BESTMAP
BEHAVIOURAL, ECOLOGICAL & SOCIO-ECONOMIC TOOLS FOR MODELLING AGRICULTURAL POLICY

Summaries of data, obstacles and challenges from interview campaigns

Deliverable 3.4

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BESTMAP

Behavioural, Ecological and Socio-economic Tools for Modelling Agricultural Policy

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Preface

This deliverable presents a *Summaries of data, obstacles and challenges from interview campaigns* of the H2020 BESTMAP project. It aims at documenting the BESTMAP interview campaigns carried out to obtain data on farmers' decision-making with regard to agri-environmental schemes (AES). It covers a detailed description of methodology, reporting on the concrete steps taken to collect and analyze interview data. It also discusses obstacles and challenges to BESTMAP interview campaigns. Finally, the deliverable presents the main qualitative and quantitative findings of the interview analysis, with a focus on qualitative content analysis of open interview questions.

Summary

The methodology section first describes in detail the processes of data collection. Following an exploratory qualitative research design, theoretical sampling based on farmer profiles and environmental zones is explained and the overall sample characterized. Data processing according to the General Data Protection Regulation (GDPR) and data gaps are discussed. Second, the methodology section documents the approach for the qualitative and quantitative data analysis. Qualitative analysis used Qualitative Content Analysis as a method, quantitative analysis used descriptive statistics, following an exploratory data analysis approach. The interview analysis guidelines with a detailed methodological description of qualitative analysis are included as Appendix 1.

The section on obstacles and challenges highlights three aspects. First, access to the research field is discussed, covering the problem of a very limited time period in which farmers were available for interviews, as well as organizational issues related to spontaneous changes to original interview appointments. Most importantly, the impacts of the COVID-19 pandemic on all five case studies is described. All BESTMAP interview campaigns had to adapt to rapidly changing political and legal conditions in the midst of the empirical phase of data collection. This required most interview teams to switch from face-to-face to telephone interviews.

The result section presents overarching and case study specific results of qualitative content analysis. As overarching results, a general qualitative evaluation of the relative importance of economic, ecological and social factors is presented, followed by a discussion of decision-making factors relevant in all case studies, which are economic benefit from AES, fit with established farm practices, soil quality and inflexibility of AES. In some case studies, a lack of knowledge about AES, past experience with AES, the tenant-owner relationship, external influence on AES outcome, automatization of AES placement on land, duration of AES / duration of lease contracts and corruption play a role. Following these overarching results, case study specific reasons for and against farmers' AES participation are described. Finally, a brief summary of the main results from ongoing statistical analysis is presented. These complement the qualitative results and confirm some of the main findings.

1 Methodology

BESTMAP interview campaigns were aimed at empirical data collection from farmers in the five case study (CS) regions in the United Kingdom (UK, Humber), Spain (ES, Catalonia), Czech Republic (CZ, South Moravia), Germany (DE, Mulde) and Serbia (RS, Backa). Both, qualitative (non-standardized) and quantitative (standardized) data were collected in order to identify potential key factors for farmers' decision-making on agri-environmental schemes (AES). Furthermore, data collection was designed to inform agent-based models about relevant elements to be integrated into the model set-up and provide empirical input to the development of envisioned Farming System Archetypes (FSAs).

Given the early stage of the project and the need to generate hypotheses for further analysis, emphasis was put on an open, exploratory research design. Data was obtained via **semi-structured face-to-face interviews** that consisted of two parts: 1) a *qualitative interview*, based on an interview protocol, 2) a *questionnaire*, to be filled in by interviewees on their own (yet supported by interviewers, if needed).

1) Semi structured interviews enabled an in-depth dialogue about farmers' decisions on AES and their practical experiences and needs, whereas 2) the questionnaire served as an efficient way to collect demographic data as well as information on farm characteristics and farmers' attitudes towards AES. The focus of the qualitative interview was on open questions, the focus of the questionnaire was on closed questions (mostly using quantitative scales and answer categories).

The semi-structured interview protocol as well as the questionnaire were developed jointly by BESTMAP researchers, taking into account overarching project objectives, such as insights in behavioural and socio-economic aspects of AES adoption, and CS-specific circumstances. However, the main purpose of the protocol was to make sure that interview data would be comparable across CS. It covered open questions on the farmer's background, attitudes towards farming, reflection on ecological aspects and especially the motivation to apply, or not apply, for AES. The questionnaire covered background information on the farm, information on environmentally sustainable practices, concrete experiences with two selected AES most common in the respective CS, motivation to apply for AES and opinions on the EU's Common Agricultural Policy in general. The interview protocol with questions and instructions used for farmer interviews has already been provided in D1.3 "Guidelines and protocols harmonizing activities across case studies".

In order to prepare CS interviewers for their task, a one-day interviewer workshop with briefings and practical exercises was held at UFZ Leipzig in October 2019. In addition, interviewer guidelines were provided to be used by all CS. They included both information on how to practically conduct qualitative interviews and information on interview data analysis. Thus, they served as instructions for local CS teams to carry out the interview campaigns and subsequent data analysis in a consistent manner. The interview analysis guidelines with a detailed methodological description are included as Appendix 1.

1.1 Data collection

1.1.1 Selection of interviewees

Generally, only farmers with decision-making capacity should be selected (farm staff deciding on AES participation or non-participation). In order to select interviewees based on more detailed criteria, the BESTMAP project team decided to use **environmental zones (EnZ) or strata (EnS)** in combination with theoretical **farmer profiles** as a basis for sampling. EnS provide a stratification of the European biogeophysical environment and are related to agronomic variables, such as growing season. Groups of farmers were selected from each CS environmental context based on those profiles. Figure 1 depicts the spatial stratification of CS according to those contexts.

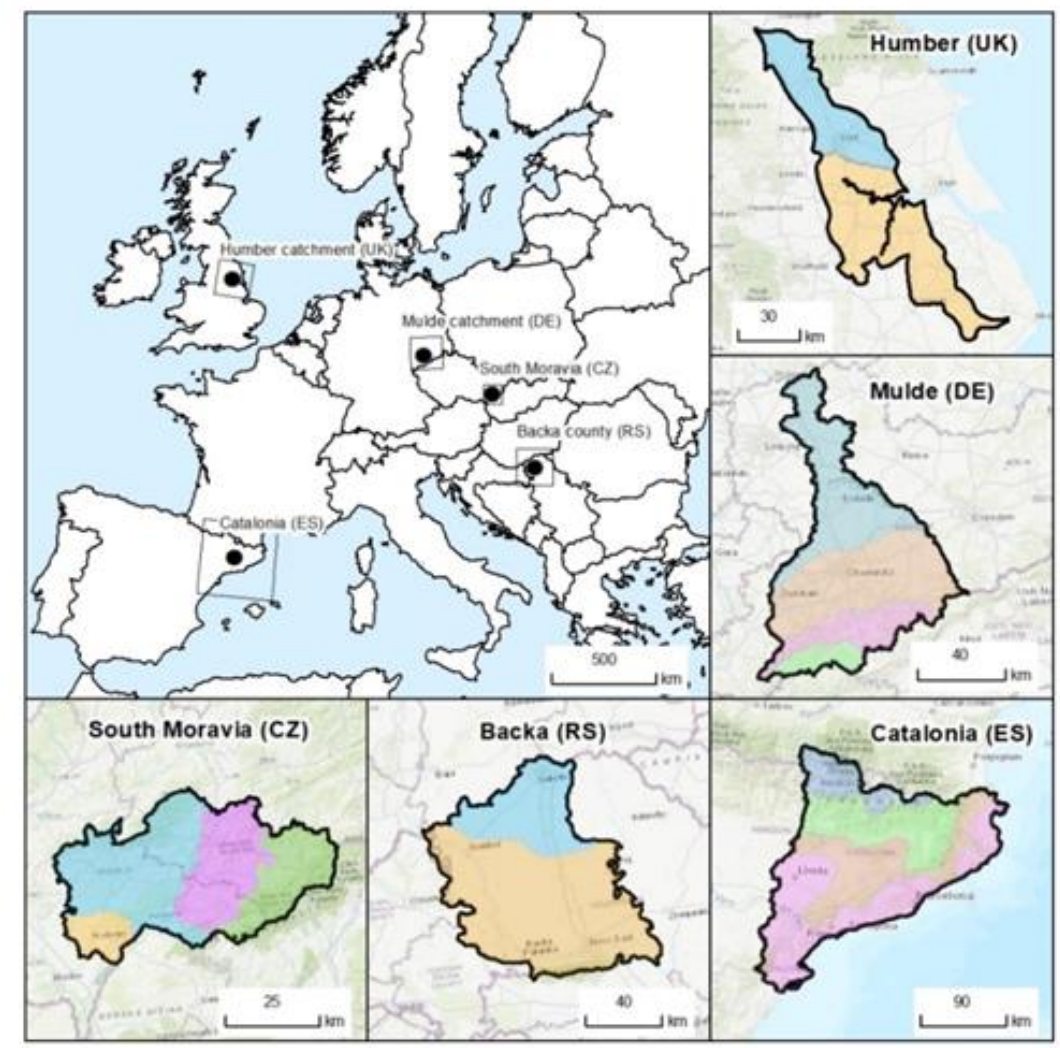

Figure 1: BESTMAP case study areas, stratified into environmental strata (UK, DE, CZ and RS) and environmental zones (ES)

The sampling aimed at **combining environmental strata/zones with farmer profiles**, considered to serve as *proto-FSAs*. Interviewees should represent four different profiles: 1) Non-professional; non-profit; hobby farmers, 2) Professional independent - field crops/arable farmers, 3) Professional independent - meat/dairy livestock farmers, 4) Company/co-operative appointed managers. Each CS consisted of 8-16 proto-FSAs (2-4 EnS/EnZ * 4 farmer profiles). 1-3 farmers should be selected from each proto-FSA, leading to an envisioned total of ~ 25-30 interviews per CS.

Prior to the interview data collection phase, however, the CS teams acknowledged that not every farmer profile might be found in every region. Interviewers also acknowledged that other potentially relevant factors were excluded by using the proposed sampling strategy, such as farmers' age, farm size or the distinction between owners and tenants. BESTMAP researchers expected farmer profiles and environmental context to be more important. However, the BESTMAP project team identified additional factors based on literature and previous research projects that should be considered by CS interviewers for interviewee selection. These were the distinction between organic and conventional farming, gender, and farmers' previous participation in AES. Sampling for CS interview campaigns aimed at a balance with regard to those categories.

1.1.2 Contacting interviewees

CS interviewers approached interviewees via mail, email and via relevant stakeholder groups such as local or regional farmers' associations, administrative staff, conservation associations, environmental protection agencies or organisations (see acknowledgments). In some cases, BESTMAP researchers attended agricultural events hosted by farmers' associations in order to present the project and ask for dissemination of information and advertise participation in the interview campaign. Furthermore, the involved BESTMAP research institutions benefitted from contacts to colleagues involved in similar research projects and contacts to farmers established in previous studies related to issues of agriculture and sustainability. Usually, a first contact was established in written form (providing basic information), followed by a phone call during which interviewers explained the details of the interview and made an interview appointment.

At the end of the interviews in some CS, interviewers asked participants about peer farmers or contact persons who also could be interested in participating or establishing further contacts. The map with CS areas depicted in Figure 1 helped interviewers to ask farmers about other farms in specific environmental zones/strata. Thus, a 'snowballing' approach, common in exploratory qualitative social research, was used as well. Typical challenges with regard to access to the research field are described in chapter 2.1.

1.1.3 Data processing

Interviews were conducted face-to-face at farmers' homes, in farm office buildings or similar sites chosen by participants. Regularly, one interviewer and one interviewee were involved. Some CS decided to divide labour between two interviewers. Interviewees were informed that only one person should be interviewed, in order to be able to clearly attribute statements to an individual decision-maker and to avoid having too many voices on the audio recording. However, in some cases, interviewers were confronted with two interviewees without prior notice (see chapter 2.2). For example, this could happen in case of family farms in which members decide together, or in case of large farms in which an AES decision-maker brought along a colleague who is solely in charge of processing all the farm's bureaucratic tasks.

Interviewees were introduced to the project and interview objectives orally and in written form and received an engagement consent form prior to the interview. Each CS interview team ensured compliance with the GDPR and received approval from their institution's ethics committee. All interviews were audio-recorded, transcribed and anonymized. All documents

and audio recordings were stored safely on a secure drive (for digital records) or locked safe (for physical records). Personal data were stored separately from anonymized data.

In order to facilitate qualitative analysis and document context information, a short report was completed after each interview, elaborating on the course of the conversation, potential disruptions, and relevant aspects which emerged off records. Moreover, each CS produced an overview of the interview campaign following standardized guidelines.

1.1.4 Sample Overview

Across all case studies, 124 interviews were conducted in the period January – May 2020. Sample sizes vary from 14 (DE) to 47 (ES) interviews. Table 1 gives an overview of the most important sample characteristics.

Table 1: Overview on interview sample (n=124)

Case Study	**DE**	**CZ**	**RS**	**ES**	**UK**	Total
Number of interviews	14	22	25	47	16	124
Farmer profiles*						
NP	1	3	4	9	2	19
PC	3	5	12	11	7	38
PL	1	0	0	19	2	22
CO	7	12	4	8	4	35
PCPL	2	2	5	**	1	10
AES participation						
Participants	11	21	0	31	9	72
Non-Participants	3	1	25	16	7	52
Conventional / organic farming						

Conventional	11	13	21	26	15	86
Organic	3	9	4	19	1	36
Integrated	0	0	0	2	0	2
Gender ratio						
Female	3	2	2	17	3	27
Male	11	20	23	30	13	97
Diverse	0	0	0	0	0	0

*NP - Non-professional; non-profit; hobby farmers; PC - Professional independent - field crops/arable farmers; PL - Professional independent - meat/dairy livestock farmers; CO - Company/co-operative appointed managers; PCPL - mixed field crops and livestock (ad hoc category introduced during the research process)
** ES did not apply PCPL category

1.1.5 Data gaps and limitations

Due to specific characteristics of CS regions, limited resources and methodological challenges caused by COVID-19 restrictions (see chapter 2.3), the overall interview sample exhibits gaps that need to be considered when interpreting the results. All CS faced challenges to realize a balanced sample as was foreseen according to the sampling strategy outlined in chapter 1.1.1. CS reported the following limitations to their respective samples:

- DE: Only two out of four environmental strata could be covered (the missing two are located in the South of the CS area, with much less agricultural activity); NP and PL farmer profile categories underrepresented
- CZ: NP and PL farmer profile categories underrepresented (hobby farmers receiving AES subsidies do not exist in the CS area; PL category is very rare without PC)
- ES: Integrated production underrepresented
- UK: PL farmer profile category with and without AES and CO category with no AES from one of two environmental zones underrepresented
- RS: PL farmer profile category was not covered, because meat/dairy farmers usually also produce feed crops, five farmers from PCPL category were interviewed instead; AES do not exist in Serbia, so only non-participants could be interviewed

In three CS (DE, CZ, ES), AES participants were overrepresented in the samples compared to non-participants. The UK sample was rather balanced in this regard. Serbia is a special case in that no AES exist at all. Therefore, AES-related questions needed to be asked hypothetically and the sample consists of non-participants only. Except for CZ and ES, most samples had a rather small share of organic farmers. In addition, there is a gender bias in the data, since mostly male farmers were interviewed.

1.2 Data analysis

1.2.1 Qualitative analysis

As described in chapter 1.1, qualitative data were collected via exploratory qualitative interviews based on a semi-structured interview protocol. The focus was on open questions which should stimulate reflections on farming, decision-making and AES and enabled a conversation between interviewer and interviewee. The audio recordings were subsequently transcribed and anonymized. The results were unstructured data in the form of interview transcripts.

The challenges for the analysis of this kind of qualitative data for the BESTMAP interview campaigns were 1) the large amount of unstructured qualitative data, 2) the highly context-specific character of this empirical material which requires interpretation, 3) the different languages across CS, 4) the pragmatic need to divide some steps of analysis between CS teams, and 5) the time and resource constraints for this task. **Qualitative content analysis** (Schreier 2012) was chosen as an analysis method for the qualitative part (open questions) of the interviews. The interview analysis team decided to use computer-assisted qualitative data analysis software (CAQDAS, see Paulus et al. 2014) to ensure sensible data management and analysis. The interview team checked commercial and free software to find a compromise between functionality, cost and easy user interface and chose the software **f4analyse** (Dresing et al. 2015). Qualitative content analysis is a method designed to systematically reduce and interpret qualitative data that can help to deal with some of the challenges listed above. The aim is to reduce data while at the same time capturing the variety of the empirical material. Being exploratory in character, the qualitative analysis deliberately aimed at discovering new aspects of our research subject as well.

The **general process of the qualitative analysis** was as follows:

1. Task leader provides preliminary coding frame for f4analyse
2. Each CS applies the preliminary coding frame to 3 interview transcripts (trial coding)
3. Joint online meeting in order to differentiate that coding frame
4. Based on coding experiences within the CS, task leader provides a revised final coding frame as a follow-up of the online meeting
5. All CS apply the revised coding frame to all transcripts (main coding, initial 3 transcripts need to be recoded)

6. CS send project files to the task leader

7. Task leader merges individual project files to one and finalizes qualitative analysis

Data analysis of qualitative data was based on a coding frame for qualitative content analysis. The coding frame is a tool to structure the empirical material and to capture the meaning of the qualitative data. To be able to provide a template for the analysis, first results are required. Therefore, a preliminary coding frame was prepared after the first interviews. In general, the interview analysis team applied a *combination of deductive and inductive categories* to develop the coding frame. The preliminary coding frame consisted of deductive, concept-driven categories derived from the interview protocol (main topics and aspects the interviewers asked for, e.g. “personal meaning of agriculture” was such a category). The next step was inductive and data-driven: Based on the coding of the first three interviews in each CS, the initial coding frame was differentiated by developing inductive subcategories that captured the variety of what was mentioned in the interviews (e.g. “producing high-quality food” was such a subcategory). In order to do that, an online meeting was organized. Researchers who have conducted the interviews, who have coded them and those who continued with the coding participated in that meeting. Based on this online meeting, the coding frame was revised and expanded. This final version then was applied to all interviews. Applying this procedure, the differentiated coding frame served both as a *tool for* and a first *result of* qualitative data analysis in that it provides a detailed overview on the thematic structure of the data corpus.

1.2.2 Quantitative analysis

The quantitative data have been collected via a questionnaire that was filled in by the interviewees themselves. The focus was on closed questions that should provide more details, numbers and information on the farm, the interviewee and her or his motivation and decision-making. The result was a completed questionnaire with data that were more structured compared to transcripts. Collection and analysis of this kind of quantitative data were therefore more straightforward than in the case of qualitative analysis, as these data were easier to code. The objective was to merge the data from the different questionnaires into one data sheet based on variables. A coding system was used to transform the questionnaire data into numerical variables in order to enable data entry in table form for further statistical analysis.

The **general process of the quantitative analysis** was as follows:

1. Task leader provides template Excel sheet and coding system

2. Each CS fill in their Excel sheet

3. CS send their Excel files to task leader

4. Task leader merges individual Excel files to one

5. Statistical analysis of quantitative data

For investigation of the quantitative data, an exploratory data analysis (EDA) approach was followed. This approach uses a variety of statistical tools to discover patterns in the data and support the generation of hypotheses about the subject (Behrens 1997). Since the aim was

only to gain first insight into the subject, and not to choose a suitable statistical model for further analysis, solely descriptive statistical tools were used. The data-analysis process consisted of three different steps: First, the data were cleared up and to some free-text answers, categories were assigned. Second, in an iterative way, a number of visual analyses were performed and corresponding hypotheses formulated, to explore the influence of different factors. Finally, the results of the analyses were condensed to a few selected figures and hypotheses. All three steps were carried out within the statistical computing environment R. The figures were created with the ggplot2 package.

2 Obstacles and challenges

2.1 Access to research field

The BESTMAP interview campaigns faced the challenge of a **limited time period** during spring 2020 in which farmers were likely to be available for the interviews. While interviewers tried to contact farmers for the study, it became clear that seasonal weather conditions, the beginning of the growing season and national holidays would put the interview teams under time pressure. Thus, interviews were conducted between January and May 2020, varying across the five case studies. Contacting farmers was easier in some CS than in others, depending on the degree of access to farmers contact information. For example, while in the CZ study a regional database of contact information of farmers was available, the UK team was required to obtain contacts indirectly, though posting from local agricultural organizations. This process prolonged the time for the acquisition of contact information considerably. In some cases, potential interviewees were identified but could not be included in the sample due to these time restrictions. It should be noted that many farmers were hard to contact because of their various obligations and a resulting lack of time for the interview. Challenges arose also after agreeing on an appointment with an interviewee, and interviewers needed to be flexible in order to react to **spontaneous changes to original interview appointments**. For example, some farmers simply forgot about the interview appointments or cancelled them on short notice. In some cases, interviewers were already on the spot when a meeting was cancelled or postponed. However, the most important problem with regard to field access for all interview campaigns was the **COVID-19 pandemic** (see chapter 2.3).

2.2 Interviewer-interviewee interaction

Apart from technical issues with recording devices and the empathy needed to adapt to different farmers' personalities, specific challenges occurred during the interviews with regard to the interviewer-interviewee interaction. In some cases, interviewers were confronted with **two interviewees** without prior notice, even if interviewers explicitly asked to conduct the interview with one person only. In these situations, it could be hard to identify the actual decision-maker of the farm, and interviewers needed to split attention between two interviewees. As a consequence, the interaction became more challenging and there was more potential for inconsistent answers, disruptions and voice overlapping that complicated interview transcription and data analysis. These types of interviews, however, were

nonetheless valuable to the qualitative analysis, as they allowed us to observe the interaction between the interviewees, and the division of labor among them. This way, interviewers could better understand relevant decision-making procedures and distribution of AES-related knowledge within farms. In one of the interviews of the German case study, for example, a clear division of labour emerged between two equal decision-makers, with one farm manager in charge of crop production and one in charge of livestock farming. A similar situation occurred when an interviewee brought along a colleague who is specifically employed for AES application and other formal or bureaucratic tasks. In the UK case study, some intergenerational differences emerged, with one interview presenting a young, sustainability-oriented son, and a more traditional father who handed over most decision-making.

Moreover, depending on the interview site and obligation of the interviewees, various kinds of **interruptions** could occur during the interviews. Since interviewers deliberately contacted farm decision-makers, appointment making and the interviews themselves were influenced by farmers' workload and oftentimes their constant need to be approachable for family members, employees or stakeholders. Thus, telephone calls, dialogues with farm members and sudden changes in farmers' daily plans were common. Interviewers needed to react to those interruptions flexibly and were challenged to restart the conversation after such interruptions. In some cases, it turned out that much less time than originally expected was available for the interview. As a consequence of such **time pressure** or farmers' growing impatience during the interview, especially the questionnaire part of the interview needed to be postponed to a later telephone call or it was sent to interviewees via email after the interview. The overall **length of both parts of the interviews** sometimes seemed to reach the upper limit of the interviewees time budget, concentration and patience. Some farmers perceived the questionnaire part as too detailed which could influence the interview atmosphere in a negative way. In that context, some farmers indicated that they perceived a detailed questionnaire as an additional burden to various subsidy-related questionnaires and surveys they regularly have to respond to in their everyday professional practice, keeping them from their 'core' farming activities. In some exceptional cases, farmers perceived the questionnaire as some kind of 'control' or as a rather hostile tool of surveillance.

Some challenges were related to farmers' expectations and political attitudes. In some interviews farmers stated clear and sometimes **controversial political comments** and attitudes, oftentimes seemingly seeking approval for their opinion and sometimes asking the interviewers about their own opinion. Interviewers had to navigate between keeping up the rapport and atmosphere they established during the conversation and keeping distance with regard to explicit political statements in order not to jeopardize their role as scientific interviewers. Apart from that, the interaction with farmers before and after the interview in some cases indicated an **implicit expectation that interviews would directly influence AES design** with regard to the next funding period and agricultural policy in general. On the one hand, this expectation might have increased farmers' willingness to participate in the interview campaign, on the other hand there was potential for disappointment when interviewers needed to explain that the research cannot be expected to have immediate policy impacts.

2.3 COVID-19

All interview campaigns were struggling with the spread of the coronavirus and related COVID-19 infections throughout Europe that gained traction precisely in the midst of the empirical phase of data collection. However, all phases of the research process were affected by the uncertainty, organizational and emotional burdens that came along with it. Thus, appointment making, data collection as well as data analysis needed to be adjusted to some extent in all CS. The primary concern was the **safety and physical integrity of both interviewers and interviewees**. National travel restrictions, physical distancing regulations and lockdowns made further face-to-face interviews impossible at some point in time in all five countries involved in BESTMAP. In terms of project management and organisation, the whole research process was put under pressure and interviewers were faced with changing political and legal news and conditions almost on a weekly basis. From a scientific perspective, the question of how to continue with the interview campaigns urgently needed to be discussed with regard to methodology, sampling and comparability. Researchers involved in the interview campaigns jointly agreed to try to **switch to telephone interviews** in those CS that had conducted only a few interviews by the time. Methodological concerns were discussed with regard to comparability of data already obtained by face-to-face interviews and data generated by telephone interviews. The team decided that despite those legitimate concerns, CS should try to proceed with telephone interviews as long as a smooth conversation could be ensured and technical devices were used that comply with data protection regulations. In the following, specific reactions to the COVID-19 pandemic for each CS are described.

DE: The DE team had conducted 14 interviews when lockdown restrictions made further face-to-face interviews impossible in mid March 2020. At this point in time, farmers had already indicated that most colleagues would soon be busier again on their farms and hardly available for interviews. Two out of four environmental zones were not covered yet, however, and a more balanced sample required more farmers from the non-professional and the professional independent livestock farmer profile category. The interview team tried to identify and contact farmers that would help to fill those gaps in the data sample, but was not successful. The team then decided to work with the existing material and start with data transcription and analysis. Between April and October 2020, the interview team had to continue its work mostly from the home office, but did not encounter any major challenges or restrictions arising from this situation.

UK: The UK team had conducted 16 interviews when restrictions prevented further face-to-face contact with farmers in mid March 2020. The interviews were conducted during a long very wet season, with national and regional problems of flooding that affected many farmers in the case study area. The striking of the coronavirus crisis coincided with a long-awaited window of good weather, so that farmers became quickly unavailable for interviews and the interview campaign was put to a halt. The team's focus shifted on data transcription and analysis starting in April 2020. The work was conducted remotely without particular challenges arising from national restrictions.

CZ: In the Czech Republic, interviews with farmers began in February 2020 and an ordered state of emergency ended farm visits on March 10. Until then, five interviews had been conducted directly on the farms. These first five cases already reflected the spectrum of all selected enterprises. The CZ interview team had visited both conventional and organic farms, farms from smaller areas (50 ha) to the largest farm (8650 ha), owners from private farms to

joint stock companies, farms with both crop production and mixed farms with grass predominance and animal production. These initial on-site interviews paved the way for the subsequent next 17 interviews that were conducted under COVID-19 conditions by phone. Most of those took place in two rounds, with an initial short telephone interview about the company, and the main part of the interview conducted separately on the agreed date. Data could be collected via telephone without any major problems.

ES: The ES team had conducted 24 interviews since February 2020 when national restrictions prevented further face-to-face contact with farmers on March 13th. For a couple of weeks, the team focused its work on data transcription and analysis. By the beginning of April, methodology was changed from on-site face-to-face interviews to telephone interviews. During April another additional 23 interviews were carried out without major problems. Only three farmers felt unable to schedule a phone call due to field work tasks.

RS: The RS team had conducted three usable interviews before a strict lockdown was enacted in March 2020. The interview campaign was continued from the home office via telephone in challenging circumstances. Although it was the beginning of the agricultural field work season, the curfew applied to farmers as well, so they were available for interviews in the late afternoon in most cases. If possible, interviews were conducted through the Viber application, with end-to-end encryption ensuring privacy. Other interviews were conducted on a dedicated mobile phone with permanently disabled internet and Wifi connection, using Android 5, which enabled secure recording of conversations. 22 interviews were conducted through telephone calls. In July and August, data transcription and analysis were interrupted due to COVID-19 infections in the family of the responsible team member.

3 Results

The BESTMAP qualitative content analysis of interview campaigns draws on four main sources: 1) the interview transcripts (based on part one of the interviews), coded with the developed coding frame, 2) CS summary reports, 3) single interview short reports and 4) internal comparative CS expert discussions about farmers' decision-making on AES. All four sources have been analyzed, compared and synthesized in order to identify potential key factors for farmers' decision-making on AES. In sum, overarching factors relevant across CS, factors relevant for some CS as well as factors specific for single CS could be identified.

The BESTMAP statistical analysis of interview campaigns draws on part two of the interviews, in which interviewees had to fill in the questionnaire. Quantitative analysis identified and compared relevant decision-making factors across CS as well.

Results of the qualitative content analysis are presented in chapter 3.1, results of the statistical analysis are presented in chapter 3.2. Since qualitative content analysis was employed in order to generate empirically grounded hypotheses and enable an in-depth exploration of farmers' decision-making, context information and CS-specific details are provided in chapter 3.1 wherever needed, based on the open interview questions. The statistical analysis presented in chapter 3.2, will focus on a small set of overarching aspects, identifying quantitative patterns across CS based on the standardized questionnaire data. Detailed statistical analysis and systematic comparison to qualitative results is ongoing.

3.1 Results of qualitative content analysis

In the following section, the most important results of qualitative content analysis are presented. Chapter 3.1.1, focuses on the most important overarching factors that influence farmers' decision-making on AES, based on all four qualitative data sources described above. The first section of chapter 3.1.1 is dedicated to a general evaluation of the relative importance of economic, ecological and social factors. The second section is dedicated to factors that turned out to be important for farmers in all CS, and the third section is dedicated to factors that are important for farmers in some of the CS. In chapter, 3.1.2, we present the most important reasons for and against AES participation in each CS as analyzed by the interview teams in their CS summary reports. As described in chapter 1.1.5, Serbia constitutes a special case because no AES exist at all. AES-related questions in the interviews needed to be asked hypothetically and the sample consists of non-participants only. Therefore, the following qualitative analysis of overarching factors does not include the Serbian case, if not mentioned explicitly.

3.1.1 Overarching results

1) Relative importance of economic, ecological and social factors

The overall relative importance of **economic aspects** is very high. It is important to note, though, that those aspects can not be restricted to an individual orientation of the farmer. They are related to the overall business model of the farm, practical aspects of workflow and characteristics of the land. In that context, financial aspects amount to the *central criterion for choosing a scheme*. Financial issues seem to be the most important reasons for current and planned future AES participation. Among the economic reasons for current AES participation, *support for farm income*, *making less productive areas financially viable* and *making a profit* are the focus of the interviewees. Although a majority of statements indicate that financial compensation is not sufficient, there is evidence from three CS (ES, UK, DE) that depending on the specific scheme, the business model, area and the size of the farm, certain AES can provide sufficient financial compensation or even generate real profit and surplus. This might explain why, despite statements about insufficient financial compensation, *financial aspects are not the main reason for farmers not to apply for (additional) AES in the future*. In addition, financial aspects do not seem to cause major problems with implementing schemes, compared to technical and administrative aspects. However, some farmers report that higher financial compensation would motivate them to apply for (additional) AES in the future. Thus, financial aspects seem to play a rather enabling than a restricting role. Two CS (ES and UK) report that large estates and agribusinesses seem to profit a lot from AES, at least according to the perception of the interviewed decision-makers of smaller farms.

The overall relative importance of **ecological aspects** is medium. Financial and routine-related aspects are more often reported to be important reasons for current and future (additional or continued) AES participation than ecological aspects. When being asked about under which terms farmers would apply for (additional) AES, ecological aspects are hardly

ever mentioned and they do not play a role as reasons against AES participation as well in most cases. An exception are a few farmers that express their concern that some AES might lead to growing predator populations (which they want to have controlled). Taken together, ecological aspects do neither motivate nor prevent AES participation much in most cases. For those farmers who mention ecological aspects as a reason for their current AES participation, however, *improving biodiversity and wildlife* emerged as the most important issue. This was especially the case for UK farmers, the majority of whom expressed a personal interest or sense of pride in benefitting farmland birds, pollinators, and other wildlife. In contrast, some interviews in the German CS revealed that even if farmers participate in AES, they are either indifferent with regard to environmental effectiveness or unsure if the measures taken have positive impacts on the environment, if at all. These farmers especially question any long-term sustainability effects and complain about a lack of monitoring or scientific evaluation of ecological AES effects .

As a general criterion for choosing AES, ecological aspects do not play a major role across case studies. However, farmers from four CS (UK, DE, CZ, ES) include ecological aspects in their AES-related considerations. Many of those farmers for whom ecological aspects do play a role are very convinced of their importance and seem to observe potential ecological effects very closely. ES reports that this is especially the case for the Spanish organic farming AES, where participants show a lot of personal conviction. The reason is that changing the farm from conventional to organic comes with a lot more effort, risks and long-term effects. In that context, it is plausible to assume that personal attitudes towards conservation of the environment and sustainability play a larger role. At the same time, however, these farmers expect a rising demand for their organic products in the near future and corresponding market opportunities.

The overall relative importance of **social aspects** is low. *Social benefits* are mentioned in terms of *improving public image*, but only some farmers (UK, DE) talk about that in the context of reasons for current and future AES-participation. In fact, this is one of the least important aspects for AES decision-making. In one case (DE), a farmer portrayed this aspect in a very derogatory way, calling AES “propaganda” for the wider public. From his perspective, AES are just a way of making the public believe that agriculture can do something good for the environment, without any other real or added value. From that point of view, improving public image is a concession to hypocritical consumers who do not want to know how agriculture works and where their products really come from. Social aspects are hardly mentioned as general criteria for choosing a scheme as well. Only some interviewees (UK) mention fear of unintended social interference into AES, joint decision-making in a family-run farm and labour force requirements as social criteria for choosing a scheme. It is important to note, though, that various kinds of social aspects are closely associated with AES decision-making, but not in the narrow sense of social benefits and not necessarily as important factors directly influencing decision-making. However, in our interview protocol, we included questions about a potential *influence of fellow farmers* on farmers’ decision-making and the *role of consultancy*. Related to that was the interest to find out about *sources of information* on AES.

No farmer reports she or he participates in AES because other farmers do so. One farmer (UK) reports she is not participating because other small farms are not participating. Two farmers (UK) mention this aspect as a potential influence on deciding to apply for AES in the

future, but no one mentions non-participation of other farmers as a reason not to apply for AES in the future. A few farmers from three case studies (UK, CZ, ES) mention that other farmers play a role as a source of information. However, the source of information mentioned most across case studies is *farmers' associations*, followed by *consultants*, *media*, and *local authorities*. Some farmers refer to their *own past experience* with AES as well. Farmers in the UK mention a *lack of consultancy* as a social aspect of problems with AES implementation. Accordingly, some of them would consider (additional) AES in the future, if there was *better consultancy or information about AES.* Two farmers from the UK report *more personal contact with advisors* would make it easier to apply for (additional) AES in the future.

Although not mentioned as a reason for or against AES participation directly related to decision-making, many farmers seem to talk about AES with other farmers, at least occasionally. Most statements which report exchange among farmers on AES come from the UK; most statements which report no exchange come from CZ and ES. In the case of Catalonia, many farms are part of larger cooperatives who decide for them to apply for certain schemes (e.g. in order to fulfill certain requirements for integrated farming). This might be an explanation for the statements of those Spanish farmers who indicate they are not discussing AES among each other. In these cases, AES decision-making is simply an issue of the cooperative. In the case of the UK, some farmers are active in groups with other peers ('farmer facilitation groups', 'cluster groups', 'discussion groups'), in which AES can be a topic from time to time. Being asked if reported exchange with other farmers influences their own decision-making on AES, most farmers say this is the case only to some extent. Only a few farmers from the UK perceive a big influence of peer discussions on their own decision-making. In each CS, there are farmers who clearly state there is no influence of exchange with other farmers on their own decision-making. In general, effects on decision-making seem to be rather indirect, if existent at all, in the sense of *inspiration* or *encouragement* (not being alone, others are doing something similar etc.).

Similar answers were triggered by the question if their own decisions influence other farmers' decisions. According to most statements, this is only perceived to be the case to some extent. Some statements from Spanish farmers indicate, however, that peer-to-peer influence played a larger role some years ago when the organic farming AES was introduced. Some farmers obviously acted as 'pioneers' who helped to spread knowledge and experiences about the new opportunity. The Spanish CS reports that there was information sharing among organic farmers about the organic farming AES to a considerable extent. Compared to conventional farmers, they seem to be more open-minded in terms of sharing their experiences and helping others. Generally, however, direct influence is implausible, because AES always need to be adapted to the local circumstances and farm-specific organizational requirements (see factor *'fit with established farm practices'* below) as well as economic calculations.

2) Factors that are important for farmers in all CS

Apart from the evaluation of general aspects above, five factors which influence farmers' decision-making on AES could be identified in all CS: 1) the economic benefit from AES, 2) fit with established farm practices, 3) soil quality / productivity, 4) Inflexibility of AES, 5) farm size. In the following, factors 1-4 are described in detail. Factor 5 is analyzed in chapter 3.2.

Economic benefit from AES

The overarching meaning of economic aspects has been described above. Generally speaking, AES need to be financially attractive for farmers since a particular piece of land can always be managed differently and is part of an economic calculation. Therefore, AES implementation creates opportunity costs. Interview data across all CS indicates that there need to be clear economic incentives in order to motivate farmers to consider changing established farm practices, including but not limited to AES implementation. Among the economic reasons for AES non-participation, the most important factor is that *remuneration does not cover costs* of AES implementation or AES-related changes to previous farming practices. However, an important economic question for farmers is not only if the remuneration covers the costs for implementing and maintaining a scheme, but if it amounts to the income that could have been gained with normal production. One farmer (UK) explicitly notes that a change in crop prices directly influences such a calculation: when prices doubled, it did not make sense for the farm anymore to "take land out of the production" via AES. There is a close connection here to the second financial aspect mentioned by farmers, which is *remuneration does not generate profit*. For some farmers, AES would only make sense if they really generated considerable profit. In the German CS, some farmers clearly stated the option that if society in general and agricultural policy in particular expects farmers to deliver environmental public goods, this needs to pay off in terms of real profit. Interestingly, those farmers would at the same time perceive such a development as a remarkable change of their professional role and personal identity, in that they would not be 'real' farmers anymore but environmental service providers. In addition to those aspects, some farmers also express their *fear of demand for repayment*, i.e. fines or penalties if requirements cannot be met or AES results not delivered etc. Regarding the economic benefit from AES, some farmers in the DE and ES interview campaigns state they would prefer to get a fair price for their products and keep implementing sustainable practices, rather than being paid to implement AES.

Fit with established farm practices

One of the most important issues that emerged across CS is related to routines and regular practices established on farms. Among the reasons for current and future (additional) AES participation only financial aspects are mentioned more often. Two related basic themes can be identified: *getting money for what I am doing anyway* and *good fit with established farm practices*. Many interviewees report they are carrying out certain practices anyway (or have to do it for various reasons) and would still do so even if there was no financial support for it. In many cases, those practices existed on the farms before respective AES were offered or before farmers learned about them. This means there is little or no additional effort in terms of the farm workflow, with the important exception of administrative issues. Therefore, this category makes clear that in many cases, AES does not trigger any major change in practice on the farms, but for those who are doing something that is incentivized via AES, it can be an appreciated extra, which amounts to the financial aspect of *getting money for what I am doing anyway.*

The notion of pre-existent convictions and practices is especially expressed in statements by Spanish farmers who state they were already convinced to do organic farming, regardless of the AES. This holds true for farmers in other CS as well (DE, CZ, UK) who talk about practices that make sense to them anyway, such as managing land extensively. Those considerations

can be motivated by environmental beliefs in some cases, but seem to be influenced much more by the practicalities of the respective farm workflow (dependent on farm type, natural conditions, workforce, division of labour on the farm and business model), or by the anticipated future demand of new types of products they envisage. The data show that most farmers check AES for those options that fit to what they are already doing, instead of changing practices in order to be able to carry out a certain scheme that is of interest to them. In that sense, the routine-related aspect of *good fit with established farm practices* is a central reason to apply for AES. In a similar way, farmers from three CS (DE, UK, ES) mention those routine-related aspects as the second important general criteria for choosing a scheme, following the financial aspects.

Remarkably, the flipside of a good fit with established farm practices is present in the empirical material as well, which can be interpreted as the 'innovative' or 'experimental' aspect of AES in practical farming settings. Some farmers from three case studies (DE, UK, ES) mention *trying out / experimenting with new practices* as a reason to apply for AES currently and possibly in the future. This can be an expression of interest in gaining new knowledge about certain agricultural practices and a kind of test if those practices lead to expected results and if they can be integrated into established farm practices. Some farmers perceive AES as a way to experiment with new practices in a 'risk-free' way. One interviewee (DE) reports she stopped using the plough while participating in a respective AES a few years ago, in a previous funding period. She was curious about the effects and this way, she could test it on a few hectares without too much risk. The results were good, what even convinced her grandfather of that practice, who was very skeptical in the beginning.

Soil quality / productivity

Special attention for understanding economic aspects of decision-making should be paid to the biophysical characteristics of less productive areas, for which a specific scheme might be a way to generate at least a little bit of income. Three CS (ES, UK, DE) report that certain AES seem attractive to farmers when the respective parts of land are less productive, remote, or can only be managed with a lot of effort. However, the latter aspect is heavily influenced not only by biophysical characteristics of the land, but by knowledge and skills of the staff, the workflow on the farm and the farm type. Many German farmers reported that the first thing they take into account when deciding which parts of land could be potentially used for AES is soil productivity. The accounts of these farmers clearly indicate a case-by-case decision on AES, which is much more characterized by a special economic calculation for each potential AES site than by a general attitude in favour or against AES. For example, it is much more economic to grow wheat on a productive piece of land than to integrate it in a certain AES. On the other hand, less productive areas that otherwise would have 'fallen out of production' can contribute to farm income with AES. Thus, soil quality and productivity are central variables in farmers' economic considerations on how to best make use of a certain part of the land they manage. The results of this calculation can vary, depending on the characteristics of a particular part of the land and changing market conditions.

Inflexibility of AES

Many farmers describe administrative barriers for AES participation and implementation. It is noteworthy that many of them are related to farmers' autonomy and independent decision-making. Statements across CS make clear that, to some extent, *a decision to adopt AES is perceived as a decision to give up independent decision-making*. This is one of the main meanings of the recurrent theme of AES 'inflexibility'. Farmers know and partly criticize that, once in a scheme, there is a tight regime of rules, deadlines, cut-off dates and monitoring. In some cases, this regime is reported to be not only inappropriate with regard to local natural conditions (CZ), but also forcing farmers to do something they perceive as incompatible with good professional practice (DE). Practical farming requires a lot of experience and flexibility (weather, market conditions, site-specific changes), both of which might be neglected by undifferentiated AES requirements. In some cases, farmers perceive those generalized rules as a sign of *distrust in their professional skills* or experience them as a *devaluation of their professional knowledge*. Many farmers demand more flexibility in AES implementation, which becomes especially apparent in the case of result-based schemes and schemes that require fixed dates for defined activities, such as mowing in case of grassland AES. These fixed dates contradict the farmers' flexibility required in order to react to changing site conditions, weather and organizational rearrangements their farm might face while participating in an AES. Detailed analysis of this factor indicates that the factor '*fit with established farm practices*' analyzed above does not mean farmers are not willing to react flexibly to new situations. On the contrary, in most cases the 'way of doing things' entails a farm-specific way of reacting to changing weather conditions, legal requirements, market prices or consumer demands. It is precisely in that context that AES are perceived as too rigid to realize the farmers' way of flexibility inherent in their professional practice.

3) Factors that are important for farmers in some CS

Apart from the above explained four factors that are important in all CS, another eight factors could be identified which influence farmers' decision-making on AES in some CS: 1) lack of knowledge about AES, 2) past experience with AES, 3) relationship between farmer and landlord, 4) (potential) external influence on AES outcome, 5) automatization / digitalization of AES placement on land, 6) duration of AES and duration of lease contracts, 7) perceived corruption, 8) farmer's age. In the following section, factors 1-7 are described in detail, while factor 8 is subject to ongoing statistical analysis.

Lack of knowledge about AES

In ES and RS, interviewers report a lack of knowledge about AES, but for different reasons. In the Spanish case, interviewees express unanimous agreement that the bureaucracy of the application procedure requires a lot of dedication and time that farmers usually do not have, so farmers who are members of a cooperative delegate the management of subsidies to the agency or advisory body, while other farmers go to an agri-consultant's office to fill in the application. This results in a lack of knowledge by farmers about what the exact measures are, what they could benefit from when trying out new practices or whether there are measures they could benefit from without much effort because they are already doing a similar practice. Furthermore, there is a general split of the ES sample, in that some farmers do not know at all about AES and the differences between Pillar 1 and Pillar 2 schemes, and farmers who are more or less informed about AES. In case farmers were not aware of the existence of AES, interviewers had to inform them and explain some details before being able to discuss the issue. This was generally the case in Serbia, where AES do not exist. The Serbian CS reports

that the vast majority of interviewed farmers have never heard of AES. While the data provides evidence that in those cases a lack of knowledge about the existence of AES and the related agricultural policy is a central barrier, farmers across CS do not mention a lack of practical knowledge or professional skills as a barrier for AES adoption, given they have heard about AES in the first place.

According to the accounts of some German and UK farmers, some of the small, family-run farms are not up to date with regard to AES, because they simply cannot afford to invest time and resources in gathering information, studying regulations and application. This seems especially to be the case for decision-makers in small farms who report they are in charge of all the farm's bureaucratic tasks as well as the practical farming. Some of them had some experience with AES in the past, but were not interested in AES in subsequent funding periods. These farmers report they are already overburdened with the mandatory reporting tasks resulting from Pillar 1, such as direct payments and ecological focus areas.

Past experience with AES

A few farmers in the UK and DE talk about their experiences with AES in the past when asked how they learned about AES. Some of them have been involved with AES already for a long time. They know how to receive the information they need, and before new schemes are announced, they simply check if procedures, requirements and rules have changed compared to the previous funding period. After years of involvement in AES, problems with project administration are decreasing and farmers are then more likely to consider AES participation in coming funding periods as well (CZ). Apart from that, many farmers talk about previous experiences with AES and possible changes of the AES options over time. Some complain that certain AES they adopted are not offered anymore, which can be perceived as a lack of recognition for certain agricultural practices as well. Some farmers report they have been managing some pieces of their land similar to certain AES or within those AES for a long time (AES 'veterans') and keep doing this (UK). Some farmers in the UK highlight that 'entry level schemes' provided an easy opportunity for many farmers to start thinking about environmentally friendly farming practices. Besides that, AES helped some farms to compensate for low market prices in the past and decisions were made by persons, not yet by computer algorithms (see factor 'automatization / digitalization of AES placement on land' below). Farmers from three CS (DE, UK, ES) complain it has become more complicated over the years to apply for and implement AES, with requirements becoming more rigorous or differentiated. One farmer (UK) reports he has become an 'expert' in a particular AES, enabling him to help other farmers with it.

In general, past experience with AES seems to be helpful for current and future consideration of participation, in terms of knowledge about 'how it works'. Bad experiences, however, spark critical attitudes towards AES. Data indicates that some farmers who had bad experiences in the past with certain AES and their implementation might be less motivated to apply in subsequent funding periods. This is especially the case for specific situations of inspection or control that farmers perceived as unjust, unjustified or rather picky (UK, DE). Farmers might have to pay back the money, and some with such bad experiences have never again applied for AES (DE) or have become more cautious to do so. Therefore, current non-participation in AES does not mean non-participation in the past. On the contrary, it can be a reasoned

decision based precisely on past experiences with AES and close knowledge of respective aspects of implementation.

Tenant-owner relationship

Some farmers from the UK and DE report that the *tenant-owner relationship complicates AES implementation*. For example, some owners in the UK case study complain that tenants do not understand the reasoning of AES, and some farmers interviewed for the DE interview campaign complain that their landlords do not support AES. In these cases, tenants have trouble to explain AES to land owners or fear conflicts with them. Data from DE suggests that many tenant farmers have long-time relationships to their landlords or land owners and depend on them or feel obliged in addition to legal conditions, which means in case of AES-related divergent views, they do not want to risk a conflict. In some cases, farmers report they even accepted to pay back money for this reason. Thus, the social (long-term) relationship and corresponding (in)formal obligations to the landlord plays an important role for many farmers, even if farmers are free to manage rented land according to their preferences from a legal perspective. It turns out that many landlords (especially older ones with rather traditional views on farming) simply do not understand or accept AES on their land, e.g. they want regular mowing of grassland or want to see 'tidy fields' instead of the 'uncontrolled growth' of wildflower strips. As a result, long-term social obligations overrule short-term AES funding periods.

(Potential) External influence on AES outcome

Comparable to the role of perceived autonomy for the factor 'inflexibility of AES' is a widespread perception by farmers that some AES cannot be 'managed' by farmers in a strict sense, because factors of success are outside of their control. Thus, the degree of potential or factual external influence on AES outcomes can constitute a major barrier for AES adoption. Especially the topic of result-based schemes covered by the interview protocol triggers reflections on uncertainty. Many farmers report *uncertainty on whether measurable outcomes can be achieved*, because of external factors, such as nectar mixes not germinating even though effort was put into planting, or bird counts going down because of weather conditions. The major aspect here is that getting remuneration depends on variables that are outside of farmers' control. In addition, and related to result-based schemes, but not limited to it, is the *uncertainty about how authorities will monitor (*CZ, DE). Other social aspects play a role as well in the context of potential external influence. Farmers from two CS (UK, DE) report on *other relevant actors not respecting the physical presence of schemes*, e.g. dog walkers using buffer corridors as footpaths (DE, UK). Farmers who had to pay back money because others have unintentionally interfered with AES implementation describe experiences of helplessness and frustration.

Automatization / digitalization of AES placement on land

As described in the section on the relative importance of social aspects, farmers in the UK mention a lack of consultancy as a social aspect of problems with AES implementation. This refers to an important change in the UK: Interviewed farmers criticize the computerized system adopted in recent (~2) years since the management of AES in the country switched from the more personalised approach of an NGO (Natural England, NE) to an automated system controlled by the Rural Payment Agency. The new system, where the physical allocation of

selected options on the land is indicated by *algorithms* is deemed to be inflexible, but also highly impersonal. Farmers denounced the loss of the collaborative spirit developed through personal contact with a local NE consultant, and were at the least frustrated, and at the most offended, for being told how to manage their land by a computer. Such experiences described by UK farmers are very similar to a central theme that emerged from DE interviews, in which farmers often referred to the *software system* DIANAweb they have to use for the application of AES and the whole administrative process. The system defines on which parts of the land which AES can be implemented. Most farmers criticize this automated system, since it amounts to an inflexible 'black box' making preliminary decisions that farmers cannot influence. In many cases, farmers were willing to carry out a certain AES on a particular piece of land and thought it would make sense, but the software simply did not allow them to apply for that scheme in that specific area.

Duration of AES and duration of lease contracts

Three CS (UK, CZ, DE) report that AES duration plays a role in farmers' decision-making. UK famers currently in an AES complain that the system does not allow them to expand a current scheme by adding new practices and thus favoured the idea of adding annual schemes as a potential add-on. Opinions on preferred AES duration are mixed, since long-term AES enable better planning and require less frequent interventions (CZ), whereas an advantage of short-term AES is their flexibility (DE). Closely associated with these considerations, three CS (CZ, DE, RS) report that the existence and duration of lease contracts influence AES preferences and experiences. First of all, whenever land is rented, the social factor of the *tenant-owner relationship* described above comes into play. According to German farmers, this means some of them have to deal with landlords (especially older ones) who might not understand or accept AES on their land, or who have very specific ideas of how their land should be managed. Furthermore, farmers who have rented land report that the duration of lease contracts can contradict the time frames of certain AES. For example, some of them indicate that if their lease contract for a certain part of the land ends in two years, they would not enter a five-year scheme on that piece of land. In these cases, they face the challenge of *diverging time frames* between AES and lease contracts. For Czech farmers, in most cases longer-term liabilities seem to be more advantageous. However, shorter-term liabilities are preferred by those with short-term land leases, because a longer-term liability could cause trouble when their contracts end. In the Serbian CS, most farmers state they would prefer lease contracts with longer durations.

Another special issue with regard to diverging timeframes appeared as a recurring theme in the German CS. Farmers with rented land report they cannot continue grassland AES on rented arable land, because according to the law, after five years it will be considered '*permanent grassland*' (as a new legal status). Grassland is much less valuable in economic terms and is legally not allowed to be reconverted to arable land. Therefore, landlords could take farmers to court if their arable land has turned into permanent grassland through farmers' implementation of grassland AES. As a consequence, some farmers who have rented arable land report that even if they applied grassland AES on suitable parts of it, it would not make any sense ecologically: once there is more biodiversity in the meadow or once there is turf that sequesters carbon, they would have to plough up the area again. In these cases, AES

timeframes diverge from the land-use timeframe imposed by legal regulations with regard to permanent grassland, and sustainable long-term management of land is inhibited.

Authorities or subsidy system perceived as corrupt

In Serbia, some farmers refer to corruption as a source of uncertainty in the process of applying to subsidies. In some cases, subsidies require initial investments, without guarantee of successful application (non-AES, eg. IPARD) and in combination with very strict requirements from the farmers' point of view. Distrust in institutions, economic risk and formal obligations creates uncertainty that is unacceptable to a number of farmers. Some of them express general scepticism about proper implementation of EU programmes by current political actors, citing examples of corruption or incompetence. In the Czech CS, one arable farm perceives AES as part of a corrupt political environment.

3.1.2 Case study specific results

In the following, the most important factors for farmers' participation or non-participation in AES are summarized, as described by CS teams in their summary reports.

3.1.2.1 DE

Most important reasons for AES participation

Most important for farmers is 1) that AES provide the opportunity to use certain pieces of land meaningfully that otherwise could hardly be managed (or only with too much effort or without economic benefit) within the overall concept of the farm and 2) that for particular pieces of land and particular schemes, AES generate income or financial compensation without too much effort that otherwise would not be gained. Ecological reasons were hardly ever mentioned as a motivation. Since many farmers are carrying out practices that are environmentally friendly without applying for AES (because they do it anyway on their own, or as part of Pillar 1 or as part of the separate ecological farming subsidy), however, this is not an indicator for a lack of awareness or action with regard to conserving biodiversity, soil quality or sustainability issues in general.

Most important reasons for AES non-participation

Most important reasons for non-participation are: 1) Too much effort for too little money, 2) the availability of AES - many farmers wanted to apply for the economically attractive wildflower strip AES, but it was overbooked and 'closed' on part of the authorities very soon, 3) trade-offs between different subsidies - since AES decision-making is made case by case / field by field and double funding is not allowed, many farmers report particular fields that would fit a certain AES are already part of a the obligatory Pillar 1 schemes (e.g. ecological focus areas) or part of the ecological farming scheme (which is a separate, non-AES scheme in Saxony), 4) perceived risk of result-based schemes – many farmers are unsure if the outcome of result-based schemes can be delivered and fear a demand of repayment, especially in cases when

external influence is expected (weather, citizens not respecting the physical presence of the schemes etc.

3.1.2.2 UK

Most important reasons for AES participation

The main reason for participation in AES were two: 1) Receiving monetary compensation for implementing practices that fit well with the farming system already in place on the farm 2) the satisfaction of doing something good for biodiversity and/or the environment (occasionally motivated by hunting). Family-run farms perceived AES as a steady, albeit low, income for less productive parts of their land, and/or as a contribution towards large maintenance work on farm buildings. Generally, these farmers were aware of the potential contribution of environmentally sustainable practices for soil management (e.g. tillage, cover crops, low inputs, etc) towards the resilience of their food production system. Large family-owned estates, which are classified as companies, as they are managed as such, can profit more largely from AES, as they cover (much) larger areas and have the resources to employ personnel to run the schemes. They were less motivated by the potential contribution of certain AES towards the productivity of their land, as the arable land is usually rented to external contractors. Both small and large farmers were pleased at the idea of having wildlife and floral diversity on their land.

Most important reasons for AES non-participation

Three main reasons emerged from the interviews with farmers that did not participate in AES: 1) Lack of flexibility of the schemes and the fear of an increased scrutiny of the government on individual farms' practices (the "I do not want the government to dictate what to do on my own land" way of thinking). 2) Lack of time or resources to spend on understanding how to apply to a scheme, and what the different options within schemes are. Allegedly, the resources that are currently made available online on the government website are lengthy and subject to different possible interpretations. 3) The AES do not provide surplus of income for the land destined to them, and, for farms located on very productive land, AES participation is seen as a loss of potential income. All these were not necessarily associated with a lack of interest towards the environment. For example, all farmers that did not participate in AES still expressed positive thoughts towards wildlife presence on their farm and/or were aware of the importance of maintaining soil health and water quality.

3.1.2.3 CZ

Most important reasons for AES participation

In most cases, farmers have defined the 'good' farmers (to whom they also subscribe) as persons who must always consider economic, environmental, and social aspects in their work. When planning individual measures, these must first of all be economic, but should also have

some positive impact on the environment. Some subsidy titles are economically advantageous for farms (integrated production, biobelts, lapwing), but farmers complain about insufficient financial compensation for grassland treatment AES. When deciding on the individual measures offered, farmers focus on economic factors, to which they often returned while discussing the management of grasslands. Although farmers expressed reservation in some cases, in many areas they can hardly carry out any activity other than focusing on grassland maintenance and animal husbandry. Some companies in the production areas were not willing to expand AES at the expense of arable land, because this deprives them of the area for growing market crops. Some measures such as biobelts were evaluated from a hunting point of view rather than a wider ecological one.

Most important reasons for AES non-participation

Most agricultural enterprises in the CS area and in the whole Czech Republic are involved in AES, which support these enterprises economically. Businesses are looking for measures suitable to their conditions and those that are usually similar to the surrounding operators. Farmers avoid measures that do not sufficiently compensate them for the loss of income, especially in output peaks. However, there are other reasons for non-participation. For example, one arable farm reports it does not participate in AES because it perceives the subsidy system as part of a corrupt political environment. However, one part of the farm is dedicated to integrated production of vine. The reason may be that the vast majority of vineyards are managed via integrated production, the rest as part of the organic and conventional system. Another reason for non-participation is the required minimum area. One small farm with integrated vegetable production reports they are not able to meet the minimum acreage required for AES participation. They grow a spectrum of vegetables and in sum, they meet the required acreage size. However, in order to receive AES funding, the obligatory minimal size must be met for one specific species.

3.1.2.4 ES

Most important reasons for AES participation

In general, the decision to adopt a particular environmentally sustainable practice is driven by the following factors: 1) Farmers do it out of conviction or principles. In these cases, farmers understand agriculture as a sustainable practice and do not consider doing an agricultural activity that is not sustainable. 2) Reorientation of the business to increase the added value of the product and adapt to new market demands, especially in the case of organic farming. 3) The practice fits well with the farming system already in place, it does not involve a significant change in management and represents an improvement in the economic viability of the farm. 4) In the case of organic livestock farming, it is claimed that the financial support associated with the measure is indispensable for the activity to be economically viable. 5) The geographical location of the crop conditions the decision to adopt a certain environmentally sustainable practice because it is the AES corresponding to that area (wetlands, Natura 2000 network areas, mowing meadows). 6) Some farmers are part of a cooperative (in the case of fruit trees) and they carry out a certain practice because it is determined by the cooperative.

Most important reasons for AES non-participation

The main reason for not applying for AES is due to the business model of the farm, which is often marked by family tradition. In these cases, farmers do not consider AES because they represent a change in the way of working and an adoption of new practices of which they are unaware. As for intensive agriculture/livestock models, based on quantity of production, these farmers hardly consider AES. In the case of livestock farming, assuming a reduction in the number of animals and receiving financial compensation in return does not compensate for the economic loss. In the case of arable land farming, farmers are not willing to take the risk of losing the harvest and reducing the yield by adopting certain AES practices. In some cases, farmers also question the business model based on small production at higher quality because they do not know if consumers will buy their product and they will be able to generate profit. Finally, in some cases there are also prejudices about the adoption of AES since these practices are associated with a decline in the way of working. In these cases, such practices are compared to those that were carried out 60 years ago.

3.1.2.5 RS

Most important reasons for potential AES participation

The questions about participation in AES were discussed hypothetically in the Serbian CS. Most farmers expressed positive and enthusiastic attitudes towards the general concept of AES and stated they would participate in such programs, although for their final decision and choice they would evaluate the specific conditions and requirements of a particular scheme for potential benefits or risks. Farmers expect information about AES to be shared by experts and state or local consultant agencies and officials, through seminars, presentations or media and online presence. Many farmers said that they would have no capacity to cope with further financial losses, as they are already working with minimal profit or sometimes even losses. The observed attitude towards AES was closely related to education and age, with younger and more educated farmers understanding better the indirect benefits of participating in AES, such as long term sustainability of production, quality of environment, health and quality of life. In general, these farmers seem to be more willing to get to know and implement new techniques.

Most important reasons for AES non-participation

This question is not applicable for the Serbian case study, as there are no AES available yet, but based on the given answers, estimates can be given about what would potentially discourage farmers from participation in AES. The most important rejection factors would be financial losses, uncertain and unclear requirements, non-transparent processes or corruption in application procedures, not enough or inadequate information about the benefits of participating in AES and too strict or too complicated administrative procedures.

3.2 Results of statistical analysis

The preliminary main results from quantitative data analysis of the questionnaire part are the following: 1) Larger farms generally have a higher AES participation; 2) Managers of corporations or companies are more likely to participate in AES than individual farmers or decision makers of family-run farms; 3) The most important reasons for AES participation that farmers mention in the questionnaire are financial benefits and ecological effects; 4) The most important obstacle to AES participation is the bureaucratic burden and 5) The biggest incentive for future AES participation would be a lower bureaucratic burden, but higher recognition by society would also make a difference.

Figures 2 - 6 depict these main findings.

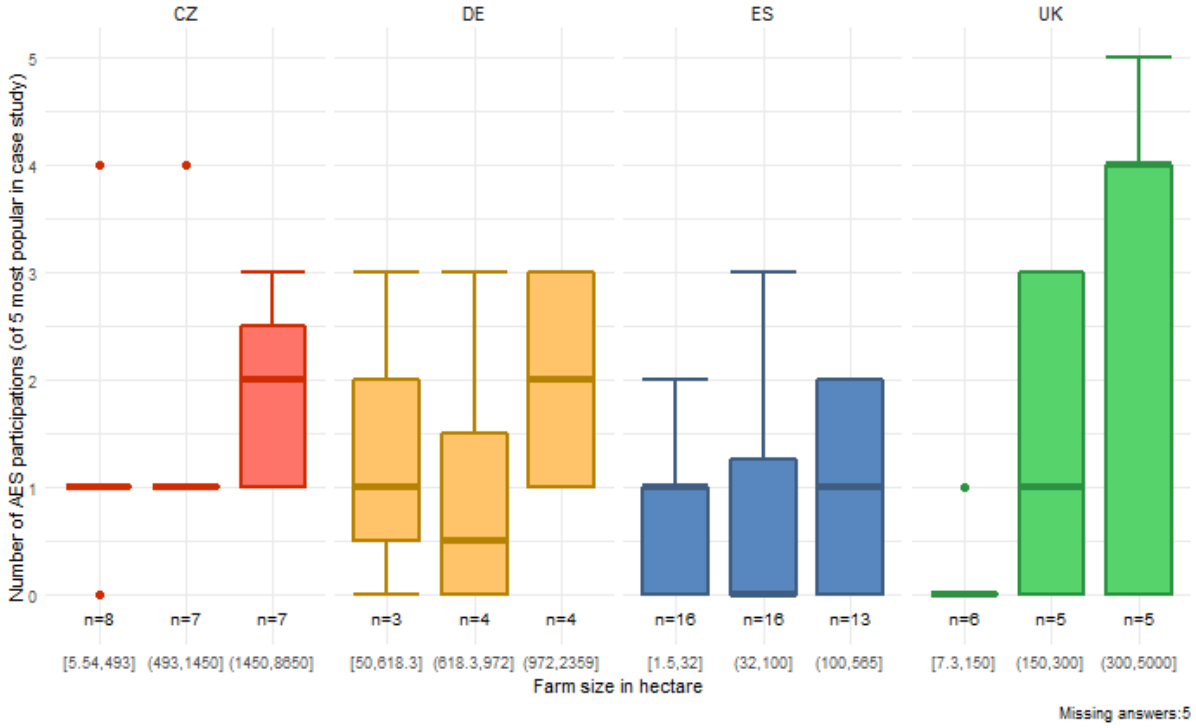

Figure 2: AES participation in relation to farm size

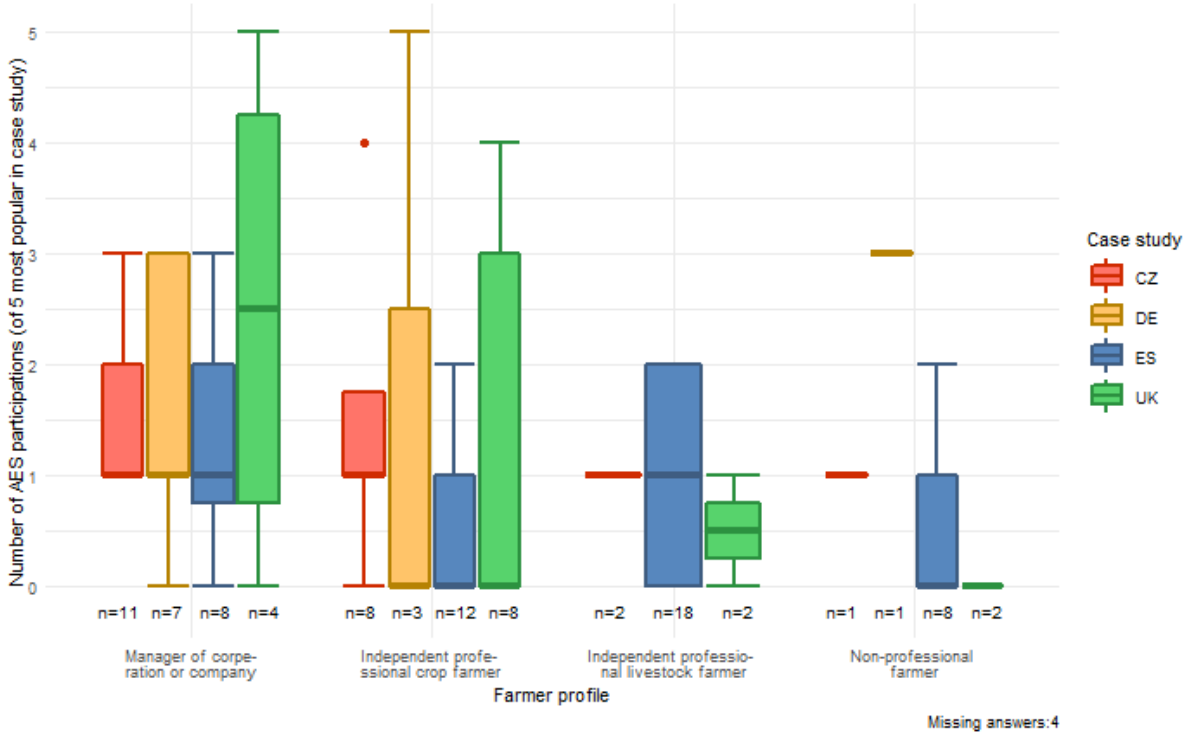

Figure 3: AES participation in relation to farmer profile

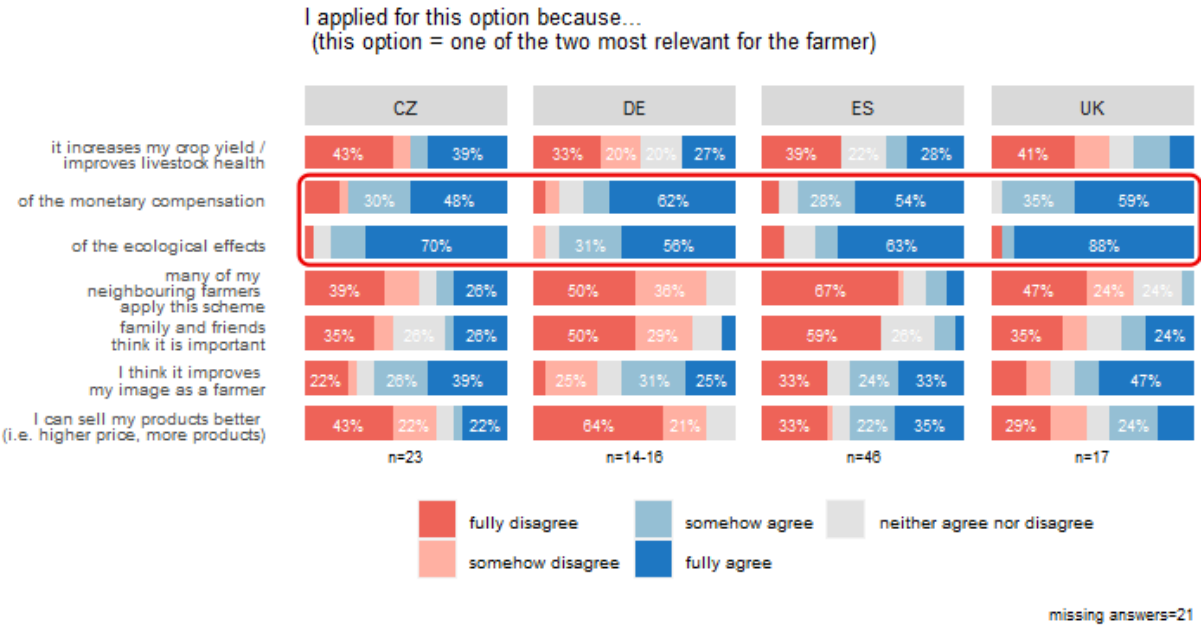

Figure 4: Reasons for AES participation

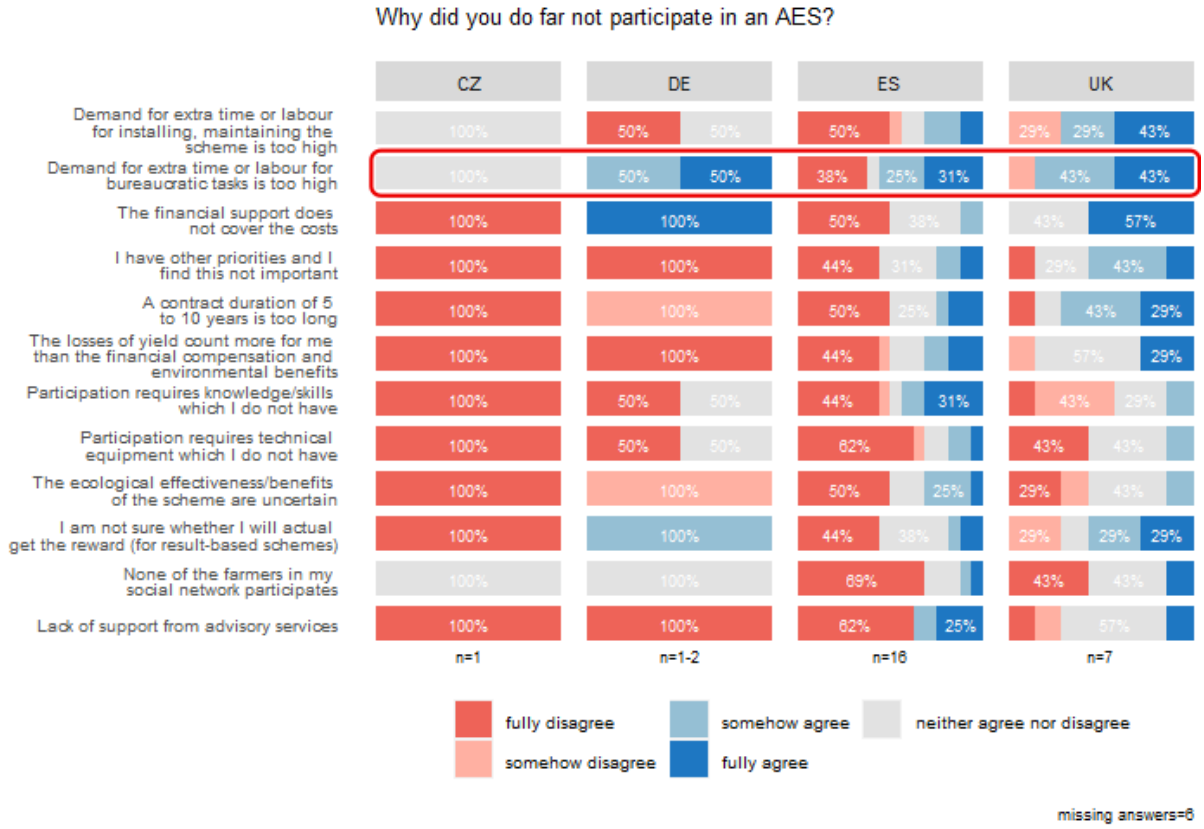

Figure 5: Reasons for AES non-participation

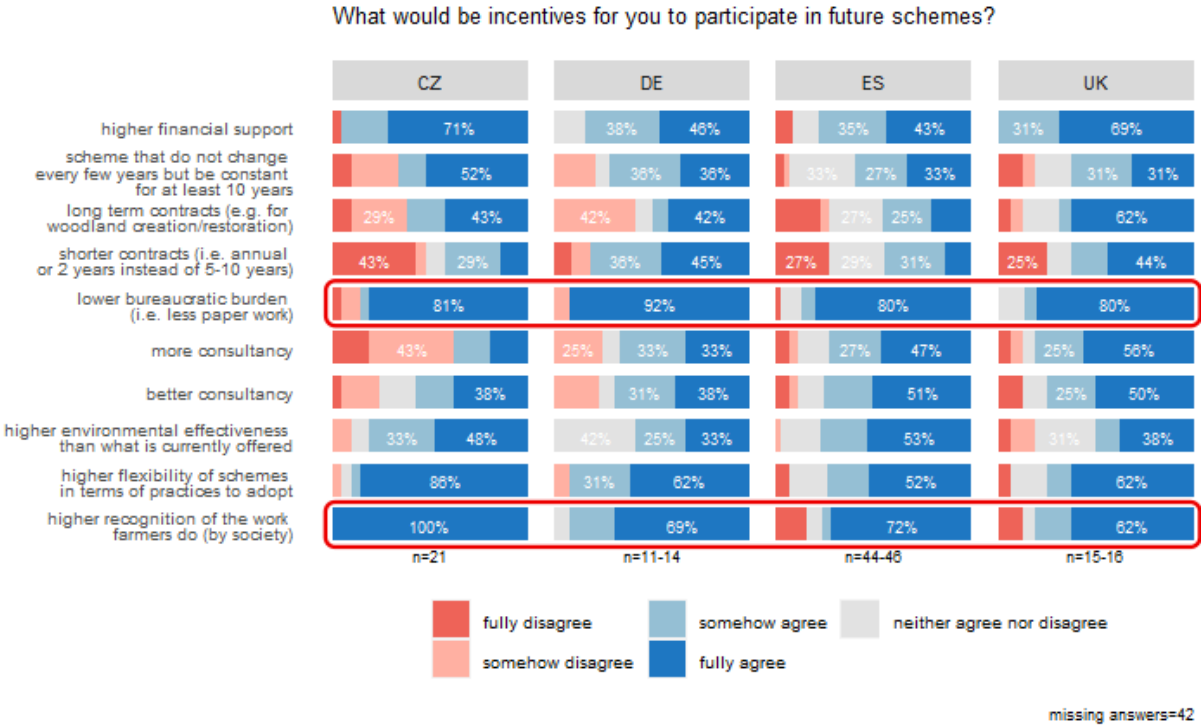

Figure 6: Incentives for AES participation

Acknowledgements

BESTMAP would first of all like to thank all the farmers who participated in our interview campaigns and shared their experiences and views. Their time, patience and open-mindedness towards our research was essential. Second, the exploratory social science approach presented here would not have been possible without all CS interviewers doing the empirical fieldwork, despite challenging circumstances.

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Appendix 1: Interview analysis guidelines

Guidelines for interview analysis

1. Introduction

The guidelines for interview analysis provide information for the interview analysis teams in the BESTMAP case studies (CS) about how to analyse interview data. We have collected both 1) qualitative data (first part of the interviews) and 2) quantitative data (second part of the interviews).

1) The qualitative data has been collected via exploratory qualitative interviews based on a semi-structured interview protocol. The focus was on open questions which should stimulate reflections on farming, decision-making and AES and enabled a conversation between interviewer and interviewee. The audio recording had to be transcribed and anonymized. The result is a transcript with a lot of unstructured data.
2) The quantitative data has been collected via a questionnaire that has been filled in by the interviewees themselves. The focus was on closed questions that should provide more details, numbers and information on the farm, the interviewee and her or his motivation and decision-making. The result is a filled questionnaire with data that is more structured.

Since we have two different types of data, it is necessary to apply different methods of collecting, interpreting and analysing the data. We will use the method of qualitative content analysis for the

qualitative data. To this end, we will use the software f4analyse and merge the data from the transcripts into one data project file based on thematic codes.

For the quantitative data, the ABM team will decide how to proceed. At this point in time, it is therefore sufficient to transform and merge this data systematically in a way that enables further analysis and set-up of agent-based models. To this end, we will use Excel and merge the data from the different questionnaires into one data sheet based on variables.

2. Qualitative content analysis

The challenges for the analysis of qualitative data for the BESTMAP interview campaign are 1) the amount of unstructured qualitative data, 2) the highly context-specific character of this empirical material which requires a lot of interpretation, 3) the different languages across CS, 4) the pragmatic need to divide some steps of analysis between CS teams, 5) time and resource constraints for this task. Qualitative content analysis is a method designed to systematically reduce and interpret qualitative data that can help to deal with some of those challenges[1]. The aim is to reduce data while at the same time capturing the variety of the empirical material. Being exploratory in character, the qualitative analysis deliberately aims at discovering new aspects of our research subject as well.

The **general process of the qualitative analysis** is the following:

1. German team provides preliminary coding frame for f4analyse
2. Each CS applies the preliminary coding frame to 3 interview transcripts (trial coding)
3. An online meeting will be organized in order to differentiate that coding frame
4. Based on coding experiences within the CS, the German team will provide a revised final coding frame as a follow-up of the online meeting
5. All CS apply the revised coding frame to all transcripts
   (main coding, initial 3 transcripts need to be recoded)
6. CS send their project files to the German team
7. German team merges individual project files to one and finalizes qualitative analysis based on a) CS f4analyse files, b) CS interview short reports, c) CS interviews summary reports

Data analysis of qualitative data (part one of the interviews) will be based on a coding frame[2] for qualitative content analysis. The coding frame is a tool to structure the empirical material and to

[1] See Schreier, Margrit (2012): Qualitative Content Analysis in Practice. Los Angeles: SAGE.
[2] A coding frame is something like a table of contents for a book: It reduces the wealth of data to the most important things. You need to know a lot about the content before you can write the table of contents. Therefore, the first step is to write down the chapters (main categories), and the second step is to differentiate them into sub-chapters (subcategories). Our interviews are the content of the book and the task is to write a table of contents (coding frame) that is differentiated enough to capture the most relevant aspects. A differentiated coding frame is both a *tool for* and a *result of* data analysis.

capture the meaning of the qualitative data. To be able to provide a template for the analysis, first results are required. The preliminary coding frame is prepared by the German team after the first interviews. In general, we will use a combination of deductive and inductive categories to develop our coding frame. The preliminary coding frame will consist of concept-driven categories derived from our interview protocol (main topics and aspects we ask for, e.g. “personal meaning of agriculture” will be such a category). The next step is data-driven: Based on the coding of the first 3 interviews in each CS, we will differentiate the initial coding frame by developing inductive subcategories that capture the variety of what was mentioned in the interviews (e.g. “producing high-quality food” could be such a subcategory). In order to do that, an online meeting will be organized. It is essential that everybody who has conducted the interviews, who has coded them and those colleagues who will do the coding participate in that online meeting (here we need the knowledge of what has been said in the interviews, how it has been said and the experience how the preliminary coding frame worked). Based on this online meeting, the German team will revise and expand the coding frame. This final version then needs to be applied to all interviews[3].

2.1 Preparatory tasks

In these guidelines, the focus is on analysis, not transcription. However, as mentioned in the interviewer guidelines, a quick reminder: In BESTMAP, we transcribe literally what was said without capturing side elements such as pauses, volume etc. For the modelers it is important that they understand what has been said in the interviews, so it is necessary to write full sentences (please do not only take notes). Due to resource constraints the transcripts cannot be fully translated into English. Therefore, for the analysis the original text (in the CS language) is used. We recommend to use f4transkript or similar software for the transcription and to have a look at this manual.

Before you start with qualitative analysis of an interview, please make sure you have anonymized the transcript[4]. All personal data that could uncover the interviewee’s identity should be removed. The basic question in terms of research ethics is: Is a third party able to identify the farmer, the particular farm or other persons when reading your transcript? Some aspects obviously need to be removed (names of persons or towns / villages, addresses etc.), others are context-specific (e.g. if you talked to the only livestock farmer in your area, the phrase “as a livestock farmer, I am in a special position” is much more delicate than in a different context).

Please include time stamps, a lot of paragraphs (no textual wasteland) and line numbering in the transcript. This will make coding much easier. The transcript needs to be saved in the rich text format (rtf) to enable f4analyse to work with it.

Please make yourselves familiar with f4analyse. Online tutorial and manual will be helpful.

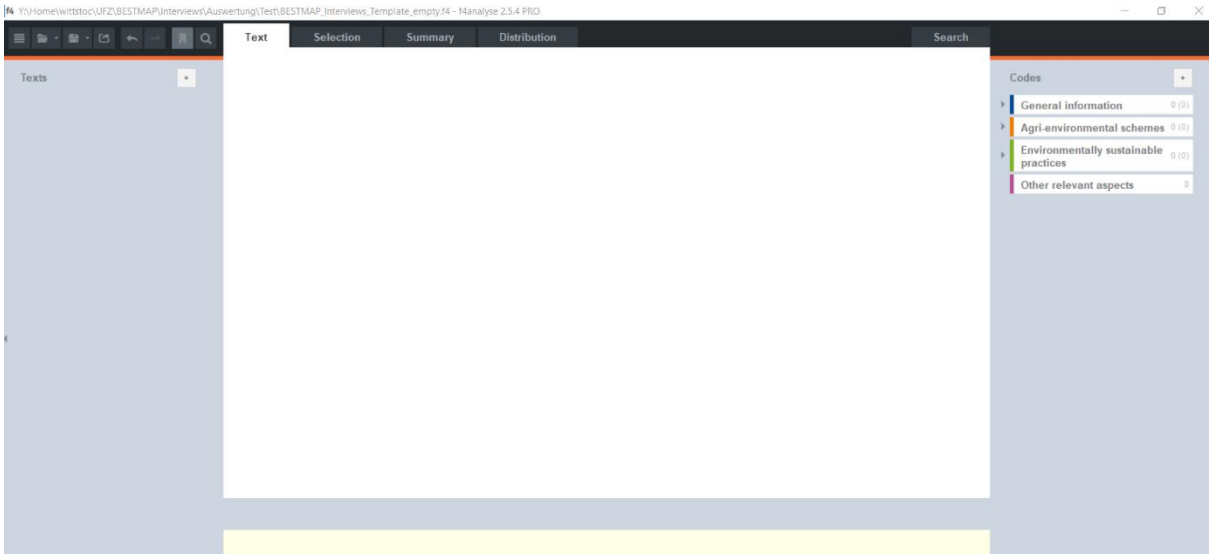
2.2 Set up your f4analyse project

[3] Please note that the first 3 interviews then need to be re-coded with the final coding frame.
[4] See p. 42 in the manual.

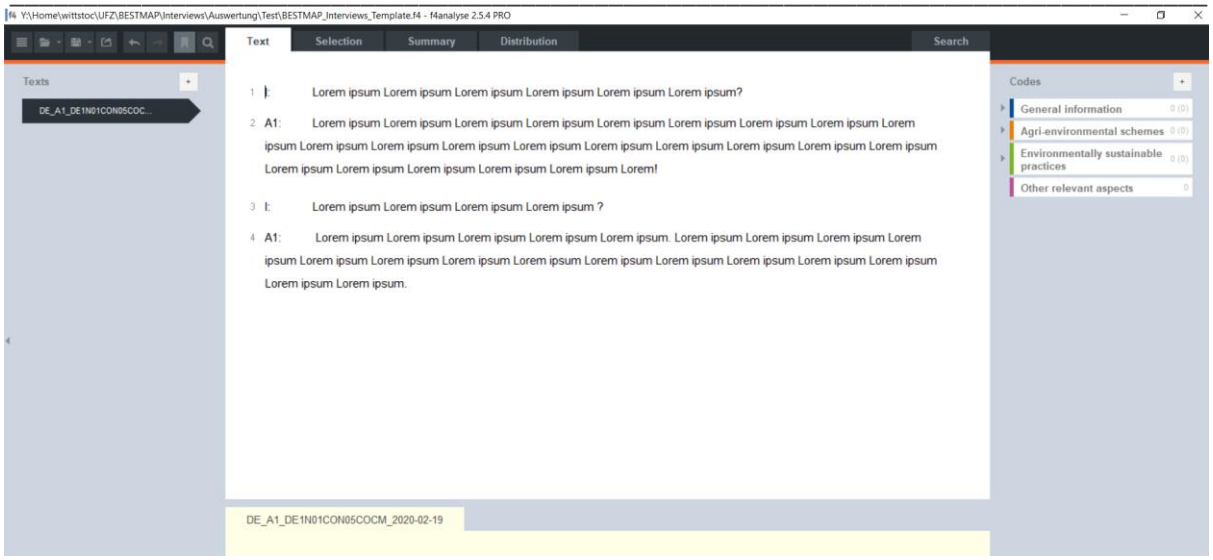
In f4analyse, you work in a project that basically consists of a) a left column with your text files, b) the space in the middle – a text editor – with your transcript and c) a column on the right side with the coding frame.

Before you start with the analysis, please open the project file you received from the German team. This is the template with a preliminary coding frame. Please save your project file (“save project as”). Please name your project file according to the logic: CS_interviews. The German project file is named *DE_interviews*, for example.

Your screen should more or less look like this:



Then, import your transcript. The text file will appear in the left column, the transcript text in the middle. Your screen should more or less look like this:



Please organize and name your transcripts in a meaningful way:
- Sort the text files in the left column chronologically
- Use the following logic to name the text files: CS_case code _FSA code_interview date

For example, the text file with the transcript from the first interview of the German team is named: *DE_A1_DE1N01CON05COCM_2020-02-06*. Please number your interviews from A1 to Ax and note that this case code needs to be used consistently throughout your CS to mark a) the interviewee, b) the interview with him or her, c) the case for qualitative and quantitative analysis. It will be helpful for organizing your data when you name your audio recordings accordingly and add the case code to all your notes, printed interview protocols etc. In addition, this prevents the use of personal data in data file names[5].

2.3 Coding

General remarks

A central step of the qualitative analysis is coding the transcript. Each transcript represents a case (A1, A2 etc.) and constitutes a unit of analysis. Our coding frame consists of main categories and subcategories (and 1-2 subcategories of the subcategories) that should cover the most relevant aspects of the interviews. Coding means that we apply those categories to segments of the transcript. These segments are the units of coding, i.e. those parts of the transcript that can be interpreted in a meaningful way and that fit within one subcategory of our coding frame.

Coding as part of a qualitative analysis is an analytical and interpretive step, not a technical one. Therefore, coding requires knowledge of the context of the units of analysis (which we have as citizens of the CS countries, researchers in the field of agriculture and which we required within the

[5] E.g. please do not name a recording file “Interview Merkel_2020-03-02.wav” etc. Use the A1, A2 etc case codes for audio, text and other CS data files. Keep the sheet that ‘translates’ A1, A2 etc. into ‘Merkel’, ‘Trump’ etc. always safely and separately stored from the data files.

project, while contacting farmers and by conducting the interviews). Coding serves the objective of structuring the meaning of diverse empirical material. The interpretation of meaning will be different across CS. However, applying the same final coding frame which is based on data and context information from all CS helps to develop and apply a common approach for analysis.

Coding in f4analyse is very easy: You mark a segment of the transcript text and click on one of the categories in the coding frame. Then, it will be marked with the colour of the respective category. Such a coded segment is called 'coding'. If you want to change (delete or recode) a coding, please click on the coloured line in the respective segment. Now the name of the category appears and the coded text itself is not only underlined but completely marked with colour. Then you can delete the coding or recode it by choosing a different category from the coding frame in the right column.

Within the coding frame, you will find code comments attached to the categories. For the test coding, these will simply be the numbers of the questions in the interview protocol. This might help to choose which category to apply. The test coding will show if additional rules for applying categories will be necessary or if certain category definitions are needed.

How to do it

For coding a transcript, please go through the steps of segmentation and actual coding:

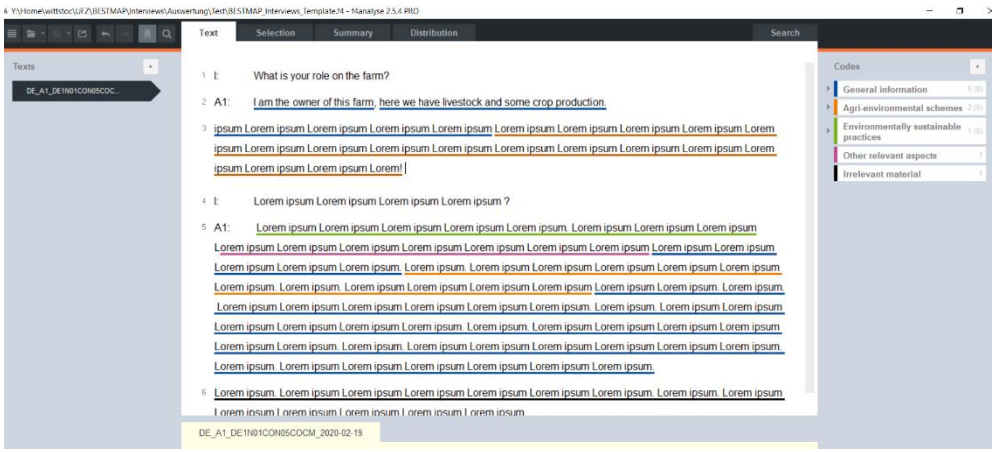
1) *Segmentation*: This first step means dividing the material into smaller units so that one unit can later on fit one subcategory within a main category. It involves two parts:

a) Mark the irrelevant parts of the transcript with the respective main category "irrelevant material". Irrelevant is everything that does not help to answer our research question and that does not fit in our coding frame. Examples would be lengthy accounts of technical details or interruptions of the interview (conversation about quality of coffee consumed during interview) etc.

b) Now go through the transcript line by line of the remaining relevant material only with the other few main categories. By doing that, please use a thematic criterion of segmentation: One unit of coding ends and another begins with a topic change. In our case, a unit of coding should at least be half a sentence so that you can take the segment out of the transcript and it still makes sense and can be interpreted meaningfully. However, the length of units of coding will differ. Please mark the relevant material with main categories. Please do this with hypothetical (test coding of the first interviews) or actual (final coding of all transcripts) subcategories in mind. This way, assign the main categories to those parts of the transcript that fit meaningfully.

E.g., when there are paragraphs in which the farmer talks about her farm in general, you assign the main category "General information". When the topic changes from the farm to the interviewee's role

on that farm or another thematic aspect of general information, you assign the same main category a second time. As a result, the units of coding a clearly marked and can later on (during the actual coding) be coded with subcategories. Now you have created a file with a transcript that is marked only with the main categories. What you have done is the segmentation as the first step. Your screen should more or less look like this:



2) *Actual coding:* This second, main step means applying the coding frame to the units of coding that you have marked with your segmentation. Now you need to use the subcategories. Please apply a suitable subcategory to every unit of coding that you have marked with a main category during the segmentation.
   E.g., the farmer described her role as an employed manger and explained before that the farm is owned by a company. You apply the subcategory “company-owned” to the paragraphs in which the farmer talks about her farm in general. Practically, you recode this unit of coding from “general information” to “company-owned” (which is a subcategory of “farm type”). Where the topic changes from the farm to the interviewee’s role on that farm, you have assigned “general information” a second time during segmentation. Now, you recode this and apply the subcategory “employed manager” (which is a subcategory of “role on the farm”).

   As a result of coding, the whole relevant part of your transcript is coded with differentiated subcategories that are much more precise than the main categories. Now you have created a file with a coded transcript that can be used for further analysis. What you have done is the actual coding as the second step.

Please apply the following **rules for coding and data file management:**

1) Please do not change anything in the coding frame (e.g. rename, add or delete categories). Only if each CS uses exactly the same coding frame the files can be merged in the end.
2) Please only code what the interviewee says, not what the interviewer says.

3) Please code everything that the interviewee says. In your final project file, every segment should be coded, either as irrelevant (see first part of segmentation) or as relevant, in this case applying subcategories.
4) Subcategories of the same main category need to be mutually exclusive. When coding, make sure that a particular unit of coding is not assigned to two subcategories of the same main category. However, subcategories of different main categories might overlap (see tips for coding below).
5) During the actual coding, always assign *the most differentiated subcategory possible*. The final version of your project file should contain all your transcripts coded with subcategories on the most specific level.
6) For the main coding with the revised coding frame: Choose the most interesting, relevant and remarkable segments of each subcategory and please translate them into English before coding. These will go into analysis as examples and direct quotes.

Tips for coding:

- Take time to get familiar with the software, the coding frame and the coding process.

- Take notes during the trial coding concerning difficulties in applying the coding frame. Write down which additional subcategories should be included in the final version of the coding frame and share this info during the online meeting.

- Sometimes it will be necessary to apply different categories to the same segment of text. The basic reason is that it is rather normal that human language contains multiple meanings at the same time. The consequence for coding is that in some parts of your material, units of coding will overlap. If you do this, you need to be able to justify that with regard to the thematic criterion of segmentation: Perhaps a larger paragraph about the personal meaning of agriculture (main category “general information”) contains a sentence about the general attitude towards AES (main category “agri-environmental schemes”). In this case, the new topic AES requires applying a different main category for that particular sentence. At the same time, the larger paragraph still provides general info and constitutes a meaningful unit of coding.

- It is helpful to go through your transcript for one main category after the other. This way, you only have to work on a certain subset of categories of the coding frame and it is easier to keep them in mind. For example, you can start the actual coding with the main category “general information”. Go through all segments that you have marked with this main category and apply the respective subcategories to the units of coding. When you have finished applying subcategories to all the material marked with this one main category, restart the procedure with the next main category and so on. As a result, you can subdivide the coding into smaller coding tasks.

- Please note that typically, a topic is covered in different parts of the material. For instance, we asked for general information at the beginning of the interview, but the topic might appear throughout the interview. During segmentation and coding we have to take into account that it is rather untypical that units of coding are continuous. So please do not expect to see big continuous 'text blocks' marked with one category and colour after segmentation. Topics are triggered by our interview protocol, but the conversation does not necessarily follow that logic.

3. Collection of quantitative data

Collection of quantitative data (part two of the interviews) is less sophisticated as qualitative analysis, as this data can easily be coded. The objective is to merge the data from the different questionnaires into one data sheet based on variables. What we do here is rather a transformation of data, not an analysis.

The **general process of collecting the quantitative data** is the following:

1. German team provides template Excel sheet and coding system
2. Each CS fill in their Excel sheet
3. CS send their Excel files to the German team
4. German team merges individual Excel files to one and hands it on to the ABM modelers

3.1 Preparatory tasks

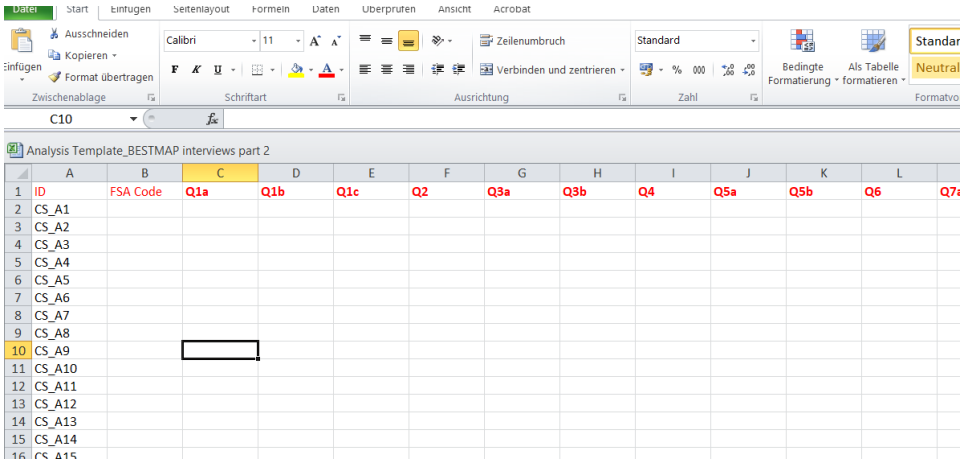
Before filling in the sheet, make sure

1) you have all your Word files with the filled questionnaires ready and named consistently using the case code A1, A2, etc.
2) you have the Word file with the coding system ready that you received from the German team. Please make yourselves familiar with that coding system first.

Please open the Excel sheet, replace "CS" with your country code (for example DE_A1, DE_A2 in the German case study etc.) and save the file according to the logic: CS_interviews part 2. The German project file is named *DE_interviews part 2*, for example.

3.2 Filling in the Excel sheet

We will work with an Excel sheet that consists of columns for each datum and lines for each case. The columns in the excel sheet are designed as variables. They are numbered according to the numbering of questions in our interview protocol. The Excel sheet looks like this:



The coding system is directly filled into the English version of the questionnaire (part two of the interview). It 'translates' the data into variable names and numbers that should be used in the Excel sheet. It explains to you which data to fill in into which column. Variable names are marked with red colour (the columns in the Excel sheet), the values you have to fill in are marked with green colour (type them into the cells below the respective column). The coding system looks like this:

BESTMAP

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Part 2: Quantitative information

A. Background information on the farm

1. What share of your farm is managed as conventional, organic or integrative type of farming?

   Conventional % Q1a
   Organic % Q1b
   Integrative % Q1c

2. What is your total agricultural area in hectares?

   ha Q2

3. How many hectares of this agricultural area is

   ☐ Owned: ha Q3a
   ☐ Rented: ha Q3b

4. What are additional sources of your household income (i.e. agro-tourism, part time job, bioenergy, off-farm income)? Click here to enter text. Q4

5. What is your age? Q5a

   ☐ Below 45 = 1
   ☐ 45 or above =2
   In case you want to specify: years Q5b

6. How many total years have you been working in agriculture? Q6

   ☐ < 5 years = 1
   ☐ 5-10 years = 2
   ☐ 10-30 years = 3
   ☐ 30-60 years = 4
   ☐ > 60 years = 5

There are many columns in the Excel sheet, but filling it in should be straightforward. For example, farmer A1 answered the question 6: “How many total years have you been working in agriculture?” as follows: 10-30 years. In the coding system 10-30 years is a “3”. In the Excel sheet you will then add a 3 for A1/Q6. In case the interviewee filled in numbers (e.g. Q3a), just copy this number into the respective cell below the column named Q3a. *In case the interviewee had to fill in text, please translate it and copy it into the respective cell.* The ABM modelers can use this textual information from open answers, but only if it is in English. Since those answers are usually rather short, hopefully this will not be too much effort.

Please apply the following **rules for filling in the Excel sheet and data file management:**

1) Please do not change the variable names in the Excel sheet (e.g. rename, add or delete variables). Only if each CS uses exactly the same Excel sheet the data can be interpreted and the files can be merged in the end.

2) Each datum has got an own variable. E.g. please fill in 1 or 2 for Q5a (age below 45 or 45 or above) *and* the exact age for Q5b, if you got this information.

3) If the question / required information does apply to that interviewee and you got no answer (missing value), please enter 999. For example, if the interviewee did not tick a box for Q5a (no info about age), enter 999 as a missing value.

4) If the question / required information does not apply to that interviewee and therefore you got no answer, please just leave the cell blank and do not fill in anything. If there is no answer for something like “Other reason: …”, leave it blank as well.

If there is a logical contradiction or mistake, please do not interpret. Fill in 999 as a missing value instead. E.g. this would be the case if someone indicated “below 45” *and* “45 or above” in Q5a at the same time.