

# ***Different perspectives on animal health and implications for communication between stakeholders***

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**Abstract:** Despite numerous efforts of various professional groups, the level of production diseases in livestock production remains on an unsatisfying high level. Barriers in the process of knowledge transfer in connection with the improvement of the animal health status have been the topic of a study taking different stakeholder perspectives into account. Using instruments of communication science, the perspectives of farmers, agricultural and veterinarian advisors as well as animal scientists were brought together and discussed in workshops. The process revealed the following barriers in the transfer of knowledge: diverging comprehension of animal health, complexity behind multifactorial production diseases, reluctance to assume responsibility, and role conflicts. We conclude that the current communication structure between stakeholders is highly self-referential and not appropriate to enable a target-oriented transfer of knowledge aiming to reduce prevalence rates of multifactorial production diseases on the farm level. Hence, an impulse from “outside” is required to irritate the deadlocked situation and provide new orientation.

**Keywords:** Knowledge transfer, stakeholder analysis, self-referential judgments, reflection, conflicting areas

## **Introduction**

Animal health is an issue of increasing interest by consumers in search of “healthy” products from animal origin. Despite numerous efforts of involved professional groups the level of production diseases in livestock production remains on a high level (Knaus, 2009).

Production diseases are multi-factorial and emerge from manifold risk factors and processes which in themselves would not necessarily cause clinical signs of a disease. Their occurrence indicates an overstrained capacity of the farm animals to cope with the living conditions provided by the specific farm situation (Gröhn et al., 1998). Thus, animal health is a complex phenomenon which can be defined as an emergent property of living systems and which cannot be deduced from single factors (Sundrum, 2012).

Several studies revealed an unsatisfactory animal health status on the farm level, varying more between single farms within than between production methods (Vaarst et al., 2008). Correspondingly, farm management plays a key role for any improvements of the animal health status, relying on the perception of diseases, targets as well as on the decisions and implementations.

An enduring high level of production diseases questions the effectiveness of the previous approach of knowledge transfer with respect to animal health. Therefore, implementations and barriers in the process of knowledge transfer have been the topic of a study taking different stakeholder perspectives into account. The communication process between stakeholders was analysed using instruments of communication science.

## **Methods and material**

Farmers, agricultural and veterinarian advisors as well as animal scientists were identified as primary stakeholders in the process of knowledge transfer with respect to a reduction of multifactorial production diseases. To assess their specific perspectives, separate workshops for each stakeholder group were held to start with and complemented in due time by a common workshop with all participants. To foster unbiased debates, the project team limited itself to an observer role, leaving the moderation of the workshops to a skilled and impartial communication expert. Altogether 26 farmers, agricultural and veterinary advisors, and animal scientists participated in the project.

### **Estimation of animal health situations**

Each separate workshop started with a brief estimation of different animal health situations. A questionnaire was designed to capture the process of perception, interpretation and considerations with respect to further actions to improve the situation. Five different animal health findings were presented to the participants by pictures (2), data sheets (2), and a video sequence (1). The first situation showed a picture, illustrating an acute udder inflammation of a single dairy cow. The second finding was represented by data on somatic cell counts (SCC) in a dairy herd from a monthly milk record, indicating the number of animals in different categories of SCCs on the farm level. This was followed by a picture of a clinical udder infection of a sow together with young piglets. The fourth situation was again represented by a data sheet, showing anatomical-pathological findings above average on lesions of lungs in fattening pigs, recorded as routine meat inspections at the slaughterhouse. The last health problem was illustrated by a short video, showing an obvious lame dairy cow in locomotion.

Open ended and closed ended questions on the findings were answered individually by the participants. Open ended questions aimed to capture opinions and attitudes without the influence of given options, while closed ended questions were used to focus on the intended context.

### **Estimation of single animal's general condition and with regard to herd health status**

For each of the presented findings, the participants were individually asked to give estimation either on the animals' general condition (situations 1, 3, and 5) or on the herd health status (situations 2 and 4) on a visual analogue scale (VAS). The VAS is a method for the assessment of subjective attitudes, first used in the measurement of pain in humans, but also validated for the assessment of lameness and pain in animals (Hudson et al., 2004). The participants were asked to mark a point on a 10 cm horizontal line. The end-points for the estimation of the impairment of the general condition were marked with "no impairment" (0) and "severe impairment" (10). For the assessment of the herd health status, represented by the data on SCC and lung lesions, the end-points were labelled "very good" (0) and "very bad" (10).

### **Role expectations in connection with animal health**

A role in a social situation is characterised by a set of rights, duties, expectations, norms and behaviours (Wiswede, 1998). Open ended questions such as: 'How would you interpret what you see?' and 'What should be done by whom?' were asked to examine the perception of roles in relation to animal health and evaluated by qualitative content analysis. According to a code of practice, described by Mayring (2000), the text material was analysed step by step, first aiming for an inductive development of categories. Hence, categories were defined according to the research question (role expectations in terms of animal health), taking the theoretical background on role theory as well as the answers into account. In an iterative process, including several feedback loops, the textual material was coded to the categories, thereby revising and further aggregating.

gating them to main categories. Afterwards the frequencies in the use of the coded categories were analysed.

### **Environmental (stakeholder) analyses**

Environmental (stakeholder) analyses (ESAs) are an instrument known in the project management to identify different stakeholders and influencing variables to analyse their interests in the project, and to understand their relationship (Vetter, 2012). In this study the ESA was used to gain a visual overview on persons, institutions, factors, and framework conditions in terms of animal health. Listing stakeholders and relevant factors was the first step to elaborate an ESA. According to their significance on animal health, the items were noted on cards of three different sizes (small, medium, large = little, medium, great importance). The cards were placed on posters, showing their relation to the topic and each other item. Lines, arrows and symbols were used to express the quality of relations. In the separate workshops all participants were asked to elaborate an individual environmental (stakeholder) analysis and to present them to the workshop group afterwards.

For further analysis the items were condensed in categories, following the steps of qualitative content analysis, and evaluated according to their size and position using basic statistics. The card size was coded from 1 (small) to 3 (large); the position was valued on a scale from 1 to 6 (1 = peripheral, 6 = central).

### **Common workshop**

In the final common workshop, interim results on the estimation of animal health situations and from the ESAs were reported to all participants, providing the option to give a communicative validation in the form of a discussion in small groups and a presentation of the main outcome, written on moderation cards, to the group and the project team. In addition the communication expert offered a summary from the perspective of communication psychology, emphasising conflicting interests and fault lines revealed by the preceding workshops.

Thereafter the participants worked in small groups on topics identified during the first workshops and reflected on options for action. Group discussions were performed in dialogue-café, an adaptation of the methodology of the world-café according to Brown (2005). The process of dialogue cafés consisted of two rounds. In the first round the workgroups were mixed from all three stakeholder workshops to discuss selected barriers revealed in the separate workshops. In the second round of dialogue cafés the participants worked on three tables within their stakeholder group and on the fourth table in a mixed group on the question how to define specific areas of action. Results were presented to the whole group and the project team.

## **Results**

### **Assessment of animal health situations**

Tables 1 and 2 represent the average estimations regarding the animals' general condition (findings 1, 3 and 5) and the herd health status (findings 2 and 4) on a visual analogue scale (VAS) for each workshop. The assessment regarding a lame cow, presented by a short video sequence, varied the least. The assessment on the VAS ranged from 7.0 in the farmers' workshop up to 10 in the workshops of farmers and researchers. Concerning the findings presented by pictures, the assessments varied more both within (situation 1) and between the workshop groups (situation 3). The estimations regarding the herd health status presented by data on SCC and findings at the slaughterhouse showed the highest variation for both situations in the workshop of advisors and least in the workshop of farmers.

Table 1: Average estimations from three workshop groups on the impairment of animals' general condition based on pictures and a video sequence

Findings		Workshop	N	Minimum	25 <sup>th</sup> percentile	50 <sup>th</sup> percentile (median)	75 <sup>th</sup> percentile	Maximum
1	Picture, udder, cow	Advisors	9	1.9	6.2	6.6	8.0	9.4
		Farmers	8	2.6	6.3	6.8	7.9	8.5
		Researchers	9	2.3	5.1	7.1	8.2	9.5
3	Picture, udder, sow	Advisors	9	5.8	7.6	8.2	8.8	10.0
		Farmers	8	5.5	7.6	8.1	8.2	8.4
		Researchers	9	1.8	5.0	6.5	7.7	9.5
5	Video, lameness, cow	Advisors	9	7.3	7.7	8.5	9.3	9.5
		Farmers	8	7.0	8.5	9.5	9.7	10.0
		Researchers	9	7.5	8.6	9.3	9.5	10.0
VAS end-points: 0 = no impairment, 10 = severe impairment								

Table 2: Average estimations from three workshop groups on the herd health status based on data on somatic cell counts and lung lesions

Findings		Workshop	N	Minimum	25 <sup>th</sup> percentile	50 <sup>th</sup> percentile (median)	75 <sup>th</sup> percentile	Maximum
2	Data, SCC, dairy herd	Advisors	9	3.7	6.5	8.2	8.9	9.6
		Farmers	8	3.4	5.8	6.6	6.8	8.3
		Researchers	9	3.3	7.0	7.4	8.3	8.8
4	Data, lung lesions, pigs	Advisors	9	2.9	4.9	7.8	8.5	10.0
		Farmers	7	5.3	6.4	6.7	7.0	7.5
		Researchers	9	3.8	6.3	6.9	7.6	8.2
VAS end-points: 0 = very good, 10 = very bad								

### Analysis of role perceptions and expectations

Role expectations were assessed from answers to open ended questions on the interpretation and considerations concerning the presented pathological findings. In total, 661 assignments to the roles of farmers, veterinarians and advisors were found. Most of the expectations were formulated in the researchers' (264) and the advisors' workshop (248) and for the role of the farmer (387), followed by the roles of the veterinarian (201) and the advisor (73). Expectations found in the assessment were grouped in 20 categories. Table 3 shows the relative frequency of expectations, formulated for the roles in the three workshops. For each role, expectations varied considerably between the three groups and especially between the self-perception and the assignments from other stakeholders.

### Evaluation of the environmental (stakeholder) analyses

In 26 ESAs a total of 391 factors, institutions, groups and persons were named. In a first step the terms were grouped in 46 topics. After the presentation to the workshop participants in the common workshop, the aggregation was reworked, taking the feedback into account. The terms were finally subsumed in 27 categories. The category 'veterinarian' was found in all ESAs while 'advisor' and 'farmer' appeared in 23 and 22 ESAs, respectively. While 'farmer' was placed centrally in most of the posters (average position 5.32), 'advisor' (average position 3.69) and 'veterinarian' (average position 3.39) occurred with some distance to the centre.

Table 3: Role assignments to farmers, veterinarian and advisors

Assignment of categories from each workshop in %	to the role of farmers			to the role of veterinarians			to the role of advisors			n=
	A	F	R	A	F	R	A	F	R	
Consulting an expert	<b>23</b>	<b>18</b>	<b>23</b>							84
Taking care of the animal(s)	<b>17</b>	<b>28</b>	<b>12</b>							70
Medication	1		1	<b>25</b>	<b>24</b>	<b>29</b>	<b>8</b>			58
Control of housing conditions	6	4	7	<b>14</b>		<b>1</b>	<b>27</b>	<b>17</b>	<b>21</b>	51
Optimise (formulating the need for improvement in specific areas)	13	10	10	1		1	<b>8</b>	<b>25</b>		50
Control of the herd	<b>4</b>	<b>8</b>	<b>10</b>	<b>7</b>		<b>5</b>	<b>16</b>	<b>8</b>	<b>8</b>	49
Need for cooperation	5	4	7	<b>7</b>	<b>12</b>	<b>7</b>	<b>11</b>	<b>17</b>	<b>29</b>	48
Diagnosis				<b>20</b>	<b>12</b>	<b>19</b>	<b>5</b>			39
Control of single animal	10	11	7	1	4	1				37
Find the cause	4	4	5	<b>1</b>		<b>5</b>		<b>8</b>	<b>25</b>	29
Develop a concept	2	3	2	<b>6</b>	<b>12</b>	<b>7</b>	<b>5</b>	<b>8</b>	<b>13</b>	29
Detection of pathogens				<b>7</b>	<b>24</b>	<b>12</b>	3			24
Collect a sample	2	4	1	4	4	2	<b>8</b>			18
Coaching				4	4	7	<b>8</b>	<b>17</b>	<b>4</b>	16
Observing animal health situation	5	6	1							14
Taking note of information	<b>2</b>		<b>6</b>							11
Carry out (acting on instruction)	<b>3</b>		<b>5</b>							11
Culling	4	1	2			1				10
Testing for antibiotic resistance				4	4	3				7
Animal health management	2	1	2							6
<b>Total in %</b>	100	100	100	100	100	100	100	100	100	
<b>n=</b>	126	112	149	85	25	91	37	12	24	661

A = Advisors' workshop, F = Farmers' workshop, R = Researchers' workshop  
 Figures in bold indicate a variation  $\geq 5\%$  for a role within the three workshops.

The farmer was valued as the most important stakeholder in the context of animal health, represented by the average size of the cards of 3.0. Following categories in the ranking represent the direct environment on the farms like 'animal' (average size 2.6), 'forage and employees' (both 2.5), 'family' (2.3) and 'barn' (2.2). The most important category from outside this inner circle was 'purchase & trade' (2.1), followed by 'veterinarian', 'advisor', 'colleagues', 'further education' and 'external factors' (all 2.0). The category 'science' was placed in 14 ESAs, while its importance was valued on a comparable low level (1.6). Beside the stakeholders participating in the workshops, 'consumers', 'supplier', 'policy & administration', 'purchaser & trade', and 'farmers associations' were identified as relevant stakeholders of high influence on the animal health issue.

For some categories the frequency and size varied considerably between the workshops (.

Table 4.) The categories 'barn' and 'forage' were found in nearly all ESAs in the farmers' workshop and only in one ESA of the other workshops. Terms of the category 'purchaser & trade', 'family' and 'economy' were found in nearly all ESAs in the advisors' workshop while they appeared less in other workshops. The categories 'animal' and 'science' were found in nearly all ESAs in the researchers' workshop. Taking into account the size of the cards, representing the importance of the terms, the largest variation between the workshop groups was found for the categories 'consumer', 'farmers' association', and 'public opinion'.

Table 4: Categories from environmental stakeholder analyses in the context of animal health representing the upper 33% of variation in frequency and/or size within three workshop groups

Workshop	Advisors (n= 9)		Farmers (n= 8)		Researchers (n= 9)	
	Frequency	Average size	Frequency	Average size	Frequency	Average size
Advisor	7	2.1	7	1,3	9	2,3
Purchaser & trade	8	2.3	3	1.3	5	2.4
Family	8	2.6	3	2.0	4	2.0
Animal	2	2.5	5	2.6	8	2.6
Consumer	5	1.0	4	1.0	6	2.5
Economy	8	1.9	3	2.0	3	2.0
Policy & administration	5	1.8	2	1.0	7	1.9
Science	2	1.0	4	1.5	8	1.8
Colleagues	7	2.3	4	1.5	2	2.0
Supplier	6	2.0	0		4	1.8
Barn	1	1.0	8	2.4	1	2.0
Farmers' associations	2	2.5	2	1.0	5	1.4
Further education	3	2.3	3	1.3	2	2.5
External factors	1	3.0	4	2.0	2	1.5
Public opinion	3	1.7	2	1.0	2	2.5
Forage	0		6	2.5	0	

Size: 1 = small, 2 = medium, 3 = large

### Results from the common workshop

All workshop groups identified animal health as a significant value, desirable for all participants. Nonetheless, during the workshop process three main areas of conflict emerged in group discussions (Table 5) and were presented to the participants in the common workshop.

Table 5: Fault lines in connection with animal health

Animal health	↔	Economy
Detailed knowledge	↔	Holistic view
Individual autonomy	↔	Public interest

The conflicting areas of animal health and economy on the farm level are an issue especially for the group of farmers. Striving for detailed knowledge and objectivity, a topic addressed to the researchers contradicts with the complexity of individual farm conditions and impedes the applicability of findings. The farmers' claim of autonomy in form of independent decisions in their business conflicts with the public interest in the animal health issue as a common good. Aiming to resolve conflicts and considering opposite opinions was expected to lead to intense discussions between stakeholders. However, the participants seemed to avoid discussing conflict issues and changing perspectives while persisting in previous argumentation lines in the first place.

From a list of topics revealed during the separate workshops, the participants chose (i) animal health, (ii) transfer of knowledge, (iii) reflection on barriers, and (iv) understanding of roles to work with in the first round of the dialogue cafés. The main findings according to these issues were the diverse understanding of animal health; the lack of definitions and thresholds; the meaning of experiential knowledge for research; the tendency to whitewash and justify insufficient conditions; the absence of psychological strain; and the need to meet with other stakeholders at eye level. Based on these insights the second round of the dialogue cafés yielded the following

options for action: increasing the motivation, standards and indicators, models for cooperation, create options for communication, holistic view, significance of animal health.

## **Discussion**

The assessment of animal health situations was based on limited information, provided as pictures, data sets and a video. Therefore, the aim was not to evaluate right or wrong answers, but to capture the variation that occurs in the process of perception, interpretation and action. This refers to the internal character of knowledge, which is embodied in humans, depending on the context, and constructed by the knower (Probst et al., 2006). The pictures, video and data sets provided different amounts of information: while pictures left the most room for individual perception and interpretation, the video clip provided much more information. For the pathological findings presented by data sheets containing high levels of SCCs in a dairy herd and findings on lung affections in fattening pigs, the perception of the visual presentation was expected to have a lower influence on the process of perception and interpretation, because the information was plainly visible in the table. Accordingly, the variation in the estimation of herd health situation based on the data sheets could be expected to be lower than in the cases presented by pictures only. However, the variation in the interpretation of the SCCs and lung lesions was quite high, indicating the existence of different reference values concerning the evaluation of pathological findings, presumably leading to diverging sense of urgency. Garforth et al. (2013) and van Asseldonk et al. (2010) found farmers referring to farm level constraints when arguing against the implementation of measures and considering actions with regard to SCCs with reference to their specific beliefs in efficacy, thereby acting self-referential and not in relation to an external reference value.

The results of 26 individual ESAs created by different stakeholders depict the system of communication and operational structure concerning the transfer of knowledge on animal health. In most ESAs, veterinarians, advisors and farmers were identified as actors in the field of animal health. The perception of rights, duties, expectations, norms and behaviours assigned to the own role and those of the other actors varied between the workshop groups. The large variation between the stakeholder groups indicates not only different expectations but also different understanding of responsibilities. Both can be seen as an essential barrier in the process of knowledge transfer.

In the common workshop the participants faced the heterogeneity in the assessments and opinions on animal health. While the separate workshops were quite reflective, the common workshop gave hints for a relapse into self-referential perspectives on individual and group level. Confronted with other perspectives, the participants seemed to seek coherence within their corresponding peer groups to underpin their positions. This observation matches with the importance of coherence (e.g. with own world views or peer groups) revealed by Kahneman (2012), supported by system justification theory (Jost, 2009).

## Conclusions

Results of the study revealed a quite complex situation due to the plurality of stakeholders, huge variation in statements between and within stakeholder groups, and the manifold parameters to be considered. Single actors in the system of communication and operational structure do not have a general overview and operate from their self-referential perspective.

The theoretical construct “animal health” was understood quite differently by the stakeholders, emphasising the need for orientation which could be provided for instance by clear thresholds in relation to mean values of prevalence rates of certain production diseases which should not be exceeded. Differences in role expectations and vague perception of responsibilities were identified as barriers in the system of communication structures and conditions, depicted in the environmental (stakeholder) analysis. The analysis of communication processes uncovered a lack of leadership, self-referentiality, self-justifying judgments and role conflicts.

The farm centred ESAs from the farmers’ workshop as well as group discussions fostered the assumption that the driving forces to improve the current unsatisfactory prevalence rates of production diseases are not fuelled by the stakeholders who have to take action and efforts. Stakeholders tend to justify their role and the system, even if they are disadvantaged by the system, especially when the situation is perceived as not changeable (Johnson & Fujita, 2012). We conclude that the current communication structure is not appropriate to enable a target-oriented transfer of knowledge with respect to animal health. Hence, an impulse from “outside” is required to irritate the deadlocked situation and provide new orientation.

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