SUSTAINABLE AGRICULTURE, GOOD FARMING PRACTICES AND APPLICATION OF QUALITY ASSURANCE SCHEMES IN DAIRY SECTOR

Abele Kuipers[1] & Frans J.H.M Verhees[2]

[1]Expertise Center for Farm Management and Knowledge Transfer, Wageningen University and Research Centre, The Netherlands; president Cattle Commission of European Association for Animal Production (EAAP)

[2]Wageningen University, Marketing and Consumer Behaviour Group, The Netherlands

Abstract

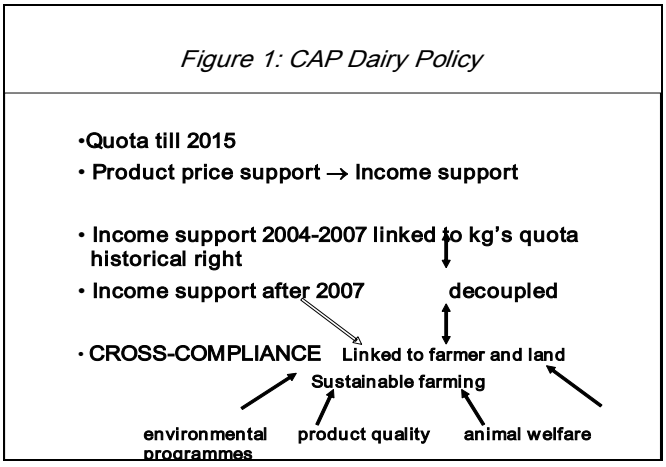
Good farming practices are part of EU policies to stimulate sustainability in agriculture. This is part of the so called Cross-Compliance conditions. To enhance social responsible behavior quality assurance schemes are in operation including good farming practices. Practices and product characteristics are included that are considered relevant to society and consumers. A method will be explained that identifies strategies to improve the transparency of the supply chain with respect to corporate social responsibility. However, a consumer study illustrates that public opinions towards product characteristics do not necessarily reflect the consumers' behavior in the market place. A field example of good farming practices will be presented.

Key words: farm practices, quality assurance schemes, social responsibility

1. Introduction

The European Union Common Agricultural Policy (CAP), as illustrated for the dairy sector is depicted in Figure 1. The policies have shifted from price support to stimulation of sustainable agriculture and rural development. Two policy pillars are backing CAP. These policies are society oriented. Pillar 1 is based on the so called Cross-Compliance conditions, which are based on statutory management requirements concerning nitrate, crop treatment, hygiene, I & R animals, medicine use, infectious diseases, animal welfare and birds & habitat. They are called "good farming practices". The conditions of cross-compliance have to be met by farmers to receive income premiums.

Figure 1: CAP Dairy Policy



March2011 - ISBN 978-92-990056-6-8 www.ifmaonline.org - Congress Proceedings

Pillar 2 deals with rural development. It is meant to strengthen agriculture (like use of advisory services and animal welfare), land and nature conservation (like landscape, cultural heritage and animal genetic resources) and diversification of production (like EU certification, ecological agriculture and quality assurance schemes). This program also addresses new and ongoing challenges, like climate change, water scarcity, biodiversity and bio-energy.

Producers and firms are requested by society to produce and process in a social responsible way or in other words "to earn a license to produce". This is made operational by quality assurance schemes, which can be organized on (inter)national level, by cooperatives or private firms. Cross-compliance conditions reflect in fact an EU assurance scheme, while companies and cooperatives also organize quality assurance schemes for farmers. In this context the word "quality' is a broad concept.

In this paper a method to assess the marketing potential of communicating corporate social responsibility (CSR) of agricultural supply chains is demonstrated. The willingness of small firms in agricultural supply chains to make available information about certain dimensions of CSR is measured and combined with the dimensions of CSR that are important for consumers. The method is demonstrated for the Dutch dairy supply chain. The issue of changing public opinions over time will be addressed, as well as the gap between expressed opinions and the behaviour in the market place. As case the quality assurance scheme in the Dutch dairy sector will be presented with special attention to medicine use as good farming practice. Drug use attracts a lot of attention these days in The Netherlands, because it may be related to the build up of bacteria resistance affecting the success of medical treatments in human beings.

2. Social responsibility

2.1 The concept

Providing customer value is an important goal in supply chain management. The demand for product differentiation is increasing and chain and network science, therefore, calls for methods to determine the value proposition at the consumer level, and tools to improve the ability of chains and networks to exploit market opportunities. The method proposed and demonstrated in this paper can be used to communicate to consumers about the corporate social responsibility of suppliers.

2.2 The method

A method is provided to identify promising strategies to improve the transparency of (agricultural) supply chains with respect to CSR (Verhees et al., 2008). The willingness of small firms in (agricultural) supply chains to make available information about certain dimensions of CSR is measured and combined with the dimensions of CSR that are relevant for consumers. This will identify the CSR dimensions that are easiest to communicate and which are most called for by consumers. Small firms in the supply chains are segmented based on the information they are willing to make available and consumers are segmented based on the CSR dimensions they consider to be relevant.

2.3 The analysis

Principal Components Analysis (PCA) was applied to identify the underlying components of CSR issues (dimensions). Indicators with highest loading on the same component were considered as one CSR dimension. 5 CRA dimensions are identified being food safety (Cronbach's Alpha = 0.92), animal welfare (Alpha = 0.91), environment (Alpha = 0.94), revenues and costs (Alpha = 0.92), and mandatory information (Alpha = 0.76). A questionnaire was developed to measure the willingness of small firms to provide information about CSR practices. The questionnaire was send to 315 Dutch dairy farmers, of

March2011 - ISBN 978-92-990056-6-8 www.ifmaonline.org - Congress Proceedings

which 60 farmers returned the questionnaire. Another questionnaire was developed and sent to consumers to identify need of consumers for information about CSR. The questionnaire for consumers was send to 1000 Dutch households, of which 136 households returned the questionnaire. Answers were provided on a 5-point scale.

Table 1 shows whether dimensions of CSR are a marketing opportunity for agricultural supply chains or not. If there is a match between consumer's expressed need for information about specific dimensions of CSR and small firms' willingness to make information available then there is a marketing opportunity.

Table 1: Marketing opportunities for CSR-communication.

		Consumers	
		High need for information	Low need for information
Small Firms	Willing to make information available	**High potential CSR dimensions**	**Information overload CSR dimensions**
	Not willing to make information available	**Persuade/ stimulate small firms CSR dimensions**	**No initiative CSR dimensions**

High potential CSR dimensions are characterized by a high willingness of small firms in the agricultural supply chain to make available information about their performance on the CSR dimension and a high need for information about the CSR dimension of consumers. These CSR dimensions are expected to have a positive influence on consumer behaviour and, therefore, the performance of the agricultural supply chain. *Persuade/ stimulate small firms CSR dimensions* are characterized by a low willingness of small firms in the agricultural supply chain to make available information about their performance on the CSR dimension and a high need for information about the CSR dimension of consumers. Two other possible dimensions are listed in table 1 as well.

2.4 Consumer needs for information about CSR

Average scores across indicators show that consumers have a need for information about the CSR dimensions food safety (3.98) and animal wellbeing (3.80). Food safety is considered even more important than mandatory information such as price information, and nutrient content (3.85). Consumers have less need for information about the environment (2.79) and about revenues and costs (2.48). Table 2 shows the results for each individual indicator. The results show that there is little variation in the average scores for the indicators within a CSR dimension.

March2011 - ISBN 978-92-990056-6-8 www.ifmaonline.org - Congress Proceedings

Table 2: Consumer needs for information about CSR indicators

Corporate Social Responsibility dimension and indicators	Need for information
Food Safety (People)	**3.98**
Guarantees about the cows' health	3.96
Guarantees about medicine residues in the dairy	4.08
Guarantees about contaminations in the dairy	4.21
Guarantees about the use of genetically modified material during production	3.73
Animal wellbeing (Planet)	**3.80**
Wellbeing of cows	3.83
Living conditions of the cows	3.76
Environment (Planet)	**2.79**
Environmental pollution: Nitrogen leakage	2.93
Environmental pollution: Ammonium evaporation	2.84
Environmental pollution: Phosphorus surplus	2.79
Environmental pollution: Use of crop protection chemicals	2.89
Water use	2.85
Revenues and Costs (Profit)	**2.48**
Processing costs of dairy processors	2.22
Farmer's price for the milk	2.70
Production costs of the dairy products	2.56
Labour costs of the dairy products	2.27
Energy costs of the dairy products	2.42

2.5 Farmer's willingness to make available information about CSR

Table 3 shows the results about farmer's willingness to make available information about each CSR dimension. However, there is a lot of variation in the average scores for the indicators within a CSR issue.

Table 3: Farmers are willing to make available information about CSR indicators

Corporate Social Responsibility dimension and indicators	Willingness to provide information
Food Safety (People)	**3.50**
14 indicators	2.64-4.24
Animal wellbeing (Planet)	**2.81**
1 indicators	2.81
Environment (Planet)	**3.10**
14 indicators	2.52-3.56
Revenues and Costs (Profit)	**3.24**
8 indicators	2.80-3.55

2.6 Marketing opportunities and identification of market segments

Based on the average scores across indicators for the CSR dimensions Table 4 is constructed. An average score of 3 is used to distinguish between high and low consumer need for information and to distinguish between willing and not willing to make information available.

March2011 - ISBN 978-92-990056-6-8 www.ifmaonline.org - Congress Proceedings

Table 4: Marketing opportunities for CSR communication

		Consumers	
		High need for information	Low need for information
Small Firms	Willing to make information available	**Food safety**	**Environment** **Revenues and costs**
	Not willing to make information available	**Animal wellbeing**	

The situation presented in Table 4 may, however, be rather simplistic because market segments with diverse needs with respect to CSR may exist. Similarly, farms may vary in the extent to which they are willing to make information available about CSR dimensions. Our analyses were elaborated and did indeed identify segments of farms and segments of consumers. For instance, for each social responsibility dimension there is at least one group of farmers not willing to make available information. This means that there will always be some resistance when the dairy sector wants to improve transparency within the chain. For more information about the segments identified see Verhees et al. (2008).

3. Relevance and market behaviour

The general need for information as expressed by consumers in section 2.4 does not necessarily reflect the behaviour of the consumer in the market place. This phenomenon will be discussed below.

3.1 Relevancy and sample studied

To measure the relevance of product characteristics respondents are questioned about the importance of each item when they buy food (Verhees et al., 2010). For example, to measure the relevance of health when consumers buy food the following items were included:

- When buying food products how important is the nutritional value for you?
- When buying food products how important is it for you to improve your health?
- When buying food products how important is for you food security, guaranteed by certificates?

These questions were answered on a 7- point scale that is anchored by not important and very important. A random sample from the Slovene population was obtained from statistics Slovenia. This allows a generalization of the results to the Slovene population. Questionnaires were sent to 2300 consumers and 340 questionnaires were returned. In addition to relevance data consumers also rated how various cheeses or sausages performed on the product characteristics. To limit the length of the questionnaire respondents rated either cheeses or sausages: 220 respondents rated 4 or 5 cheeses and 120 respondents rated 4 sausages. Eventually 325 questionnaires without missing values were used for the analyses. Again a PCA analyses was applied as explained in section 2.3. The food attributes examined belonged to the food dimensions named indulgence, convenience, sustainable production, traditional production, healthy and price.

Table 5 shows the food attributes by decreasing relevance. It shows that taste and health are the most relevant attributes, followed by produced in Slovenia. The second indulgence attribute enjoyment is the next relevant food characteristic for Slovene consumers. Sustainability issues, such as environmental and animal friendly production, and a fair price for producers score above average for relevance in this list of food characteristics. Low prices and competitive prices are least relevant for Slovene consumers.

March2011 - ISBN 978-92-990056-6-8 www.ifmaonline.org - Congress Proceedings

Convenience issues as well as tradition score below average on relevance in this list of food characteristics.

Table 5: Relevance of food attributes

Attributes of food	Average relevance across the sample	Food dimension
Excellent taste	6.36	Indulgence
Healthy	6.04	Healthy
Produced in Slovenia	5.97	Traditional production
Enjoyment	5.93	Indulgence
Environmental friendly production	5.92	Sustainable production
Improving health	5.88	Healthy
Animal friendly production of food products	5.85	Sustainable production
Fair price for producers	5.69	Sustainable production
Convenient shopping	5.47	Convenience
Certificates as safety guarantees	5.38	Healthy
Traditionally produced	5.36	Traditional production
Easy to prepare	5.22	Convenience
Nutritional Value	4.95	Healthy
Competitive price	4.61	Price
Produced in a specific region	4.40	Traditional production
Low price	4.30	Price

3.2 Market behaviour

The product/food attributes in this study resemble somewhat the results of the consumer study in section 2: healthy and safe food are very relevant, while prices and costs are ranked as least relevant. However, do consumers choose their food in the market place in accordance with this ranking in relevance?

The intention to buy was studied for different cheeses and sausages. The measure for intention to buy was:

- “When buying regular cheese/sausages, how likely it is that you buy regular cheese / organic cheese / regular sausage / PDO sausage, etc. in coming month?

Again a scale of 1-7 was used. Results are listed in table 6. An underlined coefficient indicates that the intention to buy such a product is determined by the food product characteristic, i.e. indulgence is the most determining factor for the buying decision.

March2011 - ISBN 978-92-990056-6-8 www.ifmaonline.org - Congress Proceedings

Table 6: Coefficients for regression of intentions to buy on perceived food attributes of cheese and sausages

	Behavioural intentions to buy	
Food dimension	Cheese	Sausages
Health	0.07 (p = 0.50)	0.16 (p = 0.22)
Good Price	0.08 (p = 0.22)	0.20 (p = 0.04)
Sustainable production	-0.14 (p = 0.14)	-0.10 (p = 0.42)
Traditional production	-0.06 (p = 0.52)	-0.20 (p = 0.11)
Indulgence	0.62 (p < 0.01)	0.81 (p < 0.01)
Convenience	0.32 (p < 0.01)	0.09 (p = 0.38)
Knowledge	0.22 (p < 0.01)	0.25 (p = 0.03)
R2	0.42	0.26
N	882	466

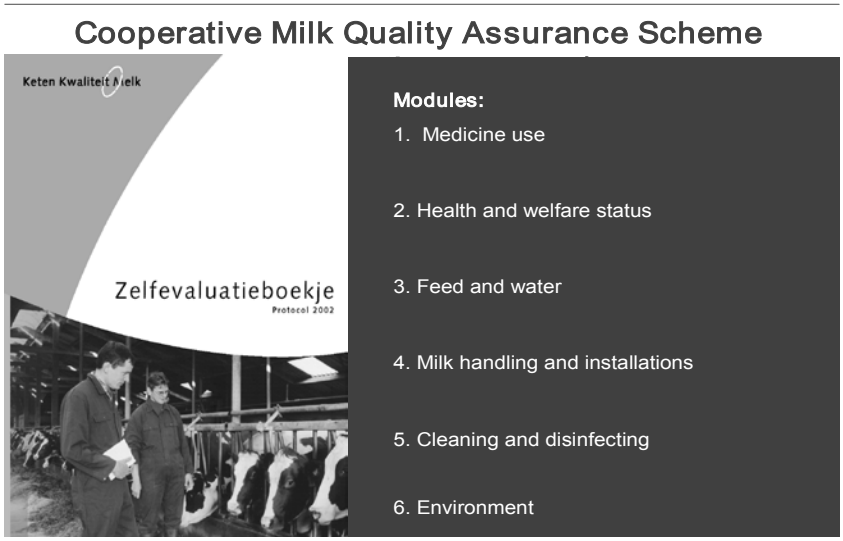
It seems strange that the relevancy of the various food attributes does not resemble completely the choice consumers make in the market place. In other words, public opinion does not necessarily reflect buying decisions. This is noteworthy for quality assurance schemes. Moreover, opinions in society change over time. For instance in The Netherlands environment was a big issue in the years 1990 till 2000, while animal welfare became a main issue after 2000. In the European Association for Animal Production (EAAP) topics like udder health and cow fertility (as elements of animal welfare) and lately the contribution of cattle to climate change (as element of environment) are top priority. However, the research discussed above shows that sustainable production, including animal friendly production, does not really influence consumer's buying behaviour, even though society considers it relevant.

4. Field example of good farming practices

A dairy quality assurance scheme was introduced nationwide in The Netherlands. All farmers were requested to participate. The scheme is based on social responsible issues such as the health and welfare status of a herd, clean water, functioning of milking equipment, milk storage, and environmental issues on farm level (see figure 2). The scheme extends regular quality schemes currently in operation, which deal with milk composition, bacteria count, cell count, cleanness of milk and contaminants. Later on the quality assurance scheme was taken over by the dairy companies to keep it operational because of juridical constraints. Some companies adapted this scheme to meet their own strategies. The scheme has become compulsory.

March2011 - ISBN 978-92-990056-6-8 www.ifmaonline.org - Congress Proceedings

Figure 2: Basic components of Milk Quality Assurance Scheme in The Netherlands

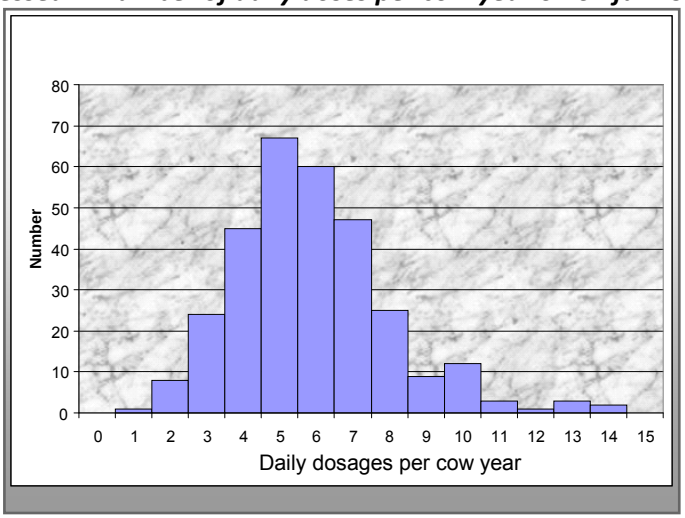


In this article we elaborate on the use of antibiotics. We evaluate its relevance for consumers, determinacy for consumer buying behaviour, and value for farmers of acting more social responsible on this issue. The society pays these days special attention to medicine use in animal husbandry. Its *relevancy* is expressed in table 2 in which medicine residues and contaminants are rated as issues about which consumers need information. In The Netherlands veterinaries and farmers apply drugs to animals. Presently farmers are obliged to have a complete up-to-date registration and administration of medicine use, including date of treatment and waiting period. However, society wants a more restricted animal drug use because of increasing antibiotic resistance in human medicine. To deal with antibiotic use at farm level, tools are necessary to manage this. Moreover, such a tool should be implemented.

A project was started to achieve good management practices in drug application on dairy farms. Drug use on 64 farms was analysed. The so called “number of daily dosages per cow year” was developed as bench marking tool. The spread in this criterion is depicted in figure 3 (Kuipers et al, 2010). The variation found between farms is considerable and offers a good basis for developing good farming practices for drug application at the farm level. However, how to get the cooperation of farmers? What is the value for them of this action? In fact farmers do not see the benefit of reducing antibiotic use. For instance, the use of drying off injectors is a safe guard for a healthy udder and the costs are relatively minor. So the direct benefits of using less injectors are limited and it is not clear whether consumers respond to a reduced overall use in the market place. The resistance of farmers to cooperate is, of course, also experienced in this project. Most probably the bench marking tool will become part of the milk quality assurance scheme, which makes it compulsory for all farmers supplying to a company. When companies do not make it obligatory the competitive advantage or disadvantage of farmers following the good farming practise becomes an issue. Clearly, corporate social responsibility is not easy to introduce.

March2011 - ISBN 978-92-990056-6-8 www.ifmaonline.org - Congress Proceedings

Figure 3: Drug use expressed in number of daily doses per cow year on 64 farms over 5 years period



5. Conclusions

- International schemes as Cross-Compliance conditions in the EU focus on improving sustainable agriculture.
- Cross-Compliance conditions, which are linked to good farming practices, have similar components as quality assurance schemes of cooperatives and private firms.
- Quality assurance schemes are a form of corporate social responsibility
- A method is available to improve the transparency of the supply chain with respect to corporate social responsibility.
- The consumers' opinions in public debate as a measure of social responsibility differ from its behaviour in the market place.
- Good farming practices favour the image of agriculture and become a fundament for farm management.
- Early adopters of good farming practices incur costs, but may not obtain a competitive advantage over late adopters

References

Verhees, F.J.H.M., Kuipers, A. and M.T.G. Meulenberg, 2008. Marketing potential of corporate social responsibility in supply chains. Journal on Chain and Network Science 8(2): 143-152

Verhees, F.J.H.M., Kuipers, A. and M. Klopcic. 2010. Protecting against foreign competitors, the case of farm made cheese and sausages in Slovenia, *in* Producers and Consumers' choices regarding cattle farming systems and products – surveys in Slovenia, *eds.* .Kuipers, A., Verbic, M., Janez, G., Kos-Scubic, M. and M. Klopcic, Publication of Ministry of Agriculture, Forestry and Food of Slovenia, p. 65-81

Kuipers, A., Wemmenhove, H., Bakker, J. and F. Kuipers, 2010. Guiding responsible antibiotic use (in Dutch), Veeteelt (Dutch dairy herd improvement magazine), October (2) 2010, p.12-14

March2011 - ISBN 978-92-990056-6-8 www.ifmaonline.org - Congress Proceedings