



ENCAW
European Network of Centres
of excellence for Animal Welfare

Swedish Centre for Animal Welfare



ENCAW
European Network of Centres
of excellence for Animal Welfare

Swedish Centre for Animal Welfare

**Report to the Swedish Government, Ministry of Enterprise and Innovation,
and the Swedish Board of Agriculture**

Table of Contents

Svensk sammanfattning	4
Abstract	5
Background: A European Network of reference Centres for Animal Welfare	6
The ENCAW-project I and II [APP. 1, 2]	7
ENCAW II, Further analysis of the structure and organization	8
ENCAW II, Definition of management and analysis of assessment systems	8
The seminars “European Animal Welfare Network strategy”	8
Plan.....	8
Action	8
Summary.....	9
Socio-economic study: to evaluate how a socio-economic study can be carried out and what impact the results can have	10
Acceptance and attitudes – procedures, retailers, consumers, citizen, experts. Bruckmeier K., MacGregor, M, Leonardsson, H., Department of Human Ecology, University of Gothenburg, Sweden. [APP. 3-10]	10
Summary.....	11
Advantages/disadvantages of animal-based measures and resource-based measures in terms of the quality of the welfare assessment on farm.	12
Animal- vs. resource-based indicators: review of benefits and drawbacks in on-farm welfare assessment. Veissier, I., Mounier, L., Dalmau, A., Velarde, A., Winckler C. & Knierim, U. INRA, France. [APP. 11-13].....	12
Summary.....	13
To evaluate the cost of controls using animal-based measures compares to resource-based measures	14
Economic consequences of changing to a more animal-based welfare assessment in legislation and official inspection. Hoffman, R., Kaspersson, E., Hansson, H., & Hakelius, K., SLU [APP. 14, 15].....	14
Summary.....	16
To test and compare different control systems: Welfare Quality®, Ask the Cow and the Official Animal Welfare Control	16
Animal welfare indicators in official animal welfare control in the Swedish Dairy. Dahlborn, K, Holmberg, M., Winblad von Walter, L., Stéen, M., SLU, [APP. 16, 17].....	16
Summary.....	18
To test, roll out and investigate how expert platforms can work in a European animal welfare network	18
Experts and authorities	18
Plan.....	18
Action	19
Summary.....	19

Managing and updating methods for the assessment of the level of welfare of animals Welfare assessment protocols and systems Peetz Nielsen, P., Blokhuis, H., SLU.	20
Plan	20
Action	20
Summary.....	20
To write an application for the Commission's call for the European Animal Welfare Network, and report the outcome of a received project.	21
Activities related to the call for a European coordinated network in Animal Welfare (SANCO 2012/10293) Coordinated European Animal Welfare Network (EUWelNet) [APP. 18].....	21
Plan	21
Action	21
Summary.....	21
Conclusions from the ENCAW project.....	22
Appendix List	23

Svensk sammanfattning

Projektet European Network of Centres of excellence for Animal Welfare (ENCAW) initierades 2010 av Nationellt centrum för djurvälstånd (SCAW), Sveriges lantbruksuniversitet (SLU) och kunde genomföras under 2011, 2012 och 2013 genom medel från regeringen via Jordbruksverket, för att i projektform testa en effektiv samordning av djurskyddsarbetet inom EU och för att förbereda sig för en utlysning från kommissionen om ett samordnat europeiskt djurvälståndsnätverk. ENCAWs målsättning var att dels försöka testa hur ett europeiskt nätverk för djurskydd- och djurvälståndsfrågor skulle kunna arbeta och dels för att verka för att Sverige skulle komma att spela en roll som koordinator i ett sådant nätverk. För att utröna hur ett sådant nätverk kan arbeta har projektaktiviteten genomförts i form av en konsekvensanalys med fyra delstudier: *1. att utvärdera konsekvenserna kring och hur en socioekonomisk studie kan göras och utfallet av den, 2. att se vad en introduktion av djurbaserade mått kan betyda för lagstiftning och i den offentliga kontrollen, 3. att utvärdera kostnaderna för en alternativ kontroll med djurbaserade mått kontra resursbaserade mått, 4. att testa och jämföra olika kontrollsystem, Welfare Quality®, WQ®, Fråga Kon och den offentliga kontrollen, 5. att testa och utvärdera hur expertnätverk kan arbeta, 6. att respondera till kommissionens projektutlysning om europeiska djurvälståndsentra och redovisa utfallet av tilldelat projekt.* Under 2012 inriktade sig ENCAW på att skriva en ansökan inför kommissionen projektutlysning för ett framtida djurvälståndsnätverk. Vid kommissionens utlysning hade ENCAW vidtagit och genomfört olika förberedelser för att vid tidpunkten för utlysningen ha ett adekvat och realistiskt förslag i ansökan. Sverige, SLU och SCAW erhöi kommissionens projekt, vilket utfördes tillsammans med andra medlemsstater och avrapporterades 2013. I redovisningen till kommissionen redogjordes för hur ett europeiskt nätverk för djurskydds- och djurvälståndsfrågor kan arbeta omfattande nätverkets arbetsuppgifter, arbetsprocesser och organisation, men även hur genomförande av olika projektaktiviteter kan göras i syfte att erhålla nödvändiga erfarenheter och lärdomar. Tillika hur ett djurvälståndsnätverk kan arbeta visavi sin uppdragsgivare, kommissionen. Utfallet av ENCAW-projektet bedömdes vara relevant för såväl nationella som internationella intressen.

Abstract

The project European Network of Centres of Excellence for Animal Welfare (ENCAW) was initiated in 2010 by the Swedish Centre for Animal Welfare (SCAW) at the Swedish University of Agricultural Sciences (SLU), and could be implemented in 2011, 2012 and 2013 through funding from the Swedish Government through the Swedish Board of Agriculture. European Network of Centres of Excellence for Animal Welfare's aim was to test how an effective coordination of animal welfare work in the EU can be realized, and to prepare for a call from the Commission on a coordinated European Animal Welfare Network. The ultimate goal was to gain knowledge and experience on how a European Network for Animal protection- and Animal Welfare issues could work and to increase chances for Sweden to play a coordinating role in such a network. Project activities were defined in six studies: 1. *to evaluate how a socio-economic study can be carried out and what impact the results can have*, 2. *to study what the introduction of animal-based measures could mean for legislation and official control*, 3. *to evaluate the costs of controls using animal-based measures compared to resource-based measures*, 4. *to test and compare different control systems: Welfare Quality® (WQ®), Ask the Cow and the Official Animal Welfare Control*, 5. *to test and roll out and investigate how an expert platform shall work in an animal welfare network*, 6. *to write an application for the Commission's call for the European Animal Welfare Network and report the outcome of the received project*.

In 2012 SCAW wrote an application in response to the Commission's call to test and evaluate a future European Animal Welfare Network. At the time of the Commission's call the activities of the ENCAW project made it possible to submit an appropriate, realistic and competitive proposal (EUWeNet). SLU and SCAW won the Commission's project, which was carried out together with organisations in other Member States. The results were reported in 2013. In the report to the Commission, EUWeNet showed how a European Network of Reference Centres for Animal Welfare can work and described extensive network tasks, work processes and organisation, but also how the implementation of various activities can be realised. Last but not least it showed how a European Animal Welfare Network can support the Commission as well as the Member States in improving compliance with EU welfare legislation. The outcome of the project European Network of Centres of Excellence for Animal Welfare (ENCAW) addressed both national and international interests.

Background: A European Network of reference Centres for Animal Welfare

In January 2006 the European Commission adopted a Community Action Plan on the Protection and Welfare of Animals. The main objectives with the Action Plan were to provide greater coordination of existing resources while identifying future needs and to ensure a more consistent and coordinated approach to animal protection and welfare across Commission policy areas.¹

In the Action Plan the idea of a 'European Centre for the protection and welfare of animals' was put forward as an option to be considered. This suggestion was further elaborated upon in the communication on "[Options for animal welfare labelling and the establishment of a European Network of Reference Centres for the protection and welfare of animals](#)". In this communication, the European Commission highlighted the WQ[®] project and its work on animal-based scientific indicators to assess animal welfare. The Commission pointed out that "a European Network of Reference Centres for the protection and welfare of animals could constitute a concrete option to provide technical support for the further development of the system"². The communication is based on external studies which included an EU-wide stakeholder survey. The survey identified three main problems that emphasised the need of a Network of European Animal Welfare Centres; 1) the lack of harmonised animal welfare standards/indicators, 2) the need for an independent source of information at EU level and 3) the duplication of activities due to a lack of coordination at EU level. To this aim the European Commission envisaged a reference centre which could serve as a coordination body for various animal welfare initiatives. In the EU Animal Welfare Strategy 2012 – 2015, they follow up with pointing out the necessity of an EU framework law on Animal Welfare to include; a European Network of Reference Centres; a stricter enforcement of the legislation; a use of indicators to evaluate Animal Welfare; and the application of equivalent standards to imported products.³

The European Commission's communication on the European Union strategy for the protection and welfare of animals 2012-2015 made it clear that the network's role should be to ensure the competent authorities receive coherent and uniform technical information on the way EU legislation should be implemented, especially in the context of outcome-based animal welfare indicators. The network's tasks were proposed to be: Support the Commission and the Member States with technical expertise, especially in the context of the use of outcome-based animal welfare indicators; Conduct training courses for the benefit of staff from competent authorities and experts from third countries where relevant; Contribute as appropriate to dissemination of research findings and technical innovations among EU stakeholders and the international scientific community and Coordinate research in collaboration, when appropriate, with existing EU funded research structures.

The [European Parliament](#) has also called for the establishment of a Coordinated Network for Animal Welfare with the tasks of providing the Commission, Member States, food chain actors and citizens with information and education, best practices and assessing animal welfare standards as well as "stating its views on future legislative and policy proposals and their impact on animal welfare".⁴

¹ Communication from the Commission to the European Parliament and Council on a Community Action Plan on the Protection and Welfare of Animals 2006-2010 (COM(2006) 13)

² Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on Options for animal welfare labelling and the establishment of a European Network of Reference Centres for the protection and welfare of animals (COM(2009)0584), page 9

³ Communication from the Commission to the European Parliament, the Council and the European Economic and Social Committee on the European Union strategy for the protection and welfare of animals 2012-2015.

⁴ Report on evaluation and assessment of the Animal Welfare Action Plan 2006-2010 (2009/2202(INI))

At present there are a variety of different collaborations across the EU between research institutes and national centres working in the animal welfare field. However, in order to further improve compliance, support and develop initiatives in animal welfare and to support further implementation of a harmonised approach to animal-based welfare assessment on a European level, the need of a more cohesive platform, a coordinating body, is apparent.

The ENCAW-project I and II [APP. 1, 2]

Through the Swedish Board of Agriculture's letter of regulation for 2010⁵ and 2011⁶ the Swedish Government decided to allocate 10 000 000 SEK (5 000 000 SEK + 5 000 000 SEK) in two steps to SLU and the Swedish Centre for Animal Welfare (SCAW) with the purpose of supporting the development of efficient coordination of animal welfare work within the EU. Handling of the funds was used after discussion with the Swedish Board of Agriculture and Lantbrukarnas Riksförbund (LRF). Swedish Centre for Animal Welfare initiated the 'ENCAW-project', and the aim of the ENCAW-project was to strengthen the Swedish position in a European Coordinated Network for Animal Welfare and to support European developments in this area by further defining and characterising the *tasks, organisational structure and working processes* of a European Network of Centres of excellence for Animal Welfare (ENCAW). The ambition was to provide a credible/realistic scenario for the establishment of such a European Coordinated Network for Animal Welfare. ENCAW I-project (SLUID SLU.ua.Fe.2010.12.-1220) and the budget accounting for ENCAW II (SLUID: SLU.scaw.2014.1.1.1 - 33) have earlier been reported to the Swedish Government and the Swedish Board of Agriculture (APP. 1 and 2).

The ENCAW II-project activities was built on what had earlier been achieved in the ENCAW I-project, and aimed to address current gaps in knowledge and to gain further relevant experience to strengthen the Swedish position in the EU context and prepare for the call "Coordinated European Animal Welfare Network". This report is a continuation of the work that was reported for the first ENCAW-project.

In order to describe and define operations as well as to gain relevant knowledge about the suggested functions of a European Coordinated Network for Animal Welfare, a number of activities were initiated and implemented within the ENCAW II-project. Continuous studies was done in six areas: 1. *Socioeconomics*, 2. *Legislation and official control based on animal-based measures*, 3. *Costs of animal-based versus resource-based control*, 4. *Comparing animal welfare control systems*, 5. *testing operations in Networking*, 6. *Forming an EU application*.

The organisational structure and working processes in network with a coordinating centre were also checked and resulted in an overall plan and thoughts as well as in general proposal on how such an organisation should function and be organised. Focus was also directed towards communication efforts to national as well as international stakeholders, with the aim of promoting the project and collecting input. ENCAW addressed both national and international interests.

⁵ Point 13 under "app. 7 Återföring av skatt på handelsgödsel och bekämpningsmedel"
<http://www.esv.se/Verktyg--stod/Statsliggaren/Regleringsbrev/?RBID=12215>

⁶ Point 10 under "app. 5 Återföring av handelsgödselmedel"
<http://www.esv.se/Verktyg--stod/Statsliggaren/Regleringsbrev/?RBID=13017>

ENCAW II, Further analysis of the structure and organization

When SCAW started ENCAW II there was a general plan for a European Animal Welfare Networks organizational structure, tasks and working processes, although there was a need to provide a more detailed description. SCAW needed to be prepared for a call for a European Network for Animal Welfare and further scientific work. The plan was that ENCAW II would give a competitive edge to a Swedish proposal. In the planning for an upcoming project discussion was: "What will an organization of a coordinating center of approximately 10 people foreseen tasks be?"; "What legal basis will a decentralized agency have and how does it affect the organizational structure?"; "What will such organization cost?" etc. These types of questions put forward were planned to be evaluated and further analyzed, discussed and described in the planned Commission project. The ENCAW II project prepared these thoughts and plans.

ENCAW II, Definition of management and analysis of assessment systems

European Network of Centres of Excellence for Animal Welfare's (ENCAW) aim was to test how effective a coordination of animal welfare work in the EU can be, to realize and prepare for a call from the Commission on a coordinated European Animal Welfare Network. The ultimate goal for ENCAW was to gain knowledge and experience on how a European network for animal protection- and animal welfare issues could work and to increase chances for Sweden to play a coordinating role in such a network. Project activities were defined in six studies: 1. *to evaluate how a socio-economic study can be carried out and what impact the results can have*, 2. *to study what the introduction of animal-based measures could mean for legislation and official control*, 3. *to evaluate the costs of controls using animal-based measures compared to resource-based measures*, 4. *to test and compare different control systems: Welfare Quality® (WQ®), Ask the Cow and the Official Animal Welfare Control*, 5. *to test and roll out and investigate how an expert network shall work in an animal welfare network* 6. *to write an application for the Commission's call for the European Animal Welfare Network and report the outcome of a received project.*

The seminars "European Animal Welfare Network strategy"

It was considered important for the credibility and cause of the ENCAW II project to maintain and continue to build support for the project through networking and communication.

Plan

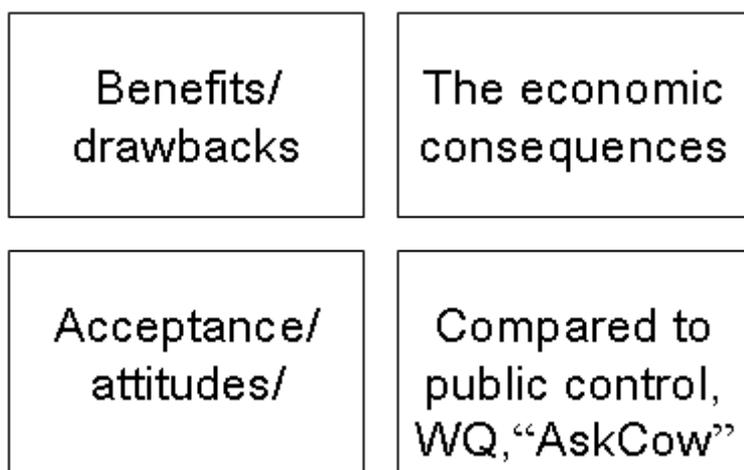
The plan was to promote the ENCAW-project national and international to stakeholders through participation in related events and through providing information of the project to key players such as the European Parliament and the Commission as well as Swedish authorities and Swedish Government and this should be done through meetings, organizing and participate in international and national conferences and seminars, and written information and communication with stakeholders.

Action

One seminar on animal welfare indicators was held with decision makers from the European Parliament and the Commission and the council where SCAW acted as the host. Another event was conducted to present the results of the ENCAW project activity "Impact assessment" to stakeholders in Sweden organized by SCAW at the Swedish Livestock Research Centre, Lövsta, SLU. This part of the ENCAW project was set up in order to gain knowledge and to explore and analyze the challenges and possibilities with our studies, including presenting the consequences of introducing animal-based welfare assessment in legislation and official control to the public. SCAW held a national and interdisciplinary seminar, "The consequences of introducing animal based welfare assessment in legisla-

tion and official control”, the 4th of October 2011 as an example of how a European Animal Welfare Network can work. The project ENCAW that was made as a national study showed how an organization and projects could be done and work at an international scale. The seminar issue of showing how an introduction of animal-based welfare assessment in legislation and official control could work was split into four parts. The different presentations performed emanated from the authors’ ENCAW reports.

1. What does animal-based welfare assessment mean?
2. What does animal-based welfare assessment cost?
3. What do the people think about animal-based welfare assessment?
4. What does animal-based welfare assessment contribute with, in practice, compared to other ‘methods’?



Summary

More than 90 participants from county administrative boards, the Swedish Government, the Swedish Board of Agriculture, universities, stakeholders and international contributors attended. Researchers and experts in animal welfare, agricultural economics and animal welfare inspectors met in an interdisciplinary discussion about consequences of introducing animal-based welfare assessment in legislation and official control. The seminar consisted of presentations on Animal welfare indicators (Harry Blokhuis, SLU), Advantages/disadvantages of animal-based measures and resource-based measures in terms of the quality of the welfare assessment on farm (Isabelle Veissier, INRA, France), Economic consequences of changing to a more animal-based welfare assessment in legislation and official inspection (Ruben Hoffman, Karin Hakelius, SLU), Acceptance/Attitudes (Karl Bruckmeier, University of Gothenburg), Animal welfare indicators in official animal welfare control in the Swedish Dairy (Kristina Dahlborn, SLU). The seminar participants were asked in a questionnaire form about their view of introducing more animal-based measurements in the official control. The conclusion of the seminar was that the official control should include more animal-based measurements but also keep resource-based ones. It was evident that for Swedish consumers, animal welfare matters. It is pivotal to better understand how legitimacy is created to synchronize the view on animal welfare held by consumers and farmers. If this could be reached, the value chain would work better. Many animal welfare inspectors raised the question about the animal keepers’ legal certainty with animal-based measures, and how the legislation would continue to be preventive if resource-based measures were reduced in the legislation. Others were more in favor of animal-based measures and

meant that they were lacking this tool in the control of today. The researchers' scientific reports are linked as attachments, here follows some extracts from the content of the studies.

Socio-economic study: to evaluate how a socio-economic study can be carried out and what impact the results can have

Acceptance and attitudes – procedures, retailers, consumers, citizen, experts.

Bruckmeier K., MacGregor, M, Leonardsson, H., Department of Human Ecology, University of Gothenburg, Sweden. [APP. 3-10]

Swedish producers, retailers, consumers and citizens support animal welfare policy broadly. The experts that were interviewed support the idea of animal-based assessment rather than environmental or resource-based assessment; they see this as more easy to communicate to consumers. Advantages and limits of animal-based assessment, what is to be included in animal-based measures, and the possibility of combination of different forms of control will be themes of continuous debate. The attitudes towards and acceptance of animal welfare policy and animal-based assessment was analysed in surveys and interviews in the WQ® project and expert interviews. For most of the Swedish consumers animal welfare is important. At the same time there are low levels of worry and knowledge about farm animals' living conditions and welfare. This is probably related to trust in institutional actors taking responsibility for the quality of animals' lives.

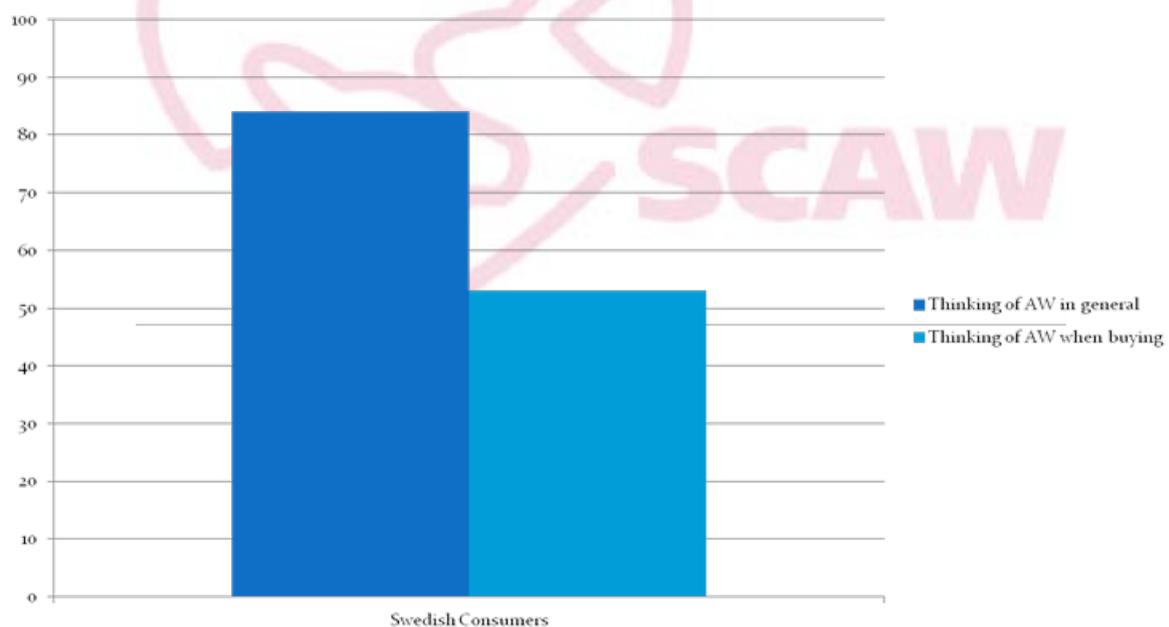


Figure 7. Attitudes of Swedish Consumers towards Animal Welfare (WQ®) Reports No. 2, p. 18)

Price is less important to Swedish consumers than to other Europeans. The majority of Swedish consumers answered that they consider animal welfare when purchasing meat. However, one has to be aware that the behaviour in stores may differ. Participants dismissed the idea of Swedish products as better than foreign products, but nevertheless preferred Swedish meat. When asked to define animal welfare as it relates to the food industry many participants answered "it does not exist", an opinion common to many groups of consumers, not just vegetarians and politically active groups. Animal

friendly products are difficult to find and identify. Forty-four percentages answered that I care about animal welfare, but it is too time consuming to look for animal welfare friendly products. Thirty-five percentage answered that I care about animal welfare, but cannot find welfare friendly products where I shop for food. Moreover, there are too many labels for consumers, and it is difficult to assess the information on labels found in stores. For effective communication an overall level of trust in institutional actors is necessary. The trust in food authorities, experts or veterinarians and farmers is higher than in politicians, therefore it is important from whom information comes. There is a large support for the WQ[®] project's experts list of animal welfare criteria. In the WQ[®] project there is no clear distinction between consumer and citizen. This will be necessary, since citizens are addressed in their roles and responsibilities as political citizen, with rights and obligations, not only as consumers. Reformulating the consumer survey results in a citizen perspective gives that Swedish citizens want good animal welfare and they regard animal welfare an issue for state and governmental actors. There are three broad definitions of animal welfare by farmers. The first emphasize the provision of basic biological needs, e.g. enough and good quality food etc. The second focuses on the idea of freedom and comfort through the animals' opportunity for expressing natural behaviour. The third, and the most rarely encountered one (almost exclusively among dairy farmers), emphasize the concept of the farmer as caring for the animals. Among retailers animal welfare is viewed as a governmental issue not used for strategic marketing of products. In stores there are few labels that communicate animal welfare claims to consumers. Retailers motivate lack of communication of animal welfare by claiming that consumers do not expect it to be an issue they have to deal with through consumption choices.

The trend is towards more centralized retailer companies, but also an increasing animal welfare. There is significant difference between retail firms in their interest in animal welfare, and the increased competition from discount stores may lead to increased focus on lower price that may counteract the interest that retailers might show for animal welfare. Interviews of 15 experts from public and private sector revealed that there is an agreement that focus should be on animal themselves to assess animal welfare, but experts disagree about the implementation of the system in policy. Advantages and limits of an animal-based assessment are debated: whether an entirely new system should be developed or if the current system could be adapted; many experts believe that the animal-based system needs to be combined with resource-based assessment and management control systems. Experts see that refinement and further research is needed and that the system is too time consuming. One expert regard animal-based measures to be more flexible and therefore better reflect reality than other control system, and another that it could be a tool for developing a more holistic assessment of farms. Animal-based measures were seen as easy to communicate to consumers. Several experts pointed out the need for a positive communication of animal welfare in terms of "the health and positive emotions of the animals" instead of "absence of hunger". Scenario analyses show that success or failure of animal welfare and assessment measures depend on the development of agricultural policy, food quality and safety and their integration in overarching policies of sustainable development. An integrated animal welfare policy is dependent on certain preconditions: transparency of animal welfare regulation, implementation, control, and trust in information, combined policy instruments.

Summary

Price is less important to Swedish consumers than other Europeans, and the majority of Swedish consumers consider animal welfare when purchasing meat. They trust in food authorities, experts or veterinarians and farmers is higher than in politicians, therefore it is important from whom information comes. Swedish citizens want good animal welfare and they regard animal welfare an issue for state and governmental actors. Farmers have a broad definition of what animal welfare is; as enough and good quality food, freedom, comfort and ability to express natural behaviour and the

farmers care for the animals. Retailers view is that animal welfare is a governmental issue not used for strategic marketing of products. In stores there are few labels that communicate animal welfare and retailers motivate the lack of animal welfare communication by claiming that consumers do not expect it to be an issue they have to deal with. Experts from public and private sector are in agreement that focus should be on animals themselves to assess animal welfare. Advantages and limits of an animal-based assessment are debated; many experts believe that the animal-based system need to be combined with resource-based assessment and management control systems. An integrated animal welfare policy is dependent on certain preconditions: transparency of animal welfare regulation, implementation, control, and trust in information, combined policy instruments.

Advantages/disadvantages of animal-based measures and resource-based measures in terms of the quality of the welfare assessment on farm.

Animal- vs. resource-based indicators: review of benefits and drawbacks in on-farm welfare assessment.

Veissier, I., Mounier, L., Dalmau, A., Velarde, A., Winckler C. & Knierim, U. INRA, France. [APP. 11-13]

What are the advantage and disadvantages of resource-based measures versus animal-based measures, when evaluating animal welfare on farms? Animal-based measures are considered more valid than resource-based ones, but this is not a rule, it rather depends on the welfare criterion considered and to a lesser extent on the animal type. To assess the overall animal welfare on farms, it is recommended to use a mixture of animal- and resource-based measures, which are chosen according to their validity and feasibility. It is important to agree on the definition of welfare. In the 70's Hughes stated a general definition of animal welfare; harmony between the animal and its environment. Welfare can also be defined by the functioning of the animal or absence of suffering versus positive experiences and physical and mental health. The conditions that result in good welfare can be defined. The UK Farm Animal Welfare Council stated (1992) five freedoms: Free from hunger and thirst; free from discomfort; free from pain, injury and disease; free to express normal behavior; free from fear and distress. Conditions for good animal welfare were further defined by WQ[®] in four principle and the 12 criteria which was chosen as the basis for animal welfare assessment in this study. To consider the validity for assessing animal welfare, the properties of measures were analyzed for: selectivity, trueness, reliability, fitness for the purpose, stability over time and feasibility in different systems. In other words: How well a measure can quantify what we want to assess, the closeness of agreement between a test result and an accepted reference value, repeatability within and between observers, whether a method can be used to detect mild welfare problems and whether it can highlight differences between farms, and, the result of a measure should not be affected by environmental changes that are not significant for animal welfare. The project paid special attention to cattle, pigs and poultry. The measures considered animal welfare on farms and at slaughter. The work was carried out in the context of an inspection visit regarding aspects of time and cost constraints.

Welfare Quality [®] (WQ [®])	Animal-based measure	Resource-based measure
Absence of prolonged hunger	Body condition is more selective and reliable than access to feeders or type of food, since it is difficult to predict how much food can be	

	eaten and the actual needs of the animals.	
Absence of prolonged thirst		Number and quality of water points are more valid than tests on animals, e.g. the skin pinch test (not sensitive enough).
Comfort around resting	Measures on animals are selective, e.g. lying down movements in cattle (but in some environments they seem not to be sensitive).	
Thermal comfort	Behavioural responses (e.g. huddling vs. panting in pigs) are reliable. Temperature, relative humidity are reliable only if measured repeatedly over time and space (low feasibility).	
Ease of movement		Slipping and falling of animals is difficult to detect. Quality of floor, structuration of space are more feasible, repeatable, selective.
Absence of injuries and absence of diseases	Direct assessment of animals is more valid than any other measurement, they measure the exact problems.	
Absence of pain due to management procedures	It is not feasible to assess pain at the moment of disbudding or castration, but it is possible to detect on animals if there were mutilation...	...and ask the farmer on procedures or to assess management practices.
Expression of social behaviour	Many factors influence social behaviour so it cannot be predicted accurately from analysis of the environment.	
Expression of other behaviours	Selective, repeatable and feasible in pigs (e.g. bar biting, exploration).	Too rare in cattle, better to analyse the environment e.g. pasture that allows species-specific behaviour.
Good human-animal relationship	Avoidance tests are easy and reliable. It is more difficult to observe interactions between stockpersons and animals.	
Positive emotional state	Behavioural assessment seems more reliable. Impossible to guess mood of an animal from its environment.	

Table 1. The table shows the result of the analysis of animal- and resource-based measures, and when animal-based or resource-based measure are more favourable.

Summary

There is no general rule whether animal-based measures are more or less valid than resource-based ones. This depends on the welfare criterion considered and to a lesser extent on the animal type. It is recommended to use a mixture of animal- and resource-based measures (chosen according to their validity and feasibility) to assess the overall welfare of animals on farms. If picking out the key parameters of the 12 criteria of WQ® they would be: no disease, no lesions, good social behaviour and good body condition score. Animal welfare should be a part of education of animal welfare inspectors and farmers.

To evaluate the cost of controls using animal-based measures compared to resource-based measures

Economic consequences of changing to a more animal-based welfare assessment in legislation and official inspection.

Hoffman, R., Kaspersson, E., Hansson, H., & Hakelius, K., SLU [APP. 14, 15]

A more animal-based welfare assessment in the official control would increase the direct cost to farmers in terms of the time taken by the audit. There is a discussion what should be compared and how the comparison should be done. How would a more animal-based assessment in legislation and official control effect 1. the costs of official control for the control authorities, 2. the direct costs to farmers when being audited, and 3. the indirect costs and benefits to farmers associated with a change to a more animal-based welfare assessment? There were indications that the administrative work for the animal welfare officer did not depend on the type of control system. Animal-based assessment may also imply potential benefits for the farmers, e.g. more freedom concerning resource use and management. This could lead to improved animal welfare, increased legitimacy and then potential for higher producer prices. The economic value of the mentioned potential benefits may outweigh the additional costs. Information concerning the time required in the current more resource-based system was obtained through a survey sent to the County Administrative Boards. A literature survey and interviews were carried out to estimate the direct and indirect consequences for farmers in a more animal-based assessment. The cost of official control of animal welfare at farm level depends on the time required on-farm to conduct the control (audit), the time for preparing and processing the audit. The time required on farm in the current system made up 25-45 % of the total time required to conduct an audit. The considerable part of the time required for administrative work may partly be explained by the recent reorganization of the Swedish control system. Hence, it may be reasonable to assume that the time required off-farm will decrease in future. The time required on-farm in the more animal-based system was primarily based on the assessment protocols developed in the WQ[®] project. The time required on the farm according to the more animal-based system was, compared to current system: 3.5 - 3.9 times for dairy cows, 2.5 - 4.2 times for fattening cattle, 2.2 - 3.5 times for sows and growing/finishing pigs, 2.2 - 2.6 times for laying hens and 1.4 - 1.7 times for broilers. The time required on farm was negatively correlated with the size of the herd or flock. A considerable time required in the WQ[®] system was attributable to measures of "Appropriate behaviour". A criterion not measured in the official control today. The relative cost disadvantage of the assessment is smaller when the time for preparing and processing the farm visit was taken into account.

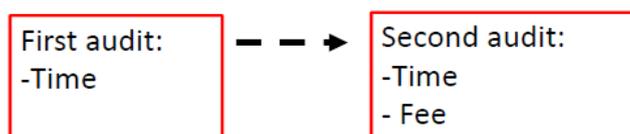


Figure 4. Direct costs on being audited, first audit is free according to Swedish legislation; the second is connected with a cost.

Table 2. Time requirements on farms for pigs, using the criteria's from Welfare Quality® system.

General principles	General criteria	Measures specific for pigs	Type of measure ^{a)}	Time required assessing AW at farm
iii) Good health	7) Absence of diseases 8) Absence of pain induced by management	Mortality Castration, tail docking	M M	10 min (all management-based measures)
i) Good feeding ii) Good housing	2) Absence of prolonged thirst 5) Ease of movement	Water supply Space allowance	R R/M	
ii) Good housing	4) Thermal comfort	Shivering, panting, huddling	A	20 min
iii) Good health	7) Absence of diseases	Coughing; sneezing	A	30 min
i) Good feeding ii) Good housing iii) Good health	1) Absence of prolonged hunger 3) Comfort around resting 6) Absence of injuries 7) Absence of diseases	Body condition score Bursitis, manure on the body Lameness, wounds on body, tail biting pumping, twisted snouts, rectal prolapse, scouring, skin condition, ruptures and hernias	A A A	170 min
iv) Appropriate behaviour	11) Good human-animal relationship	Fear of humans	A A	
iv) Appropriate behaviour	9) Expression of social behaviour 10) Expression of other behaviour	Social behaviour Exploratory behaviour	A A	60 min
iv) Appropriate behaviour	12) Positive emotional state	QBA	A	20 min
Total time required:				330 minutes (5 h 30 min)

In the more animal-based system there was an effect on the direct costs of farmers related to the time spent on the audit and the fees of the audit. In the present system farmers are given limited time to prepare for an audit and in general they choose to participate during the entire audit. According to the interviews, participating during the audit gives an opportunity to ask questions to the animal welfare officer and also to ask the inspector for advice. An open and on-going dialogue between farmer and the animal welfare inspector can lead to continuous improvements in the long term. However, it can also be problematic as the formal roles of animal welfare inspector and farmer may be affected by too social bonding. Although farmer presence may be undesirable when assessing certain criteria in the WQ® system farmers are, based on the findings in this study, assumed to participate throughout the inspection. For farmers the change in the direct costs associated with being audited was consequently estimated to be similar to the previously mentioned changes in the times required on-farm for conducting an audit.

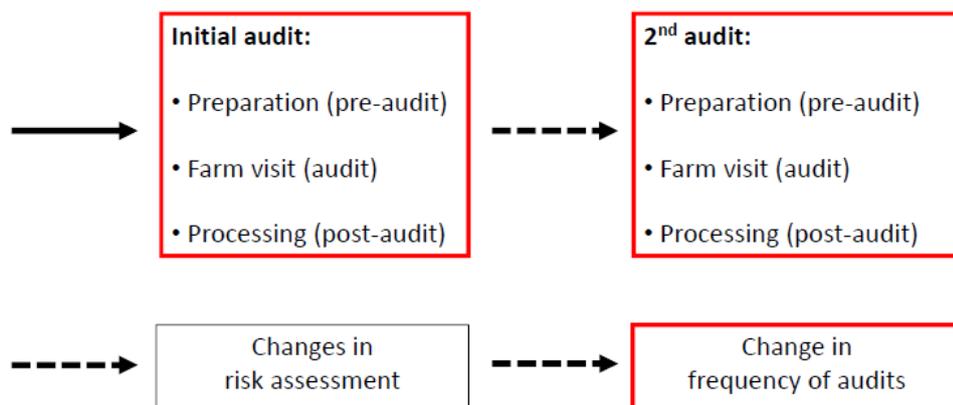


Figure 5. Costs of official inspections

Indirect costs are incurred due to changes in the farmer's resource use as well as management practices. The outcome of the decision-making process regarding these changes determines the indirect

costs. If the decision-making process initiated by the outcome of the audit would include all the relevant items and correlations, both animal welfare and legitimacy could be improved, which would potentially decrease production costs and increase producer prices. Hence, it is pivotal to better understand how legitimacy is created, hereby synchronising the view on animal welfare, held by the consumers and farmers, respectively. If this could be reached, the value chain would work better. However, it is important to take a long-term view of this process of change.

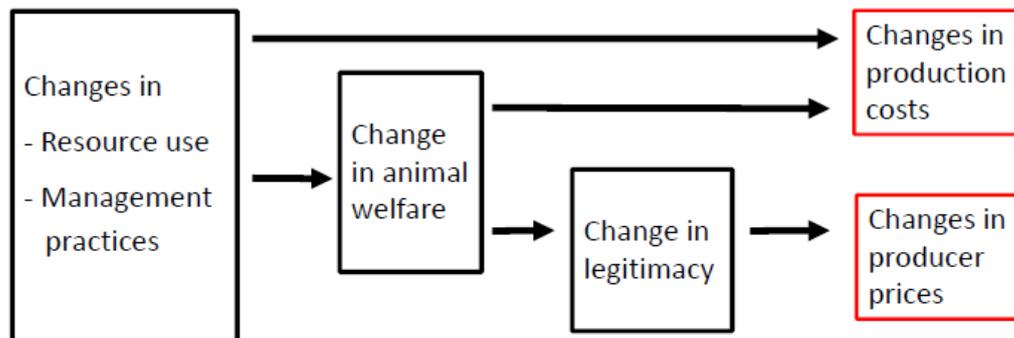


Figure 6. Indirect costs and benefits for farmer

Summary

It should be noted that the WQ® system continues to be improved. Furthermore, the system was developed to enable an overall assessment of animal welfare and it was not specifically developed to be used in official control. It is also important to note that one argument for a more animal-based welfare assessment is that it could measure animal welfare more accurately than the current system. In the longer term this could potentially reduce the cost and frequency of inspections needed to assure the level of animal welfare, which would reduce the costs for farmers for official inspections. It should be emphasized that the two systems of animal welfare control consist aspects of both animal- and resource-based measures and include measurements not present in the other system. Future policy discussions and research should consequently not be limited to which type of measures to use but should fundamentally concern which aspects of animal welfare should be included in legislation and official inspection. Both legislation and price premium are needed (market driven). We need to narrow the gap between how the production looks and the consumers' perception about production.

To test and compare different control systems: Welfare Quality®, Ask the Cow and the Official Animal Welfare Control

Animal welfare indicators in official animal welfare control in the Swedish Dairy.

Dahlborn, K, Holmberg, M., Winblad von Walter, L., Stéen, M., SLU, [APP. 16, 17]

Animal welfare and protection in dairy farms was evaluated by three assessment systems:

- 1) The official animal welfare inspection in Sweden,
- 2) The Swedish Dairy Association program "Ask the cow",
- 3) The Welfare Quality® assessment protocol for dairy cows.

The questions were: Do the systems rank farms differently? Which measures contribute most to rank farms? Is there a difference in farmers' willingness to perform changes if the assessment is based on

animal- or resource-based measures? How does the time taken to perform the different assessment systems compared with quality and reliability of the evaluation?

The hypothesis was that all systems would identify those farms with a risk of having poor welfare, but systems with animal-based measures will be better in identifying farms with good welfare. The official checklist consist mainly of resource-based measures (43 checkpoints) while Ask the cow and the WQ[®] systems use animal-based measures. Ask the cow assess' 35 cows, 35 young stock and 35 calves per farm. The official checklist is supposed to assess all animals. WQ[®] does not assess calves and young stock in the dairy cow protocol (WQ[®]) (there is a separate protocol for calves but that was not applied here), but includes behavioural aspects. The number of cows assessed during a WQ[®] audit depends on the number of cows on the farm. As reference data, welfare indicators from the Swedish Dairy Data Base were used, which include information about production, fertility, genetics, disease, mortality, and registration at slaughterhouse. Assessors were trained to perform the WQ[®] system, the animal welfare inspectors were employees from the County Administrative Boards and the Ask the cow assessors were employees from Swedish Dairy Association. The data collection was performed on 41 farms and included 2652 cows in Sweden. The selected farms should have an official control planned, be member of the dairy data base but have no experience of Ask the cow, and have accepted to take part in the project. The results showed no correlation regarding the ranking between the different assessment systems and previously identified welfare indicators from the Swedish dairy data base. Overall, there was a good agreement concerning the best farms, but assessors agreed less about which farms had the poorest welfare. In the checklist of official control there were very few remarks (1700 "yes", 55 "no"). The remarks were predominantly related to resource-based measurement, e.g. mechanically ventilated stables not having extra emergency ventilation, single housed calves not having contact with other calves, calves not having enough space. Regarding animal-based measures there were two remarks on hoofs and on dirty cows, respectively. Based on the four principles the WQ[®] assessed 25 farms as "enhanced", 11 as "acceptable", and some farms that had missing data. No farm was "excellent" or "poor". In contrast to the official checklist, both WQ[®] and Ask the cow had high scores for dirty cows. Ask the cow found quite many remarks on hooves and many remarks on cows standing in the resting area and dirty young animals and calves (in some farms all young stock and calves). Many cows, 10 %, were lame according to WQ[®], but just a few according to Ask the cow and the official control had only three remarks on lame cows. In Ask the cow and WQ[®] lesions were found in over 30 % of the cows, whereas the official control had only two remarks. WQ[®] measures the time taken for an animal to lie down whereas Ask the cow measures time from lying to standing position of cows. The latter is less time consuming, one does not have to wait for a cow to stand up, you can "ask" the cow to stand up, and another advantage is that the total percentage of animals having problems to stand up is reflected. The eight assessors performing the WQ[®] assessment were also inspectors of official control and were asked how the systems evaluate animals and farms. Welfare of the farm animals was regarded to be best evaluated by WQ[®], because of longer time on-farm and due inclusion of social behaviour, which contributes with lots of information. Protection of the farm was preferably assessed by official control (7 assessors) due to that all cows as well as young stock and calves are included. Regarding welfare of the cow, most assessors (6) found WQ[®] best, because it covers many aspects of the cow. Regarding protection of the cow, five assessors preferred official control since all animals are considered and the ones that preferred WQ[®] valued the possibility to go along the cow without the farmer. In the WQ[®] assessment, clinical scoring followed by measurements of the playing time, were found to be the easiest parameters to assess, whereas the avoidance distance test and quality behavior were most difficult. In the Official control, indicators such as body condition score were easiest to assess, whereas assessment of whether the staff of the farm were knowledgeable or if animals had sufficient space (without a scale) were difficult. The assessors regarded that official control could be strength-

ened by parameters from the WQ[®] system: lying down- and social behavior and clinical scoring of hoofs. When asked if WQ[®] is too time consuming to be part of Official control all assessors answered “yes”.

Summary

The systems rank the farms in a different order, partly because they measure different parameters. For official (legal) control animal-based measures should be included since these measures are a way of quantifying e.g. cleanliness, body condition score, lesions and important behaviours that are relevant to animal welfare. The best aspects of each system: Official control considers the whole production chain and all the animals. The WQ[®] adds natural behavior. The legislation states that animals should be able to behave naturally. Strength of Ask the cow is consideration of the whole cow, young cattle and calves included, compared to WQ[®]. Also the hooves should be included. Do bigger farms imply better animal welfare? The biggest farms scored highest in this study. Experts at the seminar agreed that an average-sized farm may be the best from animal welfare point of view, since very small farms may not afford new equipment etc., whereas very big farms may have reduced animal welfare.

To test, roll out and investigate how expert platforms can work in a European animal welfare network

Experts and authorities

A core task of ENCAW was to gather and coordinate experts with the purpose to test and to provide relevant authorities with expertise and expert opinions within the animal welfare area. SCAW has established panels with experts/scientists active in various fields that were used for the purpose. The expert function of SCAW bears similarities with what is envisioned for a European Network for Animal Welfare at EU level.

Plan

As with other ENCAW project activities, the aim was to achieve value aspects for the project. Hence, expert meetings should be arranged in such a manner that they brought new valuable experience to further development and descriptions of how a European Network for Animal Welfare could work and its task should be of providing expert opinions. The ultimate goal for a European Network for Animal Welfare could be to build up a network consisting of animal welfare experts in Europe. And the forthcoming experts' need to be internationally recognized as leading authorities in their specific areas of expertise and to be connected to internationally recognized and respected institutions in different parts of Europe and the expert will become a very valuable group when various issues are to be addressed.

ENCAW used former partners of WQ[®] both to apply for the upcoming call from the Commission and also to continue with the collaboration within the WQ[®] network (www.welfarequalitynetwork.net). The purpose was to form a group of experts and come together in the expected pilot study of a Network for Animal Welfare in Europe (EUWelNet). The ultimate goal was to provide efficient communication, a web based platform for communication and network interaction tool be used and tested.

Action

Meetings were tested and held in different topics; concerning laboratory animals, farm animals as well as wild animals. Scientific contributions to the impact on animal welfare were picked up from different expert groups. The different groups should look into research in general in animal welfare to see if they had been centered on farm animals or not, since it is conceivable that a European Coordinated Network for Animal Welfare will also embody laboratory animals and pets! These aspects somehow should be addressed in the scope of the project (the focus at EU-level on the different types of animals is for instance noticeable in the recent evaluation of EU animal welfare⁷). Based on this notion the expert groups should orientate the inventory/analysis of how European Coordinated Network for Animal Welfare should/could deal with as well laboratory animals and pets. ENCAW's task in the project should be, among other things, to bring together experts in laboratory animals to analyze how laboratory animals can be included in the suggested tasks for the European Animal Welfare Network.

Summary

Among other things the future important role of animal welfare centres expert panels would be to promote how the worldwide leading role of EU in animal welfare science should be. The expert panels did identify gaps in the current scientific knowledge required to assess all aspects of animal welfare, in areas of compliance (laws and cross-compliance), social, economic and environmental policy, as well as strategies for implementation of sustainable improvements. In the meetings scientists discussed everything from assessment of the physical health and disease status to the impact on the overall well-being and animal welfare. Many scientists were of the opinion that science of animal welfare has to broaden its focus, with recent research on animal emotions, animal cognition, to the mental health of animals. Knowledge in these areas continues to grow and it is essential to have a critical mass of people with different areas of expertise to build a holistic view of any animal welfare issue. In addition, new animal welfare issues are likely to arise due to changes in the types of animals being kept for farming or other economic purposes and advances in genetic technologies, and changes in social and environmental pressures. The ENCAW project was therefore able to foresee a future European Network for Animal Welfare that will bring together experts in different areas in a unique framework, to ensure that the underpinning sciences need to support decisions about animal welfare will be sound and valid. The ENCAW project was in that way a project base together with WQ[®] to build up a network; bringing together expertise and knowledge from institutions all over Europe. A future Animal Welfare Network would convey its view on priorities for research to a range of EU and national research funding bodies. Out of our results and knowledge the European Animal Welfare Network and its coordinating centre will preferably initiate and co-ordinate its own specific research related to on-farm assessment tools such as evaluate and developing the assessment protocols from for example the WQ[®] project. It is clear that a European Animal Welfare Network has to work in close cooperation with the Commission in the area of animal welfare, both providing expertise and advice during the process of setting up new standards, laws and reviewing those already accepted, and also by taking into account the other countries' laws and standards.

⁷ http://ec.europa.eu/food/animals/docs/aw_arch_122010_evaluation_findings_en.pdf

Managing and updating methods for the assessment of the level of welfare of animals Welfare assessment protocols and systems

Peetz Nielsen, P., Blokhuis, H., SLU.

In order to gain knowledge and experience on ENCAW's tasks of managing and updating welfare assessment protocols and systems, including supporting practical implementation, providing up to date assessment protocols, conditions for use, certification of assessors etc. a pilot project within this area was initiated. The aim was to get first-hand experience and to provide valuable information of a foreseen task of ENCAW, while at the same time doing something of substantial value.

Plan

The plan was to update the WQ[®] protocol. The WQ[®] protocols are seen as living documents that shall be based on new knowledge from research projects and the experience of the people using the protocols. The task was the upgrading (e.g. changing definition of measures, add/exclude measures) of protocols and on the basis of that experience also define a 'blueprint' on the procedure for upgrading the protocols which can be used/followed in future upgrading exercises.

Action

The work started with activities to correct the currently available WQ[®] protocols for poultry, pigs and cattle. This involved networking and connecting experts in Europe for the different animal categories. The networking was facilitated by the existence of the WQ[®] network which is collaboration between former partners of the WQ[®] project. A working group lead by Per Peetz Nielsen, SLU was consisting of 5 other experts on the protocols for different species, assigned by the WQ[®] network General Assembly for upgrading all the protocols, had a physical meeting in Amsterdam where they thoroughly went through all protocols and addressed the obvious mistakes in the current protocols that needed to be corrected.

Summary

The most central obstacle for the process of upgrading the protocols has been the fact that most of the works performed have been on a more or less voluntary basis. This has resulted in a prolonged process since the researchers involved were mainly involved in their own on-going research activities and had a hard time in finding space in their schedule to work on the upgrade and to find dates to meet. The organization and use of a web tool as an initial way of discussing problems within the protocols could have been an appropriate strategy for allowing all the members of the WQ[®] network to give comments and suggestions for what is needed to be addressed, as well as suggestions for solutions. Unfortunately the web tool was not used as much as anticipated for the initial stage of this process. So a suggestion for future upgrades would be to skip the web tool discussion and go directly to the upgrade process. The working groups found their own a way of working that fit all members and there were various physical and online meetings within the groups. Another suggestion for future upgrades would be to assign one person as responsible for all the groups and have this person to work with arranging meetings, keeping notes and preparing the comments and suggestions from all groups. After final approval the documents were prepared for publication at the WQ[®] Network public home page <http://www.welfarequalitynetwork.net>

To write an application for the Commission's call for the European Animal Welfare Network, and report the outcome of a received project.

Activities related to the call for a European coordinated network in Animal Welfare (SANCO 2012/10293) Coordinated European Animal Welfare Network (EUWelNet) [APP. 18]

In March 2010, the European Commission launched a call to support a pilot project to study the feasibility and usefulness of a coordinated network for animal welfare.

Plan

In relation to the actual preparation of a response to the call for a Coordinated European Animal Welfare Network, the ENCAW project hired outside support in relation to writing, proof reading etc. This person worked closely with the other personnel of SCAW and was responsible for preparing a proposal for the project "European Coordinated Network for Animal Welfare" and for the implementation of the project activities. There was also a need for engaging outside capacity through consultants from the WQ® project when the work load connected to the preparation increased significantly. A preliminary indicated budget for personnel also included salary cost for work performed by the other members of SCAW for the upcoming project.

Action

A proposal was made in response to the call (SANCO 2012/10293) for a pilot project on the feasibility of a coordinated European Animal Welfare Network. The project was granted and was carried out during 2013 under the name EUWelNet. SCAW budgeted financial resources for expenses related to the process and travels and meetings as well as counter funding the EUWelNet project.

The project addressed four main objectives:

1. To establish a consortium and coordinate the study.
2. To identify bottlenecks/difficulties in implementing EU legislation on animal welfare.
3. To develop and test knowledge strategies.
4. To carry out an overarching analysis and formulate recommendations on the feasibility and the conditions for a European Animal Welfare Network.

Summary

The project EUWelNet created a consortium of 16 universities and 10 research- and technical institutes from 16 EU countries. All partners had extensive scientific expertise in relevant and complementary disciplines (ethology, veterinary medicine, animal production, sociology, etc.), experience in knowledge transfer, education, science-society dialogue, and a history of effective collaboration. EUWelNet investigated the feasibility and usefulness of establishing a network of institutions having a recognized knowledge of animal welfare and independent of private interests to assist the competent authorities and the stakeholders in improving the implementation of a European Animal Welfare Network. The sustainable development of animal production requires the industry to address societal, economic and environmental concerns. In this context societal concerns about and demands for improved farm animal welfare are increasingly important and have to be realized within economically viable and environmentally friendly production systems. Effective knowledge transfer and innovative strategies are essential to satisfy the welfare requirements under these constraints. EUWelNet clearly demonstrated that a coordinated network of knowledge providers can work successfully to-

gether and deliver extremely useful support for the implementation of European legislation on animal welfare. It proved possible to effectively identify difficulties and bottlenecks and to create innovative knowledge strategies to overcome them. The results of the brief pilot project provided firm proof of principle for a functional Coordinated European Animal Welfare Network. In view of the outcomes of the EUWelNet project it is strongly recommended that such a network should be established with a mission to contribute to safeguarding and improving the welfare of animals in Europe by supporting Competent Authorities and other stakeholders in the implementation of EU legislation. A regional structure of the network (regional Reference Centres and associated partners) would reduce language barriers, and enable regional and cultural differences to be taken into account thereby supporting the development of trust among relevant actors and agencies in each region. Regional Reference Centres should cover all topics (species or issues) but may be specialized in a given topic due to regional circumstances. A regional organization runs the risk of fragmentation and isolation so effective inter-regional communication and collaboration will be essential. Member State institutions and the network should designate one institution as the "Coordinating Body" and the Coordinating Body should include representatives of Reference Centres and of the Commission. Such an organization is considered most likely to ensure trust and confidence while also facilitating coordination and smooth communication between Member States and the Commission.

It is of importance that the coming European Animal Welfare Network and EFSA establish strong links and cooperation, each within their own remit, although EFSA's remit falls into two areas: risk assessment and risk communication. In particular, EFSA's risk assessments provide risk managers with a sound scientific basis for defining policy-driven legislation or regulatory measures. One of the main tasks for European Animal Welfare Network will be related to improving compliance with animal welfare standards, which are part of risk management. Therefore, EFSA and a European Network for Animal Welfare remits strongly complement.

Conclusions from the ENCAW project

The Swedish Government allocated funding to the Swedish Centre for Animal Welfare (SCAW) through the Swedish Board of Agriculture's letter of regulation for 2010 and 2011 have been crucial and given much new insight in a broad spectrum of animal welfare, animal welfare control, perception of animal protection- and welfare in the view of the producers, consumers and experts. It has also given the important insight of an EU based Animal Welfare Network that can work with the implementation and compliance of the EU directives and regulations in the Member States. The ENCAW project has also shown the importance of having an international cooperation on "the knowledge of the control of animal welfare as well as the research on animal welfare".

Appendix List

Appendix 1

Report ENCAW I, SLU. Dnr. 12-1220/10.

Appendix 2

Economical report ENCAW II. SLU. Dnr: SLU.scaw.2014.1.1.1-33

Appendix 3

Bruckmeier K., MacGregor, M., Leonardsson, H., Department of Human Ecology, University of Gothenburg, Sweden. Acceptance and attitudes – procedures, retailers, consumers, citizens, experts.

Appendix 4

Molly MacGregor, Hanna Leonardsson and Karl Bruckmeier, University of Gothenburg, Sweden. Report No. 1: Swedish Pig, Cattle, and Poultry Farmers' Views on Animal Welfare.

Appendix 5

Molly MacGregor, Hanna Leonardsson and Karl Bruckmeier, University of Gothenburg, Sweden. Report No. 2: Swedish Consumers' Views on Farm Animal Welfare.

Appendix 6

Hanna Leonardsson, Molly MacGregor and Karl Bruckmeier, University of Gothenburg, Sweden. Report No. 3: Opinions, Practices and Developments in the Supply Chain Related to Animal Welfare as a Product Attribute.

Appendix 7

Molly MacGregor, Hanna Leonardsson, and Karl Bruckmeier, University of Gothenburg, Sweden. Report No. 4: Animal-Based Measures.

Appendix 8

Karl Bruckmeier, Hanna Leonardsson and Molly MacGregor, University of Gothenburg, Sweden. Report No 5: Animal Welfare Comparative Report – Producers, Consumers, Supply Chain Actors in Sweden and other European Countries.

Appendix 9

Hanna Leonardsson, Molly MacGregor and Karl Bruckmeier, University of Gothenburg, Sweden. Report No 6: Trends and Future Developments in Animal Welfare.

Appendix 10

Karl Bruckmeier, Hanna Leonardsson, Molly MacGregor, University of Gothenburg, Sweden. Scenario: Animal Welfare Policy in Sweden 2021.

Appendix 11

Veissier, L. Mounier, A. Dalmau, A. Velarde, C. Winckler & U. Knierim, Europe. Animal- vs. resource-based indicators: review of benefits and drawbacks in on-farm welfare assessment.

Appendix 12

Veissier, L. Mounier, A. Dalmau, A. Velarde, C. Winckler & U. Knierim, Europe. Report: ENCAW – Working group for Area 1 – Welfare Indicators.

Appendix 13

Veissier, L. Mounier, A. Dalmau, A. Velarde, C. Winckler & U. Knierim, Europe. ENCAW – Working group for Area 1 – Welfare Indicators – Table: 1-12.

Appendix 14

R. Hoffman, E. Kaspersson, H. Hansson, & K. Hakelius, SLU, Sweden. Abstract: Economic consequences of changing to a more animal-based welfare assessment in legislation and official inspection.

Appendix 15

R. Hoffman, E. Kaspersson, H. Hansson, & K. Hakelius, SLU, Sweden. Report: Economic consequences of changing to a more animal-based welfare assessment in legislation and official inspection.

Appendix 16

K. Dahlborn, M. Holmberg, L. Winblad von Walter & M. Stéen. Abstract: Animal welfare indicators in official animal welfare control in the Swedish Dairy.

Appendix 17

B. Staaf Larsson. Report: Comparison of three assessment programmes in Sweden.

Appendix 18

Activities related to the call for a European coordinated network in Animal Welfare (SANCO 2012/10293).