



LAND ECONOMY WORKING PAPER SERIES

Number: 42 **Improving Market Orientation in the Scottish Beef Supply Chain through Performance-related Communications: The Case of the McIntosh Donald Beef Producer Club and Qboxanalysis**

Corresponding Author:

Philip Leat
Land Economy Research Group
SAC Research Division
SAC Edinburgh

EH9 3JG
Tel: 01224 711048
Email: Philip.Leat@sac.ac.uk

IMPROVING MARKET ORIENTATION IN THE SCOTTISH BEEF SUPPLY CHAIN THROUGH PERFORMANCE-RELATED COMMUNICATIONS: THE CASE OF THE MCINTOSH DONALD BEEF PRODUCER CLUB AND QBOXANALYSIS

Philip Leat, Cesar Revoredo-Giha and Beata Kupiec-Teahan
Food Marketing Research,

Abstract

The reform of the Common Agricultural Policy (CAP) in 2003 and particularly the introduction of the Single Payment Scheme (SPS) is intended to make farmers more market orientated and competitive. In this context, the purpose of this paper is to discuss whether performance-related communication strategies present the possibility of improving farmers' market orientation. This is studied through the case of McIntosh Donald, a beef processor located in the North East of Scotland and a major red meat supplier for Tesco, and Qboxanalysis, a performance-related communication system, introduced by the processor to its beef Producer Club members in March 2005. Results indicate that the enhanced communication strategy has the potential to increase farmers' performance and market orientation, not only through the use of the Qboxanalysis system but also through the Producers' Club activities. However, additional efforts are required to engage producers that are less proactive.

I. Introduction and background to the research

Since it came into force in 1962, the European Union's (EU) Common Agricultural Policy (CAP) supported increases in farm production, thereby steadily generating overproduction, agricultural support budget pressures, accusations of excessive market protection and distortion, along with concerns about the environmental impact of agricultural intensification. All these reasons contributed to growing support for fundamental reform of the CAP.

The new agricultural policy measures adopted by EU farm ministers in 2003, seek to reform the CAP in ways that will encourage EU farmers and their businesses to become more market orientated, competitive and sustainable, both economically and environmentally. The main element of this reform has been the introduction of farm support that is decoupled from production, through the Single Payment Scheme (SPS), which commenced in 2005/06. In the case of cattle production in Scotland, the SPS has replaced a number of production-linked subsidies supporting both beef cows and beef cattle during their production.

Another source of pressure for the beef supply chain to adopt a more market oriented strategy comes from the presence of imported beef (the UK was 78 per cent self-sufficient in beef in 2006, (MLC, 2007)), which in the case of further trade liberalisation would become a more serious competitor for the local industry. This may be even more threatening, as consumer loyalty to stores (large multiple retailers are also importers of beef) is usually higher than to brands or products (Mintel 2006), even for those products with strong regional/local identity. Furthermore, in the absence of local produce, consumers are likely to choose a substitute product, i.e. one that is not produced locally, rather than postpone the purchase or look for the product in an alternative outlet.

The aforementioned policy and market forces will, over time, force farmers to adopt more market focussed strategies in order to survive within the new market environment. An indication of such a development is provided by Revoredo-Giha and Leat (2007) in a study of how Scottish cattle producers plan to cope with the CAP's 2003 reforms. They found that 37 per cent of farmers were planning to take measures for improving the quality of their production. Whilst this is an appropriate response, as it would allow farmers to achieve a better alignment of production with market requirements with respect to quality and at the same time secure quality-related price premia, it should be noted that it is not an easy task to accomplish for many producers. This is due to the fact that many farmers are not actively part of a supply chain within which information on quality requirements and the rewards for quality improvement is readily communicated. As shown in FOODCOMM (2006) and in Leat and Revoredo-Giha (2007), farmers as a whole are the most difficult component of beef supply to draw into integrated supply chain activities. In part this is due to many of them selling their store animals and finished livestock in auction markets, without having a clear view of the final customer and their requirements, and not having the possibility to benchmark their production - in terms of physical performance or quality - against that of other producers.

Finally, research has shown (FOODCOMM, 2007) that supply chain relationships in the beef chain can be significantly improved where chain arrangements offer the opportunity for commercial reward to chain participants, including farmers, and that good communication is also necessary for the development of sustainable chain relationships.

The described context, while challenging, may also open opportunities for farmers to develop alternative and improved marketing channels, possibly by establishing new forms of partnership with processors. Thus, the purpose of this paper is to discuss whether performance-related communication strategies have the possibility of improving farmers' market orientation. This is studied through the case of McIntosh Donald, a beef processor located in the North East of Scotland and a major red meat supplier for Tesco, and Qboxanalysis, a performance-related communication system, introduced by the processor to its beef Producer Club members in March 2005.¹

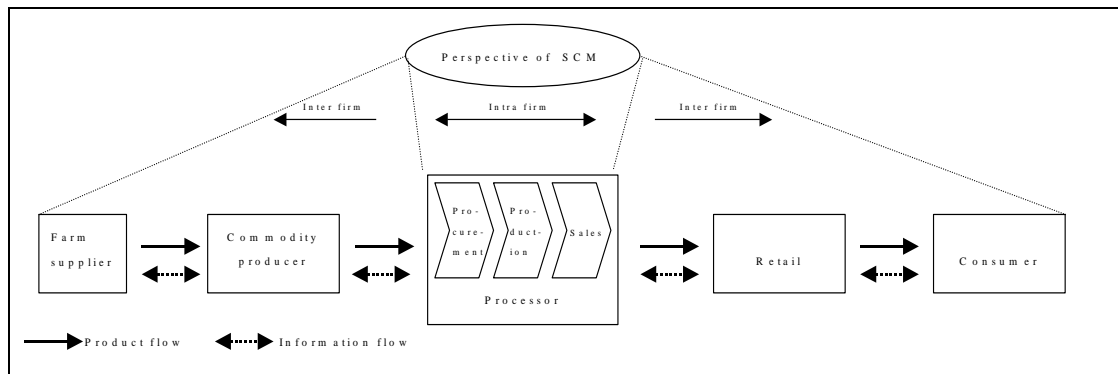
II. Literature Review

Prior to the CAP reform of 2003, production-related support tended to reduce the incentives for primary producers to become more proactive in the operation of supply chains. This is particularly important as an efficient and effective collaborative supply chain can provide a critical source of competitive advantage (e.g. Dyer and Singh, 1998; Sahay, 2003; Power, 2005).

The purpose of this section is to provide a brief overview, based on the literature, of some of the main issues surrounding the use of performance-related communication. In particular, regarding its impact on increasing market orientation of the supply chain (as market information flows along the chain) and through its effects on supply chain cohesion by means of improved communication between farmer and processor and the level of trust between them.

The flow of information from consumers to farmers in a market oriented food supply chain can be represented as in Figure 1. A fundamental pre-requisite of good marketing performance within a free market environment is that of awareness of the customer, and their needs. Harmsen et al. (2000) note that market orientation involves a focus on, and responsiveness to, customers and competitors, as part of an external orientation. Within the context of supply chains and their performance, this awareness should be extended to embrace the needs of other chain participants as well. Such awareness invariably involves information sharing (Peterson et al., 2000).

¹ An account of the McIntosh Donald Producers' Club, also known as the Tesco Producers' Club, can be found in Fearn (1998)



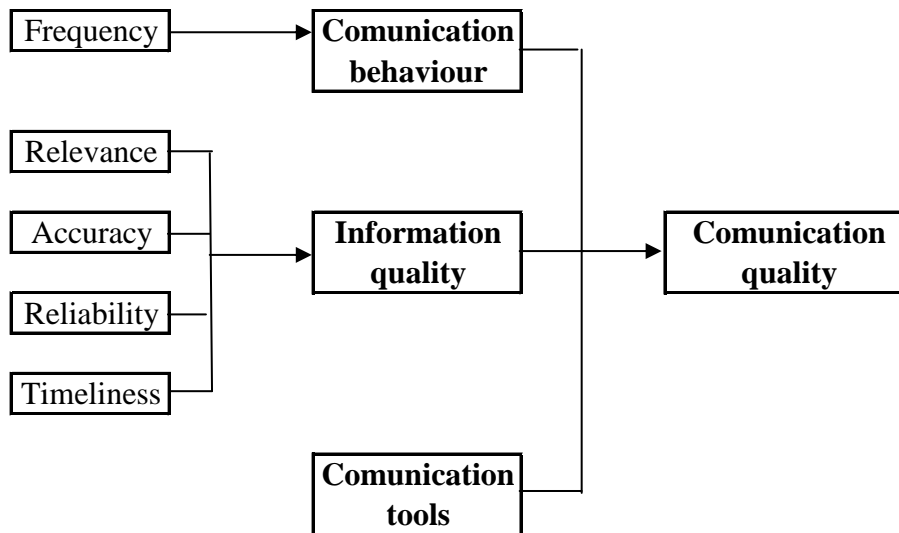
Source: Dangelmaier et al. (2001).

Figure 1. Flow of Information in Supply Chain Management (SCM)

As the flow of information is an important component in the operation of the supply chain, it is not surprising that communication has emerged as an important factor in achieving successful inter-firm co-operation (e.g. Bleeke and Ernst, 1999; Mohr et al., 1996; Tuten and Urban, 2001). Communication allows chain participants to learn about, and react to, changes in the requirements and expectations of other chain participants, and to assist superior chain performance, which can be enabled by modern information technologies. Furthermore, enhanced transparency, through an information sharing mechanism linking supply chain partners, is one of the most critical drivers of supply chain success (Min and Zhou, 2002). Increasingly, communication of comparative performance information, which enables benchmarking, can also play a role in furthering enterprise and chain performance.

With respect to information transmission, information technology (IT) has an important role in helping communication and cohesion within the supply chain. It should be noted that information IT selection and usage is a key strategic consideration in efficient consumer response (ECR), where information is transmitted from consumers to all parties in the supply chain. Enabling technologies, such as electronic data interchange, create the basis for data transmission between chain partners. By storing data on customers, stocks, sales, competitors, etc. in a centralised location, it is possible to divide it into use-oriented and decision-oriented forms. Overall, using modern and harmonised IT can give supply chain partners an information advantage (Mau, 2000) that can lead to a significant competitive advantage.

Communication in supply chains can be influenced by many factors. Most of these can be allocated to one of the following groups: (1) communication behaviour; (2) information quality; (3) communication tools. These factors, along with some of the key influences on them, are shown in Figure 2.



Source: Based on FOODCOMM

Figure 2: Factors Influencing Communication

Several elements present in Figure 2 are also part of systems' performance-related communication. A particularly important aspect present of these systems, is that they can make decision-making easier by reducing uncertainty (Duncan and Moriarty, 1998). Moreover, Farace et al. (1977) define information in terms of the reduction of uncertainty. The greater the uncertainty, the greater the need for information, and this is particularly important for beef producers as they can use information over time to improve the quality of their finished animals.

Information quality is an important aspect of communication quality. Low and Mohr (2001) use the indicators of relevance, accuracy, reliability and timeliness to characterise the quality of marketing information, drawing on work by O'Reilly (1982). Relevance means that only useful and significant information for the decision process, or for achieving specific objectives, will be transmitted. Accuracy refers to the clear and precise formulation and transmission of information. Reliability concerns the trustworthiness of the information. Timeliness adds a temporal dimension: up-to-date information allows the receiver to react appropriately.

The indicators of relevance and accuracy do not refer solely to information quality, but also to information quantity. Both should be appropriate to the situation. Previous research has shown that managers tend to believe that more information is better (O'Reilly, 1980) and that a lack of information is connected to poor decisions. On the other hand, information overload can occur when communication costs decrease as a result of new technologies, and information may be transmitted without processing. Thus, important information can get lost in reams of irrelevant messages. Therefore, it is essential that the transmission of information is undertaken in the appropriate quantity and also in a way that the user can apply to management decisions.

As regards, the effects that performance-related communication has on supply chain cohesion, results from FOODCOMM (Fischer et al., 2008) show that the most important contributor to good business relationships is effective communication,

which comprises adequate communication frequency and high information quality. Within the same FOODCOMM project, the current authors have identified that communication quality is a significant determinant of sustainable supply chain relationships within the UK beef supply chain.

Finally, appropriate and successful functioning of the communication system has the possibility of enhancing trust and satisfaction amongst the businesses in the supply chain and therefore, also their commitment. These three values, as many studies have shown (e.g., Lagace et al., 1991; Moorman et al., 1992; Wray et al., 1994; Storbacka et al., 1994, p. 25); Bejou et al., 1996; Lewin and Johnston, 1997, p.28; Hennig-Thurau and Klee, 1997; Boles et al., 1997; Dorsch et al., 1998; Rosen and Suprenant, 1998; Lang and Colgate, 2003; Bennet and Barkensjo, 2005) are important components of the quality of relationships within the supply chain.

III. Methodology

The information used in this case study arises from an EU Sixth Framework research project known as FOODCOMM². It was gathered through a series of in-depth interviews conducted during August and September 2007. The 11 interviews collected information from the main stakeholders within the supply chain including farmers (4 persons), representatives of the processor (2) and retailer (1), beef production advisers (2) and developers of the technology (2).

Some of the interviews were conducted on a face-to-face basis, whilst others were conducted over the telephone with further information exchanged by e-mail.³ In addition, secondary information was collected from internet sources and written material.

Information on the marketing environment faced by the Scottish beef industry was drawn both from the FOODCOMM project and a Scottish Executive Environment and Rural Affairs Department (SEERAD) funded project on the implications of the CAP reform (IMCAPT) (SAC, 2006). In addition, the case study has also been assisted by additional information supplied by Innovent Technologies Ltd.

The topics explored in the interviews were as follows:

- The marketing environment context of the Scottish beef industry.
- History of Qboxanalysis and its development.
- The aims of the initiating stakeholders.
- The information transmitted.
- The costs and mechanics of its operation.
- The potential and actual benefits of the system for the respective stakeholders.
- The level of uptake by farmers.

² 'Key factors influencing economic relationships and communication in European food chains' (FOODCOMM, SSPE-CT-2005-006458).

³ When the case study was being conducted, caution had to be exercised with respect to farm visits because of Foot and Mouth Disease problems in Southern England.

- The implications of the system for beef production management, supply chain operation, performance and relationships.

IV. Case study

This section is structured in the following way. First, the origins of Qboxanalysis and the businesses involved are presented, and second, the Qboxanalysis system is fully described, covering: the operation of the system; the information provided; the costs of the system; and its uptake by farmers.

IV.1 The origins of Qboxanalysis and the businesses involved

The Qboxanalysis system was originally developed by Mr Willie Thomson, Technical Director of Harbro Ltd., a progressive livestock feed company based in the North East of Scotland. The development of Qboxanalysis started in 2002 with the aim of providing pig farmers with a management tool, which would help them to get more of their pigs hitting target specification with respect to weights and carcass probe values (for determining carcass quality). The system not only enables the user to investigate how to improve pig enterprise performance, but also the financial consequences of the changes. In essence it provides a fact-based analysis of the pig enterprise and enables a proficient manager or adviser to plan performance improvements.

The property rights for Qboxanalysis belong to Innovent Technology, a software company, closely related to Harbro Ltd., and which is also based in the North East of Scotland. Innovent has extensive experience developing and operating a range of web-based systems for enterprise monitoring and planning in the farming sector, all under the Qbox name.

Qboxanalysis for beef cattle was developed during 2003 and 2004 and made available to the McIntosh Donald Producer Club members in March 2005. McIntosh Donald is part of the Grampian Country Food Group, and is a major slaughterer and processor of beef cattle in the North East of Scotland. In total, it slaughters approximately 80,000 cattle per year, some 15 per cent of the Scottish kill, and has Tesco as one of its major customers. The company has an established network of over 1,000 beef cattle producers who operate within the structure of their Producer Club. This has a series of activities, which aim to strengthen the flow of information and relationships between the retailer, processor and its farmer suppliers.

At the outset, McIntosh Donald recognised that their slaughtering and processing operation generated a considerable amount of information about the quality and life-time performance of the cattle they are procuring, and that communication of this information back to its farmer suppliers, in an appropriate format, would provide farmers with the opportunity to better identify the performance of their cattle, both in their own right and relative to the cattle of other producers supplying the factory.

From the interviews it was clear that, through Qboxanalysis, McIntosh Donald aims to provide information to farmers which will enable them to make better on-farm management decisions with respect to their beef production. It is also hoped that the Qboxanalysis system will help strengthen farmer-processor relationships, and that in

the longer run the company will benefit from more cattle meeting their target specifications in terms of weight, fatness and conformation.

Key points:

- **McIntosh Donald, with the support of Tesco, has an existing Producer Club within which to communicate with farmers on matters of mutual interest.**
- **Qboxanalysis provides comparative information on the on-farm performance of beef cattle.**
- **It aims to facilitate improved on-farm management decisions and improve the overall quality of beef cattle production in line with market requirements.**
- **An informal system of horizontal collaboration is assisting vertical integration with respect to communication and production improvement.**

IV.2 The Qboxanalysis system

IV.2.1 The operation of Qboxanalysis

The system operates by McIntosh Donald supplying the basic data to Innovent Technology on a weekly basis. Innovent sends out an email each Friday to all registered Qboxanalysis suppliers of cattle in that particular week. The farmer clicks on the Qboxanalysis link in the email and enters into the system with a Username and Password. The system is totally confidential, in that a user only has access to his/her own results and comparable figures for the complete McIntosh Donald cattle intake.

The information is provided on a 7-day and 13-week basis, thus providing the user with the opportunity to compare the results of his/her cattle with all others slaughtered in that week, or to examine the performance of his/her cattle over the past quarter and to again compare with the results of the factory's complete intake. This provision of quarterly data recognises the difference in production methods and feeding performance across the farming season, thus enabling 'like to be compared with like' (e.g. the performance of winter fed cattle in one year with that of another). The system also provides the opportunity for a 365-day summary, and if a Qboxanalysis registered farmer does not submit cattle to McIntosh Donald for a prolonged period, they are periodically sent a reminder about the availability of the 365-day summary.

Key point:

- **Detailed comparative information is made available on a frequent and regular basis.**

IV.2.2 The information provided by Qboxanalysis

The data gathered for Qboxanalysis is collected by McIntosh Donald via the scanning of cattle passports (which give the farmer, and age, sex and breed of the animal) and uploading of data from the Hellenic abattoir data system which carries all the

slaughter data for the plant. Thus there are no significant additional costs in gathering the information.

The data on the Qboxanalysis system distinguish between Scotch Steers, Scotch Heifers and Scotch Young Bulls and include the following indicators: the numbers of cattle, average weights, conformation score (using the EUROP classification but translated onto a scale of 1-8 for ease of comparison), fat score (using the 1-5H classification but expressed on a scale of 1-7), age at slaughter; average value, deadweight gain per day, estimated liveweight gain and percentage of cattle with fluke

Key point:

- **The extensive range of comparative data is collected at no additional cost to the processor.**

Thereafter, there is also a 'Whole Life Margin Monitor' which expresses the margin on the animal slaughtered, given a range of feed costs per head per day. There is also a 'Whole Life Breed Performance Monitor', which compares, for steers and heifers separately, the average daily liveweight gain for each of the main crosses, with data given for the individual producer and the processor. The breeds covered are Charolais Limousin, Simmental and Belgian Blue crosses.

Figure 3 shows the information that is available to a farmer on the Qboxanalysis system (similar data are also provided for the 365 day period). The producer concerned has supplied 16 steers and 12 heifers in the previous 7 days, and 189 steers and 222 heifers in the past 13 weeks. Over the 13 weeks his steers have been on average 7 kg. heavier than the plant average and his heifers about 16 kg. heavier.

The steers, despite the heavier weight, were 33 days younger than the plant average at slaughter (717 days versus 750 days) and the heifers 15 days younger (701 versus 716). The deadweight and liveweight gain were marginally better than average. In terms of carcase value, the steers were £23 better than average and the heifers £30 better.

The Whole Life Margin Monitor shows the margin that would have been earned on animals submitted in the last 7 days for a range of feeding costs. If the producer had had feeding costs of 90 pence per day, he would have earned a margin of £161 on his steers as opposed to the plant average of £108 (an additional 49 per cent).

Key points:

- **The physical performance of a producer's cattle, across a range of criteria, are clearly compared with the average results for cattle going through the plant.**
- **The financial consequences of cattle performance are indicated both in terms of carcase value and net margin.**

IV.2.3 The costs of the system

The initial development costs of the system were borne by Innovent Technology and Harbro. When McIntosh Donald adopted the system they made an initial payment of £10,000, with a further £10,000 coming from Tesco. Tesco is a major customer of McIntosh Donald and wished to support the processor in furthering its communication with farmers so as to improve the quality of cattle being supplied to the processor, and to assist farmers in improving the performance of their beef enterprises. These payments enabled the system to be installed and made operational. In addition, there is an ongoing annual operational cost of £10,000 which is borne by McIntosh Donald. As noted in the above section, there are no additional data collection costs for Qboxanalysis within the abattoir.

At the present time there is no direct cost to producers who are members of the McIntosh Donald Producers Club. The system is available to any of the Club members who wish to register with Qboxanalysis. All they require is an email address and access to the internet. Thereafter, the only cost is the time that is spent in accessing and studying the information.

Key points:

- **Qboxanalysis is free to the farmer user.**
- **The establishment costs have been paid by the processor and retailer.**
- **Following the initial establishment costs, the annual running cost to the processor is very modest at approximately 12.5 p. per carcass.**
- **The retailer aims to assist farmers in improving the quality of cattle supplied and in improving the performance of their beef enterprises.**

PRODUCER CLUB MONITOR

Producer ID:
Producer Name:



McIntosh Donald

TESCO

[BACK](#) [VIEW PRINTER FRIENDLY VERSION](#) Choose... [Go](#) Weekending: 20/07/2007

	7 Day Period						13 Week Period						Base Price	
	Cattle supplied w/e: 20/07/2007						Period: 20/04/2007 to 20/07/2007							
	Steers		Heifers		Young Bulls		Steers		Heifers		Young Bulls			
	Producer	McIntosh Donald	Producer	McIntosh Donald	Producer	McIntosh Donald	Producer	McIntosh Donald	Producer	McIntosh Donald	Producer	McIntosh Donald	Type	p/Kg
Number of cattle	16	585	12	366	0	232	189	10215	222	6186	0	2462	Steers	
Average Weight	361.57	364.78	322.32	306.53		351.93	379.96	372.83	328.34	312.12		359.48	Heifers	
Conformation Score	3.81	3.99	3.67	3.99		3.2	3.56	3.9	3.72	3.98		3.44	Y Bulls	
Fat Score	4.15	4.15	4	4.15		3.6	4.2	4.13	4.46	4.4		3.64		
Age	745.19	813.75	669.08	721.9		480.93	717.01	750.15	701.11	716.7		434.17		
Average Value	797.42	782.03	713.71	669.86		704.99	806.05	782.96	691.6	661.84		715.2		
DeadWeight Gain	0.49	0.45	0.47	0.42		0.78	0.53	0.5	0.47	0.44		0.83		
Est. LiveWeight Gain	0.8	0.74	0.76	0.69		1.28	0.88	0.82	0.76	0.71		1.36		
% cattle with fluke	6.3	14.2	8.33	0	0	10.78	7.9	12.2	5.91	11.59	0	5.93		

	Whole Life Margin Monitor						Whole Life Breed Performance Monitor				Conformation & Fatness Scores				
	Steers		Heifers		Young Bulls		Breed	Type	Producer		McIntosh Donald		Score	Conf	Fat
	Producer	McIntosh Donald	Producer	McIntosh Donald	Producer	McIntosh Donald			No.	Avg DWT Gain	No.	Avg DWT Gain			
Feeding Cost	Margin	Margin	Margin	Margin	Margin	Margin									
pence per head per day	(£)	(£)	(£)	(£)	(£)	(£)	CHX	Steers	57	0.572	2087	0.527	1	E	1
60p	376	333	271	232	0	455		Heifers	94	0.479	1360	0.458	2	U+	2
70p	304	258	201	160	0	411	LIMX	Steers	47	0.491	2254	0.475	3	U-	3
80p	232	183	131	88	0	368		Heifers	41	0.453	1483	0.418	4	R	4L
90p	161	108	61	17	0	324	SMX	Steers	2	0.46	960	0.483	5	O+	4L
100p	89	33	-10	-55	0	281		Heifers	7	0.501	513	0.426	6	O-	5L
							BBX	Steers	3	0.458	310	0.466	7	P+	5L
								Heifers	5	0.458	143	0.403	8	P-	

[BACK](#) [VIEW PRINTER FRIENDLY VERSION](#) Choose... [Go](#)

© Innovent Technology 2005

Figure 3. Producer's steers and heifers compared with plant average

PRODUCER CLUB MONITOR

Producer ID:

Producer: ,



Traditional Goodness



Suckler Herd Monitor

Selection Criteria

Birthholding	Category	Breed	Conformation	Fatness	Weight	Cost per day
uk521341	ALL	Simmental Cross	>= 1 <= 8	>= 1 <= 8	> 1 < 999	1.00

Conformation & Fatness Scores

Score	Conf	Fat
1	E	1
2	U+	2
3	U-	3
4	R	4L
5	O+	4H
6	O-	5L
7	P+	5H
8	P-	

Summary

	No. of Cattle	Conformation	Fatness	Weight	P/Kg	Value £	Age	DLWG	Cost/day	Margin/hd
Breeder	78	3.58	3.96	323.38	2.06	666.51	483.13	1.17	1.00	183.38
Factory	26641	3.93	4.11	334.31	2.03	679.84	689.09	0.85	1.00	-9.26

© Innovent Technology 2007

Figure 4. Feedback to the rearer on how cattle have performed to finishing

IV.2.4 Uptake of the system by farmers

As at August 2007 the system had 429 registered farmer users of which 100-150 were regular users (i.e. delivering cattle for slaughter and logging onto Qboxanalysis). This number of registrations was very close to the number of McIntosh Donald cattle suppliers who have an email address. These farmers were delivering approximately 15,000 (19 per cent) of the 80,000 cattle supplied to the factory annually.

It is apparent that those who register to receive Qboxanalysis are already connected to the internet for other reasons, rather than getting connected in order to access Qboxanalysis. The use of the system is also constrained by the fact that currently the data presented are of most relevance to a farmer who both breeds and finishes his own cattle ready for slaughter. This is because much of the performance information relates to the whole life of the cattle concerned, i.e. age at slaughter, weight gain per day over the life of the animal, margin over the whole life, etc.).

The appeal of Qboxanalysis to farmers who are beef 'finishers', i.e. those who buy 'store' animals which others have bred and then feed them through to slaughter, will be greatly enhanced when it carries a module which reports on performance over the 'finishing period'. For this to be achieved, purchase data have to be entered onto the system, including the holding of birth, weight at purchase and time of purchase. The system could then provide 'finishers' with accurate data on the performance of cattle during the time on their farm. The introduction of a finishing module will occur in early 2008, and it has the potential to identify the source of cattle most likely to achieve the performance level desired by the finisher. Moreover, a by-product of this development will be the ability to compare the performance of store calves prior to purchase, and this could provide useful information on the influence of different feeding regimes in early life. With the introduction of a 'Suckler Herd Monitor' the breeder could also potentially receive information on how their store animals performed through to slaughter, which could ultimately influence breeders' decisions on the genetic qualities and management of their suckler cows and bulls.

The type of information that could be made available to a breeder via the 'Suckler Herd Monitor' is presented in Figure 4. In this case the breeder's Simmental Cross calves have finished at an average daily liveweight gain of 1.17 kg, compared with the factory average of 0.85 kg. This has a dramatic effect on the margin of the animal taking it up to £183 compared to a loss of -£9 for the average animal with the lower liveweight gain.

Key points:

- **Greater internet connectivity levels by farmers will enable Qboxanalysis type communication.**
- **The power, appeal and uptake of the system will be considerably enhanced by a 'finishing period module' and 'suckler herd monitor'.**
- **These will ultimately enable the better selection and management of breeding stock, improved management of young stock, and the potential for better store stock selection decisions by finishers.**

V. Benefits of Qboxanalysis

The purpose of this section is to explore the benefits of Qboxanalysis for farmers, processors and retailers, emphasising those elements that increase the cohesion of the supply chain and farmers' market orientation.

V.1 Benefits for producers and farmers' use of the system

From the farmer's perspective, the data from Qboxanalysis is:

- highly accurate
- quick and easy to access at no cost
- provides a straightforward analysis of carcase classification and value achieved
- gives a health check report for fluke, and
- provides trend data over time

Within the case study it is apparent that at present there are broadly 3 types of farmer registered with Qboxanalysis: First, there are those who are registered with the system but who infrequently log on or make use of it. This may be as many as 65 per cent of those registered for the system. Second, there are farmers who log onto the system and use it to provide confirmation that their beef production enterprise is operating satisfactorily. Such farmers are generally operating at average or above average levels of performance. This relatively passive usage is in itself beneficial in that it reassures those with basically sound beef husbandry practices. Moreover, in time such users may become more proactive in developing their beef production based upon Qboxanalysis information. Finally, third, there is a smaller group who are logging onto the system regularly (when they put cattle away for slaughter) and are using the information gained to influence their enterprise management practices and decisions. For example, such producers may engage in:

- weighing animals at a younger age and batching them according to weights rather than age
- weighing cattle more regularly and being more selective about which animals are put away for slaughter
- getting a better understanding of the relationship between the liveweight of animals and their deadweight
- changing the bull that is put onto the suckler cows
- confirming the quality of a particular source of store cattle
- reviewing feeding rations to try and achieve better weight gain and earlier finishing
- treating cattle for fluke when they come onto the farm
- reviewing the grazing used by stock when fluke problems have arisen
- putting animals that are not ideal for McIntosh Donald to another market (e.g. through the livestock market).

Those who use the system regularly find that the information is easy to understand, once they have familiarised themselves with how the data are presented.

The second and third groups of producers, namely the 'reassured' and 'active' users, may represent together 35 per cent of registered users and 10-15 per cent of McIntosh Donald's cattle suppliers.

It is important to note that to make full use of Qboxanalysis requires a farmer who: is motivated to improve the performance of his finished cattle; and who has the capabilities to decide what farm-related changes need to be made to the cattle production system (e.g. changes in the genetics / source of stock, adjustments to feeding systems, improved animal health and welfare, etc.). An example of what may be achieved is provided by a breeder-finisher who has steadily responded to the Qboxanalysis data for his cattle over 3 years. He has experienced a 32 day reduction in days to slaughter (486 to 454) and an improvement in deadweight gain of 0.05 kg per day (from 0.73 to 0.78). At the same time, the change in the value of his carcasses has matched that of the plant average.

Where a farmer requires help in evaluating the practical implications of the Qboxanalysis data, a farm or feed adviser would seem the obvious source of assistance.

Key points:

- **Qboxanalysis information may provide evidence for a number of potential improvements in beef enterprise management.**
- **The 'reassured' and 'active' users of Qboxanalysis may represent 35 per cent of registered users and 10-15 per cent of McIntosh Donald's cattle suppliers.**
- **Active use of the system by a farmer depends on the existing performance of his/her finished cattle and the scope for improvement, and his/her motivation and capabilities.**
- **Some farmers will need advisory assistance to get the best out of the information provided.**

V.2 Benefits for the processor

Qboxanalysis has a number of benefits for McIntosh Donald. First, it enables the company to take a proactive approach towards their farmer suppliers in helping them achieve better efficiency and reduced costs on the farm, as well as producing carcasses that better match market needs. In this sense, they can help farmers achieve better carcase values and higher net margins, and strengthen their image and relationship with farmers. Second, it provides an accurate analysis of producer performance and can help in supply chain management by providing clear evidence of beef production trends. Longer term a greater proportion of beef carcasses may hit the processor's ideal carcase specification. Whilst the company is accepting carcasses of 250 to 410 kg. without penalty, in order to remain competitive, the narrower range of 270-380 kg. better meets their customers' needs and 350 kg. is ideal. In mid 2007, the factory average was close to this level. As far as fatness is concerned 4L is ideal, but in mid 2007 some 25 per cent of animals were fatter at 4H. Overfat animals cost the company about £24 per carcase in lost revenue, as an overfat animal yields 2 per cent less saleable meat. Fat which is effectively purchased at £2.10 to £2.20 per kg. has to be trimmed and sold for 6 pence per kg. There is thus considerable financial benefit to

be achieved from the production of cattle of ideal fatness (4L) and conformation (R or better). In 2007, for example, overfat animals, representing a total of 20 per cent of supply, could cost the processor over £380,000.

Finally, the system may provide further opportunities for payment notification, email marketing and the promotion of Producer Club initiatives.

Key points:

- **Qboxanalysis enables the processor to help beef cattle suppliers in their production and marketing decisions, as such it can further strengthen communications and relationships with producers, and the company's image.**
- **It can also improve the quality of its overall cattle intake and assist in major cost savings.**
- **It can assist in analysing its cattle supplies and suppliers over time.**

V.3 Benefits for the Retailer

Tesco sources beef and lamb from some 10,000 farmers and endeavours to operate and support supply chains within which all parties can derive benefit. Its Producer Clubs, operated by its main suppliers, are a major channel of two-way communication with farmers.

In supporting the introduction of Qboxanalysis, Tesco is seeking to raise awareness about production efficiency and to encourage performance comparison amongst producers, geographical areas and breeds / crosses. It is particularly wishing to support those producers who are more progressive in seeking production improvement and greater market orientation. They see the system's value lying in the fact that it is based upon hard current and historical facts, and that it can provide a good basis for discussing / considering production improvement within the Producer Club. It also draws farmers' attention to the potential benefits of IT systems and provides an incentive for them to 'get connected'.

As far as the processor is concerned, Tesco see the potential benefits of more better quality animals entering the supply chain with less wastage (less animals being outside the ideal specification), and earlier finishing giving rise to higher eating quality.

A further benefit is that the system helps Tesco identify progressive producers with whom it can engage over the future development of the industry.

Tesco are very satisfied with the system's performance to date. They see value in the developments identified above (a finishing module and suckler herd monitor) and in the wider adoption of the system (a further supplier - also part of the Grampian Country Food Group to which McIntosh Donald belongs - is also looking to introduce the system). They also recognise that for some farmers the information may appear quite complex and that its presentation may need further development in order to facilitate the interpretation of information.

Key points:

- **Tesco regards Qboxanalysis as helping to raise awareness about production efficiency by encouraging performance comparison amongst producers.**
- **They see the potential benefit of improved quality over time in the intake of cattle by the processor.**
- **The system helps them identify more progressive farmers with whom they can engage on future industry development.**
- **Tesco is very satisfied with the system and welcomes its wider adoption and further development.**

VI. The influence of Qboxanalysis on farmer-processor relationships and farmers' market orientation

At present Qboxanalysis appears to be of benefit to those farmers who have a strong commercial orientation towards their farming activities and the marketing of their cattle. As market pressures further impinge on the sector through possible greater import penetration and reduction in the Single Payment Scheme, active interest in the system may increase. Further planned developments in the system, specifically assisting beef finishers and breeders, will also widen its appeal with beef producers.

The farmers who are actively using the system are mainly those who are engaging regularly with other Producer Club activities. Consequently, any influence that Qboxanalysis may have on processor-farmer relationships is difficult to disentangle from the relationship influences of the wider Producer Club activities.

First, it should be recognised that significant numbers of farmer suppliers have a sound relationship with the processor, particularly those who readily engage with the processor over marketing and livestock suitability issues. Relationships are frequently based on the personal interactions and bonds that exist between the two parties. The company's staff (field and procurement staff) are readily described as 'very professional', 'friendly' and 'always helpful', 'responsive to queries' etc. The factual information provided by Qboxanalysis provides a sound basis for discussions between the farmer and field staff on how to achieve improvements in the beef enterprise, thereby helping to enrich the relationship further.

Second, those farmers who are commercially orientated and seeking improvements in their farm enterprises are appreciative of what the Producer Club is doing in making farmers aware of their own performance, market developments, challenges facing the factory and industry, and in bringing producers together to help interaction both amongst themselves and with the factory and retailer. For such farmers there is a strong level of satisfaction with McIntosh Donald. However, Qboxanalysis is recognised as providing information of potential commercial value that is not readily available through other marketing sources (although it may be complemented by other farm record data systems), and as such it strengthens the trading relationship, and satisfaction with it, for farmers who see the value in Qboxanalysis data.

Third, there appears to be limited impact on the level of trust with which the processor is held, although exceptions do exist. Trust appears to be influenced by price and the state of the market, as well as by the personal relationships with key company personnel. However, it is readily acknowledged that Qboxanalysis does add greater transparency to the issue of farm enterprise performance, and that it provides guidance on how, in the medium to longer term, a producer may improve the market performance of his animals.

Key points:

- **The system gives most benefit to commercially and market oriented farmers.**
- **The system reinforces the good relationship that many farmers have with the processor (there is a strong personal element to this relationship).**
- **For some the value of the data strengthens the relationship with the processor.**
- **There is little impact on the trust that farmers have in the processor (it is already reasonable).**
- **Market oriented users of the system appreciate its value (actual and potential) and derive satisfaction from the comparisons it gives and the indications of how to improve things.**

VII. Conclusions

The key points arising from the case study are as follows.

- McIntosh Donald, with the support of Tesco, has an existing Beef Producer Club within which to communicate with farmers on matters of mutual interest.
- Qboxanalysis provides comparative information on the on-farm performance of beef cattle.
- It aims to facilitate improved on-farm management decisions and improve the overall quality of beef cattle production in line with market requirements.
- An informal system of horizontal collaboration is assisting vertical integration with respect to communication and production improvement.

The nature of Qboxanalysis

- Detailed comparative information is made available on a frequent and regular basis.
- The extensive range of comparative data is collected at no additional cost to the processor.
- The physical performance of a producer's cattle, across a range of criteria, is clearly compared with the average results for cattle going through the plant.
- The financial consequences of cattle performance are indicated both in terms of carcase value and net margin.
- Qboxanalysis is free to the farmer user. The establishment costs have been paid by the processor and retailer.
- Following the initial establishment costs, the annual running cost to the processor is very modest at approximately 12.5 p. per carcase.

- The retailer aims to assist farmers in improving the quality of cattle supplied and in improving the performance of their beef enterprises.

Uptake of Qboxanalysis

- Greater internet connectivity levels by farmers will enable Qboxanalysis type communication.
- The power, appeal and uptake of the system will be considerably enhanced by a 'finishing period module' and 'suckler herd monitor'.
- These will ultimately enable the better selection and management of breeding stock, improved management of young stock, and the potential for better store stock selection decisions by finishers.

Benefits and use of the system

Farmers

- Qboxanalysis information may provide evidence for a number of potential improvements in beef enterprise management.
- The 'reassured' and 'active' users of Qboxanalysis may represent 35 per cent of registered users and 10-15 per cent of McIntosh Donald's cattle suppliers.
- Active use of the system by a farmer depends on the existing performance of his/her finished cattle and the scope for improvement, and his/her motivation and capabilities.
- Some farmers will need advisory assistance to get the best out of the information provided.

Processor

- Qboxanalysis enables the processor to help beef cattle suppliers in their production and marketing decisions, as such it can further strengthen communications and relationships with producers, and the company's image.
- It can also improve the quality of its overall cattle intake and assist in major cost savings.
- It can assist in analysing its cattle supplies and suppliers over time.

Retailer

- Tesco regards Qboxanalysis as helping to raise awareness about production efficiency by encouraging performance comparison amongst producers.
- They see the potential benefit of improved quality over time in the intake of cattle by the processor.
- The system helps them identify more progressive farmers with whom they can engage on future industry development.
- Tesco welcomes further development of the system.
- Tesco is very satisfied with the system and welcomes its wider adoption and further development.

Qboxanalysis effect on farmer-processor relationships and farmers' market orientation

- The system gives most benefit to commercially and market oriented farmers.

- The system reinforces the good relationship that many farmers have with the processor (there is a strong personal element to this relationship).
- For some the value of the data strengthens the relationship with the processor.
- There is little impact on the trust that farmers have in the processor (it is already reasonable).
- Market oriented users of the system appreciate its value (actual and potential) and derive satisfaction from the comparisons it gives and the indications of how to improve things.

Summarising all the points, the McIntosh Donald decision to introduce Qboxanalysis has potential benefits for all parties in the supply chain. It can be seen as an effort to improve the on-farm performance and market orientation of beef farmers through performance-related communications. It also has the potential to improve the performance of the processing and supply chain operation by reducing the number of animals that fall outside the ideal specification for the processor and its main customer, thus reducing waste and saving costs. Benefits also accrue to the retailer (who has helped pay for the installation of the system), not least of which is the opportunity to be proactive in assisting the performance of farmers and the whole supply chain. Furthermore, Qboxanalysis can also be seen as a way of improving business relationships along the supply chain, complementing the other chain integration activities of the McIntosh Donald Producers' Club.

VIII. References

Bejou D., Wray B., Ingram T.N. (1996), "Determinants of Relationship Quality: An Artificial Neural Network Analysis", *Journal of Business Research*, Vol. 36 No. 2, pp. 137-143.

Bennet, R. and Barkensjo, A. (2005), "Relationship quality, relationship marketing, and client perceptions of the levels of service quality of charitable organisations", *International Journal of Service Industry Management*, Vol. 16 No. 1, pp. 81-106.

Bleeke, J. and Ernst, D. (1993), *Collaborating to Compete*, John Wiley & Sons, New York.

Boles, J. S., Barksdale, H. C. and Johnson J. T. (1997), "Business relationships: an examination of the effects of buyer-salesperson relationships on customer retention and willingness to refer and recommend", *Journal of Business & Industrial Marketing*, Vol. 12 No. 3-4, pp. 253-264.

Dorsch, M.J., Swanson, S.R., and Kelley, S.W. (1998), "The Role of Relationship Quality in the Stratification of Vendors as Perceived by Customers", *Journal of the Academy of Marketing Science*, Vol. 26 No. 2, pp. 128-142.

Duncan, T. and Moriarty, S. E. (1998): *A Communication-Based Marketing Model for Managing Relationships*, *Journal of Marketing*, Vol. 62, pp. 1-13.

Dyer, J.H. and Singh, H. (1998), "The relational view: co-operative strategy and sources of inter-organisational competitive advantage", *Academy of Management Review*, Vol. 23, No. 4, pp. 660-79.

European Commission (2005). *Agriculture in the European Union, Statistical Economic Information 2004*, CEEC, Luxembourg.

Farace, R. V., Monge, P. R. and Russel, H. M. (1977): *Communicating and Organizing*. Reading, MA, Addison-Wesley.

Fearne, A. (1998), "The evolution of partnerships in the meat supply chain: insights from the British Beef Industry", *Supply Chain Management - An International Journal*, Vol. 3 No. 4, pp 214-231.

Fischer, C., Gonzalez, M., Henschion, M., and Leat, P. (2007), "Trust and economic relationships in selected European agrifood chains", *Food Economics - Acta Agricult Scand C*, Vol. 4 No. 1, pp 40-48.

Fischer, C.; Hartmann, M.; Bavorova, M.; Hockmann, H.; Suvanto, H.; Viitaharju, L.; Leat, P.; Revoredo-Giha, C.; Henschion, M.; McGee, C.; Dybowski, G.; Kobuszynska, M.; (2008). "Business Relationships and B2B Communication in Selected European Agri-food Chains – First Empirical Evidence" *International Food and Agribusiness Management Review*, Vol. 11, No. 2 (forthcoming).

FOODCOMM Project (2006), *Key factors influencing economic relationships and communication in European food chains, Workpackage Report 2: Review of Food Chain Systems*, European Commission-funded FP6 research project.
Website: <http://www.foodcomm.eu>.

FOODCOMM Project (2007), *Key factors influencing economic relationships and communication in European food chains, Workpackage Report 4: Analysis of survey data* (forthcoming).

Hahn, D. (2000): *Problemfelder des Supply Chain Management*, in: Wildemann, H. (ed.): *Supply Chain Management*, München, pp. 9-19.

Harmsen, H., Grunert, K.G. and Declerck, F. (2000), "Why did we make that cheese? An empirically based framework for understanding what drives innovation activity", *R&D Management*, Vol. 30 No. 2, pp. 151-66.

Hennig-Thurau, T. and Klee, A. (1997), "The impact of customer satisfaction and relationship quality on customer retention: A critical reassessment and model development", *Psychology and Marketing*, Volume 14, Issue 8, Pages 737 – 764.

Lagace, R.R., Dahlstrom, R., Gassenheimer, J.B. (1991), "The relevance of ethical salesperson behavior on relationship quality: the pharmaceutical industry", *Journal of Personal Selling and Sales Management*, Vol. 4 No. 1, pp.39-47.

Lang, B. and Colgate, M. (2003), "Relationship quality, on-line banking and the information technology gap", *International Journal of Bank Marketing*, Vol. 21 No. 1, pp. 29-37.

Leat, P. and Revoredo-Giha, C. (2007), "Building collaborative agri-food supply chains: The challenge of relationship development in the Scottish red meat chain" *British Food Journal* (forthcoming).

Lee, H. L. (2004): *The Tripple-A Supply Chain*, *Harvard Business Review*, Vol. 82/10, pp. 102-112.

Lewin, J.E. and Johnston, W.J. (1997), "Relationship Marketing Theory in Practice: A Case Study", *Journal of Business Research*, Vol. 39 No. 1, pp. 23-31.

Mau, M. (2000): *Supply Chain Management*. Frankfurt.

Meat and Livestock Commission - MLC (2007), "A pocketful of meat facts 2007", MLC, Milton Keynes.

Min, H. and Zhou, G. (2002), *Supply chain modelling: past, present and future*, *Computers & Industrial Engineering*, Vol. 43, pp. 231-249.

Mintel (2006), *Attitudes towards ethical foods*.

Mohr, J. J., Fisher, R. J. and Nevin, J. R. (1996), "Collaborative Communication in Interfirm Relationships: Moderating Effects of Integration and Control", *Journal of Marketing*, Vol. 60, N. 3, pp. 103-115.

Moorman, C., Zaltman, G. and Deshpande, R. (1992), "Relationships between Providers and Users of Market Research: The Dynamics of Trust within and between Organizations", *Journal of Marketing Research*, Vol. 29 No. 3, pp. 314-328.

O'Reilly, C. A. (1980): *Individuals and Information Overload in Organizations: Is More Necessarily Better?*, *Academy of Management Journal*, Vol. 23/4, pp. 684-696.

O'Reilly, C. A. (1982): *Variations in Decision Makers' Use of Information Sources: The Impact of Quality and Accessibility of Information*, *Academy of Management Journal*, Vol. 25/4, pp. 756-771.

Peterson, J., Cornwell, F., Pearson, C.J. (2000), *Chain stocktake of some Australian agricultural and fishing industries*, Bureau of Rural Sciences, Canberra. Available online at: <http://affashop.gov.au/PdfFiles/PC12761.pdf>

Power, D. (2005), "Supply chain management integration and implementation: a literature review", *Supply Chain Management: An International Journal*, Vol. 10 No.4, pp. 252-263.

Revoredo-Giha, C. and Leat, P. (2007), *Red Meat Producers' Preferences for Strategies to Cope with the CAP Reform in Scotland*, AA211 Special Study Report. Scottish Executive Environment and Rural Affairs Department (SEERAD).

Rosen, D.E., and Suprenant, C. (1998), "Evaluating relationships: Are satisfaction and quality enough?", *International Journal of Service Industry Management*, Vol. 9 No. 2, pp. 103-125.

Sadler, I., and Hines, P. (2002), “Strategic operations planning process for manufacturers with a supply chain focus: concepts and a meat processing application”, *Supply Chain Management, An International Journal*, Vol. 2 No. 4, pp. 225–241.

Sahay, B.S. (2003), “Supply chain collaboration: the key to value creation”, *Work Study*, Vol. 52 No. 2, pp. 76-83.

Scottish Agricultural College (SAC) (2006), *Implications of the CAP reform (IMCAPT)*, SAC, Edinburgh.

Storbacka, K., Strandvik, T. and Grönroos, C. (1994), “Managing customer relationships for profit: the dynamics of relationship quality”, *International Journal of Service Industry Management*, Vol. 5 No. 5, pp. 21-38.

Tuten, T. L. and Urban, D. J. (2001), “An Expanded Model of Business-to-Business Partnership Formation and Success”, *Industrial Marketing Management*, Vol. 30 No. 2, pp. 149-164.

Wray, B., Palmer, A., and Bejou, D. (1994), “Using neural network analysis to evaluate buyer–seller relationships”, *European Journal of Marketing*, Vol. 28 No. 1, 32–48.

IX. Acknowledgements

We would like to thank the members of the FOODCOMM project and also to all the persons interviewed in the case study. We particularly would like to thank Mr. Alan McNaughton and Mr. Eric Buchan, Managing Director and Procurement Director, respectively, McIntosh Donald; Mr. Michael Martin, Chairman, McIntosh Donald Producer Club; Mr. Willie Thomson, Harbro Feeds Ltd and Innovent Technologies Ltd and Ms. Alice Pattinson, Producer Club Manager, Tesco Stores Ltd who made especially valuable comments and amendments to a preliminary version of the case study. Any remaining errors are solely the responsibility of the authors.

X. The authors

Philip Leat is a Senior Economist and Team Leader of the Food Marketing Research Team at the Scottish Agricultural College (SAC) and is based in Aberdeen. He has a MSc in Agricultural Economics from the University of Aberdeen and more than 30 years of experience working and publishing in the area of agri-food marketing at Scottish, UK and EU levels.

Cesar Revoredo-Giha is a researcher within the Food Marketing Research Team of the Scottish Agricultural College (SAC) and is based in Edinburgh. He has a PhD in Agricultural and Resource Economics from the University of California (Davis). His areas of specialisation and interest are industrial organisation of food market industries and international trade.

Beata Kupiec-Teahan is a researcher within the Food Marketing Research Team of the Scottish Agricultural College (SAC) and is based in Edinburgh. She has a PhD in Food Science from Cracow's Agricultural University. Her experience and interests are in the areas of marketing and consumer studies.