reported to be a prerequisite for the marketing of products. One farmer stated in the interviews that *"many of the supermarkets don't buy fruits without [certification]." [ES1]* As regards compensation payments, public environmental payments (CAP) are received by some farmers for environmental enhancements such as green covers, crushing pruning, and integrate certification. One farmer reports that subsidies are also available for proven water efficiency. The two remaining farmers (citrus farming, olives) are both receiving payments under the public scheme of organic production.

In the Portuguese EBA, characterised also mainly by orchard farming (olive groves, almond orchards, vineyards), two main public incentives fostering the implementation of biodiversity-friendly management are reported, namely integrated production and organic farming. As regards the latter, two farms are already certified organic and one farm is currently in the transition phase. The reason for the farmers to switch to organic management is clearly market-driven: Two farmers stated that they do the transition because of the higher prices received by the value chain. The report of the interviewer on one farmer stated this very precisely "*Reason: higher selling price by the value chain" [PT2]*, the other farmer stated that *"The decision to switch to organic was due to the fact that the product is more valued and there is currently a greater demand for organic products, paid by the value chain."* [PT4] Even if organic farming is a profitable option for the farmers *per se*, and the decision to switch is economically driven, the transitioning phase remains difficult if not subsidised while funding for the transition phase is limited. In this respect, one farmer reported that "*this year we received the certification of organic farming. However, when we started, this incentive was not available. We were 3/4 years transitioning to organic farming without incentive, because the quotas were already filled when we started." [PT5]* Another farmer, in contrast, reported that for the transition process, incentives were available from an environmental programme with compensation payments. Besides organic farming, management according to the integrated production system[2] is adopted on three of the five Portuguese EBA farmers. For integrated production, one farmer reports that no financial compensation is provided by this incentive since the year 2015. Nevertheless, the scheme is described as an official, agri-environmental measure and is associated with a certification. Besides organic farming and integrated production, both being rather comprehensive and systematic schemes for interventions, one farmer in the Portuguese EBA carries out gradually and plotwise underseeding in the olive groves due to self-motivation, as this intervention is not included in any environmental programme. Concretely, he/she underseeds the olive groves with a mixture of shamrocks (http://www.fertiprado.pt/en/products/biodiverse-covers/revoliv-6/). The farmer sees clear ecosystem service benefits by this measure,

[2] Explanatory note about the integrated production system by the interviewer: 1. Individuals or collective persons, of public or private nature, engaged in agricultural activities, provided that they meet the eligibility requirements may apply. 2. Beneficiaries receive monetary support according to their rank (type of culture and area). Support can be increased, in a limited way, to obtain technical support. 3. The guarantee that the rules and principles of Integrated Production are complied in accordance with established regulations is provided by the implemented control and certification system. This system is carried out by control and certification bodies recognized by the Quality Certification System for this purpose.

namely he perceives the management measure as a way to control weeds by increasing competition and allelopathy, to increase predator populations against some pests and diseases, to improve the level of organic matter and soil structure, to increase soil fertility and its capacity for water infiltration and retention, to fix atmospheric nitrogen, and to reduce nitrogen fertilization cost.

In the Swiss EBA, four of the five interviewed farmers take part in the IP-SUISSE organisation of production and marketing, being an association of famers adopting the integrated production system. IP-SUISSE establishes the guidelines for sustainable label production, develops and defines obligatory management programs for the farms and has them controlled by independent institutions. The interviewed farmers mainly associate economic benefits with IP-SUISSE certification and labelling. One farmer stated that *"Being part of IP-SUISSE gives economic benefits. Economic incentives are very important for being motivated to implement biodiversity-friendly management measures." [CH1]* The same farmer also stated that receiving higher prices for products which are produced with higher effort is an important incentive too. Another farmer stated that the IP-SUISSE measures to receive the label can be very well integrated into his/her business situation: *"The main motivation to produce for this label is the moderate soil quality, which does not allow an intense farm management but suits an extensive management. Joining this label for extensive farming brings more economic benefits for the farm. Also, with joining such labels/programmes, the pressure for obtaining a high enough yield is far less strong."[CH2]* Also another farmer sees the integrability of the IP-SUISSE programme into the farming reality as a major advantage: he/she explained that individual crops can be registered for the label production yearly, but can be taken out of the label if requirements can't be met during the cultivation, for example due to bad weather conditions (e.g. favouring pests such as insects and fungi in sugar beet, fungi in potato). This flexibility is highlighted by the interviewer who reports that *"He [the farmer] likes that a cancellation of the culture in the programme is always possible."* [CH5] As regards public programmes, two of the interviewed Swiss farmers report of the governmental scheme "Extenso", being an action-based programme providing compensation payments for individual arable crops, focused the extensive production of cereals, sunflowers, protein peas, field beans, lupins and rapeseed. Extenso rewards the cultivation of a defined crop without the use of fungicides, insecticides, growth regulators and chemical-synthetic stimulators of natural defences while the compensation payment has been described as *"attractive*" by one farmer [CH4]. Another public programme co-financed by the state/canton offers compensation payments if participating in a biodiversity area networking project ("Vernetzungsprojekt"). Here, the basis for the scheme is however the ÖNL regulatory framework which prescribes a specific amount of area being dedicated to biodiversity but then incentivises the implementation of biodiversity areas by different schemes, depending on quality and networking aspects (see Chapter 4.2.3). This project aims at connecting biodiversity area in the landscape by involving farm area. Also here, the measures are obviously well-integrable into the farming reality: On the one hand as their extent is acceptable from the economic point of view, and on the other hand as workload can be shared among farmers due to the connection of the intervention areas. The interviewer reports that *"the respondent especially likes measures like flowerstrips – they only take away a small area and do not influence the economics of a farm too much. Also, the flowerstrips are sown together with a farmer nearby, who also has flowerstrips – so the workload is less." [CH3]*

In the Swedish EBA, participation in public incentives schemes to foster biodiversity management is obviously low, at least on the 5 farms selected for the interviews. One farmer reports to receive public action-oriented subsidies from the Swedish Board of Agriculture for management measures, namely for catch crops and for applying a fuel-saving technology of soil cultivation in spring time. Joining such schemes has obviously a clear economic motivation, however, also effects of the technology on ecosystem services and disservices are considered. The farmer reports to implement shallow tillage *"to save fuel for agricultural machinery" [SE3].* Further, he reports that the intervention has advantages as well as disadvantages both related to ecosystem services and disservices. In this respect, the interviewer reports that, from the farmer's point of view, *"more plant residues on the soil surface […] can cause plant diseases*

if you grow wheat after wheat (no crop sequence)" [SE3] while, on the positive side, *"the worms come up on the surface to pick up the straw and enrich the soil with oxygen"* [SE3. Also another farmer conducting direct seeding mentioned the spring cultivation support as the only subsidy available supporting biodiversity-friendly soil cultivation while it did not become clear if he/she also applies for the scheme. This farmer stated that "*there is no support/subsidy system that supports [biodiversity-friendly soil cultivation] other than the spring cultivation support*" while "*Direct seeding is, however, best for my business and the size of the farm, as it saves energy and water". [SE5]* Besides this programme, only one other farmer reported to have received public subsidies, namely for the very specific one-shot measure of establishing a wetland on farm lands. All other biodiversity measures reported by the interviewed farmers in the Swedish EBA are carried out due to self-motivation while farmers expressed clear dissatisfaction that no better funding opportunities are available or that mainly large scale and competitive agricultural operations are supported, being rewarded for their amount of (organic) production rather than for conserving biodiversity. One farmer stated that, particularly in value-chain based incentive programmes, *"The current support system is based on area and kilo of produce, and indirect support for biodiversity is lacking. Currently, only large-scale operations or farm shops are profitable agricultural businesses."* [SE2] In contrast, *"Small-scale agriculture, which enriches the landscape and contributes to biodiversity, receives no support" and "for farmers who have irregular fields with a large perimeter per area and (therefore) increased biodiversity at landscape level, it costs more to use such land. Amount of support should be based on the (size of the) perimeter of the fields, rather than [on] total area." [SE2]* The same farmer also stated the missing distribution and marketing opportunities due to the dying of local mills and infrastructure for small-scale farming causes problems. Also another farmer expressed dissatisfaction about the direction agricultural management is heading to (intensification), while at the same time stressing the importance of sustainable agricultural management for the provision of ecosystem services. For this farmer, the intensification of agriculture in the SHOWCASE EBA represents a big problem. He states that particularly the growing size of agricultural fields is a threat to biodiversity, stating that åkerholmar (areas with high biodiversity surrounded by agricultural land such as groups of trees on the agricultural fields) *"are removed to increase the grain area"* while *"the main goal of [the] agricultural sector cannot be to deliver grains. Instead, agriculture must be a repairer of life-sustaining systems (ecosystems) for clean water, clean soils, net carbon storage. More perennial woody crops integrated in agricultural production would contribute to reparation of agro-ecosystems. Our policy makers, agencies need to restructure the agricultural sector!" [SE4]*

In the French EBA, four of the five interviewed farmers report to receive payments for environmental services by a local hunter group. While three of these farmers explained, that payments are issued for measures keeping hedges and flowering/grass strips to maintain bird habitats (partridge) [FR1, FR2, FR5], one farmer reported to be paid for keeping winter stubbles and regrowth/volunteer plants from the previous cropping season [FR3]. Also falling under the characterisation of payments for environmental services, one farmer receives compensation payments for no fertilizers and pesticides application by the local water supply organisation [FR4]. Moreover, two farmers receive compensation payments for a local agri-environmental measure to delay mowing in Alfalfa fields in order to protect local endangered birds (bustards) [FR2, FR4]. Last but not least, one farmer reports about incentives from the value chain, namely a guarantee of prices and long-term contracts with the cooperative when complying with the French High Environmental Value (HEV) certification [FR5] and one farmer reports to receive public compensation payments for fallow lands as part of the CAP [FR1].

In conclusion, analysing the incentives for biodiversity management reported by the SHOWCASE intervention farmers across the EBAs, it becomes obvious that, in most EBAs, farmers are able to activate a rather broad bundle of existing public action-oriented incentive schemes compensating the costs for environmentally friendly management. In many cases, public compensation payments have been evaluated as attractive and needed to foster biodiversity management. Nevertheless, as regards the public incentive schemes, it also becomes clear that in parts they are either still lacking or not consistent enough for farmers to really trust particularly

in their longevity. Particularly as regards the interviewed farmers in the EBAs of Romania, it is noticeable that the use of incentive mechanisms seems less common – in parts this is due to the fact that programmes are not available or, potentially, not known to the farmers. As regards the limited use of incentives by the farmers interviewed in the Swedish EBAs, it shall be mentioned that this might be a specificity for the region and the specific agricultural context (e.g. more small farms and mixed farming systems than elsewhere) and not representative for other Swedish regions. In many EBAs, also market-based, action-oriented value chain incentives play a very important role. For many of the interviewed farmers, it was possible to enter management contracts with the private sector supporting specific biodiversity management activities and incentivising biodiversity-friendly management – either by higher product prices or by guaranteeing market access. In general, from the comments of the farmers it becomes obvious that economic profitability and market access, for both public and private funding opportunities, are the decisive factor to step into these contracts. However, beyond financial incentives, it also becomes clear that many farmers have an intrinsic motivation to manage their land environmentally friendly, as long as the condition is met that agricultural production is still sustainable from an economic point of view, or given that ecosystem services are fostered which can be directly used by the farmers.

4.2.3 **The role of regulatory frameworks – what is there and what are the challenges?**

Regulatory frameworks in the EBAs

Besides private and public incentives providing compensation payments for specific measures, the biodiversity management of the interviewed EBA farms is also influenced by different regulatory frameworks, in parts with specific biodiversity objectives, setting compulsory restrictions and rules for agricultural management. To get a better insight into the regulatory frameworks existent in the EBA regions, farmers were asked to name such frameworks in the interviews and to explain what specific management measures they require and which challenges exist in integrating them into the farming contexts.

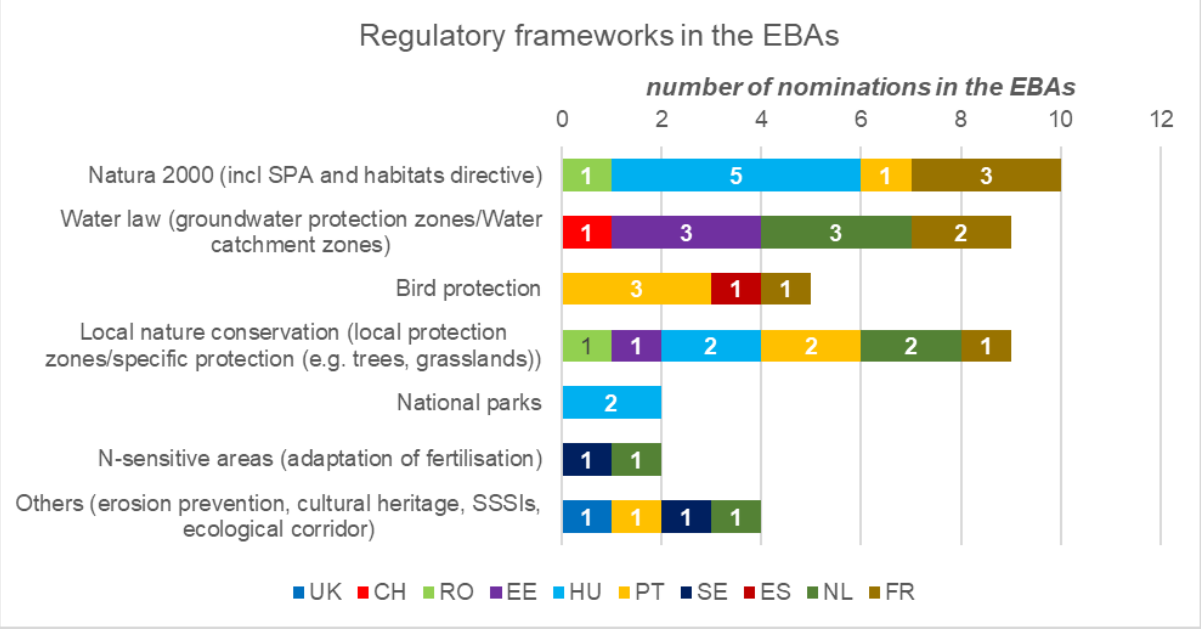

Figure 16: Specific biodiversity frameworks in the EBAs (n = 50); compiled by the authors, 2022.

As regards specific biodiversity frameworks in place, on top of the general cross compliance obligations for receiving direct CAP payments (good agricultural and environmental conditions) or the basic requirements for receiving direct payments in Switzerland (ÖNL Richtlinie), 28 of the 45 interviewed farmers reported that they have to consider specific regulatory frameworks on their farmland, having indirect or direct effects on the provision of biodiversity (see Figure 16).

As regards number of nominations, most prominent regulatory frameworks to be considered by the EBA farmers were Natura 2000 and water regulations in water protection areas. Also rules and restrictions to be considered in local nature conservation zones were mentioned in many EBAs, with in parts very specific conservation objectives.

As regards Natura 2000 areas, this major European nature conservation and biodiversity framework plays a role first and foremost in the Hungarian and French EBAs where all (HU), respectively three out of five (FR) interviewed farmers reported their fields to be located within Natura 2000 area. In the Hungarian EBA, besides Natura 2000, two farmers moreover reported to have land leasing contracts with the Kiskunság National Park for land located within the park. These land leasing contracts come along with environmental clauses and regulations, such as plans for grazing, harvesting, etc. The integration of the demanded interventions (both Natura 2000, and the land leasing clauses) into the farm management concepts was however not seen very critical by the Hungarian respondents. They argue that they can cope with the restrictions due to experience [HU5] and good advice [HU4]. A major problem reported was rather to coordinate the different regulatory frameworks and the additional agri-environmental programmes. This was mentioned in the Hungarian EBA as well as in the Portuguese EBA, where also one farmer manages Natura 2000 area. This farmer stated as the biggest challenges "*Lack of knowledge. Overlapping of some regulatory instruments. Some laws are contradictory. Laws are not complementary*." [PT3] In order to increase the feasibility of implementing different frameworks and programmes in parallel, more flexibility in specific management regulations could be targeted. One farmer from the Hungarian EBA concretely reports that "*the timing of the mowing should be more flexible in case of not optimal weather condition, it should be discussed with an expert. The timing of many tasks is really close to each other, it would be beneficial to do them more flexible".* [HU2]

In many EBA regions, local or national nature protection regulation is in place. These regulations set rules for the management of locally or nationally protected natural area, and are often designed for the protection of specific target agro-ecosystems (e.g. grasslands in Romania, semi-natural habitats in Estonia) or specific target species (e.g. the Municipal Master Plan (PDM) in Portugal, including the cork and holm oak protection law in Portugal; the protection status of specific animals (badgers) and trees in the Dutch EBA). Also some local regulatory frameworks exist influencing land use *per se*, namely again the PDM in Portugal, establishing the rules and parameters applicable to the occupation, use, intensification and transformation of land, or, again in Portugal, the Alqueva Dam Multiple Purpose Enterprise Perimeter (EFMA) defining rules for specific land use. Here, one farmer reports: *"e.g. we cannot install olive groves in some areas". [PT2]* Also for the local and national nature protection regulations, main concerns mentioned by the interviewed farmers are to coordinate the different demands set by different regulations and their interplay with incentives. One farmer from the Portuguese EBA explains: "*It is difficult to apply all the rules in the field/difficult management. Difficulty in knowing which laws are applicable. There should be an institute that centralizes all legal issues. Feeling that the law is blind and doesn't consider the systems as a whole." [PT2]* Actually, also being part of local nature protection initiatives, two specific regulatory frameworks for bird protection were mentioned by three farmers of the Portuguese and one farmer of the Spanish EBA. In Portugal, the bird protection regulation prohibits mechanic harvesting by suction during the night in olive groves, as this technology and timing has a negative impact on birds that use olive groves as a roost (avifauna mortality). For the farmers, this means mainly that they are not allowed to harvest at night time. In the Spanish EBA, one farmer reported to manage land close to a river and therefore being inside a bird protection zone with actually no effects on his/her management, as *"the width is very small"*. [ES3].

Regulatory frameworks for water protection areas are considered mainly by EBA farmers in Estonia, France and the Netherlands. Also one farmer from the Swiss EBA reports regulatory frameworks for water protection set by the cantons. For regulatory frameworks on water protection, the impacts on biodiversity are rather indirect, as the frameworks are not directly addressing biodiversity. Nevertheless, demands such as the regulation of sowing time and particularly the regulations on the use of pesticides and fertilisers certainly also affect biodiversity

and moreover mean a strong impact on the way farmers can manage their fields within the respective areas. One farmer from the Dutch EBA reports that to meet the regulations, crop rotations need to be adapted: "*For instance, we basically cannot grow onions anymore nowadays because necessary pesticides were prohibited recently."* [NL2] The same farmer feels strongly threatened by the restrictions set stating that "*New regulations make it harder and harder to practice farming. Regulations change and increase all the time, for instance now on onions. We don't know where this leads to, will farming here be still possible in the future or are the farmers being phased out?"* [NL2]

Of the remaining regulatory frameworks, where farmers reported some stronger effects on their management, also the erosion regulation described by one Dutch farmer shall be mentioned. Here, the farmer stated that these "*regulations cause the most important restrictions, for instance limitations to ploughing."*

Last but not least, and already mentioned at the beginning of this paragraph, a regulatory framework of highest importance, but not included in the list of specific biodiversity frameworks in Figure 16, are the so-called cross-compliance regulations (now conditionality). These regulations have been mentioned by many of the interviewed farmers to be respected in their general farmland management. Cross compliance means that in order to receive EU income support, farmers must respect a set of basic rules. These rules include mainly (1) statutory management requirements, applying to all farmers whether or not they receive support under the common agricultural policy (environmental directives such as nitrate directive or the birds directive; animal welfare directives, such as the directive on the protection of calves, pigs and animals kept for farming purposes; laws as and regulations on public, animal and plant health, such as the regulation on plant protection products or the directive on the use of hormones). Moreover, cross compliance obliges farmers to manage their farms in a way which maintains (2) good agricultural and environmental conditions. These cross compliance rules apply only to farmers receiving support under the CAP. As regards (2), in addition to the statutory management requirements, farmers receiving CAP support have to respect EU standards on good agricultural and environmental condition of land (GAEC) which are designed to prevent soil erosion by defining minimum soil cover and minimum land management practices, maintain soil organic matter and soil structure, maintain permanent grassland, protect biodiversity and ensure the retention of landscape features through, for example, a ban on cutting hedges and trees during the bird breeding and rearing season, protect and manage water through the establishment of buffer strips along water courses, authorisation on water for irrigation and protection of ground water from pollution (EC, 2022). Comparable to the cross compliance regulatory framework active in all EU member states, the interviewed farmers in Switzerland mentioned on the so-called ÖLN (proof of ecological performance) regulations. These regulations represent the prerequisite for receiving payments for production and include regulations about fertilisation balance, use of pesticides, soil testing, soil protection, crop rotation, animal husbandry, etc. As regards biodiversity regulation in line with ÖNL, there is the obligation to have a minimum proportion of biodiversity areas accounting for at least 3.5% of the agricultural area occupied by special crops and 7% of the remaining agricultural area. The implementation of the biodiversity area is then subsidised by different schemes representing different qualities of biodiversity areas as well as their networking.

Challenges of integrating regulatory frameworks for EBA farmers

In general, the interview results on the question of regulatory frameworks revealed that many of the interviewed farmers seem to be able to cope with the challenges of implementing regulatory requirements. Even if one farmer stated that "*every law is a restriction in a way",* the same farmer also ascertains that "*mostly this is acceptable for farming" [CH1]*. This statement seems to be representative for quite many of the interviewed farmers who in parts reported that adapting to changing regulations is the hardest part, while long term regulation with fixed and static rules is something they can cope with. For example, two farmers from the Estonian EBA stated that "*There have been problems with handling the manure (manure management)*

in the past, these problems are solved now" [EE5] and "*At the beginning, we did not have many animals and it was much more complicated to manage semi-natural grasslands and suppress reed in coastal meadow. Now [the] situation has changed and [the] Environmental Board is content with maintenance of coastal meadows here in our area".* [EE3] In this sense, also one farmer from the Romanian EBA answered to the question of challenges with regard to regulatory frameworks by saying "*The main challenge is changing practices"*. [RO4]

Besides the already mentioned criticism as regards flexibility and coordination among different regulatory frameworks and incentives, for some farmers also the implementation of regulations represents a challenge, while here not only meeting the restrictions, but also the administrative effort connected to the implementation is perceived as difficult and frustrating by some farmers. The topic of bureaucracy was particularly mentioned by the farmers interviewed in the Swedish and the French EBA. In the Swedish EBA, three out of five, and in the French EBA, 2 farmers stated that bureaucracy is an issue, one farmer stated that "*applying laws and regulations in daily business is an art – too cumbersome and too much bureaucracy"* [SE3], *"it is very administrative and bureaucratic"* [FR5] and another reported that *"many farmers have stopped farming due to complicated rules. We have a penalty system rather than a support system."* [SE4] In the same sense, the third Swedish farmer reported that *"A small mistake when documenting details of where/when/how much you have sprayed crops with fertilizer or pesticide (this is a requirement in Sweden) can result in a fine of SEK 10.000 (this happened to another farmer he knows)"* [SE5]. Besides fines for not meeting regulations, it is clear that the regulatory frameworks and their impact on farm management can have negative economic effects, too. For the case of the bird protection programme in the Portuguese EBA, one of the farmers stated that the prohibition of mechanic harvesting during the night in the olive groves means higher cost of harvesting. Another farmer from the same EBA details on these higher costs as being a result of longer harvesting periods and, related to this, losses in quality of the products. The farmer explained that "*when I could harvest in 10 days, it now takes 20 days, which increases the cost of the harvest and is also reflected in the quality of the oil, because the longer it takes to harvest, the greater the risk of having the production infected by pests, which reduces the quality of the oil. I usually start harvesting when the olives have 15% fat, but as it takes longer to harvest, I have to start harvesting earlier and consequently I have less % of fat in the olives. So I have to find a balance between the % of fat in olives and the risk of having lower quality olives, which causes a problem in the management of the harvest campaign".* [PT4] Also a second farmer managing olive groves in the Portuguese EBA points to the negative economic effects caused by the bird protection regulation, namely: *"harvesting during the day implies that it is carried out at higher temperatures, which is reflected in the decrease in the quality of the olives and, consequently, of the olive oil, as well as in the increase in stress for the trees. It is more difficult to operationalize the harvest, considering that, in addition to not being able to harvest at night, we also have to reconcile with the weather conditions. It is more difficult to amortize the equipment, as we can only harvest for 12 hours a day, instead of 24 hours."* [PT1]

Some other critical issues related to the implementation of the rules set by regulatory frameworks which rather questioned the usefulness and effectiveness of the rules set within the regulatory frameworks as regards biodiversity improvement were also raised by some farmers. For example, one Swiss farmer explained that *"some governmental obligations for farmers (ÖLN Richtlinien) do not really make sense for biodiversity: for example, the creeping thistle and other plants have to be removed from the biodiversity areas if they reach a certain coverage (e.g. if weeds cover more than 20% of the area). Otherwise, there are no payments given for this biodiversity area. However, butterflies and birds would benefit from such wildflowers." [CH1].* In the same sense one French farmer stated that: "*[the regulatory framework] does not always make sense in practice. For example, cover crops has to be sown during the summer when the water availably is too low for the plants to grow. So cover crops are often not successful in the region."* [FR1] Another farmer mentioned that strict regulations do not fit to everyday farming, especially as farming is strongly relying on external influences such as the weather. Here, one farmer stated that *"the strict requirements on dates do not align with nature*

nor farming reality. For instance, the mowing date of 15 June is set on several parcels. I understand why this is set, but it would help to have some flexibility, e.g. to adjust to weather conditions. Sometimes the animals are already gone even. Maybe it would be better to monitor the focus species and mow as soon as they're gone?". Going into the same direction, another farmer explained that *"Respecting the rules about sowing or time of cultivation [is a challenge, as] sometimes the weather is very difficult to predict and sowing or application of chemicals is not possible for a long time. The main challenge is thus also the unforeseeable weather"* [CH3].

Last but not least, some concern was expressed as regards the future development of regulations and how they will affect farming. Some of the interviewed farmers perceive regulations to get continuously stricter, with the effect on the one side that *"more restrictions lead to less thinking on the farmer's side"* [CH2] and on the other, that farmers are not able to comply anymore or only under high efforts. Again, one Swiss famer mentioned that *"The strict rules about application of pesticides, or also the fact that more and more pesticides get prohibited, means much more effort by hand/by machine."* [CH5] And one Dutch farmer in his comment expressed that very strict environmental regulation might even lead to an opposite effect, by displacing smaller farm businesses with bigger contributions to biodiversity but not able to cope with the regulations: The farmer stated that current activities for nature protection are "*not yet as issue but it may become so in the future due to the nitrogen deposition. […] In the '90s and '00s this [nitrogen crisis] started with widespread nature development on the less productive soils, together with a great reduction of the cattle staple. That now backfires to the farmers who remain. What's gonna remain now? A clear cut (kaalslag)? The family businesses that disappear will not return, and this goes at the cost of the landscape, it's diversity and mosaic of diverse fields and land uses. Only the largest farms [will] remain profitable"* [NL4].

4.3 Perspectives for the effective implementation of biodiversity interventions in the SHOWCASE EBAs

4.3.1 General factors motivating or hindering implementation of biodiversity interventions

In the following, we summarise first results on the motivating and hindering factors to implement biodiversity interventions. They are derived from a first screening of the audio-recorded qualitative interviews with farmers. The responses illustrate that many interacting factors reinforce pro-biodiversity implementation decisions on different levels and scales. These range from internal/intrinsic to external, with social and operational factors at times motivating internally as well as externally.

Personal, or internal, factors included expressions of moral and philosophical views of nature (e.g., CH3: "*the inner pull to protect the environment*"), sometimes connected to an individual's sense of ecology, or more narrowly indicating a relationship to different flora, fauna, or a particular landscape (e.g., HU2: "*I farm where I was born. I've grown up there since I was a little kid. So I live here in this place in the world, I farm closely with the environment. So […] I'm quite […] affected by it*").

Social influences include engagement with media, with local communities, and with consumers. These, along with education, information, and cultural factors, appear to interplay with the personal level, and were at times expressed in relation to individual preferences, identities, and goals (e.g., HU3: "*I've only had hobbies that have given me direct contact with the natural environment [a]nd that's where my commitment comes from. […] Of course, there were very good teachers who also influenced my attitude*"; PT3: "*We also have to be accountable, not only to our region, but also to the consumer […] and I think this is an important motivation. It gives us power, but it also gives us quite a big responsibility*"). Results directly addressing social influence and pressure are further outlined in chapters 4.4.2 and 5.2.

Operational dimensions, especially those supporting current practices and priorities, were repeatedly identified as relevant to pro-biodiversity decision making. Examples included existing irrigation regimes, field shape, and crop orientation. Budget considerations were widely reported as one of the strongest motivators, from increased income of higher-valued products, as well as reduced costs, especially through the decrease in need for pesticides. Broader (landscape) external factors may overlap with the operational, as in the case of soil condition and topography, or with the social, as through political and economic elements (e.g., NL2: "*Many farmers care about nature, but that is because policy forces it or simply because it generates income.*").

Among the interviews, key factors of pro-biodiversity implementation largely reinforced a farmer's current understanding of their farming goals and practices, and how their operations and products deliver value to society. On a personal level, a worldview that incorporated the inherent value of nature clearly promoted the adoption of these measures. On an operational level, ecosystem services, especially pest control and pollination, provided a strong justification for nature-friendly practices as well as potential to reduce costs. Economising was also a powerful motivating factor not only for finances, but for time, labour, effort, and physical resources, especially water. Finally, the perception of health spanned levels/scales, being relevant personally, operationally in soil and plant health, and socially via consumers.

Motivating factors were not always supportive of pro-biodiversity implementation, but *de*-motivated or hindered decision makers and presented challenges to adoption. Hindering personal factors included a respondent's self-identification with production- and profit-motivated agriculture (e.g., NL3: "*We are not a nature organisation and we do not maintain biodiversity. We are here to produce food.*"). This production motivation's hindering influence was mitigated for some when addressing the goal of long-term production, or when ecosystem services are viewed as essential to farming (e.g., PT3: "*My primary goal is not nature conservation. I don't see it as an obstacle, I see it kind of as a mission. My mission is agriculture in the first place, of course to do agriculture I need nature and biodiversity.*"). Apart from effects on production, farmers also noted increased effort and an aesthetic preference for cleaner landscapes, that latter of which was explicitly connected to social/cultural influences.

Social factors were generally linked more to pro-biodiversity motivation, but hindrances included poor experiences with others such as neighbouring farmers or monitoring parties. In at least one case, pro-biodiversity implementation rivalled other social goals of the farm (e.g., ES3: "*This crop is here to make money, it has no other reason to exist. It is a totally social crop, which provides 10-12.000 € of direct labour, right? And this social aspect is very important for us, it is something that we always value because it is a crop that is generating a lot of wealth here.*"). Beyond the farm, a number of respondents pointed to hindering socio-structural factors in payment schemes, including conflicting policy goals (e.g. SE1 "*The subsidies are still there, guiding us in the wrong direction*") and insufficient compensation (e.g., EE3 "*These subsidies and things are so small that a person can't get started*"). This complemented a broader social deficit in supporting biodiversity which farmers expressed in tandem with political hindrances, or as a stand-alone issue.

Operational factors were expressed as particularly discouraging for pro-biodiversity implementation, chiefly concerns of cost and applicability/fit within current operations. Costs again included non-monetary resources (e.g. time, knowledge) and also opportunity costs (e.g., UK4: "*There's a cost as the opportunity cost, there's a cost for actually putting into the ground the cost of seed, the labour, or fertilizer spray, et cetera.*"). Crop or production type, potential of soil, technological limitations, weather, and availability of labour were all highlighted by multiple respondents. Pro-biodiversity measures appeared to present an additional set of considerations for farms, which were at times in competition with others, or viewed as incompatible (e.g. CH1 "*We don't have time anymore... If it doesn't fit, then it just doesn't work*").

Key factors and challenges intersected at different levels/scales on a case-by-case basis to affect pro-biodiversity implementation positively and negatively. Internal, social, and operational variables all determined if and how measures were adopted or carried out. Policy and regulations generated an additional external factor by which implementation was considered. While these frequently related explicitly to operational factors of budget and farm characteristics (e.g. farm size), internal factors also played a role (e.g. attitudes, capabilities).

4.3.2 The perceived effectiveness of current public incentives and regulatory frameworks in enhancing biodiversity – potentials for improvement

As became clear in the interviews, besides regulatory frameworks and incentives provided by the value chain, many of the interventions carried out by the EBA farmers are supported by, and implemented in line with, public, action-based environmental programmes which provide payments for the specific management measures carried out. Typical for such programs is that the actual environmental effect of the management measures, e.g. on biodiversity, is rarely monitored. In order to get a first insight into the effectiveness of the current public schemes for the enhancement of biodiversity in the EBAs, farmers have been asked during the interviews if they observe whether such "classical" management-based programmes are actually effective in enhancing the biodiversity in their EBA region.

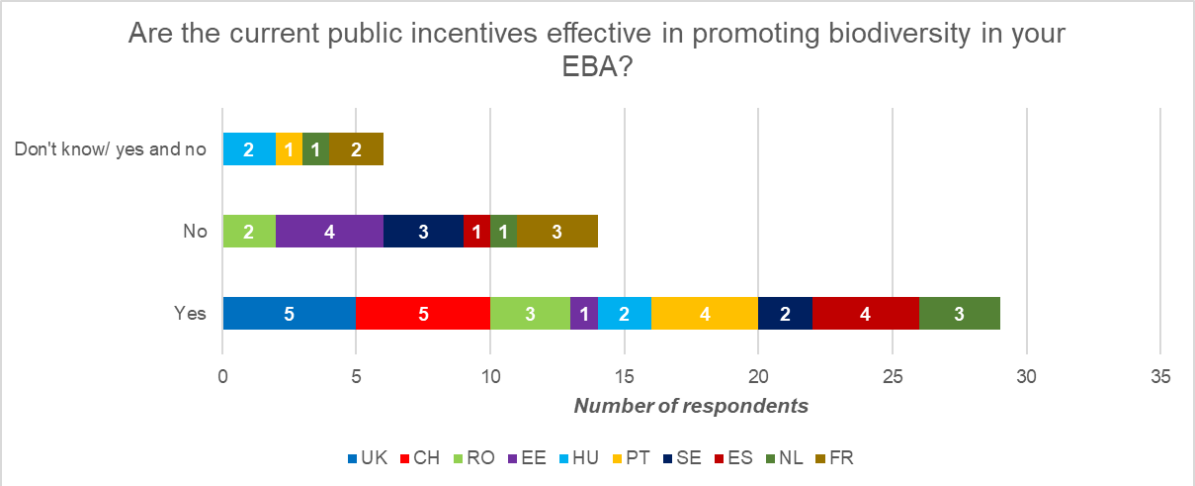

Figure 17: Perceived effectiveness of public programmes (n = 50); compiled by the authors, 2022.

Figure 17 reveals that most of the interviewed farmers have a positive view on the public programmes available as regards their "biodiversity effectiveness". Out of the 50 interviewed farmers, 29 state that these programmes enhance biodiversity, while only 14 farmers express the opposite. 6 farmers report that they are uncertain about the effects. To be highlighted is that all interviewed farmers from the Swiss and UK EBAs, as well as most farmers from the Spanish and Portuguese EBA have a positive view on the effectiveness of public incentives, while most scepticism was expressed in the Estonian EBA, where only one farmer evaluated such programmes as to be supporting biodiversity.

Of the 14 farmers having stated that programmes have no or only negligibly positive effect on biodiversity, some come to this conclusion due to personal observation (RO1, RO3, EE2), while many of the remaining farmers rather express that they *"think"* there is no effect (EE1, EE3, EE4, NL4, ES3). Major reasons for failure of public programmes to enhance biodiversity, expressed by some of the 14 farmers with a negative view on the effectiveness of the programmes, but also by some farmers who generally think the programmes are efficient, are inflexibility in the design of the measures, wrong targeting and short time funding. Moreover, both the lack of monitoring of the actual biodiversity results, as well as insufficient control of the sound implementation of the measures are criticised (see Table 4). Interestingly, none of the French farmers clearly stated that the public incentives in place are effective. Of the two farmers at least being uncertain about the effects, one farmer stated that the incentives per se

make sense, while they are not implemented by enough farmers and therefore fail in effectiveness: "*There is no effect if only a few farmers are implementing a measure (e.g. protecting bird habitats)"* [FR2]*.*

Table 4: Reasons for failure of public programmes to enhance biodiversity

Factor	Sources and exemplary statements
Inflexible design	EE1, SE2, HU2, FR5, FR1
	[...] environmental programmes are not effective. And it may because of too unbending restrictions. (EE1)
	[..] no option to test new measures. If specific measures are chosen on certain area, farmers are bound to use that intervention during 5 years. If after 1 year it [~~is~~] experiences measures do not work in his particular conditions, noting can be changed and one is locked up within the rules. To "move" the support for cover crops to another field, where it might suit better, is not possible. [SE2]
	[…] they should be more flexible. E.g. the time of moving should be decided according to the weather (because it has huge effect on yield) and approved by an expert, not only by the farmer. [HU2]
	[…] the management of semi-natural grasslands should be more flexible. [EE5]
	The implementation of the programs are too constraining and should be done together with farmers in order to come up with measures that are effective and adapted to the agricultural context. [FR5]
	Farmers cannot choose themselves what would work well for their area. [FR1]
Wrong targeting	SE2, EE3, SE5, ES3, FR1
	[..] catch crops or cover crops - these contain mainly grasses. Flowering herbs are not prioritized. If the farmer under-sows his main crop with more flowering herbs than allowed (5-10%) by strict regulations, he would lose the support or is forced to pay back the support. [SE2]
	[..] in case of single-area payment, "non-managed" parts (e.g. landscape elements) of the land are not included and total compensation is lower. [EE3]
	[..] no link between biodiversity and the (financial) support for farmers. Since rocks and rocky areas make up around 20% of the total area of this pasture, inspectors deduct those areas from the total size of the pastureland, and he receives 20% less support for that pasture. Since rocky areas on a pasture increase the diversity of habitats for different organisms and contribute to the biological diversity, in is incomprehensible to him why the current system punishes landowners with rocky areas in their pastures. In wet years, there will be no grazing on that land when water levels are high, and he therefore will receive no support for it, even though the flooded part contributes to biodiversity and is on normal years used as pasture. If agricultural support were to be paid per meter of perimeter, this would contribute to continued cultivation on irregular arable land and the conservation of biological diversity in this type of landscape. [SE5]
	I believe that subsidies should be oriented to environmental problems. But they should tell us which measures really help the environment in each crop, and acknowledge what is already helping. [ES3]
Longevity	SE5
	There is also a lack of long-term perspective in the support system. The support system only applies to short periods of 3-5 years. But if you build an animal stable, for example, it is for 25 years. [SE5]
Lack of monitoring	PT3, NL2, CH5
	I cannot say if it's effective, but there has not been a decline either so maybe it is. [NL5
	I do not know. The measures applied are not monitored. I don't know if these programmes have a real effect on biodiversity. Part of the monetary incentive should be used to monitor and measure biodiversity. [PT3]
	[…] it's hard to say what really had which effects. [NL2]
	[…] even though such measures might have a measurable effect, this effect is hardly ever perceived by the farmer on his land directly. [CH5]
Lack of control	PT5, ES4
	[…] that is, as long as he actually applies the measures. There is a serious problem of lack of supervision. [PT5]
	[…] also it is needed more control about how they are implemented in reality. [ES4]

Of the 29 farmers having stated that programmes do have a positive effect on biodiversity, seven come to this conclusion due to personal observation (PT1, ES1, ES2, RO2, UK3, NL1, NL2). Like for the opposite case, many of the remaining farmers with a positive view on the effectiveness of the programmes express that they *"think"* these programmes are effective.

Only few farmers made clear statements why they think the public programmes work, however, this was not a specific question in the interview guideline. Nevertheless, some farmers expressed their general belief that the measures taken are based on a scientific ground and well-reasoned (CH3, CH5). Especially if habitats are created by specific measures, such as flowerstrips or hedges, the farmers are convinced that there is also an effect on biodiversity (NL3, NL2, UK3, PT4, PT5, SE1). In this sense, one farmer stated that *"if you provide the habitat, species will come",* while another farmer expressed that *"they create a more extensive management and preserve 'leftover corners/spots' that provide space for biodiversity*". Another point mentioned several times is the aspect of teaching and motivating farmers to do something for biodiversity (UK5, ES3). Here, one farmer stated that *"it encourages people to do something, even if they're not motivated by biodiversity. People can see the benefit with management-based programmes."*

4.3.3 Design features of instruments to support the implementation of biodiversity interventions

To support the implementation of pro-biodiversity management practices, several instruments are developed. Here we want to put focus on the design features of instruments that incentivize the implementation of biodiversity interventions and the setting the instruments are embedded in. The questions were asked only in the in-depth EBAs of Estonia, United Kingdom, the Netherlands and Romania.

Importance of marketing opportunities and labelling

Society's demand for agricultural products defines what is grown in the field. Therefore, the sales markets, marketing and labelling are important factors for farmers to sell their products and their choice for ways of production. Biodiversity-friendly farming can only be applied, when society supports this farming practice and has a willingness to pay for the (possibly) higher effort or income forgone through this practice.

Hence, following this rationale, half of respondents stated that labelling and marketing are (very) important when considering the implementation of biodiversity management. They mainly consider eco/organic labelling important, but also local branding and labels such as *"grassfed beef"* or *"nature-meat"*. The farmers see on the one hand higher revenues, stable payments and the opportunity to sell products to Europe, but on the other hand also criticize the number of labels. They argue for instance: *"There are already too many marks and labels on the market, which makes the system too complex and chaotic. Consumers cannot follow all that. So I'm not in favour of new ones. The organic label is very important, but already complex.".* Only one respondent mentioned that despite branding their products for the market (oat milk), they also use their branding for farm tourism.

Those farmers who answered that labelling and marketing is not important for them (5/20) argue that they just do not make use of them, or it is not important, because of established clients, who know and buy from them; e.g. *"I don't need branding for my clients, just the producer certificate. My clients trust me".*

Interestingly no farmer elaborated on additional new markets or labels, e.g. which might be needed for innovative products such as lupine for human consumption.

Co-operation, collaboration and coordination regarding biodiversity management

The interviewed farmers already have key partners they cooperate with regarding environmental management for the purposes of exchanging information and experience, nature management, getting advice and consultation, equipment sharing or monitoring. In the EBAs of the Netherlands and United Kingdom all farmers answered in this direction. In the EBAs of Estonia and Romania the answers were more often rather unclear and vague about current cooperation, sometimes not clearly having an environmental goal *("spreading manure for neighbouring farmers."*) or even clearly stating they are not collaborating with anyone.

Asking the farmers for their need for further co-operation, collaboration and coordination for implementing biodiversity management, most of them indicated a need; especially those farmers from the Romanian EBA who currently do not cooperate or collaborate with anyone indicated their wish and need to do so. One respondent for instance needs *"information for the new CAP policy period"*, while another one *"would gladly collaborate with someone to improve biodiversity"*.

However, in the Estonian EBA, those farmers who do not collaborate with anyone yet, also do not want to in the future. They argue *"Everything works, so there is not much need for that."*, or they just do not want without further explanation. In contrast, those farmers who currently already collaborate with other institutions indicate their needs, e.g. *"Cooperation with other farmers or environmental organizations is necessary for better management of biodiversity.",* or *"I need supervision to manage semi-natural grasslands and I wish to know the most efficient regime for maintenance of or increasing biodiversity."*

In the EBAs of the Netherlands and the UK, where all farmers are already in exchange with other institutions or neighbours for environmental management, the answers for their need for further cooperation towards biodiversity were in often more specific and precise. E.g., one farmer from NL gave an example, how further cooperation *"could improve our management. For instance, we could further reduce grazing intensity if we could more often outsource grazing to other parcels (not our own).",* or a farmer from the UK EBA *"would like more collaboration on soil management and a protocol for carbon trading"*. One even reported his/her struggles and need with *"scientists doing monitoring and science experiments. There is a problem with continuity with them."*, pointing us, as scientists, towards the issue of maintaining and caring for our relations with our stakeholders!

Co-design of biodiversity measures

We asked the farmers, whether they wold wish for being more involved in the design process of biodiversity measures in their community, and most farmers answered that they would like that or are already involved (14/20). They find it necessary, important, interesting, *"very relevant, especially as I am one of the youngest farmers here. I would be glad to be involved in future plans"*, and they could *"add valuable insight into the practical implications"*. However, one needs to keep in mind that the interviewed farmers might be not representative, as they are closely involved in the SHOWCASE project and will implement an intervention, hence, contributing already to the further development of biodiversity management.

Those farmers, who do not wish to be more involved in the design process of biodiversity measures argue with time restrictions, their age (too old), or that they do not see themselves as an expert, who could contribute much, or argue with a lack of experience.

For the case farmers could negotiate contracts features of biodiversity measures (e.g. the contract length or precise land use restrictions), they would like to do that mainly collectively together with NGOs, farmer associations, their collective and other farmers of the region. The reasons are "*because on your own you have a very limited effect on biodiversity"*, and *"it's organisations/associations that hold the influence"*. Among them are also many who would like both, to negotiate collectively and individually, suggesting e.g. to *"start with a collective meeting, then also personal meetings 'at the kitchen table'"*. Only one respondent preferred to negotiate individually, *"because farmers have their own desires or issues to discuss, depending*

on their own farming". In contrast, four farmers answered they would not like to negotiate at all, arguing *"money is being wasted in consultation that could be given to farmers directly", or they "want to maintain what we do already, that is good but I don't desire more or new developments. Or I will do it myself.".*

Flexibilisation

Regarding the content of such a negotiation process, we asked the farmers which precise contract features they would like to negotiate and should be more flexible in programmes to enhance biodiversity.

In Estonia, where the EBA's topic is extensive grazing to maintain biodiversity, special emphasis was put on a flexibilisation of dates (for mowing and grazing) that should be negotiatable. One respondent stated "*Gradual or mosaic mowing should be more flexible as we have a tradition to mow earlier (e.g. before Midsummer Day, June 23-25)"*. Also the *"rental conditions of lands"* and *"easing conditions of both private and state farmland should be more flexible (signed for indefinite or as long period as possible)".*

The answers from the EBA of the Netherlands included that *"raw manure can be implemented more, there are promising results with this, that it promotes biodiversity in the soil and also plant growth, thus production." and that* "more flexibility in mowing dates and the duration of contracts would be helpful". One farmer also expresses some concerns, namely that only *"sometimes more flexibility is desired, but it needs to stay applicable, and we need to understand the effects to secure that the objectives are met."*

In the UK EBA, several farmers don't want more flexibility in the programmes. They want "*just clarity in instructions, which is already there"*, and state that the *"inspectors need to be more flexible when they inspect management […]. At the moment they will penalize you for plots being 0.1ha too small"*, which is perceived inefficient. Two farmers also wished for *"more flexible mowing dates, and what you plant"* (in terms of species) and one wished for more flexibility for "*changing from one scheme to another, [which] makes it difficult to adapt to unexpected changes, and sign up for science experiments"*.

In the Romanian EBA, almost no wishes for flexibilisation were named, as long as the contract "*would please everyone"* or *"where everyone is happy"*. This strong will for a common satisfaction in the region is remarkable as many interviewed farmers stated that they would *"negotiate a contract so that both him and his community to receive an advantage"* or they *"would like to have a contract which is good for everyone"*.

4.3.4 The potential of result-based incentive approaches for enhancing biodiversity in the SHOWCASE EBAs

In contrast to the classical action-based incentives, now there is a debate that farmers should be paid for the environmental results achieved, rather than being compensated for the costs resulting from the fulfilment of pre-described management measures. Such result-based schemes aim at integrating better the farmers' management knowledge on the one hand side, and on the other, activate the farmers' entrepreneurial motivation to "produce" environmental outcomes. A consequent result-based approach would give full freedom to the farmers to decide on which management practices might be suited to contribute to the environmental objective pursued, while the environmental outcomes of this management activities are remunerated. Concretely, for the farmers the schemes mean, that to get a payment, they must reach a predefined (minimal) environmental objective while the environmental success of the self-chosen management is measured by selected indicators, which are well defined by the programme. Normally farmers additionally have access to guidance or training if participating in such a programme, and often they can also volunteer to participate in observation and monitoring. In order to learn, if farmers see some potential for result-based payment schemes in their SHOWCASE EBAs, in the interviews farmers have first been explained how such result-based payment schemes work, and then have been asked if they see the potential of such

approaches in enhancing biodiversity provision in their EBA region more effectively and efficiently than the current approaches. Also, farmers have been asked to describe the main challenges and risks of implementing such result-based payment schemes for the promotion of biodiversity on their farms.

Perceived advantages and disadvantages of result-based payment schemes

The results of the interviews indicate, that a majority (35) of the interviewed farmers see advantages in result-based remuneration compared to the classical action-based payment schemes, and several of these farmers stated that they would also consider to step into such scheme (see Figure 18).

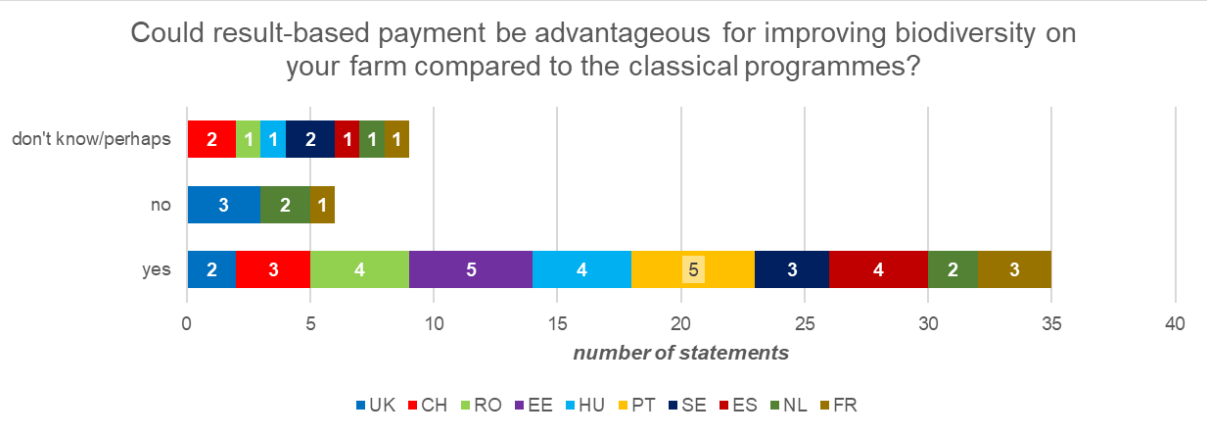

Figure 18: Farmers' attitude towards the potential of result-based schemes (n = 50); compiled by the authors, 2022.

Particularly in the Estonian and the Portuguese EBA, all interviewed farmers see this kind of payment as a chance rather than a challenge. And also in the Romanian, Hungarian and Spanish EBA, the interviewed farmers' attitude towards such schemes is rather positive. The farmers' mentioned a number of reasons, why result-based schemes are perceived as advantageous by them. The three most often mentioned aspects are listed in Table 5, while it becomes clear that these are strongly related:

The aspect of being able ***to better motivate farmers*** to step into biodiversity friendly management was mentioned 7 times by different interviewed farmers from the Estonian, Hungarian, Swiss and Swedish EBA [EE1, EE2, EE4, EE5, SE5, ES4, CH5]. Here, no specific reasons why these schemes are more motivating were given. However, as many farmers also mentioned the aspect of flexible management to be a decisive design criterion of such schemes, it could be derived that flexibility is also a major driver for motivation. As regards ***flexibility of management decisions***, being a positive aspect of result-based schemes was mentioned by 6 of the interviewed EBA farmers. To be able to implement measures, which fit to the own business is perceived as a clear advantage by the farmers [NL4, RO4, RO5, PT1, PT5, EE5]. Also, for ***effectiveness and efficiency***, being another major advantage identified by some farmers [CH5, PT2, PT4, PT1, HU2, HU3], flexibility has been mentioned as a driver. In this respect one farmer mentioned "*I think it would be more effective to increase biodiversity because the farmer can choose the interventions that suit his farm"* [PT4], while another stated that *"These models […] can be more effective, as classic models may be incompatible with the specific context of a particular farmer or farm"* [PT1].

Table 5: Advantages of result-based schemes; compiled by the authors, 2022.

Aspects	Sources and exemplary statements
Moti-	EE1, EE2, EE4, EE5, SE5, ES4, CH5

	Result-based payment does not exist in Estonia, although it would be stimulating for farmers to get an extra payment for improving biodiversity. (EE3)
	They would be a good motivator for a farmer. [EE4]
	These kind of result-based payment programmes could be advantageous as they give extra motivation and incentive. [EE5]
	[..] this would [be] more motivation for farmers, and this may have an attitude-forming effect. [HU4]
	[..] could be encouraged on more farms with such a results-based system [SE5]
	Result-based programmes would be more motivating because farmers would get compensation for every activity. [EE2]
	Every scheme that supports and motivates farmers is important to favour a change in farming, but we are already in that change with or without help [ES4]
	An effect-based payment system would give more incentive for stepping into action and take up responsibility for nature. Some farmers might even make a bigger effort because it's all based on self-responsibility, and no one's "constantly" checking. [CH5]
More flexibility in management decisions	NL4, RO4, RO5, PT1, PT5, EE5
	[...] programmes always come with restrictions and that's exactly what I don't want. No long-term commitment, but flexibility to implement measures myself, for instance on a parcel head [NL4]
	[…] RBPS is better for him because it is easy to understand and it gives him flexibility on the management of the land. [RO4]
	I agree with RBPS, because I want to be flexible in the management of the farm. [RO5]
	These models are more fair and flexible and can be more effective, as classic models may be incompatible with the specific context of a particular farmer or farm. [PT1]
	[…] these type of programmes would seem more efficient, flexible and rewards farmers that obtain better results. These type of programmes would allow choosing interventions more suitable to the local characteristics. [PT2]
	Such result-based programmes would be best for farm-specific and for improving and management of biodiversity. [EE5]
Higher effectiveness and efficiency	CH5, PT2, PT4, PT1, HU2, HU3, FR1
	This would be a (more) fair and effective system. [CH5]
	Yes these type of programmes would seem more efficient, flexible and rewards farmers that obtain better results. [PT2]
	I think it would be more effective to increase biodiversity, because the farmer can choose the interventions that suit his farm. [PT4]
	These models […] can be more effective, as classic models may be incompatible with the specific context of a particular farmer or farm. [PT1]
	[..] he feels that this could be more effective. [HU2]
	Yes, it can be effective, he would participate in one. [HU3]
	[…] for example it would work well with raptor nests [FR1]

Of the 50 interviewed farmers, only 6, coming from the Dutch, French and UK EBA clearly stated that they see no advantages, or even disadvantages, in result-based approaches and that they consequently would also not implement such approaches on their farms. The major reason for declining was the risk of not being able to control the outcomes, on the one hand because of lack of knowledge, on the other hand as results are strongly influenced by external impacts. As regards the first point, one farmer mentioned that *"Farmers [are] no experts in how to get results"* [UK1], meaning that farmers are not experts of biodiversity but rather of land management. Here, one farmer stated "*Farmers can't control outcomes, they can only control the habitats"* [UK3] and another farmer said that *"There are too many variables that farmers can't control (e.g. the weather*)" [UK4]. The same feeling had one farmer from the French EBA stating that "*it's hard to know if biodiversity interventions will lead to the expected result" [FR4].* The variability and dynamics of species occurrence was also mentioned as a factor, making "fair" payments difficult. In this sense one farmer stated that *"There is also a problem with variability - e.g. some years they have no barn owl chicks and other years they have 40! Even experts can't predict good or bad years for species!"* and *"Some farms are limited in the potential species that could come - it's not fair that some farms could get rare species and others would not be able to for reasons beyond the farmer's control"* [UK3]. Also the spatial and temporal lags, between management measure and biodiversity outcome, have been brought up by one farmer stating that "*it takes time to get the result out of a measure, biodiversity returns on the long term. That is a risk, because farmers' efforts need to be rewarded also"* [NL1]. Last

but not least, the insecurity of getting a payment while efforts have been made by the farmers, are deterrent for two of the farmers declining result-based schemes. One farmer stated that *"It's also too unsettling for farmers as they don't know what payment they will get"* [NL2] while the other declined the scheme "*because then there is no guarantee on the payments"* [NL1][3].

Main challenges and risks of implementing result-based payment schemes

Even if a high percentage of interviewed EBA farmers perceive result-based payment schemes as an advantageous approach to better increase biodiversity in the EBA regions, most of the farmers also expect some risks and challenges coming along with an implementation. In general, the risks all farmers described when having been asked about the main challenges and risks of implementing such result-based payment schemes for the promotion of biodiversity on their farms, broadly match with the reasons for not agreeing to result-based schemes, which have been explained by those farmers declining result-based schemes in the Chapter above.

A major concern for the farmers is the ***controllability of results***, meaning that farmers are sceptical that they themselves can control the biodiversity outcomes. Here, the major risk from the farmers' point of view is, that external factors determine the results rather than their own management. Farmers specifically address factors related to climate and weather [PT4, HU2, PT3, SE1, PT5, RO3, EE4, EE5, EE1], to the specific location and the related natural conditions on their fields [SE2, CH5], the management on neighbouring fields [ES5, NL5], as well as temporal lags between action and results [NL3, SE2]. As regards controllability, some farmers are moreover well aware, that the causal relationships between management and biodiversity outcomes are not fully clear yet. One farmer replied to the question if such result-based schemes could be advantageous that "*This is very hard to say as long as we don't know exactly what influences biodiversity"* [NL5]. And another farmer states "*The main points I'm sceptical about is the fact that the effect of interventions has been poorly studied*." Strongly related to the risk of the controllability of results is the risk of ***insecure payments***, mentioned by six farmers [NL4, RO4, RO5, PT1, PT5, EE2]. Particularly the farmers mention that this risk becomes crucial if farmers depend on the environmental payments [RO1, PT5], of if the management measures to support biodiversity are accompanied by higher costs and effort, which is then not compensated [UK2, NL1, NL3]. Another risk seen in result-based scheme is related to the ***sound monitoring of biodiversity outcomes.*** Farmers mention the problem of defining suited and measurable indicators [SE1, NL3]. Also, some farmers expect high cost and efforts related to the monitoring [UK5, CH4]. Moreover, the general difficulty of monitoring biodiversity outcome is mentioned by some farmers [SE1, ES2, SE3] while the difficulty is mainly seen in monitoring the rights key-species, at the right moment and at the right places. Last but not least, farmers are critical about the objectiveness and the knowledge of the controllers themselves [ES3, ES2, RO2].

[3] During the feedback round, one interviewer from the Dutch EBA added that some farmers have mentioned that Natuurijk Limburg has stopped paying for hedges which they thought perform badly, so the interviewer expected that some farmers are speaking from bad experience. Moreover, for the costs of managing hedges, all farmers mentioned to the interviewers that the subsidies cover the management costs. So this is an advantage of the non-results-based approach.

Table 6: Risks and challenges of implementing result-based schemes; compiled by the authors, 2022.

Risks	Sources and exemplary statements
Controllability	PT5, NL4, NL5, SE1, NL3, SE2, CH1, ES5, PT4, HU2, PT3, SE1, PT5, RO3, EE4, EE5, EE1
	There is a great risk associated with uncontrollable external factors. [PT5]
	There are too many variables that are out of the farmers' control [UK4]
	[..] you cannot set the goals in advance, because there's no guarantee; it's your own risk whether you succeed or not. [NL4]
	That farmers are judged on something that they did not cause themselves, yet they get the bill. [NL5]
	"The thing with biodiversity is that you don't really know what to expect". i.e. The idea of returning land to a more "wild" state would to some extent require the outcomes to be unpredictable, and not controlled by the farmer. And "farmers need to feel in control of what we're judged by. You can't really control this kind of result". They would have too little influence over what species would actually appear. [SE1]
	Sounds very promising, but is very hard to implement. The respondent is part of a "humus programme" from the canton of Solothurn, which started 8 years ago. This programme is effect-based already, but it shows limitations- proposed measures are good but goal of continuous increase of humus is hardly realizable! It is already a challenge to maintain the current humus content (not having a loss). The goals set are not realistic (sometimes such insights are only gained when measures are applied on farm level or pre-defined goals are measured at farm level). [CH1]
	A snapshot, from one moment, has limited value. The implementation of biodiversity measures requires multiple years, before its effects fully become apparent. We see on our farm that only now, almost 10 years after we started organic & nature-inclusive management, we really start seeing the effect. [NL3]
	[…] Biodiversity varies a lot in space and time, which makes it difficult to control. [SE2]
	It could be a very unfair system - the chance of attaining a given goal is very much dependent on the location of the farm and farm characteristics (soil type, exposition, present habitats etc.). So it could be unfair- some farmers would invest much time and labour but not attain the goal, while others could do it with less effort. [CH1]
	Also, other issue could be external factors. For example, if my neighbours use pesticides or other products, it could affect my field, and lose the payments. [ES5]
	Negative effects may not be caused by the farmers. […] As long as I can be certain that adverse actions of my neighbour e.g. cannot harm my compensation. [NL5]
	The biggest risk is the occurrence of external, uncontrollable factors that can compromise the results (e.g. meteorology.[PT4]
	The effect of the unpredictable weather's effect on the results is very risky, even if he did all the interventions in the right way. [HU2]
	[…] the biggest risk would be, despite the effort, not achieving the goals due to external factors. (e.g. meteorological phenomena, destruction of interventions by wild boars). [PT3]
	[…] you have paid for an intervention but for various reasons the effect is absent (dry year) [SE1]
	[…] there is a high risk factor due to variable and uncontrollable exogenous effects (e.g. climate) that can affect the results, even if the farmer works well. [PT5]
	Payment risk - because I could not have the species because of weather etc. [RO3]
	I am sceptical about external factors that affect farming (such as climate etc.) [EE4]
	Maybe climate variability [EE5]
	Extreme weather conditions, brought about by climate change, can affect farming.[EE1]
	The main risks are that it might become mandatory for farmers to deliver some results that do not depend on their farming practices alone. So they have little control on the result. [FR2]
Insecurity of payments	NL4, RO4, RO5, PT1, PT5, EE2
	Results must be viewed in a very broad scope, because they have broad effects, but this is practically difficult. The risks are that efforts are not fully acknowledged and that no secure compensation can be count on. [NL3]
	The farmers' effort and investments in nature management must be rewarded, this must be a certain basis to whatever measures and also on the short term. [NL1]
	The risk is not getting payment despite putting in management effort. [UK2]
	The main risk is a financial one, because the profit is quite low anyway and he is dependent on the money he gets from the conservation programme he's part of. [RO1]
	Often the farmer is very dependent on the incentive and if something fails in receiving this incentive, the business is no longer viable. [PT5]
	If the aims are not reached, then there is no compensation. [EE2]

Sound monitoring	SE1, SE2, SE3, UK5, CH1, CH4, NL3, RO2, ES2, ES3, FR5
	BUT how you define whether something is "working" is very important, and with biodiversity, that is really complicated. Any assessment system would have to be more advanced than just counting "indicator species", because that is not enough, and/or does not tell the whole story. (SE1)
	However, it would be hard to implement this type of programme as Natural England would need to come and look at farms and recommend things and then record results. This is very cost intensive. [UK5]
	Theoretically, this would be better, but it would mean a lot of extra effort on the side of the farmer but also on the side of the state/institutions for monitoring. [CH4]
	Interesting, but the definition of results must be very good & specific for a successful implementation. [NL3]
	It might also be too difficult to apply to different locations if it is too connected/focused on a few species (e.g. insects or flowers).
	There are also practical issues with counting certain species/taxa. E.g. If a particular butterfly is being counted, then there would be very limited time to count them (i.e. it would have to be a day of good weather within a short season, so "all of those doing the counting would have to go out on the same day!" [SE1]
	Firstly: measuring the effectiveness can be difficult. [HU3]
	Also, the lack of control of the scheme, a minimum control is required. But the monitoring should be well implemented, for example: if you are looking for butterflies, you should know their cycle and monitor them in the appropriate moment. In addition, other aspects for the natural world should be considered, as the year, etc. [ES2]
	you take samples in the wrong place and get varying results, which also vary between years and fields [SE3]
	The inspectors are only counting within a few square meters (random selection of area of control), and if the 5 species are not within this area, they down grade the quality of the meadow - even if the 5th plant is present 10 meters away. [CH1]
	[…] it depends a lot on controllers' knowledge and experience. [SE2]
	He's afraid that the person who is going to do the monitoring is going to be impartial and adjust the data against the farmer, making him lose money. […] sceptical of the implementation measures of this schemes and he believes that the money will be stolen by politicians and environment inspectors. Also, he strongly believes that the authorities don't understand the reality of the farmers. [RO2]
	The person who decides the indicator the yardstick, this person should choose something objective, because when an inspector comes and faces the specific case and local really, should be good enough and trustable. In the case of butterflies, they should know the starting situation in the Guadalquivir valley, and also my farm, mean levels in the area, and what I am doing. But it should be a third party, if I do it, I will cheat. [ES3]
	The problem with this result-based payment is who decides which result have been achieved, many of the controllers don't know the system. Some of them haven't been able to recognize seeds. These measures should be based in the convincement of farmers. [ES2]
	The other day condition of my animals was controlled. The experienced controller came with a young trainee. As soon as the experienced trainee saw the healthy animals in perfect condition (not too fat, not malnourished) they were satisfied, filled in the papers and left. A year before there was a young controller who came alone. The person noticed a nail in a wooden panel in an animal shelter. He/she reported this a s a big problem and did not check animals at all. It felt that the controller did not have any veterinary knowledge and could not charge the condition of the animals - the main task that he/she had come for. [SE2]
	It might be especially hard for some things such as monitoring the presence of endangered birds to see them exactly the day of the control. [FR5]
Lack of knowledge	UK1, UK5, RO4, RO5
	It's too risky. He thinks 2/3 of his landowners would pull out. He knows how to grow crops, but doesn't know how to grow a butterfly. [UK1]
	No knowledge for indicator species identification. [RO4]
	Professional building for control body Paying Agency and farmers. We need to know what needs to be done to keep the indicator species.[RO5]
	Without this guidance these schemes would not be fair as the average farmer would not know what to do, and it would take too much effort and time for them to design the management. [UK5]
Risk of cheating	CH5, ES3
	However, many farmers would optimize their parameters on paper and betray. [CH5]
	Manipulation of effects in order to get money. [CH5]
	this person should choose something objective, because when an inspector comes and faces the specific case and local really, should be good enough and trustable. In the case of butterflies, they should know the starting situation in the Guadalquivir valley, and also my farm, mean levels in the area, and what I am doing. But it should be a third party, if I do it, I will cheat. [ES3]

Besides these three major risks elicited from the farmers' answers, two more risks shall be mentioned which were not mentioned by many farmers, but appear to be of importance. One is the ***lack of knowledge***, (mentioned by UK1, RO4, RO5, UK5) meaning that farmers are not really able to decide for management measures which are definitely enhancing biodiversity. In this respect one farmer used a very illustrative statement by saying *"He knows how to grow crops, but doesn't know how to grow a butterfly*" [UK1]. Lack of knowledge was not only mentioned in connection of the management, but also in connection to the indicators, meaning it is very difficult for the farmers to verify if their management decisions are suited to enhance biodiversity. The other remaining risk is the ***risk of cheating,*** mentioned by only two farmers. Here answers reveal again, that sound monitoring with good indicators and well educated controllers is crucial for the effectiveness of such approaches.

Besides the main challenges and risks of implementing result-based payment schemes for the promotion of biodiversity on the EBA farms identified in the paragraphs above, a few of the interviewed farmers made some additional comments as regards two specific topics worth being considered here. One of the topics relates to the question of which species should be targeted by such schemes, the other relates to the question of how such instruments could be implemented in practice, particularly in combination with already existing incentive schemes.

As regards the first question, two points were raised, namely personal preferences for specific species and specific suitability for specific species. One farmer made clear that he, knowing and 'not liking' the target species, would not necessarily take part in a programme. In this sense he/she argued that "*for example, if snails should be conserved, that isn't my objective, I will not apply to this payment, but if we are talking about a determined local butterfly and someone tells me how to improve my management and help to reintroduce the butterfly, of course I will do it" [ES3]*. One Swiss and one French farmer discussed, that such schemes might not be suited for all environmental or biodiversity objectives, while again the availability of suitable indicators was mentioned: *"With certain measures, this is a good idea (e.g. for flowering meadows where number of specific plants are counted […]"* [CH2] and *"[could be advantageous] in some cases, for example it would work well with raptor nests"* [FR1]. In contrast to this, another farmer, coming also from the Swiss EBA, argued that for some environmental objectives such schemes might reach their limits. He/she gave the example of carbon sequestration, stating that "*This [carbon-sequestration] programme is effect-based already, but it shows limitations - proposed measures are good but [the] goal of continuous increase of humus is hardly realizable! It is already a challenge to maintain the current humus content (not having a loss)"* [CH1].

As regards the second question, particularly in order to moderate the risk of insecure payments (actually, the entrepreneurial risk of "producing" biodiversity in result-based payment schemes), several farmers suggested to have results-based approaches not replacing existing action-based programmes, but rather being developed as additional programmes [EE4, ES4, FR5]. In the same direction but more integrative, another suggestion by several farmers was to have result-based payments as "top-ups" or "mixed models", in combination with action-based schemes [PT5, SE2, NL3, SE1, NL1, UK4]. Here, action-based payments would compensate the costs of management measures, while result-based top-up payments would additionally reward, when measurable biodiversity outcomes are reached.

Table 7: Suggestions on integrating result-based schemes in the existing incentive framework; compiled by the authors, 2022.

	Sources and exemplary statements
Addi-tional schemes	EE4, ES4, FR5
	They should be initiated in addition to already existing programmes, not as replacements of existing programmes [EE4].
	A good option could be implementing both types of schemes. [ES4]
	It would be interesting to have both «classical» practice- and result-based payments [FR5]
Top-up or /mixed models	NL4, RO4, RO5, PT1, PT5, EE2
	There should be a mixed model, in which part of the incentive would be given to the application of biodiversity-friendly management measures, and the awarding of prize based on actual results obtained. PT5
	For example, there should be a basic concept for agriculture that is supported. Every extra step that you make and that is advantageous for (agro)ecosystems, should be given extra support for. [SE2]
	But a combination of measure-based and result-based payments can work, that would be interesting. I would see this as an addition to the system, not as a settle model on itself. [NL3]
	The "base" of the payment system would have to be management-based (i.e. paying farmers to carry out a particular farming practice), but with checks on results to see if the approach is working. [SE1]
	The farmers' effort and investments in nature management must be rewarded, this must be a certain basis to whatever measures and also on the short term. This should definitely be safeguarded. Maybe result-based payments could work as a bonus system? [NL1]
	People should be paid for what they achieve. He does above & beyond what the management schemes pay for, and should be paid for this. If not paid for results, you should at least get bonuses for it. This way farmers could be protected and paid for good management (with basic payments), but get more for better management (with basic payments and results-based payments on top of that). [UK2]

Monitoring of results in result-based payment schemes

As seen in the chapter above, the monitoring within result-based approaches is seen as a major risk. In general, monitoring is often a sensitive topic for farmers participating in agri-environmental-climate schemes (AECS), as they often worry about sanctions but also the bureaucracy related to the monitoring process. In result-based schemes the monitoring would extend to in-field investigations of ecological results, such as counting of species abundance. We therefore asked the farmers for their evaluation of factors related to monitoring, e.g. whether they prefer to do the monitoring by themselves, prefer external monitoring, or to do it with someone together.

Only very few farmers stated they would like to do the monitoring by themselves (N=6). Arguments were, on the one hand, that they already have *"excellent empirical and practical knowledge"* and, on the other hand, "*so that the farmer understands all aspects himself*" It was highlighted that *"for this, there should be careful education/counselling given"*. One farmer considered that monitoring by him-/herself would mean *"less effort for the state/private institutions for monitoring"*. One farmer stated that they would like to do it as a first reaction, however, has doubts as "time and knowledge are limiting factors. I would be open for it if it's doable and not too time-consuming".

A large share of the interviewed farmers stated they would prefer external monitoring when participating in a result-based scheme (N=17). We find a slightly spatial agglomeration for this answer in four EBAs: Estonia (5/5 respondents), Romania (4/5), Hungary (3/5) and Spain (3/5). Two arguments stick out: fairness, including the consideration of cheating (by themselves), and knowledge. In the Eastern European countries, a lot of emphasis was put on attributes of fairness that the external monitoring person should have, with almost every respondent highlighting: the person should be an expert in the field of biodiversity and must be independent, objective, fair and impartial. The farmers also stated that *"It is not fair to be done by me*" and the monitoring should be done by *"definitely not the one who applied the intervention"*. In the Spanish EBA, the arguments for external monitoring were all on the topic of knowledge and learning with statements such as *"I don't know how to monitor butterflies or any other bug", "We don't know about entomology. We don't know species interactions, cycles, etc."*, or in

opposition *"We have the qualification and technification to monitor. [But] I think that monitoring helps to improve and learn"*. One very honest answer also stated *"if I monitor, I will cheat".*

Considering the institutions who would be suitable to do the external monitoring and comply with the above mentioned criteria of knowledge, objectiveness and fairness, some respondents had a very clear and specific suggestions, such as a research centre, conservation associations, or governmental institutions like the environmental board or agency. The latter was very often named in the Estonian EBA. Also experts from a national park were suggested in the Hungarian EBA. However, a large share of respondents only stated, that the monitoring person should be an expert.

Most interviewed farmers stated they would prefer to do the monitoring together with someone (N=22). Also here we find an agglomeration of this answer in the EBAs of the United Kingdom (4/5), Portugal (4/5), Switzerland (4/5) and Sweden (3/5). There were not so many arguments named, but they resemble the ones from the respondents who prefer external monitoring. These are: farmers are rather not prepared for monitoring, as they have insufficient knowledge on biodiversity. "*Not farmers alone because they might not have sufficient knowledge to monitor the biodiversity in their land."* [FR2] And several respondents see a benefit of learning, if monitoring is done together with an expert. However, one respondent pointed towards the increased effort saying: *"To judge a field (e.g. plants or insects observed) or take a soil sample would be OK. However, if there would be a strict monitoring of every detail of management too (field management book etc.), this would be very tedious and annoying for the farmers. […] an effect-based payment system could lead to much more criteria, and very strict criteria."*. Topics of fairness or trust did not play a role in the answers! Also the enhanced effort was mentioned only by one respondent.

The institutions named for doing the monitoring together with the farmers were very diverse without any pattern noticeable for us, ranging from *"people giving the money (e.g. government) should do the monitoring with the farmers"* to *"the government would not be good"*. Further the suggestions also ranged from *"fellow farmers"* and several times *"farmers association"* to *"Not the farmer - because there would be many falsifications made on purpose"*. Also researchers/academia, biologists, biodiversity consultancies, local conservation organisations, certification bodies, plant cultivation advisors, agricultural consultancies, or *"an interest group, which has a new accreditation"* were named. One respondent saw *"advantages to empowering in-house staff as they meet at the property on a daily basis and have a greater insight into what is going on there, than external consultants"*. Hence, we conclude that the option to do the monitoring together with an external expert is much preferred, but a lot of discussion and probably also experience is still needed in the different regions to develop a suitable solution.

4.4 Farmers' biodiversity-related decision-making

4.4.1 The role of stakeholders

To assess the roles of various stakeholders along the agricultural value chain, including extension services, consumers and local communities, farm-input providers and food-chain operators, in farmers' biodiversity-related decision-making, a two-step approach was applied:

- In the first step, i.e. the pre-survey conducted online as described in 2.1.2, the EBA research partners helped to identify the locally most relevant, influential stakeholders and described their roles. For results, please go to *4.4.1*.
- Based on the results from the first step, a list of stakeholders potentially relevant in all EBAs was created. These stakeholders were then rated by the interviewed farmers regarding their effect on the individual biodiversity-related decision-making. For results, please go to *4.4.2*.

Identification of relevant stakeholders and their roles: Insights from the EBA research partners

Based on the findings of the pre-survey, non-governmental organizations, other primary producers, governmental bodies or agencies, advisors, input suppliers, farmers' community, farmers' social environment, farmers' associations, media/newspapers, landlords, researchers and buyers as presented in the left column of Table 8 were elicited as potentially influencing farmers' biodiversity-related decision-making. Their possible roles in the decision-making assigned to by the EBA research partners – *for the corresponding EBAs* – are summarized in the right column of Table 8 comprising the research partners' IDs. IDs with the same letter (e.g. A1, A2, A3) refer to answers provided for the same EBA.

Table 8 gives a qualitative overview of how multifaceted single stakeholder groups' roles are when compiling them across EBAs. Overall, stakeholders are assumed to affect farmers' decision-making through multiple ways with raising awareness and providing/sharing information (e.g. roles ##1, 6, 13, 17, 21, 28, 29, 31, 37, 40, 47) being named most frequently. Some roles are non-exclusive, i.e. not assigned to one specific but to multiple stakeholders across the EBAs. Besides raising awareness and providing/sharing information/advise performed by almost all stakeholders, non-exclusivity can be observed for, e.g., compensation payments which are provided by either non-governmental organizations (role #2) and governmental bodies or agencies close to the government (role #12) depending on the EBA under question. Table 8 therefore gives regional, comparative insights into various role allocations. This not only helps to EBA-specifically understand farmers' relation towards these stakeholders, but also exemplarily portrays the multitude of potentially influencing factors originating from farmers' institutional and human environment.

However, this compilation also indicates that inter- or binational comparisons of one and the same stakeholder, i.e. regarding their effect on farmers biodiversity-related decision-making, need to be drawn carefully since the stakeholder might play different roles in different countries. To illustrate: Non-governmental organizations might, in one country, run their own certification programs (e.g. role #2). In another country, however, they might be responsible for monitoring the implementation of agri-environmental measures or high-nature-value habitats (e.g. role #4). Depending on their role, they might potentially not only be perceived highly differently by the regional farmers but also have different effects on farmers' biodiversity-related decision-making. This requires further consideration as well as investigation and advocates region-specific or local approaches – generally but especially when aiming to involve stakeholders in the design of pro-biodiversity initiatives.

Whereas some roles listed are assumed to clearly positively (e.g. providing compensation for biodiversity management as described in role #3) or clearly negatively (e.g. causing frustration due to non-ideally designed procedures with regards to biodiversity management as described in role #5) affect farmers' biodiversity-related decision-making, some roles affect farmers' decision-making more generally with unclear – i.e. positive *or* negative – effects on their pro-biodiversity behaviour. For example, depending on the experiences other farmers have made regarding biodiversity-management, they might either motivate or demotivate their peers from implementing such farm practices (role #6). Similarly, actors can be role models either for successful production- or conservation-oriented farming (as described in role #8) or advise towards pro-environmental or pro-ecological farming (as described in role #17) with ambivalent effects on farmers' biodiversity management. Depending on the players' interest and the orientation of their action, i.e. with regards to the market or land management, also roles ##33, 39 and 46 played by landlords and farmers' associations can lead to different consequences in farmers' biodiversity-related decision-making. How these stakeholders, in the next step, affect such decision-making processes is reported in chapter 4.4.1 and 5.3. In order to consider such influences adequately when implementing a pro-biodiversity initiative, a detailed understanding of the local context is, again, required.

Furthermore, in contrast to most roles directly targeting farmers' behaviour, some roles are assumed to affect farmers' pro-biodiversity behaviour indirectly (e.g. roles ##15, 38). Here, stakeholders are assumed to contribute to generating a biodiversity-friendly or -aware atmosphere in society that, in consequence, might motivate farmers to foster their pro-biodiversity behaviour. These roles are closely related to social pressure discussed in chapters 4.4.2 and 5.2. As described by comment #26 in Table 10, however, creating social awareness for biodiversity might not only have positive effects on farmers' decision-making but, in worst case, rather create hostile mutual perceptions.

Table 8: Stakeholders' roles in farmers' biodiversity-related decision-making from the perspective of local EBA research partners; compiled by the authors, 2022.

Stakeholders	#	Roles
Non-governmental organizations (nature management and protection organizations, certification bodies)	1	raising awareness, providing information and facilitating knowledge exchange, organization and implementation of biodiversity management (A1*, A2, B, C, D)
	2	running certification programs (B)
	3	providing compensation for certain pro-biodiversity measures (A2)
	4	monitoring of implementation/HNV habitats (A2, C)
	5	potentially causing frustration and anger through lack of contact, income uncertainty, fines or high requirements (C, A2)
Producers (farmers, farm clusters, large-scale primary producers, beekeepers)	6	peer learning: influencing each other by (informally) sharing opinions and feedback, preferences and practices (A1, B, E, F)
	7	influencing each other through shared logistics (B)
	8	neighbors/successful players acting as role models/inspiring examples (A3, G1, G2, F)
	9	reputable large-scale primary producers offering advice to and buying products from other farmers (G1)
	10	large-scale primary producers engaging in research/demonstrations aiming at pro-biodiversity management (G)
Governmental bodies or agencies close to government (local, regional, national)	11	defining/developing both legal requirements and funding rules for biodiversity management (B, A1, A2, D)
	12	running/funding/monitoring biodiversity management initiatives (A1, A2, C, D)
	13	increasing awareness, provide or exchange information and/or cooperate (A1, C, D)
	14	determining long-term prospects for income and business (A2)
	15	promoting general desire and societal perceptions regarding (good) biodiversity management (A1)
	16	potentially causing frustration due to complicated/changing/inflexible procedures (A2, C)
Advisory services	17	advising how to economically or environmentally improve farming; directly or indirectly relating to biodiversity-management (E, A3, G1, C, I, F)
	18	providing support with administrative and organizational work, e.g. for application for AES (E, C, F)
	19	working with obligatory monitoring (E)
	20	offering farm services (e.g. harvesting) (A3)
Input suppliers	21	disseminate and provide new technology and scientific innovations, also potentially supporting biodiversity management (G2)
	22	determining which technology is affordable (B)
	23	promoting their own products, possibly acting potentially opportunistically (B, G2)
Community (consumers, monitoring people, local community, religious representatives)	24	potentially paying more for pro-environmental products (B, F)
	25	doing monitoring/recording on farm (B)
	26	coming to farms to learn about agriculture, with potential effects on farmers' reputation and profit (B)
	27	steering farmers' behavior through public perception and acceptance on farming (A2, B)
	28	socially prestigious actors efficiently providing information (D)
Social environment/family	29	offering advice (B)
	30	determining tradition and thus long-term way of farming (A3)
Farmers' associations	31	raising awareness, providing information and, e.g. technical, management- or funding-related, support (B, G1, D)
	32	defining management guidelines for the members (G1)
	33	buying products of members (G1)
	34	creating new market opportunities for sustainable production and thus pushing farmers into this direction (G1)

Stakeholders	#	Roles
	35	lobbying farmers' interests (H)
	36	contributing to policy monitoring and policy development (D)
Newspapers/media (agricultural, general, local, regional, national)	37	in farming community: raising awareness for problems and inform about (scientific or exemplary) solutions, developments or policies (B, H, F)
	38	in society: raising awareness for positive trends, problems and value of HNV (C)
Landlords	39	permitting management changes (B)
Researchers	40	providing information on current research and raising awareness and involve in research (G2, G1, B)
	41	developing new value-added products or (sustainable) solutions applicable to farmers (G1)
	42	providing information for the development of new agricultural policies/regulations or testing them (G1)
	43	scientifically supporting official agricultural processes (G1)
Producer organizations, bulk buyers	44	setting overall directives based on general trends (I)
	45	acting as successful examples farmers might want to imitate (G2)
	46	buying products from members (G1)
	47	providing information and, e.g. technical, management- or funding-related, support (G1)
	48	defining management guidelines for the members (G1)

* *Individual EBA research partners were indicated as follows with "A1" serving as an example: "A" codes the research partners' country of origin, 1 is a number assigned to the research partner – only in case more than one research partner of one country answered to the survey.*

The effect of stakeholders on farmers' biodiversity-related decision-making

Based on eliciting the relevant stakeholder groups[4] in the EBAs by means of the pre-survey described in 2.1.2 (methodological approach) with its results being outlined above, a sample of 45 farmers across the EBAs rated their effects/influence on biodiversity-related decision-making. A 5-point Likert scale was applied ranging from 1 ("++, very strong *positive* effect") to 5 ("--, very strong *negative* effect") with 3 being the *neutral* middle. For each EBA as well as across EBAs, the means of perceived effects were calculated for each stakeholder group as visualized in Table 9. To facilitate comparisons, *very strong positive* effects (rating < 2) are colored green; *rather positive* effects (2 ≤ rating < 3) are colored light green, *neither positive nor negative effects* (rating = 3) are colored grey and *rather negative effects* (rating > 3) are colored light red. Very strong positive effects (rating ≥ 4) could not be observed in any EBA or for any stakeholder group. For the single EBAs, the stakeholder rated lowest (i.e. highest positive influence) and rated highest (i.e. least positive influence) was highlighted through ***green*** respectively ***red*** font color. Additionally, standard deviations were calculated indicating how consistently or differently farmers in one EBA (row 1-9) or across EBAs (row 10) perceive the corresponding stakeholders – within and, respectively, across the EBAs. The sign ** stands for standard deviations not exceeding 0.5 points indicating similar perceptions regarding stakeholders' effects; * stands for standard deviations not exceeding 0.75 points indicating rather similar ratings regarding stakeholders' effects and ° stands for the highest standard deviation per row indicating the most divergent perceptions in the corresponding stakeholders' effects.

[4] Due to reasons regarding practicability, the list of relevant stakeholders was shortened through integrating or skipping less frequently mentioned stakeholder groups.

Table 9: Means of perceived stakeholder effects ratings by farmers; compiled by the authors, 2022.

row ID	EBA	researchers	farm advisors	direct buyers/ end-consumers	People in social environment	producer organization	people in general	bulk buyers	other farmers	government	machinery suppliers	fertilizer suppliers	crop protection suppliers
1	United Kingdom	2.4*	1.8	2.3°	1.8	3.0**	2.4*	3.0*	2.4	***1.6****	3.2**	***3.5***	***3.5***
2	Estonia	***1.8***	2.2**	2.2	2.0*	2.0*	2.2**	2.6°	2.2	2.6°	2.4*	***3.4***	***3.4***
3	Switzerland	***1.4****	1.6*	1.6	2.8°	2.0*	1.8**	2.0	3.0	1.8	2.8	***3.4***	***3.4***
4	Hungary	***1.7***	2.7°	2.3*	1.8**	***3.3****	3.0	2.8**	2.3*	2.4*	3.0	2.7*	2.7*
5	Romania	***1.2****	1.8	2.0*	2.6*	***2.7****	2.6*	2.3*	2.4°	2.3**	***2.7****	2.5*	2.5*
6	Spain	***1.2****	2.0*	1.8	1.8	1.4*	2.0*	***3.3***	2.4*	2.6°	3.0	2.8	2.6°
7	Sweden	2.2°	***1.6***	2.0**	***1.6****	2.0	2.3	2.0	2.3	2.4	2.3	***2.7****	2.0**
8	Netherlands	2.4*	2.6*	***2.2***	2.6*	***2.2***	2.6*	2.6	***2.2****	3.0°	***2.8****	3.0**	***2.8****
9	Portugal	1.6*	2.0*	2.0	2.0*	2.2	2.2**	***1.2****	2.0*	***2.6°***	***2.6****	2.2**	***2.6****
10	***across EBAs***	***1.8***	**2.0**	**2.0**	**2.1**	**2.2**	**2.3***	**2.4**	**2.4**	**2.4°**	**2.8***	***2.9***	***2.9***

***standard deviation ≤ 0.5 // *0.5 < standard deviation ≤ 0.75 // °highest standard deviation per row*
coloring: very strong positive: x < 2 // rather positive: 2 ≤ x < 3 // neither positive nor negative, i.e. neutral: x = 3 // rather negative: 3 < x ≤ 4 // very strong negative: not applicable since no corresponding average ratings observed

Looking at the results for each EBA *separately (row 1-9)*, the interviewed farmers in the UK are the only ones rating the *government* lowest, i.e. as having the most positive influence on their biodiversity-related decision-making. Whereas in the Swedish EBA *advisory services* and *people in the social environment* hold this role, it is the *end-consumers*, *producer organizations* and *other farmers* in the Dutch EBA. In two third of the EBAs, i.e. Estonia, Switzerland, Hungary, Romania, Spain and Portugal, the interviewed EBA farmers perceive *researchers* as most positively influential, i.e. assign the lowest scores to this stakeholder group. However, since farmers were not sampled randomly but, at least partly, based on past contact with the local EBA researchers, a potential selection bias, i.e. an over-representation of farmers with proximity to research, has to be considered. Additionally, social desirability might bias these results since farmers might not want to assign bad ratings to the researchers personally carrying out the interviews with them. Whereas, as mentioned above, no stakeholder was in average rated to have a very negative effect on farmers' biodiversity-related decision-making, in only five EBAs stakeholders were rated as having, in average, a slightly negative effect. All of these are, interestingly, assumed to be private players. In the EBA in the United Kingdom, Estonia and Switzerland, this includes farm *input suppliers* – for agricultural machinery, fertilizer and/or crop protection – and in the EBAs in Hungary and in Spain, this includes *producer organizations* or *bulk buyers*.

Although different roles stakeholders play in different countries need to be considered when interpreting rating differences between EBAs (see chapter 4.4.1), the *overall EBA calculations (row 10)* confirm these first impressions. No stakeholder was, in average, rated as having a negative influence on farmers' biodiversity-related decision-making. The interviewed farmers perceive *researchers* as most positively influencing whereas they perceive farm input, in particular *fertilizer and crop protection suppliers*, as least positively influencing. Whereas only few stakeholders were rated highly consistently (i.e. standard deviation ≤ 0.5 points) within one specific EBA, no stakeholder group was rated highly consistently *across all EBAs.* Accordingly, perceptions of stakeholders seem to vary widely between EBAs. For initiative design and policy making, this indicates that, in regional and even more in international initiatives, involving a certain stakeholder can have highly different effects on individual farmers' biodiversity-related

decision-making. To illustrate, *government* was rated particularly inconsistently with a standard deviation of more than 1 point across the EBAs, but also within the EBAs in Estonia, Spain, the Netherlands and Portugal. For some EBAs and their farmers, assigning a *prominent* role to governmental bodies might therefore have highly positive, for others less positive or even negative effects on biodiversity-friendly farming.

Overall, with *researchers* being the stakeholder group achieving the highest positive effect ratings, the findings indicate that – in an environment where cooperation between researchers and farmers is established already – these stakeholders might be very well able to positively contribute to the implementation of pro-biodiversity management practices. Also, stakeholders such as *advisory services*, *end-consumers*, *people in the social environment*, *producer organizations*, *people in general*, *bulk buyers* and the *government* being perceived as, in specific EBAs, having the strongest positive influence, might be players whose involvement in the design of future biodiversity initiatives might be able to promote implementation in the corresponding countries. In contrast, for the stakeholders showing rather negative influence, a deeper understanding of the reasons for this effect is required. On the one hand, some of these stakeholders might generally be perceived negatively in an EBA indicating that their involvement in initiative design is hardly promising or even counterproductive. On the other hand, however, considering that these stakeholders might, in decision-making processes other than biodiversity-related, still be powerful and trusted, implementing strategies such as stakeholder-specific raising of biodiversity awareness and responsibility might be promising to improve their role in the context of biodiversity and make use of their potential in initiative design.

4.4.2 **The role of social pressure**

To assess the influence/pressure of the public on farmers' biodiversity-related decision-making – either expressed informally or with governance support – respondents were asked to quantitatively rate this pressure. In case respondents feel pressure, they were, through an open question, asked to provide more detailed information on the exerted pressure.

The analysis uncovered widely differing perceptions on exerted pressure from the part of farmers. This is not only reflected in the descriptive statistics of quantitative rating data, also visualized in both Figures 19[5] showing ratings per scoring category as well as 20[6] showing ratings per EBA. It also manifests in Table 10 portraying the large variety of aspects brought up in the unsupported qualitative follow-up question.

For the quantitative assessment of the perception of social pressure on the scale from 0 ("no pressure at all") to 4 ("extreme pressure"), ratings follow a right skewed (i.e. not normal) distribution as visualized in Figure 19. Additional to graphical analyses, the mode (0), median (1) and mean (1.46) being all lower than the middle score of the scale (2) indicate that social pressure seems to be perceived as relatively weak. To illustrate: Whereas the largest group of farmers (n = 15) stated to perceive no social pressure at all (i.e. score of 0), extreme social pressure (i.e. score of 4) was perceived by one of the smallest farmer groups (n = 3) only.

[5] Farmers (n = 3) rating the social pressure between pre-defined scores (i.e. as 0.5, 0.5 and 2.5) were excluded from graphical illustration.
[6] see above

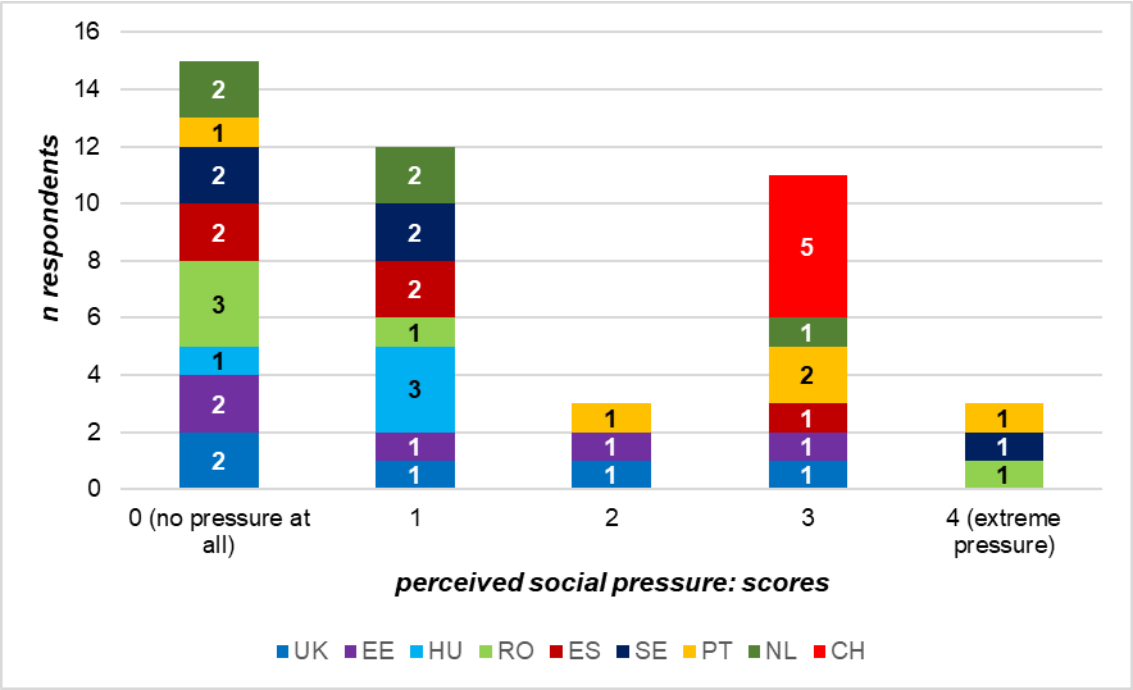

Figure 19: Farmers' perception of social pressure by scores (n = 42); compiled by the authors, 2022.

Furthermore, ratings substantially differ both within and between EBAs as can be seen in Figure 20 indicating that regional belonging is not powerful in explaining the extent of social pressure. EBA-specific standard deviations exceeding 1 point in 7 of 9 EBAs as well as an overall standard deviation of 1.34 points support this impression. The Swiss EBA, however, is an exception with farmers consistently perceiving social pressure as very strong (i.e. all farmers rating it with a 3).

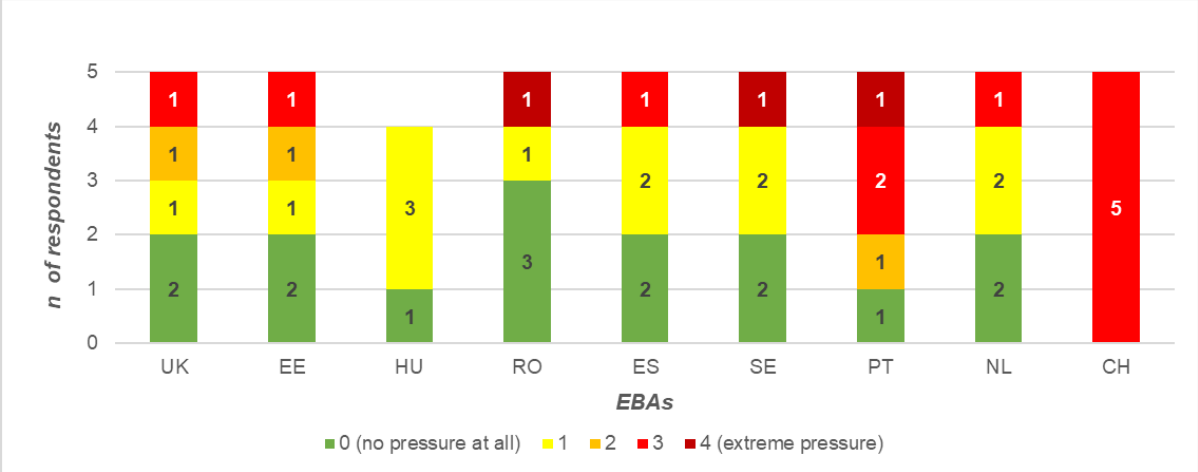

Figure 20: Farmers' perception of social pressure by EBAs countries (n = 42); compiled by the authors, 2022.

With regards to the qualitative follow-up question, five overall topics could be elicited covering the variety of aspects in the farmers' comments with, however, one non-specific comment (#29) not being assigned to any of them. Contrary to wide expectations, farmers perceive pressure from society not only negatively (e.g. ##1, 5, 14, 24, 26) but also positively (e.g. ##1, 4, 9, 22, 28, 29) or in a neutral way (e.g. ##2, 6, 7, 8) indicating that the interviewed farmers are either above or ahead criticism. This is also mirrored in the low quantitative ratings reflecting

that social pressure is widely not perceived as extreme. However, as described above, since farmers were not sampled randomly but are mainly contacted based on the EBA local researchers' networks, these findings are potentially subject to selection bias: Farmers interviewed might already farm in an above-average biodiversity-friendly way and thus do not feel as exposed to social pressure as their peers might do. Furthermore, whereas some comments directly refer to pressure from society (e.g. ##1, 6, 11, 16, 23), others reflect the connection between society and farmers more generally (e.g. ##3, 8, 12, 13, 17, 24). This only allows for relatively vague conclusions regarding perceived social pressure.

Topic A summarizes comments reflecting the influence/pressure from society relating to the role of ***general, specifically agricultural and social media***. Comments indicate that media ambivalently influences farmers – both regarding direction (positive or negative as described in #1) as well as regarding effect (effective in ##1 and 4 or ineffective in ##2 and 3). Supposedly, farmers such as NL_2 who are aware of their biodiversity-friendly farming practices might be less sensitive to further pressure (see ##2 in combination with 6). Only one farmer indicated negative pressure, i.e. "complaints" and "exposure", explicitly originating from social media (#5). Comparing with a study by Dürnberger (2019) finding that 26 of 55 livestock farmers have already experienced (heavy) criticism via social media, this finding is highly surprising. Farmers interviewed in this study might either be perceived less negatively by the public, possibly due to their potentially above-average biodiversity management (see above), or might not be actively engaged in social media. Additionally, talking about biodiversity in general is considered hardly effective as indicated in comment #3. This might be explainable through – at least to some small extent – little knowledge of farmers about how to improve biodiversity management through efficiently in practice (#15).

Topic B summarizes comments on social pressure specifically relating to pro-biodiversity behaviour that is already implemented, i.e. ***making pro-biodiversity considerations or applying biodiversity-friendly management practices***. As shown through ##6, 7 and 8, farmers having good conscience for farming – individual or in the region – or consciously deal with the topic show little susceptibility to social pressure. Whereas general society might, in consequence, not have an influence on farmers' biodiversity-related decision-making, the local community could be more effectively affecting farmers' behaviour (#8). This highlights the necessity to consider the regional social environment in farmers' decision-making which, e.g. described by De Krom (2017) can play a decisive part. Beyond that, farmers already engaging in pro-biodiversity management already might be motivated to contribute even more to stay ahead of pressure (#9) or themselves (try to) pressure society (#10) rather than the opposite. This manifests farmers' roles as active players, i.e. not passive adaptors, in pushing agriculture towards more sustainable production and indicates the promising potential of involving them in future policy design more intensively.

Topic C summarizes comments on ***society's understanding of biodiversity and farm management*** affecting the social pressure farmers perceive with regards to their biodiversity-related decision-making. This is the topic farmers most often referred to (n = 11). Whereas some farmers are little susceptible towards and stay beyond pressure originating from hardly informed public (#11), other farmers perceive little, incomplete or incorrect understanding as burden contributing to relatively high perceived social pressure (e.g.: ##13, 14; #11 in combination with #26). Additionally, some farmers perceiving pressure from society as relatively strong acknowledge the need to improve their own communication as a response to society's little, incomplete or incorrect understanding (##12 and 13) as well as their own understanding of effective and practicable pro-biodiversity measures (#15).

Topic D summarizes comments on social pressure referring to various ***market forces, particularly consumers' demand and their willingness to pay*** for sustainable products. In this context, social pressure is perceived as both pressuring and motivating (#16). Overall, farmers seem to be sympathetic towards consumers showing understanding for, e.g., increased wish for biodiversity (#17) or relatively low willingness to pay in the society as a whole (#20). Still, one farmer (#19) complains about higher demands while consumers are not willing to pay

higher prices. Finally, not only one farmer's appeal to adapt to new conditions (#18) but also the fact that farmers recognize both economic potential and practicability of biodiversity-friendly production thanks to possible market changes (##21, 22) can be exemplarily highlighted as positive effects of social pressure through market forces.

Topic F summarizes comments on social pressure relating to ***how consumers behave towards and think about farmers***. This cluster mostly includes negative statements reflecting the negative opinion society might have about farming as suggested by comment #24. Farmers state to not only feel pressure in everyday (#23) but also in virtual life (#5). Whereas #27 shows that an increase in pressure is expected in the more distant future, #26 portrays that political initiatives, such as the petitions for a referendum on reduced pesticide use in Switzerland, can create substantial social pressure within a short space of time. This not only includes increased interest for the subject under question, i.e. positive pressure, but also negative pressure such as accusations (#26). Considering the connection between ##26 and 11, such changes can be a high burden for farmers when being accompanied by little understanding of biodiversity and farming from the part of consumers. This political incident and its consequences outlined here might also explain the consistently high ratings of social pressure discussed above. #28, however, can be regarded as an example of, besides positive intrinsic motivation, positive social pressure by means of society's behaviour, i.e. benevolent feedback.

Overall, the quantitative ratings and qualitative comments provided by farmers indicate that, although pressure is generally evaluated as relatively low, farmers are still influenced by society via different channels. Both indirect social pressure originating from markets and direct social pressure originating from personal exchange between farmers and consumers can be starting points for motivating farmers' pro-biodiversity behaviour. Indeed, several forms of social pressure were, to a large extent, shown to be regarded as motivating. This, however, as explained above, needs to be reflected against the backdrop of potential selection bias. In contrast, society's little understanding of biodiversity and farming might make farmers not only insusceptible towards society's demands, but also sceptical and affronted. Additionally considering, as mentioned by one respondent, farmers' uncertainty which measures to implement to effectively conserve biodiversity, a substantial lack of knowledge on both parties involved can be identified. This indicates a clear mission to generate and transfer know-how from the part of key stakeholders including science, politics, farmers themselves as well as various multipliers towards both consumers and farmers in order to create a more constructive atmosphere for improving sustainability in agriculture and to initiate practical change.

Table 10: Farmers' comments on perceived social pressure; compiled by the authors, 2022.

Topic farmers' comments refer to	#	Farmers' comments
A: (Social) Media	1	journals or media put (positive or negative) pressure on farmers (HU2_1* // HU5_1 // EE5_2 // HU3_2-3)), i.e. through information & advice on nature conservation (HU2_1)
	2	social pressure is coming from news; however, it is not taken personal (NL2_0)
	3	talking about biodiversity in media has little impact (HU3_2.5)
	4	farmers' feeling of responsibility is triggered by media (UK3_3)
	5	farmers face complaints/exposure through social media (PT2_5)
B: Good management practices and considerations	6	no social pressure since much is already done in individual farm or region (UK4_0 // NL2_0)
	7	social pressure does not get too close since farmer already farms based on own settled, e.g. biodiversity, considerations (PT5_0)
	8	conservation of landscape mainly follows own considerations or is dedicated to local society (NL4_1)
	9	pressure triggers farmers' motivation to stay ahead (NL5_1)
	10	rather tries to pressure society than the opposite (SE1_0)
C: Society's understanding of biodiversity and farm management	11	no/little (ES3_0 // ES2_1 // ES5_1 // UK1_1) or relatively high (CH1_3 // CH3_3) social pressure since people have little or wrong understanding of biodiversity or farming and food production
	12	farmers need to take more responsibility but also improve communication to inform society about their work (UK3_3)
	13	image of farm biodiversity is either romanticized (society) or outdated (agricultural sector) leading to communication problems with potential for improvement (NL3_3)
	14	pressure to prove that farming is not detrimental for biodiversity as perceived by society (PT3_3)
	15	society tells and believes the narrative of farmers with intensive land causing the decline of biodiversity and, on the other hand, little is known about efficiency and practicability of measures in agriculture (CH4_3)
D: Market, demand and willingness to pay	16	pressure (HU1_1) and motivation (NL1_0-1) through growing demand for sustainable production
	17	necessity to consider society's demand for more biodiversity (CH5_3)
	18	need to adapt to new conditions (technology, markets, etc.) rather than stick to traditions (ES1_3)
	19	governmental recommendations come with little willingness to pay for improved biodiversity management (SE2_1)
	20	overall understanding for society's low willingness to pay for sustainable products (NL4_1)
	21	possibility to produce less and earn the same in case of higher willingness to pay for biodiversity-friendly products (RO2_5)
	22	compatibility of production and nature conservation with potentially growing demand for biodiversity-friendly products triggers motivation (NL1_0-1)
E: Society's social behavior/ thinking	23	pressure is implicit in everyday life and society (PT1_3)
	24	society has negative opinion towards farming (PT4_2)
	25	rising requirements towards farmers and participation in decision-processes (CH1_3)
	26	recently (e.g. since initiatives on pesticide reduction, also CH5_3), society shows more interest in agriculture, observes farming processes more closely, also potentially leading to wrong accusations, is more confronting or states their opinion when meeting farmers in everyday life, mainly holds agriculture responsible for current state of biodiversity or shows little respect for farmers' work (CH1_3 // CH2_3 // CH3_3)
	5	facing complaints/exposure through social media (PT2_5)
	27	in the future, society might think differently and pressure farmers more (UK5_2)
	28	appreciation of feeling pride for way of farming and receiving positive reactions from society/i.e. children (UK1_1)
F: Others	29	pressure (not defined any further) is motivating (EE1_3)

* *Individual farmers and their Likert scale ratings were indicated as follows with "HU2_1" serving as an example: HU is an abbreviation of the farmers' country of origin, 2 is an ID code randomly assigned to the farmer, 1 represents the score the farmer indicated on the Likert scale when rating the social pressure.*

5 Results from the expert consultations

In this chapter, the results from the expert consultations are portrayed. As outlined in 2.2., these expert consultations were conducted to complement the farmer interviews. In particular, the aim was to identify factors beyond the farm influencing farmers' biodiversity-related decision-making, such as transaction costs, consumer behaviour or sales strategies. Another aim was to elicit if the individual views provided by the interviewed farmers substantially differ from the public opinion in the EBAs and to describe potential differences.

5.1 Motivating and hindering factors regarding the implementation of biodiversity interventions

To elicit factors beyond the individual farms potentially influencing farmers' biodiversity-related decision-making, experts were asked to provide insights into pre-conditions in their EBAs potentially hindering or motivating pro-biodiversity management. The experts' answers were clustered content-wise. The generated clusters are portrayed and further illustrated through exemplary statements (either full sentences or parts) in Tables 11 and 12.

Motivating factors

The ***existence of (improved) financial subsidies or agri-environmental programs (factor m1)*** was mentioned most frequently by the experts as motivating factor. Non-surprisingly, numerous experts agree that farmers will be most motivated to implement biodiversity-friendly management practices if they are well-compensated. Whereas some respondents explained that compensation payments are highly motivating referring to already *existing* programs (e.g. NL1ex[7], PT2ex, RO1ex), others argue that, *in the future*, higher payments are needed to increase farmers' motivation (e.g.: ES3ex).

The motivating factor ranked second with regards to frequency of corresponding mentions comprises both ***promising production and marketing opportunities (factor m2)*** in the context of biodiversity management. Farmers might be motivated to earn money on alternative markets – either regarding their biodiversity-friendly products *per se* (e.g.: EE3ex, PT4ex), through certification approaches (UK6ex) or regarding additional income sources such as tourism (e.g.: EE3ex). Furthermore, if farmers can rely on a variety of both economically and environmentally reasonable practices (e.g. PT5ex), preferably similar to the ones implemented already (ES3ex), or might even be able to directly benefit from adapted production (e.g.: NL3ex, ES2ex, UK1ex), they are assumed to be more motivated to perform pro-biodiversity-behavior.

Considering the financial aspect included in both factor (1) and (2), these factors could be summarized as one overall-factor, namely "guaranteeing economic advantages/guarding against economic disadvantages arising from biodiversity management".

Factor m3 demonstrates that **availability of know-how** might also positively influence farmers' willingness to implement pro-biodiversity management practices. Summarizing the experts' statements, not only extension services as being mentioned by EE1ex, UK2ex and UK5ex, but also farmers themselves are relevant multiplicators of biodiversity-related knowledge (PT5ex, RO1ex). This needs to be considered wisely and carefully (UK2ex) when aiming to motivate pro-biodiversity farming. As a starting point, fundamental knowledge on the

[7] In this chapter, experts are coded as follows illustrated by means of NL1ex serving as an example: "NL" stands for the EBA the expert is relevant for, "1" is a number randomly assigned to the expert and "ex" stands for "expert" to differentiate them from the farmers interviewed (see chapter 4).

environmental impacts of farming is also essential (UK1ex). Looking at factor m6, implicit transfer of know-how, e.g. through various stakeholders such as neighbors, also might have the potential to reinforce farmers' pro-biodiversity management (PT2ex).

Deviant from the original task, i.e. the identification of motivating factors beyond the individual farm, several experts mentioned **farmers' intrinsic factors** as most or highly relevant (***factor m4***). This factor includes farmers' awareness and knowledge/interest (EE3ex, PT3ex, UK1ex), their ethical values (PT7ex) and attitudes (EE3ex). Additionally, respondents state that a long-established relationship between farmers and nature can act as motivating factors (NL2ex, SE1ex). For family farms, the feeling of responsibility towards the next generation might further reinforce farmers' willingness to implement biodiversity-friendly management practices (UK3ex).

Furthermore, ***motivation through society*** (***factor m5***) was mentioned by some experts as substantially influencing farmers' biodiversity-related decision-making. Motivation is assumed to potentially affect farmers' decision-making both positively or negatively. Farmers might, on the one hand, feel that their effort is appreciated by society (NL3ex) pushing them to reinforce their endeavors. On the other hand, however, they might perceive negative social pressure and, in consequence, feel urged to respond by demonstrating that the image which society has about farming is not correct (PT1ex, UK1ex). For further discussion on social pressure in the context of farmers' biodiversity-related decision-making, please see chapters 4.4.2 and 5.2.

In accordance with chapters 4.4.1 and 5.3, experts argue that ***various stakeholders*** might additionally affect farmers' biodiversity-related decision-making (***factor m6***). In particular, neighbors are mentioned as potential role models for biodiversity management who serve as highly relevant and, most important, *practical* information source (PT2ex). Similarly, peer farmers are assumed to contribute to farmers' increasing interest and ambitions in biodiversity management (UK1ex). Firm family relationships as mentioned by CH2ex, might further support pro-biodiversity management, potentially not only by deepening farmers' understanding of biodiversity. Firm family relationships might also reduce the perceived risk of biodiversity farming since the farmer feels backing even for non-traditional, i.e. pro-biodiversity, decisions.

Factor m7, finally, summarizes statements on the motivating effect of ***supporting policies and its ideal design***. Not only is policy perceived as now being more suitable to enhance farmers' pro-biodiversity behavior (ES2ex, also see RO1ex in factor m1). Also specific covenants (UK4ex) and clear management prescriptions (RO2ex) might be promising to increase farmers' pro-biodiversity motivations.

Table 11: Factors beyond the individual farms motivating farmers to implement biodiversity-friendly management practices; compiled by the authors, 2022.

Factors	Sources and exemplary statements
(m1) Exisiting/improved subsidies/ programs	EE1ex, EE3ex, EE4ex, HU1ex, HU2ex, NL1ex, NL3ex, PT1ex, PT2ex, PT4ex, PT5ex, PT6ex, RO1ex, RO2ex, RO3ex, ES1ex, ES3ex, ES4ex, SE3ex, CH1ex, CH2ex, CH3ex, UK3ex, UK4ex, UK5ex, UK6ex
	Economical support is the most motivating factor (HU1ex).
	The programs that exist for agricultural nature management are in fact the only concrete revenue model for biodiversity-friendly farming, so they are the main motivator […] (NL1ex).
	[…] More extreme interventions that affect production require financial support (NL3ex).
	CAP financial assistance is very important. The fact that farmers are used to only applying rules if they get an incentive makes CAP regulation essential in implementing biodiversity-friendly practices […] (PT2ex).
	The agri-environment payments […] have been very beneficial. All have been boosted by Romania's EU membership (RO1ex).
	[…] If there were more incentives to put up certain infrastructures, they [farmers] would be more inclined (ES3ex).
	The existence of contracts that guarantee the farmer higher payment for crops that are grown using biodiversity-friendly methods (SE3ex).
	Farmers cannot sustain themselves without subsidies and direct payments. Funding programs are major drivers to implement biodiversity-friendly farming and offer a solution to generate value. It is sad that the product alone is not able to generate value enough to get by (CH1ex).
	Being economically secured [...] fosters motivation for additional biodiversity-friendly efforts and promotes wholesome understanding. If they [farmers] can afford it, they are willing to try out "less efficient" management techniques. However, this requires a certain "company size" (CH2ex).
	Financial incentives (public and private), they [farmers] have to make a living at the end of the day […] (UK3ex).
(m2) Promising or viable production and market opportunities	*EE3ex, NL3ex, PT4ex, PT5ex, PT7ex, ES2ex, ES3ex, ES4ex, UK1ex, UK6ex*
	[…] Farmers can produce more ecological, organic products and it is possible to mix farming with nature tourism etc. (EE3ex).
	Financial and social appreciation of farmers' efforts, plus the own production benefits of some interventions, are the most important factors […] (NL3ex).
	[…] improved product quality with added value in the market […] (PT4ex).
	[…] The growing existence of viable alternatives (management practices) […] (PT5ex).
	[…] new technologies are helping a lot, both in terms of cost reduction and more precise and sustainable applications […] (ES2ex).
	Agronomic reasons, anything that is compatible with their way of working or farming, if it doesn't get in the way or hinder them, they don't oppose […] (ES3ex).
	Profitability. [Farmers] Don't need to farm every hectare […] (UK1ex).
	[…] And certification schemes that give a premium for biodiversity friendly farming, e.g. jordans, leaf, or organic (UK6ex).
(m3) Availability of know-how	*EE1ex, PT5ex, RO1ex, CH3ex, UK1ex, UK2ex, UK4ex, UK5ex*
	[…] better know-how from or new advisory center established […] (EE1ex)
	knowledge sharing between farmers […] (PT5ex)
	The […] best practice exchange projects have been very beneficial. All have been boosted by Romania's EU membership (RO1ex).
	[…] Data availability. Understand positive and negative env. impacts of farming (UK1ex).
	[…] Guidance and advice on biodiversity is important too, and farmers shouldn't have to keep paying for this (farm advisors are expensive). Having conflicting advice from different sources (as is often the case) confuses things (UK2ex).
	[…] having access to advisors - either agronomists, people in relevant trades (e.g. seed trade), or people in government (UK5ex)

(m4) farmers' intrinsic factors	*EE3ex, NL2ex, PT3ex, PT7ex, SE1ex, UK1ex, UK3ex*
	[…] Farmer's own awareness and attitudes […] (EE3ex).
	Mostly, it is the farmers who already have something to do with nature and who really get involved in it; they choose the difficult path, but they do not make themselves heard as much as the opponents, perhaps also because of shame or social aspects. They are less likely to take the stage. Intrinsic motivation is therefore the central motive. Those who have inherited nature from an early age are often more concerned with it themselves (NL2ex).
	Knowing that in the last 50 years the region has lost, on average, 5m of soil. The perception that soil maintenance is essential for the resilience of their farms (PT3ex).
	ethical values […] (PT7ex).
	He [the expert interviewed] feels that it's all about tapping into values such as ancestral connection to land, and how the land used to be farmed in a "better"/more sustainable way (SE1ex).
	[…] have an interest existing interest/knowledge […] (UK1ex)
	[…] Intrinsic motivation - they feel responsible for leaving the land to the next generation (UK3ex).
(m5) Motivation through society	*NL3ex, PT1ex, ES4ex, UK1ex*
	Financial and social appreciation of farmers' efforts, plus the own production benefits of some interventions, are the most important factors […] (NL3ex).
	[…] Due to the increase in social pressure on the sector, farmers increasingly feel the urge to demonstrate that they produce in a sustainable way (PT1ex).
	[…] Farmers fed up of negative press coverage. Farmers want to redress that view by representing wildlife-friendly farming to public […] (UK1ex).
(m6) Motivation through stakeholders	*PT2ex, CH2ex, UK1ex*
	[…] The example of neighbors is also essential here. Small farmers follow the example of their neighbors a lot, because they are able to perceive the good results, thus adopting the practices that work without running the risk of experimentation (PT2ex).
	Being […] in firm family relationships fosters motivation for additional biodiversity-friendly efforts and promotes wholesome understanding […] (CH2ex).
	[…] Clusters of farms support/develop these interests [existing interest/knowledge] - can almost be competitive over numbers of key wildlife on farm […] (UK1ex).
(m7)Supporting policy (design)	*RO2ex, ES2ex, UK4ex*
	clear management requirements […] (RO2ex)
	The policy has changed a lot […] (ES2ex).
	[…] covenants - directives over how the land is managed […] (UK4ex)

Hindering factors

Complementary to the prominent role of economic advantages in motivating farmers' pro-biodiversity behavior, ***economic disadvantages (factor h1)*** are the hindering factor most frequently mentioned during the expert consultations. Respondents particularly emphasize that farm holdings must be considered as enterprises which need to work efficiently, make profit out of their activities and also, naturally, aim for more agreeable livelihood which might be in contrast to biodiversity management (e.g.: HU2ex, NL1ex, NL2ex, SE1ex, UK5ex). Although biodiversity management could, especially in a long-term perspective (PT1ex), be a promising source of stable productivity, respondents state that specifically *small-scale* farms might be discouraged from farming in a biodiversity-friendly way due to economic reasons (e.g. HU2ex, RO4ex). Some respondents explicitly refer to weaknesses in the current agri-environmental policy, particularly regarding the payment level or too little financial resources to allow for broad participance of farmers (e.g. NL3ex, PT7ex). Unfavorable market conditions were further named as potential factors hindering the implementation of pro-biodiversity management (e.g. RO4ex, ES2ex, SE1ex). As not being able to keep up with the market and thus being potentially hindering for future implementation, traditional management practices, i.e. planting traditional varieties, were mentioned (e.g. PT3ex).

Factor h2 more specifically comprises ***difficulties regarding policy design and institutions involved,*** in contrast to factor h1 going beyond payment issues. Various experts mentioned high complexity, bureaucracy, work load and rigidity/strictness or little suitability of regulations as potentially being hindering for further implementation of biodiversity-friendly management practices, e.g. EE1ex, EE3ex, PT1ex, PT2ex, NL3ex, CH2ex, UK2ex, UK4ex, UK5ex. Some experts refer to problems occurring in farmers' interaction with coordinating institutions, either *per se* or as a consequence of rigid regulations (e.g.: EE1ex, UK4ex). The statement of UK2ex

sums up most of the statements' messages reflected in factor h2, i.e. "*farmers need more flexibility and to be trusted to make the right decisions*."

Whereas the number of farmers who once participated in or is still participating in agri-environmental programs is increasing (also see: NL3ex), ***low familiarity and embeddedness of biodiversity-friendly farming*** so far is still considered as a major factor hindering the implementation of pro-biodiversity management (***factor h3***). Traditional practices are still widely applied which farmers do not *perceive as necessary to change* or *do not want to change* (PT5ex, RO1ex, ES3ex).

Additional to the fact that some farmers are not familiar with or culturally inclined to biodiversity management (see factor h3), farmers foresee ***difficulties in or worry about future production*** (***factor h4***). On the one hand, reaching agreements between farmers and landowners on biodiversity management might be challenging (EE1ex). On the other hand, land use demands originating from multiple parties might hinder the establishment of further biodiversity areas (CH2ex) with farmers potentially worrying that their land is taken out of production (UK1ex). Additionally, farmers might see problems regarding increased workload (PT4ex) or lack of authorized alternatives, particularly regarding pesticides, fertilizers and herbicides (EE4ex, ES2ex).

From the first thoughts to the final implementation: ***Little information on biodiversity-friendly farming*** might also hinder pro-biodiversity management (***factor h5***). Farmers might have difficulties to access useful, site-specific information (PT3ex, PT5ex), especially with regards to more complex farm operations (UK1ex). As reasons for this, experts such as PT5ex, SE1ex and UK5ex mention a communication barrier between science and farmers, poor presentation of measures or a lack of convincing advisors.

Although social pressure was argued to have positive effects and might motivate some farmers to implement more biodiversity-friendly management practices before, little social recognition and ongoing criticism (ES4ex) might trigger the opposite, i.e. lower willingness to implement. For a more detailed discussion on social pressure, please see chapters 4.4.2 and 5.2.

Table 12: Factors beyond the individual farms hindering farmers to implement biodiversity-friendly management practices; compiled by the authors, 2022.

Factors	Sources and exemplary statements
(h1) Economic disadvantages	*EE3ex, HU1ex, HU2ex, NL1ex, NL2ex, NL3ex, PT1ex, PT3ex, PT4ex, PT5ex, PT6ex, PT7ex, RO1ex, RO2ex, RO3ex, RO4ex, ES2ex, ES4ex, SE1ex, SE3ex, CH1ex, CH2ex, UK6ex, UK1ex, UK5ex*
	[…] Farmers would like to have more for their own and for their families. Smaller farm owners are more financially restricted to do something for biodiversity (HU2ex).
	The most important limitation is the pricing of products: Farmers need to make profit, but they don't see the revenue model of nature in agriculture, and they are right on that: Intensive production […] make[s] the biggest profit [...] (NL1ex).
	[…] nature-friendly farming just doesn't earn enough reward, farmers don't see it in their income (NL2ex).
	The incentive policy for agricultural nature management is running into limited resources. As a result, there are waiting lists for interested participants [...] (NL3ex).
	Not having the financial support to make the transition. The lack of support that allows the farmer to cover financially the investment and short-term loss of productivity due to the application of biodiversity-friendly practices […] (PT1ex).
	Regarding the diversity of materials (olive trees varieties), traditional varieties are less productive, which prevents the diversification of exploited varieties […] (PT3ex).
	There is a lack of national and European incentive policies with lines of financing (PT7ex).
	The market conditions, it is cheaper to produce on a massive scale and so your possible profits are greater (RO4ex).
	[…] In addition, products from third countries that are not as strongly regulated enter the market, and they are harmed. Also cheaper labor, e.g. in Morocco (ES2ex).
	[…] Farmers need to make money to survive, and the whole economic system is set up in a way that encourages them to maximize productivity of the land. For example, in Sweden it is very expensive to employ someone […] which means that it makes more sense to use large machinery instead […] (SE1ex).
	Having applicable grant schemes which they can easily access. [...] here are also demotivated by the time to benefit ratio, e.g. one farmer said that their biodiversity management is 5% of their cashflow but takes up 20% of time. Grant schemes are not paying enough [...] (UK5ex).
(h2) difficulties regarding policy design and institutions involved	*EE1ex, PT1ex, PT2ex, EE3ex, NL3ex, RO2ex, ES1ex, CH1ex, UK2ex, UK4ex, UK5ex*
	Too much bureaucracy and problems with [coordinating/paying institution] in Estonia […] (EE1ex).
	Too strict, but clear regulation and too small aids. Management of semi-natural habitats in protected areas could be more flexible (EE3ex).
	[…] Complex, time-consuming and non-centralized bureaucratic processes (PT1ex).
	Complex and dispersed legislation, often difficult to understand. There is too much and too complex bureaucracy. The European Union's agricultural policies are increasingly complex and the farmer does not want to waste time on these issues. Legislation should be straightforward (PT2ex).
	[…] restrictive regulations in particular make it difficult to do more nowadays (NL3ex).
	[…] The design of the regulations and requirements: they are all standardized and applicable to all businesses and localities likewise. Everybody is being offered the same subsidies if they fulfill certain requirements, regardless of whether they are full time farmers or just amateur gardeners. It doesn't matter if they live in the Swiss lowlands or in remote alps. Nobody is allowed to be better off or privileged. This creates a very competitive environment […] (CH2ex).
	The public incentive schemes that pay for things like flower margins are too specific. Farmers need more flexibility and to be trusted to make the right decisions (UK2ex).
	Big factor is 'irrationalities' in AES prescriptions. while they think that biodiversity is very important, they see the rules that are restrictive and this doesn't make sense. leads to frustration with [involved institutions] (UK4ex).
	Having applicable grant schemes which they can easily access. The way that grant schemes are currently administered is an issue because it is very inflexible. There are strong financial penalties for not following strict rules, and farming is a fluid and complex system so this limits what farmers can do. This [is] why many farmers exit schemes [...] (UK5ex).
(h3) low familiarity and embeddedness of biodiversity-friendly farming	*NL3ex, PT5ex, RO1ex, ES3ex, CH3ex*
	[…] There used to be unfamiliarity with such policies, but this is decreasing, especially among the younger generation […] (NL3ex).
	[…] There is also the factor of tradition (traditional way of doing things) that is difficult to change. Additionally, farmers do not seek change when they feel that everything is going well […] (PT5ex).
	They are very confident in traditional practices (which are not always beneficial), they are not very open to practices that derive from science […] (RO1ex).
	Cultural ones: the farmer tries to make his crop profitable, to do things well, optimising the means of production, but biodiversity does not enter into this equation. Culturally it is not yet in, they do not perceive the economic aspects of it, biodiversity is not yet something that is necessary (ES3ex).

Factors	Sources and exemplary statements
(h4) difficulties or worries regarding production	*EE1ex, CH1ex, UK1ex, EE4ex, ES2ex, UK3ex, PT4ex*
	[…] Complications with land lease: it may be too expensive or just difficult to reach reasonable agreement between farmers and landowners (EE1ex).
	[...] A general problem is that biodiversity itself requires too much area: There is limited land available but all stakeholders claim it for their own purpose - recreation in nature, renaturalization, residence, forests, eco-areas... all claim the land that is also required for food production. In fact, there is no need for MORE biodiversity area, but rather better or more wholesome area [CH1ex].
	Worry that they would take land out of production […] (UK1ex).
	This may be due to the use of pesticides and fertilizers. The prizes are too high and if a product (some specific pesticides) is banned from the market, there are no alternatives in the tender (EE4ex).
	[...] For example, there is now a war on glyphosate. They are removing products from the market that do not yet have substitutes, which complicates management a lot […] (ES2ex).
	Worry about increasing pests (UK3ex).
	Internal factors ([…] lack of human resources, time taken to obtain evidence of the improvement caused by biodiversity) discourage farmer more than external factors (PT4ex).
(h5) little information on biodiversity-friendly farming	*PT3ex, PT5ex, SE1ex, UK1ex, UK5ex*
	[…] In general, farmers find difficulties to access reliable information about practices suited to their farms characteristics (soil type, humidity...) (PT3ex).
	[...] Often, there is no scientific support to define, in a given agricultural system, what is biodiversity-friendly. […] Difficulties to access knowledge. Often the information does not reach the farmers or when it does, it is not perceived as useful [PT5ex].
	[…] But we also shouldn't underestimate what farmers are sometimes willing to do without being paid for it. i.e. If they really understand the benefits of a particular measure, and/or if it can be presented in a way that really connects with them, then they are often very willing [SE1ex].
	[…] Lack of knowledge and lack of skills of ecological management. Particularly the more complex management. Very few have detailed ecological/biodiversity knowledge. Lack of large, landscape scale ecological knowledge (UK1ex).
	[…] There is also a lack of good advisors who can motivate them to do things they dont want to do. There are some good advisors, but they can be expensive which hinders farmers getting advice (UK5ex).
(h6) Challenges in social environ-	*ES4ex*
	Especially when it is not recognized from an economic or social point of view. For example, […] also environmental NGOs, criticize us and point their fingers at us, from certain sectors, who see us as evil […] (ES4ex).

5.2 Social pressure and its effect on farmers' biodiversity-related decision-making

Analogous to the assessment on public pressure carried out with farmers as reported in 4.5, also experts were asked to assess public pressure on farmers' biodiversity-related decision-making. Whereas the assessment with farmers is supposed to reflect their very personal view, the expert assessment is supposed to provide insights potentially portraying the EBA farmers' views and farming context more generally.

In a first step, experts rated the social pressure on a Likert scale from "0" (no pressure at all) to "4" (extreme pressure). The results of the expert assessment are graphically shown in Figure 21 and Figure 22. To complement, measures of central tendency were calculated. Both illustrations and calculations indicate that social pressure is, considering that a rating of "2" can be interpreted as the neutral middle, perceived as relatively week with a mean of 1.591, a mode of 1 and a median of 1.

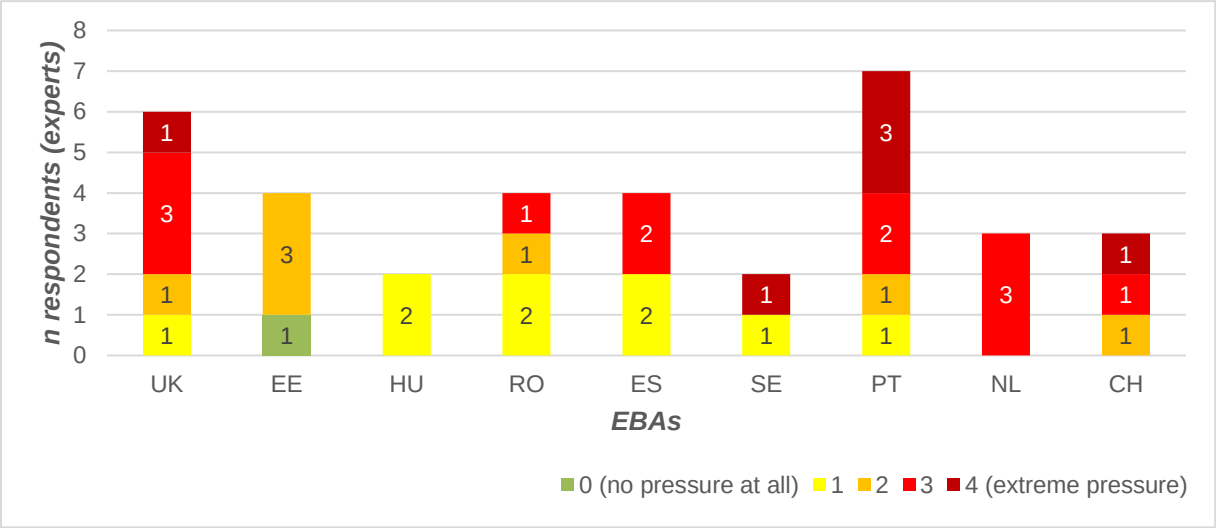

Figure 21: Perceived social pressure by experts, clustered by EBAs countries (n = 35); compiled by the authors, 2022.

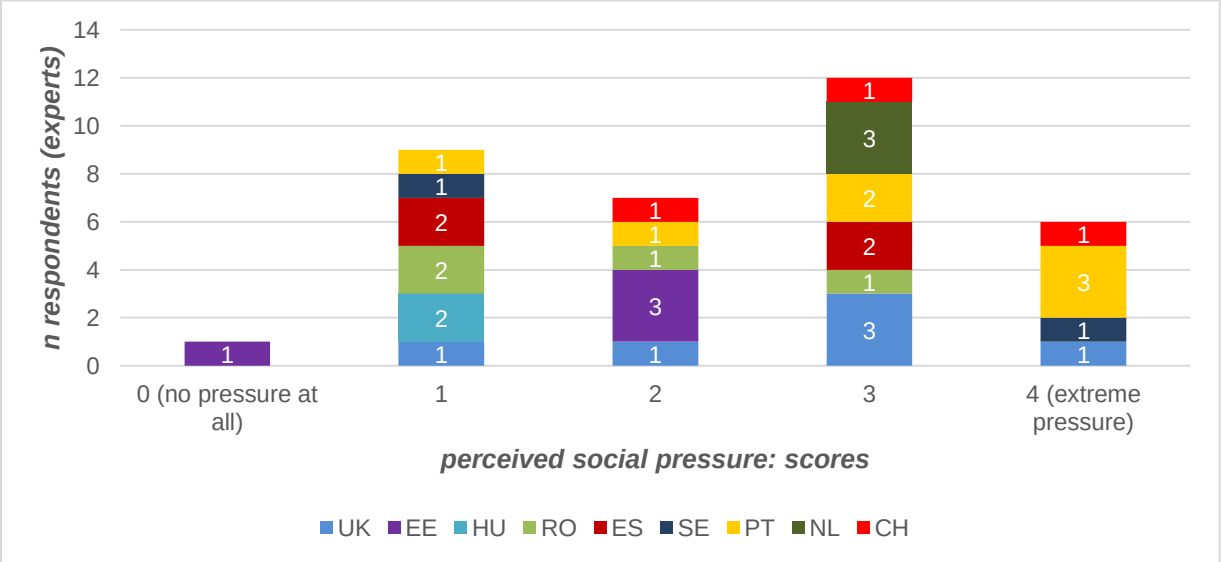

Figure 22: Perceived social pressure by experts, clustered by scores (n = 35); compiled by the authors, 2022.

By means of a qualitative follow-up question, experts were, in a second step, asked to provide further details on the kind of pressure that farmers are exposed to. The findings to this question are outlined below with exemplary statements of respondents illustrating the messages.

The majority of respondents mentioned pressure from ***society as a whole*** as highly relevant or did not define the source of pressure more precisely. Generally bad perception towards agriculture in general or more specifically towards conventional as well as livestock farming, potentially reinforced through society's little knowledge of farming or a lack of scientifically sound arguments, were listed as one major problem (PT1ex_4[8]; PT2ex_3; PT3ex_3; PT5ex_1; PT6ex_4; UK5ex_2; UK6ex_1). This problem, for example, is described by PT1ex_4: "*Farmers feel that society has a very negative opinion and is out of touch with reality* […]." The perception that, currently, "*nutrition is trendy* (CH1ex_4)" additionally leads to strong pressure to provide more organic, vegan and healthy food (ES2ex_3; SE1ex_1) as well as to more social and political debates (CH1ex_4). Whereas on the one hand, a lack of understanding is criticized, more information is available on the other hand which induces society to "*telling farmers what to do* (UK1ex_3)". Generally, but especially with regards to livestock farming (UK5ex_2, farmers might also feel exposed to guilt tripping as mentioned by UK4ex_4 and UK2ex_3. Accordingly, one expert stated that livestock farming is not fashionable anymore, which, especially for young people [farmers], is an issue (RO1ex_3). Interestingly, two experts mentioned that society is not pressurizing generally but punctually, e.g. responding to certain actions such as cutting of hedges (CH3ex_2) or focusing on one problem instead of being holistic. The latter aspect was described by SE1ex_1 by means of the following statement: "*Often it is about one issue at a time rather than being holistic – e.g. such as "don't kill bees", without considering any of the other species affected.*" Due to the high power of society's pressure, experts claim that the government is inclined to adapt policy making correspondingly (PT1ex_4; PT6ex_4), partly in an irrational way (PT6ex_4). As described by PT6ex_4, a lack of rewards for good biodiversity behavior intensifies negative social pressure: "*There is a feeling of injustice. Farmers are criticized for the problems they eventually cause, but they are never rewarded for other services they provide* […] (PT6ex_4)". This is also supported by SE3ex_4 regretting little compensation more generally. The COVID-19 crisis, however, might have changed the situation since the public has now discovered farmers' important role in society (ES4ex_1). Overall, one expert (PT4ex_2) states that farmers might feel more pressure than there actually is.

Pressure from the side of, nom specifically mentioned, ***consumers/buyers*** was frequently mentioned to manifest through new demand patterns. Consumers are assumed to now make different consumption choices with a strong focus on healthy, sustainable, often organic products (RO3ex_2; RO4ex_1; ES1ex_3) (also see the statement "*nutrition is trendy*" above referring to society more generally). Demand is not only considered regionally, but especially internationally (ES1ex_3). Due to new demand patterns, farmers might feel more obliged or motivated to produce in a different way (PT7ex_4; RO3ex_2; ES1ex_3) as summarized by RO3ex_2: "*Often people want to eat healthier foods and they seek the bio alternatives to conventional farm products, this motivates the farmers to increase their endeavors to produce such products*." Social pressure might also be exerted through ***buyers*** as a reaction to society's pressure which they pass on to farmers (ES3ex_1). ***Super markets*** as intermediaries are also perceived to become more and more demanding (ES2ex_3).

State institutions as more indirect actors in the context of *social* pressure were not only mentioned by PT1ex_4 and PT6ex_4 as reacting to publics' perceptions and being involved in more political discourses (CH3ex_2) (see first paragraph). State institutions are generally assumed to exert pressure (RO2ex_1), e.g. through more and more demanding legislation, especially with regards to EU institutions (ES2ex_3; ES4ex_1) or as control bodies (EE4ex_2).

[8] Additional to the coding applied in the previous sub-chapters, the number postponed refers to the rating on social pressure indicated by the corresponding expert. E.g., PT1ex indicated that social pressure is 4 ("extreme").

Landowners might also set their own rules for land management (EE4ex_2) which, albeit not being official legislation, might force farmers to change management.

Citizens' associations and nature organizations as well as ***lobby groups*** are further perceived as highly pressurizing (EE3ex_2; UK2ex_3; UK5ex_2), especially in the field of livestock farming (UK5ex_2), and due to guilt tripping they are also assumed to exert on farmers (UK2ex_3). ***Tourism*** seems to essentially reinforce social pressure, at least in some EBAs such as in Hungary (HU2ex_1) or in the Netherlands where a diverse landscape is a prerequisite for touristic activities and hinders farmers from expansion (NL1ex_3; NL2ex_3; NL3ex_3). A statement by NL2ex_3 shall illustrate: *It [social pressure] is big because there is a lot of recreation, and those people [tourists] do not come for large-scale cultivation.*" Lastly, social pressure might be also exerted through direct, personal contact with the ***community*** (HU1ex_1; NL2ex_3; UK5ex_2), e.g. through low community support in general (UK5ex, 2) or neighbors and new residents (NL2ex_3). Since, in consequence, less and less farm land is available with, at the same time, rising demands for pro-biodiversity areas, a non-ideal organization of the agricultural sector is claimed by CH2ex_3 also criticizing that farmers' interests are not sufficiently represented.

5.3 Stakeholders' effect on farmers' biodiversity-related decision-making

Again, analogous to the effect assessment carried out with farmers as portrayed in 4.4.2, also experts were asked to assess the effect various stakeholders along the agricultural value chain exert on farmers' biodiversity-related decision-making. Additional to the assessment with farmers supposed to reflect their very personal view, also this expert assessment is supposed to provide insights potentially reflecting the EBA farmers' views and context more generally.

The results of the experts' assessment are shown in Figure 23. Figure 23 is structured according to the multiple groups of stakeholders (grey boxes) which the experts were asked to rate as having a "*positive effect*", a "*negative effect*", both "*positive AND negative effect*" or "*no effect*". To avoid uninformed ratings, a fifth category, "*I don't know*", was included. These categories are represented by the five pillars in each grey box.

Looking at each group of stakeholders considered, i.e. at each grey box, separately, predominant pillars indicate that the majority of experts chose the corresponding rating. This means that a certain group of stakeholders is perceived widely similarly among the experts consulted. Predominant ratings indicating a tendentially positive effect on farmers' biodiversity-related decision-making can be found for *researchers* (22/35 ratings "positive"), *farm advisors* (21/35 ratings "positive"), *producer organizations* (18/35 ratings "positive") and *people in the social environment* (16/35 ratings "positive"). Predominantly negative effects are only assigned to the *fertilizer* (12/35 ratings "negative") and *crop protection suppliers* (15/35 ratings "negative"). The *governmental bodies* (22/35 ratings "positive AND negative"), *other farmers* (19/35 ratings "positive AND negative"), *bulk buyers* (13/35 ratings "positive AND negative") as well as *direct buyers/end-consumers* (16/35 ratings "positive AND negative") and *people in general* (21/35 ratings "positive AND negative") were mainly rated as having both positive and negative effects. No stakeholder was predominantly rated as having "*no effect*".

In comparison with farmers' effect ratings (chapter 4.4.1), several similarities can be observed: In both assessment, *researchers* received best ratings which indicate relatively strong positive effects on farmers' biodiversity-related decision-making. This, widely, also holds true for the *farm advisors, people in the social environment* and *producer organizations*. In contrast, *direct buyers'/end-consumers'* effects were rated more positively by the farmers. This could either originate from the sample bias and the above-average interaction between respondents and society as explained in 4.5. Alternatively, experts interviewed might not have sufficient insights into farmers' relationship with their consumers or rather distrust this relationship. In both, i.e. farmers' and experts' ratings, *fertilizer* and *crop protection suppliers* received the least positive ratings.

Still, farmers' average ratings are relatively positive or moderate for several stakeholders whereas clearer negative rating trends can be observed in the experts' average ratings. Again, the potential pro-biodiversity bias in the farmer sample as described above might help to explain: Whereas farmers interviewed might generally be more receptive to pro-biodiversity suggestions, the experts try to represent the view of "average" farmers who might, in this context, be more suspicious. Since the methods of assessing the effects differ, however, ratings cannot be compared directly, in particular quantitatively. Again, and as discussed above, also comparability between stakeholders/groups of stakeholders across EBAs is limited due to different roles they potentially play in different EBAs/countries.

In spite of limited comparability, both assessments independently lead to two convergent findings which allow the following conclusions:

- *Researchers* and *farm advisors* might have substantially positive effects on farmers' biodiversity-related decision-making. Involving them in policy or initiative design potentially helps to motivate farmers to implement corresponding biodiversity management practices. In consequence, this might contribute to improved biodiversity outcomes.

Private *farm input suppliers*, particularly for fertilizer and crop protection products, might have least positive or partly even negative effects on farmer' biodiversity-related decision-making. To improve farmers' biodiversity endeavours, investigating reasons explaining this non-desirable effect and elaborating approaches to improve, such as awareness-rising among these stakeholders, might hold substantial potential in the long term.

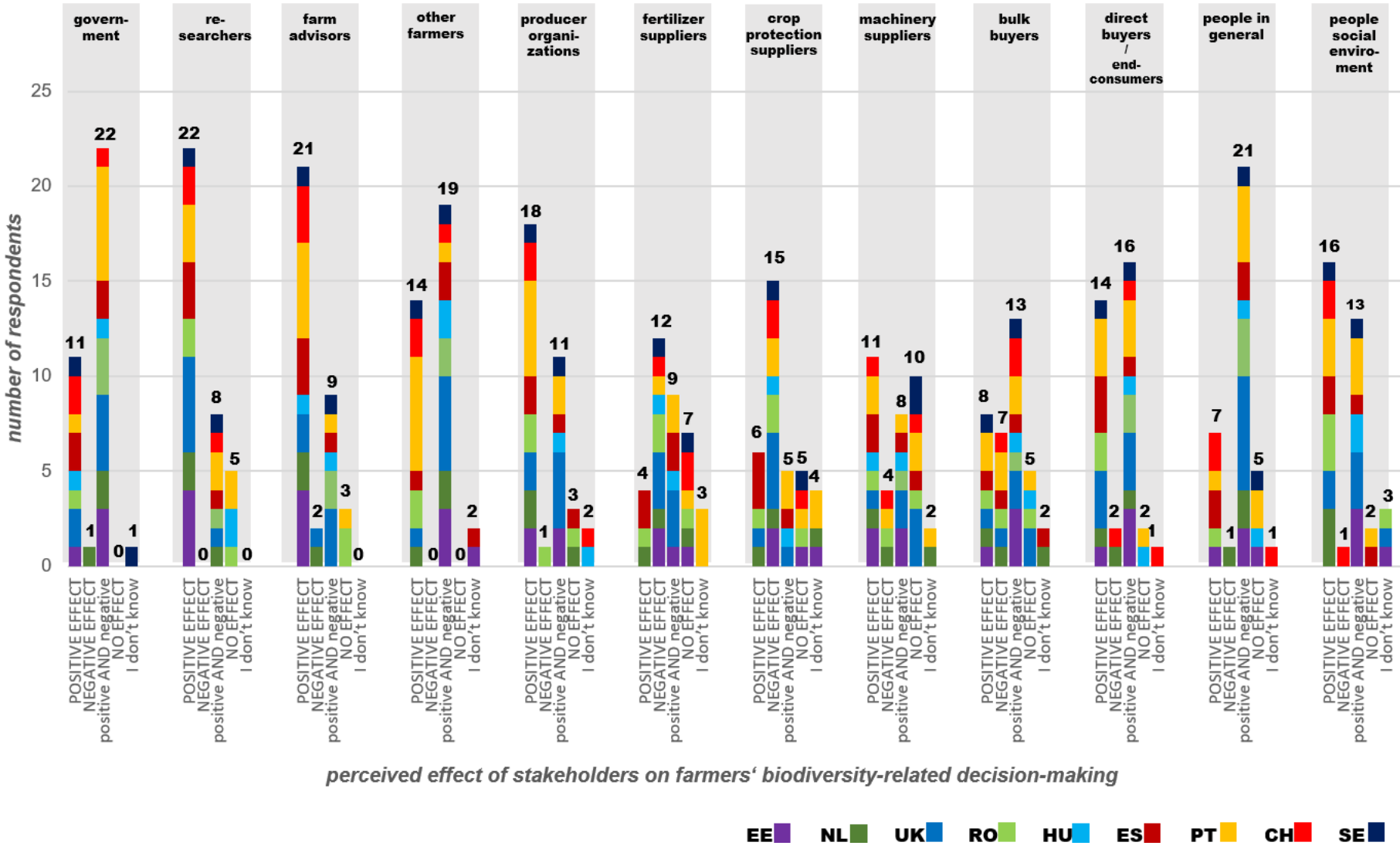

Figure 23: Experts' assessment of the effect on farmers' biodiversity-related decision-making exerted by multiple stakeholders (n = 35); compiled by the authors, 2022.

6 Outlook on further use of Deliverable 2.2 for scientific analyses

Deliverable D2.2 is the first deliverable of the SHOWCASE project which provides deeper insights into the agricultural context of the SHOWCASE EBA regions and, exemplary, into the general implementation of biodiversity interventions and the related system of incentives and regulatory frameworks in the EBAs. For all operational Showcase Workpackages (WP1, WP2, WP3), the deliverable provides EBA specific information on the challenges and chances of integrating biodiversity interventions into the business design of the farmers, and on the flexibilities and limits of the farmers, to step into incentive approaches to foster implementation.

Moreover, the Deliverable will be particularly used as a basis for elaborating the further elements of WP2. Here, the results of deliverable D2.2 have will directly support WP2 in providing a basis for the development of the surveys of tasks T2.3 and T2.4: In T2.3, the review will deliver major inputs for preparing the survey on farmers' attitude. For T2.4, particularly the information gathered on the design features of instruments to support the implementation of biodiversity interventions will be crucial to design the choice model on optimal incentive schemes and incentive mixes. For T2.5, but also for T2.8, the deliverable delivers the first in-depth information of incentive implementation, which will be used for the development of the models to determine the costs, the benefits and the acceptance of an implementation of incentives for biodiversity-friendly management. For T2.6, particularly the information gathered on the farmers' attitude towards self-monitoring will deliver important insights. For Task 2.9, the deliverable provides important information on the relevant stakeholders in the individual EBA regions and their importance as regards farmers' decision making. Also, for T2.9 (and also the related Task 1.5) the deliverable gives important hints on the development of sound and acceptable KPIs.

Last but not least, the Deliverable will, together with the results of the single WP2 tasks, be used as one basis for the project's development of policy recommendations on the design, combination and implementation of regulatory instruments as well as private and public incentives in Task T4.7.

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