Impact matrix analysis and cost-benefit calculations to improve management **pr**actices regarding health status in **o**rganic dairy farming

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D2.5 - Results of on-farm assessments

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Executive Summary

This document provides a comparison of on-farm assessments of animal health status in a sample of European organic dairy farms based a harmonized calculation of indicators. It also provides an orientation for their potential use and usefulness based on a stakeholder consultation.

Dissemination Level		
PU	Public	PU
PP	Restricted to other program participants (including the Commission Services)	
CO	Confidential, only for members of the Consortium (including Commission Services)	

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1 Introduction

One compelling, and selling, argument with organic dairy production is that the conditions under which animals are kept and managed should be favourable towards animal health and welfare. Indeed, the EU-Regulation on organic livestock production (EEC-No. 834/2007; formerly EEC-No. 1804/1999) was introduced to provide a framework ensuring living conditions for organic livestock to be better than those in conventional systems, to harmonise the rules across member states, and to make all organic systems across EU members subject to minimum standards. Previous research has, however, shown that this is not necessarily the case and that animal health status in organic dairy farming does not in all respect meet consumers' expectations. The rationale for the IMPRO-project is that the animal health status in European organic dairy farms must be improved, and this will only be possible if herd health plans are designed and targeted specifically in response to the disease profile present on an individual farm. A basic component of herd health plans is the setting of goals that should be achieved, followed by relevant action plans and re-evaluation of goals, etc. Such goals should be herd-specific, but may be influenced and founded on benchmarking based on comparable herds. Such information is however limited.

The common ground and differences between farms and European regions within the IMPRO-project provides options to elaborate reference values for an achievable minimum standard with respect to production diseases. This would provide orientation for farmers and their advisors for setting up herd health plans, but also to retailers, consumer groups and administration bodies at the regional, national and European level. However, targets and the use of reference values may well be different depending on the user, and it is not yet obvious how such values could be established.

The objective of the research underlying the current document is to provide basic information on the status of animal health on European organic dairy farms. Focus is on production diseases, a term introduced in the first International Conference on Production Diseases (ICPD) that was held in Urbana-Champaign, Illinois in 1968 defining them as multifactorial diseases associated with husbandry, feeding, performance, breeding, and management. The report has a focus on production diseases because they are linked to farming systems and management decisions and thus related to the regulatory framework of organic production. The management related to other diseases, such as contagious epidemic diseases, may not necessarily differ between organic and conventional systems and are not covered in this report. The most important production diseases are related to udder, reproductive, metabolic, and locomotion disorders. Due to data availability only udder and metabolic disorders will be directly covered in this report, and reproductive disorders only indirectly, while locomotion disorders will not be covered at all. However, aspects related to production diseases, such as mortality, is covered.

2 Material and methods

The material for this report originates partly from data recorded and retrieved for the organic dairy farms in France (FR), Germany (DE), Spain (ES) and Sweden (SE) that participated in WP2 of IMPRO. The material was also partly collected at stakeholder consultancy workshops.

2.1 Assessing the status-quo of animal health

2.1.1 Data source

Data from the national recording systems was retrieved according to the specifics for each country. All countries had access to data from the official milk recording schemes and the artificial insemination (or natural service) databases and all, except Spain, also had access to data from the animal identification and registration databases. The different databases were in most cases separate entities, except in Sweden where all the information is maintained in a common cattle database for herds that participate in the official milk recording scheme. The data in the databases are not freely available and in all countries permission from the participating farmers and database managers had to be received before the data could be collected. In most cases, the retrieval of data involved additional costs as well as conditions for the use of data and publication of results.

The national recording systems are not harmonized and recordkeeping is vastly different, as is the amount of information that is recorded. For the purpose of this report, mainly data that was available in all participating countries was used, and transformed into a common file structure as follows:

File	Fields
Animal	• unique cow identifier. • date of birth • cow breed
Milk records	• unique herd identifier • date of milk recording • unique cow identifier • calving date • cow parity • milk yield in 100 g • butterfat content in g/10 kg • protein content in g/10 kg • somatic cell count in 1,000 cells/mL • urea content in mM (only DE and SE)
(Artificial) inseminations	• unique herd identifier • unique cow identifier • calving date • date of artificial insemination
Animal movements	• unique herd identifier • unique cow identifier • date cow moved into this herd • reason for cow moving into this herd • date cow moved out of this herd • reason for cow moving out of this herd

Data was not available for all 192 herds in the IMPRO-project, because some did not participate in the milk recording schemes the year of data recording.

2.1.2 Scripts

All national recording schemes perform calculations based on their raw data, but very few such calculations are performed in a harmonized way and they can therefore not be used for comparisons across countries. Common procedures for calculations were therefore devised by researchers from

the French IMPRO-partner in consultation with the other partners participating in WP2. The procedures were written as scripts in R (http://www.R-project.org), and were applied by all countries to arrive at similar data sets with information on herd-level indicators.

Indicators were calculated for the time-period from June 2012 until May 2013, which involved data from both before and after that period, e.g. prior calving for calculating calving interval.

2.1.3 Indicators

Herd level indicators that describe the characteristics of the herds were calculated:

1. Number of cow-years – defined as the sum of all days the cows were present in the herd during the time period of interest divided by number of days in the time-period. Days present was based on test-day milk record information and calving dates.
2. Kg milk – defined as the cumulative milk yield produced by the cows in the herd during the time period of interest divided by number of cow-years. The milk production per cow was estimated using the test interval method described by the International Committee of Animal Recording (ICAR, http://www.icar.org/).

Indicators that depict udder disorders were:

3. Prevalence of high somatic cell counts (SCC) – defined as the proportion of all test-days, during the time period of interest, with an SCC-value above 100, 200, and 300 thousand cells/mL, respectively.
4. Incidence of increased SCC – defined as the proportion of cows moving from below 200 thousand cells/mL to above between consecutive test-days during the time period of interest.

No direct information on reproductive disorders was available in all countries and only a “proxy-indicator” that is directly or indirectly associated to such disorders could be calculated:

5. Median calving interval – defined as the herd median of all days between the latest and the previous calving date, for all calving’s occurring during the time-period of interest.
6. Prolonged calving intervals – defined as the proportion of all individual calving intervals, for all calving’s occurring during the time-period of interest, longer than 400 days.

Indicators that depict metabolic disorders were:

7. Prevalence of fat/protein ratios indicating increased risk for ketosis – defined as the proportion of all test-days between 30 and 100 days after calving (“days in milk”, DIM), during the time period of interest, with a fat/protein ratio above 1.4.
8. Prevalence of fat/protein ratios indicating increased risk for “sub-acute ruminal acidosis” (SARA) – defined as the proportion of all test-days, during the time period of interest, with a fat/protein ratio below 1.0.

Finally, indicators that are related to the health status, but not directly depicting health, were calculated:

9. On-farm mortality of cows – defined as the number of cows, i.e. after first calving, that die or are euthanized on farm divided by the sum of their days at risk of dying. Animals that are sold are censored at the day of leaving the herd. Only cows that died during the time-period of interest are included in the calculations and days at risk are also based only on the time-period of interest.

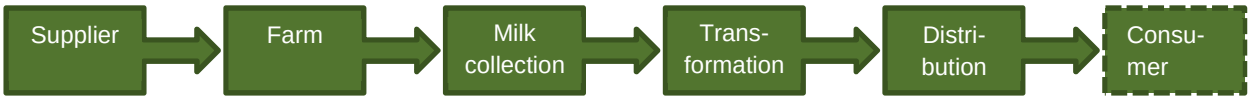
10. Calf mortality – defined as the number of calves that die between birth and 30 days of life divided by the sum of their days at risk of dying. Animals that are sold are censored at the day of leaving the herd. Only calves that died during the time-period of interest are included in the calculations and days at risk are also based only on the time-period of interest.
11. Proportion of 1st calvers – defined as the number of primiparous cows that calve during the time-period of interest divided by number of cow-years.
12. Parity of removed cows – defined as the average parity number of cows leaving the herd during the time-period of interest.

Thresholds used in the calculations were chosen based on scientific evidence.

The indicators are presented as box-plots where the box represents the lower (Q1) and upper quartiles (Q3), the line in the box represents the median (Q2), the plus-sign in the box represents the arithmetic mean, and the whiskers represents the 5th and 95th percentiles. Additional squares represent single observations outside the 5-95 percentile range.

2.2 Stakeholder workshop

Stakeholder workshops were organized in the four participating countries during January and February 2015 in order to get an orientation on the perceived use and usefulness of reference indicators of herd health status throughout the organic food chain, as depicted here:



Invited stakeholders were advisors, veterinarians, farmers, certification bodies, dairies, food retailers, farmer organisations and in ES and FR also experts on the consumer perspective. Stakeholders were not invited as representatives but as individuals to give their personal view on the topic.

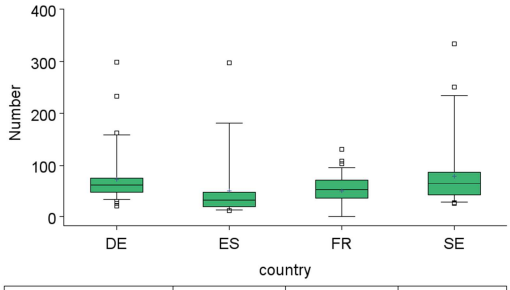
In order to increase the chances to get similar discussions in the different countries, a common roadmap was developed jointly by the partners. The final roadmap (see Appendix) was used in all workshops and, in order to minimize potential influences of the research team on the results, an external chairperson acted as the moderator.

The workshops were documented in two ways – by moderation cards and by collecting individual responses on a number of pre-defined statements related to animal health and use of indicators and reference values.

3 Outcome

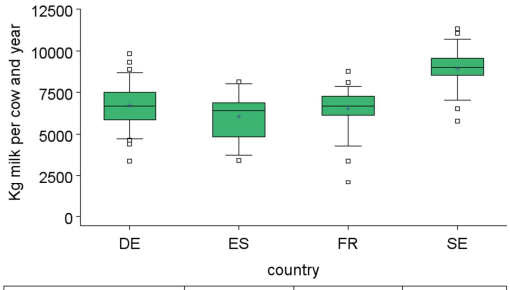
3.1 The status-quo of animal health

First an orientation of some characteristics of the herds that may be linked to production diseases is presented in figures 1 and 2. The distribution of herd size within countries was very similar, except for ES that had much smaller herds, while the level of milk production was much higher in the herds in SE than in any of the other countries.



	DE	ES	FR	SE
Q3	75.15	46.6	71.9	87
Q2	60.85	31.7	52.05	64.2
Q1	46.7	18.7	35.8	41.6
N	60	23	66	56

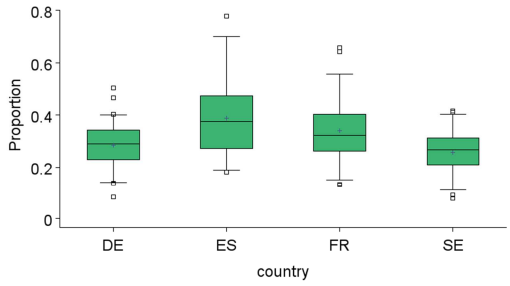
Figure 1. Number of cow-years.



	DE	ES	FR	SE
Q3	7515	6880	7266	9566.5
Q2	6706.5	6410	6701	8996.5
Q1	5842.5	4835	6118	8540.5
N	60	23	54	56

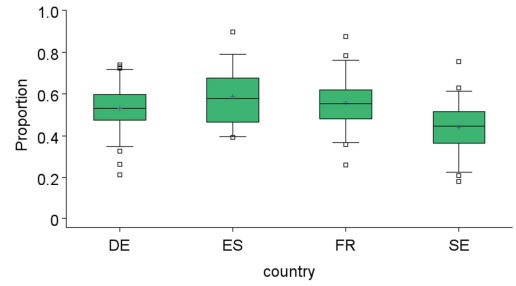
Figure 2. Kilogram milk per cow and year.

Udder health is the most common production disease affecting the dairy cow. The median prevalence of high SCC ranged from 0.27 to 0.38, when using 200 thousand cells/mL as a threshold, although a reasonable proportion of the herds, especially in ES and FR, had rather high prevalence's (figure 3). Similar pictures were found when using either 100 or 300 thousand cells/mL as thresholds (figures 4 and 5). The incidence of increased SCC was more similar across countries (figure 6). In general, the variation between herds within country was larger than the systematic differences between countries.



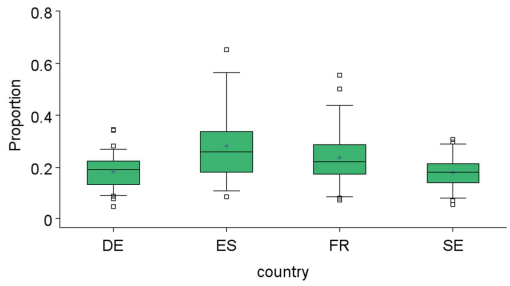
	DE	ES	FR	SE
Q3	0.342	0.473	0.404	0.312
Q2	0.2905	0.375	0.322	0.2665
Q1	0.23	0.273	0.263	0.2085
N	60	23	54	56

Figure 3. Prevalence of test-days (TD) with high SCC (>200 thousand cells/mL).



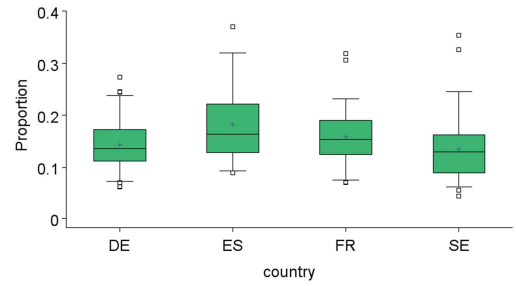
	DE	ES	FR	SE
Q3	0.5965	0.677	0.619	0.517
Q2	0.5315	0.578	0.5545	0.446
Q1	0.476	0.465	0.482	0.3665
N	60	23	54	56

Figure 4. Prevalence of test-days (TD) with high SCC (>100 thousand cells/mL).



	DE	ES	FR	SE
Q3	0.224	0.338	0.287	0.213
Q2	0.191	0.259	0.2225	0.181
Q1	0.1325	0.182	0.173	0.14
N	60	23	54	56

Figure 5. Prevalence of test-days (TD) with high SCC (>300 thousand cells/mL).

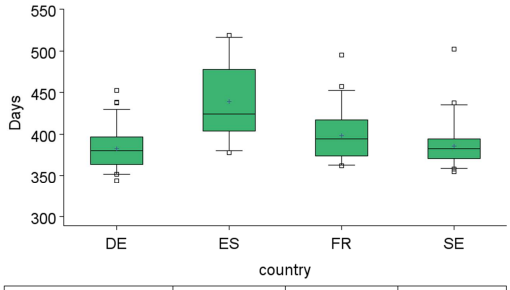


	DE	ES	FR	SE
Q3	0.1725	0.221	0.19	0.162
Q2	0.1355	0.164	0.154	0.13
Q1	0.1115	0.128	0.124	0.0895
N	60	23	54	56

Figure 6. Incidence of test-days (TD) with increase in SCC (>200 thousand cells/mL).

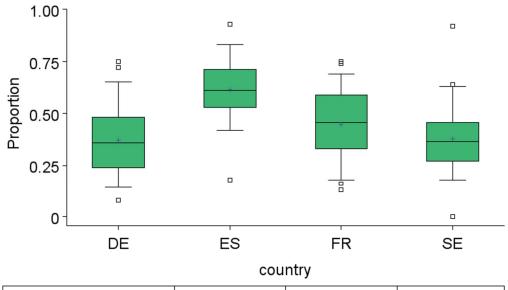
Reproductive disorders such as cystic ovaries, retained placenta and metritis are important production diseases, but they are not recorded routinely in the countries within the IMPRO-project, except in SE. However, such disorders have a considerable effect on the reproductive performance of the herd and this was monitored in this report by the calving interval, and presented as median calving

intervals (figure 7) and as proportion of prolonged calving intervals (figure 8). The proportion of prolonged calving intervals varied on average from 0.36 to 0.61. It should be noted, however, that calving intervals are also directly affected by management decisions such as culling and length of voluntary waiting period.



	DE	ES	FR	SE
Q3	396.75	478	417	394
Q2	380.25	424	394	382.5
Q1	364	403.5	374	371
N	60	23	54	56

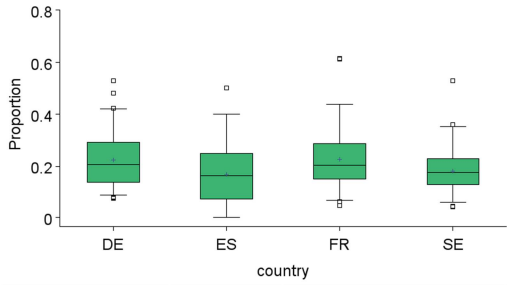
Figure 7. Median calving intervals (days).



	DE	ES	FR	SE
Q3	0.48	0.71	0.59	0.455
Q2	0.36	0.61	0.455	0.365
Q1	0.24	0.53	0.33	0.27
N	60	23	54	56

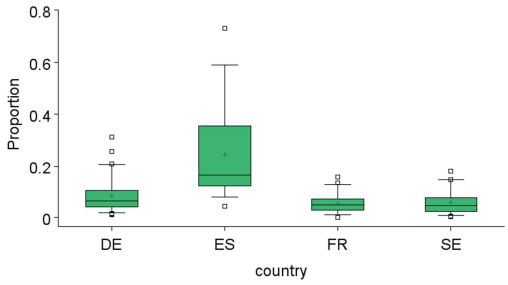
Figure 8. Proportion of calving intervals > 400 days.

A direct recording of metabolic disorders such as displaced abomasum, ketosis and SARA was not available either, except in SE. However, the ratio between fat and protein in milk at test-day observations was used to provide a picture of the prevalence of cows at risk of having ketosis (figure 9) and SARA (figure 10). The variation between herds within countries was large, but the differences between countries relatively small. The most deviating was the prevalence of cows at risk of having SARA that was much higher in ES.



	DE	ES	FR	SE
Q3	0.291	0.25	0.286	0.23
Q2	0.2055	0.163	0.203	0.176
Q1	0.1395	0.07	0.151	0.1245
N	60	23	54	56

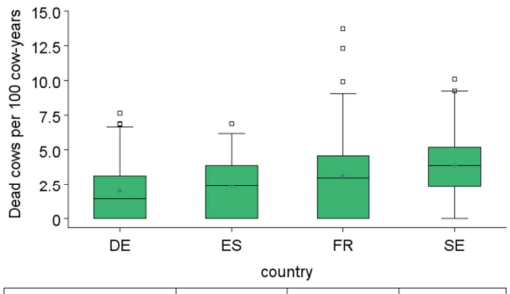
Figure 9. Prevalence of test-days (TD) with a fat/protein ratio >1.4 within 30-100 DIM.



	DE	ES	FR	SE
Q3	0.1035	0.355	0.071	0.0765
Q2	0.063	0.166	0.0465	0.046
Q1	0.0405	0.121	0.027	0.0235
N	60	23	54	56

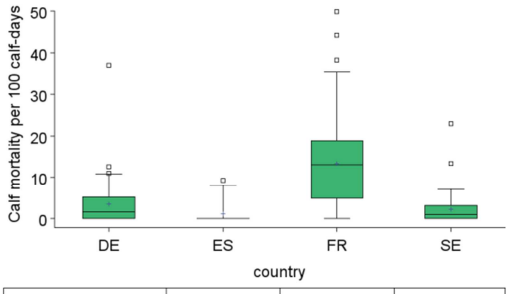
Figure 10. Prevalence of test-days (TD) with a fat/protein ratio <1.0.

On-farm mortality of cows and the mortality of young calves are not health characteristics of a herd, but the health status of the herd has a major impact on both and their incidence can thus be used for monitoring purposes. As with most other indicators presented in this report, there is a large variation between herds, but a relatively small variation between countries (figures 11 and 12). The most deviating figure is for calf mortality in FR, where the level is much higher than in DE or SE, and the very low levels in ES.



	DE	ES	FR	SE
Q3	3.112749	3.872679	4.596143	5.212203
Q2	1.425017	2.358412	2.988383	3.855314
Q1	0	0	0	2.294049
N	60	22	72	56

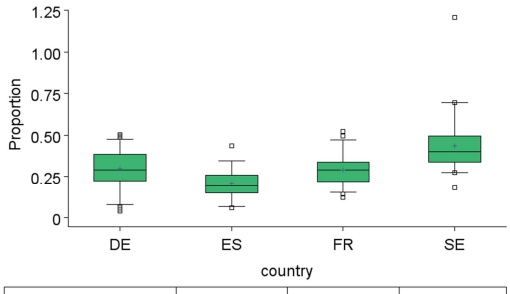
Figure 11. On-farm mortality of cows, expressed as cows per 100 cow-years at risk.



	DE	ES	FR	SE
Q3	5.10597	0	18.84817	3.129159
Q2	1.621811	0	13.02554	0.935889
Q1	0	0	4.926108	0
N	60	23	66	56

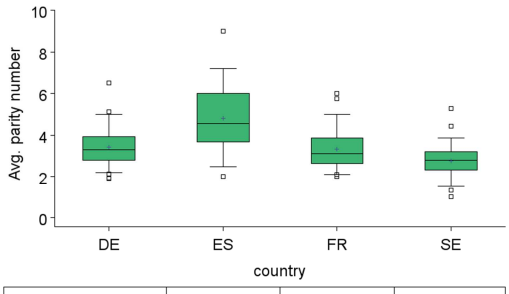
Figure 12. Calf mortality within 30 days of birth, expressed as calves per 100 calf-days at risk.

Animal health has also a direct effect on the length of life and an indicator of cow stayability or longevity in the herds can thus also be used as a proxy of health status for monitoring purposes. In this report we use the proportion of 1st calving heifers (figure 13), which indicates the herd turnaround of the stock, and the average parity of removed cows (figure 14). Here the most deviating countries are SE, with a larger proportion of 1st calving heifers, and ES, with older cows at removal, than the other countries. Note that removal can be for any reason, i.e. also sold to another herd.



	DE	ES	FR	SE
Q3	0.386389	0.26087	0.337662	0.493721
Q2	0.290226	0.193237	0.290505	0.40091
Q1	0.222987	0.150943	0.22113	0.338778
N	60	23	54	56

Figure 13. Proportion of primiparous cows per cow-year.



	DE	ES	FR	SE
Q3	3.948413	6	3.878205	3.19375
Q2	3.2932	4.5625	3.110119	2.798583
Q1	2.803309	3.666667	2.639785	2.333333
N	60	22	52	56

Figure 14. Average parity number of cows removed from the herd.

3.2 Stakeholder perceptions of indicators and animal health

The stakeholder consultation workshops were performed in a reasonably similar way, but they are still described per country to capture potential systematic differences.

3.2.1 France

There were 11 participants, in addition to three from the IMPRO-team, namely one organic dairy farmer (also chairman of the organic committee of a farmer's cooperative), one advisor in organic farming, one advisor from a dairy company, two veterinarians (one who works for a technical institute, one working for a farmer's organisation), five researchers (veterinary epidemiology, environmental toxicology, food marketing/consumer perception, parasitology) and the moderator who is a professor in food science. Thirty-two persons were invited by mail; 6 out of 11 invited organizations were represented. No independent veterinarian was present and only 1 farmer could participate. Lack of time was the main reason not to participate among those who responded to the invitation

and two persons had to cancel at the last minute. In general it was difficult to find participants since the workshop was planned in the holiday season.

A crucial point regarding expectations on organic dairy product and organic products of animal origin in general was the protection of the image of the organic sector to ensure its survival. The farmer and the researcher in marketing viewed it important to maintain consumers' trust in organic products from animal origin and stated that it must therefore be in line with consumers' expectations regarding these products. Especially, in today's situation in which the organic label has to differentiate itself from a great number of other labels. The participants all agreed that their impression is that today organic products in France are sold with the image that it is a natural product and without chemical residues. The conclusion was reached that animal welfare was not one of the consumers' expectations of organic products. Animal health is only considered taken into account in situations in which it might be harmful for human health (e.g. mainly when it contains chemical residues). The question was raised how the organic sector would survive if also conventional farms were getting better regarding the use of antibiotics. In that case how would the organic sector differentiate itself from the conventional sector? One conclusion was that the organic sector should maybe aim at selling the image of better animal welfare, rather than better animal health.

There were no surprises with respect to the **presentation of IMPRO-data**, the results were as expected by the participants. Everybody agreed that there are good and bad farmers in both conventional and organic farming systems. Even mortality figures were not shocking for the researcher in food marketing since mortality according to him is in line with the 'natural' image of organic products and thus to be expected on organic farms. A remark was made on the use of indicators on small farms: The death of one animal for example on a farm with 8 heifers calving each year will have much more impact on mortality figures than on a farm with 30 calves.

There was quickly an agreement that there is no need for specific animal health standards for the organic sector. However, it was discussed that health monitoring could be used to identify and improve the farms that are scoring extremely low in animal health, because these extremes might have a negative effect on the image of the organic dairy sector. The need to maintain check-ups of organic farms by external certification bodies was considered to be vital for the organic sector and necessary to reassure consumers. The situation in France today regarding access to data makes it difficult to monitor animal health and compare farms at herd level. Data is collected and stored by different organisations and not all advisors have access to (the same) data. Since no need to set a health level was identified within the group there was no further ground to discuss how this should be done and thus the discussion ended at this stage.

3.2.2 Germany

There were 9 participants, in addition to three from the IMPRO-team, namely four advisors, one veterinarian, one practical claw trimmer, one certification inspector, one dairy employee (who is also a farmer) and one researcher. The workshop was mediated by a professional moderator. In total 49 persons were invited to the workshop. The majority of those that did not participate indicated time or staff shortage, while three dairy representatives did not response at all and one stated he was not interested in the workshop as his company is already funding organic advisory services and relies on its cooperation partner to ensure process and product quality.

The participants were asked what they would look at in order to tell if a farm is meeting the aim of good animal health, and the participants collected a great number of indicators, ranging from very general ones ('overall appearance of the herd') to very precise ones ('fat-to-protein ratio'). Asked

how they would judge the health status of a group of farms they arrived at rather specific indicators for the major production diseases:

Health complex	Indicators
Udder	Somatic cell count
Claws and limbs	Lameness, condition of skin and joints
Metabolism	Fat-to-protein ratio
Reproduction	Calving interval, insemination index

The **presentation of IMPRO-data** was discussed and the selected indicators were found to be suitable with one advisor stating: “If we get a grip on these, then we are doing really well”. It was agreed that suitable key parameters should be chosen well to ensure easy assessment for farmer, advisory and inspection. A great potential was seen in using milk recording data (except for 10-15% of farms that are not doing milk recording). Assessing reliable data for the condition of claws and limbs remains a problem. The idea came up to make claw trimming, by a professional who uses standardised protocols, compulsory. The attending veterinarian found treatment frequencies important to include.

The veterinarian and advisors were unanimous that measuring health results should remain coupled with regulating the production process as it matters by what means good figures are reached. It was emphasised that checking animal health indicators is not product control but rather a tool for evaluating process quality and that animal health is not achieved through inspection itself but through advisory and education. It was agreed that having a common aim and creating awareness will lead to development and thus to improvement.

Regarding reference values for animal health indicators, it was said that not every farmer has to reach the same level, but there is a lower limit. The attending researcher emphasised that the discussion about thresholds needs to involve actors and that thresholds had to be achievable. One advisor reported from the concept of group advisory where one core mechanism is that good farmers are pushing those that are not.

There was no agreement on who should be in charge of health control. One opinion was that quality assurance is the duty of the organic associations. This was expressed by organisations themselves (as a matter of sharpening their profile) as well as by the dairy representative (who clearly delegated the task). Others saw a win-win-situation in having all organic farms evaluated, as this would on one hand protect the overall organic label and on the other hand oblige farms that are not a member of an association to use advisory services (‘drawing them closer’). The attending veterinarian suggested that there could also be a system, where farms perform their own quality assurance and documentation is inspected by an official agency.

3.2.3 Spain

There were 11 participants, in addition to two from the IMPRO-team, of which 3 participated through a video conference. The participants were two organic dairy farmers (who are also retailers), two technicians of the Spanish Milk Recording Scheme, one veterinary advisor, one biologist advisor, two researchers, one professor in animal production, one veterinarian of the regional Agriculture Board of Catalunya and one environmentalist. A total of 58 email invitations were sent and 52 replied. Lack of availability the scheduled time and date for the workshop was the main reason not to participate.

At a discussion on how to determine health status it was argued that indicators of good animal health should be based on direct observation of animals and resources, but also on data with information about treatments, milk recording, reproduction, mortality, and productive life. Subjective parameters could give an alert, but only collected data can confirm the problem of the farm. Longevity traits or measures of lifetime and mortality were highlighted as best health indicators for organic farms. The participants also emphasized that animal health reference values differ widely between farm systems.

After **presentation of the IMPRO-data** the participants requested to change the thresholds, e.g. to create a group of 500'-1.000' somatic cells, because SCCs are generally higher in Spain. Furthermore the participants considered it more useful to differentiate between heifers and cows when calculating SCC and to have indicators of improved udder health during the lactation instead of impaired.

With respect to actions based on indicators, it was commented that sanctions are not the way to go, because participants believed that poor management had a direct effect on poor animal health and consequently on farm profitability. Since the information on animal health is difficult to transmit to consumers, the participants did not desire extra labels. Improved information transfer to producers and consumers was generally requested.

3.2.4 Sweden

There were 9 persons, in addition to three from the IMPRO-team, that participated, of which two participated through a video conference. The participants were two farmers (one of which also representing a dairy company), two veterinary advisors, one veterinarian from the Swedish board of agriculture, one epidemiologist at an advisory organization, one representative of an organic certification organization, one dairy employee, and one veterinarian working for a major food retailer. A moderator, researcher in lactation physiology, led the discussions but did not participate. A total of 17 invitations were sent and long travel distances or conflicting obligations were the reasons for to not participate.

The discussion on information related to whether farms meet the aim of good animal health ended in three groups of information sources: i) Information possible to get from databases (e.g. milk composition, on-farm mortality), ii) Information that needs access to data available on the farm (e.g. number of treated cows, reproductive efficiency), iii) Information that needs farm visit (e.g. cow comfort, lameness, loser cows).

The **presentation of the IMPRO-data** seemed clear and obvious to the participants and there was thus little discussion. A comment was that information on the variation within one farm could be more useful, than the average. A comment was also that it would be better to present "calf survival" rather than calf mortality, because it is a more positive indicator.

With respect to actions based on the large variation in animal health, the major discussion was on incentives and premium segment. The conclusion was that this would only be possible on producer level. Another major item of discussion was on whether thresholds for indicators for animal health should be in relative or absolute values. The participants view was that absolute threshold values could wrongly be used as normative values for good animal health and thus not lead to a continuous improvement. Relative values, on the other hand, could be interpreted as good animal health even though they were "poor" on an absolute scale, depending on the status-quo of animal health in the population. The conclusion was that indicators should be tailor made for each specific purpose.

3.2.5 General comments

At the end of the workshop the participants were provided with a number of statements related to "**how to act on the large variation in health among organic farms**" to which they were asked to rate their agreement on a scale from 1 ("I do not agree at all") to 5 ("I fully agree").

A vast majority of the participants in all countries thought that there is a need to do something about the large variation between farms, and there was a high agreement that there should be a minimum standard for animal health.

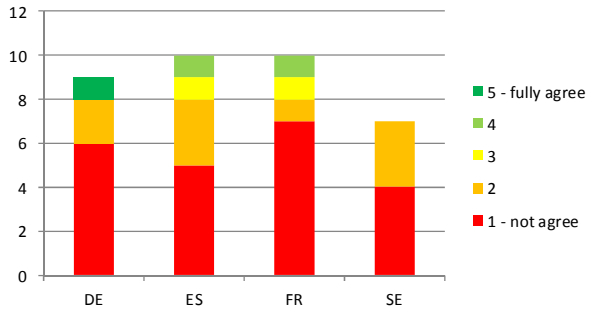


Figure 15. "There is no need to do anything about it".

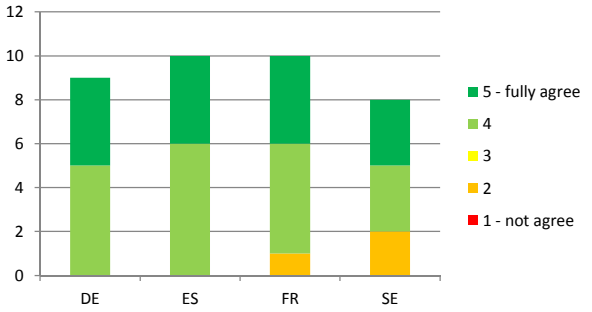


Figure 16. "There should be minimum standards for animal health".

There was less agreement on whether such standards should be based on values that are determined based on knowledge or estimates of goals or what can be achievable, or if they should be based on values that show the status-quo of animal health in organic farms.

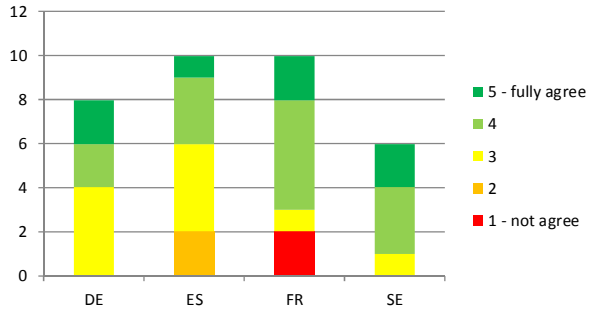


Figure 17. "Minimum standards should be based on predetermined values".

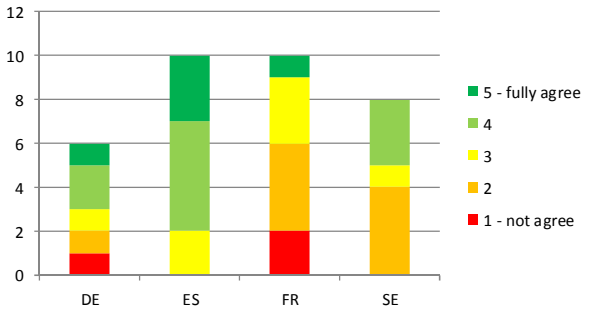


Figure 18. "Minimum standards should be based on status-quo".

The majority in most countries agreed that advisory organisations should be asked to improve their advisory services as a means to improve the animal health status, and also that farms below a standard should be obliged to take action to improve the animal health. Here the participants in Spain were less in favour of obligatory actions.

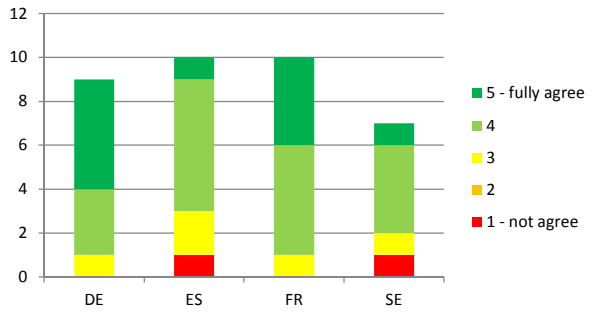


Figure 20. "Organisations should be asked to improve their advisory service".

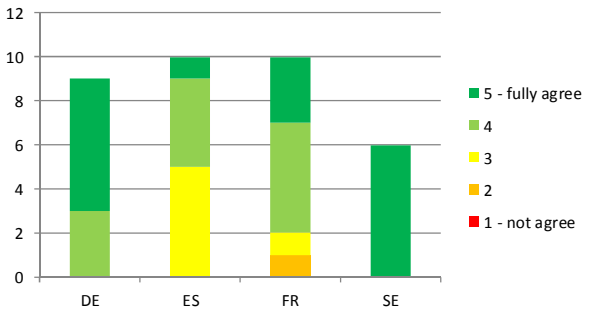


Figure 21. "Organic farms below the standard should be obliged to improve".

There was a very mixed picture when it came to how farms with good or with poor animal health should be approached. Incentives were more preferred over establishing a premium segment for organic production with good animal health. Sanctioning farms with poor animal health was least favoured in most of the countries.

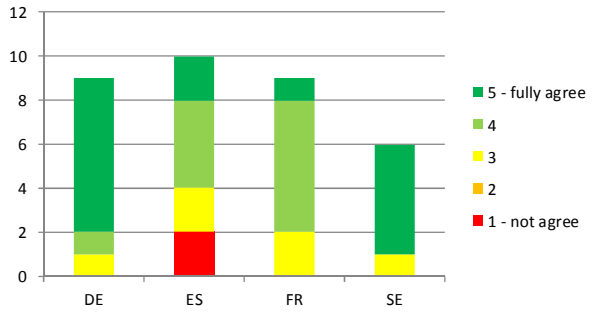


Figure 22. “For organic farms with good animal health there should be incentives“.

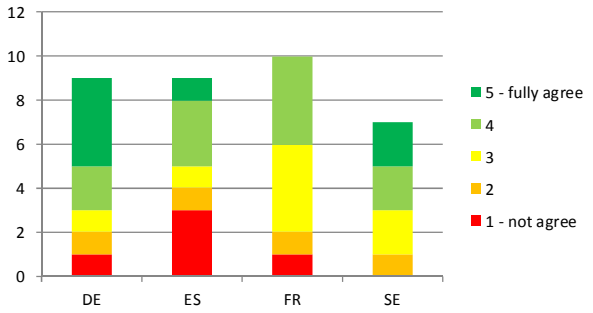


Figure 23. “For organic farms with good animal health there should be a premium segment”.

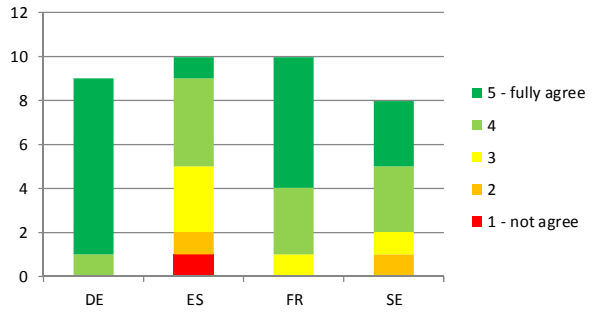


Figure 24. “For organic farms with poor animal health there should be admonishment“.

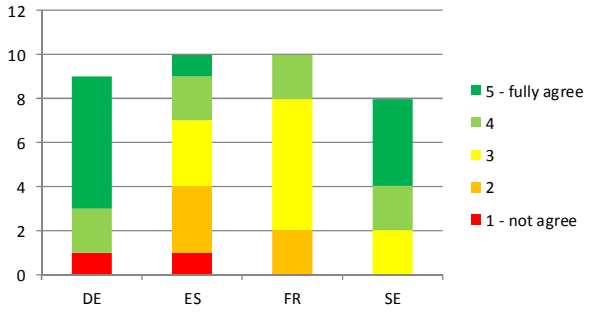


Figure 25. “For organic farms with poor animal health there should be a sanctioning”.

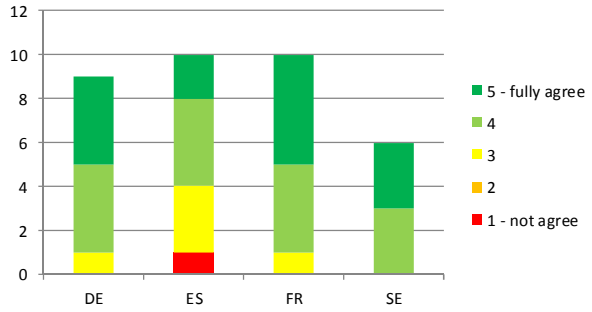


Figure 26. “For organic farms with poor animal health there should be exclusion if no improvement“.

4 Discussion

The most striking observation based on the information provided in this report is that there is a huge variation in animal health between individual organic dairy farms in Europe. One example is the prevalence of high SCC where the inter-quartile range (IQR) varies between 0.23 and 0.34 in Germany, with similar IQR’s for the other countries, or the 5 to 95% range in Spain that varies between less than 0.20 and more than 0.70. The variation is present although the regulations for organic dairy farms are applied in all countries. The variation between herds within a country is, in most cases, larger than between the countries, even though climatic and production conditions are very

different in the different countries. The selection of herds included in the IMPRO-project is not a random sample of all organic herds in the participating countries, but previous ad-hoc comparisons has indicated that they are reasonably representative of the herds in their countries. If anything, they may be better managed than the “average” organic herd, because their owners must have an interest in animal health to participate in IMPRO, and the indicators presented here can thus show an underestimation of the true variability between herds. Still, the stakeholders that participated in the workshops were not surprised when shown the indicators, so the perception of large variation between farms may already be there in the organic sector, although this is the first time ever that actual numbers that are comparable across countries can be presented.

This huge variation also shows that there is a need for improvement of animal health in a significant proportion of the organic dairy herds in Europe, because a large proportion of them have a level that is not consistent with a good animal health. The need for taking action to improve the health in these farms also received a reasonably strong support by the workshop participants, although some thought that the variation was natural and could not be avoided. It was generally agreed that focus should primarily be on the herds that deviate the most.

The stakeholder workshop discussed alternatives for actions that could be taken in order to improve the animal health status. There was some reluctance among the participants to introduce the discussed actions, although this varied between the countries. However, most agreed that farmers below a “standard” should be obliged to improve their animal health. The alternatives to introduce a premium segment within the organic sector for the “best” farms (an “OrganicPlus”) and to introduce sanctions for the “poorest” farms received rather little support whereas incentives for good health performance or admonishment, and ultimately exclusion, for bad health performance were thinkable options. It was obvious that different actors in the organic food chain had different priorities and saw different opportunities. Our impression is that there are barriers, especially within the close-to-market stakeholders (certification organizations, dairies, retailers), to introduce mandatory actions. The participants in Spain were generally more sceptical than in the other countries, which may be because the organic dairy sector is not as developed as in the other countries within the IMPRO-project.

An additional suggestion for actions from the participants in Germany was to make it compulsory for “poor” farmers to receive advisory services. This is consistent with actions taken by the Swedish organic certification organization (www.krav.se) that require farmers with poor status in the “animal welfare signals” (produced by the main advisory service organization in Sweden, Växa Sverige, www.vxa.se) to take additional actions in the form of a local variant of “cow signals” that capture health and welfare problems and provide advice on how to alleviate them.

The workshops with stakeholders were rather limited in size and time, and cannot be expected to give a complete picture of the very complex area of animal health in (organic) dairy production. The participants were also selected or agreed to participate based on availability, so they cannot be viewed as representative of all areas of the organic sector. Efforts were taken to harmonize the participation and the process during the workshops across the countries, but there were still rather large differences between the countries. The outcome of the workshops is also rather heterogeneous and cannot be used to arrive at consensus statements, but they provide an orientation about the variability in viewpoints across the different stakeholder groups and across countries.

An absolute prerequisite to be able to improve animal health in a herd or group of herds is that the status-quo of the herd(s) can be established. In that respect, access to data that can be used for

such purposes is crucial. The indicators in this report rely on data that is commonly recorded in milk recording schemes and in animal identification and registration databases, so they could be a basis for such orientation. However, not all organic dairy farms participate in milk recording schemes, data and data structures are very variable between countries and the data is not freely available to use for all actors that work on animal health in the field because of ownership constraints. There may therefore be a need for regulatory actions to ensure access to harmonized and relevant data.

The choice of indicators in this report was made based on what data was available in all four participating countries and they may not necessarily be the best for monitoring production diseases. One obvious deficiency is that no information about locomotion disorders could be provided, and this disease complex is of high relevance to monitor also. A database with recorded observations done at routine claw trimming, as is implemented in e.g. Sweden, could be a basis for such monitoring. Also, other national data, for instance on treatments of clinical health disorders, may be available that would be better suited to provide an orientation of the animal health status with respect to production diseases. However, such data may suffer from differences in definitions and in treatment thresholds that may make them less useful for across country comparisons, although harmonization efforts, for instance through ICAR, are ongoing. In addition, also other categories of diseases such as infectious diseases would be valuable to target, but would require quite distinct and specialized recording systems. The thresholds used in this report to indicate deviations in health within herds were based on scientific knowledge as far as possible, but should mainly be seen as examples that can be used to inspire a process of setting achievable goals. In a practical application of monitoring indices, the thresholds could be modified to become fit for the purpose. The stakeholders were not in agreement whether thresholds should be based on predetermined levels or on the status-quo, and any decisions on setting goals needs to be carefully elaborated.

The data used for calculating the indicators came from what was available in the individual countries. Although some quality control efforts were taken, the complexity of merging data from completely different database structures and recording systems may have resulted in errors that were not discovered. Point estimates for individual farms may, therefore, be off compared to what may be calculated in the respective national reporting systems.

A major achievement in the project was to provide harmonized methods to calculate the indicators, which means that they can, for the first time, be compared across countries. The algorithms and data editing procedures may differ from what is applied nationally and the distribution of the indicators may not necessarily be the same as in the national systems. The actual values of the indicators in this report should therefore not be compared with statistics that may be provided by the individual countries. Also, the report used only one year of data and it is well known that there may be large fluctuations in animal health status between years. However, this does not invalidate the use of the indicators in this report, because the purpose was mainly to provide an orientation about the variability in animal health within and across countries.

5 Conclusion

Based on the data presented in this report and the discussions at the stakeholder workshops the following conclusions can be made:

- There is a large variation in animal health indicators between herds within countries, and also in attitudes towards actions that can be taken to reduce that variability;

- Organic dairy production is not homogeneous with respect to animal health across Europe, despite having the same basic regulations, and “improving” (resource based) regulations cannot be expected to necessarily improve health;
- There is room and need for reducing the prevalence of production diseases in organic dairy herds in Europe, to justify consumers’ confidence in organic dairy products and the premium prices paid for them, and the main target should be to improve health in the worst farms;
- The establishment of the status-quo of production diseases in organic dairy production is an absolute prerequisite for improving animal health, as it points out the herds that deviate the most and are in particular need of improvement;
- The indicators included in this report, information about their distribution and the discussions about their use and usefulness form the preparatory work for establishing achievable reference levels with respect to production diseases for organic dairy production in Europe based on the status-quo;
- Advisory organisations should improve their advisory services as a means to improve the animal health situation on organic dairy farms;
- Standardized and continuous monitoring of health indicators relies on access to comparable data across Europe.

6 Acknowledgements

All participants in the stakeholder workshops are gratefully acknowledged for their participation, their willingness to share their expertise and ideas and thus give important input to the discussions. We would also like to express our gratitude to the farmers in all countries who shared their experiences with us and gave us permission to have access to their farm data.

Our thanks goes to the State Control Associations (Landeskontrollverbände, LKV) of Baden-Württemberg, Bavaria, Hesse, Mecklenburg-Western Pomerania, and Schleswig-Holstein as well as the United Information Systems Animal Husbandry (Vereinigte Informationssysteme Tierhaltung, VIT) in Germany for providing access to milk recording and breeding data as well as to information on animal movements, and especially to the friendly staff for their kind assistance.

Mrs Rosada Gil Cabanillas, the Department of Agriculture, Food and Rural Action (Departament d'Agricultura, Alimentació i Acció Rural) from the Government of Catalonia is acknowledged for providing the location and facilities for the workshop, and CONAFE (Associations and Federations of Holstein Friesian cattle breeders from the Autonomous regions of Spain) for providing data from the milk recording schedule.

We would like to thank France Genetique Elevage (FGE) and the French Ministry of Agriculture for access to the data from their national databases (the national genetics database-SNIG and the animal identification database-BDNI, respectively). Données fournies par les chambres d'agriculture, l'INRA, les organismes de contrôle de performances et d'insémination artificielle et les organismes de sélection aux Systèmes Nationaux d'Information Génétique.

Växa Sverige AB is gratefully acknowledged for providing data from the milk recording and artificial insemination schemes and from the animal identification and registration databases.

Special thanks are extended to Aurélien Madouasse for his assistance in the data analysis.

7 Appendix – Workshop roadmap

1 Introduction

Within Task 2.4 the aim is to develop *general reference values in relation to achievable health standards as identified by various indicators such as prevalence or incidence rates of production diseases*. The task includes a stakeholder consultation considering the status quo on animal health that was determined in task 2.2 (based on farm protocol, milk recordings etc.).

Invited are advisors, veterinarians, farmers, certification bodies, dairies, food retailers, and farmer organisations as stakeholders in the organic sector. We aim for 2 participants from each group, inviting them not as representatives but to give their personal view on the topic.

The aim of the workshop is to get orientation on the perceived use and usefulness of reference values/indicators of herd health status in organic dairy production on different levels (farm, producer group, organic sector).

The challenge of this workshop has its reason in the different levels of concern as well as presumably diverging interests between the participants regarding the implications of reference values for health standard in the organic dairy sector. The workshop will aim to capture the different perspectives of stakeholders to provide an increased understanding. The deliverable will provide an orientation about the current state of (production) diseases in organic dairy production across Europe, and the heterogeneity both in terms of current state and expectations.

The workshop does not aim for any compromise or agreement, and the workshop should be moderated by a good chairman who might be external or from the department but preferably not the IMPRO scientists.

2 Course of the workshop

Welcome *IMPRO scientist (host)*	Thank participants for following the invitation Introduce the moderator	
Introduction *Moderator*	Explain the aim of the workshop Present the agenda Ensure confidentiality Explain what will be done with the results of the workshop Round of introduction Round of expectations	20 min
Input presentation *IMPRO scientist*	Good animal health is one key objective of organic agriculture • Show examples where organic products advertise with animal health/welfare • Point out that measurable animal health outcomes are not part of the regulations Make clear the focus of the workshop is on production diseases (and not "welfare")	5 min
Guided discussion *Moderator* *Documentation:* *Picture protocol, moderation cards* 	**Launching question** Q: When you have a farm, a group of farms or a large number of farms, how do you tell if they are meeting the aim of good animal health? • Participants are asked directly (aim for different answers): o As an advisor/vet/certifier o As dairy, organisation, trademark o As a farmer **Exploring question(s)** Q: Is it easy for you to tell? What is it you can see? What do you look at? What information do you need to judge whether health claims of organic products (e.g. as found in advertisements) are met? • Leading to INDICATORS (lat. *indicare* = to point out) o There is a need for orientation (for all stakeholders) o The nature of indicators is neutral Q: What can make indicators subjective? Which ones are most objective? Pros and cons?	45 min
Presentation of IMPRO data *IMPRO scientist* *Let every talk in the right order*	Presentation of *selected* IMPRO herd health indicators (mean values, variation, European + national level) • Provide hand-out with figures to the participants • Order by health complexes	45 min

Discussion *Moderator* *Documentation:* *Picture protocol, moderation cards*	Q: Did you expect the results? Do you find them satisfactory? • Personal opinions • Professional opinions Q: Do you think the *selected* indicators were well-chosen? Who do you think should decide which indicators to use? Are there indicators that we have in common, i.e. that can be suitable for all levels/systems of the organic milk sector? Q: What ideas do you have on how we can use these (or other) indicators to gain orientation? • Reference values o Predetermined minimum standards o References based on the status quo: average, quartiles, … (benchmarking concept) Q: What ideas do you have on how the large variation in health status among organic farms can be addressed? • Collect ideas, avoid discussion as that would influence the agreement on the STATEMENTS • If there are ideas we haven't had in mind when creating the STATEMENTS, we should consider including them!	
Inquiry *Moderator* *Documentation:* *Response forms*	Provide STATEMENTS on how to act on the large variation in health (see **Annex I**) and ask for estimation of agreement • Provide participants with prepared response forms or computerized "clickers" • Present statements via beamer • Ask for their personal estimation of agreement (without discussion!)	30 min
Discussion *Moderator* *Documentation:* *Picture protocol, moderation cards*	Collecting individual responses in one big overview poster or simultaneously with the "clicker" Questions and comments?	20 min
Wrap-up	Next steps: Q: What are the open issues? Feedback: on content + on moderation Goodbye	20 min

Annex I: Statements on how to act on the large variation in health among organic farms

	I do not agree at all	<<		>>	I fully agree
There is no need to do anything about it.	○	○	○	○	○
Organisations should be asked to improve their advisory service.	○	○	○	○	○
There should be minimum standards for animal health.	○	○	○	○	○
Minimum standards should be based on predetermined values	○	○	○	○	○
Minimum standards should be based on status quo	○	○	○	○	○
Organic farms below the standard should be obliged to improve animal health.	○	○	○	○	○
For organic farms with good animal health there should be					
• Incentives.	○	○	○	○	○
• A premium segment.	○	○	○	○	○
For organic farms with poor animal health there should be					
• Admonishment.	○	○	○	○	○
• Sanctioning.	○	○	○	○	○
• Exclusion if no improvement.	○	○	○	○	○