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Farmers' preferences for agro-environmental contract design
ITAES WP7 Final Report

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Abstract:
The research under Work Package 7 adopts a choice experiment approach to explore how farmers trade-off generic design attributes of agri-environment schemes against each other and the associated per hectare payments. Modelling choice experiment data permits us to determine the relative preferences of farmers in the ITAES partner countries for key scheme design elements such as contract length, level of paperwork, and flexibility over area under agreement or over adherence to scheme prescriptions. Analysis of choice models also allows us to derive a monetary value of the farmers' willingness to trade off per hectare payments for desired changes in these generic attributes. Overall, the results of this study suggest that a choice experiment approach could provide a suitable framework for investigating farmers' preferences for AES design and gives some insights into the contract attributes that farmers find most important when deciding to participate in schemes.

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1.0 Introduction

A range of criteria are available to guide the design and delivery of agri-environment schemes (AES). The relevance of these criteria will depend on the objectives of individual schemes and the institutional context within which they are developed. If voluntary schemes are to successfully deliver their objectives they must first achieve adequate levels of participation with participants distributed appropriately across target areas (Wilson, 1996). Participation in such schemes depends on the attitudes and circumstances of individual farmers (Green, 2002) and their preferences for the attributes of their particular scheme. Participation in agri-environment schemes is addressed in Work Package (WP) 8, while WP7 was designed to investigate farmers' preferences for key aspects of the AES design.

The early stages of this work package used a combination of literature review on farmer preferences for agri-environment scheme attributes and farmer focus groups to identify the most important factors in influencing participation. This exercise identified payment rates, flexibility, levels of administration and contract length as generally being the important design factors for farmers. It also suggested that preferences could differ both across and within different partner countries. These findings suggested the use of an approach that would allow us to both measure and compare farmer preferences for a set of generic scheme attributes based on those outlined previously. One such approach would be choice experiments (see ITAES WP7 D6 P4-1).

The choice experiment approach adopted in this study explores how farmers trade-off key AES design attributes against each other and against associated per hectare payments. Such an approach will permit us to determine the relative preferences of farmers in the various partner countries for generic scheme design elements such as contract length, level of paperwork, and flexibility over area under agreement or over adherence to scheme prescriptions. It also allows us to derive a monetary value of the farmers' willingness to trade off per hectare payments for desired changes in these generic attributes such as a reduction in minimum contract length.

Similarly, the approach will also reveal the increases in per hectare payments that farmers would demand in return for accepting less-desirable contractual conditions such as higher levels of paperwork. The outputs of such an approach will help us to understand how different scheme designs could either improve or reduce the probability of a farmer participating. While increased payment levels will always increase this probability it should be interesting for policy-makers to understand how farmers are willing to trade-off payments in order to gain schemes that have a more attractive combination of characteristics.

The next section summarises the choice experiment approach adopted in this study followed by a summary of the discrete choice models used to analyse the data (see ITAES WP7 D6 P4-1 for details). The results of the choice experiment are reported next, followed by a detailed discussion of their implications for policy makers concerned with the design of agri-environment schemes.

2.0 Methodology: the choice experiment

The methodology used to provide the framework for this approach was based on stated preference choice experiments. Within the choice experiment approach, the value of any good is assumed to depend on the goods' attributes and the levels these take. Choice experiments can be implemented using a variety of survey-based methodologies used for modelling preferences for goods, where such goods are described in terms of their attributes and of the levels of these attributes. Respondents are presented with a set of alternative scenarios (choice profiles) that differ in terms of a series of attributes (which generally include a price or cost element) and asked to choose their most preferred.

For example, farmers might be asked to choose their most preferred alternative from a set of different designs of proposed AES that vary according to the length of agreement (e.g. 5 years, 10 years, etc), the level of paperwork (e.g. low, medium, high) and the associated per hectare payment. By including payments as one of the attributes of the good, monetary estimates of the utility associated with the attribute levels can be indirectly recovered from the choice data. A baseline alternative, often corresponding to the status quo or 'choose neither' option is usually included in the choice set. Including this option avoids a 'forced choice' by allowing respondents to select another alternative if they do not prefer any of the alternatives in the choice set and serves to make the results obtained welfare-theoretic (see ITAES WP7 D6 P4-1).

In this study the AES design attributes included in the choice profiles are shown in the Table below. These were chosen following a process of detailed literature review and focus group investigation of farmers' attitudes towards AES design elements. Respondents were asked to choose between a pair of choice profiles, with the option of choosing neither. These choices were repeated four times for each respondent yielding a data set of between 400 and 1300 choices across the partner countries. The choices offered to respondents were based on an orthogonal main-effects design which combines desirable statistical properties with a manageable set of choice profiles (see ITAES WP7 D6 P4-1 for more details).

Table 1: Attributes and attribute levels in choice experiments

Scheme attribute	Attribute levels
Minimum length of agreement (years)	5, 10, 20*
Flexibility over what areas of the farm are entered into the scheme?	No, Yes
Flexibility over undertaking some of the measures required under the scheme?	No, Yes
Average time spent on paperwork/administration	Low, Medium, High
Additional payment per ha	5%, 10%, 20%*

* Attribute values varied across partner countries

The choice experiments were incorporated as part of a much larger questionnaire (undertaken in WP8) that also sought to extract information about farmers' characteristics, attitudes, behaviour and experiences with AES. Information gathered by the questionnaire can be used to help model the choices made my individual farmer. Individual-specific data relevant to farmers' choices might include age, educational attainment, experience with AESs, attitudes towards the environment and trust in those responsible for administering schemes. This data can be incorporated into choice models during the analysis stage, where some individual-specific data may be shown to account for some of the differences in preferences for scheme attributes across individual respondents.

3.0 Analysis of choice experiment data

3.1 Multinomial logit model

The most common way of analysing results from choice experiments econometrically is to make use of the multinomial logit model (MNL), which is based on random utility theory (McFadden, 1974; Ben-Akiva and Lerman, 1985). A random utility model (such as the MNL) is designed to predict the choice of an individual n among a finite and discrete set of alternatives or choice set C_n. The main assumption is that each individual associates a level of utility (U) to each alternative in C_n and selects the alternative with the highest utility. The utility associated by individual n to alternative i is a random variable such that:

$$U_{in} = V_{in}(X_{in}) + \varepsilon_{in} \; \forall \; j \neq i;\; i, j \in C_n \qquad (1)$$

Where V_{in} is the deterministic, or systematic component of utility which is typically specified as a linear index of the attributes (X) of the J different alternatives (or in case, the different landscape profiles) in the choice set and ε_{in} is a stochastic element which represents unobservable influences on individual choice. The probability (P_{in}) that any particular respondent prefers option i in the choice set to any other alternative j, can be expressed as the probability that the utility associated with alternative i is greater than that associated with all other alternatives, as stated in equation 2:

$$P_{in} = \text{Prob}(U_{in} > U_{jn}) = \text{Prob}(V_{in} - V_{jn}) > (\varepsilon_{jn} - \varepsilon_{in}) \; \forall \; j \neq i;\; i, j \in C_n \qquad (2)$$

In order to obtain an operational discrete choice model, specific assumptions must be made about distribution of the error terms (ε_{in}). A typical assumption is that they are independently and identically distributed (IID) Gumbel across alternatives. This distribution of the error components implies that the choice probability (equation 2) can be expressed as a logistic distribution as stated in equation 3. This is the MNL model (McFadden, 1974).

$$P_{in} = \frac{\exp(V_{in})}{\sum_{j}^{J} \exp(V_{jn})} \qquad (3)$$

The MNL model can be estimated by conventional maximum likelihood procedures. From the estimated model, economic welfare impact of a quality change in any of the

AES attributes can be assessed through the investigation of the difference between the utility achieved by the individual under the baseline AES profile and some other "improved" alternatives. Thus a WTP compensating variation welfare measure can be derived for each attribute using the formula given by equation (4) (Hanemann, 1984) where β_y is the marginal utility of income and is the coefficient of the cost or payment attribute in the estimated choice model, V^0 represents the utility at the initial (baseline profile) state and V^1 represents the utility of the alternative state of the policy:

$$WTP = -\frac{V_i^0 - V_i^1}{\beta_y} \qquad (4)$$

Although the MNL model has provided the fundamental platform for discrete choice modelling, its basic limitations, most notably, its assumption of independence of irrelevant alternatives (IIA) and the concomitant assumption of homogeneous preferences have motivated the development of alternative modelling approaches to account for heterogeneity of preferences. Perhaps the most prominent of these approaches are the mixed logit model (Train, 2003) which postulates a continuous distribution of heterogeneity and the latent class approach (Wedel and Kamakura, 2000) which is based on the premise that the distribution of preferences is discrete—characterised by relatively homogenous (and identifiable) population segments. These models are briefly discussed in the following sections.

3.2 Mixed logit model

The mixed logit model (also referred to as random parameter logit model) is based on the premise that preferences vary continuously in the population according to any (specified) parametric distribution. By allowing taste parameters associated with each attribute to vary continuously across the population, the model enables the moments (such as the mean and variance effects) of this distribution to be estimated. Further, it addresses the limitations of the MNL, namely: (i) the assumption of IIA, (ii) there is an explicit account of both observed (systematic) and unobserved preference or taste heterogeneity.

Formally, the utility that farmer n would obtain from alternative i in choice occasion t is $U_{int} = \beta'_n X_{int} + \varepsilon_{int}$; where X_{int} is a vector of observed variables, β_n is a corresponding coefficient vector of taste parameters that is unobserved for each n and varies randomly across the population representing each individual's tastes, and ε_{int} is an unobserved random term that is assumed to be IID extreme value and independent of β_n and X_{int}.

The coefficient taste parameter vector for each individual β_n varies among the population with density $g(\beta|\theta)$, where θ is a vector of the true parameters of the taste distribution. If each farmer's tastes β_n were known (by the researcher) to take the value β, the probability that farmer n chooses alternative i in choice occasion t would be MNL (equation 5 below) since ε_{int}s are assumed to be IID extreme value. The conditional (joint) probability of farmer n's observed sequence of choices $S_n(\beta)$ over T choice occasions; $\{i_1,\ldots\ldots,i_T\}$ is the product of MNL formulas (equation 6 below):

$$P_{int}(\beta) = \frac{exp(\beta' X_{int})}{\sum_j^J exp(\beta' X_{jnt})} \quad (5)$$

$$S_n(\beta) = \prod_{t=1}^{T} \frac{exp(\beta' X_{in_t})}{\sum_j^J exp(\beta' X_{jnt})} \quad (6)$$

Since the farmer's individual tastes is not known (random) the unconditional joint probability of the sequence of choices is the integral of equation 6 over all possible values of β, weighted by the population density of β:

$$P_n(\theta) = \int S_n(\beta) g(\beta \mid \theta) d\beta \quad (7)$$

As indicated above, g(β|θ) is the density of the distribution of taste parameters in the population of all farmers, while θ represents the parameters (to be estimated) characterising this distribution, that is the mean *b* and covariance Ω. The researcher specifies a distribution for β and estimates θ that is, the population parameters that describe that distribution of individual parameters. The two main alternative specifications are a normal distribution and a log-normal distribution. The log-normal distribution is useful when the parameter is known to possess the same sign for all individuals e.g. the cost parameter that is known to be negative across the sample. The unconditional sample likelihood of the choice sequence is:

$$L(\theta) = \prod_n^N \int S_n(\beta) g(\beta \mid \theta) d\beta \quad (8)$$

Maximum likelihood procedures are used to estimate *b* and Ω. However, the likelihood function involves the evaluation of a *K*-dimensional integral (*K* is the number of variables in the attribute vector) and cannot be calculated analytically since it does not have a closed-form. Instead the probability is approximated through simulation and the parameters are obtained by maximising the resulting simulated log-likelihood function. Welfare estimates are obtained in the same way as in the MNL as discussed above.

3.3 Latent class model

The hypothesis underlying latent class analysis is that the population consists of a finite (and identifiable) number of groups of individuals (segments), each characterised by relatively homogenous preferences. However, these segments differ substantially in their preference structures. The objective is to jointly estimate segment-specific utility functions, identify the number and composition of the latent segments, and determine the probability of each individual in the sample of belonging to a particular segment as described below.

Formally, farmer *n* faces a choice of selecting the preferred alternative amongst a set of *J* (*j* = 1, 2, …, *J*) alternative AES designs in each of the *T* choice occasions (*t* = 1,

…, *T*). Suppose farmer *n* belongs to latent segment *s*, then his utility function associated with the preferred alternative $i \in J$ can be written as a linear index:

$$U(i \mid s) = \beta_s^{'} X_{int} + \varepsilon_{int|s} \tag{9}$$

Assuming a random utility framework as the basis of a farmer's choice and an IID extreme value stochastic component of a farmer's utility for the preferred choice, the probability that farmer *n* chooses alternative *i* in choice occasion *t* conditional on the farmer belonging to segment *s* takes the familiar MNL form:

$$P(i \mid s) = \frac{exp(\beta_s^{'} X_{int})}{\sum_{j=1}^{J} exp(\beta_s^{'} X_{jnt})} \tag{10}$$

Where in equations 9 and 10, X_{int} is a vector of observable attributes associated with alternative *i* and farmer *n* observed making a choice in occasion *t*, and β_s is a conformable (segment-specific) vector of taste parameters. The differences in the β_s vectors enable this approach to capture heterogeneity in preferences for the AES (choice) attributes across segments.

Now consider an individual's segment membership likelihood function *M** that classifies farmers into one of the *S* latent segments. This can be linked to individual specific data such as participation (or non participation) in AES, socio-economic characteristics or be simply specified as a non-parametric marginal probability. Assuming that individual-specific covariates (labelled Z_n) is informative about the likelihood of a farmer's membership in a particular segment, then membership likelihood function for farmer *n* and segment *s* can be expressed as: $M_{ns}^{*} = \lambda_s Z_n + \xi_{ns}$. Assuming the error terms in the individual membership likelihood functions are IID extreme value across individuals and segments, the probability that farmer *n* belongs to segment *s* can be expressed in a MNL form:

$$P(s) = \frac{exp(\lambda_s Z_n)}{\sum_{s=1}^{S} exp(\lambda_s Z_n)} \tag{11}$$

Where λ_s are segment-specific parameters to be estimated and denote the contribution of the farmers' socio-economic characteristics to the probability of segment membership. Equation 11 formulates the prior probability of membership to the segments as a logistic function of farmers' descriptor variables Z_n, while equation 10 provides the conditional (on membership to a particular segment *s*) choice probability. The unconditional probability that any randomly selected farmer *n* chooses alternative *i* on choice occasion *t* is obtained by combining the conditional probability with the segment membership probability:

$$P(i) = \sum_{s=1}^{S} [(P(s).(P(i \mid s)] \tag{12}$$

The unknown parameters of segment membership and choice probabilities λ_s and β_s respectively are obtained in a joint and simultaneous estimation procedure by maximising the unconditional log-likelihood of the sample (equation 13 below) over the parameter space; where I_i is an indicator variable for the observed choice.

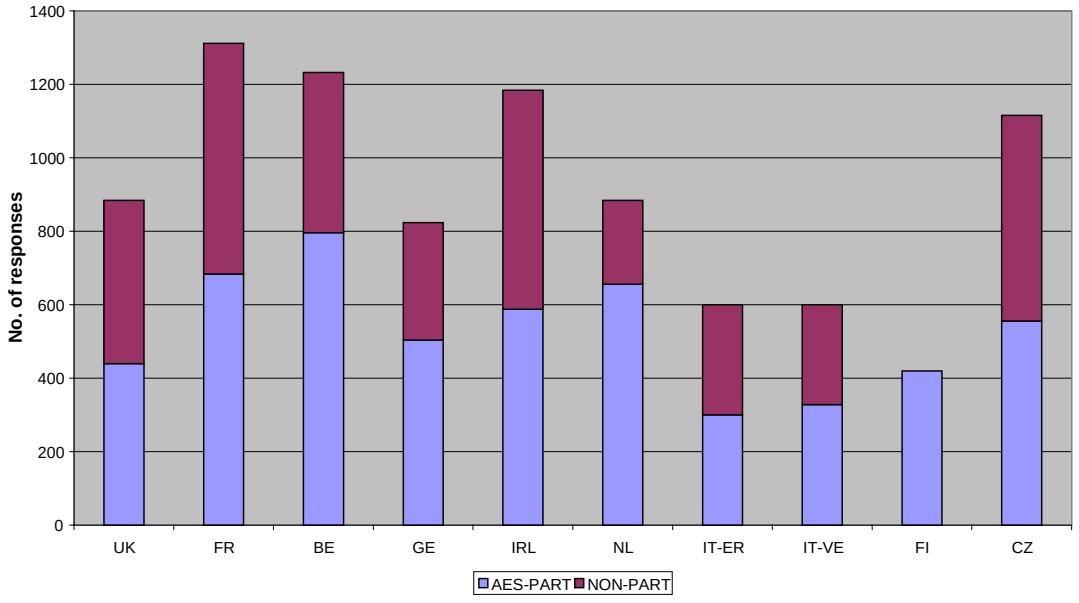
$$L = \sum_{n} \sum_{i \in J} I_i \ln \sum_{s} P(s).P(i \mid s) \qquad (13)$$

An issue to be confronted in this model is the choice of S, i.e. the number of segments. S is determined by sequentially carrying out the estimation for a number of segments until there is no significant improvement in model fit between S and S +1 segments. The difference in model fit is evaluated using a variety of information theoretic criteria. The key feature of this approach is that the segments are not pre-specified but the data is used to classify individual farmers on the basis of their choice behaviour i.e. it lets the data speak.

4.0 Results

The questionnaire survey was implemented successfully across the 10 case study countries, yielding 2,264 questionnaires and a total of 9,056 choice responses (each respondent responded to four choice questions). The opportunity to obtain repeated responses from the same individual is one of the main advantages of the choice experiment approach as the analyst can obtain relatively large numbers of responses from only modest sample sizes. Fifty seven percent of farmers interviewed were participant in AESs and the remainder were non participants.

Figure 1: Number of responses from choice experiment in the 10 case studies



The proportion of AES participants was quite similar in all the case-studies, apart from Finland where all of the farmers sampled were participants. The Finnish agri-environmental programme comprises two broad schemes: the General Protection Scheme that targets all farmers, and the Supplementary Protection Scheme which is more specialised and targets only a limited number of farmers. Only 32% of the Finish sample had contracted to at least one supplementary measure. However, the country level analysis was conducted treating the whole Finish sample as AES participants. In general, it is noted that the AES participants were over-represented in the ten sub-samples. This was deliberate and consistent with the objectives of the ITAES survey, which were to elicit farmers' views, preferences and experiences about the design and implementation of AES. The discussion of results from the analysis of choice experiment data proceeds as follows;

(1) First, country level analysis using the multinomial logit model (MNL) is conducted aimed at investigating preferences for AES design attributes across countries. This stage of the analysis aims to uncover differences in preferences between AES participants and non participants both within and across the ten case study countries

(2) Based on pooled data, we investigate the effect, on preferences, of "farmer factors" such as age of farmer, level of trust in agricultural administration etc and of "farm factors", such as land tenure and farm size, using the MNL model with interaction variables

(3) Using the pooled data and individual country data, we investigate heterogeneity in preferences for AES design attributes across the population. This is accomplished through the estimation of the mixed logit models and latent class models. The list of variable used in the analysis is presented in Table 2.

Table 2: List of variables in the analysis of choices

Variable	Description
CL	Contract length (5 years, 10 years, 20 years)*
CL_SHORT	Short contract length (1=5 years, 0 otherwise)
CL_MED	Medium contract length (1=10 years, 0 otherwise)
CL_LONG	Long contract length (1=20 years, 0 otherwise)
F_LAND	Flexibility over what areas of the farm or land are entered into the scheme? (1=YES; 0 otherwise)
F_MEAS	Flexibility over undertaking some of the measures required under the scheme? (1=YES; 0 otherwise)
LOWPW	Average time spent on paperwork/administration; 1=LOW (less than 2 hours a week)*; 0 otherwise
MEDPW	Average time spent on paperwork/administration; 1=MEDIUM (between 2 and 5 hours per week)*; 0 otherwise)
HIGHPW	Average time spent on paperwork/administration; 1=HIGH (more than 5 hours per week)*; 0 otherwise
PAYMENT	Additional payment per ha (5%; 10%; 20%)

Table 2 *continued*

Variable	Description
AGE	Age of farm head
HEDU	Education level; 1=Higher education (at least post secondary level); 0 otherwise
TRUST	Level of trust in the agricultural administration (1=Trusts the agricultural administration; 0 otherwise)
HEIR	Successor factor; (1=if farmer has successor; 0 otherwise)
FARMSIZE	Farm size (total utilisable agricultural area)
LFARM	Large farm (1 if farm is >200 ha, 0 otherwise)
TENANT	Land tenure (1=TENANT if farmer rents more than 50% of the farm; 0 otherwise)
FINCDEP	Dependency on farm for income (1=more than 50% of the farmer's income is from the farm business; 0 otherwise)

* Attribute levels varied across partner countries

4.1 Preferences for AES attributes by country

Country level trade-offs between scheme attributes and per hectare payments for AES are reported in Tables 3a to 3j (see Annexe 1). In each country, separate MNL models were estimated based on AES participants, non participant sub-samples and on the pooled data. The results show that all the five attributes employed to describe aspects of AES design are jointly statistically significant in explaining farmers' choices and the coefficient for payment enters with expected positive sign.

To facilitate interpretation of the results, positive trade offs may be viewed as the maximum amount farmers are willing to pay for desired changes in AES attributes such as increased flexibility in scheme implementation. We shall refer to these estimates as farmers' willingness to pay (WTP). For participants in schemes these WTP values may be viewed as the proportion of their current per hectare payments they are willing to trade off in order to gain schemes that have a more attractive combination of characteristics.

Negative trade offs may be interpreted as the amount of compensation that farmers would demand or are willing to accept in return for accepting less desirable contractual conditions such as higher levels of paperwork. We shall refer to these figures as farmers' willingness to accept compensation (WTA). For participants, these WTA values may be interpreted as the level of compensation (in terms of a percent increase in current per hectare payments) farmers would demand in return for accepting less attractive combination of contractual obligations.

The results reveal that farmers in different countries made different trade-offs between scheme attributes and per hectare payments. Trade-offs for different scheme

attributes varied widely between and within countries from between a few per cent and up to 55 per cent of current payments, with the highest levels of compensation required by farmers for accepting an undesirable change in AES conditions observed for the change from a 10 year to a 20 year minimum contract length. The results can be summarised as follows;

- Farmers prefer shorted rather than longer minimum contract lengths. This seems to be the case in all countries and across AES participants and non-participants. The level of compensation (WTA) for long contract length (20 years) is consistently higher than that for medium duration contract (10 years). This result, though rather obvious, is consistent with the assumption of monotonicity of individual preferences, which is one important check of internal consistency of choice experiment surveys. Preferences for shorter duration contracts were generally higher for non-participants compared to participants. The exception here is Ireland and Czech Republic where participants are more likely to demand higher compensation for long or medium duration contracts than non participants. WTA for contract length varied widely between and within countries from between about 5 % up to 50% in the Netherlands.

- The majority of countries farmers had significant positive preferences for greater flexibility in terms of the area of land entered into the scheme. This was the case for both participants and non participants. However, non participants were observed to hold higher WTP for flexibility over land than participants (except in the Netherlands). There is a wide variation in WTP between and within countries; ranging from about 5% to over 40% of current payments. The highest WTP figures were observed for Belgium (non participants) and the Netherlands. Ireland, Italy-Veneto and Finland farmers seem to have no significant preferences for flexibility over land entered into AES agreement.

- Similarly, the majority of countries farmers had significant positive preferences for greater flexibility in terms the measures which they had to undertake. However this was not so significant for non-participants (significant preferences in only 4 out of 10 countries). It seems that flexibility in the choice of measures to undertake is not so important among non participants except in the case of the Netherlands.

- As expected, farmers in all countries and across participants and non participants prefer less paperwork in terms of less time spent on non operational aspects of the scheme e.g. paperwork and information gathering. WTP for less paperwork varied from about 5% in Ireland and Italy-Emilia Romagna to about 30% of current payments in Belgium.

From the results (see annexe 1), the differences in preferences for AES attributes between and within countries can further be assessed from the implied ranking of the AES design attributes amongst the relevant population (for example how the length of contract is ranked by farmers relative to flexibility of scheme implementation). These are reported in Table 4 below. Across all countries, shorter contract lengths were consistently ranked highest in order of preference among participants and non participants. The ranking of the other AES attributes varies across and within countries.

Table 4: Implied preference ranking of AES attributes by country

	UK	FR	BE	GE	IRL	NL	IT-ER	IT-V	FI	CZ
AES participants										
CL_MED	ns	3	2	2	4	4	4	ns	3	4
CL_LONG	1	1	1	1	1	1	1	1	1	1
F_LAND	4	4	3	3	ns	2	5	ns	ns	3
F_MEAS	3	5	5	5	2	ns	2	2	4	5
HIGHPW	2	2	4	4	3	3	3	ns	2	2
Non participants										
CL_MED	5	2	2	ns	2	4	ns	ns		4
CL_LONG	1	1	1	ns	1	1	1	1		1
F_LAND	3	4	3	ns	4	2	3	ns		2
F_MEAS	4	5	ns	ns	ns	3	2	ns		5
HIGHPW	2	3	4	ns	3	5	ns	ns		3

4.2 The impact of farmer characteristics on preference for AES attributes

This part of the analysis investigates the impact of farmer related characteristic on preference for AES attributes, particularly on preference for contract length and scheme flexibility. The existing research on the uptake of AES has suggested that a complex of "scheme factors" and "farmer factors" are important in explaining AES participation. Scheme factors in include payments offered by the scheme, duration of contract, scheme flexibility and level paperwork involved in scheme implementation. These have been the focus of the analysis above.

Farmer factors include individual farmer and farm characteristics such as age, education, and aspects of farm structure such as farm size and tenure. Past behavioural research on AES participation has focused on such farmer factors. For example, Wynn et al. 2001 find that older farmers are less likely to participate in schemes while Potter and Lobley (1992) have suggested that whether or not a farmer has a successor may be important in influencing participation decisions.

Other studies have shown that a farmer's formal education is a strong determinant of conservation behaviour (Wilson, 1992). It is argued that farmers with comparatively low formal education are less likely to participate in schemes or to adopt conservation friendly farming practices. Wilson and Hart (2000) find that farm size have an influence on uptake as participants tended to be on larger farmers in their study. However, there seem to be mixed results regarding the role of land tenure in explaining AES participation behaviour.

We examine preference for AES design attributes against some of the socio demographic variables identified in the literature as potentially important factors for participation. These are age of farmer, level of formal education, dependence on farm for income, level of trust in agricultural administration, whether farmer has an heir or whether farmers' stated farming intention over the next 10 years was to handover to a successor, and land tenure status (see Table 2 for variable descriptions). Table 5 shows summary statistics of these variables for the sample.

Table 5: Mean values and standard deviations of socio economic variables, all countries

	Participants		*Non-participants*	
	Mean	*Std dev.*	*Mean*	*Std dev.*
AGE	48.65	11.24	50.47	12.06
HEDU	0.44	0.50	0.43	0.49
TRUST	0.55	0.49	0.47	0.49
HEIR	0.12	0.33	0.16	0.37
FARMSIZE	148.78	478.53	116.40	376.13
LFARM	0.12	0.33	0.11	0.32
TENANT	0.50	0.50	0.47	0.50
FINDEP	0.59	0.49	0.62	0.48

There are no major differences between AES participants and non participants with respect to mean value of the variables in Table 5 above. Nevertheless, in line with past research mentioned above, the figures generally suggest that participants tend to be younger, are comparatively more educated and tend to be in larger farms. The distributions of the variables TRUST and FINDEP suggest that participants have a higher trust on the agricultural administration and tend to be less dependent on the farm for income.

Contrary to expectations, participants tend to rent a higher proportion of their farms though the difference is quite small. However, this discussion does not suggest that the any of the above factors provide a sufficient explanation for AES participation; their influence (along with other factors) on farmers' participation in AES is the subject of the work package 8 report. Table 6 shows how preference for AES design attributes may be tempered by these farm or farmer related factors.

Table 6: Impact of farm and farm factors on preferences

Attribute	Coefficient	p-value
CL_MED	-0.24	0.00
CL_LONG	-0.73	0.00
F_LAND	0.30	0.00
F_MEAS	0.36	0.00
HIGHPW	-0.47	0.00
PAYMENT	0.06	0.00
CL*AGE	-0.27E-03	0.03
CL*HEDU	-0.002	0.62
CL*TRUST	0.01	0.01
CL*HEIR	-0.02	0.00
CL*LFARM	0.04	0.00
CL*TENANT	-0.04	0.00
CL*FINDEP	-0.02	0.00
F_LAND*LFARM	0.065	0.60
F_LAND*TENANT	0.14	0.05
F_LAND*FINDEP	0.19	0.01
N=2,264; Log-lik=-7448.54; Pseudo-R2=0.117; Adj. pseudo-R2=0.116		

The results reported in Table 6 reveal the following;

- Though farmers, on the whole, prefer shorter rather than longer AES contracts, preferences for shorter contract lengths are higher in older farmers. In other words, older farmers are more likely to demand higher compensation (higher WTA) for longer contracts than younger farmers.

- The level of farmers' level of formal education did not seem to significantly influence preferences for duration of AES contract.

- Farmers who revealed a higher level of trust in the agricultural administrations were found to have higher preference for longer contracts

- Whether or not a farmer has a successor appear to be important in decisions regarding duration of contract. Farmers who stated that their farming intension over the next 10 years was to handover the farm business to a successor have a higher preference for shorter contracts than those who expected to hold onto their farm beyond 10 years. It appears that farmers generally would not like to pass on a farm with an AES contract to their successor.

- Farm size does seem to have a significant influence on preference for AES contract length. Larger farms (>200 ha) have a higher preference for longer term contracts. Most past research on uptake of AES have found that large farm holdings are more likely to participate in AES. The per hectare payment methods used in most AES may disproportionately benefit larger farms over small farmers and hence larger farms may find longer contract lengths advantageous probably in terms of future financial security.

- Tenure status seems to have a significant effect on decisions regarding length of contact. Farm holdings that are mostly rented (over 50% of farm rented) have a higher preference for shorter term AES contracts than those who own most of

their farms (50 to 100% of farm owned). It may be expected that tenant farmers would aim to synchronise the length of their AES agreements with the duration of their tenancy

- Farm households that rely mainly on their farms for income (over 50% dependency) are less likely to enter into longer term contracts than farm households that are less reliant on the farm for income (less than 50% dependency). It can be argued that farmers who do not rely on the farm for their main income (<50% dependency) do not need to farm for maximum profits and hence may be more willing to enter into longer term AES contracts (usually these farmers are part-time or "lifestyle" farmers). On the other hand, it may be a plausible argument that farmers who rely mainly on the farm for income may be more likely to welcome additional financial security offered by longer term AES agreements. In the AES participation literature, dependency on farm income has proved to be an ambiguous variable in explaining participation decisions (Wilson, 1997). This variable may also be correlated with farm size as larger farmers may be more dependent on the farm for income.

- Large farms seem to be indifferent about the flexibility over land to enter into the scheme, judged from the lack of statistical significance of the F_LAND and LFARM interaction. This may be expected since farmers on large farm holdings already enjoy flexibility in decision making regarding parts of the land to enrol in scheme—thanks to the size of their farms.

- Farm households that depend mainly on their farm for income (>50% dependency) have a higher preference for flexibility over land in AES than farmers who are less dependent on their farm for their main income. Similarly farmers who rent most of their land (< 50% owned) have a higher preference for flexibility over land in AES than owner occupier farmers. In general farmers seek maximum benefits from AES with the least possible alterations in their farm management decisions—probably more so among tenant farmers and those highly dependent on their farms for income, as these groups are likely to be more profit oriented.

4.3 Accounting for heterogeneous preferences; the mixed logit model

The MNL models estimated thus far assume homogeneous preferences for AES attributes across respondents. However, an attempt was made to capture systematic (or observed) taste variation and explain some of the potential sources of heterogeneity within the MNL framework in section 4.2 above. The results show that there is appreciable heterogeneity in preferences for the AES design attributes. In order to investigate whether or not the data exhibit unobserved unconditional heterogeneity and conditional preference heterogeneity (based on individual farmer and/or farm related characteristics), a mixed logit model was estimated for the AES participants, non-participants, and on pooled data. All the AES attributes except the monetary attribute were specified to be normally distributed and distribution simulations were based on 100 halton draws.

The results are reported in Table 7 and a comparison of WTP/WTA estimates for AES participants and non participants for AES attributes (derived from Table 7) are depicted in figure 2 below. The log likelihood ratio test rejects the null hypothesis that

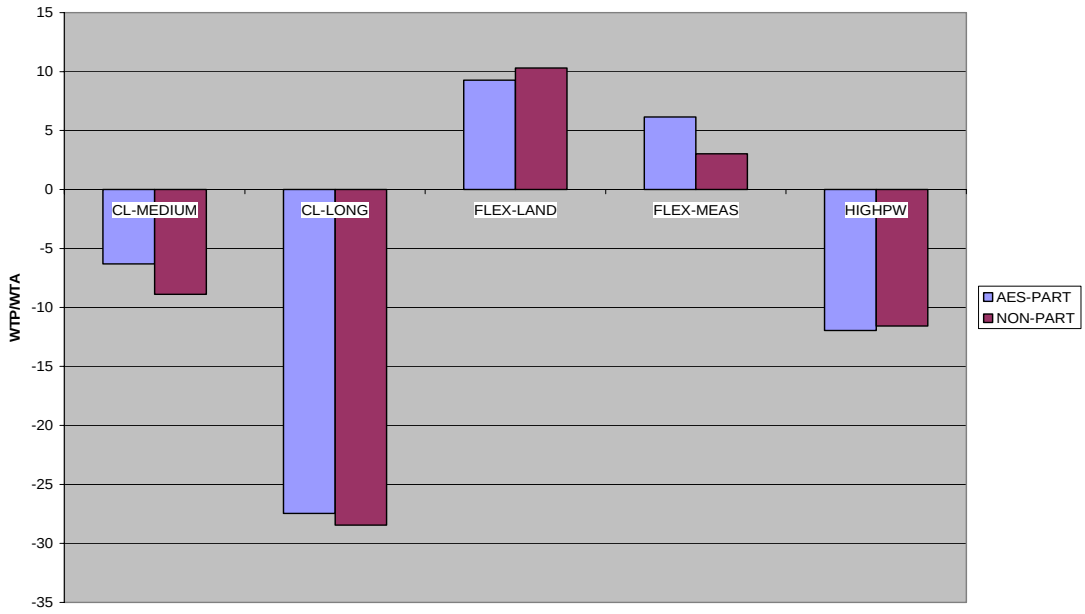
the model parameters of MNL and the mixed logit model are equal at 5% level. This result is supported by the dramatic increase in pseudo-R2 values. Hence improvement in model fit can be achieved with the use of the mixed logit model. Estimation results for participant and non-participant samples reveal significant derived standard deviations for all the six AES attributes indicating the presence of appreciable unconditional unobserved heterogeneity in preferences among respondents.

Table 7: Preferences for AES attributes: Mixed logit model

	Participants (mixed logit model)		Non-participants (mixed logit model)		ALL sample (mixed logit model with interactions)	
Attribute	Coeff. (Std.Err)	Coeff. SD (Std.Err)	Coeff. (Std.Err)	Coeff. SD (Std.Err)	Coeff. (Std.Err)	Coeff. SD (Std.Err)
CL_MED	-0.587 (0.074)	1.246 (0.126)	-0.702 (0.085)	0.904 (0.174)	-0.239 (0.055)	0.253E-04* (0.279E-03)
CL_LONG	-2.562 (0.143)	2.581 (0.167)	-2.252 (0.154)	2.230 (0.199)	-0.717 (0.111)	0.355E-03* (0.384E-03)
F_LAND	0.864 (0.080)	1.501 (0.108)	0.815 (0.096)	1.701 (0.128)	0.293 (0.060)	0.474E-03 (0.258E-03)
F_MEAS	0.573 (0.073)	1.472 (0.106)	0.240 (0.094)	1.854 (0.126)	0.358 (0.036)	0.103E-05* (0.241E-03)
HIGHPW	-1.116 (0.091)	0.951 (0.188)	-0.916 (0.103)	1.009 (0.188)	-0.462 (0.041)	0.399E-03* (0.292E-03)
PAYMENT	0.093 (0.005)	-	0.079 (0.005)	-	0.061 (0.003)	-
CL*AGE	-	-	-	-	-0.271E-03 (0.129E-03)	-
CL*HEDU	-	-	-	-	-0.002* (0.004)	-
CL*TRUST	-	-	-	-	0.010 (0.004)	-
CL*HEIR	-	-	-	-	-0.020 (0.006)	-
CL*LFARM	-	-	-	-	0.037 (0.009)	-
CL*TENANT	-	-	-	-	-0.038 (0.005)	-
CL*FINDEP	-	-	-	-	-0.022 (0.005)	-
F_LAND*LFARM	-	-	-	-	-0.047* (0.123)	-
F_LAND*TENANT	-	-	-	-	0.131 (0.071)	-
F_LAND*FINDEP	-	-	-	-	0.186 (0.072)	-
	N=1,318; Log-lik=-4711.60; Pseudo-R2=0.183; Adj. pseudo-R2=0.182		N=946; Log-lik=-3498.59; Pseudo-R2=0.156; Adj. pseudo-R2=0.155		N=2,264; Log-lik=-7445.80; Pseudo-R2=0.118; Adj. pseudo-R2=0.116	

* not significant

Figure 2: A comparison of WTP for AES attributes between participants and non participants



The results depicted in Figure 2 suggest that farmers, on the whole, prefer shorter rather than longer minimum contract lengths, have significant positive preferences for greater flexibility both in terms of the area of land entered into the scheme and the measures which they had to undertake. Finally farmers are willing to trade off about 10% of their current per hectare payment in return for less paperwork. In the choice experiment, this attribute referred to time spent on non operational aspects of the scheme e.g. information gathering, fillings in forms and other paperwork.

The highest levels of compensation required by farmers for accepting an undesirable change in AES conditions were observed for the change from a 10 year to a 20 year minimum contract length (over 20% for participants and non participants). The implied ranking of the attributes in order of importance to farmers are as follows. For participants: (1) shorter contract lengths, (2) less paperwork, (3) flexibility over land in AES, and (4) flexibility over measures. For non participants, the rankings are: (1) shorter contract lengths, (2) less paperwork, (3) flexibility over land in AES, (4) flexibility over measures. It is striking that the ordering (and even the magnitude) of preferences for AES attributes is very similar across participants and non participants.

To corroborate the MNL model results discussed in section 4.2, we also report the results of a mixed logit model estimated including the interactions of AES attributes and individual farmer/farm related characteristics in final column of Table 7. Because of the similarity in preferences between AES participants and non participants, we estimated the model on the pooled sample. The mixed logit model with interactions can capture preference variation in terms of both unobserved or unconditional taste heterogeneity (random heterogeneity) and individual characteristics (conditional heterogeneity).

Its noteworthy that, unlike the basic mixed logit model, the results of the model with interactions show insignificant derived standard deviations of the randomly

distributed AES attributes, implying that most of the heterogeneity in preferences for AES attributes is picked up by farmer/farm level characteristics. The exception, however, is the F_LAND attribute implying that heterogeneity in preferences for flexibility over land in AES attribute is not fully picked up by the farm/farm characteristics included in the model.

The results generally corroborate the results discussed in section 4.2 regarding the impact of farmer/farm characteristics on preferences for AES attributes. Respondents who are older, have a successor, farm on tenanted land (<50% ownership) and depend on their farm for their main income (>50% dependency) have a higher preference for shorter contract lengths while farmers who expressed a high level of trust in the agricultural administrations, have larger farm holdings (>200 ha) attach a higher preference for longer term contracts. Farm households that depend mainly on their farm for income and farmers who rent most of their land (< 50% ownership) are willing to pay more for flexibility over land in AES.

4.4 Accounting for heterogeneous preferences; the latent class model

The distinction between AES participants and non participants in terms of their preference structures for AES attributes appear to be quite fuzzy from the results above. A key question is that can information on AES participation (or non participation) be used to classify farmers into groups with distinct preferences for AES attributes? Separate models estimated on AES participants and non participant samples suggest that these groups have quite similar preferences (see e.g. Figure 2 above). Here we employ the latent class model to further test the hypothesis that AES participants and non participants can be delineated into two groups or segments with distinct preferences for AES attributes.

As discussed earlier, latent class analysis postulate that the population consist of a number of groups of individuals (segments), each characterised by relatively homogenous preferences (however there is heterogeneity in tastes among segments). In particular we explore the hypothesis that participation (or non participation) in AES is significantly related to farmer's probability of belonging to a segment with specific preference structure. A key feature of this approach is that rather than *a priori* partitioning the data based on AES participation and estimate separate models for each group, segments (and utility functions for each segment) are determined endogenously by the data—that is, it lets the data speak. We estimate a latent class model based on the pooled data and the results are reported in Table 8.

Table 8: Preferences for AES attributes: the latent class model

	Segment 1		Segment 2	
Choice model				
Attribute X	Parameter	|*z*-value|	Parameter	|*z*-value|
CONTLGT	-0.054	19.05	-0.272	32.22
F_LAND	0.707	19.68	0.983	14.87
F_MEAS	0.679	19.25	0.327	4.41
HIGHPW	-0.358	9.00	-1.003	11.60
PAYMENT	0.092	36.50	0.025	4.76
Segment membership model				
Attribute Z				
Intercept	1.035	13.32		
NONPART	-0.226	2.05		

Summary statistics: N=2,264; Log-likelihood = –8188.73; Pseudo-R^2 = 0.174

The results show that AES participation is significant in explaining segment membership—judged from the significance of the indicator variable for non participation in AES (NONPART) in the segment membership model (bottom part of Table 8). Participants more likely to members of segment 1 while non participants have a higher probability of being in segment 2. Of course a host of other factors may explain segment membership, the candidate ones being those that were shown earlier to have an impact on preferences for AES attributes such as age of respondent, level of trust in administration etc (note the highly significant intercept term) and further segmentation analysis will explore the role of these and other variables.

The results, though preliminary, support the hypothesis that AES participants and non participants separate out into segments with distinct preferences in the pooled sample. This hypothesis was also tested at the country level and the results are as follows. Case study areas in which information on AES participation is significantly related to farmers' probability of segment membership are France, Belgium, Italy-Emilia Romagna, Italy-Veneto and the Czech Republic. AES participation fails to significantly explain segment membership in the UK, Germany, Ireland and the Netherlands. The practical implication is that where the role of AES participation in preference segmentation has statistical support, farmers can potentially be allocated to segments with differential preference structures on the basis of information on their participation in AES (and other factors). Such stratification can be used to tailor AES promotion activities or design strategies to different farmer groups of farmers with distinct preferences.

5.0 Conclusions and recommendations

In the previous section, analysis of the choice data revealed that farmers in different countries made different trade-offs between scheme income and per hectare payments. Trade-offs for different scheme attributes were found to vary widely

between and within countries from only a few per cent up to 55 per cent of current payments. The highest levels of additional per hectare payment required by farmers for accepting an undesirable change in AES conditions were observed for the change from a 10 year to a 20 year minimum contract length.

Our analysis also suggested that, in the majority of countries, farmers had significant positive preferences for greater flexibility both in terms of the area of land entered into the agreement and the measures which they had to undertake. The former result was found both for farmers who were participants in AESs and for non-participants; while the latter was not so significant for non-participants.

Farmers were also found to, on the whole, prefer shorted rather than longer minimum contract lengths. Preferences for shorter minimum contracts were generally higher in older farmers, while farmers who revealed higher levels of trust in the agricultural administration were found to have a higher preference for longer contracts. The results also reveal that farmers who have a successor, farm mainly on tenanted land (<50% ownership) or who are highly dependent on their farm for income (>50% dependency) have a higher preference for shorter duration contracts while respondents who have large farms (>200 ha) attach a higher preference for longer term contracts. Regarding demand for scheme flexibility, the results show that farm households that depend mainly on their farm for income and those who rent most of their land (< 50% ownership) are willing to pay more for flexibility over land in AES.

Our findings also suggest that farmers are most likely to participate in schemes that either offer greater levels of flexibility or higher per hectare payments. More generally, an important finding is that farmers are usually willing to trade off less-desirable scheme attributes against those that are more desirable. This has potentially important implications for scheme design as does the observation that preferences for some attributes, particularly minimum length of contract, can be improved when respondents gain a greater level of trust in the institutions that administer AESs.

In terms of the primary aims of ITAES, that is to design tools to aid AES design, the success of this study suggests strongly that choice experiments are well-suited to investigating farmers' preferences for AES design attributes. Such experiments are relatively straightforward to design and implement and the high response rates in the farmer surveys across Europe suggest that they are easy to understand and to answer.

It would be possible to design choice experiments to investigate preferences for more detailed scheme attributes but this would have to be done carefully to ensure that appropriate sets of attributes were selected. In general, attributes should be well-defined, relevant to farmers (i.e. their presence or absence should have an impact on farmers' utility for scheme membership) and independent of all other attributes (to facilitate interpretation of the choice models). We therefore recommend the use of choice experiments as a tool for investigating farmer preferences for AES design attributes. This should be supported by a thorough programme of preliminary research to determine the suitability of candidate attribute sets and attribute levels.

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Annexe 1: Preferences for AES attributes by case study

Table 3a: UK WTP for AES attributes

Attribute	% change in current per hectare payment		
	AES Participants	**Non-Participants**	**ALL**
CL_MED	2.16 (1.02)†	-5.12 (3.02)	-1.76 (1.35)
CL_LONG	-11.93 (4.80)	-14.33 (6.11)	-13.06 (7.67)
F_LAND	3.90 (1.84)	7.80 (3.86)	5.96 (4.08)
F_MEAS	9.08 (4.00)	6.33 (3.42)	7.57 (5.24)
HIGHPW	-9.12 (3.79)	-8.28 (4.31)	-8.64 (5.70)
Summary statistics	N=110	N=111	N=221
	Log-L= -371.87	Log-L=- -371.69	Log-L= -748.71
	pseudo-R^2=0.224	pseudo-R^2= 0.238	pseudo-R^2=0.226
	Adj pseudo-R^2=0.218	Adj pseudo-R^2=0.233	Adj pseudo-R^2=0.223

†absolute values of *t*-statistics in parentheses

Table 3b: France WTP for AES attributes

Attribute	% change in current per hectare payment		
	AES Participants	**Non-Participants**	**ALL**
CL_MED	-10.88 (3.80)†	-11.77 (3.23)	-11.33 (4.92)
CL_LONG	-24.95 (5.502)	-29.47 (4.67)	-27.46 (-7.154)
F_LAND	10.31 (3.61)	11.87 (3.38)	11.26 (4.962)
F_MEAS	6.85 (2.77)	5.13 (1.74)	5.93 (3.08)
HIGHPW	-14.39 (4.52)	-8.41 (-2.77)	-11.88 (5.28)
Status quo	6.65 (2.31)	14.19 (4.19)	9.99 (4.59)
Summary statistics	N=171	N=157	N=328
	Log-L=-650.46	Log-L=-599.77	Log-L=-1259.37
	pseudo-R^2=0.133	pseudo-R^2=0.125	pseudo-R^2=0.124
	Adj pseudo-R^2=0.130	Adj pseudo-R^2=0.120	Adj pseudo-R^2=0.121

†absolute values of *t*-statistics in parentheses

Table 3c: Belgium WTP for AES attributes

Attribute	% change in current per hectare payment		
	AES Participants	**Non-Participants**	**ALL***
CL	-1.49 (8.73)[†]	-5.72 (2.18)	
CL_MED	-	-	-21.37(5.35)
CL_LONG	-	-	-46.23(6.24)
F_LAND	14.18 (5.67)	41.56 (1.84)	20.90(4.52)
F_MEAS	8.00 (3.920	4.27 (0.56)	6.17 (2.18)
HIGHPW	-6.97 (3.80)	-29.66 (2.0)	-15.41 (4.72)
Summary statistics	N=199	N=109	N=308
	Log-L=-725.48	Log-L=-375.04	Log-L=-1162.36
	pseudo-R^2=0.170	pseudo-R^2=0.217	pseudo-R^2=0.141
	Adj pseudo-R^2=0.168	Adj pseudo-R^2=0.212	Adj pseudo-R^2=0.139

[†]absolute values of *t*-statistics in parentheses; *analogue model is not significant in the non participants sample

Table 3d: Germany: WTP for AES attributes

Attribute	% change in current per hectare payment		
	AES Participants	**Non-Participants***	**ALL**
CL_MED	-11.33 (4.20)[†]	negative	-14.63 (4.00)
CL_LONG	-27.78 (5.96)	negative	-35.06 (5.22)
F_LAND	8.46 (2.78)	positive	11.85 (2.91)
F_MEAS	5.18 (1.941)	not significant	6.23 (1.88)
HIGHPW	-5.50 (2.10)	not significant	-7.50 (2.35)
Summary statistics	N=126	N=80	N=206
	Log-L=-480.52	Log-L=-339.35	Log-L= -831.80
	pseudo-R^2= 0.132	pseudo-R^2=0.035	pseudo-R^2=0.081
	Adj pseudo-R^2=0.127	Adj pseudo-R^2=0.026	Adj pseudo-R^2=0.078

[†]absolute values of *t*-statistics in parentheses; *WTP could not be derived because the payment attribute is not significant. However, we indicate the direction of preferences for the attributes in the utility function.

Table 3e: Ireland: WTP for AES attributes

Attribute	% change in current per hectare payment		
	AES Participants	**Non-Participants**	**ALL**
CL_MED	-2.87 (2.08)[†]	-2.69 (1.71)	-2.91 (2.77)
CL_LONG	-12.49 (7.74)	-9.74 (5.30)	-11.28 (9.16)
F_LAND	0.43 (0.33)	2.54 (1.65)	1.62 (1.60)
F_MEAS	5.17 (3.67)	1.33 (0.87)	3.45 (3.28)
HIGHPW	-4.47 (2.92)	-2.66 (1.68)	-3.61 (3.26)
Summary statistics	N= 147	N=149	N=296
	Log-L=-522.71	Log-L=-558.45	Log-L=-1086.64
	pseudo-R^2=0.191	pseudo-R^2=0.136	pseudo-R^2=0.159
	Adj pseudo-R^2=0.187	Adj pseudo-R^2=0.131	Adj pseudo-R^2=0.157

[†]absolute values of *t*-statistics in parentheses

Table 3f: Netherlands: WTP for AES attributes

Attribute	% change in current per hectare payment		
	AES Participants	**Non-Participants**	**ALL**
CL_MED	-9.62 (2.11)[†]	-21.27 (2.24)	-13.26 (3.16)
CL_LONG	-54.91 (3.66)	-44.45 (2.49)	-52.22 (4.40)
F_LAND	39.52 (3.16)	32.44 (2.13)	37.59 (3.79)
F_MEAS	7.12 (1.42)	22.21 (1.90)	11.84 (2.41)
HIGHPW	-16.74 (2.96)	-18.04 (2.19)	-16.93 (3.61)
Summary statistics	N=164	N=57	N=221
	Log-L=-579.37	Log-L= -195.46	Log-L= -781.15
	pseudo-R^2=0.176	pseudo-R^2=0.220	pseudo-R^2= 0.181
	Adj pseudo-R^2=0.172	Adj pseudo-R^2=0.209	Adj pseudo-R^2=0.178

[†]absolute values of *t*-statistics in parentheses

Table 3g: Italy-Emilia Romagna WTP for AES attributes

Attribute	% change in current per hectare payment		
	AES Participants	**Non-Participants**	**ALL**
CL_MED	-3.17 (1.78)[†]	-1.19 (0.46)	-2.13 (1.42)
CL_LONG	-6.45 (3.29)	-16.11 (4.64)	-10.47 (6.03)
F_LAND	3.03 (1.73)	5.77 (2.06)	4.14 (2.71)
F_MEAS	6.24 (3.37)	9.22 (2.96)	7.20 (4.41)
HIGHPW	-4.23 (2.20)	-1.02 (0.396)	-2.69 (1.74)
Summary statistics	N=75	N=75	N=150
	Log-L= -247.88	Log-L=-262.82	Log-L= -516.83
	pseudo-R^2=0.248	pseudo-R^2=0.203	pseudo-R^2=0.216
	Adj pseudo-R^2=0.240	Adj pseudo-R^2=0.195	Adj pseudo-R^2=0.212

[†]absolute values of *t*-statistics in parentheses

Table 3h: Italy-Veneto WTP for AES attributes

Attribute	% change in current per hectare payment		
	AES Participants	**Non-Participants**	**ALL**
CL_MED	-1.18 (0.30)[†]	-11.64 (1.48)	-5.53 (1.49)
CL_LONG	-17.79 (3.25)	-21.75 (2.06)	-20.11 (3.70)
F_LAND	-4.41 (1.29)	2.023 (0.32)	-1.52 (0.47)
F_MEAS	10.04 (2.05)	-6.45 (1.09)	4.38 (1.15)
HIGHPW	5.60 (1.29)	-1.91 (0.28)	2.27 (0.60)
Summary statistics	N=82	N=68	N=150
	Log-L= -334.72	Log-L=-292.55	Log-L= -637.36
	pseudo-R^2=0.071	pseudo-R^2=0.021	pseudo-R^2=0.033
	Adj pseudo-R^2=0.063	Adj pseudo-R^2=0.010	Adj pseudo-R^2=.0282

[†]absolute values of *t*-statistics in parentheses

Table 3i: Finland WTP for AES attributes

Attribute	% change in current per hectare payment		
	AES Participants	**Non-Participants**	**ALL**
CL_MED	-15.32 (-2.62)		
CL_LONG	-47.36 (3.46)		
F_LAND	4.70 (0.93)		
F_MEAS	11.85 (1.93)		
HIGHPW	-23.85 (2.91)		
Summary statistics	N=105		
	Log-L=-401.78		
	pseudo-R^2=0.121		
	Adj pseudo-R^2=0.114		

†absolute values of *t*-statistics in parentheses

Table 3j: Czech Republic WTP for AES attributes

Attribute	% change in current per hectare payment		
	AES Participants	**Non-Participants**	**ALL**
CL_MED	-8.80 (3.22)	-5.37 (1.87)	-7.26 (3.64)
CL_LONG	-23.63 (5.48)	-20.57 (4.79)	-22.26 (7.23)
F_LAND	9.64 (2.93)	12.11 (3.11)	11.01 (4.30)
F_MEAS	5.00 (1.82)	3.53 (1.24)	4.28 (2.15)
HIGHPW	-17.28 (4.69)	-6.70 (2.18)	-12.05 (5.10)
Summary statistics	N= 139	N=140	N=279
	Log-L= -539.03	Log-L= -558.37	Log-L=-1103.75
	pseudo-R^2=0.117	pseudo-R^2=0.092	pseudo-R^2=0.100
	Adj pseudo-R^2=0.113	Adj pseudo-R^2=0.088	Adj pseudo-R^2=0.097

†absolute values of *t*-statistics in parentheses