Citizens' Perception of Recent Livestock Production Systems in Germany

Anja Rovers
Thünen Institute of Market Analysis, Braunschweig

Winnie Isabel Sonntag
Georg-August-Universität Göttingen

Nanke Brümmer and Inken Christoph-Schulz
Thünen Institute of Market Analysis, Braunschweig

Abstract

In this study, we examine citizens' perceptions of recent livestock production in Germany. Thereby, we focus against the backdrop of seven animal species-specific guidelines written by Scientific Advisory Board on Agricultural Policy, Food and Consumer Health Protection at the Federal Ministry (WBA, 2015). We combine a qualitative study with focus group discussions about pig, cattle and poultry production systems and a quantitative online survey with factor analysis. Based upon the findings of the exploratory factor analysis, a cluster analysis was conducted to assign respondents to groups. The results provide an overview of citizens' recent perceptions and attitudes, show differences and commonalities with regard to the three main livestock production systems pig, cattle and poultry production. We sum up our qualitative results as thesis for each animal species. Furthermore, we show relevant factors for respondents and divide them into clusters. We discuss these results against the background of the guidelines stated by the WBA.

Key Words

perception of livestock production; focus group discussions; factor analysis; cluster analysis

1 Introduction

Livestock production is a continuous topic of public interest and present in debates on consumption and food (VANHONACKER et al., 2008; TONSOR et al., 2009; VANHONACKER et al., 2012). For several years it has been an ongoing discussion about how farm animals should be treated (OHL and VAN DER STAAY, 2012). According to cross-border studies, citizens believe that the welfare of livestock should be improved. Already in 2005, about 78% of respondents to an EU-wide survey shared this opinion (EUROPEAN COMMISSION, 2005). In 2016, as many as 82% of EU citizens said that farm animal welfare should be enhanced (EUROPEAN COMMISSION, 2016). Concurrently, farmers are criticized for supposed bad living conditions for their farm animals, especially indoor breeding or high stocking densities (EUROPEAN COMMISSION, 2005; VANHONACKER et al., 2009; WILDRAUT et al., 2015; WEIBLE et al., 2016).

This mismatch between recent livestock production systems and societal claims is also reported for Germany (ZANDER et al., 2013; WEIBLE et al., 2016), one of the biggest livestock producing countries in the EU. The Federal Ministry of Food and Agriculture (BMEL) in Germany is one of the players who recognises this growing mismatch between the status quo of livestock farming on the one hand and society's expectations on the other hand. Regarding the situation, the Scientific Advisory Board on Agricultural Policy, Food and Consumer Health Protection at the Federal Ministry (WBA, 2015) outlined a report on today's livestock production. Within this report, the authors published nine forward-looking guidelines. The major goal of these guidelines is a prospective way leading to animal husbandry practices and upcoming livestock production systems that are longer-termed accepted by the majority of the Germany society.

In this study, we examine citizens' perceptions of recent livestock production in Germany. Thereby, we focus against the backdrop of seven animal species-specific guidelines written by the WBA. We combine a qualitative study with focus group discussions about pig, cattle and poultry production systems and a quantitative online survey with factor analysis. Based upon the findings of the exploratory factor analysis, a cluster analysis was conducted to assign respondents to groups. Both parts deal with the major aspects of the guidelines to cover up actual tendencies discussed in policy and science.

The results provide an overview of citizens' recent perceptions and attitudes, show differences and commonalities with regard to the three main livestock production systems pig, cattle and poultry production. The aim is to provide insights in citizens' main criticism points as well as in points of fewer importance for the three livestock production systems. We sum up our qualitative results as thesis for each animal species. Furthermore, we show relevant factors for respondents and divide them into clusters. We discuss these results against the background of the guidelines stated by the WBA (2015). The results can be seen as a first step to show players along the animal production chain what important points for citizens and also consumers regarding pig, cattle and poultry production are.

The article is structured as follows: Section 2 discusses the methods and Section 3 presents the paper's data collection. The fourth Section provides the results and Section 5 summarizes the study and discusses its implications.

2 Methods

2.1 Focus Group Discussions

For the qualitative part of the study, citizens were invited to focus group discussions on the topics pig, cattle or poultry production in several German cities in 2015. A similar method has been used in several studies e.g. by NGAPO et al. (2003), EVANS and MIELE (2008), THORSLUND et al. (2016), WEIBLE et al. (2016).

In the focus group discussions, the moderator used a semi-structured guideline consisting questions and asked all participants. The aim was to ascertain perceptions and opinions as well as deeper structures of consciousness (LAMNEK, 2005). Individual opinions did not have priority, but showed all views of the participants. The interactions between them and their changes of view were of main importance (MAYRING, 2002). Thus, in contrast to standardised surveys, unexpected issues occured (HALKIER, 2010). In this case, the results of the discussions are fundamental for several upcoming quantitative surveys, which are almost representative of the German population in terms of several quotas. Participants discussed their perception of actual animal husbandry with respect to housing systems, animal health and well-being regarding the Scientific Advisory Board's guidelines[1]:

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[1]   With focus on the animal, the guidelines 6 and 8 were not involved.

1.   Access for all farm animals to different climate zones, preferably outdoor climate,
2.   areas with different flooring types,
3.   offering of facilities, fabrics and stimuli for species-appropriate employment, food intake and hygiene,
4.   sufficient space per animal,
5.   avoiding surgical interventions,
7.   significantly reduced medication,
9.   better consideration of functional characteristics in breeding.

Against the background of the key points of these guidelines, different key words were mentioned by the moderator to capture participants' perception of livestock production: outdoor access, fresh air supply, daylight, flooring type, space per animal, manipulable material, medication, surgical interventions and breeding. In order to ensure comparability, a common guideline for the three different discussion topics (pigs, cattle and poultry) was developed for all animal species.

Referring to a common discussion guideline, the categories were developed and compared in close coordination within the researcher team. Due to the qualitative character of the study and its limitations regarding representatively, differences such as the participants' age or gender regarding presentation, were not analysed.

2.2 Factor Analysis

An exploratory factor analysis was carried out to define the underlying structure in the data matrix (HAIR et al., 1998). The seven-point Likert scale of the 36 items dealing with animal husbandry ranged from "I totally agree" to "I do not agree at all". A special emphasis in the survey is placed on guidelines for the improvement of animal welfare and societal acceptance published by the Scientific Advisory Board on Agricultural Policy at the Federal Ministry of Agriculture and Nutrition with the aim to increase societal acceptance (WBA, 2015). A principal component analysis was carried out by using a promax rotation on level 6. This factor analysis describes respondents' attitude towards farm animal husbandry. Within the analysis the factors will be formed from those items which were answered similarly (HÜTTNER and SCHWARTING, 2002).

2.3 Cluster Analysis

The cluster analysis was carried out to assign respondents to groups with as much similarity within

and difference among the groups as possible (CHURCHILL and NIELSEN, 1995). Based on the standardized factor levels for each respondent, a hierarchical cluster analysis was initially conducted with a random sample of approximately 145 respondents using Ward`s method. The analysis of the dendrogram and the elbow diagram identified three clusters representing the structure of the respondents. After this, all respondents were clustered using a K-means cluster analysis, with the cluster centers taken from the hierarchical analysis as initial seed points. By doing so, respondents with homogenous attitudes regarding pig husbandry are grouped within one cluster, whereas respondents with different attitudes are grouped in another cluster. Bi- and multivariate analyses were used for further details of the segments found. A discriminant analysis confirmed the validity of the clusters found (BACKHAUS et al., 2011).

3 Data

3.1 Qualitative Data Collection

For each animal species we conducted six focus groups in two rounds per location. To get widespread opinions of the participants, the locations should be contrary. Therefore, they were chosen based on low or high concentration of the regarded species or areas with more alternative farming systems (referring to STATISTISCHE ÄMTER DES BUNDES UND DER LÄNDER, 2011). Nevertheless, there was no evaluation of differences in discussion content between the selected sites in this paper. The locations for the discussions are listed in Table 1.

Furthermore, to get different opinions, as effectively as possible, the discussions with up to eleven citizens also included people with vegetarian or vegan diets. They were included because today's husbandry conditions could influence an individual's decision to increase or avoid the consumption of animal products. The participants were chosen by a market research company regarding several criteria (18 to 70 years old, at least 50% female participants, at least 33% employed), relevant for each focus group. Additionally, only people without agricultural background (qualification, personal milieu) could take part. People having participated in a survey on agriculture or nutrition for the last six months and people who have not been in Germany for more than five years were also excluded. All discussions took up to 120 minutes and were recorded and verbatim transcribed afterwards. In order to structure the main results, a content analysis following a category system was carried out (based on MAYRING, 2002). It was performed with MAXQDA Plus 12.

3.2 Quantitative Data Collection

As qualitative data is not representable, an online survey (conducted with Technical University of Munich) was carried out. The quantitative survey was conducted based on the outcomes of the qualitative research with the limitation that is to be seen in the general focus on animal husbandry instead of comparing different species, taking account of the guidelines by the WBA (2015). The performance of the survey was supported by a private market research company that surveyed 1,420 people in Germany in the spring of 2016. Participants were asked questions about their general trust in other people, their dietary habits and their knowledge of animal livestock production systems. Additionally, respondents were presented 36 items on a seven-point Likert scale about different aspects of farm animal husbandry. These items ranged from suggestions for improvement to statements focussing on the necessity of current animal husbandry practices. As well as the keywords of the basal focus group discussions, the items were based on guidelines to improve societal acceptance of farm animal husbandry published by the Scientific Advisory Board on Agricultural Policy at the Federal Ministry of Food and Agriculture in 2015. Furthermore, respondents had to state who they considered responsible for animal welfare in livestock production (farmers, consumers, state and suppliers). The sample was widely representative of the German population in terms of gender, federal state/region, age, income category, employment and education – except for people older than 65 and respondents with a low level of education

Table 1. Locations of focus group discussions with citizens

Topic	Locations (state)
Pig	• Oldenburg (Lower Saxony) • Fulda (Hessia) • Halle (Saxony-Anhalt)
Cattle	• Schwerin (Mecklenburg-Western Pomerania) • Essen (North Rhine-Westphalia) • Kempten (Bavaria)
Poultry	• Hamburg (Hamburg) • Vechta (Lower Saxony) • Würzburg (Bavaria) • Erfurt (Thuringia)

Source: own elaboration

Table 2. Sample characteristics

	Sample (N=1,420), relative (%)	German population (%)*
Gender		
Female	50.6	51.0
Male	49.4	49.0
Age category		
18-24 years	8.0	9.8
25-34 years	16.2	14.7
35-44 years	15.8	15.2
45-54 years	21.3	20.4
55-64 years	16.1	16.7
65-84 years	22.6	24.7
Education level		
No degree or not yet	1.0	3.6
Secondary general school-leaving certificate ("Hauptschule")	21.6	31.4
Certificate of ten-grade school of general education in the former GDR ("Polytechn. Oberschule")	6.2	6.7
Intermediate school-leaving certificate ("Mittlere Reife")	28.9	22.7
University/University of applied sciences entrance qualification ("Abitur")	21.4	29.5
Degree from university or university of applied sciences	20.9	Bachelor 1.9 Master 1.2 Diplom 12.8 Promotion 1.2
Mean household size (standard deviation)	2.25 (1.148)	-
Households' net monthly income (€)		
<499	2.1	1.7
500-899	7.6	8.8
900-1.299	13.7	12.5
1.300-1.499	8.5	7.0
1.500-1.699	7.3	6.7
1.700-1.999	9.9	8.8
2.000-2.599	16.0	14.9
2.600-3.199	11.8	10.9
3.200-4.499	14.7	14.4
4.500 and more	8.5	11.4
Place of residence		
North	15.8	16.1
West	35.1	35.3
East	20.0	19.8
South	29.2	28.8
Having pets	49.4	-
Vegetarien/vegan diet	12.4	-

* if available

Source: own calculation; STATISTISCHES BUNDESAMT (2015, 2016, 2017a and b)

as well as people with a high income who were underrepresented. People having a professional background in agriculture or market research were excluded. People having participated in a survey on agriculture or nutrition for the last six month and peo-ple and people who have not been in Germany for more than five years were also not surveyed (see Table 2 for more information).

Table 3 shows some descriptive characteristics of the data set. Because of space limitations, only sociodemographics or those variables are presented which have a proven significant influence on cluster membership[2].

Table 3. Descriptive characteristics of the quantitative online survey

Farmers are mainly responsible for a more species-appropriate animal husbandry.	43.3
The state is mainly responsible for a more species-appropriate animal husbandry.	26.8
Consumers are mainly responsible for a more species-appropriate animal husbandry.	21.5
Suppliers are mainly responsible for a more species-appropriate animal husbandry.	6.2
Personal feeling of having low trust in general.	17.0
Personal feeling of having medium trust in general.	67.5
Personal feeling of having high trust in general.	15.4

Source: own calculation

4 Results

4.1 Qualitative Results

First, general qualitative results are presented. They refer to all focus group discussions and could be identified for all three animal species investigated. The results of the qualitative study will then be presented in more detail for the animal species and divided into pig, cattle and poultry production.

General Results

Participants of all focus group discussions across all topics indicated that their perception is influenced by the media. Nowadays, there are fewer farms even in rural regions and it is not probable or possible at all to have personal contact with farmers. According to participants, the media often shows negative examples of livestock production. Additionally, direct marketing is a good possibility, if available, to stay in touch.

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[2] Further information is available on request.

In all discussions, the topic "factory farming" was discussed critically. The lack of free movement, too little space per animal and, for citizens, non-transparent, locked systems, especially in pig and poultry production, were mostly mentioned. Furthermore, the use of technology (e.g. for feeding processes or milking in case of cows) is seen as a negative influence that reduces the relationship between farmers and their animals. A huge part of all discussions was the use of (prophylactic) medication and, above all, antibiotics. Participants talked about residues in meat, milk and eggs and resistances that are dangerous for the consumer. They suspected the preventive use of antibiotics and their necessity as a result of poor living conditions for the animals.

Pig Production

The discussion about pig production was mainly about the space per animal. Participants used the wording "no space", "narrow" or "penned up", especially when talking about sows. Gestation crates were described in own words but their name and function was not known. Regarding manipulable material for pigs, only a few assumed that balls or chains were in the stables, but emphasized the importance of activities. The participants said that pigs are intelligent animals and therefore needed facilities for activity. Talking about surgical interventions, castration was mentioned, but it was not known as a common procedure in pig production. With respect to breeding, it was mentioned that pigs are very sensitive for illnesses and not robust. Following the participants, that would lead to the need of medication and not allow outdoor access. Furthermore, participants talked about injuries because of slatted floors.

Cattle Production

The participants of focus group discussions on cattle production shared the ideal idea of dairy cattle in the pasture. They were, nevertheless, aware of limitations and said that dairy cattle are often kept only in stables. Some respondents even stated that cows were fixed in grids. With regard to feeding, they stressed that grass and hay are natural feedstuffs for cattle and mistrusted the ingredients of concentrated feed. The participants discussed whether and how much roughage cattle would receive. Some of them were sure that the animals only get concentrated feed, enhanced with lots of "chemistry". There was also a vivid discussion regarding prophylactic medical treatment of dairy cows: on the one hand, respondents were sure that especially antibiotics are given regularly. On the other hand, other participants discussed the detectability and were sure that prophylactic administration of drugs to lactating cows would not be practiced. Additionally, the use of technology such as milking robots was seen critically by the participants. Some said that there are several advantages for the animals, others assumed a worsening of the relationships between farmers and their dairy cattle. Differences between husbandry of dairy and beef cattle were not well known by the participants.

Poultry Production

Discussions about poultry production systems showed that the ban of conventional cage systems in the EU and Germany is not known at all. Participants often described keeping systems with bars and cages for laying hens and broiler chicken as well, although broilers never had been kept in cages. Those cage systems were perceived as very negative and were associated with no animal friendly keeping system. Overall, when participants were asked to describe keeping systems for laying hens and broilers in their own words they used very negative descriptions, such as "full", "dark", "cruel life", "pumped with antibiotics". Furthermore, preventive use of medication and antibiotics was also mentioned very often in the discussions. Residuals were supposed in chicken meat and eggs and bad influence for humans' health was described. In contrast, an outdoor or an organic keeping system of poultry was perceived positively by the participants. In general, the single farmer was perceived as trustworthy; however, an industrial agribusiness system was made responsible for the perceived problems in poultry farming systems.

4.2 Quantitative Results

Factor Analysis

In order to ensure the suitability of the sample for factor analysis, the Kaiser-Meyer-Olkin test (0.955), the Measure of Sampling Adequacy (ranging from 0.977 and 0.821) and the Bartlett test of sphericity (0.000) were run. All calculated measures ensure suitability for factor analysis. After a principal component analysis with promax rotation on level 6 and using the Screeplot and Eigenvalue criterion, five factors were identified that account for 59.42% of the error variance. Based on HAIR et al. (2009), Cronbach's α for all factors can be considered as reliable. These factors are:

1. support of an efficient production (α: 0.930),
2. animals' needs (α: 0.911),
3. trust in experts (α: 0.825),
4. support of justified mutilations (α: 0.720),
5. rejection of pharmaceutical treatment (α: 0.752).

Table 4. Promax rotated factor loadings for citizens' perception of recent livestock production systems

	Factor 1 α=0.930	Factor 2 α=0.911	Factor 3 α=0.825	Factor 4 α=0.720	Factor 5 α=0.752
Livestock should not be kept outdoors, as this leads to odour nuisance.	.856	.004	- .070	- .039	.044
If the windows in the stable can be opened, the farm animals do not need to go outside.	.812	- .084	.005	- .019	- .020
Bedding in the barn (e. g. straw, sawdust) is not required for livestock farming.	.807	- .058	- .034	- .006	- .011
Farm animals do not need much room for movement.	.793	- .056	- .072	.016	- .013
For the well-being of farm animals it is sufficient to keep them only in the stable.	.784	- .102	.036	.031	.014
Farm animals are intended for efficient production and can therefore be kept in confined spaces.	.761	- .093	.037	.080	.058
Farm animals don´t need diversion.	.721	- .199	.086	- .031	.072
Farm animals are not so sensitive because they have a different sense of pain than humans.	.697	- .032	.086	.067	.067
It is sufficient if the farm animals have enough space to lie down without problems.	.686	- .100	.122	- .001	.053
With regard to world food, farm animals must be bred in such a way that they produce as much meat or milk as possible in a short period of time.	.662	- .008	.106	.074	- .041
It is provided that farmers and stable workers have enough time for the individual animal, it is not important how many animals are housed in a stable.	.376	.020	.353	- .101	.005
If diseases are prevented as a result, the preventive use of medicines in livestock farming is to be supported.	.371	.293	.222	.135	- .274
Areas in the barn with soft lying surfaces (e. g. straw) benefit the well-being of farm animals.	- .078	.734	.028	.080	- .054
Farm animals must have enough space to be able to run.	- .022	.728	- .021	- .196	- .090
Farm animals should have diversion in the stable, e. g. with toys.	.290	.721	- .229	- .032	- .359
The farm animals should have different areas (for sleeping, eating, walking) in their stable.	- .062	.711	.001	- .116	- .088
Farmers and stable workers should regularly update their expert knowledge.	- .111	.709	- .055	.130	.045
Varied food for farm animals is important.	- .054	.696	.084	- .072	.044
Farmers should be subject to stricter controls.	.214	.671	- .420	.050	.188
As much as possible should be documented on farm animals (water, feed intake, milk yield, weight gain).	.222	.659	- .131	.105	.160
Farm animals should be able to live according to their natural behaviour as much as possible.	- .279	.655	.065	.045	.002
The farmer should monitor daily whether his farm animals are doing well.	- .261	.649	.083	.058	.073
It is important to take into account criteria such as health and resistance to diseases in the breeding of farm animals.	- .135	.585	.141	.170	.139
Livestock should generally be able to go outdoor.	- .260	.580	.098	- .080	.006
Breeding should not only focus on the performance of the farm animal (milk yield, meat approach) but should also ensure that the animal lives without suffering.	- .236	.576	.090	.037	.049
Farm animals should only be given medicines if they are really sick.	- .216	.508	.103	.066	.075
The breeding of farm animals should avoid shortening or removing body parts (horns, tails, beaks).	.184	.458	.187	- .453	.029
As a consumer, one can rely on the farmers' expertise in dealing with their livestock.	.039	.021	.855	- .019	.001
Farmers know best how to keep farm animals properly.	- .001	- .043	.780	.049	.144
Consumers in Germany can rely on the controls that guarantee the quality of food of animal origin.	.168	.072	.673	- .017	- .172
The well-being of livestock is controlled sufficiently by farmers.	.320	- .015	.570	.058	.029
If the removal or shortening of body parts (horns, beaks, tails) prevents injury to other farm animals, it should be done.	.185	.207	.045	.781	.056
If a veterinarian recommends the removal or shortening of body parts (horns, beaks, tails) of farm animals, it should be done.	.198	.226	.052	.764	- .034
It is irresponsible to remove or shorten body parts (horns, beaks, tails) from farm animals.	.244	.377	.012	- .709	.143
Farm animals intended for human consumption should generally not be given medicines.	.067	.114	.059	- .051	.820
The use of antibiotics in livestock farming should be banned.	.069	.116	- .058	- .029	.813

Source: own calculation

The first factor, "support of an efficient production", reflects the opinion of the respondents on efficient production. The factor summarizes aspects that explicitly deny livestock's need for freedom of movement and accept stables without litter. Outdoor farming is also seen critically because of possible odour nuisance. However, medical treatment is supported if it serves to prevent illness. The second factor, "animals' needs", expresses more or less an opposite view of the first one. The items emphasise needs and wellbeing of livestock, such as the need for different functional areas in the stables to sleep, eat and move. This factor includes the rejection of prophylactic medical treatment, but supports it in case of illness. It includes many well-known claims of society on how to deal with animals. The third factor, "trust in experts", deals with trust in the experts of animal husbandry (especially farmers and official controls). Statements like „Farmers know best how to keep farm animals properly." or „In Germany, the welfare for farm animals is sufficiently controlled by the farmers" are supported. The fourth factor, "support of justified mutilations", emphasises particularly the acceptability of justified mutilations when recommended by a veterinarian. The item indicating that these mutilations are irresponsible has a negative loading on this factor, which leads to a rejection of this statement. The fifth factor, "rejection of pharmaceutical treatment", specifies the opposition towards any pharmaceutical treatment of livestock used for human consumption. If such a treatment would be accepted in case of a severe illness can neither be affirmed nor denied.

Factor loadings of all factors are presented in Table 4.

Cluster Analysis

Based on these identified factors, a cluster analysis was conducted and three clusters were identified. Discriminant Analysis showed that 95% of the respondents were assigned correctly (compare Figure 1). The members of the clusters might be named as

1. supporters of efficient animal husbandry (36%),
2. evaluating pros and cons (36%),
3. opponents of an efficiency driven husbandry (28%).

Respondents' cluster membership and mean factor deviations are presented in Figure 2:

Figure 1. Results of discriminant analysis
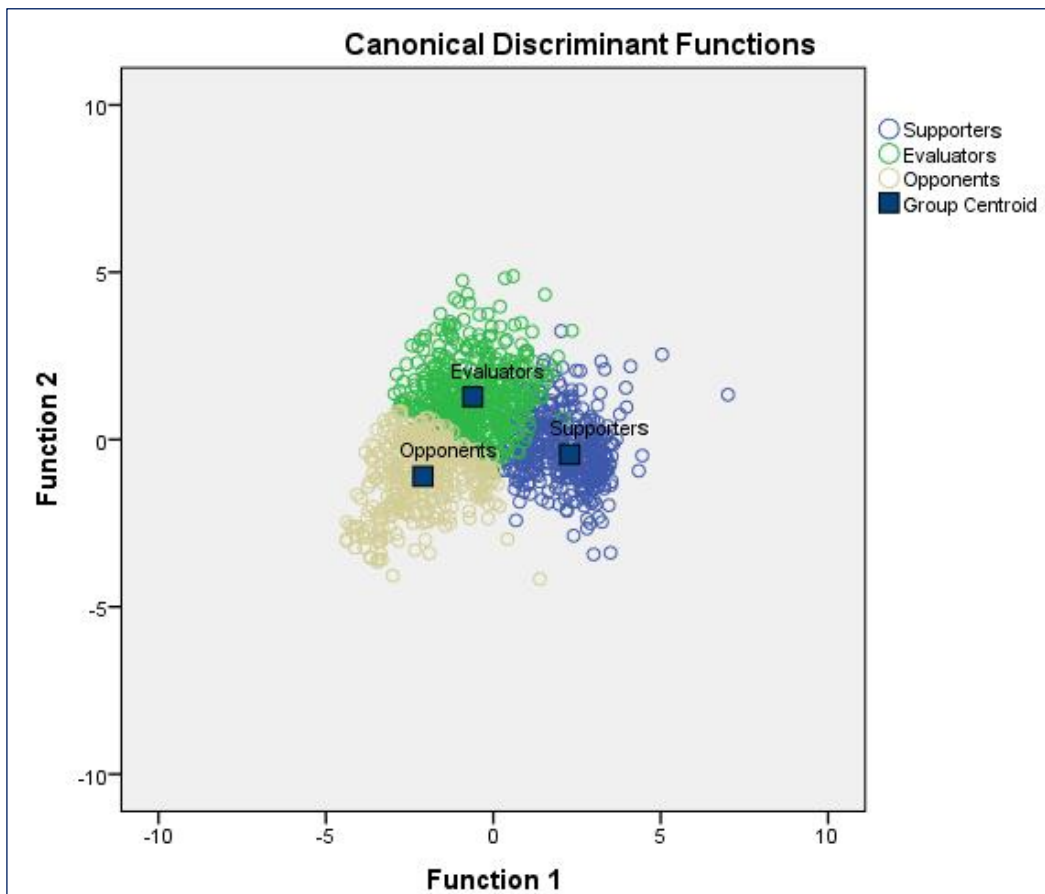
Source: own calculation

Figure 2. **Respondents' cluster membership and mean factor deviations: the identified three clusters and their mean factor deviation from the grand sample mean**
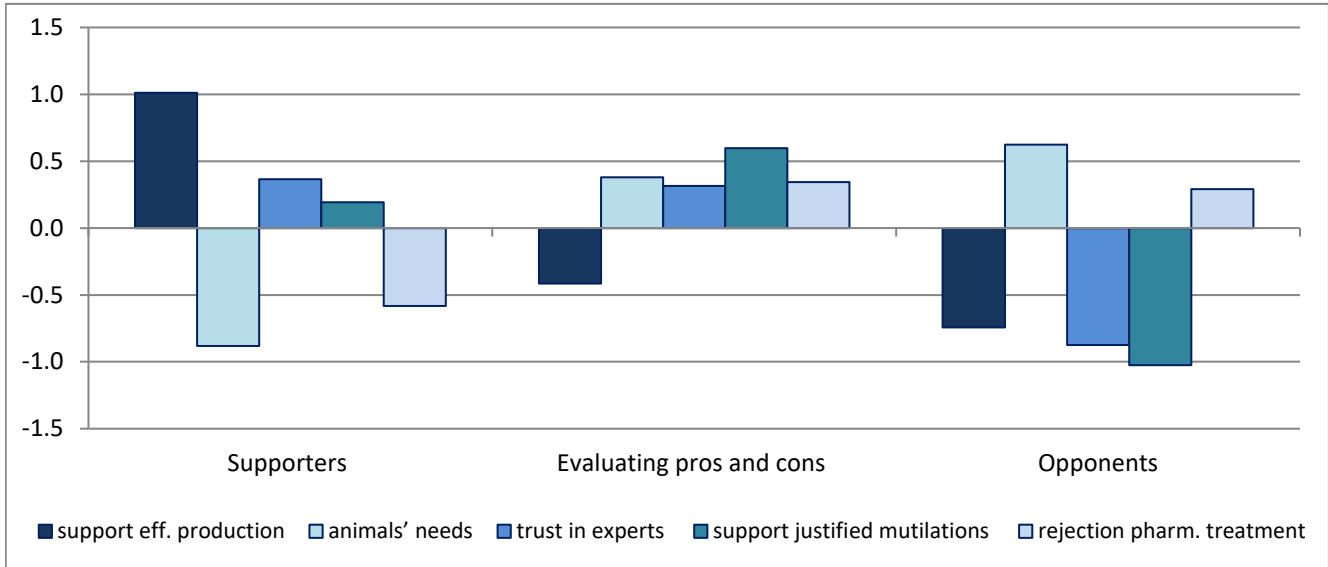
Source: own calculation

"Supporters of efficient animal husbandry" (cluster 1) show a high above-average level of support (compared to the sample mean) for all aspects focusing on (cost) efficiency without considering animals' needs. Compared to the average respondent, the members of this segment believe more in expert knowledge and tolerate mutilations as well as pharmaceutical treatments as the negative loading of the factor "rejection" stands for support. The third cluster is almost a mirror image of the first one. Compared to the average respondent, the members of this cluster show below-average support for efficient animal husbandry. For all other factors, the factor load is above average. The

most dominating factor of the second cluster is the one supporting justified mutilations. Although the members of this cluster show above-average interest in the needs of animals, they tolerate mutilations when recommended by experts and when they can prevent even more serious injuries. Their confidence in experts is similar to that of members of the first cluster, but they do not accept pharmaceutical treatment of animals intended for human consumption.

The Chi-Square-Test shows several significant variables influencing the cluster membership. However, only weak or very weak correlations were found. Table 5 shows these results in detail.

Table 5. **Cross table analysis to describe the identified cluster in more detail**

	Potential supporters	Evaluating pros and cons	Potential opponents
Gender	More often male	More often female	More often female
Respondent is vegetarian/vegan	Less often	Less often	More often
Knowledge of animal husbandry	More often average knowledge or below	Above average	Above average (even better than the 2nd cluster)
Personal feeling of being happy	More often happy or very happy	Less: very happy More: not overly happy	More: not overly happy, not happy at all
Personal feeling of having trust in general	Medium to high	Low to medium	Low to medium
Having pets	Less often	Less often	More often
Main responsibility species-appropriate animal husbandry	More: farmer and supplier Less: consumer	More: farmer Less: consumer	More: consumers and state
Region	More: South, Less: North, West	More: West, East Less: South, North	More: North Less: East

Source: own calculation

5 Discussion

The analyses of the qualitative part show several common aspects of livestock production for all three investigated animal species. The participants discussed a dwindling direct contact with farmers and animal husbandry and the influence of the media as a consequence. It was agreed that the living conditions of farm animals are often in need of improvement, with a better image of free-range husbandry and organic farming. Technological innovations such as feeding or milking robots were viewed critically and participants suspected a less close relationship between farmers and their animals as a result. The assumed preventive use of medications, and in particular antibiotics, was regarded as very critical by the participants because of the effects on their own health. The use of antibiotics and its suspected consequences for human health were dominating the focus groups.

To sum the focus groups up, we can state the following general results:

1. Our society has a decreasing direct connection to animal husbandry, therefore, information about agriculture come mainly from the media.
2. Farm animals should get better husbandry conditions; however, it is often unclear, who should pay the additional costs.
3. Today's livestock pens are very technologized and automatized; however, the farmers' work is easier and the farm animals can be better observed.
4. The use of medicine in animal husbandry is viewed critically; however, farm animals should be treated, when they are sick.

Qualitative analyses also show that space per animal is important in pig production. Furthermore, manipulable material is regarded as needful for pigs. Discussions on poultry husbandry showed that cage system housing is still present in the perception of the participants and that only outdoor and organic livestock production had positive images. The animal-specific results correspond to studies dealing with the same animal species. For example, pasture keeping of dairy cattle is considered positive (CHRISTOPH-SCHULZ et al., 2015). In pig production, space per animal is an often mentioned topic (WILDRAUT et al., 2015; WEIBLE et al., 2016). Regarding manipulable material, BUSCH et al. (2015) showed in their study with photos that it is not identified by respondents as such, even when available in the stables. ERMANN et al. (2016) find great differences between citizens' per-

ception and reality. They conclude that visits to stables should be offered for critics and media representatives to demonstrate transparency. A lack of such measurements could be an explanation for the identified unknown improvements of husbandry conditions in the poultry production like the ban of cage housing systems in the EU and Germany since 2012 and 2010 (VAN ASSELT et al., 2015). Thus, improvements in livestock production seem to be difficult to communicate to the wider public. According to BUSCH et al. (2015), communication is essential for a better societal acceptance of livestock production and, thus, the poultry sector need enlarged and differentiated communication strategies to demonstrate improvements in poultry keeping systems. However, further adjustments and improvements may become necessary to regain trust in conventional systems and to achieve an acceptable animal welfare husbandry by the wider public.

As the qualitative results have limitations and are not representative of the German population, we carried out a quantitative survey. Its items considered also keywords written in the guidelines by the WBA (2015).

The factor analysis presents five factors that summarize the content of the regarded guidelines.

1. Support of an efficient production (α: 0.930), covers aspects that make farming more efficient, but are often rejected by the population because they are not considered animal-friendly.
2. Animals' needs (α: 0.911), describes various points which are considered to be natural needs of animals and which are considered by society to be particularly important, but which are not or not sufficiently taken into account in current practice.
3. Trust in experts (α: 0.825), describes the confidence in experts of a topic.
4. Support of justified mutilations (α: 0.720), discusses the support of surgical procedures when justified - for example because they prevent injuries to the animal or fellow animals or humans, because ranking fights are avoided etc.
5. Rejection of pharmaceutical treatment (α: 0.725), describes the rejection of medication for farm animals.

The subsequent cluster analysis identified three different clusters:

1. supporters of efficient animal husbandry (36%),
2. evaluating pros and cons (36%),
3. opponents of an efficiency driven husbandry (28%).

This analysis shows that the sample is by no means homogeneous, but that three quite different groups could be identified. It was also possible to show that the groups surveyed are very heterogeneous, but that they can be differentiated in more detail with regard to different characteristics. However, it must be noted critically that only weak or very weak correlations could be found, so that it can be assumed that other latent variables (e.g. values) have a greater influence. For further research, it is recommended that the Schwartz value matrix is integrated into the surveys on the subject of livestock husbandry. Additionally, a comparison between the three different animal species, as considered in the focus groups, would be interesting for another representative survey.

Regarding the guidelines by the WBA (2015), we can conclude that a large part of the population agrees with the points listed in the guidelines. Based on our findings we can describe citizens' perception with respect to the guidelines as follows:

1. Access for all farm animals to different climate zones, preferably outdoor climate: focus group discussions showed that free-range husbandry is preferred. Especially in dairy cattle, pasture grazing plays an important role. Positive effects are mentioned in poultry production. The results of the online survey show a load of the factor "animal needs". The guidelines` content is perceived as disproportionately important in cluster 2 and 3.

2. Areas with different flooring types: especially in the pig production the relevance of flooring types was mentioned. Participants talked about injuries as a result of slatted floors. The survey shows a load for the second factor "animal needs".

3. Offering of facilities, fabrics and stimuli for species-appropriate employment, food intake and hygiene: participants of focus groups said that pigs are intelligent animals and need facilities for activity. Factor analysis also shows a load for the second factor "animal needs".

4. Sufficient space per animal: following the focus groups' contents, this was relevant for all animal species, especially for pig and poultry production. The results of the survey show a load for the second factor "animal needs". It is perceived as disproportionately important in cluster 2 and 3.

5. Avoiding surgical interventions: this aspect was not very relevant in the focus groups. Results of the survey show a load for the fourth "factor support of justified mutilations" with the conclusion that reasonable amputations are okay.

7. Significantly reduced medication: this aspect was part of all focus groups. The online survey showed the fifth factor with the conclusion that medication is necessary for ill animals.

9. Better consideration of functional characteristics in breeding. This aspect was discussed in the pig focus groups. The survey showed an agreement within factor 2, but weaker than e.g. outdoor access.

Acknowledgement

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Contact author:
DR. ANJA ROVERS
Thünen Institute of Market Analysis
Bundesallee 63, 38116 Braunschweig, Germany
e-mail: anja.rovers@thuenen.de

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