Does everyone reject modern pig production? Identification and characterisation of societal groups in Germany

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Abstract

Today's agriculture and food production has been topic in public discussions and the media in the last years. Societal perceptions and imaginations of agriculture seem to be far away from reality. There is no indication of a declining gap between consumers' expectations and their perception of animal husbandry. However, precise information about expectations and priorities of the population are unknown. Thus, the paper concentrates on society's views and opinions. On the example of intensive pig production, the objective of the study is to analyse societal perceptions, expectations and main points of criticism. It also aims on the identification and characterisation of societal groups with almost identical attitudes.

By combining exploratory focus groups with a quantitative survey, a mixed method approach is pursued. Focus groups are carried out in September 2012 in three German cities to capture a variety of opinions and concerns among the population. On the basis of findings from focus groups a quantitative survey is carried out in spring 2013 per online survey with approximately 1500 German citizens to quantify qualitative results.

The surveys' findings confirmed many of the critical views gained in the focus groups. On the basis of four extracted attitudinal factors three groups with heterogeneous opinions are differentiated with respect to modern pig production. Besides a very engaged group which is characterised by a strong criticism in general and a strong critical perception of current production systems, also a considerable group accepting modern animal husbandry was identified. The multinomial logit regression finally allows for a characterisation of the identified societal segments by sociodemographic and regional aspects. Additionally, the question of responsibility and the acceptance of consequences of several governmental actions are included in the model. It turns out that gender and agricultural knowledge of the people are significant determinants in explaining cluster membership. Interestingly, opponents more often have a good knowledge of agriculture. These findings imply that negative attitudes cannot be traced back to a missing knowledge.

Keywords: modern pig production, societal groups, mixed method approach, multinomial logistic regression

1 Introduction

Today's agriculture and food production has been topic in public discussions and the media in the last years. Many citizens have a romantic image of agriculture and associate a retrospective, nostalgic view on agriculture based on a picture book farmstead from childhood with a differentiated way of production (DLG 2009). An increasing strong criticism can be observed especially in respect to contemporary animal husbandry systems which is also driven by an increasing feeling of insecurity due to food scandals, e. g., BSE or dioxin scandal. Societal perceptions and imaginations of agriculture seem to be far away from reality. On the one hand, modern animal husbandry does not match consumers' or societal expectations but on the other hand, animal production is an important sector in German agriculture and in the whole food processing chain. And what is more, it is a growing sector comprising about 60 % of farmers' sales, but often suffering by small margins. There is no indication of a declining gap between consumers' expectations and their perception of animal husbandry which might affect consumption patterns in the long-run due to changes in the basic narratives. However, precise information about expectations and priorities of the population are unknown.

In this context the following paper concentrates on society's views and opinions. On the example of intensive pig production, the objective of the study is to analyse societal perceptions, expectations and main points of criticism. It also aims on the identification and characterisation of societal groups with almost identical attitudes. A mixed method approach is pursued which combines qualitative with quantitative research. Based on a literature review guidelines for focus groups are developed to capture and discuss society's views and expectations on pig husbandry in detail. Based on these focus groups an online survey is carried out to quantify

the results of the focus groups. The papers' focus will lay on the analysis of the information gained within the quantitative step. The overall study is conducted within the project "Societal expectations towards agriculture"[1] and funded by "Stiftung Westfälische Landschaft". The project compiles information to enabling the development of strategies for all involved agents including farmers, politicians, processors, and distributors to shape agriculture production better towards society's expectation.

2 Background

In literature, studies dealing with expectations concerning animal husbandry in agriculture are rather rare. They often only touch this topic as their main focus lays elsewhere, e. g., on animal welfare, hampered food quality, or on agriculture's role for the society.

The relevance of animal welfare in modern husbandry systems is addressed in many consumer studies. For example, results of several Eurobarometer studies show that the importance of animal welfare is rated by European population as high: with 8.1 on a scale of 10 (Eurobarometer 2007) or as the third important objective of European agriculture (Eurobarometer 2010). At the same time, most people (85 %) stated that they know little or even less about husbandry and 77 % think that improvements are required (Eurobarometer 2007). 55 % of the respondents stated that agriculture policy does not give enough prominence to animal welfare (Eurobarometer 2005). In the survey of TNS Emnid (2012), only 46 % of 1000 European respondents are interested in agricultural topics in general, while 85 % mentioned good governance in animal husbandry as a desired property of German agriculture which is only partly achieved. Biggest room for further improvement is seen in pig production (Eurobarometer 2005).

In contrast, studies focusing on food, food quality and security seldom identify animal welfare concerns when consumers are asked spontaneously. Only when questioned directly, concerns against modern animal husbandry are raised and often identified as reason for changes in individual consumption pattern (Harper and Henson 2002) supported by Lassen et al. (2006). Although negative impressions about animal welfare lead to latent unease, other criteria affect buying decisions (Alvensleben 2002).In the SGS Fresenius (2011) survey 69 % of the population regarded animal welfare as an important factor of quality outscoring regional origin and ecological production. In general (83 %), Germans are against the application of human antibiotics in animal husbandry (Forsa 2012).

3 Method

By combining exploratory focus groups with a quantitative survey, a mixed method approach is pursued. Focus groups are carried out in September 2012 in three German cities to capture a variety of opinions and concerns among the population. Perception, assessment, responsibility and expectation of the participants regarding pig production are discussed in detail. Each group involves up to 12 participants, is moderated by an interview guide that is written in advance to structure the discussion and documented in audio and video format. The interview guide dealt, inter alia, with participants' perception and expectations of modern pig production in general and the most wishful improvements in particular. The cities chosen are Rheine (high concentration of pig farms), Mainz (low concentration of pig farms) and Leipzig (close to an area with Germany's largest pig farms).

The method of focus groups takes advantage of group interactions to determine participants' motives and for eliciting respondents' individual opinions, attitudes and perceptions. However, the qualitative character of this approach does not allow deriving conclusions for the German population. Thus, on the basis of findings from focus groups a quantitative survey is carried out to quantify qualitative results.

Approximately 1500 German citizens are questioned in spring 2013 per online survey which is undertaken by an external research company. Respondents face several statements regarding the perception and assessment of keeping pigs within a seven-point likert scale. In the majority of cases, those statements stem from participants and are stated in discussions described above. A special point surveyed is the question about responsibility for modern pig production. Participants have to choose between four options: the state, farmer, consumer or retail/processing industry. Respondents also got specific actions on how pig production could be improved by the state, consumers or retailing and processing companies. These actions are described with specific consequences such as increasing prices resulting from stronger regulations. Eight questions relating to agricultural knowledge are also asked as well as sociodemographic characteristics.

[1] The German title is „Erwartungen der Gesellschaft an die Landwirtschaft".

Overall, an enormous amount of information is gained of both, the focus groups and the online survey. Results of the focus groups are already described in more detail (see Weible et al. 2013 and Zander et al. 2013). Hence, this paper concentrates on the analysis of the survey's data. Several successive and interrelated analyses are performed. These are factor and cluster analysis, as well as multinomial logit regression. In the following, the methods and their aims and applications are briefly introduced.

Factor analysis

An exploratory factor analysis is carried out to define the underlying structure in the data matrix (Hair, Anderson and Tatham 1998: 90). Factor analysis is applied to describe respondents' attitudes towards modern pig production. Categories, or so-called factors, are formed of those statements which are answered similarly (Hüttner and Schwarting 2002). Thus, basic attitudes are gained through the reduction of many single statements to few categories.
The used seven-point likert scale of the 19 items regarding perception, assessment and expectation towards pigs husbandry ranged from ''I totally agree'' to ''I do not agree at all''. Statements were pretested in February/March 2013. To ensure suitability of the sample for factor analysis the measure of sampling adequacy (MSA) Test (results: ranging from 0.732 to 0.952), Kaiser-Meyer-Olkin (KMO) test (result: 0.901) and the Bartlett test of sphericity (result: 0.000) were run. After that a principal component analysis was carried out using a promax 4 rotation (Hair et al. 1998: 99-103).

Cluster analysis

Based on the extracted factors a cluster analysis is carried out. Respondents with homogenous attitudes regarding the keeping of pigs are grouped within one cluster whereas respondents with different attitudes are grouped into another cluster. The grouping process generates so many groups that the largest possible homogeneity within groups and heterogeneity between groups is given (Churchill and Nielsen 1995: 985). Based on the standardized factor levels for each respondent a hierarchical cluster analysis was conducted with a random sample of approximately 90 respondents. Analysing dendrogram and elbow graph three clusters were found to represent respondents' structure. After this, all respondents were clustered using a K-meanscluster analysis taking the cluster centres from the hierarchical analysis as the initial seed points. In the end found clusters were confirmed by discriminant analysis.

Multinomial logit regression

In a final step, membership in any of the identified societal groups is explained within a multinomial logit model. Logistic regressions generally attempt to determine the probability that a specific event occurs, e. g., the purchase of a product or the membership of a group in dependence of several influencing factors. Logistic models only differentiate between two groups, whereas multinomial logistic models allow for analysing more than two groups. Thus, the dependent variable takes more than two outcomes and the outcomes have no natural ordering (is discrete with nominal scale). Multinomial logistic regressions aim to identify those factors that influence the probability that an individual sampling unit belongs to a specific group. Explanatory variables can be either metric or categorical, or both. Independent variables are often called as covariates. One of the considered groups serves as reference for the others in the estimation procedure. Hence, estimated coefficients will differ depending on the chosen reference group because they have different interpretations. However, the predicted probabilities for each group will be still the same. Goodness of fit can be assessed using several measures, e.g., criteria basing on log-likelihood function like deviance likelihood ratio-test and Pseudo-R-squared-measures like Cox and Snell, Nagelkerke and Mc Fadden (Backhaus et al. 2011: 276, 289).

4 Description of the survey's data

The sample comprises 1,519 observations all fully completed the questionnaires. Sociodemographic characteristics are presented in Table 1. The distribution of the German population regarding region, age and income category is also shown for comparison in column 3 allowing the assessment of the samples' representativeness. Except persons aged 65-99, who are underrepresented, it can be assumed that the sample constitutes a good representation for the German population.

Table 1: Sample characteristics (in %)

	Sample (N=1519)	Germany[1]
Gender (=female)	50.0	
Age category		
• aged 18-24	16.3	13.7*
• aged 25-34	17.4	14.7
• aged 35-44	20.1	17.4
• aged 45-54	23.1	20.0
• aged 55-65	15.6	15.2
• aged 65-99	7.5	25.3**
School education level		
• low educated: completed German *Hauptschule* or less	2.0	
• medium educated: secondary education (German *Realschule*)	36.1	
• high educated: qualification to study at college or university	44.9	
• no information given	2.0	
Households' net income		
• up to 499	2.3	2.4
• 500-899	9.9	10.7
• 900-1299	14	14.7
• 1300-1499	8.6	7.9
• 1500-1699	7.6	7.3
• 1700-1999	8.7	9.2
• 2000-2599	15.5	15.5
• 2600-3199	11.3	10.7
• 3200-4499	13.2	12.9
• 4500 and more	9.0	8.6
Region of Germany		
• north	15.9	16.1
• south	28.9	28.5
• west	35.2	35.4
• east	19.9	20.0
Live in a city (self-assessed)	67.3	
Persons having a child or children	30.3	

[1] Federal Statistical Office (2010a, b, c) *for Germany: persons between 15 and 25, ** for Germany: persons between 65 and 80.

Source: Own calculations.

5 Results

5.1 Focus groups

Main results of focus groups are only briefly summarized as the focus of the paper lays on the results of the quantitative part of the study. A detailed description of results of the focus groups can be found in more detail in Weible et al. 2013 and Zander et al. 2013.

In the most discussions participants gave mainly attention to the following topics: the space for each pig was considered as insufficient and not species-appropriate, the application of medications as too high, and in particular the prophylactic use of antibiotics as problematic. The relation among the lack of space, the higher use of medication and the behavioural disorders (e. g., pigs bite each other's tails) were also discussed. Participants often criticized that animals are only seen as a product in a production system and there is no "real caring" as the pigs are means of generating profit. Regarding the question of "who is responsible for modern animal husbandry?" it is striking, that respondents have seen consumers' responsibility as well as the role of the state. None of the participants expressed missing knowledge as reason for criticizing and simultaneously consuming meat from modern animal production. Generally, meat consumption and responsibility was intensively

discussed and answers such as “animal welfare is a taboo subject”, “people looking away when buying meat” or “most people fade it out” were often mentioned.

5.2 Quantitative online survey

The quantitative analysis confirms the generally critical perception and assessment of modern pig production in Germany which is gained by focus groups in the first step of our applied research approach. For example, over 80 % of respondents agree with the following statements: “the use of antibiotics in modern pig husbandry is a danger to human health”; “animals do not have enough room to move around in modern pig husbandry”; and “animals in intensive livestock farming are more susceptible to disease than those in smaller farms”. Further, only 25 % of respondents agree with “modern pig husbandry and love for animals fit together”.

Factor analysis

After testing the suitability for factor analysis, a principal component analysis with Promax 4 rotation is carried out. Four factors are identified which describe respondents’ attitudes towards modern pig production. These factors are

- general criticism towards the keeping of pigs (factor 1)
- critical perception of the farmer (factor 2)
- acceptance of the current system (factor 3)
- claims regarding the behaviour of others (factor 4).

Table 2 shows the assignment of each statement to one of the four factors and their factor loadings. Together, they account for 54 % of the error variance. Crombachs’ alpha for internal consistency is good for factor 1 and 2, acceptable for factor 3 and unacceptable for factor four.

The first factor *„general criticism towards the keeping of pigs“* includes those statements covering criticism towards the state, the conditions in husbandry and large farms. The first factor encloses several claims regarding the state: the state should ensure animal-appropriate husbandry by stricter laws and that animal-appropriate husbandry is profitable for farmers. Criticism of the factor focuses mainly on the issue that animals do not have enough room to move around in modern pig husbandry. The husbandry of pigs is generally seen as not species-appropriate and, hence, the reason for the application of antibiotics. Further, intensive livestock farming is seen as great problem because animals are more susceptible to disease than in smaller farms. The second factor *„critical perception of the farmer“* reflects respondents opinion about the farmer of modern stables. It is criticized that farmers work more on their computers than in the barn and that they only go into the stable if something happens. Famers are perceived as persons without respect for animals and without a relationship with the animals.

Table 2: Factor loadings for attitudes towards modern pig production

	Factor loading			
	Factor 1 α=0.839	Factor 2 α=0.801	Factor 3 α=0.630	Factor 4 α=0.437
Much stricter laws must regulate animal husbandry.	**0.758**	-0.059	-0.008	0.069
The use of antibiotics in modern pig husbandry is a danger to human health.	**0.739**	-0.026	-0.046	-0.050
Animals in intensive livestock farming are more susceptible to disease than those in smaller farms.	**0.731**	0.024	-0.028	-0.046
Farmers must be more strongly penalized when they break the law.	**0.720**	0.118	-0.160	-0.088
The state should ensure that animal-appropriate husbandry is profitable for farmers.	**0.712**	-0.254	-0.027	0.127
Animals do not have enough room to move around in modern pig husbandry.	**0.664**	0.115	0.156	-0.059
Not the well-being of the animals, but rather the farmer's profit is the focus of modern pig-keeping.	**0.485**	0.279	0.195	-0.041
The use of antibiotics is only required because animals are no longer held appropriately to their needs.	**0,400**	0,286	-0,026	0,112
Today farmers work more on their computers than in the barn.	-0,086	**0,893**	-0,142	0,041
In modern farming, farmers only go into the stable if something happens.	0,005	**0,862**	-0,098	-0,009
Farmers in modern agriculture have no respect for animals.	0.168	**0.655**	0.103	0.014
There is no longer a relationship between humans and animals on the farm.	0.416	**0.437**	0.149	-0.109
The pigs feel at ease in modern stables because they have no other experience.	0.102	-0.226	**0.836**	0.014
Modern pig husbandry and a love of animals fit together.	0.005	-0.078	**0.811**	-0.020
Farmers in modern pig husbandry are also interested in the health of their animals because sick or dead animals are a loss for them.	-0.393	0.366	**0.639**	0.014
If people would eat less meat, then there would be no mass animal husbandry.	0.001	0.014	0.206	**0.745**
Only the farmer decides whether his animals should be kept appropriately or not.	-0.214	0.183	-0.181	**0.575**
Farmers have to produce bulk goods if consumers will only pay attention to the price of goods.	0.176	-0.273	0.008	**0.523**
More than enough food is produced in Germany. That is why the state should prohibit mass production.	0.227	0.291	-0.078	**0.436**

α= Crombach alpha; Bartlett-test=0.000; Kaiser-Meyer-Olkin (KMO)=0.901; MSA (measure of sampling adequacy) lowest/highest value: 0.731/0.952

Source: Own calculations.

The third factor *„acceptance of the current system"* covers respondents acceptance. Statements such as the presumption that pigs feel at ease in modern stables, modern pig husbandry and a love of animals fit together, and farmers are also interested in the health of their animals load on the third factor. The fourth factor *„claims regarding the behaviour of others"* speciefies claims relating to consumers as well as farmers and the state. Hence, mass animal husbandry is due to consumers eating very much meat and who are strongly price-conscious. In respondents' opinion, each farmer decides whether his animals should be kept appropriately or not.

Cluster analysis

Based on the factor analysis a cluster analysis was run to identify societal groups. Three clusters were identified: opponents (28%), moderates (35 %) and the tolerating (37 %).

Figure 1 shows the affiliation of the clusters according to the extracted factors. Figure 1 presents mean deviation of each cluster from the grand factor mean of the overall sample for all four factors. Every bar

indicates the factors' deviation from the average of all respondents. That is, the factor is either under or above the average in the respective group.

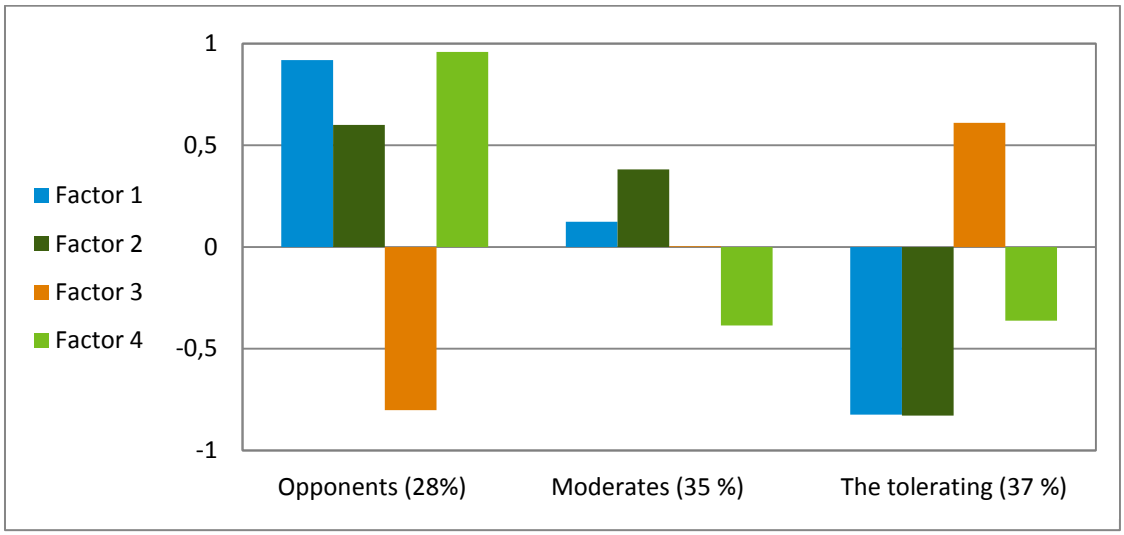

Figure 1: Identified three clusters and their mean factor deviation from the grand sample mean
Source: Presentation of own calculations.

Three clusters with enormous differences regarding the four extracted factors were found. The first cluster, the "opponents", can be described as very engaged people since every single factor is strongly above or below the average. General criticism towards modern pig production and a critical perception of the farmers are (very) strong in this cluster, whereas the acceptance of the current system is very weak. Further, the opponents depicted strong claims regarding the behaviour of others. The second cluster, the "tolerating" segment, is complementary to the opponents and thus, this cluster also shows a high engagement. They have a very high acceptance of the current system and no criticism towards modern pig production at all. Thus, the behaviour of others is not an issue. The third cluster can be described as the moderates or the indifferent persons who have no real opinions towards modern pig production. This interpretation appears from factor 1 (general criticism) and factor 3 (acceptance) which are both on average. Even factor 4 (behaviour of others) which is above the average, confirms the indifferent attitude as they have no claims regarding the current system. Nevertheless, the critical perception of this cluster is above the average. Finally, all three clusters are of comparable sizes.

On the basis of these three societal groups, which are identified through factor and cluster analysis, further analysis are done for characterisation of these groups. In a first step mean values of the clusters were statistically analysed in bivariate analyses using cross-tabulation and the chi-square tests. Results indicate that persons belonging to the group of opponents are more often female, they have more often good knowledge of agriculture, and they have more often a high income. In contrast, the tolerating group contains more often men than women, more often people with a mean income and with low knowledge about agriculture. Additionally, a multinomial logit model was estimated to explain cluster membership in any of the identified clusters in more detail.

Multinomial logit regression

Each of the three societal groups is described within the multinomial logit regression in regard to sociodemographic and regional aspects as well as the persons' level of knowledge about agriculture and the acceptance of questioned possibilities for creating stricter animal husbandry laws. Average marginal effects are calculated and shown for all three groups (Table 3). Marginal effects allow describing the probability that an individual belongs to a specific group. The values of the significant coefficients indicate - when they are multiplied with 100 - the increased or decreased probability for membership in percentage points.

Gender and the knowledge of agriculture are highly significant variables in the group of the opponents. The chance belonging to this segment increases by 11 percentage points for women and by 5 percentage points for every correct answered question (out of 8). The variable "knowledge" is also highly significant for the tolerating people, however negative. For every correct answered question about agriculture, the probability decreases by 3 percentage points that this person belongs to the tolerating group. Thus, with increasing knowledge probability decreases to belong to the "tolerating". The variables gender and agricultural knowledge are also significant for the moderates. The probability to belong to this group is decreased for women and for people

with better knowledge. In regard to the variables for the region of living, the variable "west"[2] is significant for two groups. Compared to people from the eastern part of Germany (base or reference category), the probability to belong to the moderates is increased by 6 percentage points for people living in the western part. Instead, the chance to be member of the tolerating group is decreased by 7 percentage points for people living in the western part. Further significant sociodemographic variables are "medium educated" and "medium income category" for the group of opponents as well as the "medium" and "high income category" for the group of tolerating people. With the presence of children the probability decreases by 7 percentage points to belong to the tolerating group. No influence for any group is shown for the variables age, household size and urban living.

Respondents were also asked about who is - from their point of view - responsible for a more species-appropriate animal husbandry. Participants had to choose between processing industry & retail, consumer, state and farmer. For those who stated that the consumer and state is responsible, the probability increases by 10 and 9 percentage points for a membership in the group of opponents and decreases by 14 and 10 percentage points for a membership in the group of moderates (base category: processing industry & retail). The probability belonging to the tolerating group increases by 9 percentage points if farmers are seen as responsible.

[2] Western Germany covers the federal states North Rhine-Westphalia, Saarland, Hesse and Rhineland-Palatinate whereas Brandenburg, Mecklenburg-Western Pomerania, Saxony, Saxony-Anhalt and Thuringia belong to the eastern part of Germany.

Table 3: Average marginal effects of multinomial logit regression explaining the affiliation to the groups identified in cluster analysis

	Opponents	Moderates/ indifferent persons	The tolerating
Age	0.00	-0.00	0.00
Gender (=1 if female)	**0.11** ***	**-0.07** **	-0.04
Education (base: low)			
- Medium educated	**0.06** *	-0.02	-0.04
- High educated	-0.01	0.00	-0.01
Income category (base: low)			
- Medium (1300-1999 €)	**-0.05** *	-0.04	**0.09** **
- High (2000-4499 €)	-0.02	-0.05	**0.07** *
- Very high (≥ 4500 €)	-0.04	0.04	0.00
Region in Germany (base: east)			
- North	0.01	0.04	-0.05
- South	0.01	0.04	-0.05
- West	0.02	**0.06** *	**-0.07** *
Urban living, self-assessed (=1 if yes)	0.01	0.00	-0.02
Presence of children	0.03	0.04	**-0.07** *
Household size	0.00	-0.00	0.00
Knowledge of agriculture	**0.05** ***	**-0.01** *	**-0.03** ***
Main responsible for a more species-appropriate animal husbandry			
- Processing industry, retail (base)			
- Consumer	**0.10** *	**-0.14** **	0.04
- State	**0.09** *	**-0.10** *	0.01
- Farmer	-0.02	-0.07	**0.09** *
Possible governmental actions to support animal friendly husbandry and their consequences:			
Stronger regulations result in increased prices for pork. (=1 if accepted)	**-0.15** ***	**0.08** *	**0.07** *
Stronger regulations induce that a couple of farms had to close. (=1 if accepted)	**-0.11** ***	**-0.09** ***	**0.21** ***
Stronger regulations induce that several farms go abroad because regulations are less strict. (=1 if accepted)	0.00	0.02	-0.02
The state provides incentives for farmers to improve their own husbandry conditions. (=1 if accepted)	**-0.06** **	0.04	0.02
Consumers are responsible for animal friendly production systems through their purchase behaviour. (=1 if accepted)	**-0.11** *	0.02	**0.10** *
Agriculture, retail and processing industry commit on voluntary basis for more species appropriate husbandry. (=1 if accepted)	-0.05	0.04	0.01

***, **, * significant at the 0.01, 0.05, 0.10 level.

Source: Own calculations.

Finally, the acceptance of several possible governmental actions to support animal friendly husbandry and their consequences were questioned in the survey and considered in the regression. The second listed action (that stronger regulations induce that a couple of farms had to close) is highly significant for all three segments. If participants stated that they accept this action, the probability decreases by 11 percentage points to belong to

the group of opponents and also decreases by 9 percentage points to belong to the group of moderates. It is increased by 21 percentage points for people to be member of the tolerating group.

Likelihood ratio test statistic of significance of all parameters indicates a good differentiation of the groups. The null hypothesis can be rejected with a χ^2 of 322 and a degree of freedom of 46. The Pseudo-R^2-measures are partly acceptable: Nagelkerke is at 0.192 and the Cox and Snell at 0.192. However, McFadden's R^2 is with a value of 0.097 not acceptable. Here, it has to be kept in mind that attitudes count for an important share for explaining cluster membership with respect to modern pig production. Participants' attitudes are not considered in the regression as they had been already used for the identification of the different population groups with relative homogenous attitudes in this respect. Hence, R^2-measures can turn out to be rather low.

6 Discussion and conclusion

Aim of the study is the identification of societal expectations and current criticism towards modern pig production to derive indications for possible improvements for a better acceptance of agriculture in society. The study investigates the current situation from a society's point of view. Moreover, population groups are identified and characterized.

Results of the study show that a diverse picture of attitudes, perceptions and expectations exist. Qualitative research uncovers a huge range of points of criticism. These mainly cover the lack of space, frequency and prophylactic use of medications and a deficit of monitoring. In particular the relation among the lack of space, the higher use of medication and the behavioural disorders turned out as the main problem of modern animal husbandry perceived by participants of the focus groups at all. Kayser et al. (2012) also concludes in their study that interviewees perceive an animal welfare problem particularly in large stocks and criticism towards modern husbandry is mainly due to the lack of space per animal. An overall low societal acceptance of modern pig production has also been shown in previous studies (Eurobarometer 2005, Boogaard et al. 2011, Krystallis et al. 2009).

Data of the quantitative online survey confirms the general critical perception and opinions received in the former qualitative step. On the basis of four extracted attitudinal factors three groups with heterogeneous opinions are differentiated with respect to modern pig production. The final regression model allows for a characterisation of the identified societal segments by sociodemographic and regional aspects. Additionally, the question of responsibility and the acceptance of consequences of several governmental actions are included in the model. It turns out that gender and agricultural knowledge of the people are significant determinants in explaining cluster membership. Interestingly, opponents more often have a good knowledge of agriculture. Hence, negative attitudes cannot be traced back to a missing knowledge and educational activities to improve the image of animal husbandry in society may have a reverse effect. Nevertheless, there is the need to improve the image of animal husbandry in society because a generally negative or critical attitude in society is present.

Developing strategies for a measureable improved perception of modern animal husbandry in society can be recommended; however, the picture is far from being clear cut and strategies need to be underpinned and clarified by new and additional results.

Results of the study indicate that a mix of different strategies might lead to a step by step improvement. One possible step to gain more insights into important determinants of societal perceptions and expectations may be a detailed analysis of single societal groups for developing measures such as communication strategies. Possible communication strategies could cover the opening farm gates to the public by, e.g., frequent visits on farms, better representation of farms in picture books, on TV and in the internet. This strategy might overcome the limited knowledge of production and retrospective, nostalgic view on pig production. Another possible strategy might be the introduction of governmental incentives for farmers to improve conditions in husbandry. Government could also impose obligations for a more animal-friendly production process without compensation for the farmers. Due to the fact that German farmers are integrated in an EU Common Market, this strategy would require a common introduction in all EU Member States to avoid a reallocation of production into other countries without these obligations. As respondents also see consumers' responsibility for the pig production system they need to adjust their buying decisions. This is only possible if they have the choice to separate animal friendly produced meat from others which would require labelling. However, people who were asked, showed weariness towards labels and in particular, the credibility of labels is assessed as low. Thus, special emphasize needs to be put on the compliance with label rules very frequently controlled by a really trustworthy organisation.

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