

What influences farmers' acceptance of agri-environment schemes? An ex-post application of the 'Theory of Planned Behaviour'

Lilli A. Schroeder*, Stephen Chaplin**, and Johannes Isselstein***

Abstract

A better understanding of farmers' behaviour regarding agri-environment schemes (AES) can be one step towards further improving these voluntary schemes. In order to assess farmers' acceptance and perception of agri-environment schemes, the 'Theory of Planned Behaviour' (TPB) was applied ex-post to identify factors influencing farmers' willingness to join agri-environment schemes. This ex-post application is a new approach of using the TPB and also the analysis of farmers' acceptance towards AES by using the TPB has not been done before. In the 'Yorkshire and The Humber' region of northern England, standardized face-to-face interviews were conducted with 32 farmers already participating in an AES. The results demonstrate that the general attitude and acceptance of the English scheme are high. Biodiversity, landscape, and natural resources are perceived to be improved by the scheme and to be valuable. An increase in weeds was perceived as an undesirable outcome. Farmers' families were ranked to have the highest and most positive social pressure on farmers' decisions to join AES. Interestingly, the opinion of other farmers or of the farm advisor did not influence the farmers much. More paperwork and more demanding management requirements would make it much more difficult to join the scheme. The provision of advice and greater consideration of environmental conservation in policy development were perceived to make joining the scheme more attractive. Most of the gained results are confirmed by the literature. This shows that the ex-post application of the TPB is feasible and that acceptance of AES can be analysed by using the TPB.

Keywords: *environmental conservation, Theory of Planned Behaviour, farmers' values, farmers' behaviour, farmers' beliefs, farmers' decision-making process*

Zusammenfassung

Was beeinflusst die Akzeptanz von Landwirten gegenüber Agrarumweltmaßnahmen? Eine ex-post Anwendung der „Theory of Planned Behaviour“

Ein besseres Verständnis des Verhaltens von Landwirten in Bezug auf Agrarumweltmaßnahmen (AUM) kann zur weiteren Verbesserung dieser Programme beitragen. Um dies zu untersuchen und Einflussfaktoren auf die Teilnahmebereitschaft zu identifizieren, wurde die 'Theory of Planned Behaviour' (TPB) ex-post angewendet, was ein neuer Ansatz ist. In der Yorkshire and The Humber' Region im Norden Englands wurden standardisierte, persönliche Interviews mit 32 Landwirten durchgeführt, die bereits an AUM teilnahmen. Die generelle Einstellung und Akzeptanz gegenüber den Programmen sind hoch. Als positive Auswirkung der Programme wurde eine Verbesserung von Biodiversität, Landschaft und natürlichen Ressourcen wahrgenommen; als negative das vermehrte Vorkommen von Unkräutern. Der größte und positivste Einfluss auf die Landwirte bezüglich einer Programmteilnahme wurde ihren Familien zugeordnet; die Meinung anderer Landwirte und des Betriebsberaters beeinflusste kaum. Mehr Schreibarbeit sowie noch strengere Bewirtschaftungsauflagen würden die Teilnahme wesentlich erschweren, Beratung und mehr Berücksichtigung von Umweltschutz in der Politik die Teilnahme erleichtern. Der Großteil der gewonnenen Ergebnisse wird durch die Literatur bestätigt; ferner ist die ex-post Anwendung der TPB zur Analyse der Akzeptanz von AUM praktikabel.

Schlüsselwörter: *Umweltschutz, Theory of Planned Behaviour, Wertvorstellungen der Landwirte, Verhalten der Landwirte, Überzeugungen der Landwirte, Entscheidungsprozesse der Landwirte*

* Johann Heinrich von Thünen Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries, Institute of Rural Studies, Bundesallee 50, 38116 Braunschweig, Germany

** Natural England, Land Management Development Unit, King's Pool, 1-2 Peasholme Green, York, YO1 7PX, United Kingdom

*** Georg-August-University of Göttingen, Department of Crop Sciences/Grassland Science, von Siebold-Str. 8, 37075 Göttingen, Germany

1 Introduction

The availability and condition of public goods such as landscape, wildlife or ecosystem functioning cannot be controlled by normal market mechanisms. As a result it is the responsibility of the public authorities, such as the government, to provide access to and maintain the supply of those goods (Koester, 2005). To address this responsibility, European Union policy has, since the 1980s, paid an increasing amount of attention to environmental conservation in general, and also to environmental friendly agricultural practices in particular (Kirschke et al., 2004). With the 'McSharry reforms' of the Common Agricultural Policy (CAP) in 1992 it was first obligatory for the EU member states to develop and introduce agri-environment schemes (AES) (EC, 2010). The political agreement reached on the 26th June 2013 on the CAP after 2013 (EC, 2013), illustrates the continuing importance of environmental aspects in European agricultural policy; AES will continue to be a major mechanism to protect public goods. However, both the European Court of Auditors (2011) and the European Commission have criticised agri-environment schemes as not being efficient enough and have demanded further improvements. Since AES are voluntary for farmers, their acceptance is one essential requirement for the success of a scheme (Falconer, 2000). Acceptance means participation by farmers, but also including farmers in a more sustainable way in terms of awareness, attitudes, and perception of the policy objectives behind AES. Therefore, and to address the above-mentioned challenge, this paper assesses farmers' acceptance and perception of AES. Here, the 'Theory of Planned Behaviour' (TPB) is applied ex-post in a case study in the 'Yorkshire and The Humber' region of northern England to assess the behaviour of existing AES agreement holders. The TPB was selected because it clearly defines the different elements that are important drivers for the performance of certain behaviour. This enabled the TPB to be used as a construct to help understand what drives farmers to join AES, what influences their intentions, and which issues might make them insecure. Finally, potential strengths and weaknesses of the English 'Environmental Stewardship' agri-environment scheme are identified. This information can help to better understand farmers' behaviour regarding AES, to keep farmers in AES, and to further improve the schemes.

1.1 Agri-Environmental Schemes in England

The first AESs in England were the 'Environmentally Sensitive Areas' (ESA) established in 1987 and, from 1991, the 'Country-side Stewardship Scheme' (CSS). Following a major policy review in 2002 (Curry et al., 2002) these schemes were closed for new agreements in 2005 and a new AES named 'Environmental Stewardship (ES)' was launched (Peel and Chaplin, 2008). ES is developed, administered and evaluated by 'Natural England'¹ (NE) (Peel, 2010). It is comprised of two

main tiers: 'Entry Level Stewardship' (ELS) and 'Higher Level Stewardship' (HLS).

The ELS tier of the ES was designed as a so-called 'hands off scheme': easy for farmers to understand and to implement without any need for advice and open to all kind of farmers. Farmers can choose any management options from a menu of over 60 options. The menu of options contains, e.g., boundary, historical or landscape features and arable or grassland options (Natural England, 2010a). Each option has a points tariff per unit and an overall points target for the farm is established based on the area and land type of the holding. Provided the points target is achieved, a five year agreement is offered with an annual payment of £30 per ha (for lowlands).

NE allocates HLS agreements only where they are likely to achieve the greatest environmental benefit. The ten-year HLS agreements are drawn up in discussion with NE advisers. HLS is not based on a fixed payment rate, each option is worth a certain amount of money per unit and the overall agreement payment reflects the combination and area of individual options within the agreement. The menu of HLS options covers a wide range of potential habitats and features, similar to ELS, but the management requirements are typically more complex and demanding. The scheme also has similar additional options designed for specific habitats e.g., moorland, lowland heathland, coastal locations, and wetland. Extra payments are offered selectively for capital investments, to support changes in land management practice and deliver access improvements and maintain and conserve cultural heritage features on farmland. Compared to ELS a key difference of HLS is its high supply of support and advice. Regular farm visits monitoring progress against 'Indicators of Success' established for each agreement allow progress to be assessed and the need for adjustments to agreements to be identified (Natural England, 2010b).

In May 2013 ES- and remaining ESA- or CSS-agreements covered in total an area of 6,513,389 ha in England, which is 70 % of all English agricultural land. Within this, ELS uptake is the dominant component in terms of area (Natural England, 2013a). Spending on support and improvement of the environment and countryside with land management accounts for about 80 % of England's total share of the EU-second pillar funding (Peel, 2010). After the first five years of scheme operation, a range of studies confirmed that the ES can be an appropriate tool to protect valuable ecological sites and to make progress towards delivering the schemes' environmental objectives (Natural England, 2008; Natural England, 2009; Peel, 2010; Tucker, 2010). The simple structure of ELS allows for a high rate of scheme participation providing some environmental benefits over a large area with relatively low administrative costs. The more complex structure and support offered by HLS, in contrast, allows more flexibility in targeting, agreement set ups, and farmers' management with a focus on the outcomes.

With regard to this targeted approach for an AES and the high effort which is put into it, it would be interesting to find out how farmers' intention to join the ES is influenced and to assess how advantages and disadvantages of participation are perceived by farmers with agreements under the

¹ Natural England is an independent public body and a government advisor, providing practical advice, grounded in science, to protect and improve England's environment.

scheme. This could lead to findings helpful to further improve ES and AES in general and to gain knowledge about farmers' behaviour regarding environmental measures. To address this challenge the 'Theory of Planned Behaviour' was chosen to serve as study construct.

1.2 The Theory of Planned Behaviour

The TPB was developed by Ajzen in 1985 to predict human intentions to exhibit certain behaviour and is an extension to the 'theory of reasoned action' (Ajzen and Fishbein, 1980). As Figure 1 shows, within the approach of the TPB, human behaviour is determined by the intention towards certain behaviour and the actual behavioural control over this behaviour. The intention in turn is a result of three determinants: the attitude towards the behaviour (favourable or unfavourable), subjective norms (social pressure through others), and the perceived behavioural control over certain behaviour. The source of these determinants and the basis of the whole theory are the related salient beliefs (outcome, normative and

control) which are then multiplied by their corresponding judgements. The products of these factors reflect the whole range of personal experiences, varying influences or received information readily accessible in memory. Whereas the behavioural beliefs consist of the perceived personal outcomes of certain behaviour (advantages, disadvantages or other associations), the normative beliefs reflect other groups of people or individuals who are noticed to have influence or an opinion on the intention to perform the behaviour. The control beliefs are a perception of factors that may allow or facilitate certain behaviour but also factors that hamper or preclude somebody from this.

2 Material and methods

2.1 Applying the 'Theory of Planned Behaviour': Conceptual framework

In this study, the TPB was not applied to predict a behaviour but to serve as construct for assessing aspects that influence

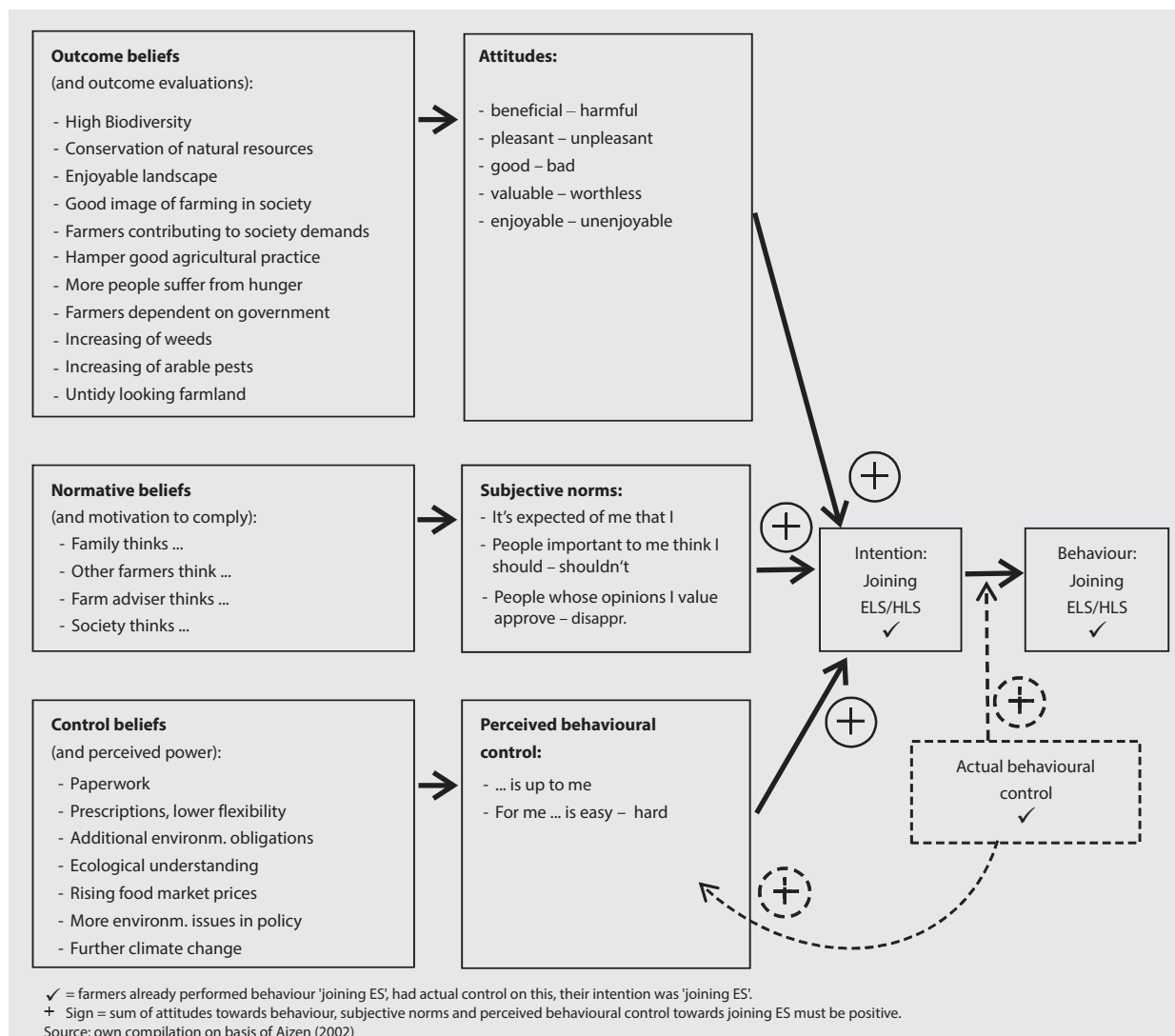


Figure 1
Conceptual framework for ex-post application of the Theory of Planned Behaviour regarding farmers' behaviour 'joining the ES'

the decision to 'join the ES'. Also Beedell and Rehman (1999) showed that the TPB can be a good tool to explain behavior. Figure 1 illustrates how the different elements of the TPB were defined in this case study and which items or questions were set to measure them. Since the interviewed farmers had already joined ES, the actual behaviour, their control on the behaviour and their intention was already defined. This in turn means that the sum of attitudes towards the behaviour, the subjective norms and the perceived behavioural control towards joining the ES must be positive. To design questions assessing the different TPB elements not yet pre-defined, appropriate literature was reviewed. Subsequently, the content of behavioural beliefs likely to be shared by the target population was identified and potential influencing groups and other controlling factors were defined. The most often listed statements were selected and converted into a set of statements which should reflect the beliefs that might affect the behaviour of the target population.

All questions regarding the TPB were designed in close connection to Ajzen (2002), whereby questions regarding the personal beliefs are supposed to be relatively concrete, questions to assess farmers' attitudes, perceived subjective norms, and perceived control are asked more indirectly in order to obtain also subconscious perceptions and feelings of the farmers.

2.2 Interview procedure, sample and data analysis

Based on the conceptual framework, interviews with farmers were conducted in summer 2010 in the 'Yorkshire and The Humber' region of northern England. Interviewed farmers had to meet both of the following sample criteria: i) be located in one of the selected authority regions; ii) hold an HLS-agreement. A non-probabilistic sample of 44 farmers fulfilling these criteria was contacted and 32 face-to-face interviews with farmers were conducted. This resulted in a response rate of 73 % and enabled us to perform statistical tests (Raab-Steiner and Benesch, 2010). The interviews were carried out on the holdings of the farmers as investigative, individual interviews using a standardised questionnaire as in Schroeder et al. (2013). The interviewer explained the questionnaire to the farmers and directly transcribed their answers step by step, which minimized the risk of bias with regard to e.g., misunderstanding the Likert scale or the questions. When farmers asked how to define term 'society', which was the relatively often used in the questionnaire, the interviewer answered: "the general public, the neighbours, but also the media and the politicians."

The total area of the study (summing up the area of all farmers interviewed) comprised 9,694 ha. The smallest farm in the sample was 10 ha, the largest 1,342 ha. 27 farmers (84 %) ran their farm as their main business. Two farmers (6 %) managed their land organically. All 32 farmers (100 %) had permanent grassland and had HLS agreements, 28 farmers (88 %) had ELS agreements. 17 farmers (53 %) managed land that was identified as a 'Site of Special

Scientific Interest' (SSSI ²). The age of the farmers was between 29 and 75 years and interviewed farmers were mainly male (27 farmers = 84 %). To test whether the sample reflects the region and to assess the potential transferability of the results, variables assumed to be relevant and for which data was available were compared to the corresponding averages of the region (see Table 1).

Table 1
Comparison of sample characteristics with population

Variable	Study area 'Yorkshire and The Humber' ^a	Case study sample
Farm size of HLS-agreement holding farms	159.5 ha (mean)	155.5 ha (median)
Average area of land in ES-grassland options per farm	ELS = 15 ha; HLS = 14 ha	ELS = 16 ha; HLS = 11 ha

^a Study area = 'Yorkshire and The Humber'.
Own calculation for 2010 on basis of data from 'Natural England', York

Since these tests resulted in comparable values, it can be presumed that the characteristics of the sample of farmers interviewed in this case study, and hence also their answers are relatively representative of all farmers already joining ES in the region 'Yorkshire and the Humber' and they could serve as orientation for further studies.

The questionnaire contained questions about the general farm business structure, farming characteristics and ES-agreements, 23 items for beliefs (OB see Figure 8 in the annex, NB see Figure 4, CB see Figure 6), each for ELS and for HLS, and 23 items for their evaluative components (OE see Table 3 in the annex, MC see Table 4 in the annex, PP see Figure 6). The questionnaire ends with demographic questions. Different scales were used to categorize the answers (nominal, ordinal, and interval). However, predominantly a five-point Likert scale was used. A pilot test served as proof of the questionnaire and its further development.

For the description of the data obtained, frequencies, median, and inter-quartile range were calculated. The TPB belief constructs were calculated in order to obtain an overall level of a belief and the corresponding personal evaluation for each farmer:

$$[1] \quad OBC = OB_i \times OE_i$$

$$[2] \quad NBC = NB_j \times MC_j$$

$$[3] \quad CBS = CB_k \times PP_k$$

² Areas of special nature value due to their flora, fauna, geological or physiographical conditions, protected by law (Natural England, 2013b).

Furthermore, a score was calculated summing up all these products for each farmer of the whole sample:

$$[4] \quad OBC \text{ Score} = \sum OB_i \times OE_i$$

$$[5] \quad NBC \text{ Score} = \sum NB_j \times MC_j$$

$$[6] \quad CBS \text{ Score} = \sum CB_k \times PP_k$$

To assess the consistence of farmers' evaluations gained in this study their given answers were tested for correlations. Because two ordinal scaled variables had to be compared for this, non-parametrical bivariate correlations were carried out according to Spearman (two-tailed). The Spearman rank correlation can be used to test two ranked variables and if normality cannot be guaranteed (McDonald, 2014).

3 Results

In this section, the results of applying the TPB will be presented. This will be done by describing each of the three constructs with its elements separately. For example, first the results regarding farmers outcome beliefs, then the outcome beliefs multiplied by the corresponding outcome evaluation, and afterwards farmers general attitude towards 'joining the ES' will be presented. The same will be done for the normative construct and the control construct. For the questions regarding ELS, a sample of 28 farmers was interviewed, and for HLS, the sample was 32. This difference is due to the fact that all farmers interviewed had HLS agreements but four farmers had no ELS agreement, which is possible but relatively uncommon.

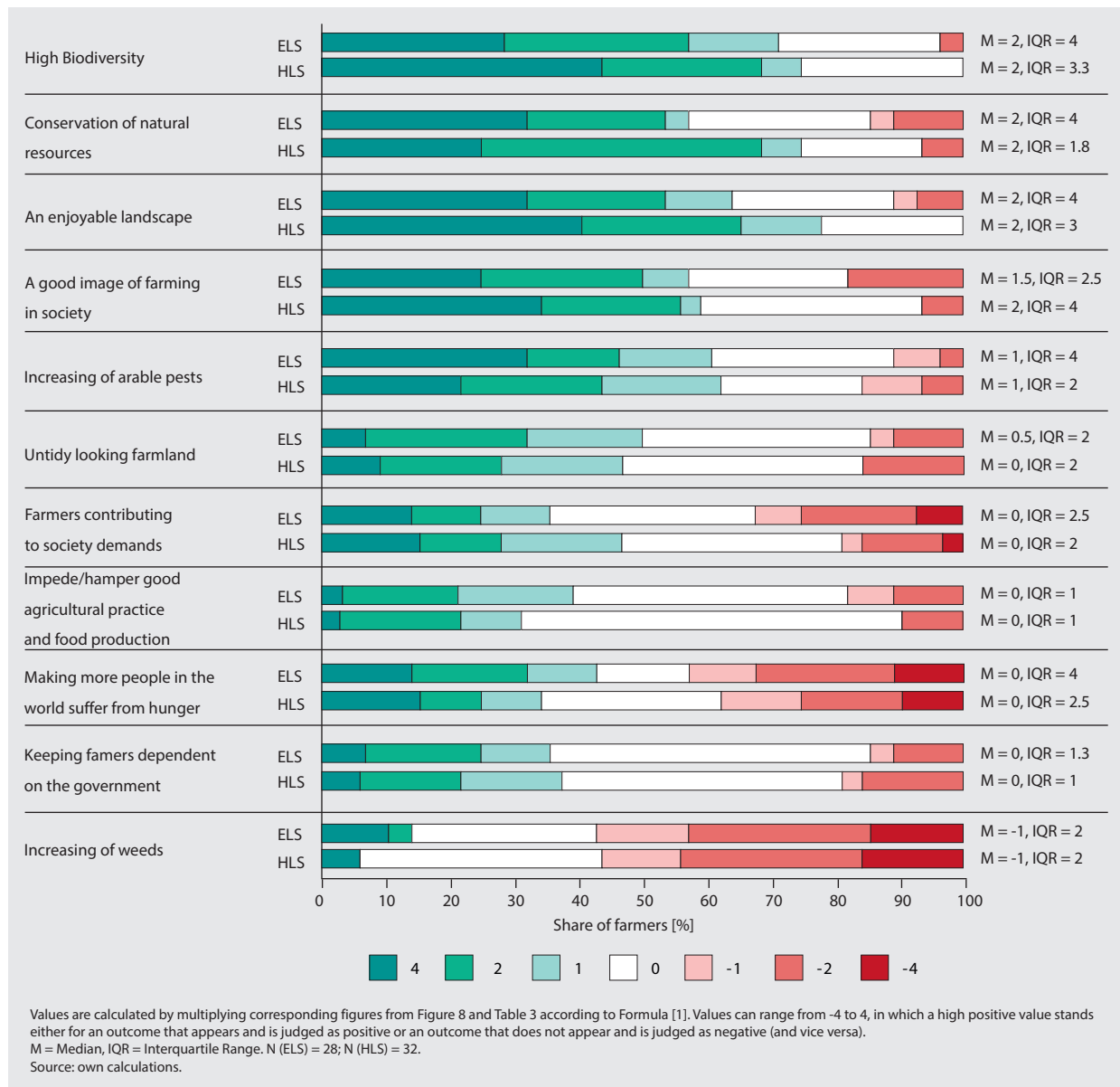


Figure 2
Product (OBC) of ELS and HLS outcome beliefs (OB) and outcome evaluation (OE)

3.1 Outcome beliefs, outcome evaluation and attitude towards the behaviour

Farmers perceived ELS as positive. They saw the advantages and disadvantages also pointed out by former studies. The only neutral/uncertain result was obtained for 'ELS keeps farmers dependent on the government' and 'ELS leads to increase of weeds'. Both statements had high Inter Quartile Ranges (IQR) (see Figure 8, in the annex). For HLS, the statements regarding outcome beliefs were rated similar to ELS. Generally, the outcome of joining HLS was perceived even more positively than of joining ELS.

Because the evaluation of the above listed statements can be very different between individual people and in order to interpret the results presented above correctly from the farmers' point of view, it was required to ask them about their general personal evaluation of aspects contained in the different outcome statements. The results are shown in Table 3 in the annex. The only relatively high IQRs were found for 'Keeping farmers dependent on the government' and 'Increasing of weeds'. However, the median for both statements was still -1.0. All evaluations of each farmer, in which 2 represented '(...) is generally very good', -2 '(...) is generally very bad' and 0 the neutral opinion, were multiplied by the given answer for the corresponding outcome belief (2 = 'totally agree'; -2 = 'totally disagree'). The results of this multiplication are shown in Figure 2.

The only negative product (on average) was gained for the aspect 'increasing of weeds'. Neutral results (on average), meaning that one of the factors was 0 (evaluated neutrally), were calculated for 'Farmers contributing to society demands', 'Impede/hamper good agricultural practice and food production', 'Making more people in the world suffer from hunger' and 'Keeping farmers dependent on the government'.

The variation in results was relatively high for the majority of the statements. The outcome score (sum of all multiplications per farmer, see Formula [4]) for 'joining ELS' was on average 7.5.

For HLS, the results were on average very similar, but for some statements, higher positive frequencies were obtained (e.g., regarding biodiversity, landscape, farming image in society).

The outcome beliefs that a farmer holds regarding 'joining the ES' lead to his general attitude towards this behaviour. To assess this attitude, farmers were asked to judge in general terms their decision to join ES. As Figure 3 shows, a very positive feedback was given for joining ELS as well as for joining HLS, farmers gave generally very similar answers regarding their general attitude towards joining these two tiers. However, for the statements 'Joining ELS/HLS is pleasant – unpleasant' and 'Joining ELS/HLS is enjoyable – unenjoyable' their valuation was not as high as for the other statements.

3.2 Normative Beliefs, motivation to comply and subjective norms

As presented in Figure 4, the highest level of agreement from other people for the farmer to join ELS was assigned to the family of the farmer with a very low IQR of 0.0. The highest indecision of the farmers in this context was obtained for estimating the opinion of their colleagues (mode = 0, median = 0.5, IQR = 2.0). The opinion of the adviser and the society was also judged as affirmative, but both with a relatively high IQR of 2.0.

Also for HLS the highest consensus for joining the programme was assigned to the family with a low IQR of 1.0.

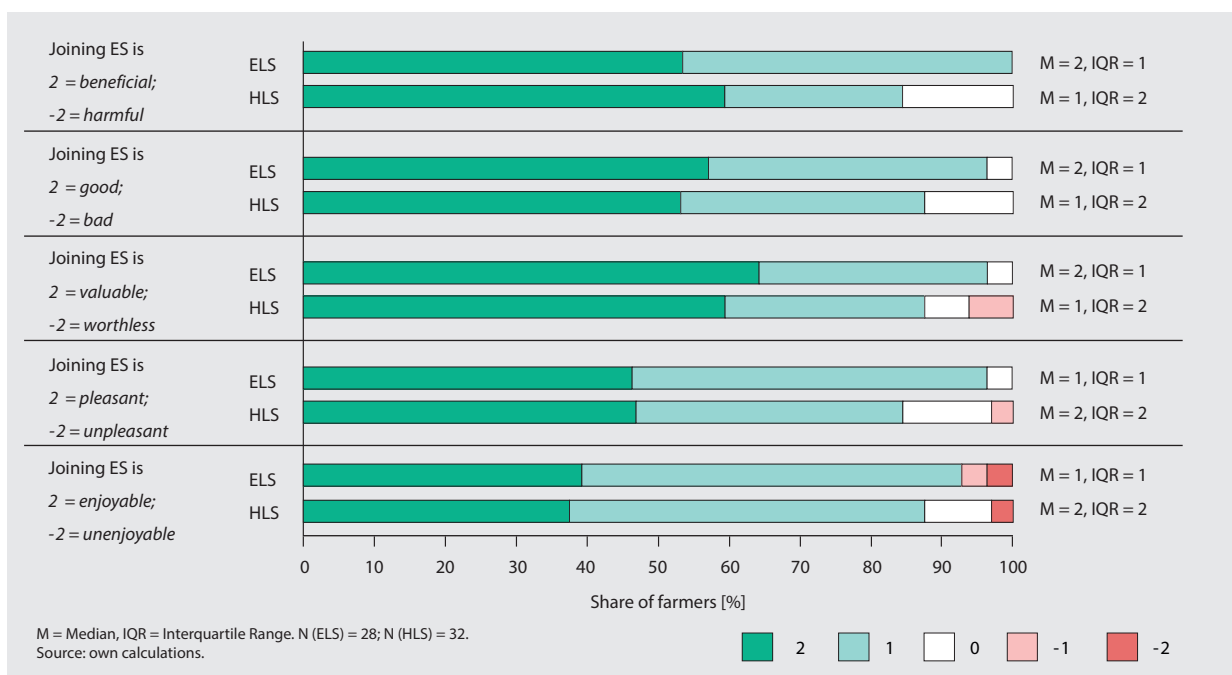


Figure 3 Farmers' attitudes towards joining ELS', joining HLS'

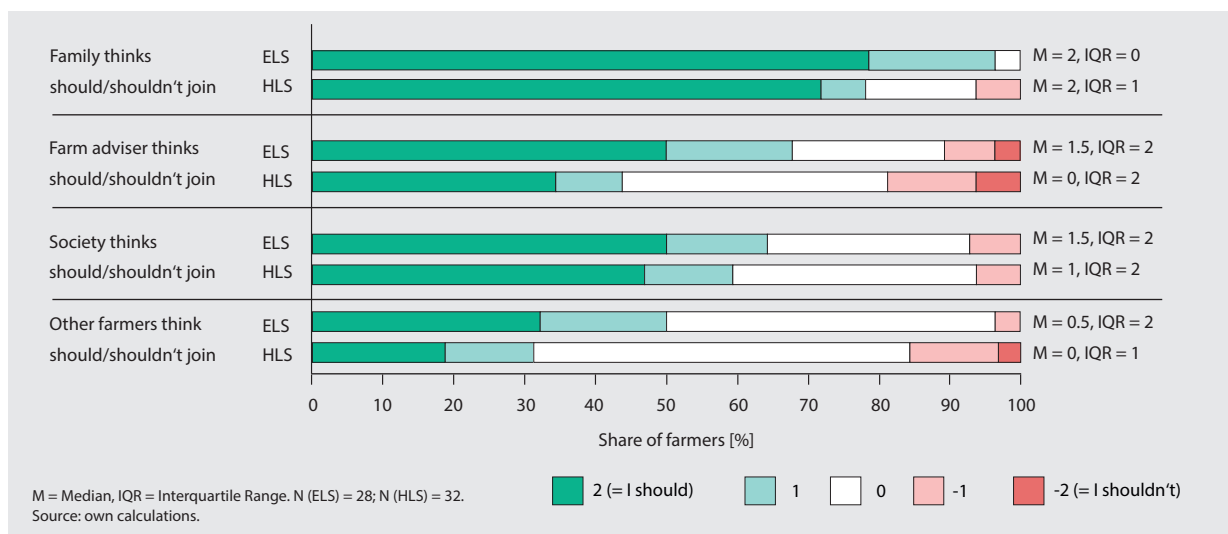


Figure 4 Farmers' normative beliefs (NB) regarding 'joining ELS' and 'joining HLS'

Farmers judged the opinion of colleagues as neutral/undecided, like they did also for ELS, with a low IQR of 1.0. Also the opinion of the farmer's adviser was judged undecided in total but two different bigger groups of farmers were observed: one group thinks advisers would strongly welcome farmers joining the HLS and one group being undecided. On average, the farmers thought that the society would relatively appreciate their joining HLS but also here two different groups of farmers were observed: one group thinking that the society would strongly welcome their joining the HLS and one being undecided about it.

The motivation of farmers to generally comply with the opinions of other people was measured with a five-step Likert scale in which 1 represented 'not at all', 3 the neutral evaluation, and 5 'very much'. The highest motivation was observed with regard to their family, followed by their adviser (see Table 4 in the annex). Farmers were on average relatively undecided about their motivation to comply with the opinion

of the society and of other farmers. Their motivation to comply with the opinion of their adviser was slightly higher but still relatively undecided. Table 2 shows the results of multiplying the motivation to comply by farmers' evaluation about the opinions of other people concerning 'joining ELS' and 'joining HLS' (normative beliefs). This was done in order to interpret farmers' evaluation about the opinions of other people concerning joining the ES more correctly. From the farmers' point of view, the highest (positive) social pressure comes from their families and the lowest from other farming colleagues. All potential influencing social groups were perceived to have a positive influence on the behaviour 'joining ELS'. For HLS, the social pressure is generally slightly lower. For 'other farmers' and the farm advisor, the product was 0.

As shown in Figure 5, all farmers stated that people whose opinions are of high value for them approve of them joining the ES. The majority of farmers perceived that it was generally expected for them to join ELS. For HLS, many

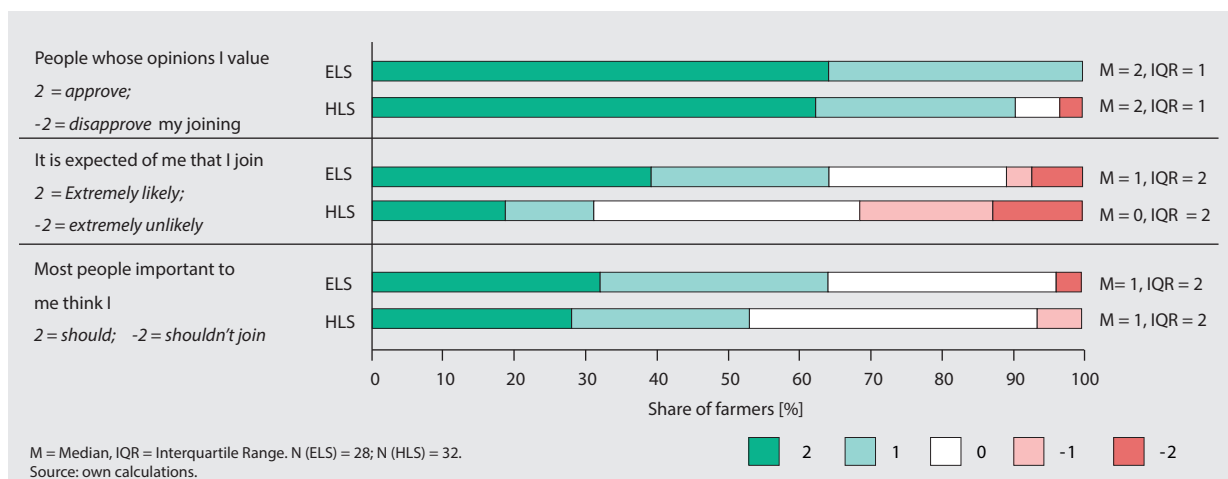


Figure 5 Farmers' evaluation about social pressure concerning their 'joining ELS' and 'joining HLS' (subjective norms)

farmers had a neutral opinion in this concern. On average, farmers thought that most people who were important to them appreciate their joining the ELS. For HLS, many farmers thought similarly, but also many farmers had a neutral opinion.

Table 2

Product (NBC) of ELS and HLS normative beliefs (NB) and motivation to comply (MC)

		Median	IQR	No.
Family	ELS	8	6	28
	HLS	8	7,3	32
Other Farmers	ELS	1,5	6	28
	HLS	0	3,3	32
Farm adviser	ELS	5	8	28
	HLS	0	8	32
Society	ELS	4	6,5	28
	HLS	3,5	6,5	32
ELS NBC score		17,5	14,5	28
HLS NBC score		11,5	18,5	32

Values are calculated by multiplying corresponding figures from Figure 4 and Table 4 according to Formula [2]. Values can range from -10 to 10, in which a high positive value stands either for a positive attitude of others towards AES and a high desire of the farmers to meet the expectations of this group or a negative attitude of others towards AES and a refusal of the farmers to meet the expectations of this group (and vice versa). NBCi scores: see Formula [5], values can vary from -40 to 40, in which a high positive value stands for a high positive social pressure to join the scheme and vice versa.
Source: own calculations

3.3 Control beliefs, perceived power and perceived behavioural control

Figure 6 shows farmers control beliefs and their perceived power regarding 'joining ELS' and 'joining HLS'. Farmers thought that paperwork is too much for ELS and HLS. If this would become even more, it would get much more difficult for them to join ES. There was a strong consistence between the different farmers for these statements (IQR = 1.0). The prescriptions of ELS were perceived as less constrictive as those for HLS. However, farmers thought their management flexibility to be reduced in both cases. If these restrictions were to increase, farmers assumed that it would become more difficult for them to join the ES. Nevertheless, farmers expect additional environmental farming obligations to come along in the future. Too many of those obligations would make it more difficult for them to join the ES. On the other hand, farmers think that in general, more consideration of environmental conservation in policy would make it easier for them to join the ES. The vast majority of farmers thought that the quality and quantity of environmental advice have big impact on a better understanding of ecological processes and management effects and that this in return makes it easier to join ELS and especially HLS. Farmers were relatively undecided about the future development of food prices and also about potential influence of those developments on joining the ES. Farmers expected climate change to

carry on in the future but could hardly say if this would influence them in joining the ES.

Figure 7 shows the results of general perceived control for the behaviour 'joining ELS' and 'joining HLS'. The vast majority of farmers had the feeling that it is definitely up to them whether they join the ES or not. Furthermore, they find it easy to join ELS. Regarding HLS, this judgement differed greatly; all steps from 2 to -2 were named in comparable frequencies.

4 Discussion

In this study, the TPB was applied not to predict a behaviour (for which it was actually developed) but to serve as construct for assessing influencing aspects on farmers' acceptance of AES in a case study in the 'Yorkshire and the Humber' region. For this purpose, farmers who already performed the behaviour 'joining the ES' were interviewed. Many expectations based on the literature review were confirmed by the results of this study and hence approve the applicability of the TPB ex-post application and for analysing the acceptance of AES. However, unexpected results also emerged and these are discussed and compared to findings from the literature in the following section.

4.1 Outcome beliefs and attitude towards the behaviour to measure the acceptance and perception of the aims behind AES

The farmers link more positive than negative impressions with the outcome of 'joining the ES' (positive OBC score), which leads to a positive attitude towards the ES and can hence be judged as one major issue why the farmers joined the ES. The OBC scores were more positive for HLS than for ELS. Consequently farmers perceived HLS to produce more positive outcomes. The highest OBCs were observed for the ES outcomes 'increasing biodiversity', 'conservation of natural resources', and 'enjoyable landscape'. These observations can be confirmed by findings from Januchowski-Hartley et al. (2012) that farmers value improved landscape aesthetics as private benefit, or Bertke et al. (2010) who found that improvement of the environment is one reason for farmers to join AES and hence perceived as a valuable outcome. On the basis of these results, it is concluded that the major aims of the scheme are recognized by the farmers and that they think that ES is generally delivering these benefits. Regarding HLS, the outcome 'good image of farming in society' resulted in a comparably high OBC, which can be attributed to the success and high acceptance of the 'public access' HLS-options. Also Bertke et al. (2010) and Siebert et al. (2010) found that improving the image of farmers is one reason for them to participate in AES and Januchowski-Hartley et al. (2012) state that public recognition is important for farmers for providing public goods.

Nevertheless, it should be noted that also negative outcomes of 'joining the ES', i.e., 'increase of weeds', were recognized by the farmers. This logic negative effect was also

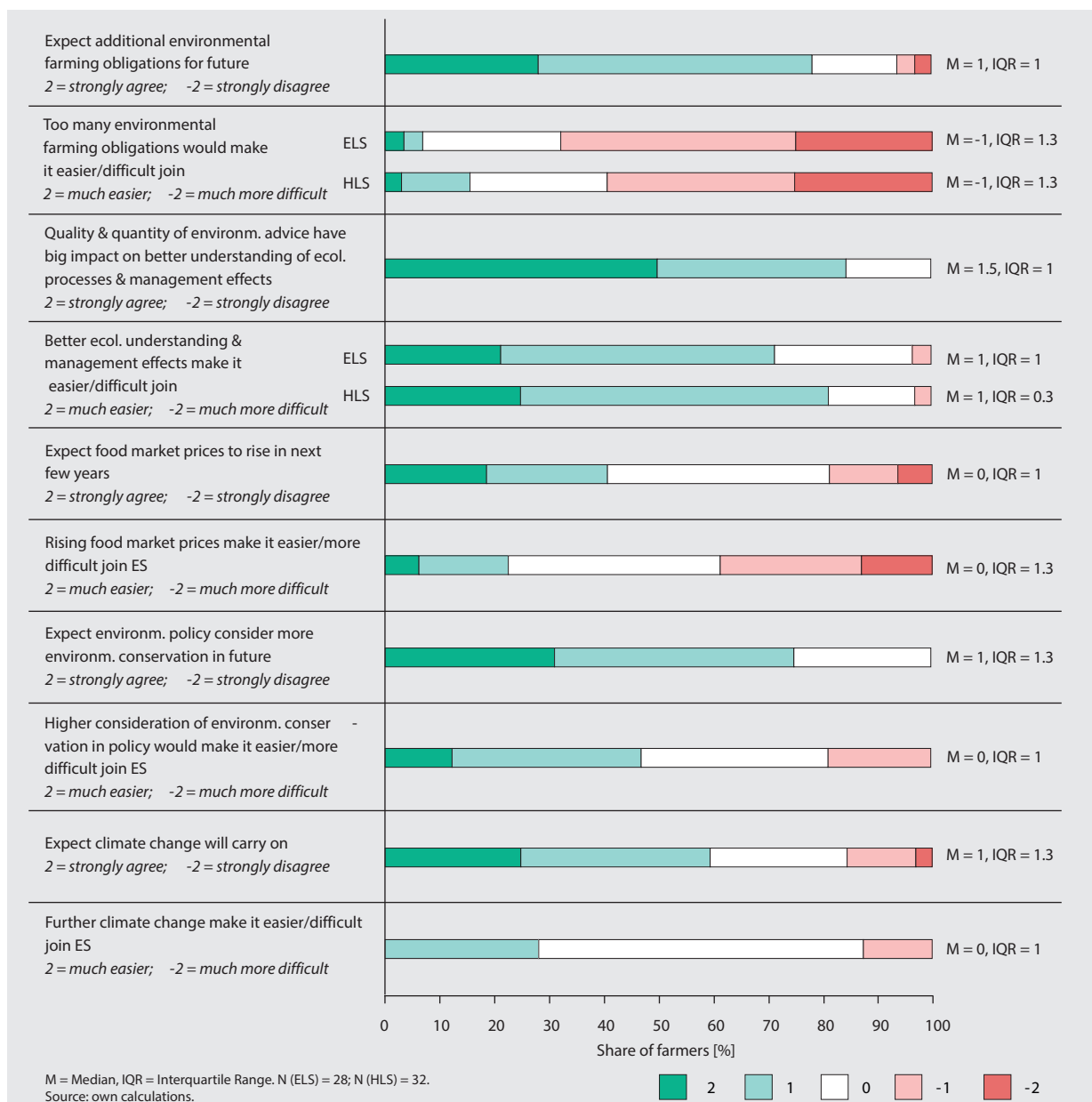


Figure 6 Farmers' control beliefs (CB) for 'joining ELS' and 'joining HLS' and perceived power (PP)

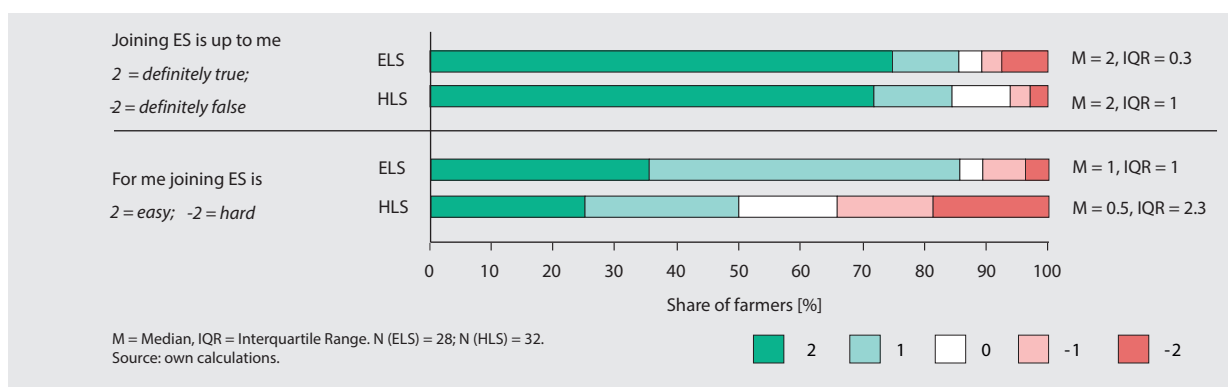


Figure 7 Farmers' perceived behavioural control for 'joining ELS' and 'joining HLS'

perceived by farmers interviewed by Beedell and Rehman (1999) as consequence of environmentally friendly hedge management. Outcomes, which are perceived as negative can have a negative impact on the acceptance of a scheme and should hence either be considered in the amount of payment or in the design of the management options and should be addressed in advisory actions.

Finally, the results for the items measuring farmers' actual attitude towards the behaviour 'joining the ES' were all very positive. Within these, the more emotional statements resulted in a slightly lower positive attitude. A possible explanation could eventually be that farmers perceive the material values or monetary advantages of 'joining the ES' as more positive than the emotional or ideological advantages. However, this issue cannot be proven by the results of this case study and the literature provides contradictory findings in this regard. Siebert et al. (2010) or Franco (2011), for example, stated that financial gain is the main reason for farmers to participate, whereas Januchowski-Hartley et al. (2012) found that anticipated private benefits are strong drivers. It should therefore be considered that it might be a compromise between these extremes and that this is of course case specific.

4.2 Normative beliefs and subjective norms to measure who might influence farmers intention to join AES

Indeed, all three constructs of the TPB influence the intention of farmers to join ES, but the aim of this study was to identify single critical aspects from these constructs. In this regard, it was found that the family is the social group which most influences the intention of a farmer. This is consistent with the literature, which shows that farmers' families have a strong influence on the decision-making process (Siebert et al., 2006; Siebert et al., 2010; Christensen et al., 2011). In this study, the acceptance of the family was pro 'joining the ES' and therefore resulted in a high positive pressure for the farmer. To consider also details and the high complexity of interactions in decision making processes within farmers' families, further investigations and literature analyses need to be carried out.

Interestingly, the opinion of the other farming colleagues was judged as relatively irrelevant. This is in contrast to the general findings in the literature: Defrancesco et al. (2008) and Hynes and Garvey (2009) show that the opinion of neighbours regarding AES has significant influence on the farmers to adopt AES. Also Siebert et al. (2010) found that colleagues influence the decision-making of farmers. A possible explanation for this contradiction could be that in this study, the question was asked too directly and obtained a biased result (Raab-Steiner and Benesch, 2010). Even though it was suggested by Ajzen (2002) to ask directly how much a person wants to comply with the opinion of others, farmers might have felt too dependent on other people's judgements, if they would have stated that they care a lot about the opinion of farming colleagues. Therefore, the operationalization of the study question should be questioned. In open interviews, it would be easier to assess the influence

of farming peers. Another reason for the low influence of neighbours' opinion could be that the scheme was established already five years before the survey was carried out so that it might have been already common behaviour to join the schemes and that colleagues no longer matter in the decision-making process.

Also the opinion of the farm adviser was not ranked as to influence the behaviour of the farmers in this study much, which is in contrast to Siebert et al. (2010), who found that advisers influence farmers' behaviour at least to some extent. The farmers interviewed in this study responded that the farm adviser (agronomist) had a relatively neutral opinion whether farmers should join HLS. Hence, it is very important to include farmers' family and to work closer together with the farm advisers while promoting an HLS-option or conclude new HLS-contracts.

4.3 Control beliefs and perceived behavioural control to measure what drives farmers to join AES and which issues might make them insecure

Regarding aspects that were perceived to have influence on the personal control of farmers to join the ES, paperwork, scheme prescriptions and environmental advice should be noted. It was found that more paperwork or more prescriptions were perceived to make farmers' 'joining the ES' much more difficult, which should be considered when a scheme is designed. The high load of paperwork was also underlined by many farmers during the interview before this question was actually asked. These findings confirm the results of several other studies: Ruto and Garrod (2009) found that farmers require higher payments for schemes, which involve more paperwork; in the survey of Bertke et al. (2010) many farmers criticised that the level of bureaucracy of AES is too high; and Christensen et al. (2011) state the amount of paperwork is very important for farmers' decision to participate in environmental conservation measures. Scheme management restrictions for AES are also widely represented in the literature (Ruto and Garrod, 2009; Bertke et al., 2010; Espinosa-Goded et al., 2010; Christensen et al., 2011).

Aspects that were considered to make the joining of the ES easier were in this study generally higher consideration of environmental conservation in policy in the future and good quality and quantity of environmental advice because this would lead to a better understanding of ecological processes and management effects which was assumed to be helpful, especially for joining HLS. However, ultimately, farmers perceived that it was within their control to join the ES or not and that joining ELS was relatively easy. For HLS, many different opinions regarding this concern were observed. Hence, one aim for the future could be making HLS more easily understandable for farmers and to ease the procedure in which the farmer is involved. Otherwise, the high complexity and difficulty could lead to a lower willingness of farmers to join HLS. At the same time it should nevertheless be kept in mind that to a large part the high complexity of HLS allows for great success regarding environmental goals and is therefore often needed.

4.4 Critical appraisal

While interpreting the results of this study, it should be noted that measuring opinions of people is a difficult task and that some unconscious opinions, personal values, or behaviour might not have been expressible by the farmers and hence not been measurable. For further studies, it could be an option to develop the questions or items on basis of a prior elicitation study in which a smaller number of farmers would be asked openly about their (TPB) beliefs. The most often stated beliefs could subsequently be listed for the questionnaire. Indeed, some given answers in this study were correlated to others, e.g., 'HLS leads to an increase in weeds' and 'HLS makes farmland look untidy', or 'Prescriptions of HLS lead to lower flexibility in farming' and 'HLS impedes/hampers good agricultural practice and food production' (data not shown). This shows the link between farmers' perceptions and the consistence of their evaluations gained in this case study.

For further research, it would be interesting to apply the TPB for farmers who are not joining the ES and subsequently compare the results in order to prove whether reasons for refusal might be in accordance with issues identified to be critical in this study.

5 Conclusions

In this paper, the TPB was applied as theoretical construct to assess the acceptance of English farmers of AES and to identify factors influencing their decision to join the schemes. Interviews were conducted with farmers already participating in ES. The results show that these farmers judge the ES to produce more positive than negative outcomes and that HLS has higher positive impacts than ELS. Positive scheme effects included the increased biodiversity, conservation of natural resources, an enjoyable landscape and a good image of farming in the society and lead to a positive attitude towards joining the ES. It is therefore concluded that the major aims behind the ES are recognized and accepted by the farmers. However, the scheme outcome increasing of weeds was judged as negative and needs to be considered in future developments of the ES to avoid a decreasing scheme acceptance. Another approach could be here to try to change farmers' attitude towards weeds, taking into account that they ranked biodiversity as a positive outcome of AES. The intention of farmers to join AES is, besides their own attitude, also influenced by social pressure through others. The highest social pressure on farmers' decision making process occurs through their family, which is pro joining the ES. The results show that the farm adviser also influences farmers' intention, but to a lower extend. His opinion whether the

farmers should join ES was judged as pro joining ELS but neutral regarding HLS. It is therefore suggested that it is very important to work more closely together with the farmers' advisers while promoting an HLS-option or conclude new HLS-contracts and to involve the farmer families. Also farmers' perceived behavioural control influences their intention to join AES and is a result of their control beliefs. High load of paperwork and tight scheme prescriptions were identified to have negative influence and a good environmental advisory service to have positive influence on farmers' intention to join the ES. This leads to the perception of the farmers that, even though it is within their control to join ELS or HLS and joining ELS was perceived to be relatively easy, some farmers found it difficult to join HLS. Hence, it should be considered for the future to make HLS more easily understandable for farmers and to ease the procedure in which the farmer is involved. The findings from this study and their confirmation through the literature show that an ex-post application of the TPB for analysing the acceptance of AES is applicable and it contributes to a better understanding of farmers' decision making process regarding the participation in AES in general. The results show furthermore the high acceptance of farmers in the 'Yorkshire and the Humber' region already participating in the ES of the scheme and provide essential information required for future development of AES. For the new programming period 2014 to 2020, in-deed, a simplification of scheme design can be expected for the new AES of England called Countryside Stewardship (Defra, 2014).

Acknowledgement

The development of the initial research idea and the data collection for this paper were carried out in connection with the final Master thesis of Lilli Aline Schroeder at the Georg-August-University of Göttingen in cooperation with 'Natural England' (NE). The data analysis and writing of the paper was carried out at the Thünen Institute of Rural Studies. We are grateful to Dr. Stephen Peel from 'Natural England' for his support, guidance, and the productive discussions. We also thank the NE-advisors from the York office who assisted and provided required information, and all English farmers for their cooperation and time for giving an interview. The thesis would not have been possible without the financial support of especially the DAAD (German Academic Exchange Service) and of the GFL (Gesellschaft der Freunde der Landwirtschaftlichen Fakultät Göttingen e.V.) for which we are very grateful. Furthermore, thanks are due to the anonymous referees for comments and suggestions for improvements of the manuscript.

Annex

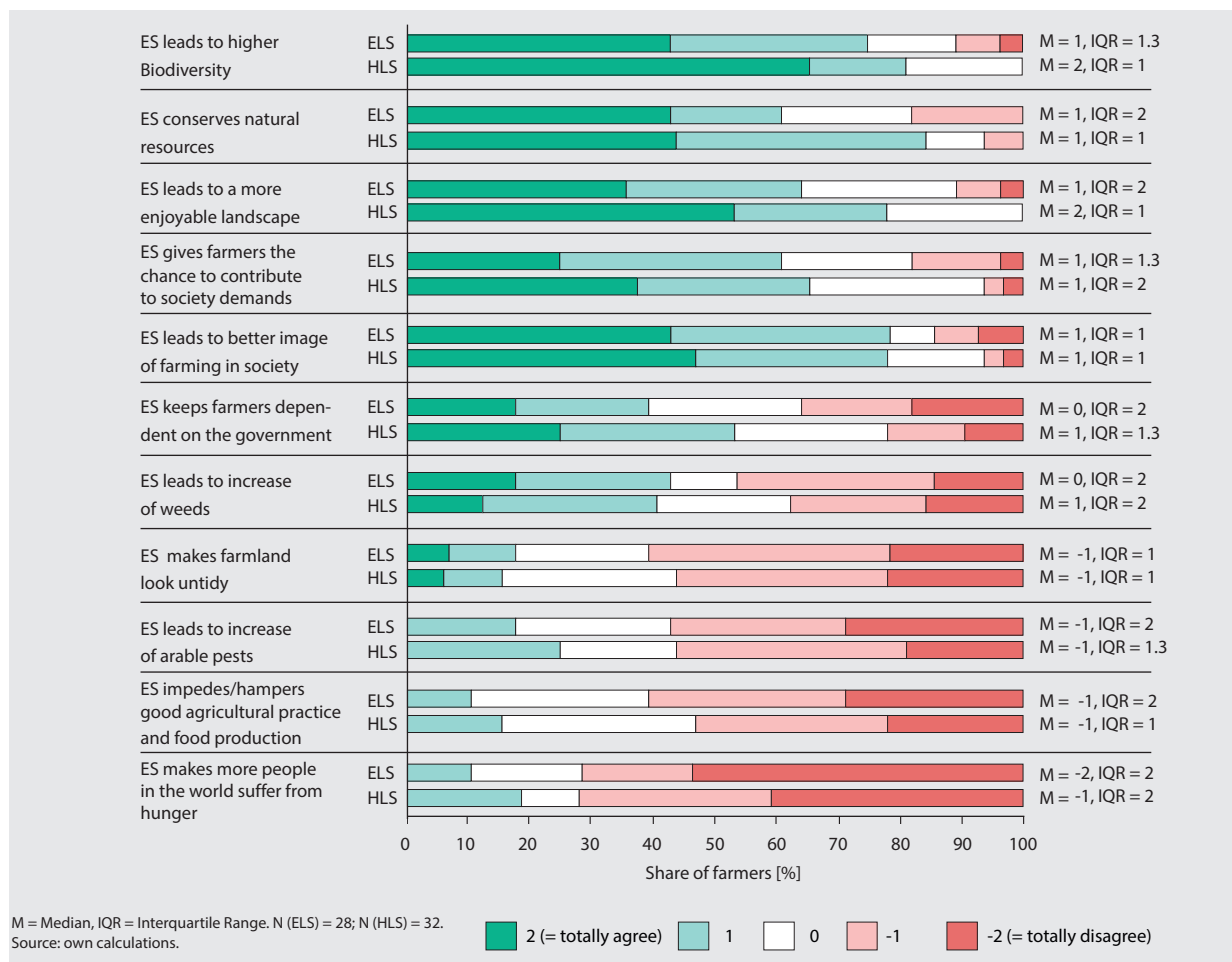


Figure 8 Farmers' outcome beliefs (OB) concerning 'joining ELS' and 'joining HLS'

Table 3 Farmers' outcome evaluations (OE)

	2	1	0	-1	-2	Median	Q1	Q3	IQR	No.
High Biodiversity is	16	11	5	0	0	1.5	1.0	2.0	1.0	32
Conservation of natural resources is	21	8	3	0	0	2.0	1.0	2.0	1.0	32
An enjoyable landscape is	22	10	0	0	0	2.0	1.0	2.0	1.0	32
A good image of farming in society is	23	6	3	0	0	2.0	1.0	2.0	1.0	32
Farmers contributing to society demands is	14	12	6	0	0	1.0	1.0	2.0	1.0	32
Impede/hampers good agricultural practice and food production is	1	0	12	14	5	-1.0	-1.0	0.0	1.0	32
Making more people in the world suffer from hunger is	0	0	3	8	21	-2.0	-2.0	-1.0	1.0	32
Keeping farmers dependent on the government is	0	0	10	10	12	-1.0	-2.0	0.0	2.0	32
Increasing of weeds is	1	0	7	9	15	-1.0	-2.0	-0.8	1.3	32
Increasing of arable pests is	0	0	4	14	14	-1.0	-2.0	-1.0	1.0	32
Untidy looking farmland is	1	1	4	12	14	-1.0	-2.0	-1.0	1.0	32

2 = 'extremely good'; -2 = 'extremely bad'. Q1 = first quartile; Q3 = third quartile; IQR = Interquartile Range. N = 32.

Table 4

Farmers' motivation to comply (MC) with opinions of others

	2	1	0	-1	-2	Median	Q1	Q3	IQR	No.
Want to do what family thinks	10	15	3	3	1	1.0	1.0	2.0	1.0	32
Want to do what other Farmers think	1	8	14	5	4	0.0	-1.0	1.0	2.0	32
Want to do what farm adviser thinks	5	11	11	3	2	0.5	0.0	1.0	1.0	32
Want to do what society thinks	2	8	19	1	2	0.0	0.0	1.0	1.0	32

2 = 'very much'; -2 = 'not at all'. Q1 = first quartile; Q3 = third quartile; IQR = Interquartile Range.
Source: own calculations.

References

- Ajzen I (1985) From intentions to actions : a theory of planned behavior. In: Kuhl J, Beckmann J (eds) *Action-control : from cognition to behaviour*. Berlin ; Heidelberg : Springer, pp 11-39
- Ajzen I (2002) Constructing a theory of planned behavior questionnaire : brief description of the theory of planned behavior [online]. To be found at <<http://people.umass.edu/ajzen/pdf/tpb.measurement.pdf>> [quoted 13.07.2015]
- Ajzen I, Fishbein M (1980) *Understanding attitudes and predicting social behaviour*. Englewood Cliffs, NJ : Prentice-Hall, 278 p
- Beedell JDC, Rehman T (1999) Explaining farmers' conservation behavior : why do farmers behave the way they do? *J Environ Manage* 57:165-176
- Bertke E, Kirchner C, Niens C, Tute C, Marggraf R (2010) Agrarumweltmaßnahmen in Zeiten des Klimawandels - Überlegungen zu einem ergebnisorientierten Ansatz. *SchrR Rentenbank* 24:55-83
- Christensen T, Pedersen AB, Nielsen HO, Morkbak MR, Hasler B, Denver S (2011) Determinants of farmers' willingness to participate in subsidy schemes for pesticide-free buffer zones : a choice experiment study. *Ecol Econ* 70:1558-1564
- Curry D, Browing H, Davis P, Ferguson I, Hutton D, Julius D, Reynolds F, Tinsley M, Varney D, Wynne G (2002) *Farming and food : a sustainable future ; report of the Policy Commission on the Future of Farming and Food* [online]. To be found at <<http://webarchive.nationalarchives.gov.uk/20100807034701/http://archive.cabinetoffice.gov.uk/farming/index/CommissionReport.htm>> [quoted 13.07.2015]
- Defra (2014) *The new Common Agricultural Policy schemes in England : december 2014 update* [online]. To be found at <<http://www.gov.uk/cap-reform>> [quoted 24.04.2015]
- Defrancesco E, Gatto P, Runge F, Trestini S (2008) Factors affecting farmers' participation in agri-environmental measures : a northern Italian perspective. *J Agr Econ* 59:114-131
- EC (European Commission) (2010) *Agriculture and the environment : Introduction* [online]. To be found at <http://ec.europa.eu/agriculture/envir/index_en.htm> [quoted 13.07.2015]
- EC (European Commission) (2013) *Political agreement on new direction for common agricultural policy*, Brussels, 26 June 2013 [online]. To be found at <http://ec.europa.eu/agriculture/cap-post-2013/agreement/index_en.htm> [quoted 29.08.2013]
- Espinosa-Goded M, Barreiro-Hurlé J, Ruto E (2010) What do farmers want from agri-environmental scheme design? : A choice experiment approach. *J Agr Econ* 61:259-273
- European Court of Auditors (2011) *Is agri-environment support well designed and managed?* [online]. To be found at <http://bookshop.europa.eu/en/is-agri-environment-support-well-designed-and-managed--pbQ-JAB11005/downloads/QJ-AB-11-005-EN-C/QJAB11005ENC_002.pdf?FileName=QJAB11005ENC_002.pdf&SKU=QJAB11005ENC_PDF&CatalogueNumber=QJ-AB-11-005-EN-C> [quoted 29.08.2013]
- Falconer K (2000) Farm-level constraints on agri-environmental scheme participation : a transactional perspective. *J Rural Stud* 16:379-394
- Franco JA (2011) Analysis about the participation factors in EU agri-environmental programmes of fight against soil erosion in olive groves. *ITEA-Inf Tec Econ Ag* 107:169-183
- Hynes S, Garvey E (2009) Modelling farmers' participation in an agri-environmental scheme using panel data : an application to the rural environment protection scheme in Ireland. *J Agr Econ* 60:546-562
- Januchowski-Hartley SR, Moon K, Stoeckl N, Gray S (2012) Social factors and private benefits influence landholders' riverine restoration priorities in tropical Australia. *J Environ Manage* 110:20-26
- Kirschke D, Daenicke E, Häger A, Kästner K, Jechlitschka K, Wegener S (2004) *Entscheidungsunterstützung bei der Gestaltung von Agrarumweltprogrammen : ein interaktiver, PC-gestützter Programmierungsansatz für Sachsen-Anhalt*. *Ber Landwirtsch* 82(4):494-517
- Koester U (2005) *Grundzüge der landwirtschaftlichen Marktlehre*. München : Vahlen, 445 p
- McDonald JH (2014) *Handbook of biological statistics* [online]. To be found at <<http://www.biostathandbook.com/index.html>> [quoted 21.07.2015]
- Natural England (2008) *Environmental stewardship : review of progress ; Defra - natural England 2008* [online]. To be found at <<http://collections.europarchive.org/tna/20081027092120/http://defra.gov.uk/erdp/schemes/es/es-report.pdf>> [quoted 14.07.2015]
- Natural England (2009) *Agri-environment schemes in England 2009 : a review of results and effectiveness* [online]. To be found at <<http://publications.naturalengland.org.uk/file/107014>> [quoted 14.07.2015]
- Natural England (2010a) *Entry level stewardship : environmental stewardship handbook ; NE226* [online]. To be found at <<http://webarchive.nationalarchives.gov.uk/20150714000001/http://publications.naturalengland.org.uk/publication/30034>> [quoted 14.07.2015]
- Natural England (2010b) *Higher level stewardship : environmental stewardship handbook ; NE227* [online]. To be found at <<http://webarchive.nationalarchives.gov.uk/20150714000001/http://publications.naturalengland.org.uk/publication/30034>> [quoted 14.07.2015]
- Natural England (2013a) *Land management update : may 2013* [online]. To be found at <http://webarchive.nationalarchives.gov.uk/20140605090108/http://www.naturalengland.org.uk/Images/lmupdate11_tcm6-35842.pdf> [quoted 14.07.2015]
- Natural England (2013b) *Sites of special scientific interest* [online]. To be found at <<http://www.naturalengland.org.uk/ourwork/conservation/designatedareas/sss/i/default.aspx>> [quoted 14.07.2015]
- Peel S (2010) *Grassland in agri-environment schemes : the science and the art*. *Asp Appl Biol* 100:19-26
- Peel S, Chaplin S (2008) Biodiversity of plants and animals in grassland systems approaches to conservation and restoration in England. In: *Multi-functional grasslands in a changing world : XXI International Grassland Congress, VIII International Rangeland Congress ; first joint conference held June 29-July 5, 2008, in Hohhot, China ; vol 2*. Guangzhou : Guangdong People's Publ House, pp 993-998
- Raab-Steiner E, Benesch M (2010) *Der Fragebogen : von der Forschungsidee zur SPSS/PASW-Auswertung*. Wien : Facultas-Verl, 190 p
- Ruto E, Garrod G (2009) Investigating farmers' preference for the design of agri-environment schemes : a choice experiment approach. *J Environ Plan Manage* 52:631-647
- Schroeder LA, Isselstein J, Chaplin S, Peel S (2013) *Agri-environment schemes : Farmers' acceptance and perception of potential "Payment by Results" in grassland ; a case study in England*. *Land Use Pol* 32(1):134-144, doi:10.1016/j.landusepol.2012.10.009

- Siebert R, Toogood M, Knierim A (2006) Factors affecting European farmers' participation in biodiversity policies. *Sociol Ruralis* 46:318-340
- Siebert R, Berger G, Lorenz J, Pfeffer H (2010) Assessing German farmers' attitudes regarding nature conservation set-aside in regions dominated by arable farming. *J Nat Conserv* 18(4):327-337
- Tucker R (2010) Preserving the balance. *Asp Appl Biol* 100:1-2