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The relationship between citizens' perceptions of farmers and the overall assessment of farm animal husbandry in Germany: a case of four animal types and two production systems

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ABSTRACT

Citizens' perceptions of farmers are considered one of the most important factors influencing the overall assessment of livestock production. Therefore, this study aims to explore this relationship considering four different types of animals: Dairy cows, fattening pigs, broilers and laying hens for both conventional and organic farming systems. In analyzing the data, a contingency table analysis with chi-square test was performed. The values of the adjusted residuals were used as a post hoc test. The results showed that each of the five perception statements was significantly associated with the assessment of conventional and organic livestock production for all types. The results of this study are useful for understanding the overall assessment of the types and systems studied and for planning future research.

Keywords: farm animal husbandry, perception, overall assessment

1 Introduction

Farm animal husbandry has long been criticised by numerous groups in society. The reasons for this, as well as possible strategies for solving it, are therefore being intensively studied by scientists around the world. Extensive research has been conducted with various stakeholders on perceptions, expectations, attitudes, willingness to pay and much more (e.g. Yunes et al., 2017; Sato et al., 2017; Cardoso et al., 2017; Roosen et al., 2018; Christoph-Schulz and Rovers, 2020; Ritter et al., 2020; Vissers et al., 2021; Hossain et al., 2021). The results offered a number of valuable insights into how farmers and citizens/consumers, as well as other stakeholders, view various aspects of the management of different types of farm animals and what issues are not yet known and need to be addressed. It has been shown that respondents perceive diverse types of farm animal husbandry differently (e.g. Christoph-Schulz et al., 2019b). When it comes to the overall evaluation of specific production types and systems, aspects related to the concept of farm animal welfare are crucial for most respondents (e.g. Boogaard et al., 2011). Farm animal welfare is a concept that encompasses various dimensions of animal well-being, such as appropriate animal behaviour, stable emotional state, and physical health (Spigarelli et al., 2021). Although there are various actors that can contribute to farm animal welfare, the farmer is a key actor who can directly implement important standards to ensure farm animal welfare (Balzani and Hanlon, 2020).

A survey conducted in Germany found that 43% of respondents believe that farmers are primarily responsible for ensuring adequate social standards, while 26.8% believe that this is the responsibility of the state. However, 21.5% believed that consumers should assume this responsibility (Roosen et al., 2018). The results of group discussions conducted with German farmers by Wildraut and Mergenthaler (2018) showed that farmers primarily associate animal welfare with health traits and biological performance. Although the role of farmers in ensuring good conditions for their animals is crucial, the expectations and demands of citizens also play an important role, because ultimately they purchase and consume these products. Therefore, it is important to know how citizens perceive and evaluate the different types of production and systems of animal husbandry as

well as the farmers who work in these systems. A study conducted by Christoph-Schulz and Rovers (2020) found that 80% of respondents thought that broiler farming should be improved to a greater or lesser extent. The same was said by 79% of respondents for laying hens, 76% of respondents for fattening pigs and 62% of respondents for dairy cows. Kühl et al. (2018) published a study in which German citizens rated different ways of keeping dairy cows, fattening pigs, and broilers. For all animal species, respondents rated confinement with grazing as the most positive type of husbandry. Yunes et al. (2017) investigated Brazilian citizens' opinions and attitudes towards farm animal production systems. Results revealed that respondents prefere cage-free, free-range and natural production systems. The study also showed that participants were concerned about farming systems that limit the movement or expression of natural behaviours as well as those in which animals suffer. Christoph-Schulz (2021) used group discussions and an online survey to investigate how German citizens perceive the keeping of beef cattle and dairy cows. The results of the group discussions showed that three topics were central to the discussion: Medication, feeding, and availability of space. Respondents thought that dairy cows receive antibiotics, while they were unsure if this was also the case for beef cattle. No significant differences were found between the two production types in terms of feeding. Respondents believe beef cattle is grazed more often than dairy cows. Regarding medication, respondents believe that the use of medication is critical. Respondents believe that animals do not receive a varied diet, and they slightly disagreed with the statement that animals have enough space. Sato et al. (2017) examined U.S. citizens' views of their ideal swine operation. The ideal farm is seen as profitable, clean, and with optimal sanitary conditions. Aspects such as animal care, including freedom of movement, feeding, contact with the outdoors, absence of suffering and pain, avoidance of chemicals to increase production, as well as farm size, environmental regulations, and worker rights are cited as important factors. Christoph-Schulz et al. (2019a) published a study on the perceptions of German citizens regarding the keeping of laying hens and broilers using factor and cluster analyzes. Proponents and opponents were identified for both types of production. Other groups included moderate proponents in the case of laying hens and contradictors and acceptors in the case of broiler husbandry. Rovers et al. (2019) investigated how citizens perceive the importance of stable-related and animal-related aspects of keeping fattening pigs, dairy cows, and laying hens. For all three production types, space per animal and access to outdoor space were the aspects selected as most important by the highest percentage of respondents, while manipulable materials were selected as least important by the highest percentage of respondents in all three cases. For animal-related aspects, a variety of feeds were selected as the most important aspect for all three production types by the highest percentage of respondents. The aspect no imported food was least important for the highest percentage of respondents for fattening pigs and laying hens, as was the aspect no amputations or surgeries for dairy cows.

The summary of the literature raises the following research questions (RQs):

RQ 1: What is the citizens' overall assessment of the husbandry conditions of the different types of animals (dairy cows, fattening pigs, laying hens, broilers) and husbandry systems (conventional versus organic)?

RQ 2: What is the citizens' perception of farmers?

RQ 3: What is the relationship between the citizens' perceptions of farmers practicing a particular type of production and the overall assessment of a particular type of production and system?

The overall aim of this paper is to explore the relationship between citizens' perceptions of farmers and their overall assessment of dairy cow, fattening pig, laying hen, and broiler husbandry for both conventional and organic systems.

2 Materials and methods

An online survey was conducted with a total sample of 2000 participants divided into four subgroups of 500 respondents each. It was conducted between May and June 2021 in Germany. The survey was conducted with a highly representative sample of the German population in terms of some sociodemographic characteristics for both the total sample and the subsamples (see Appendix, Table A1. Description of the sample).

The questionnaire included, among others, questions on the participants' perception of farm animal husbandry of different types (dairy cows, fattening pigs, laying hens, broilers) and systems of housing (conventional versus organic) as well as an overall assessments of mentioned production types and systems. For this study, we used

five perceptual items from item batteries, related to the respondents' perception of different farmer types (farmers of dairy cows, fattening pigs, laying hens, broilers).

Perceptions and overall assessments of production types and systems were measured on a 7-point Likert scale (1- needs much improvement/strongly disagree; 7-completely satisfied/ strongly agree) with the additional response option (8) I cannot judge. For the purposes of this study, we combined the 7-point Likert scale responses into new categories with the following responses: 1-in need of improvement/rejection; 2-neither nor/undecided; 3-satisfactory/approval; 4-I cannot judge.

Data was analysed using SPSS statistical software. To examine the relationship between outcome variables, we used contingency table analysis with the chi-square test. We adhered to two assumptions of the chi-square test: a) there should be no cells with an expected value/number less than 1, and b) there should be no more than 20% of cells with expected values/number less than 5 (see McHugh, 2013). To test which cells (response combinations) contribute more and which contribute less to the significant relationship between the variables under study, we applied adjusted residuals as a post hoc test (see Agresti, 2013). Adjusted residuals greater than 2 or less than - 2 indicate the significant contribution of the cell (response combination) (see Sharpe, 2015). The higher the value of the adjusted residuals for a given cell, the greater the contribution of that cell to the chi-square value (Ebbers et al., 2016). Cramer's V value has been used as a measure of strength between the variables under study (see Acock and Stavig, 1979). It is interpreted as follows: below 0.10 negligible association, 0.1 and below 0.20 weak association, 0.20 and below 0.40 moderate association, 0.40 and below 0.60 relatively strong association, 0.60 and below 0.80 strong association, 0.80 and up to 1.00 very strong association (see Kotrlik et al., 2011).

3 Results

3.1 Descriptive results

This section presents the descriptive results of the study: Items used to measure the overall assessment of four farm animal types and two systems and citizens' perceptions of farmers.

3.1.1 Evaluation of the husbandry of four different farm animal types in two housing systems

The results of the survey show that at least one third of all respondents (n= 2000) believe that conditions need to be improved for all animal types as well as for both production systems (see Figure 1). Respondents are more satisfied with the organic farming system than with the conventional one for all animal types. Regarding the individual farming systems, the respondents think that the conventional farming of broilers and fattening pigs should be improved the most, while they are most satisfied with the conditions of organic farming of dairy cows. Although organic farming is rated better than conventional farming, a considerable proportion of respondents believe that some improvements are still needed. According to the respondents, the greatest need for improvement in organic farming is in the rearing of organic broilers, while they are most satisfied with the conditions in the organic rearing of dairy cows, with the organic rearing of laying hens and fattening pigs in between. It is also worth mentioning the percentage of respondents who were not able to assess the current state of rearing of certain types of domestic animals. This mainly concerned organic farming in all four farm types (Figure 1).

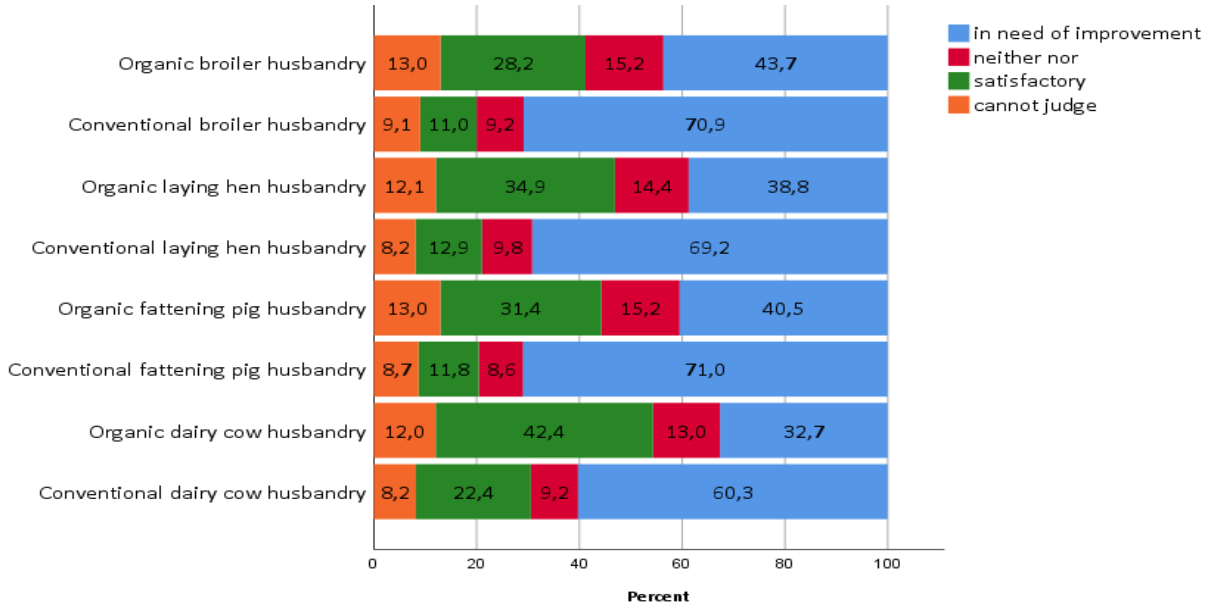

Figure 1. Respondents' assessment of four animal types and two systems

3.1.2 Citizens' perceptions regarding farmers

To examine respondents' perceptions of farmers, statements about farm animal farmers were used. For this purpose, the sample was divided into four groups of almost equal size, and each group was presented only with the assessment of farmers who keep a particular type of animal.

3.1.2.1. Fattening pigs

Regarding respondents' perceptions of farmers who raise fattening pigs, it is evident that respondents are dissatisfied with the role of farmers with this type of animal. Almost 60% of the respondents stated that individual farmers keep too many pigs. Almost 50% think that farmers have too little contact with their animals or that farmers' activities are not properly controlled. And almost 49% of respondents think that farmers are not the only ones who benefit from this type of breeding. More than 12% of the respondents were not able to evaluate these 5 presented statements (Figure 2).

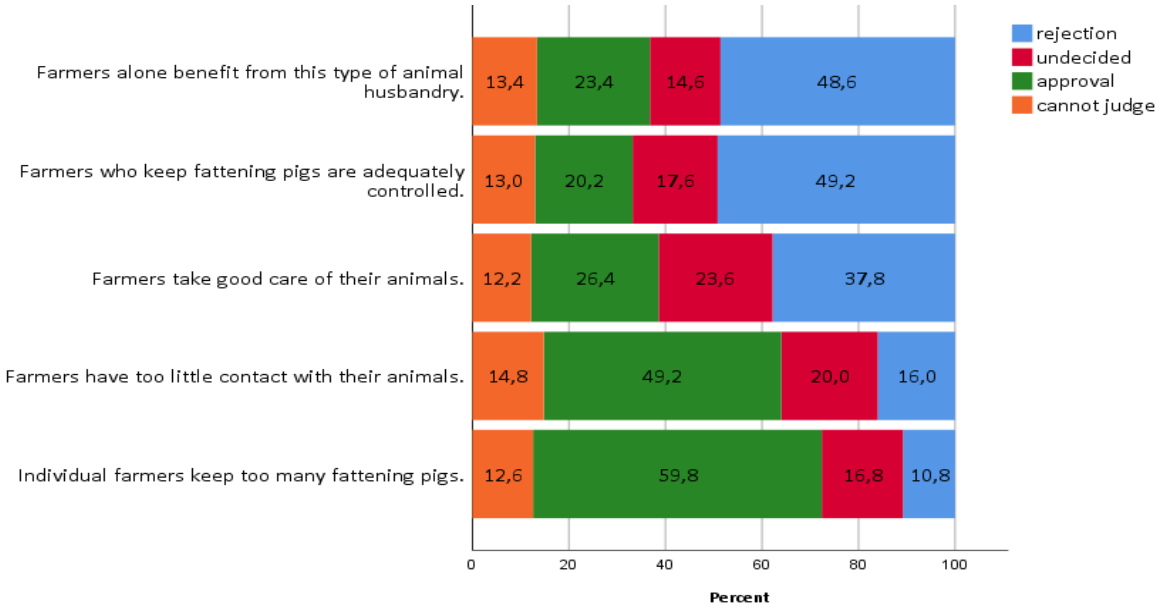

Figure 2. Respondents' perceptions of pig fattening farmers

3.1.2.2. Dairy cows

Regarding dairy cows, the respondents' perceptions suggests that they believe the role of farmers in the farming process could be better. Although a higher percentage of respondents than for fattening pigs believe that farmers are properly controlled and take good care of their animals, almost 20% and 37% of respondents believe that this is not the case. The fact that more than 45% of respondents believe that individual farmers keep too many animals and that more than a third of them believe that they have too little contact with their animals suggests that the role of farmers in the production process could be better. It is important to mention that between 17% and 26% of the respondents remained undecided regarding the evaluation of farmers with this type of animals. Between 8% and 12.5% of the respondents stated that they could not answer the question (Figure 3).

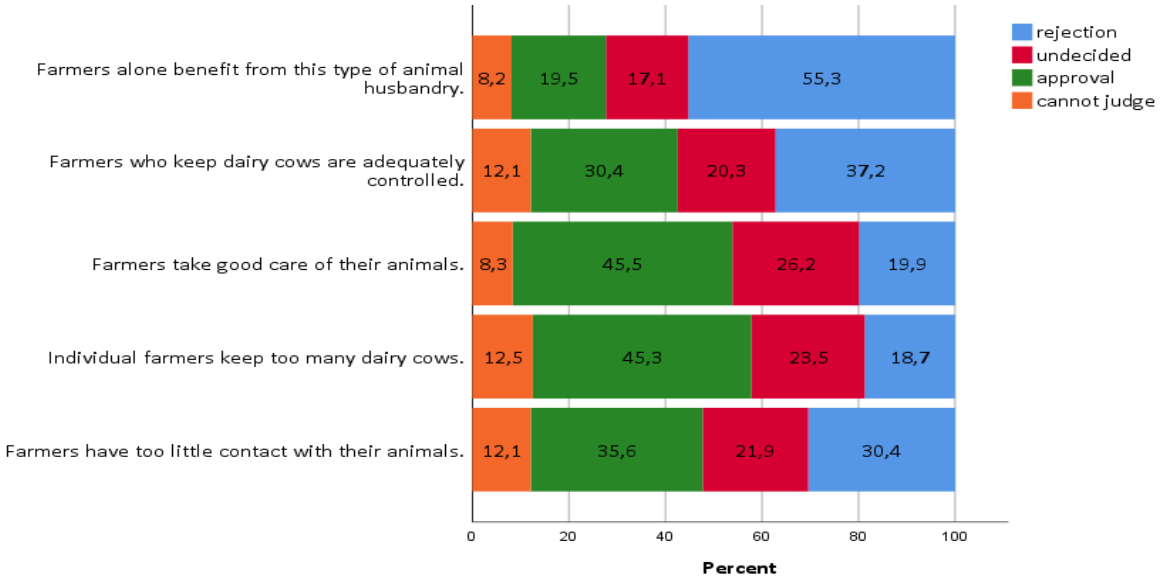

Figure 3. Respondents' perception of dairy cow farmers

3.1.2.3. Broilers

When looking at the perceptions of broiler farmers, it appears that many more respondents are dissatisfied with certain aspects related to farmers in this type of farming than in the farming of fattening pigs and dairy cows. This is particularly reflected in the number of animals kept by each farmer. More than 56% of respondents believe that the number of broilers kept by a single farmer is simply too high. Similarly, a considerable proportion of respondents, 48%, believe that farmers have too little contact with their animals and that farmers are not sufficiently controlled (48.9%) or that they do not take good care of their animals (44%). It is important to mention that between 13.4% and 18.4% of the respondents were not able to evaluate certain aspects related to farmers in broiler husbandry, and between 13% and 23.2% were undecided (Figure 4).

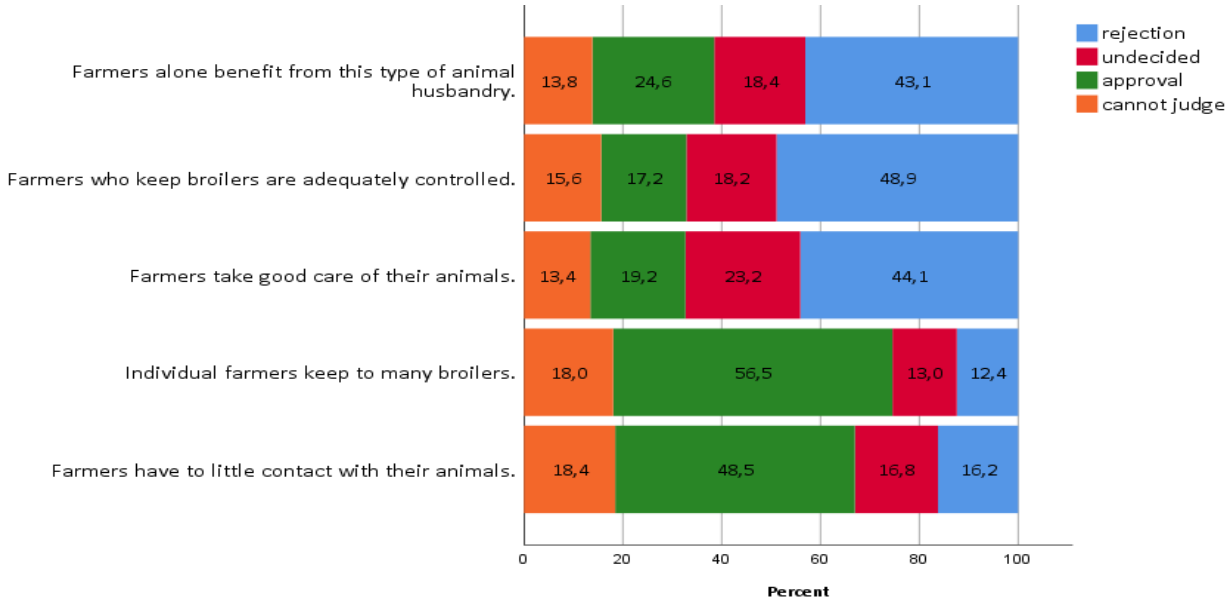

Figure 4. Respondents' perception of farmers in broiler farming

3.1.2.4. Laying hens

As with broilers, respondents perceive the position of farmers who keep laying hens more negatively than those who keep fattening pigs or dairy cows. More than 60% of respondents believe that individual farmers keep too many laying hens, and more than half of them believe that farmers have too little contact with their animals. A slightly higher percentage of respondents (22%) than for broilers believe that farmers take good care of their animals. As with the previously mentioned husbandry practices, a notable percentage of respondents were undecided when evaluating aspects related to farmers. For example, more than 27% of respondents were undecided about whether farmers take good care of their animals, and 19% were undecided about whether only farmers benefit from this type of farming. In addition, between 11.8% and 15.7% of respondents could not rate the statements presented (Figure 5).

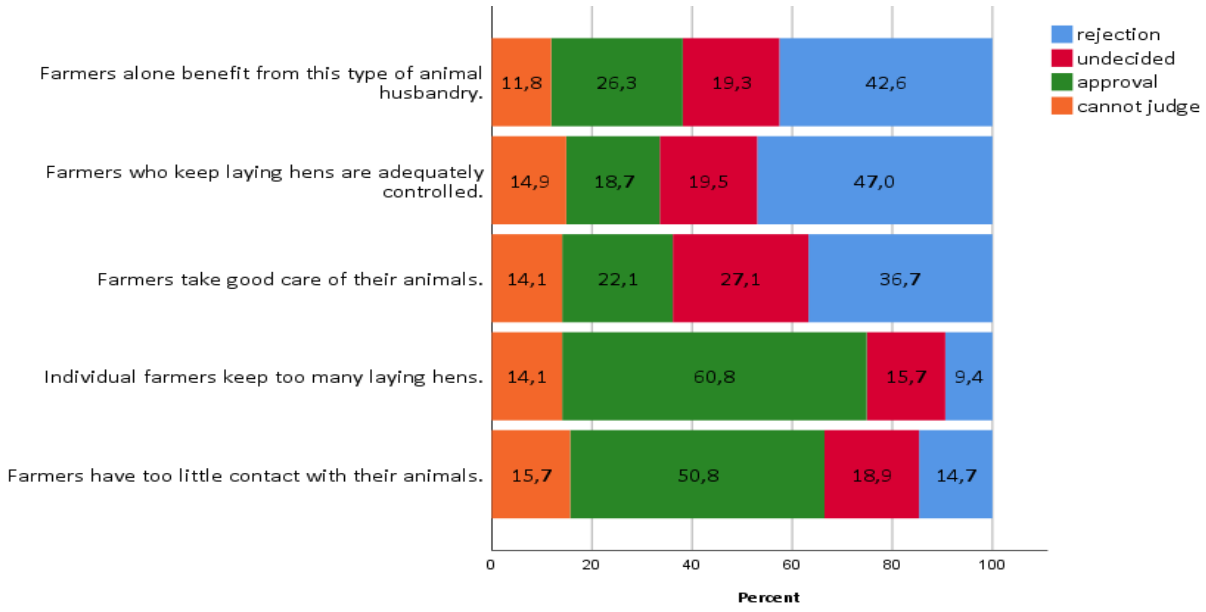

Figure 5. Respondents' perception of farmers in laying hen farming

3.2. Results of the tested relations

This section contains the results of the tested relationships between citizens' perceptions of farmers in a particular production and the overall assessment of production types and systems.

3.2.1 Relationship between citizens' perceptions of farmers and the overall assessment of conventional dairy cow husbandry

As can be seen in Table 1, all variables used to measure citizens' perceptions of dairy farmers were significantly related to their overall evaluation of dairy cow farming. Almost every perception category was significantly associated with at least one evaluation category. The adjusted residuals show that respondents who could not rate the perception statements and dairy cow husbandry contributed most to the significance of the relationships. For the statement *„Farmers have too little contact with their animals (dairy cows)"* 76.5% of respondents who agree with this statement think that dairy cow husbandry should be improved. At the same time, 54.2% of respondents who disagree with this statement believe that this type of production should be improved. A considerable percentage of respondents who cannot judge whether farmers have too little contact with their animals (47.5%) nevertheless think that the keeping of dairy cows should be improved. 75.9% of respondents who think that individual farmers keep too many dairy cows and 53.4% of undecided respondents regarding this statement answered that dairy cow keeping should be improved. 42.9% of respondents who could not evaluate this statement thought the same. 94% of respondents who do not think that farmers take good care of their animals think that dairy cow husbandry should be improved. A considerable percentage of respondents who think that farmers take good care of their animals (50.2%) and respondents who cannot evaluate this statement (42.9%) also think that dairy cow husbandry should be improved. However, 36.7% of respondents who are satisfied with how farmers take care of their animals rate dairy cow husbandry as satisfactory. When it comes to the statement that farmers who keep dairy cows are adequately controlled, 83.4% of respondents who disagree with this statement, as well as 48.4% of respondents who agree with this statement and 44.3% of respondents who cannot evaluate this statement claim that dairy cow husbandry should be improved. There is also a considerable percentage of respondents (39.2%) who believe that farmers are well controlled in dairy cow farming and who are satisfied with this type of production. A considerable group of respondents (69.8%), who believe that farmers are not the only ones who benefit from this type of livestock production, demand that dairy cow farming should be improved. The same opinion is held by the group of respondents (43.9%) who cannot judge whether farmers are the only ones who benefit from this type of animal husbandry. The values of the Cramer's V indicate a moderate strength of the relationships between the tested variables. The strongest relationships were between the statements *„Farmers who keep dairy cows are adequately controlled"* and *„Farmers take good care of their animals"* and the overall assessment of conventional dairy cow husbandry (V= 0.319 and V= 0.315, respectively) (Table 1).

Table 1.
Citizens' perception of dairy farmers and conventional dairy cow husbandry

Perception		Conventional dairy cow husbandry			
		in need of improvement	neither nor	satisfactory	cannot judge
Farmers have too little contact with their animals (dairy cows).	rejection	54.2% (83) a.r.= -2.7	6.5% (10) a.r.= -1.2	34.6% (53) a.r.= 4.7	4.6% (7) a.r.= -1.2
	undecided	61.8% (68) a.r.= -0.3	19.1% (21) a.r.= 4.3	16.4% (18) a.r.= -1.5	2.7% (3) a.r.= -1.8
	approval	76.5% (137) a.r.= 4.7	6.1% (11) a.r.= -1.5	15.1% (27) a.r.= -2.7	2.2% (4) a.r.= -2.9
	cannot judge	47.5% (29) a.r.= -2.7	3.3% (2) a.r.= -1.6	18.0% (11) a.r.= -0.7	31.1% (19) a.r.= 8.3
	X^2= 109.141; df= 9; p= 0.000; V= 0.269				
Individual farmers keep too many dairy cows.	rejection	57.4% (54) a.r.=-1.2	5.3% (5) a.r.= -1.3	34.0% (32) a.r.= 3.2	3.2% (3) a.r.= -1.5
	undecided	53.4% (63) a.r.= -2.5	14.4% (17) a.r.= 2.5	28.8% (34) a.r.= 2.2	3.4% (4) a.r.= -1.6
	approval	75.9% (173) a.r.= 5.4	8.3% (19) a.r.= -0.3	13.2% (30) a.r.= -4.2	2.6% (6) a.r.= -3.2
	cannot judge	42.9% (27) a.r.= -3.5	4.8% (3) a.r.= -1.2	20.6% (13) a.r.= -0.2	31.7% (20) a.r.= 8.6

	X^2= 105.800; df= 9; p= 0.000; V= 0.265				
Farmers take good care of their animals.	rejection	94.0% (94) a.r.= 7.2	2.0% (2) a.r.= -2.7	2.0% (2) a.r.= -5.3	2.0% (2) a.r.= -2.1
	undecided	68.2% (90) a.r.= 1.4	16.7% (22) a.r.= 3.7	11.4% (15) a.r.= -3.3	3.8% (5) a.r.= -1.5
	approval	50.2% (115) a.r.= -5.4	8.3% (19) a.r.= -0.3	36.7% (84) a.r.= 7.5	4.8% (11) a.r.= -1.5
	cannot judge	42.9% (18) a.r.= -2.8	2.4% (1) a.r.= -1.5	19.0% (8) a.r.= -0.4	35.7% (15) a.r.= 8.0
	X^2= 149.596; df= 9; p= 0.000; V= 0.315				
Farmers who keep dairy cows are adequately controlled.	rejection	83.4% (156) a.r.= 7.3	3.7% (7) a.r.= -3.1	11.2% (21) a.r.= -4.4	1.6% (3) a.r.= -3.5
	undecided	58.8% (60) a.r.= -1.0	21.6% (22) a.r.= 5.1	17.6% (18) a.r.= -1.1	2.0% (2) a.r.= -2.1
	approval	48.4% (74) a.r.= -4.5	7.2% (11) a.r.= -0.8	39.2% (60) a.r.= 6.3	5.2% (8) a.r.= -0.8
	cannot judge	44.3% (27) a.r.= -3.2	6.6% (4) a.r.= -0.6	16.4% (10) a.r.= -1.1	32.8% (20) a.r.= 8.8
	X^2= 153.880; df= 9; p= 0.000; V= 0.319				
Farmers alone benefit from this type of animal husbandry.	rejection	69.8% (194) a.r.= 3.5	6.1% (17) a.r.= -2.3	21.9% (61) a.r.= 0.2	2.2% (6) a.r.= -4.4
	undecided	54.7% (47) a.r.= -1.8	18.6% (16) a.r.= 3.6	19.8% (17) a.r.= -0.5	7.0% (6) a.r.= 0.2
	approval	59.2% (58) a.r.= -0.9	9.2% (9) a.r.=0.2	27.6% (27) a.r.= 1.6	4.1% (4) a.r.= -1.1
	cannot judge	43.9% (18) a.r.= -2.6	4.9% (2) a.r.= -0.9	9.8% (4) a.r.= -1.9	41.5% (17) a.r.= 9.4
	X^2= 107.745; df= 9; p= 0.000; V= 0.267				

3.2.2 The relationship between citizens' perceptions of farmers and the overall assessment of organic dairy cow husbandry

Table 2. shows that all variables used to measure citizens' perceptions of dairy farmers were significantly related to their overall evaluation of organic dairy cow farming. As in the case of dairy cow husbandry, the adjusted residuals show that respondents who could not rate the perception statements and organic dairy cow farming contributed most to the significance of the relationships. The results show that a significant percentage of respondents (49.7%) who disagree with the possibility that farmers have too little contact with their animals are satisfied with organic dairy cow husbandry. 41.9% of respondents who believe that farmers really have too little contact with their cows think that organic dairy cow husbandry needs to be improved. Regarding the statement *„Individual farmers keep too many dairy cows“*, 40.8% of respondents who agree with this statement would improve organic dairy farming, as would 43.6% of respondents who disagree with this statement. 60% of respondents who think that farmers do not take good care of their cows think that this production should be improved. A significant percentage of respondents (53.7%) who think that farmers take good care of their animals are satisfied with organic dairy cow farming. 56.9% of respondents who agree with the statement that farmers who keep dairy cows are adequately controlled are satisfied with organic dairy cow farming. 46% of respondents who disagree with this statement believe that this production should be improved. A significant group of respondents (46%) who believe that farmers alone do not benefit from this type of livestock production answered that organic dairy cow husbandry is satisfactory. The strongest relationship was found between the perception statement *„Farmers take good care of their animals“* and the overall assessment of organic dairy cow husbandry (V= 0.298). However, the strength of all relationships was moderate (Table 2).

Table 2.
Citizens' perception of dairy farmers and organic dairy cow husbandry

Perception		Organic dairy cow husbandry			
		in need of improvement	neither nor	satisfactory	cannot judge
Farmers have too little contact with their animals (dairy cows).	rejection	28.8% (44) a.r.= -1.6	13.1% (20) a.r.= -0.5	49.7% (76) a.r.= 2.3	8.5% (13) a.r.= -0.6
	undecided	34.5% (38) a.r.= 0.1	22.7% (25) a.r.= 2.9	38.2% (42) a.r.= -0.9	4.5% (5) a.r.= - 2.1
	approval	41.9% (75) a.r.= 2.8	12.3% (22) a.r.= -1.0	40.8% (73) a.r.= -0.4	5.0% (9) a.r.= -2.6
	cannot judge	23.0% (14) a.r.= -1.9	8.2% (5) a.r.= -1.5	32.8% (20) a.r.= -1.5	36.1% (22) a.r.= 7.4
	X^2= 69.027; df= 9; p= 0.000; V= 0.214				
Individual farmers keep too many dairy cows.	rejection	43.6% (41) a.r.= 2.2	8.5% (8) a.r.= -1.8	38.3% (36) a.r.= -0.8	9.6% (9) a.r.= -0.1
	undecided	20.3% (24) a.r.= -3.6	23.7% (28) a.r.= 3.3	51.7% (61) a.r.= 2.5	4.2% (5) a.r.= -2.3
	approval	40.8% (93) a.r.= 2.9	11.8% (27) a.r.= -1.4	43.4% (99) a.r.= 0.6	3.9% (9) a.r.= -4.0
	cannot judge	20.6% (13) a.r.= -2.4	14.3% (9) a.r.= 0.0	23.8% (15) a.r.= -3.1	41.3% (26) a.r.= 9.0
	X^2= 109.775; df= 9; p= 0.000; V= 0.270				
Farmers take good care of their animals.	rejection	60.0% (60) a.r.= 6.1	10.0% (10) a.r.= -1.4	26.0% (26) a.r.= -3.6	4.0% (4) a.r.= -2.2
	undecided	31.8% (42) a.r.= -0.6	24.2% (32) a.r.= 3.8	39.4% (52) a.r.= -0.7	4.5% (6) a.r.= -2.3
	approval	26.6% (61) a.r.= -3.2	11.8% (27) a.r.= -1.5	53.7% (123) a.r.= 4.9	7.9% (18) a.r.= -1.3
	cannot judge	19.0% (8) a.r.= -2.1	7.1% (3) a.r.= -1.4	23.8% (10) a.r.= -2.5	50.0% (21) a.r.= 9.2
	X^2= 134.270; df= 9; p= 0.000; V= 0.298				
Farmers who keep dairy cows are adequately controlled.	rejection	46.0% (86) a.r.= 4.4	11.2% (21) a.r.= -1.5	38.0% (71) a.r.= -1.4	4.8% (9) a.r.= -2.9
	undecided	32.4% (33) a.r.= -0.4	28.4% (29) a.r.= 4.6	35.3% (36) a.r.= -1.5	3.9% (4) a.r.= -2.2
	approval	26.1% (40) a.r.= -2.5	8.5% (13) a.r.= -2.5	56.9% (87) a.r.= 4.5	8.5% (13) a.r.= -0.6
	cannot judge	19.7% (12) a.r.= -2.5	14.8% (9) a.r.= 0.1	27.9% (17) a.r.= -2.4	37.7% (23) a.r.= 7.9
	X^2= 103.716; df= 9; p= 0.000; V= 0.262				
Farmers alone benefit from this type of animal husbandry.	rejection	37.1% (103) a.r.= 1.6	10.8% (30) a.r.= -2.5	46.0% (128) a.r.= 2.1	6.1% (17) a.r.= -3.0
	undecided	24.4% (21) a.r.= -2.1	25.6% (22) a.r.= 3.3	39.5% (34) a.r.= -0.5	10.55 (9) a.r.= 0.2
	approval	38.8% (38) a.r.= 1.1	15.3% (15) a.r.= 0.3	41.8% (41) a.r.= 0.0	4.1% (4) a.r.= -2.1
	cannot judge	22.0% (9) a.r.= -1.7	12.2% (5) a.r.= -0.4	19.5% (8) a.r.= -3.0	46.3% (19) a.r.= 8.2
	X^2= 85.277; df= 9; p= 0.000; V= 0.238				

Note: a.r. – adjusted residual; V – Cramer's V

3.2.3 The relationship between citizens' perceptions of farmers and the overall assessment of conventional fattening pig husbandry

All variables used to measure citizens' perceptions of fattening pig farmers were significantly related to their overall evaluation of fattening pig farming (Table 3). As in the previous two cases, the adjusted residuals show that respondents who could not rate the perception statements and fattening pig management made the strongest contribution to the significance of the relationships. 82.1% of the respondents who think that farmers have too little contact with their animals believe that fattening pig husbandry should be improved. Also, 37.8% of respondents who could not assess whether farmers have too little contact with their fattening pigs believe that this type of production should be improved. Regarding the statement *„Individual farmers keep too many fattening pigs“*, it can be seen that regardless of the respondents' answers, a considerable number of respondents from all categories would improve fattening pig production. 91.5% of respondents who think that farmers do not take good care of their fattening pigs think that this production should be improved. The same is true for the 59.1% of respondents who think that farmers take good care of their animals and for 34.4% of the respondents who cannot evaluate this production. Regarding the statement that farmers who keep fattening pigs are adequately controlled, 90.2% of respondents who disagree with this statement would improve fattening pig production, as well as a significant percentage of respondents who agree with this statement (51.5%). There is also a significant percentage of respondents (34.7%) who believe that farmers are adequately controlled in this type of production and who believe that fattening pig production is satisfactory. 81.1% of respondents who disagree with the statement that only farmers benefit from this type of animal husbandry believe that fattening pig husbandry should be improved. A relatively strong relationship was found between the statement *„Farmers who keep fattening pigs are adequately controlled“* and the overall evaluation of conventional fattening pig farming (V= 0.421), and between the statement *„Farmers take good care of their animals“* and the overall evaluation (V= 0.415). All other relationships were moderate (Table 3).

Table 3.
Citizens' perception of fattening pig farmers and conventional fattening pig husbandry

Perception		Conventional fattening pig husbandry			
		in need of improvement	neither nor	satisfactory	cannot judge
Farmers have too little contact with their animals (fattening pigs).	rejection	70.0% (56) a.r.= -0.2	7.5% (6) a.r.= 0.0	18.8% (15) a.r.= 2.0	3.8% (3) a.r.= -1.9
	undecided	68.0% (68) a.r.= -0.7	15.0% (15) a.r.= 3.2	14.0% (14) a.r.= 0.6	3.0% (3) a.r.= -2.5
	approval	82.1% (202) a.r.= 5.5	5.7% (14) a.r.= -1.4	10.2% (25) a.r.= -1.4	2.0% (5) a.r.= -5.7
	cannot judge	37.8% (28) a.r.= -6.8	2.7% (2) a.r.= -1.7	9.5% (7) a.r.= -0.8	50.0% (37) a.r.= 12.8
	X^2= 179.153; df= 9; p= 0.000; V= 0.346				
Individual farmers keep too many fattening pigs.	rejection	50.0% (27) a.r.= -3.6	9.3% (5) a.r.= 0.6	31.5% (17) a.r.= 4.6	9.3% (5) a.r.= -0.1
	undecided	60.7% (51) a.r.= -2.2	21.4% (18) a.r.= 5.4	14.3% (12) a.r= 0.6	3.6% (3) a.r.= -2.1
	approval	85.3% (255) a.r.= 8.7	3.7% (11) a.r.= -3.9	8.7% (26) a.r.= -2.9	2.3% (7) a.r.= -6.7
	cannot judge	33.3% (21) a.r.= -7.0	4.8% (3) a.r.= -0.9	9.5% (6) a.r.= -0.7	52.4% (33) a.r.= 12.3
	X^2= 214.477; df= 9; p= 0.000; V= 0.378				
Farmers take good care of their animals.	rejection	91.5% (173) a.r.= 7.9	2.6% (5) a.r.= -3.2	3.2% (6) a.r.= -4.8	2.6% (5) a.r.= -4.1
	undecided	69.5% (82) a.r.= -0.4	17.8% (21) a.r.= 4.9	9.3% (11) a.r.= -1.1	3.4% (4) a.r.= -2.6
	approval	59.1% (78) a.r.= -3.4	6.1% (8) a.r.= -0.7	31.1% (41) a.r.= 7.7	3.8% (5) a.r.= -2.6
	cannot judge	34.4% (21)	4.9% (3)	4.9% (3)	55.7% (34)

		a.r.= -6.7	a.r.= -0.8	a.r.= -1.9	a.r.= 13.1
	X^2= 258.025; df= 9; p= 0.000; V= 0.415				
Farmers who keep fattening pigs are adequately controlled.	rejection	90.2% (222) a.r.= 9.4	4.1% (10) a.r.= -2.8	4.1% (10) a.r.= -5.5	1.6% (4) a.r.= -6.0
	undecided	68.2% (60) a.r.= -0.6	14.8% (13) a.r.= 2.9	11.4% (10) a.r.= -0.3	5.7% (5) a.r.= -1.4
	approval	51.5% (52) a.r.= -4.8	10.9% (11) a.r.= 1.5	34.7% (35) a.r.= 7.7	3.0% (3) a.r.= -2.5
	cannot judge	30.8% (20) a.r.= -7.6	4.6% (3) a.r.= -0.9	9.2% (6) a.r.= -0.8	55.4% (36) a.r.= 13.4
	X^2= 265.620; df= 9; p= 0.000; V= 0.421				
Farmers alone benefit from this type of animal husbandry.	rejection	81.1% (197) a.r.= 4.9	3.7% (9) a.r.= -3.1	13.6% (33) a.r.= 0.9	1.6% (4) a.r.= -5.9
	undecided	67.1% (49) a.r.= -0.7	19.2% (14) a.r.= 4.2	6.8% (5) a.r.= -1.5	6.8% (5) a.r.= -0.9
	approval	73.5% (86) a.r.= 0.7	9.4% (11) a.r.= 0.9	15.4% (18) a.r.= 1.2	1.7% (2) a.r.= -3.3
	cannot judge	32.8% (22) a.r.= -7.3	4.5% (3) a.r.= -1.0	7.5% (5) a.r.= -1.3	55.2% (37) a.r.= 13.6
	X^2= 210.847; df= 9; p= 0.000; V= 0.375				

Note: a.r. – adjusted residual; V – Cramer's V

3.2.4 The relationship between citizens' perceptions of farmers and the overall assessment of organic fattening pig husbandry

As can be seen in Table 4, all perception variables were significantly related to the overall evaluation of organic fattening pig production. From the adjusted residuals, it can be concluded that respondents who could not rate the perception statements and fattening pig management made the strongest contribution to the significance of the associations. More than 50% of the respondents who could not rate the perception statements were also unable to rate organic fattening pig management (see Table 4). Regarding the statement *„Farmers have too little contact with their animals (fattening pigs)“,* 50.8% of the respondents who agreed with the statement answered that organic fattening pig management should be improved. The same answer came from 52.5% of respondents who think that individual farmers keep too many fattening pigs. There is a considerable number of respondents who think that farmers do not take good care of their fattening pigs and who believe that this production should be improved (61.4%). However, there is also a considerable number of respondents who say the opposite (48.5%). 55.7% of respondents who believe that fattening pig farmers are not adequately controlled, as well as 32.7% of those who do, answered that this production system should be improved. Regarding the statement that only farmers benefit from this type of animal husbandry, a considerable number of respondents (27.4%) are undecided and also undecided whether organic fattening pig husbandry should be improved or not. The strength of all relationships was moderate. The strongest relationships were between perception statements regarding the farmers care of animals, adequate farmer control and the overall assessment of organic fattening pig management (V= 0.359 and V= 0.332, respectively) (Table 4).

Table 4.
Citizens' perception of fattening pig farmers and organic fattening pig husbandry

Perception		Organic fattening pig husbandry			
		in need of improvement	neither nor	satisfactory	cannot judge
Farmers have too little contact with their animals (fattening pigs).	rejection	36.3% (29) a.r.= -1.3	18.8% (15) a.r.= 1.1	33.8% (27) a.r.= 0.8	11.3% (9) a.r.= -0.5
	undecided	45.0% (45) a.r.= 0.5	19.0% (19) a.r.= 1.4	32.0% (32) a.r.= 0.5	4.0% (4) a.r.= -2.9
	approval	50.8% (125) a.r.= 3.6	13.4% (33) a.r.= -0.7	31.3% (77) a.r.= 0.7	4.5% (11) a.r.= -5.5

	cannot judge	20.3% (15) a.r.= -4.2	8.1% (6) a.r.= -1.7	17.6% (13) a.r.= -2.5	54.1% (40) a.r.= 11.5
	X^2= 140.429; df= 9; p= 0.000; V= 0.306				
Individual farmers keep too many fattening pigs.	rejection	35.2% (19) a.r.= -1.2	20.4% (11) a.r.= 1.3	29.6% (16) a.r.= 0.0	14.8% (8) a.r.= 0.5
	undecided	38.1% (32) a.r.= -1.0	28.6% (24) a.r.= 4.0	29.8% (25) a.r.= 0.0	3.6% (3) a.r.= -2.8
	approval	52.5% (157) a.r.= 5.4	10.4% (31) a.r.= -3.3	31.4% (94) a.r.= 1.0	5.7% (17) a.r.= -5.8
	cannot judge	9.5% (6) a.r.= -5.7	11.1% (7) a.r.= -0.8	22.2% (14) a.r.= -1.4	57.1% (36) a.r.= 11.3
	X^2= 156.551; df= 9; p= 0.000; V= 0.323				
Farmers take good care of their animals.	rejection	61.4% (116) a.r.= 6.5	12.2% (23) a.r.= -1.2	21.7% (41) a.r.= 0.2	4.8% (9) a.r.= -4.2
	undecided	42.2% (50) a.r.= -0.1	22.9% (27) a.r.= 2.9	30.5% (36) a.r.= 0.2	4.2% (5) a.r.= -3.2
	approval	31.1% (41) a.r.= -3.2	10.6% (14) a.r.= -1.5	48.5% (64) a.r.= 5.5	9.8% (13) a.r.= -1.2
	cannot judge	11.5% (7) a.r.= -5.3	14.8% (9) a.r.= 0.0	13.1% (8) a.r.= -3.0	60.7% (37) a.r.= 11.9
	X^2= 192.918; df= 9; p= 0.000; V= 0.359				
Farmers who keep fattenig pigs are adequately controlled.	rejection	55.7% (137) a.r.= 5.7	13.4% (33) a.r.= -0.7	28.5% (70) a.r.= -0.6	2.4% (6) a.r.= -6.8
	undecided	43.2% (38) a.r.= 0.1	17.0% (15) a.r.= 0.7	30.7% (27) a.r.= 0.2	9.1% (8) a.r.= -1.1
	approval	32.7% (33) a.r.= -2.3	14.9% (15) a.r.= 0.1	40.6% (41) a.r.= 2.7	11.9% (12) a.r.= -0.3
	cannot judge	9.2% (6) a.r.= -5.9	15.4% (10) a.r.= 0.2	16.9% (11) a.r.= -2.4	58.5% (38) a.r.= 11.8
	X^2= 164.977; df= 9; p= 0.000; V= 0.332				
Farmers alone benefit from this type of animal husbandry.	rejection	46.5% (113) a.r.= 1.6	14.8% (36) a.r.= 0.1	32.9% (80) a.r.= 1.5	5.8% (14) a.r.= -4.6
	undecided	41.1% (30) a.r.= -0.3	27.4% (20) a.r.= 3.4	24.7% (18) a.r.= -1.0	6.8% (5) a.r.= -1.6
	approval	49.6% (58) a.r.= 1.7	10.3% (12) a.r.= -1.5	35.9% (42) a.r.= 1.6	4.3% (5) a.r.= -3.2
	cannot judge	19.4% (13) a.r.= -4.2	7.5% (5) a.r.= -1.8	13.4% (9) a.r.= -3.1	59.7% (40) a.r.= 12.3
	X^2= 164.835; df= 9; p= 0.000; V= 0.331				

Note: a.r. – adjusted residual; V – Cramer's V

3.2.5 The relationship between citizens' perception of farmers and the overall assessment of conventional laying hen husbandry

Table 5 shows that all perception variables were significantly related to the overall evaluation of laying hen husbandry. The adjusted residuals show that respondents who could not rate the perception statements and laying hen husbandry made the largest contribution to the significance of the relationships and the chi-square value. A significant proportion of respondents who think that farmers have too little contact with their laying hens answered that this production should be improved (82.6%). The same was said by 54.3% of respondents who are undecided about whether farmers have too little contact with their laying hens and 46.2% of respondents who are unable to assess this question (see Table 5). 81.5% of respondents who stated that individual farmers keep too many laying hens believe that laying hen management needs to be improved. From the point of view of 50% of the respondents who are undecided and 38.6% of the respondents who cannot judge whether individual farmers keep too many laying hens, this production must be improved. 90.7% of

respondents who think that farmers do not take good care of their laying hens think that this type of production should be improved. The same is true for 47.3% of respondents who believe that farmers take good care of their animals. However, there is a significant number of respondents who believe that farmers take good care of their laying hens and who are satisfied with this type of production (34.5%). Regarding the statement that farmers who keep laying hens are adequately controlled, there are a considerable number of respondents who disagree with this statement (92.7%), as well as respondents who agree with this statement (32.3%) and believe that laying hen management neeeds to be improved. Also, 47.3% of respondents who could not assess this statement think that laying hen husbandry should be improved. 78.8% of respondents who do not think that only farmers benefit from this type of production stated that laying hen management should be improved. The same is true for 57.3% of respondents who are undecided whether only farmers benefit from this type of production and for 40.7% of those who cannot judge. The perception item *„Farmers who keep laying hens are adequately controlled"* and the overall assessment of conventional laying hen husbandry showed a relatively strong relationship (V= 0.446). All other relationships were moderate (Table 5).

Table 5.
Citizens' perception of laying hen farmers and conventional laying hen husbandry

Perception		Conventional laying hen husbandry			
		in need of improvement	neither nor	satisfactory	cannot judge
Farmers have too little contact with their animals (laying hens).	rejection	61.6% (45) a.r.= -1.4	13.7% (10) a.r.= 0.7	24.7% (18) a.r.= 3.6	0.0% (0) a.r.= -2.7
	undecided	54.3% (51) a.r.= -3.3	27.7% (26) a.r.= 5.5	14.9% (14) a.r.= 0.9	3.2% (3) a.r.= -1.9
	approval	82.6% (209) a.r.= 6.9	5.9% (15) a.r.= -3.9	9.5% (24) a.r.= -1.8	2.0% (5) a.r.= -5.1
	cannot judge	46.2% (36) a.r.= -4.6	7.7% (6) a.r.= -1.1	5.1% (4) a.r.= -2.0	41.0% (32) a.r.= 11.7
	X^2= 186.543; df= 9; p= 0.000, V= 0.353				
Individual farmers keep too many laying hens.	rejection	59.6% (28) a.r.= -1.4	14.9% (7) a.r.= 0.8	21.3% (10) a.r.= 2.0	4.3% (2) a.r.= -1.0
	undecided	50.0% (39) a.r.= -3.8	26.9% (21) a.r.= 4.7	20.5% (16) a.r.= 2.5	2.6% (2) a.r.= -1.9
	approval	81.5% (247) a.r.= 7.8	7.3% (22) a.r.= -3.7	9.6% (29) a.r.= -2.1	1.7% (5) a.r.= -6.5
	cannot judge	38.6% (27) a.r.= -5.8	10.0% (7) a.r.= -0.4	7.1% (5) a.r.= -1.4	44.3% (31) a.r.= 12.0
	X^2= 187.227; df= 9; p= 0.000; V= 0.354				
Farmers take good care of their animals.	rejection	90.7% (166) a.r.= 8.1	4.4% (8) a.r.= -3.8	2.2% (4) a.r.= -5.2	2.7% (5) a.r.= -3.3
	undecided	66.7% (90) a.r.= -0.5	19.3% (26) a.r.= 3.3	11.9% (16) a.r.= -0.1	2.2% (3) a.r.= -2.9
	approval	47.3% (52) a.r.= -5.4	16.4% (18) a.r.= 1.8	34.5% (38) a.r.= 8.2	1.8% (2) a.r.= -2.7
	cannot judge	47.1% (33) a.r.= -4.1	7.1% (5) a.r.= -1.2	2.9% (2) a.r.= -2.5	42.9% (30) a.r.= 11.6
	X^2= 232.761; df= 9; p= 0.000; V= 0.395				
Farmers who keep laying hens are adequately controlled.	rejection	92.7% (217) a.r.= 11.0	4.3% (10) a.r.= -4.7	2.1% (5) a.r.= -6.4	0.9% (2) a.r.= -5.5
	undecided	60.8% (59) a.r.= -1.8	25.8% (25) a.r.= 4.9	12.4% (12) a.r.= 0.1	1.0% (1) a.r.= -2.8
	approval	32.3% (30) a.r.= -8.3	19.4% (18) a.r.= 2.7	41.9% (39) a.r.= 9.8	6.5% (6) a.r.= -0.6
	cannot judge	47.3% (35) a.r.= -4.2	5.4% (4) a.r.= -1.8	5.4% (4) a.r.= -1.9	41.9% (31) a.r.= 11.6

	X^2= 296.549; df= 9; p= 0.000; V= 0.446				
Farmers alone benefit from this type of animal husbandry.	rejection	78.8% (167) a.r.= 4.3	10.4% (22) a.r.= -0.6	9.0% (19) a.r.= -1.8	1.9% (4) a.r.= -4.3
	undecided	57.3% (55) a.r.= -2.6	26.0% (25) a.r.= 5.0	15.6% (15) a.r.= 1.2	1.0% (1) a.r.= -2.8
	approval	72.5% (95) a.r.= 1.2	6.1% (8) a.r.= -2.2	19.1% (25) a.r.= 2.9	2.3% (3) a.r.= -2.8
	cannot judge	40.7% (24) a.r.= -4.9	3.4% (2) a.r.= -2.1	1.7% (1) a.r.= -2.6	54.2% (32) a.r.= 13.9
	X^2= 228.028; df= 9; p= 0.000; V= 0.391				

Note: a.r. – adjusted residual; V - Cramer's

3.2.6 The relationship between citizens' perception of farmers and the overall assessment of organic laying hen husbandry

All perception statements were significantly related to the overall evaluation of organic laying hen husbandry (Table 6). As in the case of the conventional production system, the adjusted residuals show that respondents who could not rate the perception statements and organic laying hen husbandry made the strongest contribution to the significance of the relationships. These response combinations also accounted for a significant proportion of respondents. The proportion of respondents who agree that farmers have too little contact with their laying hens and that organic laying hen management should be improved (41.9%) is similar to the proportion of respondents who agree with this statement and believe that this production is satisfactory (40.3%). 40.9% of respondents who think that individual farmers keep too many laying hens think that this organic production should be improved. Almost the same percentage (40.3%) of respondents who also agreed with this statement think that organic laying hen husbandry is satisfactory. Regarding the statement *„Farmers take good care of their animals“*, 53.6% of respondents who disagree with this statement believe that organic laying hen production should be improved. The opposite is believed by 62.7% of respondents who agree with this statement. There is a significant number of respondents who believe that farmers who keep laying hens are adequately controlled and that this production is satisfactory (62.4%), as well as respondents who believe that farmers are not adequately controlled and that this production consequently needs to be improved (49.6%). Regarding the statement that only farmers benefit from this type of husbandry, a significant number of respondents (48.9%) agree with this statement and believe that organic laying hen husbandry is satisfactory. The relationships between all tested variables were moderate. However, the strongest relationship was between the perception item regarding adequate control of farmers and the overall assessment of organic laying hen husbandry (V= 0.339) (Table 6).

Table 6.
Citizens' perception of laying hen farmers and organic laying hen husbandry

Perception		Organic laying hen husbandry			
		in need of improvement	neither nor	satisfactory	cannot judge
Farmers have too little contact with their animals (laying hens).	rejection	41.1% (30) a.r.= 0.9	9.6% (7) a.r.= -1.5	41.1% (30) a.r.= 1.0	8.2% (6) a.r.= -1.1
	undecided	28.7% (27) a.r.= -1.7	29.8% (28) a.r.= 4.3	38.3% (36) a.r.= 0.5	3.2% (3) a.r.= -3.0
	approval	41.9% (106) a.r.= 2.5	11.1% (28) a.r.= -2.6	40.3% (102) a.r.= 2.1	6.7% (17) a.r.= -3.8
	cannot judge	24.4% (19) a.r.= -2.4	16.7% (13) a.r.= 0.4	14.1% (11) a.r.= -4.4	44.9% (35) a.r.= 9.6
	X^2= 118.423; df= 9; p= 0.000; V= 0.282				
Individual farmers keep too many laying hens.	rejection	46.8% (22) a.r.= 1.5	2.1% (1) a.r.= -2.6	42.6% (20) a.r.= 1.0	8.5% (4) a.r.= -0.8
	undecided	29.5% (23)	32.1% (25)	33.3% (26)	5.1% (4)

		a.r.= -1.4	a.r.= 4.5	a.r.= -0.5	a.r.= -2.1
	approval	40.9% (124) a.r.= 2.5	12.9% (39) a.r.= -1.8	40.3% (122) a.r.= 2.5	5.9% (18) a.r.= -5.4
	cannot judge	18.6% (13) a.r.= -3.4	15.7% (11) a.r.= 0.1	15.7% (11) a.r.= -3.8	50.0% (35) a.r.= 10.4
	X^2= 136.374; df= 9; p= 0.000; V= 0.302				
Farmers take good care of their animals.	rejection	53.6% (98) a.r.= 6.0	13.1% (24) a.r.= -1.0	27.3% (50) a.r.= -3.1	6.0% (11) a.r.= -3.2
	undecided	30.4% (41) a.r.= -1.7	23.0% (31) a.r.= 2.9	38.5% (52) a.r.= 0.7	8.1% (11) a.r.= -1.7
	approval	22.7% (25) a.r.= -3.4	10.9% (12) a.r.= -1.4	62.7% (69) a.r.= 6.6	3.6% (4) a.r.= -3.1
	cannot judge	25.7% (18) a.r.= -2.0	12.9% (9) a.r.= -0.6	11.4% (8) a.r= -4.6	50.0% (35) a.r.= 10.4
	X^2= 164.778; df= 9; p= 0.000; V= 0.332				
Farmers who keep laying hens are adequately controlled.	rejection	49.6% (116) a.r.= 5.7	13.7% (32) a.r.= -0.9	30.8% (72) a.r.= -2.3	6.0% (14) a.r.= -4.0
	undecided	27.8% (27) a.r.= -2.0	28.9% (28) a.r.= 4.2	41.2% (40) a.r.= 1.2	2.1% (2) a.r.= -3.4
	approval	20.4% (19) a.r.= -3.6	8.6% (8) a.r.= -2.0	62.4% (58) a.r= 5.9	8.6% (8) a.r.= -1.2
	cannot judge	27.0% (20) a.r.= -1.8	10.8% (8) a.r.= -1.2	12.2% (9) a.r.= -4.6	50.0% (37) a.r.= 10.7
	X^2= 172.167; df= 9; p= 0.000; V= 0.339				
Farmers alone benefit from this type of animal husbandry.	rejection	39.2% (83) a.r.= 1.0	14.6% (31) a.r.= -0.3	38.2% (81) a.r.= 0.9	8.0% (17) a.r.= -2.5
	undecided	40.6% (39) a.r.= 0.9	25.0% (24) a.r.= 3.0	31.3% (30) a.r.= -1.1	3.1% (3) a.r.= -3.0
	approval	33.6% (44) a.r.= -0.8	10.7% (14) a.r.= -1.7	48.9% (64) a.r.= 3.6	6.9% (9) a.r.= -2.2
	cannot judge	27.1% (16) a.r.= -1.6	11.9% (7) a.r.= -0.8	6.8% (4) a.r.= -5.0	54.2% (32) a.r.= 10.5
	X^2= 129.407; df= 9; p= 0.000; V= 0.294				

Note: a.r. – adjusted residual; V – Cramer's V

3.2.7 The relationship between citizens' perception of farmers and the overall assessment of conventional broiler husbandry

Table 7 shows that all perceptual statements were significantly associated with the overall evaluation of broiler husbandry. Using the adjusted residuals, it can be seen that the strongest contribution to the significance of the relationships between the variables tested came from the respondents who could not evaluate the perception statements and broiler husbandry. More than 34% of respondents who could not rate the perception statements also could not evaluate broiler keeping (see Table 7). A significant proportion of respondents who thought that farmers have too little contact with their broilers (80.6%), a significant proportion of respondents who were undecided (54.8%), and a significant proportion of respondents who could not rate whether or not farmers have too little contact with their broilers (48.9%) believed that broiler husbandry should be improved. Regarding the statement *„Individual farmers keep too many broilers“*, a considerable percentage of respondents, regardless of how they judge this statement, think that broiler management should be improved. More than 90% of respondents who do not think farmers take good care of their broilers also think this production should be improved. Broiler management would also improve 39.6% of respondents who believe that farmers take good care of their animals and 35.8% of respondents who cannot judge. 86.1% of respondents who do not believe that broiler farmers are adequately supervised, as well as 47.7% of respondents who believe so, and 39.7% of respondents who could not judge this statement, also believe that broiler farming should be improved. A significant percentage of respondents who agree (77.2%)

and disagree (74.4%) that only farmers benefit from this type of animal production would improve this type of production. The strength of all relationships was moderate. However, the strongest relationship was found between the perception statement regarding the care of animals by the farmers and the overall evaluation of conventional broiler husbandry (V= 0.391) (Table 7).

Table 7.
Citizens' perception of broiler farmers and conventional broiler husbandry

Perception		Conventional broiler husbandry			
		in need of improvement	neither nor	satisfactory	cannot judge
Farmers have too little contact with their animals (broilers).	rejection	63.0% (51) a.r.= -1.0	14.8% (12) a.r.= 1.7	19.8% (16) a.r.= 1.9	2.5% (2) a.r.= -2.4
	undecided	54.8% (46) a.r.= -2.7	19.0% (16) a.r.= 3.2	16.7% (14) a.r.= 1.0	9.5% (8) a.r.= 0.0
	approval	80.6% (195) a.r.= 6.0	6.6% (16) a.r.= -2.2	10.3% (25) a.r.= -1.9	2.5% (6) a.r.= -5.2
	cannot judge	48.9% (45) a.r.= -4.2	4.3% (4) a.r.= -1.9	12.0% (11) a.r.= -0.4	34.8% (32) a.r.= 9.1
	X^2= 110.767; df= 9; p= 0.000; V= 0.272				
Individual farmers keep too many broilers.	rejection	56.5% (35) a.r.= -2.0	14.5% (9) a.r.= 1.4	25.8% (16) a.r.= 3.1	3.2% (2) a.r.= -1.8
	undecided	44.6% (29) a.r.= -4.2	23.1% (15) a.r.= 3.9	20.0% (13) a.r.= 1.7	12.3% (8) a.r.= 0.8
	approval	82.3% (232) a.r.= 8.0	6.0% (17) a.r.= -3.1	9.6% (27) a.r.= -2.7	2.1% (6) a.r.= -6.5
	cannot judge	45.6% (41) a.r.= -4.9	7.8% (7) a.r.= -0.7	11.1% (10) a.r.= -0.7	35.6% (32) a.r.= 9.2
	X^2= 134.905; df= 9; p= 0.000; V= 0.300				
Farmers take good care of their animals.	rejection	90.5% (199) a.r.= 9.7	4.1% (9) a.r.= -3.7	2.7% (6) a.r.= -6.1	2.7% (6) a.r.= -4.6
	undecided	65.5% (76) a.r.= -0.5	16.4% (19) a.r.= 2.8	11.2% (13) a.r.= -0.7	6.9% (8) a.r.= -1.1
	approval	39.6% (38) a.r.= -6.5	15.6% (15) a.r.= 2.2	40.6% (39) a.r.= 8.8	4.2% (4) a.r.= -2.0
	cannot judge	35.8% (24) a.r.= -6.0	7.5% (5) a.r.= -0.6	11.9% (8) a.r.= -0.3	44.8% (30) a.r.= 10.5
	X^2= 228.768; df= 9; p= 0.000; V= 0.391				
Farmers who keep broilers are adequately controlled.	rejection	86.1% (210) a.r.= 8.6	4.9% (12) a.r.= -3.5	5.3% (13) a.r.= -5.1	3.7% (9) a.r.= -4.4
	undecided	60.4% (55) a.r.= -1.6	20.9% (19) a.r.= 4.0	14.3% (13) a.r.= 0.3	4.4% (4) a.r.= -1.9
	approval	47.7% (41) a.r.= -4.3	14.0% (12) a.r.= 1.5	34.9% (30) a.r.= 6.5	3.5% (3) a.r.= -2.1
	cannot judge	39.7% (31) a.r.= -5.7	6.4% (5) a.r.= -1.0	12.8% (10) a.r.= -0.1	41.0% (32) a.r.= 10.2
	X^2= 184.082; df= 9; p= 0.000; V= 0.351				
Farmers alone benefit from this type of animal husbandry.	rejection	74.4% (160) a.r.= 2.9	11.6% (25) a.r.= 1.3	9.3% (20) a.r.= -2.3	4.7% (10) a.r.= -3.3
	undecided	63.0% (58) a.r.= -1.0	12.0% (11) a.r.= 0.8	18.5% (17) a.r.= 1.6	6.5% (6) a.r.= -1.1
	approval	77.2% (95) a.r.= 2.6	5.7% (7) a.r.= -1.7	16.3% (20) a.r.= 1.1	0.8% (1) a.r.= -3.8
	cannot judge	34.8% (24)	7.2% (5)	13.0% (9)	44.9% (31)

		a.r.= -6.3	a.r.= -0.7	a.r.= 0.0	a.r.= 10.7
	X^2= 129.314; df= 9; p= 0.000; V= 0.294				

Note: a.r. – adjusted residual; V - Cramer's V

3.2.8 The relationship between citizens' perception of farmers and the overall assessment of organic broiler husbandry

As can be seen in Table 8, all perception statements are significantly related to the overall evaluation of organic broiler production. As in the previous cases, the adjusted residuals show that respondents who could not judge the perception statements and organic broiler farming contributed most to the significance of the relationships. In all cases, more than 46% of respondents who could not rate a particular perception statement also could not assess organic broiler farming (see Table 8.). 46.3% of respondents who think that farmers have too little contact with their broilers answered that this production system should be improved. The same was concluded by 27.2% of respondents who could not judge whether farmers have too little contact with their animals. Regarding the statement *„Individual farmers keep too many broilers“*, a considerable number of respondents who agreed with this statement (48.6%) and those who could not judge this statement (24.4%) and were undecided about this statement (23.1%) think that the organic broiler production system should be improved. 54.1% of the respondents who do not believe that farmers take good care of their animals stated that organic broiler management should be improved. However, there is a significant percentage of respondents (55.2%) who believe that farmers take good care of their broilers and are satisfied with the production. 54.7% of respondents who believe that broiler farmers are well controlled stated that they are satisfied with organic broiler production. On the other hand, 51.6% of respondents who believe that farmers are not properly controlled answered that organic broiler production should be improved. A significant percentage of respondents believe that only farmers benefit from this type of production and that organic broiler production should be improved (48.8%). However, 34.4% of respondents who believe that not only farmers benefit from this type of production answered that they are satisfied with this production. The moderate strength of relationships was found in all perception statements and overall assessment of organic broiler husbandry. The perception statements *„Individual farmers keep too many broilers“* and *„Farmers take good care of their animals“* were most strongly related to the overall assessment of this production (V= 0.308) (Table 8).

Table 8.
Citizens' perception of broiler farmers and organic broiler husbandry

Perception		Organic broiler husbandry			
		in need of improvement	neither nor	satisfactory	cannot judge
Farmers have too little contact with their animals (broilers).	rejection	35.8% (29) a.r.= -0.7	22.% (18) a.r.= 1.7	35.8% (29) a.r.= 1.3	6.2% (5) a.r.= -2.4
	undecided	36.9% (31) a.r.= -0.5	22.6% (19) a.r.= 1.8	31.0% (26) a.r.= 0.3	9.5% (8) a.r.= -1.5
	approval	46.3% (112) a.r.= 3.0	16.5% (40) a.r.= 0.3	29.8% (72) a.r.= 0.0	7.4% (18) a.r.= -4.5
	cannot judge	27.2% (25) a.r.= -2.7	3.3% (3) a.r.= -3.7	22.8% (21) a.r.= -1.6	46.7% (43) a.r.= 9.5
	X^2= 100.688; df= 9; p= 0.000; V= 0.259				
Individual farmers keep too many broilers.	rejection	37.1% (23) a.r.= -0.4	19.4% (12) a.r.= 0.8	37.1% (23) a.r.= 1.4	6.5% (4) a.r.= -2.0
	undecided	23.1% (15) a.r.= -2.9	33.8% (22) a.r.= 4.2	27.7% (18) a.r.= -0.4	15.4% (10) a.r.= 0.1
	approval	48.6% (137) a.r.= 4.7	14.5% (41) a.r.= -1.0	31.9% (90) a.r.= 1.3	5.0% (14) a.r.= -7.1
	cannot judge	24.4% (22) a.r.= -3.2	5.6% (5) a.r.= -3.0	18.9% (17) a.r.= -2.5	51.1% (46) a.r.= 10.7
	X^2= 142.024; df= 9; p= 0.000; V= 0.308				

Farmers take good care of their animals.	rejection	54.1% (119) a.r.= 5.9	16.8% (37) a.r.= 0.4	21.8% (48) a.r.= -3.4	7.3% (16) a.r.= -4.2
	undecided	32.8% (38) a.r.= -1.7	23.3% (27) a.r.= 2.4	31.9% (37) a.r.= 0.6	12.1% (14) a.r.= -1.0
	approval	24.0% (23) a.r.= -3.5	12.5% (12) a.r.= -1.0	55.2% (53) a.r.= 6.1	8.3% (8) a.r.= -2.0
	cannot judge	25.4% (17) a.r.= -2.5	6.0% (4) a.r.= -2.4	14.9% (10) a.r= -2.8	53.7% (36) a.r.= 9.6
	X^2= 142.280; df= 9; p= 0.000; V= 0.308				
Farmers who keep broilers are adequately controlled.	rejection	51.6% (126) a.r.= 5.4	16.4% (40) a.r.= 0.2	24.2% (59) a.r.= -2.6	7.8% (19) a.r.= -4.3
	undecided	35.2% (32) a.r.= -0.9	27.5% (25) a.r.= 3.3	27.5% (25) a.r.= -0.5	9.9% (9) a.r.= -1.5
	approval	25.6% (22) a.r.= -2.9	12.8% (11) a.r.= -0.9	54.7% (47) a.r.= 5.6	7.0% (6) a.r.= -2.3
	cannot judge	21.8% (17) a.r.= -3.5	5.1% (4) a.r.= -2.9	21.8% (17) a.r.= -1.7	51.3% (40) a.r.= 9.9
	X^2= 139.230; df= 9; p= 0.000; V= 0.305				
Farmers alone benefit from this type of animal husbandry.	rejection	38.1% (82) a.r.= -0.5	16.7% (36) a.r.= 0.4	34.4% (74) a.r.= 2.0	10.7% (23) a.r.= -2.3
	undecided	38.0% (35) a.r.= -0.3	25.0% (23) a.r.= 2.6	28.3% (26) a.r.= -0.3	8.7% (8) a.r.= -1.8
	approval	48.8% (60) a.r.= 2.4	14.6% (18) a.r.= -0.5	30.9% (38) a.r.= 0.3	5.7% (7) a.r.= -3.3
	cannot judge	29.0% (20) a.r.= -1.9	4.3% (3) a.r.= -2.8	14.5% (10) a.r.= -3.0	52.2% (36) a.r.= 9.4
	X^2= 99.216; df= 9; p= 0.000; V= 0.257				

Note: a.r. – adjusted residual; V – Cramer's V

4 Summary

Through this research we gained valuable insight into the relationship between citizens' perceptions of different farmers and their overall assessment of the management of dairy cows, fattening pigs, laying hens and broilers in both conventional and organic production systems. All five statements used to measure citizens' perceptions of farmers were significantly related to the overall assessment of all production types and systems. The majority of respondents who believe that farmers have too little contact with their animals and that some farmers keep too many animals also believe that husbandry practices should be improved in all conventional production types. Most respondents who believe that farmers do not take good care of their animals and that farmers are not adequately supervised also believe that husbandry practices in conventional systems need to be improved. Most respondents who do not believe that only farmers benefit from this type of production believe that all conventional systems need to be improved. A considerable percentage of respondents who believe that farmers take good care of their animals and that farmers are adequately controlled believe that conventional systems need to be improved. The same is believed by a significant percentage of respondents who could not rate the five perception statements. Regarding the strength of the relationships, it is important to emphasize that a relatively strong relationship was found between perceptions regarding farmer care of fattening pigs and adequate control of fattening pig farmers and the overall evaluation of conventional fattening pig production. A relatively strong relationship was also found between perception of adequate control of laying hen farmers and the overall evaluation of conventional laying hen management. All other relationships were moderate. These results suggest that a substantial proportion of respondents, regardless of how they perceive farmers in a particular production, believe conventional systems need improvement. The mostly moderate relationships suggest that other perceptual aspects, not only those related to farmers, may also play an important role in the overall evaluation of the farm animals studied. The relatively strong relationships found between perceptual statements about fattening pig and laying hen farmers and the overall evaluation of these production types suggest that respondents believe that improvements in conventional

fattening pig and laying hen production in some segments are more dependent on the behavior of the farmers themselves.

Similar conclusions can be drawn for the organic systems studied. A considerable proportion of respondents who believe that farmers have too little contact with their animals, as well as respondents who believe that individual farmers keep too many dairy cows, fattening pigs, laying hens, and broilers, believe that these four organic systems need to be improved. The same is true for respondents who think that farmers do not take good care of their animals and that farmers are not adequately controlled. However, no consistent conclusions can be drawn for the relationship between the statement that only farmers benefit from a certain type of animal husbandry and the overall assessment of a particular organic system. Also, a significant percentage of respondents who believe that farmers are adequately controlled and that farmers take good care of their animals believe that organic systems should be improved. The strength of all relationships was moderate, suggesting that it is not only the public's image of farmers that is important for the overall evaluation of the organic systems studied.

Comparing conventional and organic systems for all farm animal types, it is noticeable that a lower percentage of respondents would improve the organic systems studied compared to the conventional ones. This suggests that respondents are generally more satisfied with organic production than conventional. However, to gain a deeper insight into the factors related to the overall assessment of a particular livestock production system, it is advisable to consider not only perceptions, but also some other factors, such as citizens' knowledge of standards and regulations in specific production types and systems.

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Appendix

Table A1.
Description of the sample

Socio-demographic characteristics	Categories	Dairy cows (n= 503)		Fattening pigs (n= 500)		Broilers (n= 499)		Laying hens (n= 498)	
		n	%	n	%	n	%	n	%
Gender	Female	252	50.1	245	49.0	249	49.9	240	48.2
	Male	251	49.9	254	50.8	248	49.7	257	51.6
	Divers	0	0	1	0.2	2	0.4	1	0.2
Age groups (years)	18 - 24	35	7.0	38	7.6	41	8.2	35	7.0
	25 - 39	106	21.1	92	18.4	116	23.2	101	20.3
	40 - 64	270	53.7	272	54.4	252	50.5	262	52.6

	65 and over	92	18.3	98	19.6	90	18.0	100	20.1
Region	Northern Germany	94	18.7	69	13.8	88	17.6	84	16.9
	Southern Germany	155	30.8	161	32.2	132	26.5	137	27.5
	West Germany	163	32.4	173	34.6	193	38.7	168	33.7
	East Germany	91	18.1	97	19.4	86	17.2	109	21.9
Net household income	Up to 1499 €	116	23.1	118	23.6	121	24.2	116	23.3
	1500 – 2599 €	153	30.4	161	32.2	146	29.3	152	30.5
	2600 – 4499 €	179	35.6	164	32.8	158	31.6	165	33.2
	4500 € and more	55	10.9	57	11.4	74	14.8	65	13.1
Education	Low education	113	22.5	110	22.0	115	23.0	104	20.9
	Middle education	184	36.6	178	35.6	161	32.3	181	36.3
	High education	206	41.0	212	42.4	223	44.7	213	42.8
Current employment status	Employed	322	64.0	301	60.2	309	61.9	323	64.9
	Not employed	181	36.0	199	39.8	190	38.1	175	35.1
Eating habits	Vegetarian/vegan	38	7.6	32	6.4	30	6	42	8.4
	Omnivorous	465	92.4	468	93.6	469	94.0	456	91.6