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Ghislain Geniaux, Laure Latruffe, Jerome Lepoutre, Celine Nauges, Claude Napoleone, Jasmin Sainte-Beuve, Natacha Sautereau

► To cite this version:

Ghislain Geniaux, Laure Latruffe, Jerome Lepoutre, Celine Nauges, Claude Napoleone, et al.. The drivers of the conversion in organic farming (OF): a review of the economic literature. 3. ISOFAR Scientific Conference at the 17. IFOAM Organic World Congress, Sep 2011, Gyeonggi Paldang, South Korea. hal-01462611

HAL Id: hal-01462611

<https://hal.science/hal-01462611>

Submitted on 3 Jun 2020

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The drivers of the conversion in organic farming (OF): a review of the economic literature.

Geniaux, G.¹, Latruffe, L.², Lepoutre, J.³, Nauges, C.⁴, Napoléone C.⁵, Sainte Beuve, J.⁶, & Sautereau, N.⁷

Key words: conversion to organic farming, drivers of conversion, discrete choice model.

Abstract

We reviewed the studies, mainly in economy, to identify the drivers of the farms' conversion in organic farming (OF). The scientific documents were selected by requesting the international bibliographic databases (Web Of Knowledge, Organic Eprint) to identify articles, and by crossing main articles quoted in the recent economic literature in the field of the drivers of conversions. We have organised the review in two groups, one focused on motivations for conversion and values associated with the choices of OF, and the other on the observable drivers. This category of drivers was split in internal factors (linked to the farmer and the farm) and external factors (such as public policies, localization, etc).

Introduction

The conversion of farms into organic farming (OF) is an important phase for the perennity of the structures and more globally for the development of the organic sector. Relevant knowledge of its drivers is at stake for research and for public action. We have mainly focused our analysis on economic works aiming at identifying the drivers of conversions. In this perspective we analyzed a hundred of documents (scientific articles and reports) which allow us to (i) describe motivations and drivers explaining conversion to OF and (ii) identify the future tracks to be explored in economic research on OF. The scientific documents were selected by requesting the international bibliographic databases (Web Of Knowledge, Organic Eprint) to identify articles in the field of the drivers of conversions, and by crossing main articles quoted in the recent economic literature on OF. Most of the micro-economic modellings make the hypothesis that the choice of conversion is based on the maximization of an expected utility under constraints of price, income or rules. However, numerous studies showed the importance of non-economic motivations in the decision to convert to OF (Koesling et al. 2008), and particularly for the pioneers of OF (Padel, 2001). Actually, the discrete choice models have little explanatory power for this type of decision. Furthermore, as objective factors can have a different effect according to the motivations of the farmers, we observe very heterogeneous results on variables such as farm size for example. To correctly analyze the drivers of conversion, it is important to distinguish the motivations of the conversion and the internal or external characteristics of the farms.

¹ INRA SAD, Ecodéveloppement, Site Agroparc, 84914, Avignon, France, E-Mail ghislain.geniaux@avignon.inra.fr

² INRA, UMR 1302 SMART, 35000 Rennes, France, E-Mail Laure.Latruffe@rennes.inra.fr

³ INRA SAD, Ecodéveloppement, Site Agroparc, 84914, Avignon, France

⁴ INRA, UMR 1081 LERNA, 31000 Toulouse, France, E-Mail, celine.nauges@toulouse.inra.fr

⁵ INRA SAD, Ecodéveloppement, Site Agroparc, 84914, Avignon, France, E-Mail cnapoleone@avignon.inra.fr

⁶ INRA, UMR 1302 SMART, 35000 Rennes, France,

⁷ INRA SAD, Ecodéveloppement, Site Agroparc, 84914, Avignon, France, E-Mail natacha.sautereau@avignon.inra.fr

1/ Motivations for conversion and values associated with the choices of OF.

It is commonly acknowledged that non-economic factors such as political and ideological perspectives, and sensitivity to environmental problems may induce a farmer to convert to OF. L  pple (2010) finds that Irish drystock farmers who expressed a higher level of environmental concern were more likely to adopt organic technology (OT) in 2008. Similarly, Genius *et al.* (2006) show that Cretan farmers who expressed great concern about environmental problems were more likely to convert to OF. The same finding is reported by Burton *et al.* (2003) for horticultural farmers surveyed in 1996 in the United Kingdom.

We have separated the motivations in five main groups: ***the agronomic challenges*** (Wernick & Lockeretz 1977, Fairweather 1999, Midmore *et al.* 2001, Niemeyer & Lombard 2003, Padel 2008), ***the sanitary motivations*** (Salamon 1997, Padel 2001) ***the ethical questions*** (Conacher & Conacher, 1982, Darnhofer *et al.* 2005, Clarke *et al.* 2008), ***the environmental considerations*** (Burton *et al.* 1999 ; Latruffe & Nauges 2010) and the ***economic motivations*** (Hall & Moggyorody 2001, Flaten *et al.* 2006, Padel, 2008, Darnhofer *et al.* 2009, Cranfield *et al.* 2010).

These studies give a more precise image of the complexity of the decision of conversion according to the importance of the various motivations. It presents however several drawbacks coming from the nature of the methods of data collection. Samples are generally very small, often below 100 observations. It leads to collect information only on farms that have already adopted OF or on farms in conversion and to study the factors of conversion from descriptive univariate statistics. The interactions between the objective characteristics of the farms and the motivations in the process of decision cannot be then studied with adequate statistical treatments. These interactions are likely not to be relevant outside the territory, the sector and the concerned period. However, some studies using larger samples exist, for example Koesling *et al.* 2008 or Latruffe and Nauges, 2010. Other works use an objective observable variable as proxy for motivations: for ex., Latruffe and Nauges, 2010 used the amount of agri-environmental subsidies received by the farmer as a proxy for his environmental concern.

2/ Observable drivers

2.1.Farm and farmer's characteristics (internal factors)

We expect the size of the farm -at the time it was operated under conventional practices- to influence the decision to convert to OF. Evidence from the literature shows that the sign of the effect depends on the study area: Pietola and Oude Lansink (2001), for a sample of Finnish farms, and Gardebroek (2003) for Dutch dairy farms, find that farmers with large land areas are more likely to switch to OF. By contrast, L  pple (2010) for a sample of drystock farms in Ireland and Latruffe and Nauges (2010) for a sample of French farms, find that farmers operating on smaller farms are more likely to adopt OF.

Better educated farmers are usually found more likely to convert, as shown among others by Genius *et al.* (2006) for a sample of Cretan farmers and Gardebroek (2003) for a sample of Dutch dairy farms.

To our knowledge, Kumbhakar *et al.* (2009) and Latruffe and Nauges (2010) are the only studies which consider technical inefficiency as a potential factor driving adoption of OF. Latruffe and Nauges (2010) find that the probability of conversion does depend on technical efficiency preceding the conversion, but that the direction of the effect depends on farm size.

OF is generally perceived to be riskier than conventional farming, as organic farmers are restricted in the use of chemical pesticides and fertilizers that could help them in

reducing production risk (Gardebroek *et al.* 2010), so we would expect more risk averse farmers to be less likely to adopt the OT. Using data from a sample of Spanish farms specialized in the production of arable crops, Serra *et al.* (2008) find evidence that both conventional and organic farmers are risk averse. Both groups are found to exhibit decreasing absolute risk aversion but organic farmers have preferences that are very close to constant absolute and relative risk aversion. Gardebroek (2006), using a Bayesian random coefficient model, finds that organic arable farmers were less risk averse than the conventional ones in the Netherlands from 1990 to 1999.

2.2 External factors

Even if the theory indicates that the higher the subsidies to OF, the greater the probability of adoption should be, there is little empirical evidence on the magnitude of the effect. Pietola & Oude Lansink (2001) find that the probability of switching to OF increases at an increasing rate with increasing premium subsidies to the OF for Finnish farms during 1994-1997. Tzouvelekas *et al.* (2001), in a study of the olive-growing sector in Greece make a similar analysis. Kumbhakar *et al.* (2009), for a sample of Finnish dairy farms also find evidence that higher subsidies increase the probability of OF adoption. Finally, it is recognized that information provided about new technologies (by other farmers, media, meetings, farmers' unions, extension officers, etc) usually positively correlates with adoption of these technologies (Knowler & Bradshaw 2007).

Conclusion

It emerges that factors susceptible to explain the conversion to OF are numerous and that they play on the decisions of conversion through an important range of motivations, widely exceeding the only economic drivers. The decisions of conversion are connected to variables such as attitudes and opinions, not always observable. The use of such variables as explanatory factors in econometric models may raise methodological problems (endogeneity for ex.). Furthermore, the contexts in which the farmers evolve condition the way the motivations and the various observable factors play on the decisions, which limits the transferability of the results between countries, regions and periods.

As a result 1) factors driving conversion are often specific of the region/territory under consideration and of the production 2) few observable variables have unambiguous impact whatever the type of farming or region (age, educational level).

Actually, it seems important to develop works and to enhance collaborations on : (i) comparative studies based on counterfactual method, (ii) econometric works on the effect of the conversion on agricultural employment and on farms profitability, as well as on the role of technical efficiency in the decision of conversion. We need to take into account the spatial distribution of the farmers (effects of neighborhood, localization of markets, etc.). Therefore it is a necessity for research teams to get important and homogeneous databases both for conventional and organic farms. It is all the more important to create networks of teams on these fields, that the integration of specific information on OF farmers in the agricultural inventories is an extending practice (Italy 2000, France 2010).

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