Innovations in low input and organic dairy supply chains – what is acceptable in Europe?

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Abstract

There is a need to develop innovations within low input and organic dairying in order to overcome some of their identified constraints. This study applies the Q methodology to determine the attitudes of low input and organic dairy supply chain members in four European countries (Belgium (BE), Finland (FI), Italy (IT) and the United Kingdom (UK)) to the acceptability of various innovations in dairy farm and dairy supply chain practices. The results of the study indicate that the preference of low input and organic dairy supply chain members in Belgium, Finland, Italy and the United Kingdom regarding innovations to improve the sustainability of their supply chains, lies in developing innovations to improve animal welfare and to improve forage quality in order to be able to reduce the need for purchased concentrate feeds. Our investigation confirms that there is no interest within these sectors for innovations based on biotechnology.

Introduction

There is a need to develop innovations within low input and organic dairying in order to overcome some of their identified constraints (e.g. Smit et al., 2009; Darnhofer et al., 2005; Smith and Marsden, 2004) and improve their multi-functional performance.The applicability of innovations across a wide geographical area and in a wide range of low input and organic dairy systems is important for maximizing the return on investment in research and development. In order for an innovation to be taken up and effect desirable change, that innovation must be acceptable to the whole supply chain, including producers, processors, retailers and consumers. Different actors in the supply chain and consumers may have different views on an innovation depending on how it is perceived to affect their business or themselves. In addition, the acceptance of an innovation in farming or supply chain practices is also likely to vary significantly geographically due to differences in climate, farming practices, farm ownership and structure, lengths of supply chains and supply chain relationships. It is necessary, therefore to evaluate the acceptability of a range of potential innovations for improving dairy supply chain competitiveness across a range of European countries

Material and methods

The Q methodology (McKeown and Thomas, 1988) was applied to understand the different attitudes of supply chain participants to innovations within organic and low input dairy supply chains. The five key steps in the methodology were:

1) Definition of the research topic ("The acceptability of innovations in dairy farming and dairy supply chain practices to achieve more sustainable low input and organic dairy farming and supply chain systems") and the discourse surrounding it. The relevant discourse included materials on innovations across the broad range of dairy farming systems applicable or existing in the participating countries.

2) Derivation of a representative set of innovations statements from the discourse to be presented to participants for sorting. Four categories were used to select the statements in this study: Breeds, Feeds, Management and Practice on Farm and in the Supply Chain. From the 200 statements identified in the concourse, 34 statements (the Q-sample) were selected (Table 1).

3) Participants (8-12) were selected from each of the following: Consumers, Producers and Retailers & Processors involved in organic, low input and conventional dairy supply chains in the UK, IT, FI and BE.

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4) The participants, in a series of workshops and interviews, ranked the 34 innovation statements on a template in a quasi-normal distribution. The 34 statements had to be sorted from ‘strongly like’ (+9) to ‘strongly dislike’ (+1). These workshops and interview were followed by short informal interview for participants to explain their choices.

5) The statistical analysis of the results was carried out using the software package PQMethod (Schmolck, 2002). The first step in the analysis involved correlating every sort with every other sort. The sorts were then factor analysed applying the centroid factor extraction (Watts and Stenner, 2012) to reduce the data to a smaller number of defining sorts. The factor analysis was applied for all supply chain participant categories (Consumers, Producers and Retailers & Processors) and for each country involved (UK, IT, FI and BE)..

Results

There was considerable agreement across countries and supply chain members as to the acceptability of innovations in low input and organic dairy farm management and supply chain practices (Table 2). In all countries surveyed there was an overwhelming dislike of those innovations related to practices that are perceived to be “unnatural”. They include activities improving the forage quality and yields in low-input and organic dairy systems by GM plant breeding techniques, developing designer dairy food from transgenic animals, accelerating genetic selection using processes that includes recombination in vitro and innovations to speed up calf development from birth to maturity. It is perhaps unsurprising that these technologies are rejected by certified organic supply chain members as they do not comply with current organic principles or regulations but they were firmly rejected by all participants in the study. In all countries there were two main themes that dominated the innovations that were liked, these were innovations to improve animal welfare and innovations to improve feed and forage quality and reduce the use of purchased concentrate feed. The latter highlights the importance of good quality forage in low input and organic dairy systems and also reflects consumers desire for more “naturally” fed animals. The strong desire by all supply chain participants for innovations to improve animal welfare builds on the findings of previous studies looking specifically at consumer attitudes to animal welfare (European Commission, 2005; 2007). There were some innovations that were only strongly liked in certain countries due to the countries specificities (e.g. Italy- innovative solutions to improve the efficiency and customer convenience of short supply chains in the dairy sector).

Discussion

Albeit qualitative in nature, the results of the study indicate that the preference of low input and organic dairy supply chain members in Belgium, Finland, Italy and the United Kingdom regarding innovations to improve the sustainability of their supply chains, lies in developing innovations to improve animal welfare and to improve forage quality in order to be able to reduce the need for purchased concentrate feeds. Our investigation confirms that there is no interest within these sectors for innovations based on biotechnology. Further research is needed to confirm our findings in other countries and to fully investigate the antecedents of these attitudes in larger samples.

Table 1. 34 innovation statements that made up the Q-Sample

No.	Statement
1	Improve breed performance in different natural environments.
2	Identify adapted breeds for organic and low input production systems
3	Reduce the risk of Genetically Modified Organism (GMO) contamination in dairy feeds by optimal use of proteins alternative to soy.
4	Develop techniques to improve soil biodiversity to increase the feed value of forage.
5	Develop new forage varieties specific for low input and organic farming.
6	Develop the use of herbs in pastures for their phytotherapeutic properties to reduce animal health problems.
7	Improve milk quality by better use of forage.
8	Improve the Carbon Footprint of dairy supply-chains through improved logistics.
9	Develop an efficient network for the selling of biogas from livestock manure and slurry.
10	Improve storage and processing methods for organic food products to maximize their nutritional quality.
11	Innovation in automation and robotics in dairy management.
12	Increase animal welfare by prolonging maternal feeding in an efficient way.
13	Develop organic dairy production systems free of antibiotics.
14	Innovation in milk analysis to enable traceability (e.g. access to pasture, place of rearing, quality of feed).
15	Innovation in on farm processing of raw milk.
16	Innovation in housing aimed at improving animal welfare.
17	Selection of breeds for higher levels of desirable fatty acids in milk to produce healthier milk products.
18	Improve forage quality and yields in low-input dairy systems by GM plant breeding techniques.
19	Minimize the use of purchased feed through efficient use of home-grown feed.
20	Develop management systems that reduce the use of wormers to control parasites.
21	Improve forage conservation techniques to improve feed quality.
22	Develop systems for reducing water and fossil fuel consumption on organic and low input farms.
23	Advances in crop and soil management to improve on farm recycling of nitrogen from slurry and manure.
24	Reduce the nitrogen in slurry and manure through better management of the animal diet.
25	Develop approaches to manage health problems during the transition between gestation and lactation.
26	Develop designer dairy food from transgenic animals.
27	Improve the efficiency of reproductive techniques acceptable for organic dairying.
28	Acceleration of genetic selection including recombination in vitro (e.g. semen sexing).
29	Innovation in dietary supplements to increase milk yield and quality.
30	Develop feed additives to reduce greenhouse gas emissions without reducing milk yield or quality.
31	Innovative solutions to improve the efficiency and customer convenience of short supply chains in the dairy sector.
32	Improving the digestibility of feeds via physical, chemical or other processing.
33	Innovations to speed-up calf development so that they can breed earlier.
34	Innovation in indoor (100% housed) dairy systems to improve animal welfare.

Table 2. Summary of Consensus and Distinguishing statements*

	Belgium		Finland		Italy		UK	
	F1	F2	F1	F2	F1	F2	F1	F2
Consensus Statements								
Positive	8, 13		16		7, 16, 19, 22		none	
Negative	18, 26, 28, 32, 33		18, 26, 28, 33		18, 26, 28, 33		18, 26, 28, 34	
Distinguishing statements								
Positive	5, 6, 19	34, 9, 12	4, 5, 19, 23	2, 6, 12, 13	4, 6, 12	31	4, 19, 22, 23	2, 3, 6, 13
Negative	34	none	none	none	34	none	none	none

* A full list of innovations related to the statement numbers is available in Table 1.

References

Darnhofer, I., W. Schneeberger, and B. Freyer. 2005. Converting or Not Converting to Organic Farming in Austria: Farmer Types and Their Rationale. Agric. Human Values 22:39–52.

Smit, A. H., P. J. Driessen, and P. Glasbergen. 2009. Conversion to Organic Dairy Production in the Netherlands: Opportunities and Constraints. Rural Sociol. 74(3):383-411.

Smith, E., and T. Marsden. 2004. Exploring the “Limits to Growth” in UK Organics: Beyond the Statistical Image. J. Rural Stud. 20:345–57.

McKeown, B., and B. Thomas. 1988. Q Methodology. Sage Publications Inc. Newbury Park, California, USA.

Schmolck, P. 2002. PQMethod Manual. Accessed Feb. 26, 2013. http://schmolck.userweb.mwn.de/qmethod/pqmanual.htm.

Watts, S., and P. Stenner. 2012. Doing Q Methodological Research – Theory, Method and Interpretation. Sage Publications Ltd, London, UK.

European Commission. 2005. Attitudes of consumers towards the welfare of farmed animals. Eurobarometer, Brussels, Belgium.European Commission. 2007. Attitudes of EU citizens towards animal welfare. Eurobarometer, Brussels, Belgium.

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