The image of agriculture in Germany: An empirical survey and structural equation model

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Abstract: *For the vast majority of people, everyday life appears to be far removed from farming. Their image of agriculture tends to be determined by on-off observations or experiences of farm life rather than by any informed knowledge of agriculture. How, then, do people perceive agriculture? This question is addressed using a structural equation model based on an empirical study of people's image of agriculture. Using a standardized questionnaire, 600 adults, selected randomly throughout Germany, were interviewed in 2007. The model reveals the interrelationships between the constructs 'citizens' direct contact to farmers', 'mass media representations', 'closeness to agriculture' and 'image'.*

Keywords: *image, agriculture, perception, communication, structural equation model*

Of real and fictional realities

Images exert a particular influence when there are limited opportunities for direct experience or direct contact. Images are based on communication and are mediated via the mass media, advertising agencies, politicians, organizations and, in agricultural itself, through the people whose life and work it is. In everyday life, images function as a substitute for the domain they represent. This is significant not least when decisions need to be made quickly or opinions are sought and one is not familiar with the specific domain in question. Images are a part of our subjective constructions of reality. Having said this, it is important to acknowledge that a large proportion of our subjective realities is mediated by the mass media and is more or less unverifiable for the individual. However, images do not exist in complete isolation from 'reality', as key experiences or isolated situations experienced oneself are often taken as a measure of the credibility of communication (see, among others, Merten, 1999). The work and leisure activities of the general German public give ample cause to assume that images of agriculture are 'more real' for many people nowadays than actual agricultural practice. However, particularly in more recent publications on the topic of the 'image of agriculture', it is noticeable that many respondents say they are interested in agriculture and that they even know farmers personally. Overall, people have viewed agriculture in favourable terms for at least ten years, if not longer (amongst others Haase, 1998; I.M.A., 2007; Linnartz, 1994).

Objective, hypotheses and structural model

The aim of the present study is to describe people's images of agriculture, taking account of both the role played by direct contact with agriculture (that is, direct experience of a farming operation) as well as information about agriculture mediated by the mass media. It is based on the following hypotheses: Direct contact with agriculture and interest in agriculture as mediated via the mass media give people an active sense of being close to agriculture. The constructs (= latent variables) 'direct contact', 'media contact', and 'closeness' give rise to differentiated as well as ambiguous images. Socio-demographic and socio-geographical data are entered into the model as control variables (Fig. 1).

One specific image will be present in this paper: 'Image 1/Ethics' represents the extent to which agriculture is regarded as honest, concerned about quality and as being animal-friendly and environment-friendly.

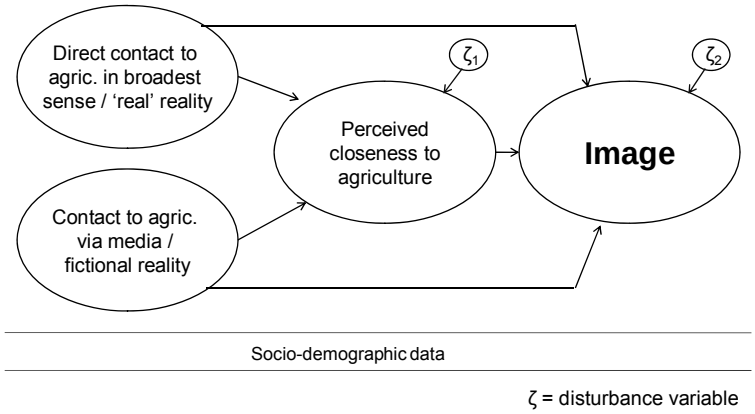

Figure 1. Structural model: Image of agriculture.

Materials and methods

The empirical study is based on 600 oral surveys conducted towards the end of the summer of 2007 in the Federal Republic of Germany. The sample was put together according to prescribed quotas (urban or rural environment, eastern or western German states, gender, age). In addition to descriptive statistics and qualitative analyses of category-based data (see Mayring, 2008), the data were compressed within a structural equation model (see, among others, Backhaus et al., 2008a; Bollen, 1989). Such models make it possible to estimate and check the relationships between latent variables, i.e. constructs, which are not directly observable empirically. The model does not test individual hypotheses but rather a system of hypotheses in its entirety with the ideal hypothesis: the actual (real) correlation matrices and those implied by the model are the same.

Image of agriculture— descriptions

What image does agriculture has in Germany? Below, first, is an extract from the descriptive results, illustrated by a set of semantic differentials represented in terms of a polarity profile (Fig. 2).

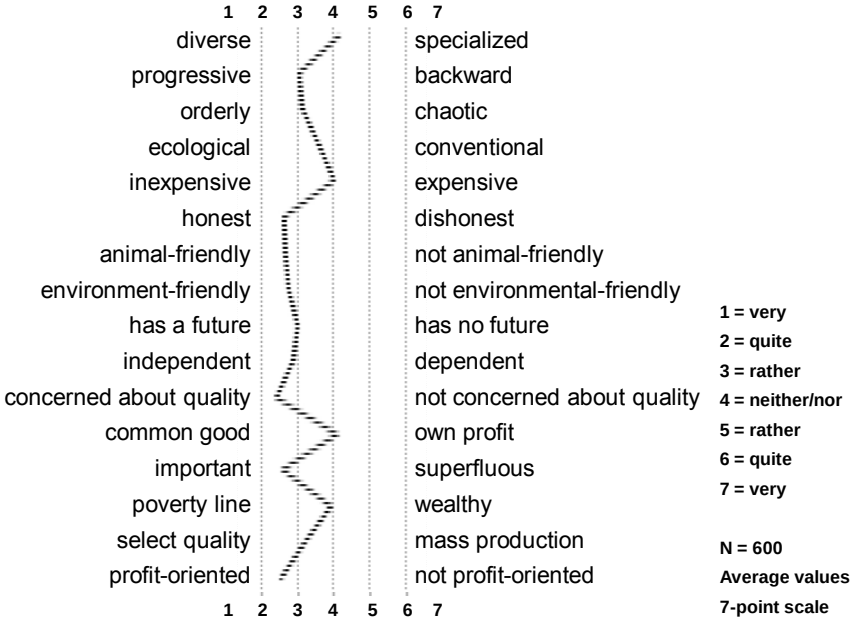

Figure 2. Characteristics of farm businesses.

In the middle are those businesses that are regarded as fairly honest, animal-friendly and environment-friendly, independent, concerned about quality, important and profit-oriented (values between 2 and 3 on a 7-point Likert scale). Further, farm businesses are perceived as rather progressive, orderly, ecological, as having a future, and as a supplier of products of exceptional

quality. In the middle of the scale, around point 4 (neither/nor), are the characteristics diverse - specialized; inexpensive - expensive; concerned with the common good - concerned with their own profits; and, finally, poverty line - wealthy.

These evaluations were not made entirely on the spur of the moment. The respondents had been asked first to imagine an actual farm business. Nearly all the respondents managed to do so; only 7.4% of them said that they could picture something only very vaguely or not at all. Once the evaluations had been made, a further question was asked, namely: 'Does the farm you imagined differ from other farms?' This question was answered in the affirmative by half the respondents. This means that half the respondents base their view of the universal on the particular. The answer given by the other half of the respondents indicates that, to them, differentiation is possible or even necessary. Farm descriptions given by these respondents paint a picture of a predominantly friendly, warm and caring agriculture. However, this agriculture is not very successful in economic terms.

This picture is confirmed by corresponding factor analyses. According to these, two powerful factors emerge from the pairs of concepts. Factor 1 includes concepts to do with the 'ethical' aspects of value generation. In clear contrast to this, factor 2 emphasizes a way of generating value in which the term 'future' acquires an increasingly important role.

For the later structural equation modelling these factors were reduced further to the most powerful variables. These variables are highlighted in Table 1.

Table 1. Factor analysis: 'Image'

Rotated factor matrix	Factor 1	Factor 2	
ecological	.531	.042	
honest	.683	.045	Notes:
animal-friendly	.798	.023	KMO test for
environmental-friendly	.852	.092	sampling adequacy[a]: 0.857
independent	.444	.315	
concerned about quality	.712	.314	explained variance by
common good	.567	-.028	both factors: 44.8%
quality	.677	.081	
progressive	.080	.704	Extraction:
orderly	.131	.509	Principal axes factor analysis
have a future	.222	.626	Rotation:
profit-oriented	-.161	.479	Varimax with Kaiser normalization

Factor transformation matrix	Factor 1	Factor 2
Factor 1	.949	.314
Factor 2	-.314	.949

[a]Kaiser-Mayer-Olkin measure, should be >0.8 (Backhaus et al., 2008b:336).

Structural equation model: Image

Model, variables, coefficients

Figure 3 shows the overall structural equation model. At its core is the structural model with the causally interpreted relationships between the latent variables. These are symbolized by an oval. The individual latent variables are backed up by a set of manifest variables, i.e. empirically measured variables, or indicators (symbolized by rectangles). The figure shown top right in each case shows what proportion of variance is explained by the associated la-tent variable.

The manifest variables as well as the dependent latent variables are subject to a further influence related to errors in measurement and influencing factors not taken into account in the model (= errors of measurement, symbolized by δ, ε and ζ; for a detailed explanation, see Bollen, 1989). Since all the variables were Z-transformed, the path coefficients given should be interpreted as correlation coefficients. The relationship between 'direct contact' and 'media contact' (symbolized by a curved double-headed arrow) is not interpreted causally. The corresponding correlation coefficient, with a value of only 0.18, confirms this assumption.

Socio-demographic data along with the quota parameters 'size of home town' and 'location of town in Germany' were entered into the model as control variables. In order not to overstretch its complexity any further, these variables are not depicted in the diagram. Overall, only a minor influence is exerted by these variables. The correlation coefficients belonging to the four constructs lie between |0.1| and |0.19|. The correlation coefficient between 'size of home town' and 'direct contact' is greater than this, namely -0.26. This coefficient reflects those survey locations with fewer than 9,000 inhabitants, in which the presence of agriculture is more tangible.

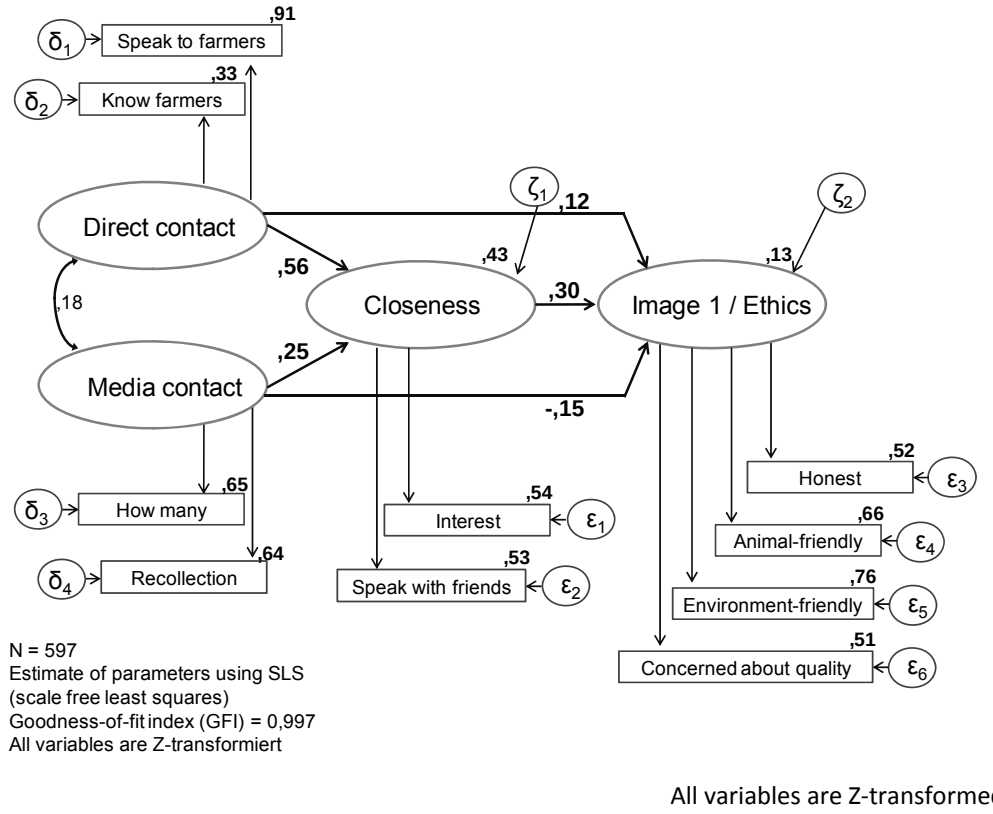

Figure 3. Structural equation model: Image 1 / Ethics.

Statistical procedure, goodness-of-fit and reliability

Overall the model explains 13% of the variable 'image'. The relationships were estimated according to the 'scale-free least squares' procedure (SLS). The goodness-of-fit index (GFI) is given by way of representing other, additional parameters. Having a value close to the optimum, the GFI indicates that the model as a whole can be accepted (Arbuckle, 2005). The degree to which the model is reliable is shown, among other things, by the variances of the manifest variables. At least 40% variance should be explained by the construct behind each term (Backhaus et al., 2008a). In the present model, the variable 'know farmers' violates this criterion, and yet the estimates of the constructs are still regarded as reliable overall.

Constructs, their relationships and content

Direct contact to agriculture, perception of agriculture acquired through the media and perceived closeness to agriculture stand for three different points of access to agriculture as well as for communication about agriculture. Looking at the web of relationships at the level of the structural model shows that people's perception of real and fictional realities generates a kind of perceived closeness to agriculture. While these relationships are of varying extents (0.56 and 0.25), they still point in the same direction. Closeness tends to mean that agriculture is seen more as honest, animal-friendly and environment-friendly and concerned about quality (0.30). Direct contact and media contact, regarded on their own, do not give rise to any differentiated images (0.12 and -0.15) with regard to these characteristics. But what is the actual content of these constructs and how high is the

proportion of variance explained by the construct in each instance? Table 2 shows the latent variables and their indicators.

Table 2. Rendering the latent variables operational

Latent variable	Manifest variables / indicators	Brief description
Direct contact	Do you know any farmers personally?	know farmers
	How often do you speak to these farmers about agriculture?	speak to farmers
Media contact	In how many media have you seen something about agriculture over the last few days?	how many
	Can you remember what it was about?	remember
Perceived closeness	How much are you interested in agriculture?	interest
	How often do you speak with your friends about agriculture?	speak with friends
Image 1 / ethics	How much or how little do these terms fit the farm business you imagined?	
	• honest and dishonest	honest
	• animal-friendly and not animal-friendly	animal-friendly
	• environment-friendly and not environment-friendly	environment-friendly
	• concerned about quality and not concerned about quality	concerned about quality

Direct contact explains the one indicator, which captures the conversations between farmers and the respondents (91%, Fig. 3). Media contact explains 64% of the indicator related to the accuracy of what was perceived and remembered from the media. Closeness explains 53% of the indicator 'How often do you talk with your friends about agriculture?' Each of these variables is accompanied by a second indicator expressing where these conversations or recollections 'begin'.

In terms of what the constructs stand for content-wise, I refer back to the descriptive statistics. The empirical data show that half of the respondents stated they knew farmers personally. Of those respondents who know farmers or other people working in agriculture, approx. 27% speak frequently with these individuals about agriculture, 33% occasionally and 40% never. What can also be seen from the descriptive statistics is that agricultural issues in the media certainly do come to people's notice. Some 70% of respondents say they have 'recently' seen or heard something about agriculture on television, on the radio or in the print media. The internet barely registers in this regard. Those who have seen or heard something about agriculture in the media are usually able to recall the subjects that were addressed. The most frequent responses are related to issues that have been in the news for some time. In 2007 these included price increases for food and milk in Germany and various scandals over (rotten) meat. Animal diseases (especially BSE, FMD and bird flu) are also mentioned. Almost 1/3 of respondents also recall 'more complex' issues, such as climate change, harvests, organic food and genetic technology. Almost all these 'recollections' are related to news items. Agriculture, as represented in entertainment programmes, was hardly mentioned at all. In conjunction with the construct 'perceived closeness', three patterns of communication become apparent:

1. Those who speak with farmers about agriculture also talk about it in their circle of acquaintances. Agriculture enters the conversation at home especially when a specific local issue is involved. Examples include flower boxes, blackberry bushes in the garden, fruit orchards and difficult growing sites (slopes). People also talk about issues that crop up in the media, though. This pattern applies to a maximum of ¼ of the respondents.
2. The following pattern is more frequent: Knowing farmers or people involved in agriculture, hardly ever talking about or recalling anything about agriculture.
3. In a third pattern, agriculture barely registers with people as a subject of thought or discussion. This applies to approx. 1/3 of the respondents. The image of agriculture is more negative or indifferent in this case, i.e. generally speaking, no clear evaluation is made.

Conclusion

Wherever communication takes place about agriculture, its image is a rather positive one, favourable to agriculture. Thus negative headlines do not necessarily impact on the image of farm businesses – — at least, not of those businesses to which the respondents claim to have a personal connection. Overall, the following can be concluded from the model: Agriculture is perceived as something to which one is connected and as an issue that is immediate, at least in the first instance. 'Perceived closeness' feeds into a consistent, friendly image. For the majority of the respondents, though, it is still a case of 'close and yet far away'. Initially it looks as though agriculture is an almost taken-for-granted feature of one's immediate environment. Agriculture seems far away when this 'taken-for-grantedness' is manifested only occasionally in communication. What has an effect is the sense of having a direct contact to agriculture and of hearing or seeing what is reported about agriculture. Issues that are the object of controversy and debate in society and would require greater attention and consideration of specific aspects are largely bracketed out. When such issues or associated events are perceived, this is not linked to 'farms in my personal environment', so that there is no conflict with the images.

From a scientific perspective, the model represents a considerable degree of compression in comparison to previous, predominantly descriptive studies of image. Agriculture is depicted in terms of only a few features, but these features are based on a sound selection procedure.

For actors in agriculture this poses the question of whether this positive, albeit superficial, image of agriculture is a satisfactory one. In practical terms, the question is one of where and how such images are brought up to date. The few everyday conversations people have about agriculture and 'anchor points' in daily life, such as a garden or friends who are also interested in agriculture, influence the formation of images. Images are brought up to date through personal conversation. Perceived closeness and personal contact to agriculture have a mutually constituting impact here. Both appear to be rather resistant to the influence of the mass media. Nonetheless, actors in the agricultural sector are surely aware that there will be fewer rather than more means of communication offering personal experience in the future and that farmers will be under increasingly strong pressure to perform well. This is why it is important to provide a direct means of contact, to continue reporting and to offer the wider public 'reality-based' familiarity by means of communication.

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