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# **Linking Animal-Health-Related Information to an Integrated-Animal-Health System**

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## Linking Animal-Health-Related Information to an Integrated-Animal-Health System

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### Abstract

EU-regulation (EG) 178/2002 and the EU hygiene package have fixed general principles and requirements for the food law. Some of these principles and requirements are related to the issues of traceability and quality assurance along the agro-food-chains and affect all participants of the supply value chain. This paper focuses on the implementation of these requirements to the livestock farmer and veterinarian segment of the supply value chain. Livestock farmers and veterinarians are responsible for animal health, which is one of the key features of quality assurance. Furthermore, both groups already document information related to animal health. Often, the documentation is comprehensive and at times redundant, and is accomplished manually. Currently, an IT-solution does not exist for the entire supply-value chain of livestock farming and animal products in Germany. Only isolated IT-solutions exist. An integrated IT-solution for farmers and veterinarians has not yet been developed. The development of an IT-system meeting these requirements is the main objective of the BMBF-funded project IT Food Trace in collaboration with IBM. In this paper, first results of an analysis of stakeholder acceptance of IT-solutions will be presented (livestock farmers and veterinarians).

**Keywords:** *IT-based animal-health system, traceability, quality assurance, agro-food-chain, livestock production, integrated IT-solution*

### Introduction

Changes in EU-regulations regarding traceability and quality assurance allow IT-based data documentation of relevant information along the agro-food-chain (e.g. regulation (EC) 178/2002, EU Hygiene-Package) (cf. unknown author, 2006; Hartig and Untermann, 2005). These regulations affect many participants in the supply value chain, including farmers and veterinarians. Both groups must comply with the regulations (EC) 178/2002, (EC) 852/2004 and (EC) 853/2004, which are also connected to national regulations (e.g. regulation requiring documentation of veterinary medicine). Livestock farmers and veterinarians partially document the same information and depend on information from each other (e.g. veterinary medicine chest) (Gollé-Leidreiter, 2004). The veterinarians pass the application- and dispensing document (Anwendungs- und Abgabebeleg) to the livestock farmer. This form includes the following information: animal identity, diagnosis, medicine, charge identification, quantity of application, dosage, waiting period (standby time). The livestock farmer must keep a "stock book," which contains information regarding animal identity, medicine, dosage, date of application, waiting period in days and the name of the person that administers the medication (Rothfuß, 2006).

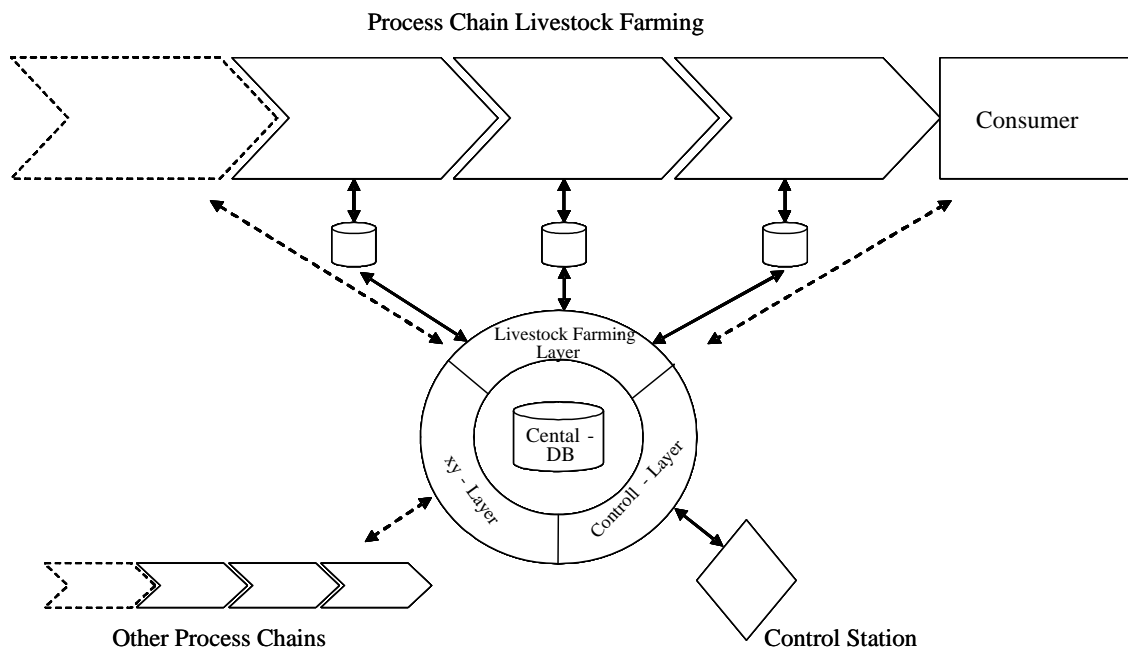
The documents of both farmers and veterinarians are also important information sources for public administration. More transparency of quality assurance and traceability could be obtained, but would involve higher administrative expenses for all process participants involved, as well

as a redundancy of certain data (e.g. identity of animals) and a lack of efficiency (Rothfuß, 2006).

According to the above mentioned EU-regulations, IT-solutions are allowed, however currently only isolated applications exist along the supply value chain “livestock farming”. An integrated IT-solution for livestock farmers and veterinarians has not yet been developed and standardised interfaces are not common between the presently employed technologies. An IT-based integrated-animal-health system would not only guarantee a higher level of traceability and quality assurance for customers and public authorities, but should also help livestock farmers and veterinarians to optimise production management. For example, this can be achieved through animal-specific analysis and increased animal health prophylaxis, which could lead to reductions in cost.

## Objectives

This sub-project of IT FoodTrace ([www.itfoodtrace.de](http://www.itfoodtrace.de)) focuses on the analysis of data acquisition, data flows and data retrieval between selected process participants (e.g. livestock farmers, veterinarians, public authorities). Currently available data (systems) from each of the process participants, which are often decentralized, deficient and redundant, will be consolidated into an integrated-animal-health system for cattle and pigs. This will allow for an optimised utilisation of already available data on animal health. Figure 1 shows a possible future scenario in a simplified and abstracted version.



**Figure 1.** Future situation, simplified and abstract, displayed

Connected to the development of IT-models are concepts of user rights and responsibilities for data and information.

## Conception and methods

The conception and development of the IT-model can be divided into five steps:

- Sensitisation and analysis of acceptance of stakeholders (livestock farmers, veterinarians, public authorities)
- Comparative analysis of different IT-applications for animal health
- Conception and verification of various IT-applications
- Exemplary implementation of an IT-model, concept development regarding user rights and responsibilities
- Evaluation and improvement of the chosen IT-model

A combination of methods will be involved in the execution of these steps. Table 1 connects the steps with their related method.

**Table 1.** Combination of methods

Steps	Methods
Sensitisation and analysis of acceptance	Survey - written survey; - guideline-based interviews with experts Document analysis
Comparative analysis of different IT-applications to animal health	Case analysis
Conception and verification of various IT-applications	Lead-User-Analysis Data-Flow Modelling
Exemplary implementation of an IT-model	Specification sheet
Evaluation and improvement of the chosen IT-model	Benchmark-Analysis

### *Research design*

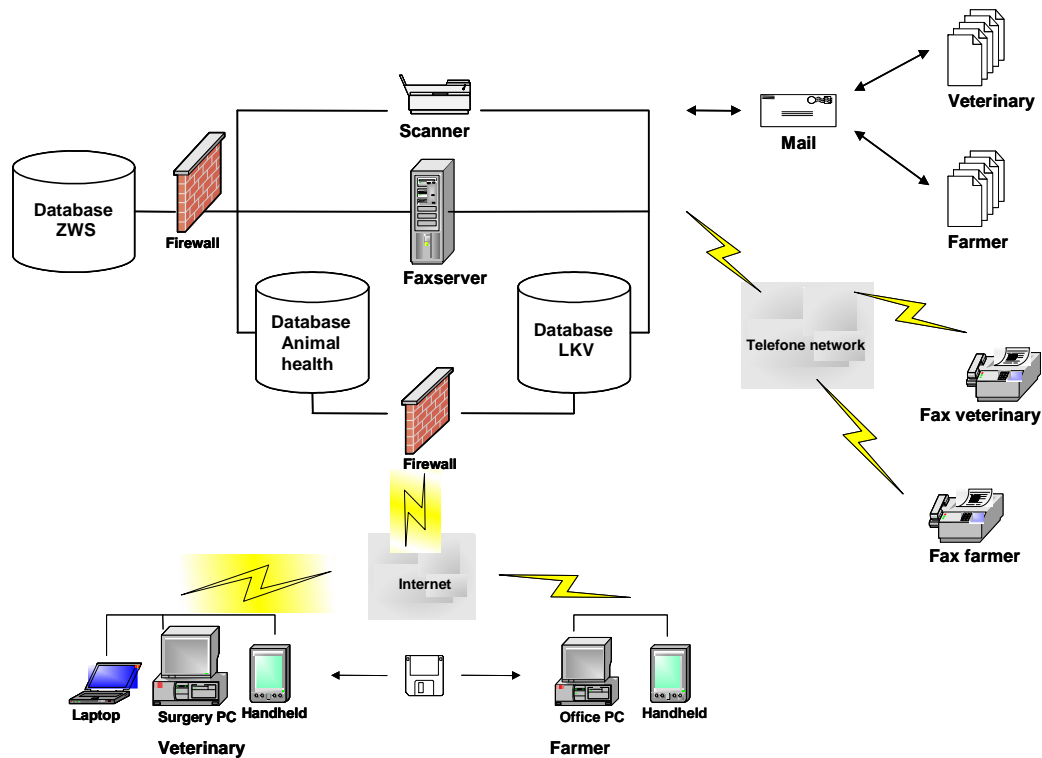
Within the scope of Step One, livestock farmers and veterinarians in the German state of Baden-Württemberg were surveyed with the aid of a standardised, written questionnaire: the veterinarian-survey as a self-administered survey, the livestock farmer-survey as a survey with assistance. Both surveys contained primarily closed questions.

The survey was conducted between December 2006 and January 2007. The surveys were given to 84 dairy farmers and 400 veterinarians (equal to 75 % of practising veterinarians with emphasis on large and mixed animals). First sampling criterion for dairy farmers was that the dairy farm had to have more than 40 dairy cows. This seems to be the minimum farm size that makes an investment in and the application of information- and communication technology efficient. The second sampling criterion was based on an organisational reason. Livestock farmers had to be members of the Landesverband Baden-Württemberg für Leistungsprüfung in der Tierzucht e.V. For veterinarians, the key sampling criterion was that they primarily focus on large animals or mixed animals. A total of 79 veterinary questionnaires were returned. That implies a rate of return of 20 percent. In the case of livestock farmers a return rate of 100 percent was achieved because of the support by the LKV-staff. Both empirical studies are not representative.

*Research questions included*

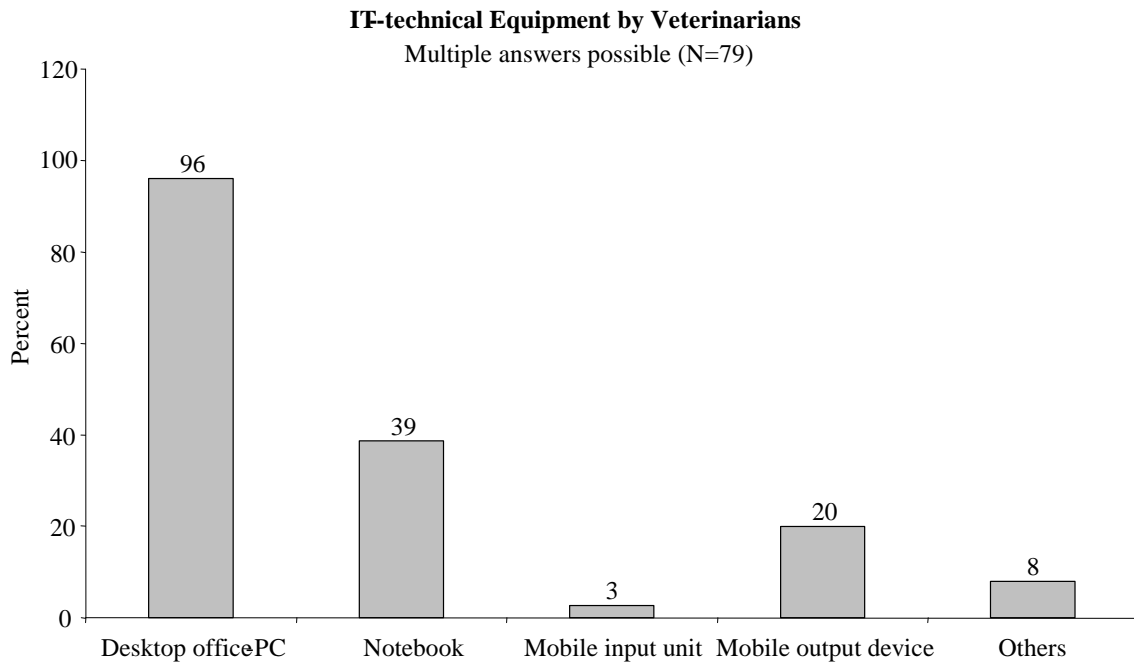
- What is the state of the IT-technical equipment of livestock farmers and veterinarians?
- How are the relevant working procedures carried out and how much time is required for relevant operational procedures?
- What benefits of an animal-health system can be identified by the potential user?

The first research question provides information regarding the technical equipment in hard- and software. Furthermore, it points to the most popular sectoral software. Figure 2 shows a potential version of an animal-health data network.



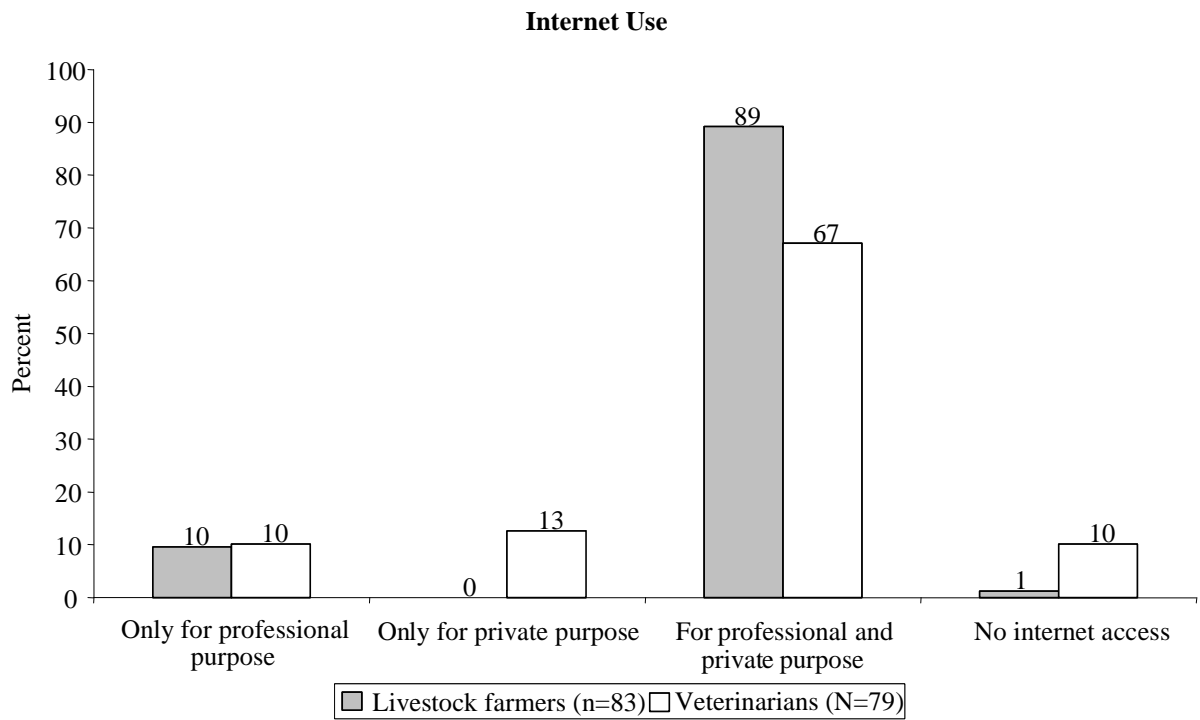
**Figure 2.** Animal health –data network (Source: Doluschitz, Kaiser, 2004)

Preliminary results of the analysis of the questionnaires show that the technical equipment of veterinarians is mostly the desktop-office PC (96%) followed by notebooks (39%). Mobile-output devices (20%) or mobile-input units, such as PDAs (3%) are quite rare (Figure 3).



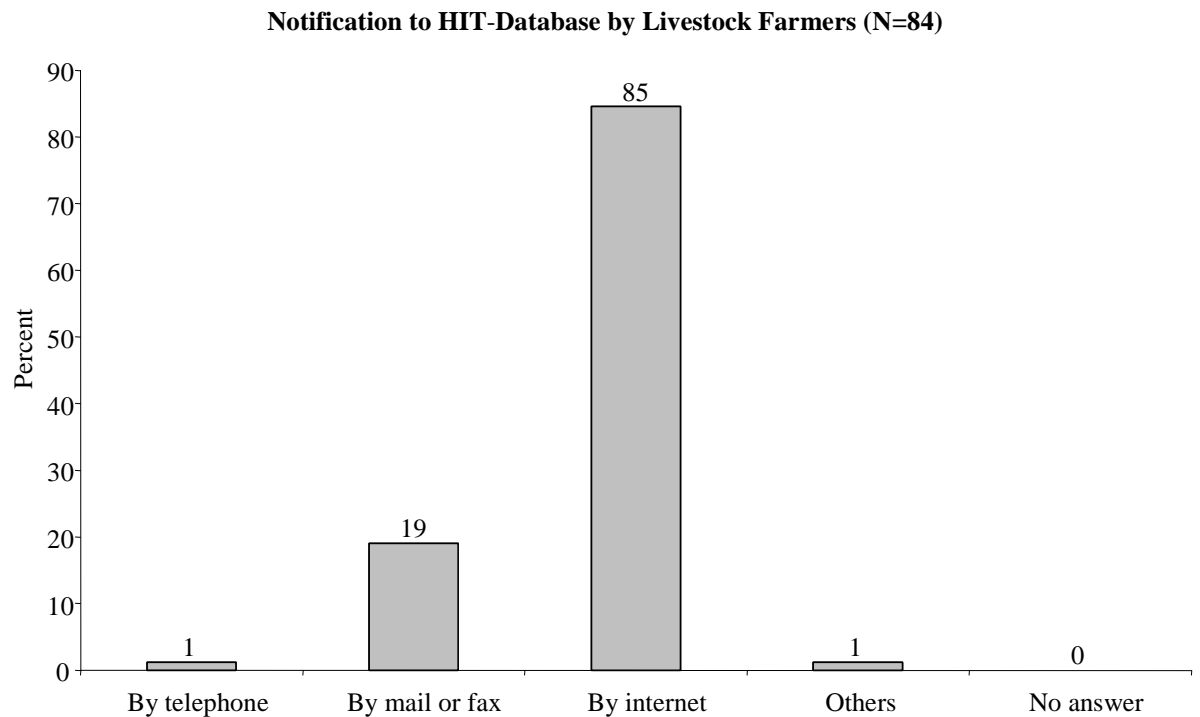
**Figure 3.** IT-technical equipment by veterinarians

The Internet is one of the primary information and communication technologies. The access to and the use of the Internet are key factors in the implementation of an integrated animal health system. Figure 4 depicts internet access and the focus on internet-use by veterinarians and livestock farmers. Nearly all questioned livestock farmers have internet access and use it for professional purpose. In comparison, ten percent of the questioned veterinarians have no internet access and around 13% use the internet exclusively for private purpose. As sectoral software, livestock farmers predominantly utilise acreage index and cow planner. Circa 80 percent of the questioned veterinarians use practice-management-software. These are mainly products of the firms EasyVet, Vetinf or Vetera.



**Figure 4.** Internet Use

An indicator for the popularity of the internet for livestock farmers is shown in Figure 5. The majority of interviewees (85%) are notifying the HI-T database via internet. Information transfer by mail, fax or phone is infrequent.



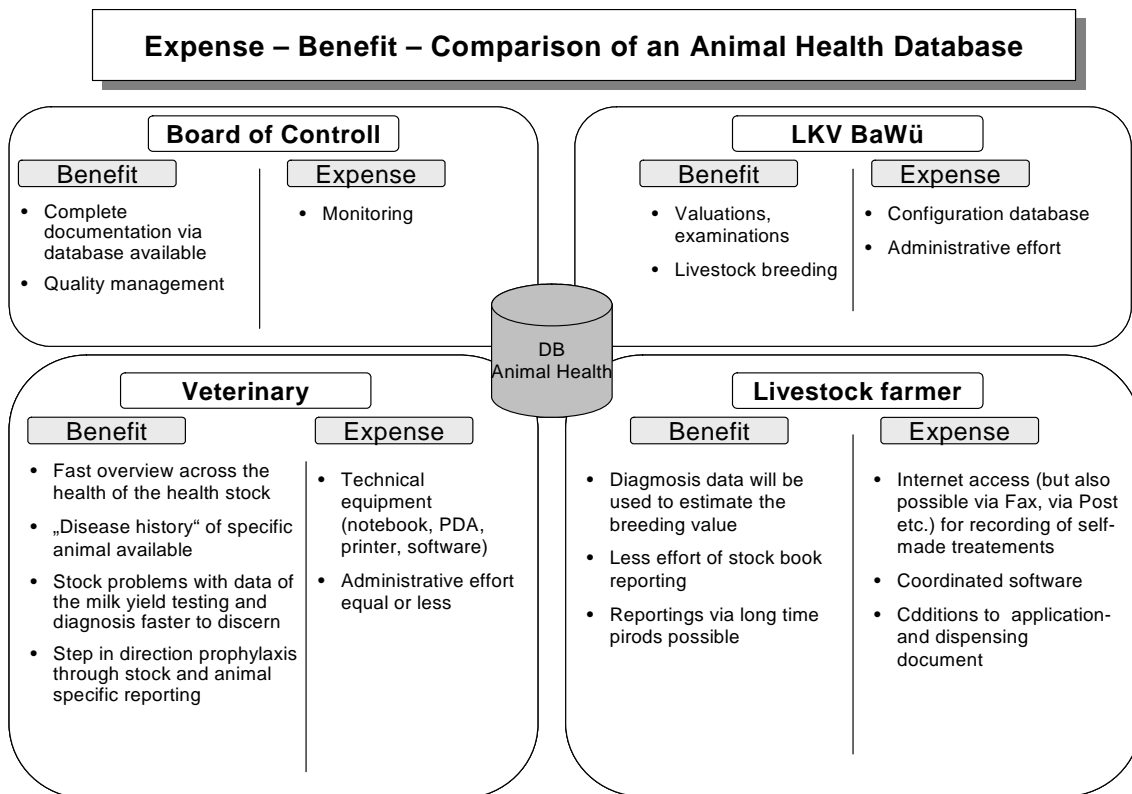
**Figure 5.** Notifying the HI-T database

The second research question - how are the relevant working procedures carried out and how much time is required for relevant operational procedures - should provide information about specific operational procedures:

- Veterinarians - complete and hand over the application- and dispensing document, make out an invoice;
- Livestock farmer - administer the stock book, receive the application- and dispensing document, notify to HIT-database<sup>1</sup>, receive administrative requests, receive requests of statistics agencies.

Both groups carry out nearly all the operational procedures manually or with traditional communication technologies (e.g. phone, fax). The only exception is the above mentioned notification sent to the HIT-Database (cf. figure 5). The estimation of specific working procedures is very different in both groups. Reasons can be diverse firm sizes, structures and emphases, or management systems.

The third research question is: what benefits can be identified by the potential user. Figure 6 indicates the results of a theoretical analysis.



**Figure 6.** Expense–Benefit–Comparison of an animal-health database (Source: Doluschitz nach Gollé-Leidreiter 2004)

A preliminary analysis showed that livestock farmers and veterinarians identify the same expedient applications that can generate a benefit for them (see table 2). Both groups estimate the usefulness of diagnosis data of the livestock or of the individual animal best, followed by the application “Access to data of the milk yield testing for the farm veterinarian”.

1. HIT-database is the national database on origin safety and information system for animals.

**Table 2.** Expedient application of an animal-health system

	<b>Application</b>	<b>Veterinarians (N=79)</b>	<b>Livestock farmers (N=84)</b>
1.	Diagnosis data of the livestock	80	80
2.	Diagnosis data of individual animal	79	80
3.	Access to data of the milk yield testing for the farm veterinarian	73	64

Both livestock farmers and veterinarians emphasized their interest in an integrated- animal-health system, and in the linkage of animal-health data and milk yield testing data. Around half of the interviewed livestock farmers would take part in an IT-based animal-health system. A further 27 percent are undecided.

Veterinarians assume obstacles for the establishment of an integrated-animal-health system caused by lack of customer acceptance, lack of knowledge, technical problems and doubts concerning data security.

### **Conclusion and Outlook**

The results of the empirical studies confirm acceptance of linking animal-health-data with milk yield data. Both interest groups assess the diagnosis data of livestock and of the individual animal as important for the improvement of animal health and livestock production. In the face of an IT-based animal-health system, all participants should have similar IT-technical standards and knowledge, in order to enter the animal-health system. At the moment, veterinarians seem to lag behind. Information, consultation and training in user-oriented IT-themes are required. Specific attention should be given to the aspects of data security and access rights.

The next step is a survey in the north of Germany, to verify the results of the surveys in Baden-Württemberg. Different structural conditions exist in the north and south; farms in the north tend to be more specialized enterprises, while their southern counterparts tend to be smaller and family-run. Furthermore, the target groups will be expanded by including administrative institutions. To evaluate our activity with respect to integrated animal-health systems, a screening and analysis of analogous developments abroad will be undertaken. In a broader view, this project can have impacts on traceability, quality assurance, and food safety and improve production management and stock management.

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