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Dairy farmers' use and non-use values in animal welfare: Determining the empirical content and structure with anchored best-worst scaling

H. Hansson[1,2] and C. J. Lagerkvist[1]
Department of Economics, Swedish University of Agricultural Sciences, PO Box 7013, SE-75007 Uppsala, Sweden

ABSTRACT

In this study, we sought to identify empirically the types of use and non-use values that motivate dairy farmers in their work relating to animal welfare of dairy cows. We also sought to identify how they prioritize between these use and non-use values. Use values are derived from productivity considerations; non-use values are derived from the wellbeing of the animals, independent of the present or future use the farmer may make of the animal. In particular, we examined the empirical content and structure of the economic value dairy farmers associate with animal welfare of dairy cows. Based on a best-worst scaling approach and data from 123 Swedish dairy farmers, we suggest that the economic value those farmers associate with animal welfare of dairy cows covers aspects of both use and non-use type, with non-use values appearing more important. Using principal component factor analysis, we were able to check unidimensionality of the economic value construct. These findings are useful for understanding why dairy farmers may be interested in considering dairy cow welfare. Such understanding is essential for improving agricultural policy and advice aimed at encouraging dairy farmers to improve animal welfare; communicating to consumers the values under which dairy products are produced; and providing a basis for more realistic assumptions when developing economic models about dairy farmers' behavior.
Key words: animal welfare of dairy cow, best-worst scaling, economic value in animal welfare, non-use value, use value

INTRODUCTION

The living conditions of animals in farm production are becoming an increasingly important topic of public concern. Lusk et al. (2007) report that a majority (62%) of representatives of US households think that the wellbeing of farm animals should be considered even in the presence of suffering among humans. In the European Union (**EU**), evidence presented within the Welfare Quality project shows that consumers in the EU are concerned about the wellbeing of farm animals (Ingenbleek and Immink, 2011). The recognition of animals as sentient beings that can suffer unless handled properly has resulted in farm animal welfare (**FAW**) regulations of both a public and private nature in the EU region.

In discussions about how to regulate FAW, including FAW in dairy production, a thorough understanding of farmers and their decision-making with respect to FAW should receive special attention. Farmers' welfare-related choices, such as complying with current FAW regulations or providing better FAW standards than required by regulations, will have a direct effect on animal wellbeing. From an economic perspective, McInerney (2004) noted that humans will care about animal welfare as long as their own utility is influenced by the conditions under which animals live. Furthermore, because farmers need to provide a certain FAW standard to satisfy FAW regulations, they encounter a constrained optimization problem where these regulations stipulate a lower limit of their FAW standards. Provision of FAW standards above FAW regulations can be expected to the extent that the farmers believe that there are economic benefits from so doing and that these benefits are not offset by the costs associated with FAW.

In particular, McInerney (2004) noted that farmers might derive 2 general types of economic value from working with their livestock: use and non-use values. Use values refer to economic values derived from productivity considerations; that is, the type of value that can be derived from any kind of production factor. However, and as noted by McInerney (2004), farmers may provide FAW beyond what would be justified from productivity concerns. This may be because they experience economic value associated with knowing that their animals are treated well. It may also be because the farmers feel uncomfortable with pushing the animals toward their biological maximal productivity, even

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[1]Both authors contributed equally to this study.
[2]Corresponding author: Helena.Hansson@slu.se

if that would be advantageous in terms of maximizing profit. Non-use values have come to be defined as "the value that producers derive from economic goods related to the wellbeing of livestock independent of any use, present or future, that the producer might make of the animals" Lagerkvist et al. (2011, p. 486). Consequently, the presence and accounting of non-use values in FAW are relevant in explaining why farmers provide FAW beyond the statutory requirements and beyond what would be justified if the animals were only viewed as production factors. Furthermore, non-use values may explain why farmers allow animals to produce at economically nonoptimal levels.

Lagerkvist et al. (2011) developed the notation of non-use values by identifying these as consisting of 5 theoretically separate types: pure non-use values, existence values, bequest values, option values, and paternalistic altruism. In the terminology of Lagerkvist et al. (2011), pure non-use values refer to economic values derived from provision of FAW beyond what would be defensible when considering its associated economic return. Existence values refer to economic values derived from treating the animals according to the absolute rights they are perceived to have, compliance with ethical codes among farmers, fulfillment of self-perception, and avoidance of discomfort associated with not treating animals well. Bequest values refer to economic values associated with maintaining and increasing the legitimacy of production involving animals. These values also refer to the economic value associated with preserving the possibilities to sustain animal production for future generations. Option values comprise economic values obtained from providing better food choices for consumers. Therefore, these are values derived from knowing that consumers can choose food products that are produced under animal-friendly production conditions. Paternalistic altruism refers to economic values derived from the establishment of lasting consumer-to-business relationships, from knowing that consumers are eating high-quality food products, and from gaining recognition from the industry and the food supply chain.

The framework related to use and non-use values in FAW thus recognizes why farmers may work with FAW, are prepared to comply with FAW regulations, and even provide FAW beyond the regulated requirements. Therefore, it is appealing to use the framework for describing farmers' FAW-related behaviors from a conceptual point of view. However, actual empirical existence of various use and non-use values in farmers' understandings of the economic value associated with FAW is lacking, and how farmers prioritize between these values is currently not well understood.

Previous literature has empirically investigated livestock farmers' FAW-related behaviors, including how farmers define FAW. For instance, Te Velde et al. (2002) found that farmers in the Netherlands believed their FAW to be good. Dockès and Kling-Eveillard (2006) found that farmers view FAW as being conditioned on that the animals need to produce. They also found that some viewed FAW as being about feeding and monitoring animal health, whereas others believe it was about the animals' psychological and behavioral needs. Furthermore, farmers participating in conventional or organic quality control schemes have been found to differ in their views on FAW (Hubbard et al., 2006, 2007). Those authors found that farmers participating in conventional quality control schemes viewed FAW as being related to the economic performance of the farm. They also found that those farmers participating in organic quality control schemes viewed FAW as being related to moral and ethical considerations. Kling-Eveillard et al. (2007) and van Huik and Bock (2007) have reported similar results. Previous studies have reported differences in the human-animal relationship depending on the species kept and the purpose of keeping the animal (Bock et al., 2007), which may affect farmers' views on FAW. Additionally, several studies have examined farmers' attitudes to FAW (e.g., Kauppinen et al., 2010, 2012; Kielland et al., 2010). Furthermore, based on in-depth interviews with 50 Swedish dairy farmers, Hansson and Lagerkvist (2015) examined the mental representation of FAW and deduced that both use and non-use values act as motivational factors in dairy farmers' decision-making and goal attainment with respect to FAW.

Notwithstanding the contribution made by previous literature, the empirical content, structure, and prioritization of the economic value associated with FAW have not yet been identified. Such information can be used for developing successful private and public FAW policy aimed at farmers, by taking determinants of farmers' behaviors into consideration. Understanding which type of FAW motivation drives behavioral action is relevant, because such motivation can be expected to influence farmers' cognition and productivity and is relevant as input to form their work motivation. Such information can also be useful for consumers interested in the origins of their food. Moreover, it could be important in the development of economic models of farmers' behaviors, by revealing interdependencies among use and non-use values.

In this study, we sought to identify the empirical content and structure of the domain of use and non-use values that motivate dairy farmers in their work related to the animal welfare of dairy cows (**AWC**). We also