UNDERSTANDING FARMERS' RESPONSES TO CAP REFORM

D. Menozzi [1], M. Fioravanzi [2], M. Donati [3]

[1] Department of Food Science, University of Parma, Via Kennedy 6, 43125 - Parma (Italy). Tel.: +39 0521 902519; Fax: +39 0521 902498. Email: davide.menozzi@unipr.it

[2] Department of Biosciences, University of Parma, Via Kennedy 6, 43125 - Parma (Italy). Email: m.fioravanzi@gmail.com

[3] Department of Biosciences, University of Parma, Via Kennedy 6, 43125 - Parma (Italy). Tel.: +39 0521 902497; Fax: +39 0521 902498. Email: michele.donati@unipr.it

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Abstract

The 2014-2020 Common Agricultural Policy (CAP) reform defines new rules for farmers including regionalization, crop diversification and ecological focus area (EFA). This paper aims to evaluate farmers' intention to modify their behaviour because of the CAP reform, using the Theory of Planned Behaviour (TPB). A questionnaire was submitted to 71 Italian durum wheat producers assessing their intention to change durum wheat surface and to maintain as EFA part of the arable land. Subjective norms affects intention to change durum wheat surface, while attitude drives intention to dedicate arable crop to EFA. Implications for policy makers and producers are discussed.

Keywords: Theory of Planned Behaviour (TPB); Common Agricultural Policy (CAP); Durum wheat; Intention; Ecological focus area.

1. Introduction

The new 2014-2020 Common Agricultural Policy (CAP) reform defines another important step towards a more balanced European agricultural policy interventions and its full involvement within global issues like world population food access and climate change (European Commission, 2010). This is especially true for countries like Italy, where the decoupled agricultural payment has been applied according to historical criteria, freezing in this way the level of farm payments to a situation linked to the past and out-of-date, with evident disparities among farms also belonging to the same sector. After a debated negotiation, the CAP reform has introduced a more equitable direct payment as uniform as possible for farms across and within Member States according to non-discriminatory and homogenous criteria (regionalization). This process will be implemented gradually by each Member State minimizing the prejudice sustained by the historical beneficiaries. When the convergence will be completed, a more balanced and equitable distribution of direct payments among farmers will be achieved, and those who are currently receiving high payments per hectare will be worse off, and those with low (or null) payments will be better off.

The CAP reform design aims to improve the environmental performance of agriculture, by introducing new environmental commitments involving all the beneficiaries. The CAP green direct payment (greening), accounting for 30% of the national direct payment envelope, rewards farmers for respecting three agricultural actions: crop diversification, maintenance of permanent grassland and ecological focus area (EFA). Crop diversification is compulsory when arable land exceeds 15 hectares and corresponds to a cultivation of at least 2 crops (3 if arable land exceeds 30 hectares); the second greening constraint requires that the incidence of the permanent grassland at farm or regional level cannot be lower than 5%; the last action imposes farms with more than 10 hectares of arable land to maintain at least 5% of the arable crop land (likely 7% after 2017) to area with particular environmental characteristics, such as strip and buffer areas, environmental set-aside, nitrogenous fixing crops. To fulfil the greening requirements, farmers will receive a payment (the green payment) compensating for the possible profit losses incurred. The new CAP mechanism will likely affect farmer decisions (input allocation) and the economic results of farms.

Many authors have evaluated the impact of the past CAP reforms on farmer's behaviour trying to identify a relation between the level of public support and the farm production responses, e.g., evaluating the effects of the coupled payments reduction or removal on farm strategy. Most of these analysis assume that decoupled payments are neutral with respect to farm choices, since they do not affect the level of profitability of the agricultural activities (see,

e.g., Arfini, 2005; Viaggi et al., 2010). Only few works have dealt with the evaluation of the decoupled payment modifications on production decisions. These works are mainly based on econometric techniques aiming at evaluate the effect of (decoupled) farm payments on the farm risk aversion (Sckokai and Moro, 2006; Hennesy, 1998; Koundouri et al., 2009; Goodwin and Mishra, 2006). While the effect of CAP payments on farmers' behaviours has been widely studied in the economic literature, the agri-environmental measures have been less investigated. In particular, the second pillar agri-environmental actions have been evaluated for understanding the responsiveness of farmers and their real effectiveness at territorial level (Primdahl et al., 2010; Godard et al., 2008; Buysse et al., 2007). Attempts to predict the impact of agri-environmental measures on farm decisions have been developed mainly applying mathematical programming techniques (see, e.g., Arfini and Donati, 2013; Buysse et al., 2007) and econometric approaches (see, e.g., Espinosa-Godet et al., 2010; Kleinhanß et. al., 2007).

Despite the large use of quantitative methodologies to assess agri-environmental measures, quali-quantitative approaches are also adopted to predict farm response to new environmental policy design. In particular, the Theory of Planned Behaviour (TPB) (Ajzen, 1991) has been applied to evaluate the attitude and the likely behaviour of farmers about environmental protection actions. The TPB suggests that the likelihood of a particular behaviour can be predicted by the individual's intention to perform that behaviour (Ajzen, 1991), which captures the motivational factors that influence behaviour. According to the TPB, behaviour is guided by favourable or unfavourable evaluation of the behaviour (attitudes towards the behaviour), perceived social pressure (subjective norms, SN) and perceived ability to perform the behaviour (perceived behavioural control, PBC). In general, the more favourable the attitude and subjective norm, and the greater the perceived control, the stronger the intention to perform a given behaviour should be (Ajzen, 1991). Although usually applied in the consumer's behaviour analysis (see, e.g., Menozzi and Mora, 2012), the TPB has been successfully used to predict farmers' intention to join agri-environmental measures (Beedel and Rehman, 2000; Wauters et al., 2010; Hansson et al., 2012; Power et al., 2013) and other sustainable agricultural practices (Corbett, 2002; Fielding et al., 2008). All these TPB's applications try to identify the driving factors that lead producers to adopt a given decision. The results are important for policy makers and food-chain actors which should consider cause-effect linkage between policies and producer behaviour in order to elaborate the most appropriate strategy and intervention to stimulate farmers' sustainable behaviour (Beedel and Rehman, 2000).

This paper aims to evaluate the farmers' intention to modify their behaviour because of the new 2014-2020 CAP reform; in particular, a TPB model has been applied on durum wheat producers in Italy. This Mediterranean production represents the raw material for one of the most important Italian food chain: the pasta's food-chain. Moreover, this sector has demonstrated to be particularly sensitive to CAP changes: after the Mid Term Review reform, the durum wheat cultivation drop by 40% (Cisilino et al., 2011). Currently, we are potentially in front of another perturbating scenario, where the durum wheat could be interested by important change with consequences on the entire food chain. The modifications in decoupled payment level should be no longer considered neutral in farmers' decision process, and greening actions should be carefully evaluated. The TPB may help to analyze the relationship between the farmers' intentions under the new CAP scenarios and their antecedents, and to understand how farmers use the available information to build a strategy. The following section presents the data and method adopted; the third section shows the main results, while the related discussions and implications are presented in the fourth section.

2. Material and Methods

2.1 Design and sample

A survey was conducted during June-July 2013 on a sample of farmers producing durum wheat in Italy, involved in the pasta's supply chain. In particular, all the contacted farmers have signed contract farming with the biggest world pasta producer. Contract farming establishes the technical and agronomic criteria for growing and delivering durum wheat with a specified quality, as well as the price. Most of these farms belongs to producers' organizations (POs) covering a significant share (no lower than 10%) of cereal production within a given region. POs represent the main interface between farmers and industry. Through the pasta industry and POs, we have identified 211 durum wheat producers distributed uniformly in the three geographical areas of Italy, i.e. North, Centre and South.

As described in Figure 1, the survey has been conducted in different steps, starting from the organization of a preliminary focus group with 6 participants (4 farmers, 1 food industry representative and 1 agronomist) to identify the main issues perceived by durum wheat producers about the new CAP reform (Fioravanzi, 2013). The focus group allowed to identify the relevant behaviours related to the CAP reform, to be tested with the statistical analysis. Then, the questionnaire, based on the TPB constructs, was defined and sent to the farmers by regular and electronic mail. At the beginning of the questionnaire, we emphasised a request of participation with the explanation of the study's aim and the instructions to fulfil the questionnaire, in order to prepare and commit the farmers in the survey. We offered farmers three ways to fill in the questionnaire: by using a specific webpage developed by GoogleDoc®, by phone through direct interview, and by paper questionnaire to return via regular mail.

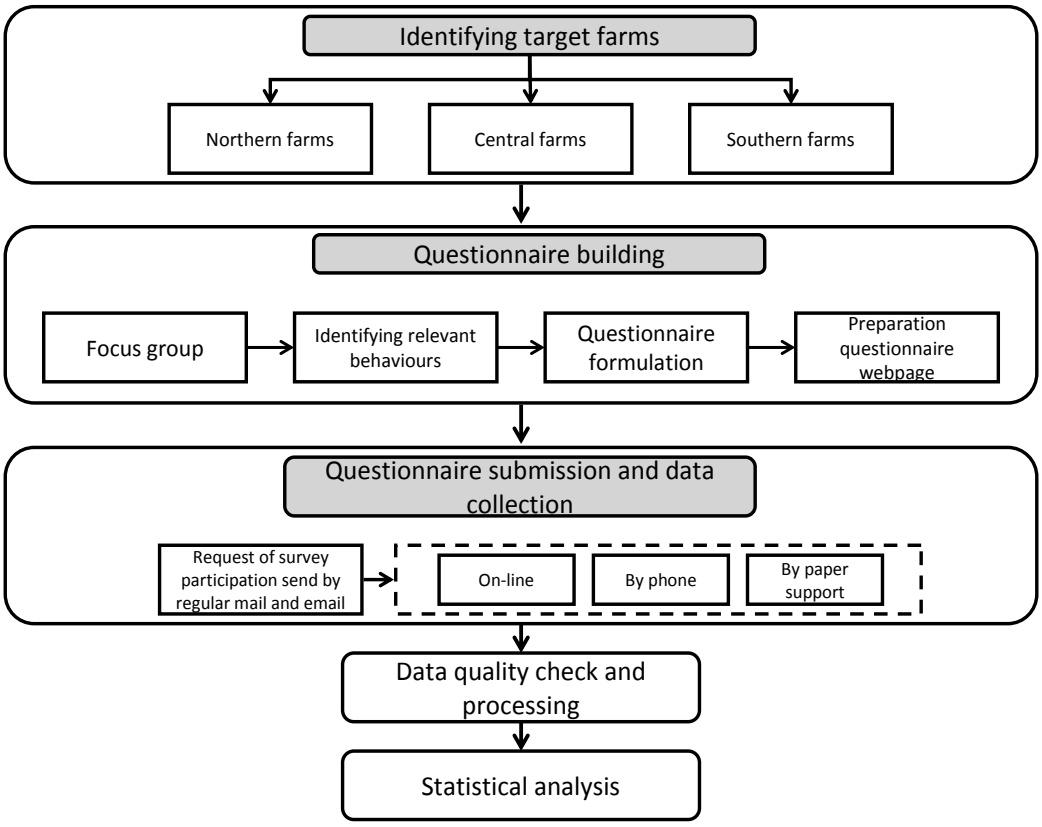


Figure 1. Study design.

A total of 73 questionnaire were completed, 16 by paper questionnaire and 57 by on-line questionnaire; no farmers decided to reply by phone interview. After two incomplete questionnaires were removed, the final sample consisted of 71 respondents. The response performance (34.6%) not fully satisfactory can be justified by the period when the survey was conducted, early summer, when farmers are usually busy with agricultural activities. Nevertheless, the sample is almost equally distributed between the three geographical areas (Table 1).

Table 1. Description of the main characteristics of the sample.

Description	North	Centre	South	Total
No. of farms	21	29	21	71
- Specialized in cereals	17	22	20	59
- Specialized in fruits and vegetables	2	3	0	5
- Specialized in animal production	0	2	0	2
- Other specialization	1	2	0	3
- Belonging to Producers' Organization	16	16	13	45
Average UAA (ha)	114.6	212.6	71.3	141.8
% Rented agricultural land	36.1	58.3	19.7	40.4
% Durum wheat surface	20.2	44.6	63.6	43.0
% Single farm payment on total revenue	29.1	31.1	46.8	35.1
% Durum wheat revenue on the total	18.8	45.0	59.2	41.5
Farmer age (average)	50.6	47.1	53.3	50.1
Distance from milling plant (Km)	129.1	87.6	172.2	124.9

Most of the farms are specialized in arable crops and in particular in cereal production, while 63% belongs to POs. The farms surveyed in Centre Italy have larger size then those in Northern and Southern regions. On average, 40% of the cultivated land is rented, with a greater incidence in North and Centre Italy. About 35% of the total revenue is represented by the single farm (decoupled) payment, demonstrating the high level dependence of these farms on public subsidies. The introduction of more balanced CAP payments could strongly affect farm's revenues and, consequently, investments. The high percentage of durum wheat revenue and cultivated surfaces on the total, shows the high degree of specialization, particularly of farms in Centre and South Italy.

2.2 TPB model measures

The questionnaire items were defined taking into account a) Ajzen's conceptual and methodological considerations for constructing a TPB questionnaire (Ajzen, 1991; 2006), b) the previous findings on similar topics (Beedel and Rehman, 2000; Corbett, 2002; Fielding et al., 2008; Wauters et al., 2010; Hansson et al., 2011), and c) the preliminary focus group (Fioravanzi, 2013). After having explained in detail the 2014-2020 CAP reform in terms of regionalization and greening commitments, two behaviours were analysed: 1) the change in the durum wheat acreage, and 2) the maintenance of at least 7% of the arable land with particular environmental characteristics (ecological focused area, EFA). The participants received a questionnaire containing items measuring these two behaviours as well as the TPB variables: attitudes, subjective norms, perceived behavioural control (PBC) and behavioural intentions. All items were scored on a 7-point Likert scale (1="totally disagree", 7="totally agree").

Four semantic items were formulated to measure attitude towards the change in durum wheat acreage (e.g., "A possible change of the durum wheat acreage to diversify the farm's activity is: bad – good"), subjective norms was assessed by six items (e.g., "The producers' organization I belong expects me to change the durum wheat acreage"), three items measured PBC (e.g., "I believe that changing in my farm the durum wheat acreage is possible"), and two items assessed intentions (e.g., "I intend to change the durum wheat acreage").

With regard to the ecological focused area (EFA), attitudes were assessed with four semantic differential items (e.g., "Maintaining at least 7% of the arable land as EFA is negative – positive for the environment"), eight items assessed subjective norms (e.g., "The mills and the food industries expect that I maintain at least 7% of the arable land as EFA"), three items measured PBC (e.g., "Weather I maintain at least 7% of the arable land as EFA it's a decision that depends entirely on me") and two items measured intentions (e.g., "I intend to maintain at least 7% of the arable land as EFA"). Many participants at the focus group stated that they felt an obligation to protect the environment with their agricultural practices (Fioravanzi, 2013). To include this dimension, a measure of perceived moral obligation (Beedel and Rehman, 2000) was added to the TPB with two items (e.g., "I believe that maintaining at least 7% of the arable land as EFA is fair for future generations"). The questionnaire included items covering also aspects related to farm characteristics (e.g., farm size, farm location, crop cultivation, etc.), and other socio-economic aspects (e.g., % durum wheat revenues on the total farm revenues).

2.3 Data analysis

We tested an extended version of the TPB model, as defined by Ajzen (1991), where intention is determined by attitudes, subjective norms and PBC, and also by some farm characteristics and other socio-economic aspects as predictors of intention. A structural equation model (SEM) technique was employed on the data that were collected to test for the relative importance of intention determinants in the two considered behaviours. SEM determines the specifications of the model structure with both latent and observed variables; the latent variables, i.e., abstract phenomena that cannot be directly measured by the researcher, have been analysed using confirmatory factor analysis (CFA) (Byrne, 2010). CFA, often referred to as the measurement model, is used when the researcher has some knowledge of the underlying latent variable structure or wishes to evaluate a priori hypotheses driven by theory. The internal consistency of the latent variables has been assessed by Cronbach's alpha coefficient. The relationship between the latent variables identifies the structural model. The use of different goodness-of-fit indices is generally recommended to test how well the observed data fit the model. The model fit was assessed with chi-square normalised by the degrees of freedom (χ^2/df), comparative fix index (CFI) and root mean square error of approximation (RMSEA). The coefficient of determination R-square was used to measure the explained variance of the endogenous variable (i.e., intention). The models were estimated using maximum likelihood procedures. To make sure that the overall fit was not inflated because of the small sample size relative to the degrees of freedom of the model, we performed a model-based bootstrapping simulation (Yuan and Hayashi, 2003; Byrne, 2010). Bootstrapping methods are re-sampling simulations with repetition from the initial collected sample (Byrne, 2010). Bootstrapping is widely used with path modelling and SEMs, as these models usually are associated with many degrees of freedom and therefore require a larger sample size than the collected sample (Dentoni et al. 2012). In this study, a model-based bootstrapping simulation increasing the sample up to one thousand repetitions leaves the overall fit of the model still acceptable on the basis of the chi-square, RMSEA and CFI.

3. Results

3.1 Descriptive analysis

The questionnaire was divided into three parts. The first part aimed to identify the level of the farmers' knowledge regarding the new CAP and the perception of its effect on farm management; the second part referred to the individual prediction of the durum wheat acreage change, while the last part aimed to collect information of the impact of the greening measures, particularly the EFA.

The respondents reported a moderately low level of knowledge about the new CAP reform. Table 2 shows that farmers believe that the new reform will mostly affect land value, farm labour and input use. The beliefs about the modifications of the input use (labour included), significantly below the value 4 ("no variation"), as well as the durum wheat acreage change (although not significantly below the value 4), indicate that farmers expects to reduce rather than increase the investments in durum wheat production and in the level of inputs because of the CAP reform. Farmers foresee a positive change, although not significantly above the value 4, in fallow areas, i.e. area set aside to agricultural productions. Thus, farmers perceive that the greening will negatively affect the productive land availability. Given a supposed reduction in the level of subsidies and the farm margins, respondents have indicated a significant land value reduction following the new CAP.

Table 2. The perceived effects of the new CAP.

Item	Mean	SD	p value[c]
Self-reported level of knowledge about the new CAP [a]	3.62	1.60	0.049
How do you believe that the CAP reform will affect the durum wheat acreage? [b]	3.85	1.13	0.252
How do you believe that the CAP reform will affect the input use? [b]	3.70	1.26	0.052
How do you believe that the CAP reform will affect the farm labour? [b]	3.52	1.21	0.001
How do you believe that the CAP reform will affect the fallow areas? [b]	4.23	1.46	0.196
How do you believe that the CAP reform will affect the land value? [b]	3.49	1.31	0.002

[a] Scale: 1 ("worst") – 4 ("moderate") – 7 ("excellent")
[b] Scale: 1 ("strong reduction") – 4 ("no variation") – 7 ("strong increase")
[c] One-sample t-test on value 4 ("moderate" or "no variation")

We first investigated the influence of the new CAP on the durum wheat cultivation (i.e., Behaviour 1). Farmers generally are not willing to significantly modify the current situation, as shown by the intention items in Table 3. This result may mask the intention to maintain the status quo in the short run, at least until the CAP reform will enter into force. A likely change in durum wheat acreage is perceived to reduce farm wealth. A modification of durum wheat cultivation is evaluated as a moderate unprofitable and unrealistic solution with a negative effect on farm equilibrium. At the same time, farmers are aware that a change (in particular a reduction) in durum wheat can engender a positive effects for the natural environment. This because of the likely reduction of fertilizers and pesticides used for growing and protecting durum wheat plants. The role of other subjects in the durum wheat cultivation decisions is perceived by farmers as weak. Only the public authorities expectations and other specialized farmers behaviour may have some influence in farmer decisions, according to the respondents. The fact that all the surveyed farms are strongly dependent by public subsidies, can justify this response; similarly, the "neighbour behaviour" can be considered by durum wheat producers as a guideline for taking decisions. As evidence has already shown in other social contexts, people are generally inclined to conform to a descriptive norm, i.e. the behaviour of similar others (de Lauwere et al., 2012). Finally, the PBC items also indicate the presence of barriers

(e.g., lack of knowledge and experiences, fixed capital endowments, etc.) that may reduce the willingness to change the durum wheat production. The reliabilities of the scales in the measurement model are confirmed by the Cronbach's alpha coefficient values higher than the recommended level of 0.70; in other words, the type and the number of items included in the analysis provided an accurate measure of the constructs.

Table 3. Questionnaire items of Behaviour 1 "Change in durum wheat acreage", mean and standard deviation (in parenthesis).

Items	Intention	Attitude	Subjective norm	PBC
Cronbach's alpha	0.78	0.71	0.91	0.70
I intend to change the durum wheat acreage [a]	2.96 (1.71)			
I am sure I will change the durum wheat acreage [a]	1.83 (1.96)			
The change in the durum wheat acreage is bad (1) – good (7)		3.92 (1.90)		
The change in the durum wheat acreage is unrealistic (1) – realistic (7)		3.62 (1.72)		
The change in the durum wheat acreage is not profitable (1) – profitable (7)		3.42 (1.49)		
The change in the durum wheat acreage is negative (1) – positive (7) for the environment		4.45 (1.62)		
Other farmers expect me to change the durum wheat acreage [a]			2.7 (1.62)	
The mills and the food industry expect me to change the durum wheat acreage [a]			2.99 (1.71)	
The public authorities expect me to change the durum wheat acreage [a]			3.49 (1.84)	
The cooperatives and Producers Organisations expect me to change the durum wheat acreage [a]			2.80 (1.62)	
The agronomists expect me to change the durum wheat acreage [a]			2.90 (1.68)	
Other durum wheat producers will change their durum wheat acreage [a]			3.55 (2.00)	
I think that changing the durum wheat acreage is possible [a]				4.04 (1.86)
My skills and knowledge do not allow me to change the durum wheat acreage [a]				3.52 (2.01)
Machinery and structural endowments do not allow me to change the durum wheat acreage [a]				3.77 (1.95)

[a] Scale: 1 ("strongly disagree") – 7 ("strongly agree").

Then, we have assessed the intention to maintain at least 7% of the arable land as ecological focus area (EFA, Behaviour 2), which is considered the most costly greening measure included in the CAP reform (Matthews, 2013). Farmers have expressed a low intention to adopt the new agro-environmental measure (items scores lower than 2.6), even though they think that EFA is "good" for the environment (Table 4). The attitude towards the behaviour is generally negative; although durum wheat producers believe they would provide public goods through maintaining at least 7% of the arable land as EFA (i.e., is "positive" for the environment), they also point out that this measure could have negative consequences on farm profitability. This result is not contradictory, while suggesting that the farmers' greatest concern are the supposed economic

losses from the reduction of productive arable land, and not the uncertainty of the positive externality generated. Public authorities and consumers/society expect and would approve their decision to adopt the EFA measure. Farmers believe that the public authorities (e.g., the EU and regions) are the agricultural policy makers and controllers, while consumers are the end-users of their environmental services provision. The items measuring moral obligation support this consideration: most of the respondents believes in the relevance of the EFAs for future generations and society.

Table 4. Questionnaire items of Behaviour 2 "Ecological focus area", mean and standard deviation (in parenthesis)

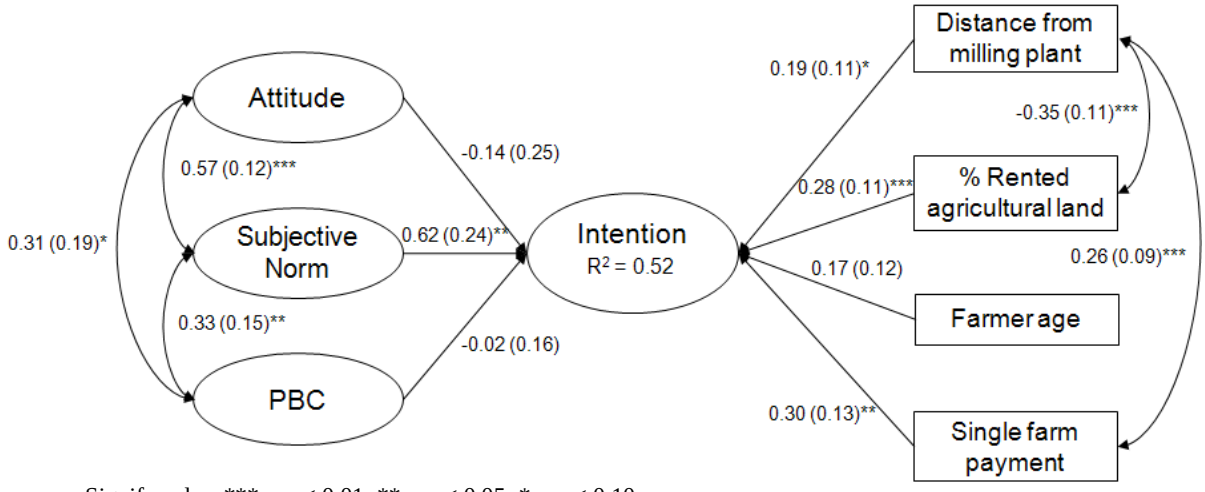
Items	Intention	Attitude	Subjective norm	PBC	Moral obligation
Cronbach's alpha	0.95	0.81	0.89	0.75	0.94
I intend to maintain at least 7% of the arable land as an EFA [a]	2.59 (2.00)				
I'm sure that I will maintain at least 7% of the arable land as an EFA [a]	2.39 (1.96)				
Maintaining at least 7% of the arable land as an EFA is bad (1) – good (7)		3.79 (2.06)			
Maintaining at least 7% of the arable land as an EFA is unrealistic (1) – realistic (7)		3.45 (1.67)			
Maintaining at least 7% of the arable land as an EFA is unprofitable (1) – profitable (7)		2.41 (1.29)			
Maintaining at least 7% of the arable land as an EFA is negative (1) – positive (7) for the environment		4.97 (2.04)			
Other farmers expect me to maintain at least 7% of the arable land as an EFA [a]			2.89 (1.74)		
My family expects me to maintain at least 7% of the arable land as an EFA [a]			3.63 (2.02)		
The mills and the food industries expect me to maintain at least 7% of the arable land as an EFA [a]			3.68 (1.86)		
The public authorities expect me to maintain at least 7% of the arable land as an EFA [a]			4.87 (1.83)		
The cooperatives and POs expect me to maintain at least 7% of the arable land as an EFA [a]			3.69 (1.78)		
The agronomists expect me to maintain at least 7% of the arable land as an EFA [a]			3.54 (1.76)		
Other durum wheat producers will maintain at least 7% of the arable land as an EFA [a]			3.25 (1.65)		
Consumers (society) expect me to maintain at least 7% of the arable land as an EFA [a]			4.39 (1.98)		
I think that maintaining at least 7% of the arable land as an EFA is possible [a]				3.77 (2.11)	
My skills and knowledge allow me to maintain at least 7% of the arable land as an EFA [a]				3.37 (2.09)	
Whether I maintain at least 7% of the arable land as an EFA is a decision that depends entirely on me [a]				4.45 (2.20)	
I believe that maintaining at least 7% of the arable land as an EFA is fair for future generations [a]					4.24 (2.01)
I believe that maintaining at least 7% of the arable land as an EFA is a commitment to society [a]					4.10 (1.99)

[a] Scale: 1 ("strongly disagree") – 7 ("strongly agree").

The scores of the other subjective norm items are at the negative side of the scale, indicating that family, industries, agronomists, POs and other farmers would not expect them to perform the behaviour. However, the mean scores of subjective norm are higher than those of Behaviour 1). This suggests that farmers might require more participation by external subjects to their EFA decision, such as family that may give suggestions on how implement (interpret) the EFA measure, and industries or agronomists that can provide support with technical advice. The PBC items confirm that farmers believe to a lesser extent that their skills and knowledge allow them to maintain at least 7% of arable land as EFA. Nevertheless, farmers claim that this decision would be made autonomously. The Cronbach's alpha coefficient values showed a good internal reliability of the constructs.

3.2 Factors affecting the behaviours

Figure 2 and Figure 3 show the results of the structural equation model predicting, respectively, the intention to 1) change the durum wheat acreage in response to the regionalisation and crop diversification, and 2) to maintain at least 7% of the arable land as an ecological focus area (EFA). The TPB model was tested for each behaviour. The overall goodness-of-fit of the illustrated models, as measured by the fit indices, indicated a good fit to the data.

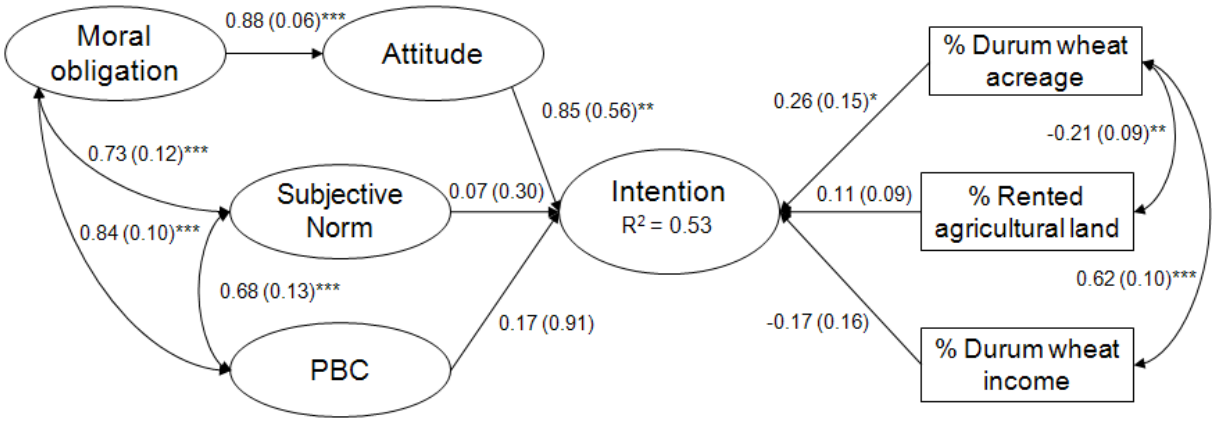


Signif. codes: *** = p < 0.01; ** = p < 0.05; * = p < 0.10
Model fit: χ^2/df = 1.154; CFI = 0.957; RMSEA = 0.047

Figure 2. Structural equation model results, behaviour 1 "Change in durum wheat acreage": R-squared, standardised coefficients, correlations and standard errors (in parenthesis).

The results show that the attitude, subjective norms and PBC, as well as other farms characteristics (i.e., the relative importance of the single farm payment, the age of the farmer, the % of rented agricultural area and the distance from the mill), explain 52% of the variance in the intention to change the durum wheat acreage in response to the CAP reform (Figure 2). The subjective norms are the main determinants of the farmers' intention to change the durum wheat surface ($\gamma = 0.62$, $p < 0.05$), indicating that both the farmers' perception of social pressure (e.g., what the food industry, producer organisations, agronomists, etc., expect them to do about changing the durum wheat acreage) and descriptive norm (i.e., how other farmers would behave) significantly affect intention. The other TPB variables are not significant predictors of behavioural intentions in the extended model, while the percentage of the single farm

(decoupled) payment on the total revenue ($\gamma = 0.30$, $p < 0.05$) and the percentage of rented agricultural land ($\gamma = 0.28$, $p < 0.01$) play positive and significant roles in influencing the intention to change the durum wheat acreage in response to the CAP reform. Even the farm distance from the mill has a positive, although marginal, effect on the behavioural intention ($\gamma = 0.19$, $p < 0.10$). The farm's distance from the mill is also positively correlated with the relative importance of the single farm payment ($\varphi = 0.26$, $p < 0.01$) and negatively correlated with the percentage of rented agricultural land ($\varphi = -0.35$, $p < 0.01$). The variables of attitude, PBC and subjective norms are all positively correlated, supporting the theoretical hypothesis of the TPB.



Signif. codes: *** = p < 0.01; ** = p < 0.05; * = p < 0.10
Model fit: $\chi^2/df = 1.415$; CFI = 0.923; RMSEA = 0.077

Figure 3. Structural equation model results, behaviour 2 "Ecological focus area": R-squared, standardised coefficients, correlations and standard errors (in parenthesis).

Attitude, subjective norms, PBC, moral obligation and other farms characteristics (i.e., the relative importance of the single farm payment, the relative importance of the durum wheat surface and revenue) accounted for 53% of the variance in the intention to maintain at least 7% of the arable land as an ecological focus area (EFA) (Figure 3). In this case, the farmers' attitude towards the behaviour, i.e., the positive or negative personal evaluation of maintaining the arable land as an EFA, is the main determinant of the intention ($\beta = 0.85$, $p < 0.05$). The other TPB variables are not significant predictor of behavioural intentions, while the percentage of the durum wheat surface ($\gamma = 0.26$, $p < 0.10$) positively affects the intention to maintain the EFA. The perceived moral obligation, i.e., the personal normative considerations felt by farmers with respect to future generations and society, strongly affects attitude ($\gamma = 0.88$, $p < 0.01$). The results suggest that, rather than directly influencing intentions, the farmers who felt a self-generated personal moral obligation had more positive personal attitudes towards the behaviour, which significantly affects the intention to maintain at least 7% of the arable land as an EFA. As expected, the percentage of the durum wheat surface and the percentage of the durum wheat revenue are positively correlated ($\varphi = 0.62$, $p < 0.01$). Hence, the moral obligation construct and the other TPB variables are all positively correlated.

4. Discussion and conclusions

The results show that attitude, subjective norms, PBC and other farms characteristics accounted for 52% and 53% of the variance in the intention, respectively, to change the durum wheat acreage and to maintain at least 7% of the arable land as an ecological focus area. These results are satisfactory because a meta-analysis of 185 independent studies found that the TPB variables, on average, accounted for 39% of the variance in intention (Armitage and Conner, 2001).

The intention to the change the durum wheat acreage has shown that farmers were more affected by stakeholders like the food processing industry, Producers' Organizations, than they thought. This is in line with de Lauwere et al. (2012), that suggested that pig breeders were generally unaware of the influence that social norms have on them. Moreover, this study shows that farmers' behaviour may be affected by the behaviour of people in their social environment (i.e., other durum wheat producers). Other studies have proven that descriptive norms may act in influencing behaviour and, in general, people are inclined to conform to the behaviour of similar others than to that of dissimilar others (de Lauwere et al., 2012). The structural equation model confirm the significant effect of the single farm payment level in influencing the intention to modify the durum wheat surface. As the direct observation of farm management also reveals, farmers do not consider decoupled payments as an external component of the farm's investment decision process. Instead, they are considered as part of the farm activity financial sources and their modification can thus affect the final input (e.g., land) allocation. Nevertheless, many CAP assessment studies assume that decoupled payments have no influences in the production plan (see Arfini, 2005). This paper shows that the single farm payment is a key variable in farmer's behaviour that cannot be neglected. We have also demonstrated that the intention to change the durum wheat acreage is positively affected by the farm's percentage of rented land. The percentage of rented agricultural land is a factor that contribute to make more flexible the farm planning and land allocation. Thus, farmers with a higher incidence of rented land may react more dynamically and adapt their choices quickly to the new CAP.

The EFA, although being evaluated as a positive initiative for enhance public good provision, is perceived by farmers as a costly measures that can depress farm economic performances. This study shows that farmers' attitude is the main determinant that positively affects the intention to maintain EFA. Thus, the awareness that farm investment in EFA can contribute to protect and improve rural environmental quality is the key element that may support the farmers' decision to dedicate at least 7% of arable land to area with particular environmental features. As suggested by other authors, a measure of moral obligation may contribute to an independent effect in the prediction of behavioural intentions for certain forms of social behaviour (Sparks et al., 1995; Beedell and Rehman, 2000). In this study, however, the measure of moral obligation did not prove to be a significant direct predictor of intention. Perceived moral obligation may be less important in situations in which behaviour is compulsory, as for the commitment to an EFA (de Lauwere et al., 2012), although to a lesser extent than that proposed in this study (at least 5% for farms with more than 10 hectares of arable land, instead of 7% regardless of the farm size proposed here). Nevertheless, in this study, the farmers who felt a self-generated personal moral obligation had more positive personal attitudes, which significantly affected the intention to dedicate at least 7% of the arable land to an EFA. The farm's level of specialization can explain the relation between the percentage of durum wheat acreage and the intention to maintain arable land as EFA, with the supposed better knowledge of the CAP reform and the related criteria of exclusion (Matthews, 2013). Larger and more specialized farms, for example, may already have part of the arable

land with the natural elements required by the EFA measure (e.g., strip and buffer areas, environmental set-aside, etc.).

As suggested by Ajzen (1991), TPB may provide suggestions for possible interventions aiming to stimulate the behaviour. In particular, the analysis clearly indicates the need for a better understanding of farmers about the new CAP tools. Although the questionnaire provided farmers with some specific information about the CAP reform, we believe that most of the farmers' concerns towards the greening measures is due to a little understanding of the new policy instrument. Thus, efforts to improve, not only the farmers' knowledge of the greening agricultural payments per se, but also their awareness of the rationale for greening payments, including the new role that the society requires to agriculture, is a central issue that must be addressed by both policy makers and food-chain operators. Farms are not isolated entities but they participate with other subjects, like cooperatives, POs and industries, in enhancing the competitiveness path of each food chain. As suggested by our analysis, the role of cooperatives, POs and industries and their relationships with farmers is important, for instance in shaping their intention to modify the durum wheat production, but should be improved. This research shows also that the success of many agri-environmental policy tools will be limited unless we succeed in shaping more positive farmers' attitude towards ecological measures. Finally, we suggest that farmers evaluate the efforts required by the greening measures not properly compensated by the economic transfer, that we estimated in 100 €/ha. This may suggest also that the Member States should calibrate the CAP intervention (regionalization, convergence and green payment) taking into account the territorial and farm type characteristics.

We acknowledge that the limited number of respondents and the length of the questionnaire are the main limitations in the current study. Moreover, our analysis has only modelled a self-reported behavioural intention. The triangulation of these results with on-field observations may provide further consistent results. Finally, although these results cannot be generalized to the broader population, they provide a comprehensive picture of the main determinants that policy makers and food-chain operators must address to improve the farmer's adoption of the new CAP reform.

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