

REFEREED CONFERENCE PAPER

FARMERS' BEHAVIOURAL INCLINATIONS AND THEIR INFLUENCE ON THE ANTICIPATED RESPONSE TO THE REFORM OF THE COMMON AGRICULTURAL POLICY IN ENGLAND¹

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University of Reading has completed a research project recently on behalf of Defra (Department of Food, Environment and Rural Affairs) to understand the behaviour and motivation of farmers in adjusting to the reform of the Common Agricultural Policy, particularly to the Single Payment Scheme. Interesting insights into how farmers can be expected to use the Single Payment (SP) have emerged.

The Reading project has created an 'influence' model to identify the factors that are likely to determine farmers' responses, in a differentiated way, to the unprecedented event of the SP. A typology of farmers, a refined set of behavioural types, capable of providing insights into farmers' intentions with regard to the SP has been created. Data were obtained from a postal survey of a stratified (by region and farm type) random sample of 3,000 farmers in England in January 2006. Some 683 useable responses to 25 statements on "objectives" in farming, and 26 statements on "values" were received. Using Factor Analysis, Principal Component Analysis and a two-step Cluster Analysis five distinct behavioural types were identified eventually: family orientation, businessman / entrepreneur, enthusiast / hobbyist, lifestyle, and independent / small farmer. Most of the statements on objectives and values represent long term, enduring aspirations and, therefore, the behavioural types extracted from them can be expected to remain stable despite changes in the policy and business environments for farmers.

The questionnaire also elicited farmers' attitudes and likely responses to the introduction of the SP. The conceptual framework of the Theory of Planned Behaviour (TpB) was used as it postulates that behavioural intention is determined by a combination of attitudes towards the outcomes of the behaviour, perception of the views of others towards the behaviour (subjective norm), and the degree of control one thinks one has over a decision to carry out the behaviour (perceived behavioural control).

A set of six behavioural responses were identified through discussion with farmers including a general response of changing one's farming system and practices in the next five years, and five specific ways of applying the SP. A two stage process was used to collect data on key TpB variables: a series of focus groups identified a set of consequences ("outcome beliefs") that farmers believed may or may not ensue as a result of the Single Payment Scheme and, a list of people and organisations ("referents") to whom farmers might turn for advice in respect of the use of the SP.

The analysis of farmers' responses shows that of the five potential methods of using the SP, the most likely to be adopted is to regard it as a substitute for the previous production-linked subsidies. Although some of the normative influences on behaviour are not statistically significant, a scrutiny of the motivation to comply and respondents' subjective beliefs reveal interesting insights. The respondents felt that family members, business partners, accountants and the farming press would strongly support changing the farming system and practices as a result of the SP, while Defra, land agents and other farmers would be indifferent or against the idea. Respondents are least motivated to comply with what Defra, consultants and land agents might suggest. They were also not likely to follow the views of other farmers, except the views of those with whom they associate closely in farmers' clubs. This could imply that they

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think the farming population generally is as uncertain as they are about the implications and future consequences of the SP. Amongst all five farmer types the family is the strongest influence. Farming press and farmers' clubs have a stronger influence on the independent farmers than on other types, while enthusiast/hobbyists are least likely to be influenced by accountants. Referents fall into three distinct categories: referents external to the farm business, farming peers, and those that are internal to the business (including family members and business partners). Attitudes, perceived behavioural control and the views of others all have a significant influence on farmers' behavioural intentions with respect to the use of the SP.

Key words: Single payments scheme; Common Agricultural Policy; Theory of planned behavior behavioral intentions; farmer behavioral types

Introduction

The University of Reading has recently completed a project for Defra: "Research to Understand and Model the Behaviour and Motivations of Farmers to Policy Changes (England)". This research has explored and assessed the possibility of incorporating data on farmers' motivations and the influences on their behaviour into Defra policy analysis models. The objectives of the research were to:

- i. review existing literature on farmers' motivations and behavioural influences;
- ii. review existing predictive models intended to simulate or forecast farmers' responses to policy changes or market price changes, drawing out their strengths and weaknesses and identifying implicit assumptions;
- iii. gather and analyse appropriate data on farmers' motivations and behavioural influences relevant to their farm management decisions;
- iv. identify and describe the main factors found to influence farmers' behaviour;
- v. characterise different groups of farmers found to have distinct behavioural patterns;
- vi. where possible relate any such groups to existing conventional systems for classifying farm types including the Farm Business Survey, and to farm income/return on capital;
- vii. construct and, where possible, parameterise an "influence model" of farmer behaviour capable of describing the behaviour of the full range of groups identified at (v) above; and,
- viii. make recommendations for using the outputs of this research in conjunction with existing and possible new quantitative economic models used by Defra, and as far as possible specify in detail the techniques and construct the model design.

The study² began with a *review of international academic literature* on farmers' motivations, values, objectives and behavioural influences. For objective (ii), a review of policy modelling literature was followed by a series of *interviews with key informants* working on the models most relevant to the present study. Empirical data for objectives (iii) to (vi) came from two

surveys: the ADAS 2005 Farmers' Voice survey, and a stratified random sample survey of farm holdings in England drawn by Defra from the June Census database. These data were used in three main ways: (a) for an analysis based on the *Theory of Planned Behaviour* of the influences on farmers' behavioural responses to the Single Payment Scheme; (b) to identify, through *Principal Component Analysis (PCA)* and *Cluster Analysis*, distinct farmer types in respect of values and behavioural objectives; and (c) to contribute to the construction and parameterisation of "influence models" (objective (viii)).

The proposition tested in our research is that it is possible to extract strata of behavioural types from empirical data. These strata can be merged with predictive models for policy analysis to generate differentiated predictions of responses to policy changes.

A postal questionnaire survey of a stratified (by region and farm type) random sample of 3,000 farmers in England in January 2006 generated 683 responses to 25 statements of "objectives" in farming, and 26 statements of "values" measured, on nine point Likert scales. Factor Analysis, using Principal Component Analysis followed by a two-step Cluster Analysis, identified five distinct behavioural types: *family orientation*, *business / entrepreneur*, *enthusiast / hobbyist*, *lifestyler*, and *independent / small farmer*. The objectives and most of the values statements used in the postal survey represent long term, enduring aspirations and, therefore, the behavioural types derived from them can, in turn, be expected to remain robust through changes in the policy and business environment in which farmers operate.

Farmers' attitudes and likely responses to the introduction of the Single Payment Scheme (SPS) were explored within the conceptual framework of the Theory of Planned Behaviour (TpB), which postulates that behavioural intention is determined by a combination of attitudes towards the outcomes of the behaviour, perception of the views of others towards the behaviour (subjective norm), and the degree of control one thinks one has over a decision to carry out the behaviour (perceived behavioural control).

Six behavioural responses were identified through discussion with farmers: a general response of changing one's farming system and practices in the next five years, and then five specific ways of applying the Single Payment (SP) that farmers' will receive under the SPS. Data on key TpB variables were collected through a two stage process. A series of focus groups identified a set of outcomes that farmers believed may or may not occur as a result of the SPS ("outcome beliefs"), plus a list of people and organisations ("referents") to whom farmers might turn for advice in respect of SPS. Farmers' behavioural intentions, and their assessment of the outcomes and how they would react to the views of referents, were measured on rating scales through our postal survey.

This paper is divided into the following four main parts:

- (i) the treatment of behaviour in agricultural policy models;
- (ii) the behavioural typology of farmers;

2. The final report and all the associated material with this project are available at:
<http://statistics.defra.gov.uk/esg/reports/Farmers%20Behaviour/>

- (iii) the influences on behavioural intentions of farmers with regard to Single Payment; and,
- (iv) the observations emerging out of the research undertaken.

Treatment of behaviour in agricultural policy models

The social psychology theories of value expectancy, such as the Theory of Reasoned Action or its extension the Theory of Planned Behaviour, offer promise in understanding and modelling behaviour (not necessarily defined exclusively in terms of profit or utility maximisation) when they are combined with traditional economic analysis (Lynn 1995). As the reform and restructuring of the Common Agricultural Policy proceeds, the demand for behavioural studies and models is likely to increase, particularly in the context of participation in environmental management schemes, to mention a case in point (Burton 2004).

A policy model is expected to extrapolate and predict from a sample for the population as a whole. If a pragmatic approach could be devised to group farmers (Edward-Jones et al. 1998) into strata where members of each stratum are sufficiently similar to be taken as one 'type' and at the same time they are sufficiently distinct from other types, then a policy model can be built that takes a step towards the inclusion of behavioural influences that act on individual decision-makers.

Theoretical approach – Theory of Planned Behaviour

The Theory of Planned Behaviour (TpB) was developed by Ajzen (1991 and 2005) and it is an extension of the Theory of Reasoned Action (TORA) originally proposed by Ajzen and Fishbein (1980); both provide the conceptual framework for exploring farmers' attitudes and intentions. According to TORA, the intention to adopt a particular behaviour is a function of attitudes towards the behaviour and the subjective norm – the extent to which one is influenced by the views of other people regarding the behaviour. Attitudes are a product of the extent to which one expects the behaviour to result in specified outcomes and the perceived importance attributed to those outcomes. The subjective norm is a function of the perceived support of important referents toward the performance of the behaviour and the motivation to comply with those referents. TORA claims that the intention to undertake a particular behaviour is a reliable indicator of future behaviour, if the expressed attitude toward this behaviour and/or the perceived social pressure to do so correlate closely with the stated intent. A comparison of the strength of correlation of the stated attitude (SA) and subjective norm (SN) with the stated intent (I) to apply the Single Payment (SP) in a particular way indicates which of the two components has greater influence on the subjects' decision to apply the SP for the suggested purpose. The quantitative components of TORA are:

$$B \approx BI = \gamma_1 \sum bs_i oe_{i1} + \gamma_2 \sum nb_j mc_j$$

$$= \gamma_1 Aact + \gamma_2 SN$$

B Behaviour or action

BL Intention to perform the behaviour

$Aact$ Attitude

T p B
extends
TORA by

SN Subjective norm

Bs Belief strength

Oe Outcome evaluation

mc Motivation to comply

introducing an additional component, perceived behavioural control (PBC). PBC is an assessment of the actor's perceived ability to perform a particular behaviour and his/her capability to do so. TpB states that PBC can also predict behavioural intent. The contribution of PBC is assessed by comparing the strength of correlation of intent with that of the other two causal components, attitude (SA) and the subjective norm (SN). TpB is generally seen as a more appropriate conceptual framework in studying behaviours which are not fully under 'volitional control'; that is, where an individual might want to carry out a particular behaviour but feels he or she is constrained from doing so. The quantitative components after the modification stand as:

$$B \approx BI = \gamma_1 \sum bs_i oe_{i1} + \gamma_2 \sum nb_j mc_j + \gamma_3 \sum cb_k pb_k$$

$$= \gamma_1 Aact + \gamma_2 SN + \gamma_3 \sum PBC$$

where

PBC Perceived behavioural control

cb Control belief

pb Power of control belief

Figure 1 is a graphic presentation of the Theory of Planned Behaviour.

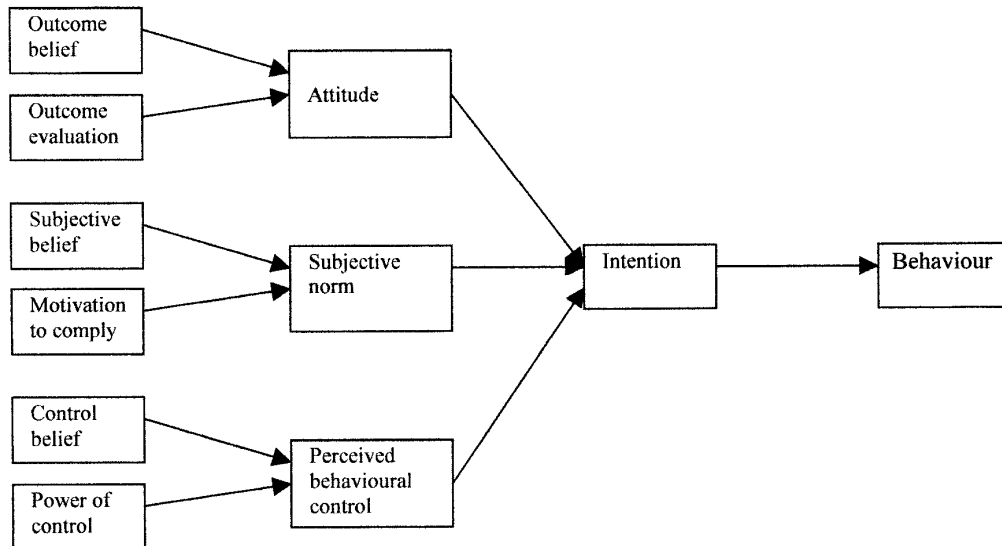


Figure 1 is a graphic representation of the Theory of Planned Behaviour. For a complete explanation of the TpB model, see Ajzen (1991).

TpB was used as the conceptual framework and has been applied to predicting farmers' intentions to change their farming systems over the next 5 years as a result of the introduction of the SP.

To understand farmers' attitudes toward the SP in general, the salient outcome attitudes (OAs) have been combined to form a 'reasoned' or calculated attitude (CA).³ The OAs do not relate to the specific six behavioural intentions⁴ considered and are therefore not associated directly with these. Rather, the strengths of the specific OAs are used to gain a deeper understanding of the beliefs and values underpinning the farmers' stated attitudes toward the SP. To enhance the understanding of the farmers' attitude to the SP a further measure of attitude is also taken, the general or emotive measure (GA). This is arrived at by taking the mean of the farmers' evaluation of the necessity, helpfulness and constructiveness of the SP, each measured on a 5 point bi-polar scale.

In contrast, specific referent social norms (RSNs) are related to the farmers' intention (I) to change their farming practices in the next five years. Therefore, those RSNs that are found to correlate closely with the stated intent to change indicate which salient referents are likely to have greatest influence on the subjects' decisions.⁵

3. An OA is the product of 'strength of belief' that an outcome will result (b) and evaluation of how good or bad that outcome would be (e). Thus $OA_i = e_i * b_i$, and CA is the sum of all the OAs.

4. That is, change in farming system and practice in the next five years; and five behaviours related to how the farmer intends to use the SP.

5. RSN is the product, for a specified social referent, of the respondent's motivation to comply with that referent (m) and the respondent's subjective belief (sb) – i.e. how likely the referent is to approve or disapprove of the respondent carrying out the behaviour in question.

The non-parametric Spearman Rank Order Correlation (r_s) has been applied to identify the differences in the contribution or influence of the attitude and subjective norm on the intention (I). Similarly, a non-parametric equivalent of t test, the Mann Whitney U test, is applied to identify significant differences in the TORA variable readings between the comparative categories such as size of holding, type of farm enterprise and type of farmer, tenure, level of education and gender.

Data were collected in two interdependent stages. Initially the salient outcome beliefs, social referents and probable investment strategies regarding the SP were identified through focus group discussions with farmers in three different areas of England. The second stage incorporated the identified salient outcome beliefs and pertinent referents in a structured questionnaire, which was then posted to a random sample of 3000 English farmers.

Focus group discussions

Three focus groups for farmers were held in May 2005 – in Devon, Norwich and Reading – and a fourth one for students studying agriculture at first degree level and, planning to go into farming on completion of their studies, to capture the views of the next generation of farmers. Between four (for the students) and ten participants took part in each discussion. In each case, participants were identified by consultants in the area with a deliberate attempt to represent a broad range of farm types and sizes. Each discussion was structured around three main issues:

- a. the reasons why the participants are farming, or were intending to farm in the future;
- b. how they intend to apply the SP and what they expect its impact to be on farming; and,
- c. what sources of advice they would turn to on the SP and its application.

As part of the discussion on (a), participants were asked if they could identify themselves in any of three farmer types referred to in the literature on farmer objectives and motivations as related to their behavioural orientations: *dedicated producer*, *flexible strategist* and *environmentalist or lifestyle*. These behavioural types were taken from the existing literature (Fairweather and Keating 1994) and their existence in the target population was corroborated by a Cluster Analysis of the ADAS Farmers' Voice survey data collected in 2006 (see: ADAS (2006)).

Postal survey

A representative random sample of 3,000 was drawn by Defra statisticians, which was stratified by farm type and by region. Defra also supplied data from the June Census returns for each of the years 2001 to 2005 for all the farm holdings in the sample. These data were needed to build and parameterise the agricultural policy models mentioned in the introduction.

The questionnaire was piloted by mailing it with an adapted version of the

covering letter to a sample of 100 farmers selected randomly from the

“farmers” listing at yell.com. Ten replies were received. The completed questionnaires suggested that respondents who decided to take part did not find the questions and format of responses difficult to deal with. A few minor modifications were made to the questionnaire.

Questionnaires were sent out with a covering letter between 11th and 13th January 2006. A reminder was sent to those who had not yet responded on 3rd February; and a second reminder with a copy of the questionnaire two weeks later. In total, 742 usable questionnaires were returned. Those reporting farm areas less than 4 ha were excluded from the TpB analysis and modelling, to avoid the results being skewed by people who are not farming as a business; thus, an effective response rate of 25% was achieved.

The questionnaire for the postal survey comprised seven main parts with a total of 36 questions. Part 1 asked for some basic information about the farm and farm business that was not included in the June Census data. Part 2 comprised the statements of objectives and values which respondents were asked to rate on scales of importance and agreement. Part 3 focused on the main building blocks of the TpB framework, asking respondents to indicate their intentions, attitudes, perceived difficulty, and perceptions of the views of others, in respect of changing their farming practice as a result of the introduction of the SP. Part 4 asked for stated intentions, attitudes and social norms in respect of using the SP in five specific ways identified from the focus groups. Part 5 listed 15 salient outcome beliefs about SP (obtained from the focus groups) and asked respondents to indicate their agreement / disagreement with, and their evaluation of each statement on five point scales. Part 6 asked how supportive they think the ten specified organisations and people would be if they were to change farming practice as a result of the introduction of the SP and how motivated they would be to follow their advice. Part 7 covered information about the respondent.

Behavioural typology of farmers

Derivation of farmer types from the postal survey was achieved in two stages. First, a set of factors was identified through Principal Component Analysis (PCA) of responses to the objectives and values statements in questions 13 and 14 of the survey questionnaire (Appendix I). Then a two-step Cluster Analysis was performed on these factors to identify distinct clusters of respondents. Those farming less than four hectares were excluded from the analysis, leaving a dataset of 683 survey respondents.

The sixteen factors that emerged from the PCA are listed in and Tables 1 and 2 below, together with the ‘objectives’ and ‘values’ statements that are associated significantly with them. The first step of the subsequent Cluster Analysis identified two distinct clusters, one reflecting a mostly positive outlook on a majority of factors whereas the other was just the opposite. The former cluster had 379 cases (55.5%) and the latter had 304 cases (44.5%). In the second step, separate CAs were conducted for the two sub-samples using

the same set of factors as employed previously. From the first sub-sample a further two clusters emerged, labelled *family oriented* and *business orientation/entrepreneur* with 202 and 177 cases respectively. Similarly, from

Table 1 Factors extracted by PCA from ‘objective’ statements

Factor	Factor label	Statements with significantly high factor loadings
1	<i>Family standard of life</i>	• Increase family income • Maintain my family’s standard of living • Improve my family’s standard of living
2	<i>Quality of achievement</i>	• Produce the best quality output on my farm • Be the best farmer I can be • Contribute to the farm in order to achieve something
3	<i>Environmental concern</i>	• Be sensitive to the environmental impacts of farming by reducing inputs on my farm • Do everything to be environmentally aware
4	<i>Expansionist</i>	• Buy more land • Rent/contract more land
5	<i>Quality of life and leisure</i>	• Reduce work load and improve quality of life • Make more time to spend on activities away from the farm
6	<i>Debt avoidance</i>	• Reduce debts • Keep my ordinary business borrowing and mortgages below 50% of my farm ‘net worth’
7	<i>Stewardship</i>	• Have my family work with me • Pass on a viable business to the next generation
8	<i>Investment</i>	• Increase my ‘net worth’ • Make farm investments that will pay for themselves quickly
9	<i>Diversification</i>	• Diversify my business by investing both on-farm and off-farm

the second sub-sample three further clusters, *enthusiast/hobbyist*, *lifestyler* and *independent/small farmer* with 113, 147 and 44 cases respectively, were identified as shown in Table 3. Table 4 shows the distinguishing features of each type, in terms of the factors identified in the PCA.

Table 2 Factors extracted by PCA from 'value' statements

Factor	Factor label	Statements with significantly high factor loadings
1	<i>Job satisfaction</i>	- Farming allows the expression of special abilities and skills - Farming gives self-respect for doing a worthwhile job - Farming provides a chance to be creative and original - Farming is about meeting a challenge, forging one's character and achieving one's objectives
2	<i>Marginalisation</i>	- Bad press has undermined farmers' standing in the community - Local authorities do not understand farmers and their needs - Local residents are not sympathetic to farmers and their needs - Central government does not appreciate farmers and their needs
3	<i>Profit and financial</i>	- In running a farm as a business, planning and financial management are the most important parts - Farming is about maximising profits from the farm business - Paying attention to details is crucial in making a success of running a farm
4	<i>Staff management</i>	- Farmers should provide congenial working conditions, hours, security and surroundings for themselves and their staff - Farmers should maintain good relations with staff
5	<i>Technology</i>	- To survive in farming, a farmer has to adapt to changing and new technologies - Survival in farming depends upon being technically efficient
6	<i>Self-reliance</i>	- Farming makes one independent, free from supervision and gives one the chance to gain control in a variety of situations - By choosing to be a farmer, one is expressing a preference for a clear purpose and value in hard work
7	<i>Uncertainty of control</i>	- Farmers have always to bear in mind that any decision they take will affect their farm and their family - Farming today depends on forces beyond farmers' control, all they can do is to adjust to the situation

Table 3. Farmer behavioural types derived from the Defra sample

Farmer types	<i>n</i> *	% of Total
<i>Family orientation</i>	202	29.6
<i>Business/entrepreneur</i>	177	25.9
<i>Enthusiast/hobbyist</i>	113	16.6
<i>Lifestyler</i>	147	21.5
<i>Independent/small farms</i>	44	6.4
Total	683	100

*Number of cases in the sample

Table 4. Farmer behavioural types with their characteristic features

Behavioural types	Characteristic features (based on factors from PCA)	
<i>Family orientation</i>	• High environmental score • High stewardship • Low marginalisation	
<i>Business/entrepreneur</i>	• High quality of achievement • High expansion • High investment • High independence • High staff management	• High job satisfaction • High debt avoidance • High technically efficient • High marginalisation
<i>Enthusiast/hobbyist</i>	• High quality of life and leisure • High diversification • High job satisfaction	• Low independence • Low profit and financial aspects
<i>Lifestyler</i>	• High family standard of life • High quality of life and leisure • High future security • High staff management	• High uncertainty of control • Low job satisfaction • High marginalisation
<i>Independent/small farmer</i>	• High family standard of living • High independence • High job satisfaction	• Low marginalisation • Low quality of life and leisure • Indifferent to profit and finance

Note: The use of the terms, "high" and "low" in the context of the formation of these clusters does not mean a measurement along a scale for a particular score, but instead it implies that in any cluster an aspiration, say "job satisfaction", is rated highly as compared to other clusters and thus this observation becomes a defining characteristic of that cluster.

The *family orientation* type score highly on environmental aspects and such farmers tend to be very sensitive to environmental issues. Considerations such as “stewardship”, “working alongside family” and “passing on viable business to the next generation” receive priority over other factors and this group tends to be content with the institutional and communal outlook on farming and they don’t feel neglected.

The *business orientation /entrepreneur* behavioural type records high scores in several of the factors that determine their success in business. This group views farming as a business and approaches it professionally, scoring highly on “quality of achievement”, “expansion”, “investment”, “debt avoidance” and “staff management”. The members of this group however feel that they have been marginalised despite doing a worthwhile job in the community, leading to dissatisfaction with the present state of affairs.

The behavioural label *enthusiast/hobbyist* would suggest that to such farmers farming is a hobby activity, with the main occupation being something different. This group has high scores on “diversification” combined with low scores on “profit” and the financial aspects. The simultaneously high scores on “quality of life” and “leisure” indicate that farmers are more concerned about reducing work load and spending more quality time with family and friends away from the farm. Such farmers farm because of the intrinsic values attached to farming as reflected in the “job satisfaction” factor. Not being full-time farmers, they do not record a high score on “independence”.

The *lifestyler* behavioural orientation scores highly on “family standard of life”, suggesting that the objective for being in farming is to increase family income to maintain and/or increase “family’s standard of living”. At the same time there are high scores for “quality of life” and “leisure”, indicating that such farmers balance high income with reduced work load and quality time with family and friends. This group scores highly also on future “security / investment” and “staff management”. A low level of job satisfaction is expressed and there is an awareness of and a concern for the uncertainty associated with farming. A high score for “marginalisation” might suggest that this group feels let down by the government and society at large.

The *independent/small farmer* group also records high scores on “family standard of living”, but unlike the lifestyler group, low scores for “quality of life” and “leisure” contrast with the high scores for “job satisfaction” and “independence”, indicating the emotive value of farming and the intrinsic nature of these influences. This group is rather indifferent to “profit” and “financial” aspects, reinforcing the impression that their reasons for farming are more intrinsic rather than instrumental. Interestingly though, this group does not feel marginalised.

Further details of the various behavioural types are given below using Table 5, where the differences amongst the farmer types for characteristics other than values and objectives are compared

The family oriented farmer

This group are the most likely, of the five categories considered, to have

id

Table 5 Significant differences between the identified farmer types

Descriptors	Family oriented	Business / entrepreneur	Enthusiast / hobbyist	Lifestyler	Independent / small	Overall means	P value
Dependency on farm income - 100%	31%	33%	19%	15%*	37% ^a	26%	0.000
Dependency on farm income >50%	66%	67%	44%*	54%	70% ^a	50%	0.000
Age (proportion <40)	12%	7%	13%	20%*	5%*	13%	0.000
Age (proportion >66)	18%	25%*	18%	13%	12%*	18%	0.000
Education: University (%)	17%	17%	41%*	31%	14%*	24%	0.000
Education: Technical college (%)	42%*	29%	32%	38%	23%*	35%	0.000
Education: Secondary school (%)	42%	54%	26%*	30%	63% ^a	41%	0.000
Successor: (%) of those likely & definitely	42%*	39%	20%	18%*	25%	32%	0.000
Successor: (%) definitely not	17%*	21%	30%	34%	50%*	26%	0.000
Land area: Median hectares	77	70	65	90	40*	67	0.001
Those with non agricultural enterprises	27%	36%	40%*	39%	16%*	33%	0.005
Agricultural sales (mean annual value)	£122,224	£110,323	£101,937	£127,320	£49,706*	£112,275	0.005
Difference SP will make –great difference	30%	31%	16%*	35%	43%*	30%	0.016
Difference SP will make –no difference	14%	11%*	24%*	14%	18%	15%	0.016
Those likely to be farming in 5 years	62%*	55%	59%	51%	34%*	56%	0.016
Attitude to SP Positive	39%	44%	46%	33%*	49%*	40%	0.034
Attitude to SP Negative	23%	21%*	28%	37%*	23%	26%	0.034
Land type: those farming mainly or all upland	20%	12%*	16%	14%	35%*	17%	0.037
Received environmental grants	34%	26%	41%*	30%	21%*	31%	0.043

Notes: Shaded cells indicate the highest value per descriptor and * indicates the lowest value, only p values <0.05 are presented here.

entified a successor and are most likely to still be farming in five years (62%). However, average age of this category of farmer is the same as the whole group.

The group reported the highest percentage attending technical college (42%) but the proportion that has received a university education is below average (17%).

The category reported above average economic dependency on the farm, tend to be farming larger than average areas (median 77 hectares) and reported above average annual agricultural sales (mean £122,224).

The family oriented farmer group's opinion regarding the impact the SP would have was equal to the average opinion when the whole sample was considered, only 30% considering it would make a 'great difference'. Similarly the general attitude (GA) to the SP was similar to the overall sample mean GA.

Overall, this group is most likely to have their succession secured and to be more economically dependent on the farm, though farming a larger area than the average. The majority have a tertiary level of education though mainly at a technical level.

Business orientation / entrepreneur

The entrepreneurs' dependency on the farm is above average but not the highest. They are also more likely than average to have identified a successor for the farm (39%). Just over half (55%) thought they would still be farming in 5 years, equivalent to the overall mean.

Although the median area farmed is similar to the overall average, they tend to be farming better land, i.e. they registered the lowest proportion farming upland (12%). However, the average annual farm income is slightly below average. They are also less likely than average to have received environmental grants in the past year.

They have the largest proportion of those over 66 years of age of any of the categories of farmer (25%) and are less likely than average to have received a tertiary education.

Their opinion regarding the impact of the SP differs from most other groups in that they have the lowest proportion (11%) who thought that it would have a negative impact. Similarly the group has the lowest proportion expressing a negative attitude to the SP (21%). The entrepreneurs expressed a more positive GA towards the SP than average.

The entrepreneurs tend to be older and less educated than the average and still highly dependent on the farm and agriculture, although with a lower income than average. However, they have a positive attitude to the SP while recognising it will make a difference to their business in future.

Enthusiast / Hobbyist

This grouping are farming on average only a slightly smaller area (median 67 hectares) than the overall median area registered for the whole sample of 69

hectares.

They have the lowest dependency on the farm income, only 44% indicating that they relied on the farm to provide more than 50% of their income. However, their mean annual agricultural sales are only slightly lower than the median of the whole sample. They registered the highest proportion of any category involved in non agricultural enterprises (40%). They also registered the highest proportion receiving environmental grants in the last year (41%).

This category of farmer has achieved a higher level academic education than any other category considered, 41% claiming to have gone to university whilst only 26% have not had post-secondary education of some kind.

Of the five categories, this group is least likely to feel that the SP will make a difference to the way they manage their farms, only 16% indicating that it would make a great difference, whilst 24% felt it would make none.

The enthusiast / hobbyist category of farmer tends to be the most educated. The fact that the majority of their income is not tied to agricultural production may lead them to feel that the SP will have less impact on the way they farm. They are also most likely to be taking advantage of available environmental grants and to be involved in non-agricultural enterprises.

Lifestyler

This category indicated a comparatively lower dependency on the farm as a source of income, although they register the highest mean income from agricultural sales (£127,320) and claim to be farming on average the largest area (90 hectares). A higher proportion than average is also involved in non-agricultural enterprises (39%); therefore, as a category, the lifestylers appear to be the most economically secure, with enterprises diversified between agricultural and non-agricultural activities.

They tend to be younger, registering the largest proportion (20%) under 40 years of age of any of the five categories. They also tend to be more highly educated than the average.

Only 18% claim to have identified or probably identified a successor, the lowest of the five categories. This might reflect the fact that they have the largest proportion still less than 40 years of age. However, only 51% think they will still be farming in five years time, a lower proportion than the overall average.

Although their opinion regarding the future impact of the SP on the way they farm does not differ from the norm, they expressed the most negative attitude (GA) toward the SP of all (37% negative).

Independent / small

This category of farmer is the most dependent on income from the farm, 37% indicating that they are totally dependent. They tend to farm the smallest area of the five categories (median 40 hectares) and have the smallest mean income from agricultural sales (£49,706) – less than half of the overall

average. As a group they also registered the lowest proportion with non-agricultural enterprises. They are the group with the highest proportion farming upland. However, they are the least likely to have received an environmental grant in the last year (21%).

The group is mainly middle aged, it registered the lowest proportion both under 40 years of age (5%) and over 66 years old (12%). This indicates that the young are not entering this category and the old are not remaining. As a group they also registered the lowest level of educational achievement with only 37% having received a tertiary education.

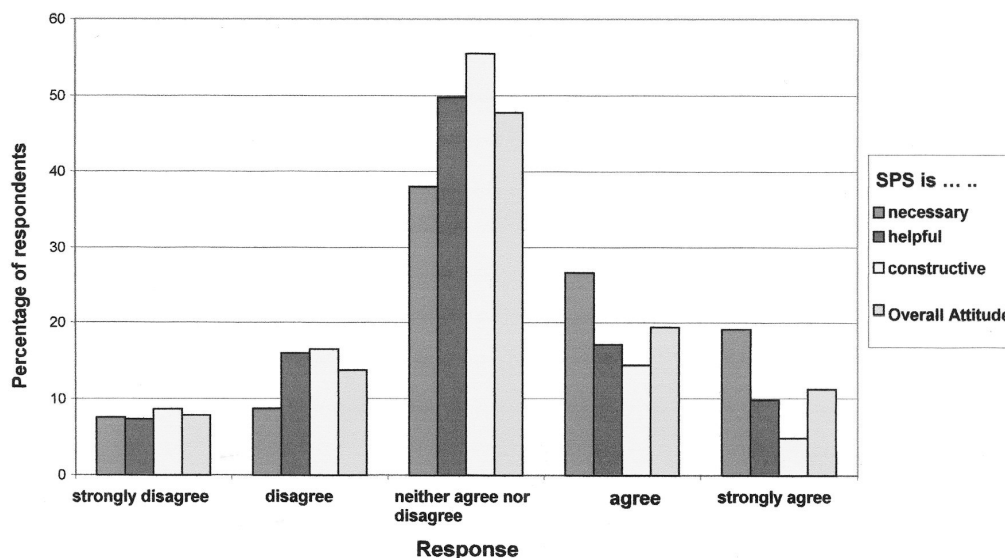
This group was also the most likely not to have identified a successor (50%). However, only 37% thought that they would still be farming in five years, indicating that they are the group most likely to withdraw from farming.

Of all the categories, the independent / small category felt that the SP would have the greatest impact on the way they farm. However, they are also the farmers that expressed the most positive attitude toward the SP. Given the high proportion of upland farmers, this may be because they see the SP as offering them a viable route out of an insecure future in farming. The independent /small category of farmer is the least economically secure with the highest dependency on smaller than average farms. They tend to be farming more marginal land and are the group most likely to withdraw from farming.

Table 5 shows those characteristics, other than values and objectives, on which there are significant differences between the farmer types.

Influences on farmers' behavioural intentions regarding SP

Figure 2. Assessment of general attitude to the SP (whole sample)



General attitude

General attitudes towards SP, based on perceptions of the extent to which it is necessary, constructive and helpful, were slightly positive, with ‘necessary’ recording the most positive score. ‘Constructive’ was the only element to register a slightly negative response while ‘helpful’ received an

Table 6. Mean general attitude to the SP by farmer type.

	All	Family	Business	Hobbyist	Lifestyler	Independ- ent	KW Sig. <i>p</i> <0.05
range -2 to +2	Mean	Mean	Mean	Mean	Mean	Mean	
Necessary	0.41	0.37	0.49	0.45	0.30*	0.60	
Helpful	0.06	0.09	0.12	0.14	-0.14*	0.15	
Constructive	-0.10	-0.03	-0.02	-0.10	-0.32*	0.05	0.012
General mean	0.13	0.15	0.19	0.18	-0.05*	0.29	0.046

Notes: Shaded cells indicate the highest value per descriptor and * indicates the lowest value; only *p* values <0.05 are presented here for the statistical significance of the Kruskal-Wallis non-parametric test.

overall neutral score. Around half of all respondents gave a neutral response on all three elements suggesting that, while farmers on the whole have neither dismissed SPS out of hand nor accepted it with enthusiasm, they are waiting to see how the scheme affects them before coming to a judgement (figure 2).

Table 6 shows differences between the five types on the three separate measures and the overall general attitude score. Overall, there is a significant difference between the farmer types regarding the general attitude. The independent /small farmers registered the most positive attitude across the three components that were assessed to form the general attitude, in particular regarding the perceived necessity of the SP. In contrast, the lifestylers registered consistently the most negative or weakest opinions across the three components, the only positive aspect being with regard to perceived necessity.

The only component where a significant difference ($p = 0.012$) was registered with regard to the perceived constructive nature of the SP. In this regard the independent/small farmer was the only farmer type, of the five considered, to register a positive, though only slightly so, attitude regarding the constructiveness of the SP. Although all the other farmer types registered negative opinions regarding this aspect, the lifestyler group registered a relatively stronger negative opinion than the other groups.

Interestingly, this measure of general attitude is more sensitive to farmer type than to either type of enterprise or farm size. Given that the lifestylers tend also to be the larger farmers it may have been assumed there would be a significant difference in general attitude to the SP based on the size of holding. However, no significant differences were observed; also, no significant differences were observed between the general attitudes toward SP expressed by different farm enterprise types. This suggests that the general emotive response to the SP is more sensitive to the farmer typology than to either size of holding or type of enterprise.

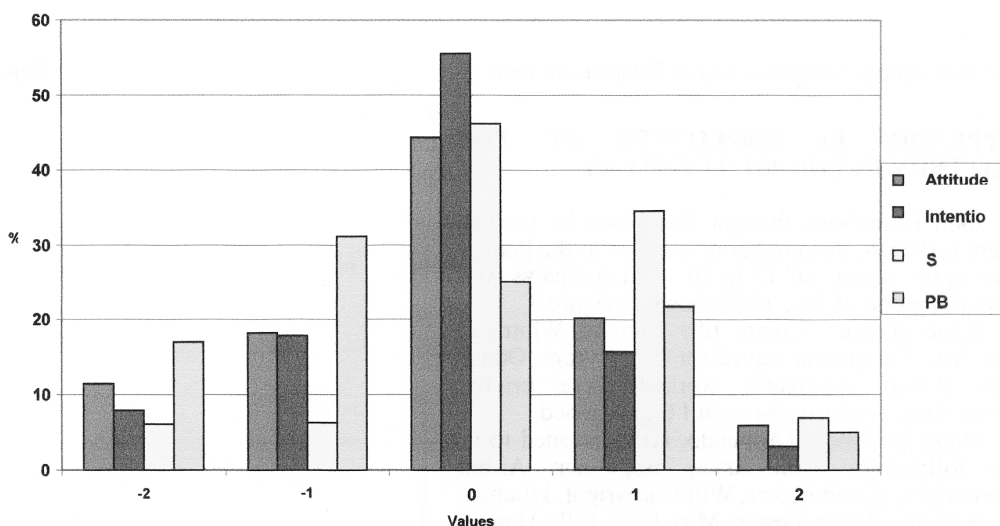
Calculated attitude

The “calculated attitude” (CA) is based on responses to fifteen statements

about specific possible impacts or “outcomes” of SPS on farmers and farming. For each outcome, respondents indicated their strength of agreement / disagreement that SPS would lead to the outcome (their outcome belief, (b)) and how good or bad they think this outcome would be (outcome evaluation, (e)), both on scales from -2 to +2. For each statement, the Outcome Attitude (OA) is calculated as (b) * (e) with a range of -4 to +4; and the CA is the sum of the OAs, giving a possible range for the CA of -60 to +60.

The CA shows a similar picture to the general attitude, with the mean for various categories based on farmer and farm type, scale, enterprise and other related features, falling within a limited range. The overall mean score was slightly negative, while the range in scores for all the different categories was between -13.11 and -2.66. This demonstrates that overall there was little difference in the CAs registered across all the groups. There are small, though statistically significant, differences between farmer types: lifestyle farmers hold more negative attitudes than other farmer types, while independent / small farmers

Figure 3. TpB variables regarding changing farming systems and practices in the next 5 years (whole sample).

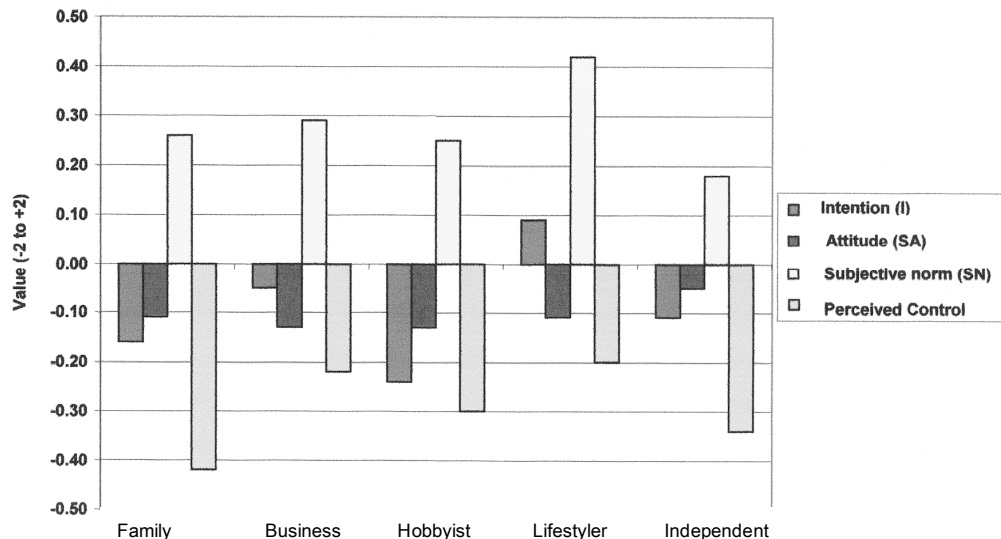


express the least negative attitudes.

The most strongly expressed OAs are all negative, resulting from strong agreements with the statements (b) and equally negative attributed values (e). These OAs in rank order according to their strength of expression relate to:

- Loss of national food self sufficiency (-1.94)
- Loss of skilled rural labour (-1.87)
- Smaller farmers being forced out of farming (-1.79)
- Loss of pride due to being seen as park keepers paid for by the state (-1.69)
- Reduced long term investments in farming (-1.55).

Figure 4. *TpB variables (means) regarding changing farming system and practices (means) by farmer type.*



Intentions to change farming system and practices as a result of SP

Overall intentions, attitudes, subjective norm and perceived behavioural control

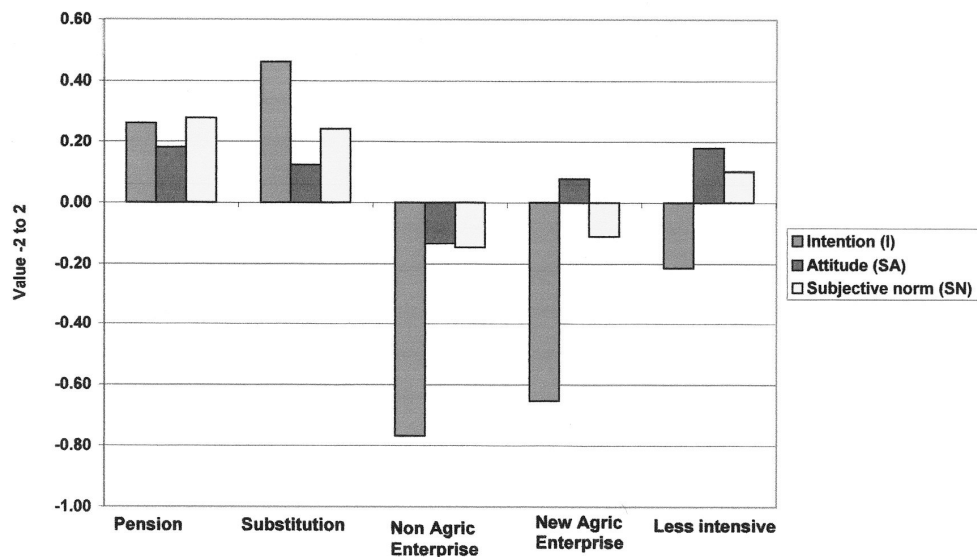
Theories of Reasoned Action (TORA) and Planned Behaviour (TpB) state that the intention (I) to undertake a particular behaviour is the immediate precursor of that behaviour. The survey sample was asked how strong their intention (I) was to change their own farming system and practices as a result of the SP in the next 5 years. The respondents' attitude (SA) and perceived social pressure (SN) regarding changing their farming system and practices in the next 5 years were also assessed. They were also asked how difficult it would be to make the proposed change and how confident they felt in their ability to make the intended changes to their farming system and practices over the next 5 years. All the responses were measured on bi-polar 5 point scales. The sum of the last two responses, difficulty and ability, was taken to represent the perceived behavioural control variable (PBC). Each variable therefore corresponded to a proposed activity, its target, the context and the time in which it should take place.

An alternative measure of the subjective norm was arrived at by presenting the respondents with a list of 10 salient social referents (Farmers clubs/associations, National Farmers Union, business services, themselves/own experience/business partners, land agents/family/other farmers/specialist farmers, Defra, consultants (e.g. dairy consultant) and accountants. They were asked to indicate how motivated (m) they would be to follow the advice of

each referent regarding changing their farming system and practices in the next 5 years as a result of the SP. Also the subjective belief (sb) regarding each referent was assessed by asking how strongly they felt each referent would support their adopting the proposed change. The individual referent subjective norms (RSN) were calculated by taking the product of the respective measures of motivation and subjective belief, i.e. $(RSN_j) = (m_j * sb_j)$. The calculated subjective norm is arrived at by taking the sum of the RSNs giving a possible range of -40 to +40.

Figure 3 shows the distribution of the main TpB variables for the whole sample. Only 26% of respondents indicated that they intended to change their farming system and practices as a result of the SP in the next 5 years, while the

Figure 5. Intention regarding Single Payment investment strategies (whole sample).



largest proportion, 44%, were still uncertain.

Four out of ten feel that those they respect most in farming would be in favour of their changing farming system and practices in response to the SP, while only 12% indicated they would disapprove. Although 46% are uncertain as to what their most respected others would think, a large proportion do feel under pressure to change their farming system.

Differences between farmer and farm types

The mean values of the main TpB variables for each of the farmer types are shown in figure 4. Statistical analysis shows there is no overall significant difference between the five behavioural types on any of the variables. However comparison between each pair of farmer types does show a significant difference in intention between *lifestyler* and both *family oriented* and *enthusiast/hobbyist* farmers.

The 'lifestyler' is the only farmer type to indicate a positive although weak

intention to change their farming system and practices over the next 5 years in response to the SP. It is interesting that the lifestyler feels most able to make that change when compared to the other types. The lifestyler also registered the most positive SN of all the farmer types.

The 'business oriented' farmer registered the second least negative intention to change (-0.05) also registered the second most positive SN of the five farmer types.

The 'independent/ small' farmer registered a weak negative intent (-0.10)

Table 7 Subjective norm with respect to changing farming system and practices as a result of the SPS over the next 5 years

	n=676 Motivation to comply (m) (-2 to +2)	Subjective belief (sb) (-2 to +2)	RSN (-4 to +4)	Correlation between RSN & intent (I)
Social referents (RSN -4 to +4)	mean	mean	mean	r _s
Farmers clubs	0.75	0.79	0.42	ns
Accountants	0.39	0.54	0.70	ns
Family	0.24	0.25	1.14	ns
Farming press and literature	0.14	0.36	0.45	ns
NFU	-0.12	0.00	0.73	ns
Business partners	-0.18	0.14	0.78	ns
Consultants	-0.41	0.01	0.80	ns
Defra	-0.45	-0.03	0.85	ns
Land agents	-0.46	-0.07	0.63	ns
Other farmers	-0.89	-0.26	0.51	ns
Own experience	1.67	1.08	1.67	ns
CSN (-40 to +40)			6.97	ns
Alpha coefficient				0.812

but expressed the least negative attitude (SA). However, this seems to have been offset to some degree by the weakest SN of the five farmer types being recorded by this group.

The 'family oriented' farmer recorded the second most negative intention (-0.16) to change their farming system during the next five years. This group is noted for registering the most negative PBC (-0.42) of the five farmer types indicating that they consider a change to their farming system and practices most difficult to achieve.

The 'enthusiast/hobbyist' type of farmer registered the most negative intention (-0.24) to change of the five types. They also expressed the most negative attitude to this behavioural change.

Therefore of the five farmer types, the 'lifestyler' is the most likely to change their farming system while the 'enthusiast/hobbyist' is least likely to change.

Potential methods of using the Single Payment

When the five investment strategies are compared, the use of the SP to 'substitute' for the previous production linked payment is the most likely strategy to be adopted as shown in figure 5. This strategy of, in effect, "recoupling" may be a reflection of many farmers not yet having worked out

what SP means for them and waiting to see how the scheme works and what it means for their business. One could anticipate the proportion expressing this intention to fall once the details and implications of SPS become clearer after full implementation. The only other strategy to register a positive intent (I) was the use of the SP as a 'pension' or income supplement. Both of these strategies are also supported by positive SA and SN responses. The concept of using it as a supplement / pension registered the most positive SA and SN scores across all the strategies considered. The least likely strategy to be adopted was to invest the SP in establishing non-agricultural enterprises. This non-agricultural strategy was also the only one to register a negative attitude (SA).

The option of investing the SP received in 'new agricultural enterprises' is also unlikely to be adopted. However, in this case a positive though weak attitude was expressed. The concept of using the SP so as to achieve a 'less intensive system' also registered a negative intent. However, the most positive attitude was expressed toward this option (equal with the 'pension' strategy), though relatively weak. The SN was also slightly positive. This may suggest that the concept of adopting a less intensive system is considered positively, but the idea of investing to achieve this objective is negatively perceived.

For four of the five uses of the SP (i.e. all except *use as a pension or income supplement*), there are significant differences in intent between the five farmer types; only for *maintain current farming system* is there a difference between farm types. For attitude and social norm also, there are more differences between farmer types than farm types.

Table 8. Referrant subjective norms (means) by farmer type.

Social referent	Farmer type				
	Family	Business	Hobbyist	Lifestyler	Independent
	RSN (m*sb)	RSN (m*sb)	RSN (m*sb)	RSN (m*sb)	RSN (m*sb)
Farmers clubs	0.39	0.40	0.37	0.37	0.98
Accountants	0.78 ^a	0.65	0.46	0.77	0.86
Family	1.20	1.12	0.98	1.24	1.02
Farming press and literature	0.51	0.38	0.42	0.30	1.02
NFU	0.76	0.76	0.52	0.72	1.02
Business partners	0.80	0.69	0.55	0.98	0.91
Consultants	0.81	0.88	0.59	0.84	0.86
Defra	0.81	0.92	0.68	0.89	0.98
Land agents	0.59	0.65	0.49	0.67	0.93
Other farmers	0.53	0.59	0.41	0.49	0.50

Note: pairs of farmer types with the same superscript letter in a row have significantly different ($p < 0.05$) referent subjective norms for the given social referent.

Salient referents and subjective norms

Table 7 presents the motivation, subjective beliefs and resulting referent subjective norms (RSN) regarding each of the salient social referents identified in the focus groups. The calculated subjective norm (CSN) is neutral to slightly positive (mean 6.97 on a -40 to +40 scale). It does not correlate significantly with the intention to change nor with the stated subjective norm SN. Neither are any significant (I vs. RSN) correlations observed with correlation coefficients greater than 0.2.

For the whole sample, respondents are most motivated to comply with farmers clubs, accountants and family regarding changing their farming system and practices in the next 5 years. They are least motivated to comply with land agents, Defra and consultants and, surprisingly, 'other farmers'.

Table 9 Correlations of TpB variables with intent to change system: whole sample and farmer types

Main TpB variables	All	Family	Business	Hobbyist	Lifestyler	Independent
n	674	200	172	112	146	44
r_s	r_s	r_s	r_s	r_s	r_s	r_s
Attitude (SA)	.483**	.412**	.587**	.487**	.438**	.537**
Subjective norm (SN)	.325**	.318**	.276**	.371**	.327**	.377*
Perceived Behavioural Control (PBC)	.403**	.361**	.552**	.217*	.381**	.461**

** Correlation is significant at the 0.01 level (2-tailed).

With respect to the issue of changing farming system and practices due to the SP, therefore, the farmers in the sample clearly do not like to comply with those sources which one might expect to have the most accurate information regarding the SP. This could mean that they feel challenged by these referents to go against their own desires regarding future farming practice. Their negative inclination to comply with other farmers, other than those with whom they associate closely in farmers clubs, is interesting as it suggests that there is an underlying recognition that their peers are similarly ignorant regarding the future consequences of the SP.

The strongest subjective beliefs are expressed regarding the perceived opinions of farmers clubs, accountants, the farming press, other farmers and family. Of these only other farmers are believed not to support a change in farming system and practices. A positive mean RSN was recorded for all referents. The strongest RSNs in rank order were for the family, Defra, consultant and business partners. For family referents, the high positive RSN comes from a generally positive motivation to comply and positive subjective belief. In the case of Defra, it is the result of a negative to neutral subjective belief (i.e. most respondents think either that Defra does not want them to change or they do not know) and a negative motivation to comply. The NFU also registered a stronger than average RSN. Although none of these RSNs when correlated with intent produced a correlation coefficient greater than 0.2,

Table 10. Correlations of TpB variables with intent to use SP in various ways, by farmer type.

TpB variables	All	Family	Business	Hobbyist	Lifestyler	Independent
	r_s	r_s	r_s	r_s	r_s	r_s
<i>Use SP as pension or income supplement</i>						
Attitude (SA)	.462**	.467**	.380**	.570**	.481**	.458**
Subjective norm (SN)	.477**	.445**	.458**	.549**	.467**	.529**
<i>Use SP to compensate for loss of previous subsidy, to maintain current farming system</i>						
Attitude (SA)	.488**	.489**	.371**	.598**	.624**	ns
Subjective norm (SN)	.470**	.403**	.442**	.474**	.562**	.465**
<i>Use SP to invest in non-agricultural activities</i>						
Attitude (SA)	.514**	.515**	.423**	.545**	.558**	.511**
Subjective norm (SN)	.428**	.432**	.429**	.427**	.404**	.485**
<i>Use SP to develop new farming enterprises</i>						
Attitude (SA)	.517**	.567**	.334**	.520**	.571**	.602**
Subjective norm (SN)	.486**	.427**	.439**	.599**	.478**	.524**
<i>Use SP to make farming system less intensive</i>						
Attitude (SA)	.646**	.540**	.677**	.738**	.612**	.797**
Subjective norm (SN)	.529**	.399**	.562**	.579**	.529**	.704**

** Correlation is significant at 0.01 level (2-tailed)

two (I vs. RSN) correlations were significant at $p < 0.01$: those for consultants and business partners. Across all the categories these two referents appear to be the most commonly influential, i.e. demonstrating significant (I vs. RSN) correlations.

It is interesting to note from the final row of Table 7 that the highest positive (m) and (sb) values are attributed to following their 'own experience'. However, the resulting RSN does not correlate significantly with their intent. This also suggests that farmers may wish to change, given the strong positive (sb) registered in this case but that other factors such as their stated attitude and perceived behavioural control regarding changing their farming system may subdue this underlying desire.

Table 8 compares referent subjective norms for the five farmer types derived from the main survey. For five of the ten referents, there are no significant differences in RSN between farmer types, indicating that these referents' influence is similar across all types. Among these five, the *family* registers the highest RSN for all farmer types. Farmers clubs have a higher degree of influence on the independent / small farmer type than the others, and

accountants have a lower influence on the hobbyist than on others. The independent / small farmer type also seems to be more influenced by the farming press and literature than other farmers, an observation which seems to underline their independence.

Influences on behavioural intentions

Correlation between intent and other TpB components

For the general behaviour of changing farming system or practices in the next five years as a result of SP, the SA, SN and PBC for each farmer type correlate significantly with stated intent (I). The (I vs. SA) is the dominant correlation in each case followed by the (I vs. PBC) correlation in all cases but the 'enthusiast/hobbyist' (Table 9). The 'hobbyists' appear to be more likely to take into account the opinions of their 'respected others' than the difficulty posed by the change and their ability to achieve it - the PBC. There are similar significant correlations for each of the six farm types, with the exception of specialist cereals where only SN correlates significantly with intent.

Except for specialist cereal growers, all farm and farmer types show a stronger correlation between intent and attitude than between intent and subjective norm. This implies that the respondents' decisions regarding changing farming system and practices in response to the introduction of the SP will be governed more by their own experience and values than by perceived social pressure. For beef and sheep, general cropping and 'other' farm types, perceived behavioural control correlates with intent more strongly than attitude. As the mean PBC for these farm types is negative, this suggests that their perception that it would be difficult for them to make a change will be more influential than their attitudes or social pressure.

For the five investment strategies, only in the case of *using the SP as a pension or income supplement* did the SN produce a stronger correlation with intent than the SA at the level of the whole sample (Table 10). This suggests that in this one instance the farmers are more likely to be influenced by the opinions of their respected referents over and against their own experience. Though this is the most likely strategy to be adopted, the influence of the SN in this case indicates a degree of uncertainty. This is only natural given that the consequences of the SP were still unknown at the time of the survey. Therefore the stronger positive intent expressed regarding this strategy reflects a tendency to 'stick with the known' – rather than accepting the need for change. This could mean that the SP could initially have a detrimental impact on farmers until the need for adjustment is recognised and an alternative strategy adopted.

For the five farmer types, however, the relative influence varies, with the business / entrepreneur, hobbyist and independent / small types recording higher (I vs SN) than (I vs SA) correlations for four, one and two respectively of the five strategies, as shown in Table 10. Overall, the strong correlations observed between intention and the other TpB variables suggest that stated intent with respect to the six behavioural responses to SPS is a reliable predictor of actual future behaviour. However, on a lot of the measures, large proportions of farmers gave neutral or non-committal responses, indicating a

continuing degree of uncertainty about how the scheme will impact on their farm and on farming in general.

Concluding observations

As regards the five potential methods of using the SP, the most likely to be adopted is to regard it as a substitute for the previous production-linked subsidies. Analysis of the influence of ten referents showed that respondents felt family members, business partners, accountants and the farming press would strongly support a decision to change farming system and practices as a result of the SPS, while Defra, land agents and other farmers would be neutral or against the idea. Respondents are least motivated to comply with what Defra, consultants and land agents suggest. They also do not feel inclined to follow the views of other farmers, apart from those with whom they associate in farmers' clubs. This suggests they think the farming population generally is as uncertain as they are about the implications and future consequences of the SPS. For all five farmer types, the family is acknowledged as the strongest influence. Farming press and farmers' clubs have a stronger influence on the *independent* farmers than on other types, while *enthusiast/hobbyists* are least likely to be influenced by accountants. Cluster analysis (not reported here due to shortage of space) shows that referents fall into three distinct categories: referents *external* to the farm business, *farming peers*, and those that are *internal* to the business (including family members and business partners). A possibility to explore in future research is that respondents are implicitly distinguishing between referents who are sources of information and knowledge, and those who they regard as sources of guidance, wisdom and support.

Correlation of the TpB parameters with intention shows that attitudes, perceived behavioural control and the views of others all have a significant influence on farmers' behavioural intentions with respect to SP. Further analysis through ordinal regression showed that farmers' attitudes towards the impact of SPS on farming in general have a separate and significant influence.

The above analysis shows distinct patterns of response by the five behavioural types in respect of SPS. This behavioural typology is potentially useful for policy analysis, complementing the other typologies that differentiate the farming population on scale, enterprise and economic status.

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Appendix

Statements on values and objectives as used in the Questionnaire

“what you are trying to achieve as a farmer”:

(a) “not at all important” “most important” (on nine point rating scale)

1. Produce the best quality output on my farm
2. Be the best farmer I can be
3. Contribute to the farm in order to achieve something
4. Reduce work load and improve quality of life
5. Diversify my business by investing both on-farm and off-farm
6. Concentrate on farm work and not be sidetracked by outside activities
7. Be sensitive to the environmental impacts of farming by reducing input use on my farm
8. Do everything to be environmentally aware
9. Have my family work with me
10. Buy more land
11. Rent/contract more land
12. Avoid borrowing money
13. Reduce debts
14. Make more time to spend on activities away from the farm
15. Increase my ‘net worth’
16. Keep my ordinary business borrowing and mortgages below 50% of my farm ‘net worth’
17. Invest part of my profits for retirement
18. Save for children’s education
19. Make farm investments that will pay for themselves quickly