



Identifying use and non-use values of animal welfare: Evidence from Swedish dairy agriculture



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ABSTRACT

In this study, we sought to identify the use and non-use values that underlie farmers' decision making with respect to animal welfare, based on in-depth interviews with 50 dairy farmers in Sweden. We identified use values related to: being able to continue the business, earning a living from the business, not being tied to the farm (i.e. having time available for other things), product quality, and work environment. We also identified non-use values related to avoidance of suffering, being able to further improve the welfare of dairy cows, the dairy farmer feeling good him/herself, ethical considerations, a feeling of doing the right thing, and animals eating properly (i.e. functioning as dairy cows should). Understanding the values underlying dairy farmers' decision making with respect to animal welfare is an important step in understanding why these farmers work with animal welfare. The results are useful in improving communications from authorities and farm advisors to farmers, as a strategy to gain better acceptance for improved animal welfare standards; in designing product certification schemes in the food industry; and in communicating to the public the values influencing production of dairy products.

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Introduction

There is increasing concern in society about farm animal welfare (FAW). This has resulted from the increasing degree of industrialisation in primary production (D'Silva, 2009), food safety concerns (European Commission 2002; Evans and Miele, 2008), ethical considerations (European Commission, 2002), concerns about food quality and humans' bonds with pet animals (Evans and Miele, 2008) and most likely also from the increasing knowledge and information about the physiological and psychological requirements of animals. According to Lusk et al. (2007), 62% of representatives of U.S. households report that they believe that farm animal wellbeing should be taken into consideration in situations where humans also suffer, and 64% of representatives of U.S. households believe that farmers and other actors in the food chain put their own profit concerns ahead of humane treatment of animals. In Europe, findings obtained in the Welfare Quality® project and reviewed by Ingenbleek and Immink (2011) provide considerable evidence of consumer concerns about the wellbeing of animals in Europe. On the European market, FAW is regulated in the EU by minimum requirement regulations, specific member state

laws and different types of product certification standards used to obtain product differentiation. Most of these regulatory actions are conceptually based in the *five freedoms* of farm animals (Botreau et al., 2007; Veissner et al., 2008), which stipulate that farm animals should experience freedom: (1) from hunger and thirst; (2) from discomfort; (3) from pain, injury or disease; (4) to express normal behaviour; and (5) from fear and distress (Farm Animal Welfare Council, 2009).

FAW is generally defined as an integral concept in human values (e.g. Fraser, 1995; Rushen, 2003). In the context of economic decision making, FAW is seen as a subset of human wellbeing and thus humans will care about animals to the extent that their own utility is affected by the wellbeing of animals (McInerney, 2004). Decision making by farmers ultimately determines the living conditions of farm animals. Therefore, compliance with various FAW regulations and policy schemes, or even improvements in FAW beyond what is required by regulations, is likely to be highly dependent on the motivation of individual farmers to work on improvements in FAW. In the psychological literature, personal values are viewed as standards which guide selection, thoughts and evaluations of people's behaviours (Rohan, 2000; Bardi and Schwartz, 2003). Personal values provide a rationale for why a certain action was chosen. Understanding the formation of farmers' values for animal welfare would therefore be of particular relevance for the design of policy. With specific reference to

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FAW, [McInerney \(2004\)](#) concluded that farmers' decision making may be motivated by economic values not only related to a desire to increase the productivity and profitability of the animal, but also to other considerations based on animals as sentient beings. [McInerney \(2004\)](#) described two categories of economic values (and thus motivators of behaviours with respect to FAW) which farmers may derive directly from FAW, namely use and non-use values. Use values refer to productivity values and govern the improvements in FAW necessary to maintain productivity. Non-use values are all other values the farmer associates with FAW. Farmers' perceptions of, and preferences for, these use and non-use values will thus drive their decisions with respect to FAW. Use values, but in some cases also non-use values, are not ends in themselves, but may be a means to achieve something else. Through this study we sought to identify values underlying farmers' decision making with respect to FAW, in an empirical application based on in-depth interviews with 50 dairy farmers in Sweden.

In the scientific literature, there is considerable interest in farmers' views on FAW, in particular what farmers think about it, i.e. how they conceptualise FAW (e.g. [Te Velde et al., 2002](#); [Dockès and Kling-Eveillard, 2006](#); [Bock and van Huik, 2007](#); [Kauppinen et al., 2010](#)). [Hansson and Lagerkvist \(2014\)](#) reviewed and synthesised the literature relating to how farmers conceptualise FAW and found it to be related to the aspects: "animal health, physiological needs of the animals, natural behaviour of the animals, living environment of the animals, humane and ethical treatment of the animals, profitability of the animals, and the farmer's own wellbeing and knowledge" (p. 54). Other studies have examined whether there are differences in views on FAW depending on production orientation (organic or conventional) (e.g. [Hubbard et al., 2006](#); [Hubbard et al., 2007](#); [Kling-Eveillard et al., 2007](#); [van Huik and Bock, 2007](#)). Furthermore, the type/s of animals kept by the farmer and the purpose of keeping them has been found to influence farmers' attachment to their animals ([Bock et al., 2007](#)), something that may also influence FAW.

While there have been many contributions by previous studies, there appears to have been scant interest in the content and structure of actual values underlying and directing farmers' decision making with respect to FAW. However, uncovering and explicitly understanding the values that govern farmers' decision making with respect to FAW would help provide a better understanding of what motivates farmers to work with FAW. Therefore, policy formulation would benefit especially from understanding these values. In particular, such knowledge can be used by the agriculture sector when developing and targeting advice for improved FAW; by the food industry when developing and targeting FAW policies including product certification schemes, which would be essential to maintain legitimacy of food production throughout the food supply chain; and by government when developing and targeting policy schemes related to FAW. Knowledge about the values that underlie farmers' work with FAW can also be used by agrifood industries when developing marketing strategies to promote their food products, since such knowledge can be used to communicate to consumers the types of value codes under which the food products have been produced.

In order to uncover the values underlying dairy farmers' decision making with respect to FAW, in this study we used the means-end chain (MEC) model ([Gutman 1982](#); [Reynolds and Gutman, 1988](#)). This model has been extensively used in the past to identify the values behind consumption decisions (e.g. [Russell et al., 2004](#); [Westerlund Lind, 2007](#); [Barrena and Sánchez, 2009](#); [Radder and Grunert, 2009](#); [Bitzios et al., 2011](#)). Recently, [Lagerkvist et al. \(2012\)](#) and [Okello et al. \(2014\)](#) adopted MEC analysis to investigate farmers' decision-making with respect to farm inputs and, ultimately, the personal values that drive such

decisions. Our ambition in this study was to facilitate structured identification of values underlying dairy farmers' decision-making with respect to FAW. Through this, we aimed to add to previous literature by examining why dairy farmers make decisions in relation to FAW based on the actual content of their cognitive structure. The MEC approach is particularly appealing because through its systematic interview technique, it allows the researcher to push the respondent into increasingly higher cognitive structures and uncover values they might not have thought of initially. This allows in-depth exploration of the values underlying their behaviour.

As mentioned above, previous studies have found that the type of animal kept by farmers and the purpose of keeping the animals can affect their attachment to the animals ([Bock et al., 2007](#)). This implies in turn that the values underlying farmers' decision-making with respect to FAW may be influenced by the particular species kept by the farmers and by the purpose of keeping the animals. Focusing on dairy farmers, in this paper we examined the values underlying this type of farmers' decision making with respect to FAW. Dairy cows are kept for a relatively long period of time, offering dairy farmers plenty of time to establish relatively strong human-animal relationships. From the perspective of the values underlying farmers' decision making with respect to FAW, we anticipated that focusing on farmers who are able to establish these stronger human-animal relationships and become more attached to their animals would be particularly interesting, because it is plausible to assume that longer relationships and stronger attachment create a greater variety in the types of values in use.

We now continue by presenting the conceptual framework in 'Conceptual framework', the empirical method and data in 'Empirical method and data' and our results in 'Results'. In 'Discussion and conclusions' we discuss our results and report our conclusions.

Conceptual framework

Means-end chain theory in its original form posits that consumption choices are based on the perceived attributes of the products, the consequences associated with these attributes and how consequences can lead to the fulfilment of desired end-states or values ([Gutman, 1982](#); [Reynolds and Gutman, 1988](#)). Consumption is thus undertaken in order to satisfy values, so consumption products are chosen for the values the attributes can help achieve, not for the product attributes per se. There is a hierarchical relationship from attributes to consequences, and finally to values. A central component of the MEC approach is the identification of values directing a decision, based on the identification of attributes of a phenomenon, i.e. what it represents to the decision maker, and the identification of future consequences of the attributes.

MEC theory can thus facilitate understanding of the hierarchical links within mental models between the attributes dairy farmers ascribe to FAW, i.e. what constitutes FAW, the consequences they relate to these attributes and the personal values fulfilled by the consequences. MEC is therefore a relevant framework for uncovering the values that govern dairy farmers' decisions with respect to FAW. Used in the context of dairy farmers' decision making with respect to FAW, the MEC approach posits that dairy farmers make decisions about FAW based on perceived attributes of FAW, the consequences of these attributes and how these consequences help to achieve desired values. This means that the desire to achieve certain values governs their decision making.

As mentioned previously, [McInerney \(2004\)](#) categorised farmers' values related to FAW as use and non-use values. This terminology was useful in our analysis, since it recognises that dairy farmers' decision making with respect to FAW may be

directly driven by utility concerns other than that derived from direct use of livestock through the production process. Use values in FAW refer to the production values that may be derived from FAW. If only use values were associated with FAW, the level of FAW provided would be determined only by the utility derived from production concerns. Farmers would have no reason to introduce special treatments for their animals unless this increased the productivity to such an extent that the cost of treatment was offset by the returns obtained. In this sense, farm animals are similar to any other production factor used on the farm.

Non-use values in FAW refer to “the value that producers derive from economic goods related to the wellbeing of the livestock independent of any use, present or future, that the producer might make of the animals” (Lagerkvist et al., 2011, p. 486). In the case of FAW, McInerney (2004) suggests that farmers may be interested in improving FAW even though this is not justified by the increased economic value that can be derived from the productivity increase associated with the investment or effort, or that farmers may be reluctant to push their animals towards their maximal biological productivity, even if that would maximise their economic returns. As McInerney (2004) stresses, the economic rationale behind these actions lies in the non-use values associated with FAW, and reflects the fact that there is a benefit associated with animals, as sentient beings, being well-treated. Lagerkvist et al. (2011) identified non-use values in FAW as being of five theoretically distinct types: existence values, pure non-use values, bequest values, option values and paternalistic altruism. Non-use values in FAW can thus relate to aspects such as: the perceived absolute right of the animal; ethical codes among farmers; improvements in FAW beyond what is justifiable from a profit point of view; a desire to increase the legitimacy of animal production; a desire to increase the availability of food choices for consumers; and a desire to facilitate lasting business-consumer relationships (see Lagerkvist et al., 2011 for an extensive discussion of possible non-use values in FAW). As McInerney (2004) notes, it is important to realise that value in this sense is based on whatever feelings humans may have, and that these can sometimes be determined by pure misunderstandings or illusions of reality.

The use and non-use values described by McInerney (2004) and Lagerkvist et al. (2011) need to be compared against the personal values guiding decision making according to MEC theory. Personal values reflect what people think is important to them (Bardi and Schwartz, 2003), and are defined as desirable, transsituational goals that guide people in their lives (Schwartz and Bradi, 2001). A set of 10 universal personal values has been proposed: power, achievement, hedonism, stimulation, self-direction, universalism, benevolence, tradition, conformity and security (Schwartz and Bradi, 2001). Compared with use and non-use values, personal values hence refer to desirable end-states, while use and non-use values in FAW refer to benefits, monetary and non-monetary, that are associated with FAW. Use and non-use values may therefore serve as ends in themselves, and also correspond to certain personal values and a means to something else.

Compared with the tangible consumption objects generally analysed with MEC theory, FAW in itself is a construct (Fraser, 1995; Rushen, 2003; McInerney, 2004). This means that FAW has to be considered at a higher level of abstraction. In fact, FAW in itself can be seen as a consequence of an investment or managerial practice, but has consequences of its own which are given positive or negative evaluations depending on the values held by the individual. In the terminology of MEC theory, here we considered the details of dairy farmers' conceptualisation of the FAW construct using the attributes of FAW, i.e. the aspects that define FAW for the individual dairy farmer were considered attributes. These may include managerial practices such as providing deep bedding, long grazing periods, enough space and regular contact with

humans, or desired features of animals, such as calm animals in good shape. Evaluation of the consequences is an assessment of what the attributes lead to, for instance fewer problems with lameness, which in turn can lead to better productivity and a feeling of pride in having well-kept animals.

It should be noted that decision making by dairy farmers (or any type of farmers) with respect to FAW is not an isolated event, but is one of the vast number of decisions the farmer has to make in order to maximise utility. Furthermore, the decision-making process is constrained by exogenous factors such as legislation, requirements from actors further along the supply chain and prices.

Empirical method and data

We collected data for this study through in-depth interviews with a sample of 50 Swedish dairy farmers, using the laddering interview technique (Reynolds and Gutman, 1988; Olson, 1989). While the sample size was admittedly limited, it can still be expected to provide valuable qualitative insights into the subject under study (e.g. Chema et al., 2006). Using the laddering technique, here we derived the dairy farmers' means-end chains with respect to FAW. Laddering has previously been used in consumer research to derive consumers' MEC in relation to consumption products (e.g. Russell et al., 2004; Westerlund Lind, 2007; Barrena and Sánchez, 2009; Radder and Grunert, 2009). It has also been used in other settings, such as use of natural areas (Lopez-Mosquera and Sanchez, 2012) and in studies of farmers' decision-making (e.g. Lagerkvist et al., 2012). However, the technique has previously never been used to identify farmers' MEC in relation to the wellbeing of farm animals.

A laddering interview consists of two basic procedures: identification of an entry concept and identification of linked meanings in a MEC (Olson, 1989). The entry concept is the starting point of the laddering interview, from which a set of ‘why is that important’ questions is asked. These questions force the respondent to ‘climb’ along a mental ‘ladder’, eventually arriving at a point where the importance of an issue can no longer be further motivated. This is taken as the end point in the MEC analysis and is often the value underlying a particular behaviour. There are several methods for eliciting a valid entry concept (Bech-Larsen and Nielsen, 1999). In this study we used the direct elicitation technique, i.e. we asked respondents to list attributes relating to FAW themselves. Direct elicitation is the closest technique to natural speech and is recommended in exploratory settings (Bech-Larsen and Nielsen, 1999) such as our study. The laddering interview can be classified as either ‘hard’ or ‘soft’ (Grunert and Grunert, 1995). Hard laddering forces the respondent to focus on one ladder at a time. Soft laddering, on the other hand, allows the respondent freedom to move between ladders. Our laddering interviews were based on soft laddering, which is preferable when previous knowledge about the respondent's cognitive structures is scarce, as in our case. Soft laddering is also preferable when the sample size is less than 50–60 respondents (Costa et al., 2004).

Soft laddering interviews are generally conducted as face-to-face interviews (Costa et al., 2004). In this study, however, we conducted most of the interviews over the telephone because this allowed us to interview dairy farmers from different geographical areas of Sweden in a resource-efficient manner. We carried out the interviews in the period August–September 2012 and audio-recorded and subsequently transcribed the material. We gave each respondent a SEK 300 gift voucher (the equivalent of approximately 45 USD) as a token of our appreciation of their time and effort. We hired two trained laddering interviewers from a Swedish marketing research company to conduct the actual interviews.

Prior to conducting the interviews, we introduced the interviewers to dairy farming and animal welfare questions. We recruited participants for the telephone interviews by sending letters of invitation explaining the purpose and procedures of the study to a sample of 250 dairy farmers, randomly drawn from the national register on the population of dairy farmers in Sweden. From these, we recruited the desired study sample of 50 farmers in a manner ensuring that farms with both conventional and organic production were represented, as well as farms with different housing systems (tie-stall or loose housing). Of the 50 dairy farmers we selected for the study, we asked four (8%) to participate in face-to-face interviews instead of telephone interviews. For convenience, these farms were all located in Stockholm County. We scheduled the face-to-face interviews to take place before the telephone interviews, in order to allow the interviewers to become further acquainted with the study sample. Summary statistics on the farmers interviewed are shown in Table 1.

Prior to the laddering interviews, we sent the dairy farmers we had recruited a letter in which we encouraged them to prepare for the interview by thinking through what FAW means to them and why it is important for them to work with FAW. We asked the dairy farmers to list about five specific aspects that constitute FAW for them and which are the most significant aspects for them when making decisions that influence FAW in their dairy herd. We took these aspects to be the attributes of FAW and used them as the starting point for the laddering interviews. Because FAW can be considered a complex concept, we also sent the dairy farmers we recruited a set of 26 pictures and photos intended to inspire their preparation for the interviews. We chose these pictures and photos to represent aspects of FAW of dairy cattle from both positive and negative sides and to cover aspects related to the animal and to the farmer. Providing graphical material is a natural, efficient way of encouraging respondents to start communicating higher-order constructs in qualitative studies, because people's abstract thought and language are image-based (Damasio, 1994). We used the criteria for assessment of FAW provided by Botreau et al. (2007) to compile the set of pictures and photos relating to the animal, but also pictures and photos relating to the farmers' feeling with respect to FAW. In the Supplementary material we provide translated versions of the letters sent to farmers (the initial recruitment letter and the follow-up letter to the recruited dairy farmers). The set of pictures and photos is available from the corresponding author upon request.

Following the recommendations by Reynolds and Gutman (1988), we took care to ensure that the respondents felt comfortable and willing to share their thoughts about FAW. We achieved this in several steps. First, in the initial recruitment letter sent out to farmers, we emphasised that while there are many ideas in society about what FAW really is, in this particular study we

were interested in how they, as farmers, think about FAW and why it is important for them to work with FAW. We also emphasised that the interview results would be handled only by the research group and that the results would be presented in such a way that no individual farmer could be identified. Furthermore, we informed the candidates that an independent marketing research company, not connected with agricultural sector authorities, would perform the interviews. We expected this to make the farmers feel more comfortable in the interview situation, as we believed that this procedure would reduce their possible fear of being judged by perceived experts regarding how they think about FAW, and therefore allow the dairy farmers to speak more openly about FAW. However, it should be acknowledged that there is a potential for social desirability bias when questioning people about their views on FAW (e.g. Lusk and Norwood, 2010), whereby the interviewees exaggerate their positive views on FAW. Such a bias may have arisen to some extent in the present study, even though the interviewers were not connected with the agricultural sector authorities. We analysed the transcripts of the interviews according to recommendations made by Reynolds and Gutman (1988) and followed in many laddering studies (e.g. Westerlund Lind, 2007; Lagerkvist et al., 2012), i.e. we analysed the transcripts for content and scrutinised them for attributes, consequences and values. Next, we summarised these into master codes, with similar responses summarised under a common heading. We then used the master codes to construct an implication matrix and summarised the laddering results into a hierarchical value map (HVM), representing the dominant way/s in which the farmers interviewed think about FAW (Reynolds and Gutman, 1988). These can be considered the major outcomes of this study. We used the computer programme Ladderux to produce the implication matrix and the HVM. The full implication matrix can be found in Supplementary material to this article. A qualitative judgement of the transcribed interviews with respect to the richness of the material gave us no reason to suspect that there were any particular interviewer effects. Furthermore, a statistical analysis provided no evidence that the number of ladders elicited in each interview differed between the two interviewers.

Results

On analysing the 50 laddering interviews, we were able to identify a total of 345 ladders. However, not all of these were complete from attribute to value, but instead ended at the consequence level. We found a total of 67 MEC elements (attributes, consequences or values) and 1414 links between these elements (782 direct links and 632 indirect links). Each respondent provided on average 6.9 ladders, each with 3.3 elements in these. The element "animals feel good" was mentioned 228 times and was thus by far the most commonly used element. Our analysis of the laddering interviews also showed that some farmers used the element "animals feel good" as a description of what FAW is to them. For those dairy farmers, we recorded this element as an attribute. Other dairy farmers used the element "animals feel good" as a consequence of something else which they in turn viewed as a description of what FAW is to them. This suggests that dairy farmers view FAW at different levels of abstraction.

One critical issue in the construction of a HVM is the choice of cut-off value, i.e. the number of times a link has to be mentioned before it appears in the HVM. Basically, a compromise is required between the desire to obtain a HVM that is clear and easy to interpret, and the desire to include as much of the data as possible in the resulting HVM, thus minimising omission of data (Reynolds and Gutman, 1988; Leppard et al., 2004). Reynolds and Gutman (1988) suggested a cut-off value of between 3 and 5 for a sample

Table 1
Descriptive statistics on the 50 farmers interviewed.

	Average value	Standard deviation
Gender (1 if male; 0 if female)	0.86	0.351
Age (years in 2012)	49.8	10.198
Production orientation (1 if conventional farming; 0 if organic farming) ^a	0.76	0.431
Housing system (1 if tie-stall; 0 if loose housing)	0.51 ^b	0.505
Number of dairy cows ^c	74.4	48.868

^a In 2011, 12% of all dairy farms in Sweden were organic (Swedish Board of Agriculture, 2012a).

^b One farm had both types of housing system. This farm was excluded from the calculation of descriptive statistics of the variable 'housing system'.

^c The average dairy herd size in Sweden in 2012 was 70.0 cows (Swedish Board of Agriculture, 2012b).

size of 50–60 respondents, while Gengler et al. (1995) used a cut-off value of 5% of the sample size, hence leading to higher cut-off values in larger samples. Leppard et al. (2004) suggested that different cut-off values should be used throughout the HVM, since attributes tend to be mentioned more often than consequences, which in turn are generally mentioned more often than values. Instead, those authors suggested a top-down approach where the number of times the most important links at each level of the HVM are mentioned is used as the cut-off value. While the approach described by Leppard et al. (2004) is flexible and appealing, it was difficult to implement in our case. As stressed above, not all dairy farmers view FAW at the same level of abstraction, implying that individual MECs are started at different levels of abstraction. This means that what some dairy farmers view as a consequence is viewed by other dairy farmers as an attribute. Therefore, in this study we used the same cut-off value throughout the HVM. We evaluated HVMs derived from different cut-off values (1–6) evaluated and considered a cut-off value of 4 to be the most appropriate, yielding a HVM that was clear and possible to interpret while retaining the majority of the data (61%) in the analysis. Fig. 1 shows the resulting HVM, in which we have marked links mentioned 10 times or more in bold type to indicate those considered the most important.

The HVM suggests that the dairy farmers interviewed view FAW as being constituted of the following elements, or attributes: “Personnel behaviour”, “comfort around resting”, “good care”,

“being outdoors”, “ability to move easily”, “no stress”, “good feeding”, “comfortable house”, “milked appropriately”, “thermal comfort”, “group/herd size”, “that the animals can manage internal rankings”, “human-animal relationship”, “good feet” and “avoiding pushing the animals too hard” (relative to their biological restrictions).

These revealed attributes of FAW were perceived by the respondents to lead, directly or indirectly, to the consequence “animals feel good”. While several of the attributes were perceived to lead directly to this consequence, a few were perceived to lead to other consequences, which in turn were perceived to lead to the consequence “animals feel good”. For instance, the attribute “comfort around resting” leads to the consequences “avoidance of injury” and “cleanliness”, both of which were subsequently perceived by the respondents as leading to the consequence “animals feel good”. The attribute “personnel behaviour” leads to the consequence “animals are viewed as individuals”, which was perceived as leading to the consequence “animals feel good”. The attributes “good feet” and “avoiding pushing the animals” were perceived by the respondents as leading to the consequence “functioning animals”, which leads directly to the consequence “animals feel good” and also indirectly to the consequence “long-living animals”. The attribute “being outdoors” was perceived as leading to the consequence “less work”, which in turn leads to the consequence “animals feel good”. This attribute was also perceived as leading to the consequence “natural behaviour”, something which was

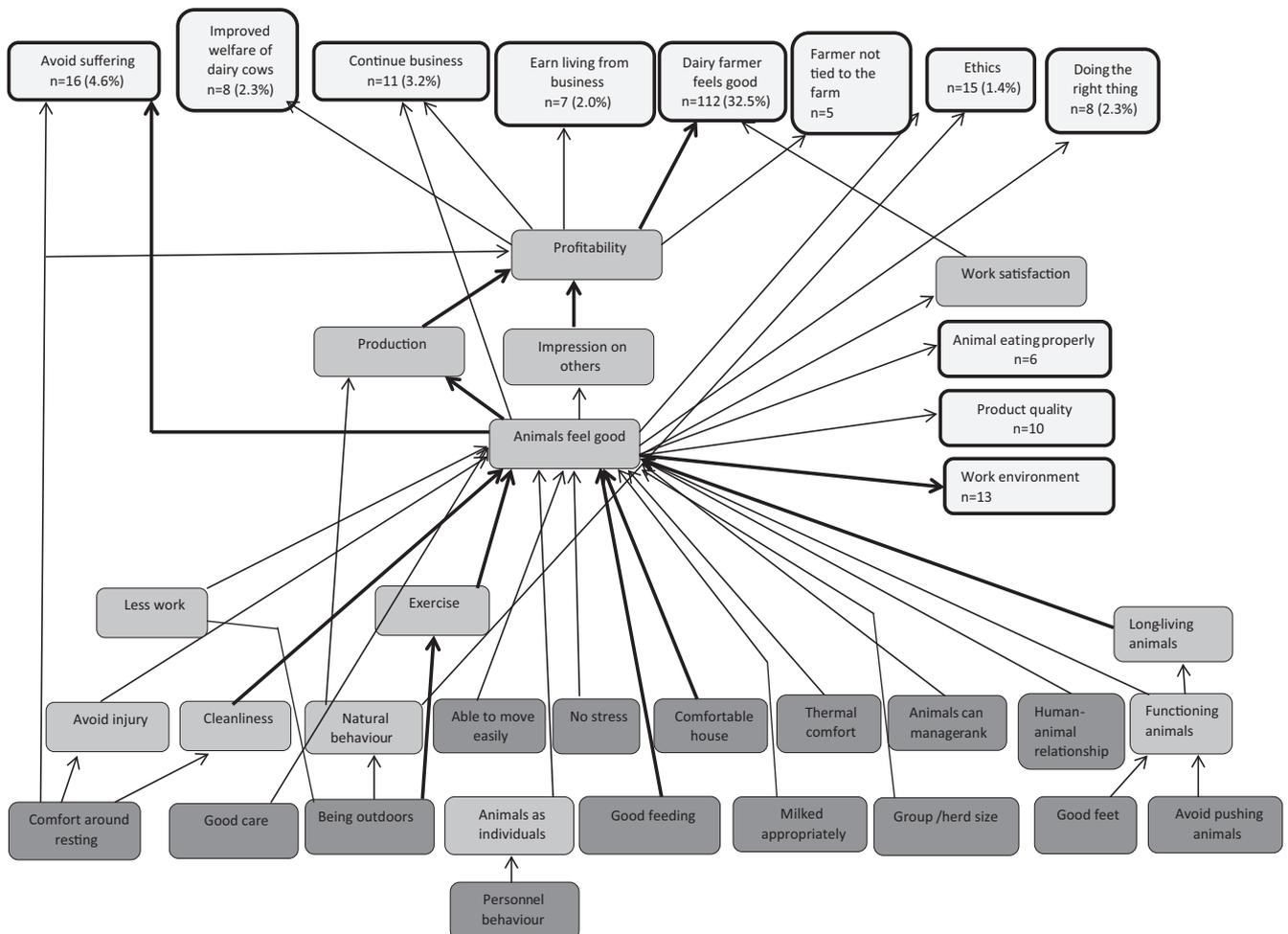


Fig. 1. Hierarchical value matrix. Note: Cut-off value = 4. Figures in the value boxes represent per cent of total number of ladders (345). Several of these are incomplete, not leading to a value. Links in bold represent links mentioned at least 10 times.

perceived as leading to the *consequence* “production”. It can be noted that “being outdoors” was the only *attribute* suggested to have a link that does not go through the *consequence* “animals feel good”.

The *consequence* “animals feel good” appears to be the major *consequence* of the abovementioned attributes, and was perceived by the respondents as leading to: “avoidance of suffering”, “production”, “impression on others”, “continue business”, “ethics” (that the production is ethical), “doing the right thing” (a feeling of being a good dairy farmer), “work satisfaction”, “animals eating properly”, “product quality”, and “work environment”. Of these, the following MEC elements appear as *values*: “avoidance of suffering”, “continue business”, “ethics” “doing the right thing”, “animals eating properly” (something that we interpreted as indicating that the dairy cows are functioning as animals should), “product quality” and “work environment”.

However, the MEC elements “production”, “impression on others” and “work satisfaction” are means to further ends and are thus *consequences*. The *consequences* “production” and “impression on others” were perceived by the respondents as leading to the *consequence* “profitability”, which in turn, interestingly, leads to “improved welfare of dairy cows, something that emerged as a *value*. The *consequence* “profitability” was perceived by the respondents as leading to the *values* “continue the business”, “earn living from business”, “dairy farmer feels good” and “farmer not tied to the farm” (has time available for other things). Finally, the *consequence* “work satisfaction” was perceived as leading to the *value* “dairy farmer feels good”.

Looking at the strengths of the links, it appears that the strongest links go from: the *attributes* “being outdoors”, “comfortable house” and “good feeding”, and from the *consequences* “cleanliness”, “exercise” and “long-living animals”, to the main MEC element and *consequence* “animals feel good”, which leads to the *values* “avoid suffering and “work environment”, and to the *consequences* “production” and “profitability”, which lead to the *value* “dairy farmer feels good”.

Discussion and conclusions

In this study we identified values underlying dairy farmers’ decision-making with respect to FAW. The findings help understand the motivation for farmers to work with FAW. Previous studies have examined how farmers think about FAW (e.g. Te Velde et al., 2002; Dockès and Kling-Eveillard, 2006; Bock and van Huik, 2007; Kauppinen et al., 2010); how type of production orientation influences farmers’ views on FAW (e.g. Hubbard et al., 2006; Hubbard et al., 2007; Kling-Eveillard et al., 2007; van Huik and Bock, 2007), and how type of animals kept and their purpose influence farmers’ attachments to their animals (Bock et al., 2007), which may also influence FAW. Compared with this literature, the novel approach we adopted in this study, involving application of MEC theory (Gutman, 1982; Reynolds and Gutman, 1988) and the laddering interview technique (Reynolds and Gutman, 1988; Olson 1989) in the study of dairy farmers’ views on FAW, allowed us to conduct an in-depth study of the values dairy farmers consider in working with FAW and how they perceive that working with FAW can lead to achievement of these values.

Our analysis of the laddering interview data through the HVM suggested that “animals feel good” was a central aspect of dairy farmers’ decision making with respect to FAW. This was a consequence of a number of attributes of FAW which the respondents considered important in their decision making with respect to FAW. The HVM also suggested that dairy farmers perceive “animals feel good” as leading to improved production and profitability. In the terminology of McInerney (2004), this refers to use values and the motivation to ensure that animals feel good is

similar to the maintenance of any production factor, i.e. it is a way of ensuring profitability and subsequently perceived values such as “continue business”, “earn living from business”, “farmer not tied to the farm” and “work environment”. Two values suggested to be connected to “profitability” can be interpreted as non-use values in the terminology of McInerney (2004), namely “dairy farmer feels good” and “improved welfare of dairy cows”. The latter is especially interesting, since it suggests that “profitability” is perceived as a means to achieve ends not directly linked to the farmer as a person. This suggests that dairy farmers view FAW as being of value in itself, even when not linked directly to their personal welfare, and that they are prepared to use at least part of the profit obtained from the farm to improve FAW further. In the theoretical classification of non-use values in FAW provided by Lagerkvist et al. (2011), this particular non-use value would be an example of an existence value, i.e. the welfare of animals is recognised as having a value in itself, without having to lead to further benefits for someone.

Furthermore, the findings suggest that “animals feel good” is perceived to lead directly to values which can be classified as non-use values. One of these values is “impression on others” and is suggested to be related to how others, especially consumers and authorities (represented by animal welfare inspectors), view the production, with the perception that unless others believe that the animals are well kept, profitability will decrease through reduced sales. With its focus on the importance of improving relationships with consumers and authorities, this non-use value is an example of paternalistic altruism in the theoretical classification of non-use values provided by Lagerkvist et al. (2011).

Apart from the non-use value “impression on others”, the non-use values revealed in the HVM we created were suggested to be related to perceived values disconnected from profitability. This may suggest that dairy farmers think there are values in FAW completely disconnected from the profitability of the farm business. Of these non-use values, most (“avoid suffering”, “ethics”, “doing the right thing” and “animals eating properly”), similarly to the non-use value “improved welfare of dairy cows”, can be classified as existence values in the terminology of Lagerkvist et al. (2011). The final non-use value we found in the present study was “product quality”, which would be classified as paternalistic altruism in the terminology by Lagerkvist et al. (2011) where value is derived from knowing that consumers may eat high-quality products. Interestingly, we found no link between product quality and profitability, at first glance suggesting that dairy farmers think of product quality as an end value. While this may well be the case, it may also be the case that dairy farmers think of the link between product quality and profitability as so obvious that they cannot articulate it. Taken together, the findings in this study suggest that there are values in making sure dairy cows feel good, over and above values achieved through maintenance of any other production input.

The values discovered in this study can also be interpreted in the light of personal value theory (Schwartz, 1992; Schwartz and Bradi, 2001; Bardi and Schwartz, 2003). The revealed values “avoidance of suffering”, “improved welfare of dairy cows”, “ethics” and “doing the right thing” would all be related to universalism; the values “continue business” and “earn living from business” would be related to achievement; and the value “dairy farmer feels good” would be related to hedonism. Thus, some of the non-use values detected in this study are in fact also related to the personal values of the dairy farmer.

The findings we obtained in this study suggest that the decisions made by the dairy farmers interviewed with respect to FAW are guided by a complex set of values and with several managerial FAW practices associated with non-use values. This suggests that for dairy farmers, FAW may not be regarded as being equivalent to maintaining any other production factor. Instead,

there appear to be values related to FAW which lead to the application of FAW over and beyond levels connected with animal productivity. From a policy point of view, these findings suggest that policy measures directed towards encouraging dairy farmers to further improve FAW should take this heterogeneity in perceived values into consideration. For instance, this can be done by adjusting the arguments used to encourage farmers to comply with improved FAW standards to account for non-use values and/or to the values in FAW considered most salient by dairy farmers. This may thus be a way of improving communications from authorities and farm advisors to farmers, thereby gaining better acceptance for improved FAW standards.

From a policy point of view, the insights about how farmers view FAW we provide in this study can also be used in the actual formulation of FAW policy. This can be used in an approach where FAW is considered from the humans' point of view and where human constructs of FAW may be used to determine what constitutes FAW in dairy production. This can be interesting for instance for private standards initiatives, such as certification schemes, where dairy farmers' constructs of FAW may be the basis for the development of a FAW code to be used in the dairy industry.

Furthermore, given that farmers feel bad when they believe that others think they do not care about FAW (Te Velde et al., 2002), which in itself is a source of cognitive dissonance with potential to generate biases in decision making, the agriculture industry should find ways of communicating to the public the values that underlie farmers' decision making. In particular, communicating the notable presence of existence values in dairy farmers' decision-making that we found here, suggesting that farmers care about their animals for reasons not connected to profitability, may be a way of reducing this possible risk of cognitive dissonance.

Our findings may also be of value to consumers. By providing insights into the values that may govern decision-making by the dairy farmers interviewed with respect to FAW, we improve understanding about what motivates farmers' behaviour in milk production. This should be of interest to consumers concerned about knowing the origin of the food they eat, including the values present in the production, and can lead to more informed purchasing decisions.

The theoretical and methodological approach we adopted in this study facilitated in-depth, structured identification of values which the farmers interviewed relate to working with FAW, but we acknowledge that there are limitations in terms of generalisability due to the qualitative approach. Further research is needed to assess whether the values identified also prevail in the larger population of dairy farmers in Sweden and across Europe. In addition, since dairy production takes place on farms with varying herd sizes, quantitative approaches are needed to identify whether and how values associated with FAW in dairy production relate to the size of the farm operation, which may influence the values guiding farmers' decision-making. Moreover, since farmers' attachment to their animals may be dependent on the type/s of animals kept (Bock et al., 2007), our findings from this study cannot readily be generalised to farmers who keep other types of animals. Instead, future research should investigate the values that govern decision making by other types of farmers with respect to FAW. Furthermore, future quantitative studies should investigate how values are correlated to the actual FAW-related investments and efforts of farmers and how the use and non-use values farmers perceive are interrelated with their personal values.

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Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.foodpol.2014.10.012>.

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