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Do organic farmers feel happier than conventional ones? An exploratory analysis¹

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Abstract: We examine the relationship between organic farming and subjective well-being or life satisfaction. Applying an ordered probit model to a sample of French farmers located in the *Provence-Alpes-Côte d'Azur (PACA)* area (Southeast), we find that organic farmers report higher levels of life satisfaction, compared to conventional ones. Moreover, this positive relationship holds for both recently-converted and earlier-converted farmers. Our findings also show that subjective well-being is positively associated with income, profitability, satisfaction at work, social recognition, and good health.

Key-words: happiness, organic farming, satisfaction, subjective well-being.

JEL codes: D03, Q19, Q57.

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1. Introduction

Organic farming –defined as “the non-use of chemical inputs in the farming process in order to provide consumers with foodstuffs respecting natural life-cycle systems” (Mzoughi, 2011) – has experienced strong growth during the last 30 years. Consequently, a huge body of literature has focused on the determinants of its adoption (*e.g.*, Burton et al., 1999; Pietola and Lansink, 2001; Parra-Lopez et al., 2007; Musshoff and Hirschauer, 2008) and its possible economic gains (*e.g.*, Lansink et al., 2002; Nieberg and Offermann, 2003; Gay and Offermann, 2006; Greer et al., 2008; Acs et al., 2009; Clark, 2009; Mayen et al., 2010; Uematsu and Mishra, 2012). Nevertheless, despite the richness and relevance of previous works, numerous issues remain unresolved and deserve careful attention. In particular, the integration of psychological concerns in the economic analysis of organic farming is still scarce. Only a few studies have emphasized the relevance of such concerns (relative standings, desire for social approval, convictions, etc.) with regard to organic farming adoption (*e.g.*, Sheeder and Lynne, 2011; Mzoughi, 2011) or within the farming community more generally (*e.g.*, Carlsson et al., 2007). In general, these studies refer more or less explicitly to behavioral economics (*e.g.*, Simon, 1987; Kahneman, 2003; Camerer et al., 2004) which assumes that individuals can undertake actions for intrinsic reasons, such as pleasure or personal satisfaction. Despite some critiques (see, for example, Beretti et al., 2013 for a nice review), several scholars argue that psychological concerns are more important than what is generally claimed in standard economic models and ignoring them may lead to flawed prescriptions (Fehr and Falk, 2002; Layard, 2006; Venkatachalam, 2008; Frey and Stutzer, 2008; Manner and Gowdy, 2010).

Among the large variety of psychological aspects considered in the behavioral economics literature, happiness or life satisfaction seems to be a prototype.² Frey (2008) considers it a “revolution in economics”. Moreover, building on the works of Easterlin (1974, 1995, 2001), a growing literature provides evidence to the empirical relationship between individuals’ characteristics or actions and their reported subjective well-being (*e.g.*, Frey and Stutzer, 2000, 2002; Kahneman and Krueger, 2006; Dolan et al., 2008 and references therein). An increasing number of national and international surveys (*e.g.*, British Household Panel Survey, U.S. General Social Survey, World Values Survey) are also conducted in order to measure how people satisfied are with their life. According to De Neve et al (2013, see also Di Tella and MacCulloch, 2006), it is imperative to make happiness more central in policy-making. In the environmental realm, there exists already a strand of literature dealing with the

² Similarly to most of the economic literature, happiness, life satisfaction and subjective well-being are used here interchangeably. For a discussion as to their distinctiveness, see Conceição and Bandura (2008).

effect of environmental characteristics and *consumers'* pro-environmental choices, including consumption of organic food, on life satisfaction (*e.g.*, Ferreira and Moro, 2010; Welsch and Kühling, 2011; Venhoeven et al., 2013). For instance, Welsch and Kühling (2011) argue that people can raise their satisfaction by consuming in a more environmental-friendly manner, although consumption of organic food has been found to be relatively weakly related to subjective well-being, compared to other types of goods. Nevertheless, as far as we know, studies oriented to the *producer* perspective are still missing. Hence, the objective of this exploratory manuscript is to investigate the relation between organic farming and life satisfaction among a sample of French farmers located in the *Provence-Alpes-Côte d'Azur (PACA)* area, southeast. The *PACA* region is the French leader in terms of agricultural area devoted to organic farming, with more than 10% in 2010, compared to 3% at the national level (Agence BIO, 2010).³ It also contains 80% of the biodiversity in France (Medail and Quezel, 1997).

Several rationales can explain why organic farming might be related to higher subjective well-being. First, previous research (*e.g.*, Padel, 2001) argues that organic farmers try to make their practices coherent with their vision of life. By using organic techniques, farmers may feel more consistent with their personal convictions which in turn may translate to higher satisfaction. According to a farmer interviewed prior to this study, “organic farming delivers a green image which differs from the farmer-polluter”. In other words, it allows farmers to get a kind of social approval, notably by improving relations with third parties. A related argument is the pursuit of social esteem or “conspicuous” behavior (Veblen, 1899; Griskevicius et al., 2010; Sexton and Sexton, 2011). That is, organic farmers may experience increased satisfaction thanks to the potential status and prestige benefits stemming from pro-environmental activities.⁴ Second, it has been proved that energy and input-economizing production methods, such as organic farming, favor autonomy (*e.g.*, Rickson et al., 1999), which is also likely to increase life satisfaction. Third, previous research found a relationship between environmental degradation and households' subjective well-being (Ferrer-i-Carbonell and Gowdy, 2007). In other words, people may feel better when their environment is less polluted. Given that organic farming is mainly intended to improve environmental performance of the farm, one may expect that farmers would feel more satisfied if they evolve in environmentally-friendly areas.

The remainder of this paper is organized as follows: Section 2 presents data and methods. Section 3 is devoted to results and discussion. Section 4 concludes, provides implications of the study, and suggests directions for future research.

³ Available at: <http://www.agencebio.org/>.

⁴ For instance, Mzoughi (2011) argues that showing to others one's environmental commitment may drive adoption of organic techniques.

2. Data and methods

Between April and May 2011, a survey questionnaire was sent to 638 organic farmers located in the French *PACA* region. These farmers have the following characteristics: their average age is 52 years; they constitute the whole population of organic farmers in four activities representative of the regional agriculture that is, fruit-growing (15%), vegetables production (18%), viticulture (41%) and cereals (26%); 55% are individual farms; and their farm's average size is 26 ha. The same questionnaire was also sent to 638 conventional farmers sampled in a way such that the two groups are comparable in terms of age, activity, farm structure and size.⁵ Before sending the questionnaire, we tested it among some experts and farmers in order to improve its readability. We received 280 responses (22%). The response rate can be considered to be good in the surveyed area. As stressed by Mzoughi (2011), who surveyed a similar sample and obtained a 19% response rate, "it is generally difficult in France to have much more responses". The author quotes several other studies (e.g., Grolleau et al., 2007) pointing out that French generally respond less to surveys, compared to their European or North-American counterparts. Moreover, respondents' characteristics are similar to the original sample, since their average age is close to 50 years, 54% of farms are individual, and average size is 25 ha. Nevertheless, the share of cereals (11%) is relatively smaller because 13% of farmers reported an activity, namely animal and other plants production, which is different from their official registration. In addition, respondents are composed of 185 organic producers and 95 conventional ones. However, using a Wilcoxon test (not reported), we found that both samples are comparable, since no significant difference has been found between the characteristics of the two groups.

Variables used and econometric model

Our dependent variable, denoted *SATISFACTION*, is an ordered one, corresponding to farmers' responses about their level of life satisfaction. It ranges from 1 (not satisfied at all) to 10 (fully satisfied). In order to test our main hypothesis, that is, being organic is positively related to the level of subjective well-being, we use the variable *ORGANIC*, equal to 1 if the farmer uses organic techniques and 0 otherwise.⁶ Moreover, conversion to organic farming is generally considered to be an economically and/or technically costly process, since farmers have to learn new practices (Acs et al., 2009) and bear a potential revenue loss (Padel, 2001). Hence, we expect that the potential relation between organic farming and subjective well-being does not hold for recently-converted farmers. In

⁵ The list of organic and conventional farmers has been obtained from the French health assurance company for farmers and farm workers (*Caisse Centrale de la Mutualité Sociale Agricole*).

⁶ It may be argued that the issue of bi-causality, that is, whether organic farmers are happier or do happier farmers adopt organic farming, remains unanswered. Further investigations with more appropriate data are required in order to address such issue.

order to check this issue, we test a model considering two categories of organic producers, *i.e.*, recently-converted (*RECENTLY_ORGANIC*) and earlier-converted (*EARLIER_ORGANIC*) farmers, using conventional farming as a reference. We set the conversion period at 3 years, as defined by the European regulation EC 834/2007.⁷

In order to control for farm-level heterogeneity, we include in our estimation a set of farm characteristics and other factors that can also be related to life satisfaction. First, previous studies argue that income is generally correlated with life satisfaction, either positively –through an increased consumption – or negatively –due to the importance of relative standings (Easterlin, 1974; Clark et al., 2008; Dolan et al., 2008; Welsch and Kühling, 2011). According to Frey and Stutzer (2002), happiness increases with income, but at a decreasing rate. Thus, in order to test this correlation, we use the farmer's monthly income. Surveyed farmers were also asked to answer a question about the profitability of their activity, that is, whether they think it is profitable or not. Second, previous literature has largely considered the effect of job characteristics on life satisfaction (*e.g.*, Booth and Van Ours, 2008), suggesting that whether people think they have a good or bad job matters. So, respondents were asked to estimate their level of satisfaction at work on a scale ranging from 1 (not satisfied at all) to 10 (fully satisfied). Respondents were also asked to indicate whether they think their work is recognized by the society as a whole. Indeed, an increasing number of studies emphasizes the role of recognition in increasing individuals' self-esteem (Bénabou and Tirole, 2003; Ariely et al., 2008). Third, it is generally considered that individuals are relatively more satisfied with their life when they have good health (Diener et al., 1999; Welsch and Kühling, 2011), since illness may prevent individuals from moving and performing certain actions. Therefore, we asked farmers to estimate their level of health on a scale ranging from 1 (very bad) to 10 (very good). Fourth, as stressed by Powdthavee (2008), social relationships (friends, neighbors, etc.) are likely to promote happiness. In other words, having good relations with relevant others is a key concern for individuals to feel relatively more satisfied. In order to test this effect, we asked farmers to indicate how satisfactory they consider their relationships with their neighboring farmers to be. Fifth, several studies show that the level of life satisfaction is determined by individual characteristics, such as age (Diener et al., 1999; Blanchflower and Oswald, 2004), gender (Louis and Zhao, 2002), level of education (Clark and Oswald, 1996; Castriota, 2006), and matrimonial situation (Helliwell, 2003); we also included these in our estimation. Given the results of previous literature (Blanchflower and Oswald, 2004; Welsch and Kühling, 2011) suggesting that life satisfaction is lower in middle age, we distinguish between three different categories for this variable. We also consider different levels of education. Moreover, without predicting which activities are relatively more associated with life

⁷ Available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:189:0001:0023:EN:PDF>.

satisfaction, we also introduce five binary variables corresponding to the main activity of the farmer, that is, fruit-growing, vegetables production, viticulture, cereals, or other.

The variables used in estimation and sample statistics are provided in Table 1. No problem of multicollinearity has been detected (not reported but available upon request). In addition to the characteristics presented in Table 1, it is worthnoting that respondents can be considered as rather satisfied with their life, since 58% of them picked a relatively high level of life satisfaction (≥ 7) and 36% are located between 8 and 10, which is higher than the average national level reported by the survey “Eurobarometer” that shows that the level of French subjective well-being ranges between 19 and 22%.⁸ Nevertheless, the scales and questions are somewhat different from what is done here, and, thus, this comparison should not be over-interpreted.

[Insert Table 1 around here]

The relation between being organic and the reported level of life satisfaction is analyzed using an ordered probit regression (Greene, 2003). More formally, assume Y_i to be our observed variable – corresponding to life satisfaction –defined by:

$$\begin{cases} Y_i = 1 \text{ (not satisfied at all)} & \text{if } Y_i^* \leq u_1 \\ Y_i = 2 & \text{if } u_1 < Y_i^* \leq u_2 \\ \vdots & \\ Y_i = 10 \text{ (fully satisfied)} & \text{if } Y_i^* > u_9 \end{cases} \quad (1)$$

Y_i^* is the latent variable influencing the reported level of life satisfaction for the i^{th} individual. u_1 to u_9 correspond to the threshold parameters. We consider the following ordered probit model:

$$Y_i^* = X_i\beta + \varepsilon_i \quad (2)$$

where X_i is the vector of exogenous variables, β represents slope coefficients to estimated, and ε_i is the disturbance term, which is assumed to be normally distributed with zero mean.

3. Results and discussion

Table 2 presents ordered probit estimation results of the relation between organic farming and life satisfaction, together with goodness-of-fit measures. We also report marginal effects, computed as the difference between the probabilities estimated at the sample means when the dummy variable takes the values 1 and 0, respectively. Marginal effects after an ordered probit estimation can be computed for each outcome of the variable *SATISFACTION*. For sake of exposition, we only present marginal

⁸Available at: http://ec.europa.eu/public_opinion/archives/ebs/ebs_135_fr.pdf.

effects for the highest level of satisfaction, that is, outcome 10. The R^2 of 0.17 indicates that heterogeneity is still relatively important in the data.⁹

[Insert Table 2 around here]

Estimation results support our prediction of a positive relationship between organic farming and life satisfaction, since the variable *ORGANIC* is positively significant at the 5% level.¹⁰ Marginal effects indicate that organic farmers are 1.5 percentage points more likely to report they are fully satisfied with their life. This finding is consistent with other studies arguing that adoption of environmentally-friendly practices is not only related to monetary gains, but also non-monetary ones such as pleasure and personal satisfaction (e.g., Chouinard et al., 2008; Mzoughi, 2011). It is also consistent with the recent works using consumer surveys and suggesting that subjective well-being may be also associated with environmental awareness (Welsch and Kühling, 2011; Venhoeven et al., 2013).

Moreover, consistent with previous work (e.g., Easterlin, 1974; Frey and Stutzer, 2002), Table 2 shows that monthly income matters, but this depends on its level. Indeed, while the variable *INCOME2000* is not significant, *INCOME1000_2000* is significant with a marginal effect of 1.5. To some extent, this finding might indicate that regarding income, farmers do not compare themselves to all other farmers in the region, but to those who are close to them. However, while *PROFIT_MODERATE* is not significant, the variable *PROFIT_HIGH* is significant at the 1% level. In other words, only farmers who think their activity is highly profitable report relatively higher levels of subjective well-being with the highest marginal effect. They are 18.5 percentage points more likely to report the highest level of life satisfaction. Regarding the variables capturing work environment, estimation results suggest that life satisfaction is highly related to satisfaction at work, the coefficients for *SATISWORK_MODERATE* and *SATISWORK_HIGH* being both positive and significant at the 1% level. In terms of marginal effects, farmers who are highly satisfied in their work are 6.7 percentage points more likely to report they are fully satisfied with their life. Social recognition (*RECOGNITION_HIGH*) is also found to be positively related to satisfaction. These findings are consistent with the previous literature and suggest that for farmers to feel happy in their life, it is crucial to feel happy and recognized in their work. Moreover, consistent with previous literature (e.g., Diener et al., 1999), farmers who feel healthier than others are found to report higher levels of life satisfaction, but this relation does not hold for farmers whose health is moderately good, since only the variable *HEALTH_GOOD* is significant. Furthermore, the variables *RELATION_GOOD* and

⁹ The estimated Pseudo R^2 should not be interpreted similarly to R -squares found in ordinary least square analyses, that is, as the percentage of the explained variance. The interested reader can refer to Long and Freese (2006) for more details about interpretation of different R -squares.

¹⁰ Other versions of the model have been tested to the omission of some variables (Appendix 1). The main finding remains robust.

RELATION_EXCELLENT are not significant. In other words, life satisfaction is not associated with the fact of having good or excellent relations with neighboring farmers. Regarding the relation between subjective well-being and socio-demographic characteristics, Table 2 shows that age matters. As suggested by previous studies arguing that life satisfaction is U shaped in age (*e.g.*, Blanchflower and Oswald, 2004), only *AGE_MIDDLE* is significant and its coefficient is negative, that is, middle-aged farmers are less likely to report higher levels of subjective well-being. However, the variables *GENDER*, *HIGH_SCHOOL*, *UNIVERSITY*, and *RELATIONSHIP* are all not significant, suggesting that being a man, reaching the university, and being in a relationship are not associated with life satisfaction. It should be noticed that these findings hold even when combining these variables, *e.g.*, gender and matrimonial situation (not reported). Compared to the previous literature which considered random samples of individuals in the studied societies, these findings may be due to the specificities of the farming community. Sectoral dummies (*FRUIT_GROWING*, *VEGETABLES*, *VITICULTURE* and *CEREALS*) are also found to be not significant.

Finally, as mentioned in Section 2, we also test whether the positive relation between organic farming and life satisfaction holds for recently-converted farmers (*i.e.*, less than 3 years from conversion). Ordered probit estimation results when the variables *EARLIER_ORGANIC* and *RECENTLY_ORGANIC* are introduced are presented in Table 3. They show that both variables are significant at the 5% and 10%, respectively. However, while earlier-converted farmers are 1.8 percentage points more likely to choose the highest level of life satisfaction, compared to conventional ones, the marginal effect associated with *RECENTLY_ORGANIC* is not significant which may suggest that its effect is weaker. Nevertheless, when predicting marginal effects for outcome 8 (not reported), both marginal effects are significant and recently-converted farmers were found to be 5.3 percentage points more likely to choose the level 8 of life satisfaction, compared to conventional farmers. Interestingly, when considering two categories of organic farmers, the effect of the other variables in the estimation remains robust.

[Insert Table 3 around here]

4. Conclusion and implications

The objective of this empirically-based paper was to investigate the relation between organic farming and subjective well-being. Using a mail survey among a sample of farmers located in the French *PACA* region, we provided evidence of a positive and significant *relationship* between being organic and the reported level of life satisfaction. Consistent with recent empirical investigations of consumers' choices (*e.g.*, Welsch and Kühling, 2011), our contribution adds content to the literature devoted the drivers of subjective well-being, by suggesting that environmental awareness matters. This finding suggests, at least to some extent, that farmers may adopt ecologically-friendly practices to

‘reach’ a higher level of personal satisfaction. Hence, if the objective of policy-makers is to increase the diffusion of such practices, they should take into account their potential non-pecuniary benefits, like happiness. Such a dimension can be also fruitfully considered when assessing organic farming performance. Moreover, the positive relationship between organic farming and subjective well-being holds for both recently-converted and earlier-converted farmers, that is, even if the first years after conversion are generally considered to be difficult for farmers, this might not affect their subjective well-being. To some extent, this finding suggests that unlike environmental benefits and strictly economic concerns (*e.g.*, returns) which generally require several years to reach, subjective well-being may be reached more quickly. Hence, if the aim of public policies is to enhance individuals’ well-being, adoption of organic farming may constitute an interesting leverage. Furthermore, our contribution also suggests other mechanisms likely to increase happiness among producers. On one hand, income and high profitability have been found to be associated with life satisfaction, which indicates that *financial* compensation is important for farmers to experience increased satisfaction. On the other hand, we also found that subjective well-being is positively related to satisfaction at work, social recognition and good health. In other words, *social* compensation is also essential. Interestingly, according to a farmer interviewed before the questionnaire administration, social recognition is a “vector of proud”. From a policy perspective, these findings highlight the importance to find the ‘right mix’ of measures likely to increase individuals’ well-being.

Nevertheless, this manuscript is rather exploratory and constitutes an appeal for further (and more refined) analyses of the relevance of psychological concerns with regards to ecologically-friendly agricultural practices, such as organic farming. Thus, we caution the reader to not over-interpret our findings, particularly given the cross-sectional nature of the data. Using panel data in a *cause-effect* framework is a challenging issue for future research about life satisfaction among farmers. Moreover, by asking farmers to self-report on their life satisfaction, this analysis is based upon a widely-used but particular measure of subjective well-being that presents some limitations, notably regarding the effect of circumstances and individuals’ emotional states (Kahneman and Krueger, 2006; see also Conceição and Bandura, 2008 for a nice review of the criticisms received by subjective measures). Yet other ways to capture happiness exist, such as the objective measurement of brain waves and sampling of individuals’ emotions also referred to as “experience sampling measures” (Frey and Stutzer, 2002; Conceição and Bandura, 2008). Although a priori difficult to implement within the farming community, using such methods constitutes a promising perspective. In addition, similar studies in other regions and countries are required in order to get more clear-cut conclusions. Furthermore, while the recent literature dealing with life satisfaction and environmental issues used mainly consumers’ surveys, an important feature of our contribution is its orientation to the producer perspective. Yet another interesting perspective is to investigate whether (and to what extent) producers’ well-being

relies on the potential consumers' satisfaction derived from organic food consumption. More generally, examining empirically the mechanisms that sustain happiness among organic producers constitutes a challenging issue.

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Table1: Variables used in estimation and sample statistics (N=280)

Variables	Description	Mean	SD
<i>Dependent variable</i>			
SATISFACTION	How the farmer is satisfied with his/her life. Ordered: from 1 (not satisfied at all) to 10 (fully satisfied).	6.66	2.06
<i>Explanatory variables (all binary, equal to 1 if yes, and 0 otherwise)</i>			
ORGANIC	The farmer uses organic methods.	0.66	0.47
RECENTLY_ORGANIC	The farmer is organic for less than 3 years.	0.19	0.39
EARLIER_ORGANIC	The farmer is organic for more than 3 years.	0.46	0.49
INCOME1000	The farmer's monthly income < 1000€.	0.33	0.47
INCOME1000_2000	The farmer's monthly income is between 1000 and 2000€.	0.45	0.49
INCOME2000	The farmer's monthly income > 2000€.	0.21	0.41
PROFIT_LOW	The farmer thinks his/her activity is not or not enough profitable.	0.71	0.45
PROFIT_MODERATE	The farmer thinks his/her activity is rather profitable.	0.23	0.42
PROFIT_HIGH	The farmer thinks his/her activity is highly profitable.	0.05	0.22
SATISWORK_LOW	The farmer is not satisfied in his/her work (≤ 4).	0.12	0.33
SATISWORK_MODERATE	The farmer is moderately satisfied in his/her work (5 or 6).	0.25	0.43
SATISWORK_HIGH	The farmer is highly satisfied in his/her work (≥ 7).	0.61	0.48
RECOGNITION_LOW	The farmer thinks his/her work is not recognized by the society.	0.22	0.41
RECOGNITION_MODERATE	The farmer thinks his/her work is not sufficiently recognized.	0.52	0.50
RECOGNITION_HIGH	The farmer thinks his/her work is rather or highly recognized.	0.25	0.43
HEALTH_BAD	The farmer thinks that his/her health is bad (≤ 4).	0.11	0.31
HEALTH_MODERATE	The farmer thinks that his/her health is moderate (5 or 6).	0.25	0.43
HEALTH_GOOD	The farmer thinks that his/her health is good (≥ 7).	0.63	0.48
RELATION_BAD	The farmer has bad or very bad relations with his/her neighbors.	0.23	0.42
RELATION_GOOD	The farmer has good relations with his/her neighbors.	0.55	0.49
RELATION_EXCELLENT	The farmer has excellent relations with his/her neighbors.	0.20	0.40
AGE40	The farmer's age < 40 years.	0.15	0.35
AGE_MIDDLE	The farmer's age is between 40 and 59 years.	0.70	0.35
AGE60	The farmer's age ≥ 60 years.	0.14	0.35
GENDER	The farmer is a man.	0.76	0.42
SCHOOL	The farmer's level of education is less than the French Baccalaureate.	0.42	0.49
HIGH_SCHOOL	The farmer's level of education is the Baccalaureate.	0.12	0.33
UNIVERSITY	The farmer's level of education is more than Baccalaureate.	0.45	0.49
RELATIONSHIP	The farmer is in a relationship.	0.82	0.38
FRUIT_GROWING	The farmer's main activity is fruit-growing.	0.14	0.35
VEGETABLES	The farmer's main activity is vegetables production.	0.17	0.37
VITICULTURE	The farmer's main activity is viticulture.	0.43	0.49
CEREALS	The farmer's main activity is cereals.	0.11	0.31
OTHER_ACTIVITY	The farmer's main activity is "other".	0.13	0.34

Table2: Ordered probit estimation of the relation between organic farming and life satisfaction

Variables	Coefficients and significance	Marginal effects (outcome=10)
ORGANIC	0.349**	0.015**
INCOME1000 (<i>Reference</i>)	-	-
INCOME1000_2000	0.306*	0.015*
INCOME2000	0.111	0.005
PROFIT_LOW (<i>Reference</i>)	-	-
PROFIT_MODERATE	0.098	0.005
PROFIT_HIGH	1.287***	0.185**
SATISWORK_LOW (<i>Reference</i>)	-	-
SATISWORK_MODERATE	0.733***	0.053**
SATISWORK_HIGH	1.493***	0.067***
RECOGNITION_LOW (<i>Reference</i>)	-	-
RECOGNITION_MODERATE	0.258	0.012
RECOGNITION_HIGH	0.591***	0.039*
HEALTH_BAD (<i>Reference</i>)	-	-
HEALTH_MODERATE	0.328	0.019
HEALTH_GOOD	1.058***	0.044***
RELATION_BAD (<i>Reference</i>)	-	-
RELATION_GOOD	0.071	0.003
RELATION_EXCELLENT	0.007	0.000
AGE40 (<i>Reference</i>)	-	-
AGE_MIDDLE	-0.395**	-0.023*
AGE60	0.007	0.000
GENDER	0.146	0.006
SCHOOL (<i>Reference</i>)	-	-
HIGH_SCHOOL	0.211	0.012
UNIVERSITY	0.045	0.002
RELATIONSHIP	0.072	0.003
FRUIT_GROWING	-0.192	-0.008
VEGETABLES	-0.218	-0.009
VITICULTURE	-0.202	-0.009
CEREALS	-0.029	-0.001
OTHER_ACTIVITY (<i>Reference</i>)	-	-
Pseudo R2	0.1771	
Log pseudolikelihood	-477.74818	
Wald Chi2 (23)	245.87***	
Number of observations	280	

***, ** and * refer to significance at the levels of 1%, 5% and 10%, respectively.

Table 3: Ordered probit estimation of the relation between organic farming and life satisfaction (recently-converted farmers *versus* earlier-converted farmers)

Variables	Coefficients and significance	Marginal effects (outcome=10)
RECENTLY_ORGANIC	0.335*	0.020
EARLIER_ORGANIC	0.357**	0.018*
INCOME1000 (<i>Reference</i>)	-	-
INCOME1000_2000	0.306*	0.015*
INCOME2000	0.111	0.005
PROFIT_LOW (<i>Reference</i>)	-	-
PROFIT_MODERATE	0.096	0.004
PROFIT_HIGH	1.284***	0.184**
SATISWORK_LOW (<i>Reference</i>)	-	-
SATISWORK_MODERATE	0.730***	0.053*
SATISWORK_HIGH	1.491***	0.067***
RECOGNITION_LOW (<i>Reference</i>)	-	-
RECOGNITION_MODERATE	0.257	0.012
RECOGNITION_HIGH	0.591***	0.039*
HEALTH_BAD (<i>Reference</i>)	-	-
HEALTH_MODERATE	0.328	0.019
HEALTH_GOOD	1.058***	0.044***
RELATION_BAD (<i>Reference</i>)	-	-
RELATION_GOOD	0.072	0.003
RELATION_EXCELLENT	0.010	0.000
AGE40 (<i>Reference</i>)	-	-
AGE_MIDDLE	-0.393**	-0.022*
AGE60	0.007	0.000
GENDER	0.144	0.006
SCHOOL (<i>Reference</i>)	-	-
HIGH_SCHOOL	0.209	0.011
UNIVERSITY	0.044	0.002
RELATIONSHIP	0.075	0.003
FRUIT_GROWING	-0.191	-0.008
VEGETABLES	-0.219	-0.009
VITICULTURE	-0.200	-0.009
CEREALS	-0.029	-0.001
OTHER_ACTIVITY (<i>Reference</i>)	-	-
Pseudo R2	0.1772	
Log pseudolikelihood	-477.74104	
Wald Chi2 (24)	253.23***	
Number of observations	280	

***, ** and * refer to significance at the levels of 1%, 5% and 10%, respectively.

Appendix 1: Ordered probit estimations of the relation between organic farming and life satisfaction when some variables are excluded

Variables	Coefficients and significance		
	Excluding income and profitability	Excluding work environment	Excluding sectors
ORGANIC	0.404***	0.294**	0.332**
INCOME1000 (<i>Reference</i>)	-	-	-
INCOME1000_2000	-	0.369**	0.301**
INCOME2000	-	0.207	0.104
PROFIT_LOW (<i>Reference</i>)	-	-	-
PROFIT_MODERATE	-	0.362**	0.082
PROFIT_HIGH	-	1.359***	1.263***
SATISWORK_LOW (<i>Reference</i>)	-	-	-
SATISWORK_MODERATE	0.756***	-	0.757***
SATISWORK_HIGH	1.572***	-	1.516***
RECOGNITION_LOW (<i>Reference</i>)	-	-	-
RECOGNITION_MODERATE	0.314*	-	0.246
RECOGNITION_HIGH	0.701***	-	0.568***
HEALTH_BAD (<i>Reference</i>)	-	-	-
HEALTH_MODERATE	0.429*	0.365*	0.333
HEALTH_GOOD	1.187***	1.293***	1.060***
RELATION_BAD (<i>Reference</i>)	-	-	-
RELATION_GOOD	0.125	0.188	0.073
RELATION_EXCELLENT	0.004	0.141	-0.013
AGE40 (<i>Reference</i>)	-	-	-
AGE_MIDDLE	-0.360**	-0.246	-0.393**
AGE60	0.001	0.093	0.013
GENDER	0.162	0.171	0.137
SCHOOL (<i>Reference</i>)	-	-	-
HIGH_SCHOOL	0.131	0.144	0.195
UNIVERSITY	0.026	0.098	0.053
RELATIONSHIP	0.050	0.085	0.074
FRUIT_GROWING	-0.230	-0.298	-
VEGETABLES	-0.187	-0.310	-
VITICULTURE	-0.184	-0.183	-
CEREALS	-0.129	-0.072	-
OTHER_ACTIVITY (<i>Reference</i>)	-	-	-
Pseudo R2	0.1626	0.1197	0.1757

***, ** and * refer to significance at the levels of 1%, 5% and 10%, respectively.