

German farmers' conception of animal welfare: A questionnaire survey

Das Verständnis deutscher Landwirte von Tierwohl: Ergebnisse einer empirischen Erhebung

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Summary

In response to the current public debate on animal welfare in livestock production, several animal welfare labelling programs have been developed in recent years. To achieve farmers' acceptance of such programs, it is important to start by determining farmers' conception of animal welfare, including important criteria for animal welfare. On the basis of a standardized online survey, this paper analyzes how 902 German farmers understand the concept of animal welfare. There were significant differences between conventional and organic farmers in their conception of animal welfare. While conventional farmers named more criteria from the categories animal health and performance, organic farmers more often named aspects related to housing system and animal behavior. Even the animal species kept influenced farmers' conceptions of animal welfare. Between poultry, cattle and pig farmers, significant differences were found in the categories housing system, animal health and performance.

Keywords: animal welfare, animal species, conventional farmer, organic farmer, questionnaire

Zusammenfassung

Aufgrund der aktuellen öffentlichen Diskussion um Tierwohl in der intensiven Tierproduktion sind in den letzten Jahren einige Programme mit erhöhten Tierwohlstandards entstanden. Um derartige Programme zu entwickeln, die von den Landwirten akzeptiert werden,

ist es von entscheidender Bedeutung zu erfassen, wie Tierwohl von ihnen verstanden wird. In dem vorliegenden Beitrag wird das Tierwohlverständnis von 902 deutschen Landwirten mit Hilfe einer standardisierten Online-Befragung analysiert. Es zeigen sich signifikante Unterschiede zwischen dem Tierwohlverständnis von konventionellen und ökologisch wirtschaftenden Landwirten. Während die konventionellen Landwirte der Stichprobe öfter Kriterien aus den Kategorien Tiergesundheit und Tierleistung angaben, nannten die befragten ökologisch wirtschaftenden Landwirte häufiger Aspekte des Haltungssystems und des Tierverhaltens. Auch zwischen geflügel-, rinder- und schweinehaltenden Landwirten gab es Unterschiede. Die Kategorien Haltungssystem, Tiergesundheit und Leistung unterschieden sich hier signifikant.

Schlagerworte: Tierwohl, Tierart, Umfrage, konventionelle Landwirte, ökologische Landwirte

1. Introduction

In recent years, animal welfare in livestock production has received growing attention from media, politicians and the wider public (KEELING et al., 2013). Western European consumers are increasingly concerned about intensive livestock farming, and various surveys estimate considerable potential for the sale of products that fulfil higher animal welfare standards (SCHULZE et al., 2008). However, with few exceptions (e.g., the Netherlands or the UK), animal welfare programs have not attained widespread influence on the European meat market. Despite other factors, producers' acceptance is crucial for the successful implementation of animal welfare programs. This acceptance depends, among other things, on farmers' conception of what constitutes animal welfare. Farmers' conception influences their attitudes towards animal welfare programs, which then determine their willingness to take part in such programs (DEIMEL et al., 2011).

Against this background, the study focusses on the question on how farmers conceptualize animal welfare. To date, there has been no overview or comparison of how animal welfare is conceived among German producers using different farming systems (conventional vs. organic) and keeping different animal species (poultry vs. cattle vs. pigs). To fill this research gap, a standardized online survey of 902

farmers from all over Germany was conducted in summer 2014. This survey used a two-step process to evaluate the respondents' conception of animal welfare. Firstly, a qualitative content analysis of farmers' answers to an open question concerning important aspects of animal welfare is performed. Secondly, we compare the findings for conventional and organic farmers and for the different animal species kept on the farm. Analyzing the open question of our questionnaire enabled us to take advantage of qualitative methods, such as respondents' unbiased and spontaneous statements, without having the disadvantage of a very limited number of participants, as is typical for most other qualitative research methods (e.g. focus group discussions).

2. Scientific approaches in defining animal welfare

Due to the varying perspectives on animal welfare (e.g. different scientific disciplines, NGOs, consumers and producers), different—sometimes competing—scientific approaches have been developed to define and assess animal welfare: the biological functioning, natural living and affective states approaches (FRASER, 2003; DEIMEL et al., 2012). Since the 1990s, science has focused on comprehensive, integrated approaches to define animal welfare. Large European projects like the Welfare Quality® project have developed an approach based on four principles: good housing, good feeding, good health and appropriate behavior (BOTREAU et al., 2009). Based on the Welfare Quality® approach, DEIMEL et al. (2012) developed an animal welfare concept that takes into account housing system, management practice, animal health and animal behavior. For many farmers, another important indicator for animal welfare is animal performance (FRASER, 2003). Therefore, DEIMEL et al. (2012) added animal performance (e.g. weight gain, milk yield) as an extra category involved in farmers' conception of animal welfare. Our study adopts this approach.

Previous studies have shown that, so far, farmers have not developed a comprehensive conception of animal welfare that gives equal weight to the above-mentioned categories, as suggested by the welfare Quality® approach (BOTREAU et al., 2009). While early studies found that farmers' conception take into account primarily aspects of the

biological functioning approach (e.g., animal performance) (FRASER, 2003), DEIMEL et al. (2012) and HEISE and THEUVSEN (2015) found, that farmers also include aspects of the natural living approach. Furthermore, AUSTIN et al. (2005) and BOCK and VAN HUIK (2007) showed that the conception of animal welfare differs significantly between conventional farmers and organic farmers and also depends on the type of livestock being farmed. Up to now, most of the empirical work has been done using quantitative surveys with closed questions. However, a study by HEISE and THEUVSEN (2015) clearly showed that different methodological approaches (qualitative vs. quantitative) lead to considerable differences in farmers' definitions of animal welfare. To our knowledge, no studies have used an open question to compare farmers' conception of animal welfare with regard to both farming system and the type of livestock kept.

3. Methods and data

For this study, farmers from all over Germany were questioned in summer 2014 using a standardized online survey. The respondents were recruited via various mailing lists, including sending the link to the questionnaire to the members of German agri-food businesses (e.g. top agrar, ISN). After eliminating incomplete data sets, 902 complete data sets (573 from conventional and 329 from organic farmers) were available for analysis. For the separate analysis of farmers keeping poultry, cattle and pigs, farmers without livestock and farmers keeping other animals had to be deleted, resulting in a data set of 611 farmers (72 poultry, 394 cattle and 145 pig farmers).

To provide an initial unbiased indication of farmers' conception of animal welfare, an open question was asked: "In your opinion, what characterizes animal-friendly agriculture? Please name criteria that you consider important for animal welfare." The participants were free to note any criteria that came to their minds. In accordance with the approach developed by DEIMEL et al. (2012), the answers to this question were analyzed by sorting the criteria identified into five categories: housing system, management practice, animal health, animal behavior and animal performance. In an open question, individuals will nominate issues that spring first to their mind and in that sense are most important to them (MAYRING, 2008). This suggests

that the more frequently a criterion was named, the more farmers identified this criterion as important. The frequency of criteria per category was calculated separately for conventional and for organic farmers and per animal species kept (MAYRING, 2008) and a variance-test for independent samples at a given significance level ($p \leq 0.05$) was used to determine whether or not there are differences in the number of criteria named per category between conventional and organic farmers and between farmers grouped by the type of livestock they keep (BÜHL, 2008). We analyzed the data using IBM SPSS Statistics 23.

4. Results

In total, 573 conventional farmers and 329 organic farmers answered the open question on their conception of animal welfare. Table 1 shows that conventional farmers most commonly named criteria from the categories housing system (78%) and management practice (74%). Overall, a good barn climate (315 nominations) was the most frequently mentioned criterion for animal welfare, followed by adequate provision of space (305) and sufficient feed and water supply (293). Criteria assigned to the category animal health were mentioned the third most frequently (33.7%). Behavior-related criteria were listed by 28.6% of conventional farmers; in this category, the opportunity to show natural behavior was the criterion named most often. Aspects from the animal performance category were mentioned least frequently, with only 18% of the conventional farmers mentioning criteria from this category.

Organic farmers most commonly named criteria from the resource-based categories housing system (84.2%) and management practice (74.5%) (see table 1). For most farmers, the criterion access to outdoor paddocks (192 nominations) was important, as were the criteria adequate provision of space (185) and sufficient feed and water supply (185). The criteria assigned to the categories animal health (17.6%) and animal behavior (49.2%) were mentioned less frequently. The opportunity to show natural innate behavior was the most frequently mentioned criterion from this category (121 nominations). Only 8.2% of organic farmers named criteria related to animal performance.

Tab. 1: Conventional and organic farmers' conception of animal welfare

Resource-based criteria		Animal-based criteria		
Housing system*	Management practice ^{n.s.}	Animal health ^{***}	Animal behavior ^{***}	Animal performance ^{***}
Adequate barn climate n=315 (55.0%) (c) n=118 (35.9%)(o)	Sufficient feed/water supply n=293 (51.1%) (c) n=185 (35.9%)(o)	Good general health status n=184 (32.1%) (c) n=52 (15.8%) (o)	Ability to express natural innate behavior n=101 (17.6%) (c) n=121 (36.8%)(o)	Adequate weight gains/milk yield n=81 (14.1%) (c) n=16 (4.9%) (o)
Adequate provision of space n=305 (53.2%) (c) n=185 (56.2%)(o)	Adequate animal supervision ^{***} n=263 (45.9%) (c) n=127 (38.6%)(o)	Absence of injuries n=40 (7.0%) (c) n=14 (4.3%) (o)	Overall wellbeing* n=58 (10.1%) (c) n=18 (5.5%) (o)	Long productive life n=59 (10.3%) (c) n=15 (4.6%) (o)
Adequate barn equipment n=250 (43.6%) (c) n=104 (31.6%)(o)	High level of hygiene ^{**} n=68 (11.9%) (c) n=19 (5.8%) (o)	Low levels of parasite infection n=12 (2.1%) (c) n=5 (1.5%) (o)	Low levels of distress n=43 (7.5%) (c) n=46 (14.0%) (o)	
Access to outdoor paddock n=90 (15.7%) (c) n=192 (58.4%)(o)	Abandonment of interventions ^{***} n=11 (1.9%) (c) n=27 (8.2%) (o)			
Access to manipulable material n=70 (12.2%) (c) n=16 (4.9%) (o)	Adequate use of medicine/veterinary n=61 (1.9%) (c) n=37 (11.2%) (o)			
Adequate group size/composition n=49 (8.5%) (c) n=83 (25.2%) (o)	Change of used genetics n=6 (1.0%) (c) n=24 (7.3%) (o)			
	Use of health data from abattoir n=6 (1.0%) (c) n=61 (18.5%) (o)			
∑ n=1079 (c) ∑ n=698 (o)	∑ n=708 (c) ∑ n=420 (o)	∑ n=236 (c) ∑ n=71 (o)	∑ n=202 (c) ∑ n=193 (o)	∑ n=140 (c) ∑ n=15 (o)
Total participants 447 (78%) (c) 227 (84.2%) (o)	Total participants 424 (74%) (c) 245 (74.5%) (o)	Total participants 193 (33.7%) (c) 58 (17.6%) (o)	Total participants 164(28.6%) (c) 126 (49.2%) (o)	Total participants 103(18%) (c) 27 (8.2%) (o)
Notes: n=nominations; (c)=conventional farmers; (o)=organic farmers Differences between conventional and organic farmers: * p≤ 0.05; ** p≤ 0.01; *** p≤ 0.001; n.s. p≥ 0.05 (not significant); n=573 conventional farmers and 329 organic farmers				

Source: OWN TABLE

Table 1 also shows the significant differences in conventional and organic farmers' conception of animal welfare. Significant differences in the number of named criteria per category were found in the categories housing system, animal health, animal behavior and animal performance. Only in the category of management practice were there no significant differences in the number of named criteria. The questioned organic farmers tended to more often name the categories

housing system and animal behavior, while conventional farmers more frequently mentioned animal health and animal performance.

Tab. 2: Farmers' conception of animal welfare per animal species kept

Resource-based criteria		Animal-based criteria		
Housing system*	Management practice ^{n.s.}	Animal health**	Animal behavior ^{n.s.}	Animal performance**
Adequate barn climate <i>n</i> =35 (48.6%) (P) <i>n</i> =198 (50.3%) (C) <i>n</i> =82 (56.6%) (p)	Sufficient feed/water supply <i>n</i> =34 (47.2%) (P) <i>n</i> =218 (55.3%) (C) <i>n</i> =86 (59.3%) (p)	Good general health status <i>n</i> =19 (26.4%) (P) <i>n</i> =89 (22.6%) (C) <i>n</i> =62 (42.8%) (p)	Ability to express natural innate behavior <i>n</i> =26 (36.1%) (P) <i>n</i> =95 (25.1%) (C) <i>n</i> =19 (13.1%) (p)	Adequate weight gains/milk yield <i>n</i> =9 (12.5%) (P) <i>n</i> =34 (8.6%) (C) <i>n</i> =28 (19.3%) (p)
Adequate provision of space <i>n</i> =36 (50.0%) (P) <i>n</i> =240 (60.9%) (C) <i>n</i> =69 (47.6%) (p)	Adequate animal supervision* <i>n</i> =32 (44.4%) (P) <i>n</i> =186 (47.2%) (C) <i>n</i> =52 (35.9%) (p)	Absence of injuries <i>n</i> =5 (6.9%) (P) <i>n</i> =20 (5.1%) (C) <i>n</i> =13 (9.0%) (p)	Overall wellbeing <i>n</i> =5 (6.9%) (P) <i>n</i> =29 (7.4%) (C) <i>n</i> =17 (11.7%) (p)	Long productive life <i>n</i> =4 (5.6%) (P) <i>n</i> =26 (6.6%) (C) <i>n</i> =20 (13.8%) (p)
Adequate barn equipment <i>n</i> =23 (31.9%) (P) <i>n</i> =172 (33.8%) (C) <i>n</i> =50 (34.5%) (p)	High level of hygiene* <i>n</i> =9 (12.5%) (P) <i>n</i> =36 (9.1%) (C) <i>n</i> =24 (16.6%) (p)	Low levels of parasite infection* <i>n</i> =3 (4.2%) (P) <i>n</i> =4 (1.0%) (C) <i>n</i> =6 (4.1%) (p)	Low levels of distress <i>n</i> =9 (12.5%) (P) <i>n</i> =39 (9.9%) (C) <i>n</i> =17 (11.7%) (p)	
Access to outdoor paddock <i>n</i> =24 (33.3%) (P) <i>n</i> =133 (6.9%) (C) <i>n</i> =13 (9.0%) (p)	Abandonment of interventions ^{n.s.} <i>n</i> =3 (4.2%) (P) <i>n</i> =13 (3.3%) (C) <i>n</i> =3 (2.2%) (p)			
Access to manipulable material <i>n</i> =6 (8.3%) (P) <i>n</i> =24 (6.9%) (C) <i>n</i> =20 (13.8%) (p)	Adequate use of medicine/veterinary* <i>n</i> =11 (15.3%) (P) <i>n</i> =37 (9.4%) (C) <i>n</i> =26 (17.9%) (p)			
Adequate group size/composition <i>n</i> =18 (25.0%) (P) <i>n</i> =54 (13.7%) (C) <i>n</i> =10 (6.9%) (p)	Change of used genetics** <i>n</i> =5 (6.9%) (P) <i>n</i> =13 (3.3%) (C) <i>n</i> =0 (0%) (p)			
	Use of health data from abattoir* <i>n</i> =1 (1.4%) (P) <i>n</i> =0 (0%) (C) <i>n</i> =3 (2.1%) (p)			
∑ <i>n</i> =142 (P) ∑ <i>n</i> =821 (C) ∑ <i>n</i> =244 (p)	∑ <i>n</i> =95 (P) ∑ <i>n</i> =503 (C) ∑ <i>n</i> =194 (p)	∑ <i>n</i> =27 (P) ∑ <i>n</i> =113 (C) ∑ <i>n</i> =81 (p)	∑ <i>n</i> =40 (P) ∑ <i>n</i> =163 (C) ∑ <i>n</i> =53 (p)	∑ <i>n</i> =13 (P) ∑ <i>n</i> =60 (C) ∑ <i>n</i> =48 (p)
Total participants 60 (83.3%) (P) 324 (82.2%) (C) 105 (72.4%) (p)	Total participants 54 (75%) (P) 304 (77.2%) (C) 110 (75.9%) (p)	Total participants 23 (31.9%) (P) 97 (24.6%) (C) 62 (42.8%) (p)	Total participants 33 (45.8%) (P) 134 (34.0%) (C) 45 (31.0%) (p)	Total participants 11 (15.3%) (P) 46 (11.7%) (C) 35 (24.1%) (p)
Notes: n=nominations; (P)=Poultry farmers; (C)=Cattle farmers; (p)=pig farmers Differences between broiler, cattle and pig farmers: * p≤ 0.05; ** p≤ 0.01; *** p≤ 0.001; ^{n.s.} p≥ 0.05 (not significant); n=72 Poultry farmers; 394 cattle farmers and 145 pig farmers				

Source: OWN TABLE

Table 2 illustrates farmers' conception of animal welfare separately for poultry farmers (P), cattle farmers (C) and pig farmers (p).

Poultry farmers most frequently named the criteria adequate provision of space (36 nominations), adequate barn climate (35) and sufficient feed and water supply (34). Overall, criteria from the categories housing system (83.3%) and management practice (75.0%) seemed to be important to most of these farmers, while criteria from the categories animal health (31.9%), animal behavior (45.8%) and animal performance (15.3%) were named by fewer poultry farmers. Similar results were found for cattle farmers: Adequate provision of space (240 nominations), sufficient feed and water supply (218) and adequate barn climate (198) were named most frequently, indicating that criteria assigned to the categories housing system (82.2%) and management practice (77.2%) were important to many farmers. Again, animal health (24.6%), animal behavior (34.0%) and animal performance (11.7%) were named less often by poultry farmers.

Pig farmers most commonly named the criteria adequate feed and water supply (82), adequate provision of space (86) and barn climate (69). Again, management practice (75.9%) and housing system (72.4%) were the categories with the most frequently named criteria. The categories animal health (42.8%), animal behavior (31.0%) and animal performance (24.1%) were again named less often.

Table 2 also shows significant differences in the animal welfare conceptions of poultry, cattle and pig farmers. Significant differences in the number of criteria named per category were found in the categories housing system, animal health and animal performance. For the categories management practice and animal behavior, no significant differences were found.

5. Discussion and conclusions

This paper has reported on the initial results from a study of farmers' conception of animal welfare. This topic has rarely been studied before with regard to different farming systems and the type of livestock kept on the farm. Our study found that the questioned farmers most frequently considered criteria assigned to the categories housing system and management practice in their conception of animal welfare; these criteria can be directly influenced (e.g., adequate feed and water

supply, group composition). Thus, this study confirms the results of DEIMEL et al. (2012), who found that criteria from the resource-based categories were named most often by conventional pig farmers. In contrast to the results of FRASER (2003), the category animal performance was named least frequently by the farmers of our sample. In our survey, the conception of animal welfare differed significantly between conventional and organic farmers and also between poultry, cattle and pig farmers. While organic farmers named more criteria from the categories housing system and animal behavior, conventional farmers more commonly mentioned criteria related to animal health and animal performance as important for animal welfare. The comparison between the animal species kept showed that poultry farmers most frequently named criteria from the categories housing system and animal behavior while animal health and animal performance were significantly more often mentioned by pig producers.

Like most non-experimental studies, ours has some limitations that need to be taken into account when interpreting the results. Firstly, this study is not fully representative of the entire population of German farmers. Secondly, a certain degree of subjectivity on how the individual criteria were sorted into the categories taken from DEIMEL et al. (2012) could not fully be avoided. Undoubtedly, there are some criteria which could also have been placed in other categories. These include the use of medication and the use of health data from abattoirs. Sorting these criteria into other categories (e.g., from the management to the health category) would have slightly changed our overall results. Thirdly, the allocation of the named criteria was conducted by the authors and not by the producers themselves. It thus remains unclear, if the producers would have sorted the criteria to the same categories. Despite these limitations, the study yields interesting results that are highly relevant for all stakeholders in the agri-food sector. Farmers' conception of animal welfare should also be taken into account when developing new animal welfare programs in order to increase the likelihood that the new programs will be accepted and properly adapted by the specific target group. Policy-makers could also use the results when developing new legislations concerning the livestock production practices to find species- and farming system appropriate solutions.

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