Effects of information on trust in farmers regarding animal welfare

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Abstract

Little consumer knowledge about agriculture and livestock production, as well as mounting concerns about modern animal husbandry make it necessary for consumers and farmers to build on the fragile construct of trust. Using the model of salient value similarity by Earle & Cvetkovich (1995) the determinants of trust and the influence of positive and negative messages about livestock production are examined. Results show that perceived value similarity between consumers and farmers has an influence on consumer trust in farmers and that positive (negative) information increases (decreases) trust.

Introduction

Within the last century, agriculture has undergone considerable changes. In Germany, like in many Western societies, this has led to a structural reformulation of the sector towards fewer and bigger farms and a shift in the employment and place of residence of the population from rural to urban regions. Due to these developments, consumers lost knowledge of and familiarity with agriculture and modern agriculture production systems. As a result, we see an unbalance between the consumer perception and expectation of food production and the modern agriculture production system. In a recent Eurobarometer survey, 83 percent of German citizens demand a better protection of farm animal welfare (European Commission, 2016). Furthermore, Vanhonacker et al. (2008) found a discrepancy between consumers' and farmers' beliefs about the current state of animal welfare, which consumers rated for most considered aspects lower than the mid-point of the scale.

As consumer knowledge of agricultural production is rather low, consumers need to rely on information from different sources for the evaluation of topics such as animal welfare. In studies about the trustworthiness of information sources, governmental organizations are ranked rather low, whereas consumer organizations are ranked relatively high (Frewer et al., 1996; Pieniak

et al., 2007). The question emerges, how the social gap between farmers and society, which is also maintained by news from non-governmental organizations and the media, can be bridged.

In food purchasing decisions animal welfare is typically a credence attribute, which means that consumers have to rely on the statements of producers or third parties, because they cannot verify the attribute themselves. Therefore, it is important that farmers can convince the society and thereby consumers of their work and good handling of their farm animals. In this context trust plays an important role. For example, Roosen et al. (2015) showed in an economic experiment that trust can restore confidence in the market and also reduce concerns towards new products or technologies. In his study on the acceptance of biotechnology, Siegrist (2000) showed that trust has an indirect impact through its influence on perceived benefits and risks. Earle & Cvetkovich (1995) conclude on the work of Parker & Parker (1993) that trust is affected by value similarity, a relationship that they could prove in an experiment.

It is crucial to note that trust is a sensitive construct and easier to destroy than to build (e.g. Slovic, 1993). As Poortinga & Pidgeon (2004) showed for the case of genetically modified food products, negative events have a clear impact on trust. In general, negative information has more influence on consumers than positive information (i.e. McCluskey et al., 2015). Additionally, as shown by Hayes et al. (2002) negative information is dominating positive one so that willingness to pay decreases if both are presented at the same time. This result holds also if the information is marked as originating from consumer advocacy groups.

The aim of this paper is twofold. First, we analyze the role of value similarity and trust in the perception of benefits from animal husbandry. We apply the model of salient value similarity by Earle & Cvetkovich (1995). In the analysis, we first confirm the validity of the constructs in a factor analysis and then evaluate the relationship between the constructs using a path model.

In a second step, an experimental study measures the effects of news articles dealing with animal welfare on trust of consumers in farmers. In a between-subject design, we compare trust

in farmers before and after an information treatment. The experiment confronts respondents with one of four news items from different senders with either a negative or a positive tendency, and trust is measured before and after the treatment. Finally, a regression combines both elements, the influence of media information with the model of salient value similarity and quantifies the particular impact. For the analysis we use data from an online survey with 1600 participants in Germany in a between-subject design.

The paper proceeds in four sections. After this introduction an overview of current literature on trust in general and the value similarity model is given. This is followed by a description of data and methods. The results are presented in the subsequent section and finally the paper concludes with a discussion of main findings.

Literature review

Trust is a topic in different research areas of the social sciences, for example in psychology, sociology and economics. Therefore, a common definition is important, but a unique definition has not been achieved. In marketing research there is the differentiation between general and specific trust. General trust is based on early childhood experience and can hardly be influenced, whereas specific trust can possibly be changed with the help of marketing strategies (Kenning, 2008). In the definition of Deutsch (1958) risk plays an important role. This follows the prevalent view, that the need for trust arises in risky situations (Mayer et al., 1995), in uncertain environments (Bhattacharya et al., 1998) or in situations characterized by a lack of knowledge (Grabner-Kräuter & Kaluscha, 2003; Siegrist & Cvetkovich, 2001).

These conditions are often met for food purchasing decisions. Many food products have credence attributes that the consumer cannot verify. Hence the consumer has to rely on trust in farmers and food processors and the information given by e.g. the media and non-governmental organizations. This is crucial for farmers, because negative information stays in mind longer and is perceived as more reliable than positive information (Cvetkovich et al., 2002; Hayes et

al., 2002; Poortinga & Pidgeon, 2004; Slovic, 1993). However trust is a fragile construct (Blomqvist, 1997). In general, studies show that negative events have a higher impact on trust than positive ones and that negative information is perceived as more reliable (i.e. Slovic, 1993). In the work of McCluskey et al. (2015) negative news cause a larger decline of utility for consumers than positive news due to concave utility functions. As a result, there is a higher demand for negative news and they dominate the market for news. Similarly, Swinnen et al. (2005) show that the large amount of published negative news is more triggered by the preferences of consumers than by those of the media. However, the effect of negative information or of negative effects depends on the prior attitude towards the topic (Poortinga & Pidgeon, 2004) and negative information can also increase trust, for example in the case of false alarms. White & Eiser (2006) showed that open false alarms could significantly increase trust and had in general more positive effects than "all clears".

It has been found that an important determinant of trust is salient value similarity (Earle & Cvetkovich, 1995). Trust results as a product shared values with the person whose trustworthiness is being assessed. The variable of interest in this relationship is social trust, which is described as *"the willingness to rely on those who have the responsibility for making decisions and taking actions related to the management of technology, the environment, medicine, or other realms of public health and safety"* (Siegrist et al., 2000). The model by Earle & Cvetkovich (1999) further consists of salient values and value similarity. The salient values are specific to the situation and Siegrist et al. (2000) define them as mostly implicitly created generalizations. The saliency of specific values is variable and may change, e.g., after receiving new information or in different situations, e.g. in the interaction with family members or business partners. The idea beyond the model is a cultural values theory of social trust, which means that people trust people and institutions, who see the world in a similar way that they do (Earle & Cvetkovich, 1999). The authors indicate, that people trust others within a certain group (i.e. the people, who are similar to them) and distrust people and institutions outside this group.

The model has been used in the literature to evaluate the effect of trust on perceived risks and benefits of technologies, for example genetically modified food (e.g. Allum, 2007) or nuclear power (Siegrist et al., 2000). Poortinga & Pidgeon (2003) found that especially for topics with little or no familiarity value similarity is of importance. However, they were not able to investigate if value similarity has an additional value or can also be measured with items of general trust and skepticism. In a later study Poortinga & Pidgeon (2006) indicate that the relationship of these items are more complex and show for genetically modified food products that people's prior attitudes have an influence and that these lead in interaction with perceived governmental position to a high explanation of the heterogeneity on value similarity. Furthermore, they yield in a precedence-role for value similarity in terms of other trust measurements.

Data and Methods

A Germany-wide online survey was conducted with 1600 respondents to examine the determinants of trust and the influence of positive and negative information on trust. The participants were sampled on a quota regarding the representativeness for education, profession, gender, household income and origin.

The survey was based on constructs that allow implementing the value similarity model according to Earle & Cvetkovich (1995). This measurement proceeds in two parts (see Figure 1). First, the respondents compare themselves with farmers. This similarity – in terms of shared values, goals, behavior, thinking and opinion – was recorded on a 7-point rating scale. An explorative factor analysis shows that the five items load on the same factor with a Cronbach $\alpha = 0.936$.

Second, the respondents are asked to indicate their agreement with different statements regarding farmers and animal welfare issues on a 6-point rating scale from 1 (completely disagree) to 6 (completely agree). The exploratory factor analysis confirms the factors social

trust (3 items, α=0.875), perceived risk (2 items, α=0.895) and perceived benefit (2 items, α=0.562).

Step 1	Step 2
Measurement Value similarity Social trust Perceived benefit	*Measurement* Information treatment in a between subject design in 4 groups
Analysis Path model of value similarity and social trust	*Analysis* Stepwise regression of impact of news on social trust

Figure 1 Sequence of questionnaire and analysis

Subsequently the respondents were randomly assigned to one of four information treatments with news texts from different senders (government or consumer association) and tendencies (positive or negative) in a between subject design. The news texts have been developed based on examples from newspapers and websites and the perception of positive and negative news was tested in a pretest among 60 respondents. After the information was given, the items of the factor social trust were measured again. Additionally, the respondents were asked to rate the text in terms of reliability, novelty and tendency. Furthermore, they were asked to indicate the sender of the information. The participants had no additional information about the text they read, neither about the sender nor of the tendency of the information was made explicit.

Descriptive statistics are calculated for the sample as a whole. Then, the structural equation model is estimated using the software AMOS to report the relationship between value similarity, social trust and perceived benefit. Having established the relationship between value similarity and social trust in farmers, the following stepwise regression will analyze the impact of news messages on the relationship.

Results

Descriptive results

Descriptive statistics on several sociodemographic are provided in Table 1. The sample was representative for the German society. Furthermore, the Table provides means and standard errors for all included variables. The sample contains an almost equal distribution of gender. Forty-three percent of the participants have a monthly net-household income between 2000 and 4500 € and thirty-two percent of the participants have an education of at least (specialized) grammar school. In average, the respondents have an age of 47 years and show a rather low level of general trust. In general, the share of vegetarians and vegans in the sample is rather low and the self-reported knowledge of farm animal husbandry practices is medium high.

Table 1 Variable definitions and summary statistics

Variable	Definition		Mean	Std. Error
Female	1 = Female, 0 = Male		0.506	.009
Income	Measured as net-household income per month			
	Less than 500 Euro	2.1 %		
	500 to 899 Euro	7.1 %		
	900 to 1299 Euro	13 %		
	1300 to 1499 Euro	8.9 %		
	1500 to 1699 Euro	7.2 %		
	1700 to 1999 Euro	9.6 %		
	2000 to 2599 Euro	16.4 %		
	2600 to 3199 Euro	12.3 %		
	3200 to 4499 Euro	14.8 %		
	4500 to 5999 Euro	6.1 %		
	More than 6.000 Euro	2.5 %		
Education	Measured in 6 categories			
	No degree/Not yet a degree	1.6 %		
	Secondary general school	31.7 %		
	Polytechnic secondary school	7.2 %		
	Intermediate secondary school	27.3 %		
	(Specialized) Grammar school	15.2 %		
	University (of applied studies)	16.9 %		
Age			47.658	.390
General Trust	*In general: Do you think most people can be trusted, or do you think one can't be careful enough when dealing with other people?* *You can't be careful enough to You can trust most people* measured on a 11-point Likert-scale		5.667	.043
Vegetarian	1 = vegetarian or vegan; 0 = non-vegetarian diet		0.088	.005
Knowledge	*How would you describe your level of knowledge regarding animal husbandry systems?* *Verly low to very high* measured on a 5-point Likert-scale		3.04	0.14

Value similarity and social trust

The variables value similarity, social trust and perceived benefit are constructs of two to five items and were calculated as mean values of the items confirmed in an exploratory factor analysis. For factor loadings and item description see Table 2.

The social trust in farmers is around the midpoint of the scale and slightly decreases after the information treatment. The statistics yield that the participants see themselves rather dissimilar from their perceived picture of a farmer. Additionally, the participants rated the perceived benefit from animal husbandry (i.e. potential more suffering of animals without usual interventions) right below the midpoint of the scale. The construct of perceived risk was measured as suggested by Siegrist et al. (2000), but excluded from the further analysis.

Table 2 Exploratory factor analysis with variable description

Variable	Description	Factor loading	Mean	Std. Deviation
Value Similarity	Value Similarity from 1 = unlike me to 7 = like me, calculated as mean of variables VS 1, VS 2, VS 3, VS 4, VS 5		3.853	1.426
VS 1	A farmer has different/the same values than/as me.	.823	4.140	1.592
VS 2	A farmers has different/the same goals than/as me.	.886	3.720	1.682
VS 3	A farmers acts different/the same than/as I would.	.906	3.850	1.542
VS 4	A farmer thinks unlike/like me.	.926	3.750	1.601
VS 5	A farmer has different/same opinions than/as me.	.923	3.800	1.567
Social Trust	Social Trust from 1 = completely disagree to 7 = fully agree, calculated as mean of variables ST 1, ST 2, ST 4			
	Before the news experiment		3.518	1.144
	After message was received		3.499	1.158
ST 1	Farmers are interested in producing products with high animal welfare standards.	.868	3.490	1.276
ST 2	On the whole, the treatment of animals in agriculture is responsible.	.902	3.530	1.344
ST 3	The interests of consumers and animals are of minor importance to farmers. They only care about profits.	Not included	3.890	1.276
ST 4	Farmers take good care of their animals' welfare.	.874	3.530	1.212
Perceived Benefit	Perceived Benefit from 1 = completely disagree to 7 = fully agree, calculated as mean of variables PB 2, PB 3		3.268	1.179

PB 1	The risk that animals suffer as a result of the currently permitted husbandry practices is very high.	Not included	4.510	1.290
PB 2	Without the usual interventions (e.g. beak shortening) animals would suffer even more.	.799	3.300	1.393
PB 3	High animal welfare standards would endanger the economic existence of farmers.	.837	3.230	1.433
PB 4	Higher animal welfare standards would increase the prices for meat.	Not included	4.570	1.224

Structural equation model

The structural equation model has a good fit with a comparative fit index (CFI) of 0.977 and all included variables are highly significant. Consistent with previous research, our results indicate that similar values have a positive influence on social trust (0.515), which positively influences the latent variable perceived benefit (0.496). The construct perceived risk is not included in the model, because its model fit is low (CFI=0.975), and the model delivers insignificant paths between trust and risk with from the literature unexpected correlation. Figure 2 shows the path diagram together with standardized regression weights (values on the arrow) and squared multiple correlations. The factor loadings are given in Table 2 and were rather high for the included variables. An inclusion of the variables with low factor loadings does not improve model fit.

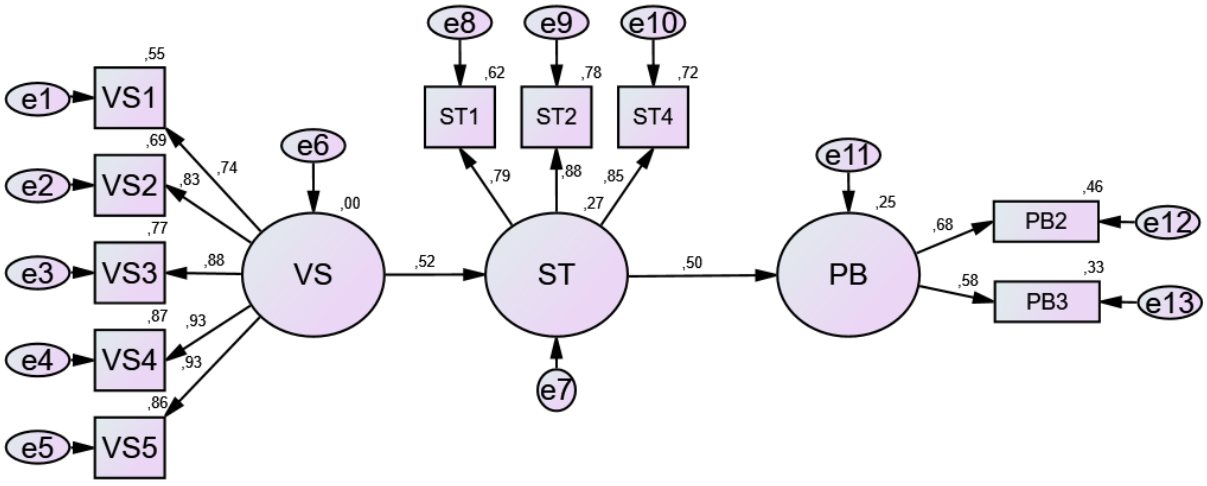

Figure 2Path diagram with standardized regression weights and squared multiple correlations

News experiment

The participants were confronted with news texts (see Annex) and asked to rate the information in terms of tendency, novelty and reliability, see Table 3 for mean values and standard errors. The participants perceived the messages as slightly reliable, rather positive and are not sure about the novelty.

Table 3 Descriptive statistics on news experiment

Variable	Description	Mean	Std. Error
Perceived Reliability	*What is your assessment of the content of the news item you just read?* *Not credible to very credible* measured on a 7-point Likert-scale	4.499	.027
Perceived Novelty	*What is your assessment of the content of the news item you just read?* *No novelty to high novelty content* measured on a 7-point Likert-scale	4.109	.027
Perceived Tendency	*What is your assessment of the content of the news item you just read?* *Negative to positive report* measured on a 7-point Likert-scale	4.785	.028
Negative Information	1 = negative information; 0 = positive information	.493	.500
Government	1 = government as sender of information, 0 = consumer association as sender of information	.507	.500

Table 4 provides an overview separated by the four news messages. Participants evaluated the messages from the government as rather positive, whereas the ones from consumer association are perceived more neutral. The values for perceived novelty are around the midpoint. It is interesting that the negative information by a consumer association received the highest perceived reliability. For participants it is in general easier to indicate the correct sender for the information by government than by the consumer association.

Table 4 Participant's rating of news texts with standard derivation in brackets

	Government		Consumer association	
	positive	negative	positive	negative
Perceived Tendency	5.350 (1.396)	5.100 (1.394)	4.600 (1.343)	4.050 (1.754)
Perceived Novelty	4.430 (1.395)	4.080 (1.549)	3.810 (1.535)	4.120 (1.557)
Perceived Reliability	4.310 (1.517)	4.460 (1.412)	4.000 (1.521)	5.270 (1.362)
Recognized Sender				
• Farmers	7.4 %	3.7 %	17.7 %	6 %
• Government	49.4 %	60.8 %	28.3 %	4.5 %
• Animal Rights group	9.6 %	12.1 %	9.3 %	56.3 %
• Consumer Association	10.9 %	7.1 %	28.7 %	12.3 %
• Media	17 %	13.3 %	12.8 %	14.1 %
• Research	5.7 %	3 %	3.2 %	6.8 %

A first comparison of the different information treatments as shown in Table 5 results in significant changes in trust for two of four treatments: the positive government message and the negative message from a consumer association. In line with expectations, positive information increases trust, whereas negative information decreases trust. The treatments with inverse combination of sender and tendencies were not found to be significant. This may be a result of the lower perception of novelty (3.810 vs. 4.120 for consumer associations and 4.080 vs.4.430 for government) and reliability (4.000 vs. 5.270 for consumer association).

Table 5 Impact of messages on social trust values

	Government		**Consumer association**	
	positive	negative	positive	negative
ST1	+ 0.27 ***	+ 0.07	+ 0.04	-0.25 ***
ST2	+ 0.22 ***	- 0.09	+ 0.03	-0.32 ***
ST4	+ 0.13 **	-0.11 *	+ 0.08	-0.38 ***
ST	+ 0.21 ***	- 0.04	+ 0.05	-0.32 ***
Participants	405	406	407	382

*, **, *** represents significance at level 0.05, 0.01, 0.001, respectively.

Regression results

A regression was used to explore the determinants of trust after the news treatment. Therefore variables were included in several blocks, first value similarity (Model I), followed by the additional including of general trust (Model II), message characteristics (Model III) and socio-demographics (Model IV). Results are given in Table 6 in form of standardized coefficients.

Table 6 Results of Regression Model of Social Trust in Farmers after News Treatment – Standardized Coefficients

	Model I		Model II		Model III		Model IV	
VS	0.414	***	0.382	***	0.329	***	0.319	***
General Trust			0.135	***	0.098	***	0.103	***
Negative Information					-0.133	***	-0.135	***
Government					0.056	*	0.059	*
Perceived Tendency					0.104	***	0.081	***
Perceived Reliability					0.177	***	0.178	***
Perceived Novelty					0.121	***	0.128	***
Female							-0.054	**
Age							0.089	***
Education							-0.043	
Household Size							0.012	
Household Income							-0.027	
Vegetarian							-0.097	***
Knowledge							0.029	
Adjusted R^2	0.171		0.187		0.298		0.319	

*, **, *** represents significance at level 0.05, 0.01, 0.001, respectively.

The last model leads to the best model fit with an adjusted R^2 of 0.319. The regression supports the influence of value similarity and showed the highest coefficient for value similarity. The influence of negative information was as expected negative, and interestingly higher than the perceived tendency of the news item. Furthermore, a message from government slightly increases the social trust in farmers. In general, it seems that female have a lower level of social trust and older people have higher social trust in farmers, whereas socio demographic factors like education, household size and income did not lead to significant changes in social trust.

Conclusion

Concurrent with the extant literature, our study shows that negative information decreases trust. However, it was not possible to replicate the full salient value similarity model, as the relationship with perceived risk was not significant. Siegrist (2001) indicates that concernment has an influence on trust. Hence, it may be that concern for animal welfare is not sufficient and it can be questioned if consumers are really concerned about the welfare of animals or if the risks of animal welfare are not visible and relevant for them. Therefore, the motives for the interest in animal welfare should be further explored. These motives may deliver reasons for the inapplicability of the full value similarity model. If the interest in animal welfare is not based on perceived risk (e. g. food safety), but rather on values and altruistic motives then the concernment may be lower and therefore may not deliver a significant relationship between perceived risks and social trust. An additional explanation for the failure of parts of the model may be that participants were not able to relate the items used for the measurement of perceived risk with animal welfare, as half of them dealt with the use and risks of antibiotics and not with animal conditions per se.

Besides the issue of perceived benefit and risk, value similarity was the most impacting factor for social trust. This yields important implications for policy-makers and stakeholders in the agriculture industry who see to improve the social trust in farmers. Communication should underline similarities between consumers and farmers and therefore change the perceived picture of farmers in order to rebuild social trust. To change the image of farmers, there is on the one hand more information necessary on both sides. On the other hand, the presentation of farmers in the public should be such that consumers can reckon more value similarity with farmers. Furthermore, there is a need for farmers to know the values and goals of consumers. This knowledge would allow them to better act in accordance with the wishes of consumers.

Due to the higher impact on social trust in farmers observed for negative compared to positive messages, it is also important to reduce negative information about farmers. Interestingly, the perceived tendency of a message has a positive impact on social trust, but only around half of the impact of negative information. This result suggest that for rebuilding social trust in farmers requires a reduction of negative information as well a more positive perception of news that lend a favorable image to farmers are needed. In addition, the help of consumer associations is required as our paper shows that negative information by a consumer association has a higher impact than the positive information by the government.

An important finding of the regression analysis, however, is that the sender of information had only a weak impact on changing social trust. There are two explanations for this: First, most participants had problems to identify the sender and therefore the influence of the sender is not as expected. Another explanation could be that the sender of information is less important than the question whether the information is positive or negative. The effect of the sender should be further investigated by acknowledging the identification of the author of information in the analysis. In addition, a panel analysis identifying base trust and changes in trust may allow controlling for heterogeneity among experimental subjects.

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ANNEX: TRANSLATED MESSAGES

Government positive:

Germany as a pioneer in the matter of animal welfare

Germany takes a leading role regarding animal welfare in Europe. The modern techniques of animal husbandry employed in German agriculture allow to keep animals in a more animal-friendly manner than ever before. For example, ideally composed feed rations and bright barns foster animal welfare. Moreover, husbandry systems fundamentally changed and improved over the last years. Already today, 86 percent of all laying hens in Germany live in barn, free range or organic laying systems. In other EU-states still significantly more laying hens are kept in enriched cage systems.

The German government wants to stay a pioneer in the matter of animal welfare also in the future and is working on new ways to further improve animal husbandry together with German agriculture.

Government negative:

The attitude towards animal welfare has to change

Christian Schmidt, federal minister of Food and Agriculture, wants animals to be better off at the end of his legislature than they are today. Since 2002, animal welfare is embodied as a national goal in the German constitution. “It’s time that we agree on a common understanding of what this concretely means, for example for animal husbandry”, says Schmidt. He aims to further strengthen animal protection, as well as to take legislative action where necessary. Dealing with animal welfare can’t stay a matter of fine words, as it unfortunately has frequently been the case so far. Policy makers want to develop assessable and clear indicators that set goals for agriculture and make the success of voluntary initiatives measurable.

For Schmidt, “Everyone has to take responsibility – the state by providing boundary conditions that foster animal welfare, the agriculturists that put those conditions into practice and we as consumers that participate in decision making at the counter.”

Consumer association positive:

Chairman of the Federation of German Consumer Organizations stresses advancements in animal husbandry

Modern agriculture, animal husbandry in large stocks and industrial processing of animals is “not bad in itself”, emphasized the Chairman of the Federation of German Consumer Organizations (vzbv) last week at the consumer policy forum of his federation in Berlin. He added that the agriculture in Germany “thank God [was] not anymore at 1800 levels”. Farm animals are substantially better off than they were in the past. The chairman advocated that communication conveyed a more realistic image of today’s agriculture to consumers. He argued that it was misleading for the consumer if, particularly with regard to animal husbandry, “an outdated image of agriculture that doesn’t exist anymore” was drawn. The chairman stressed that this should be avoided.

Consumer association negative:

The myth of animal-friendly husbandry

The meat industry increasingly advertises “animal-friendly” husbandry – but what does that actually mean for the welfare of animals? Even though alternative animal husbandry systems, such as free range or organic systems for laying hens, seem to be more animal-friendly at first sight, they don’t guarantee that animals are actually better off. Behavioral disorders, diseases and pain are very common in husbandry of agricultural livestock. Pigs nibble of each other’s tails as a result of stress, cows have their milk pumped out of ill udders, and in poultry houses cannibalism is “normal”. Lack of care and bad management cause a great number of avoidable

illnesses and deaths of animals – this is true for all animal husbandry systems, whether organic or conventional.

This is why we demand legal objectives for animal health: Husbandry systems adapted to animals' needs must become the general legal standard. All inspection results about husbandry conditions and medical data must be published. Violations must be penalized consistently.