Risk-based Animal Welfare Assessment (RAWA)
Summary of final project report

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The research project Risk-based Animal Welfare Assessment (RAWA), funded by the Swedish Board of Agriculture, was conducted by the Department of Animal Environment and Health from spring 2008 to September 2011. It aimed to improve the basis for the development of methods to assess and monitor animal welfare (AW) risks at Swedish facilities for keeping or transporting domestic animals in accordance with EU and Swedish legislation. This was done by developing and evaluating risk-based methods for official AW control at individual animal holdings, mainly from a national perspective. The main part of the project work was spent creating a foundation for risk classification of different types of animal husbandry using a questionnaire and individual assessments by a number of experts from three stakeholder categories: industry, AW authorities and university, and by comparing with historical records of official control. The project management group also assisted the Swedish Board of Agriculture by scrutinizing and commenting on checklists used in Swedish official control, and the Swedish Animal Health Services by providing advice on a quality assurance scheme for outdoor wintering beef cattle, as a basis for changes in national legislation.

The project identified several possibilities to create a risk classification system for official control, using risk assessment techniques as a basis for classifying different animal production branches or husbandry types. It also pointed to advantages and drawbacks with different approaches. The further development and final design of such a classification system should be in accordance with the resources available, not to delay unnecessarily its completion and implementation. The system should be characterized by a high level of clarity, transparency, robustness and flexibility, aiming to achieve good acceptance among national stakeholder groups such as animal owners, industry organizations and companies, producer organizations, and consumers. Contacts with other EU member states indicate that Sweden has reached comparatively far in the development of a risk-based AW control in accordance with EC Regulation No. 882/2004.

Two different probabilities were assessed by each of 55 experts at four workshops from January to March 2011: 1) the probability of non-compliance from current AW legislation at a single control of a holding, and 2) the probability of serious AW deficiencies during one year in a holding (or, in the case of temporary animal activities, at one occasion). These two figures provide different pieces of information about AW risks. The former is a snapshot at the time of inspecting a holding, while the latter also contains a time component, i.e. the probability is dependent on the time period applied (comparable to prevalence and incidence measures, respectively, of disease occurrence in epidemiology). Before data collection, parts of the assessment protocol were tested in several undergraduate courses and at an international scientific workshop. The experts also provided their degree of uncertainty attached to the most likely probability values by also giving lowest and highest imaginable probabilities. This made it possible to calculate continuous probability distributions, one for each expert, for each probability type and for each husbandry type. The individual distributions were then aggregated to estimate the total uncertainty attached to each husbandry type, creating different types of confidence intervals. The experts' estimates were compared to historical official control results in four regions (counties) of Sweden.

A questionnaire on background, experience and views regarding animal husbandry and welfare was used to characterize experts from the different stakeholder groups. However, the value of such information was found to be limited for explaining the variation between experts when assessing probabilities of non-compliance and serious AW deficiencies in different types of animal husbandry. Nevertheless, how experts for risk assessment of AW are selected was found to be of great importance. If the selection was restricted to experts who stated that they had good knowledge about

the type of husbandry being assessed, their estimates correlated better with official control records than did the estimates of a less restricted selection of experts. In future, the use of questionnaire data to support the selection of experts should be considered.

It was possible to identify approximately 120 main types and 200 sub-types of animal husbandry in Sweden, which needed separate assessments of risks for non-compliance or serious AW deficiencies. It is therefore important that the national database of official AW control provides a sufficiently detailed classification of animal husbandry types, and that the description of animal species, animal types and activities at the holdings is unambiguous enough to make it useful for AW risk classification.

The probabilities of non-compliance and of serious AW deficiencies concorded relatively well. The correlation of risk estimates from the three expert categories was also generally strong, although there were systematic differences between the categories. Furthermore, the variation between individual experts within the categories was substantial, which was difficult to explain with data that were at hand.

There was a clear relationship between probabilities of non-compliance or AW deficiencies estimated by experts and the proportion of control points identified with non-compliance in the records sampled from official AW control. The proportion of controls with more than two points of non-compliance in one checklist (each checklist basically covering one animal species) appears to be a useful measure for risk classification, although it does not account for the nature of non-compliance. The relationship was most clear-cut when the estimated probabilities were based on a selection of husbandry categories for which the experts had stated a high level of expertise regarding the animal species and holding type being assessed, and when they claimed a very high level of knowledge about Swedish animal husbandry in general and familiarity with AW assessment procedures.

It is suggested that an overall assessment of AW risks (non-compliance or AW deficiencies) in different types of animal husbandry can be based on three numerical estimates: 1) the proportion of official AW control cases with non-compliance on more than two control points in a checklist, 2) the estimated probability of non-compliance with AW legislation in an average holding of the specified type, and 3) the estimated probability of serious AW deficiencies during one year in an average holding. By combining these three estimates, while accounting for uncertainty, a number of animal husbandry types can be classified as of a high or low AW risk. The interpretation of the estimates is not unambiguous, but there are several options depending on the choice of views and how different pieces of information are prioritized. According to a suggested method for interpretation, commercial egg production, hobby egg production, aquaculture of salmon-like fish, and public exhibition of animals at markets, fairs, TV, filming or alike (excluding circuses and variety shows) are husbandry types at a comparatively high risk of poor AW.

During the project, a number of workshops and seminars were organized, partly to present project ideas and results and partly for collecting data. The project resulted in several scientific publications and conference papers. More information can be found at the project website http://www.slu.se/hmh/rawa.

In conclusion, it is possible to design a system for fair and risk-based official AW control that allows risk classification by scoring or ranking of existing animal holdings.