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Animal Welfare 2007, 16: 237-239
ISSN 0962-7286

On-farm welfare assessment systems: what are the recording costs?

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Abstract

To illustrate that different approaches lead to different costs a cost calculation on four different welfare assessment systems for four different animal species has been carried out; an integrated pig herd (450 sows), a dairy cattle herd with automatic milking (90 cows), an organic egg production system (3000 layers) and a mink farm (1000 mink). We calculated the cost to be: €375 per annum for the mink farm and €2205, €2430 and €2435 for the egg production system, the AMS dairy herd and the integrated pig farm, respectively. The costs can be reduced by: reducing the number of indicators and/or the recording frequency, reducing sample sizes, more intensive use of existing data and by exchanging external for internal recordings.

Keywords: *animal welfare, labour costs, on-farm welfare assessment systems, recordings*

Introduction

On-farm animal welfare assessment systems may be designed as a decision support tool in which the farmer obtains information on the current animal welfare situation, or a certification type concept, allowing the farmer to document a certain 'standard' level of animal welfare (Johnsen *et al* 2001).

Many on-farm welfare assessment schemes include direct measurements of animal behaviour and animal health on the farm animals, which is costly to record in a valid manner. The cost question is to some extent a cost-validity conflict, which needs to be addressed not only by commercial players but also by scientists working on welfare assessment concepts. The data used may be recorded for various purposes and recorded by many.

The purpose of this paper is to discuss the costs of recordings in on-farm welfare assessment for decision support. The discussion is based on cost calculations for four examples representing four different species.

Cost of welfare assessment systems: some examples

An integrated pig herd

In a welfare assessment system for an integrated pig herd (including sows, piglets, weaners and fattening pigs), external data on housing system, management, animal behaviour, and animal health have been collected with the use of 85-100 man-hours per year (Bonde 2003). Herd size ranged from 350 to 550 sows in a loose housing system for pregnant sows (either large groups in deep litter with transponder feeding or smaller groups in concrete floor pens). Lactating sows were housed in conventional crates, weaners were in two climate pens and slaughter pigs were in pens with concrete floors. A technician collected data on housing system and management in 2-3 hours. Data on behaviour and health were collected by a researcher taking approximately 30 h and a research technician who took around 60 h visiting the herd 6 times during a 1-year period.

The system and management parameters included pen dimensions, flooring material, feeding and drinking devices, ventilation, feeding, watering, hygiene, grouping, inspection and disease control, handling of suckling piglets, and handling of sick and weak animals. They were described by direct observations on-farm or by interviews with the farmer. Animal behaviour included agonistic behaviour, fearfulness in sows and growing pigs, different postures, use of pen area and resources, and nursing problems, fearfulness in sows, lying-down behaviour, stereotypic or abnormal behaviours and play behaviour. These behaviours as well as painful chronic and acute diseases and injuries such as skin lesions, lameness, and hoof disorders, infectious local and systemic diseases and the general condition of the animals were monitored on a random sample of animals six times during a year.

A dairy cattle herd with automatic milking

A welfare assessment system for dairy herds with automatic milking was based on information on housing system, management, animal behaviour, animal health, and selected

https://doi.org/10.1017/S0962728600031420 Published online by Cambridge University Press

Table 1 Examples of time spent on recording in four different welfare assessment systems for four different species.

Welfare assessment type	Internal recording time (hours)	External recording time (hours)	Data recorded for other purposes (hours)	Total hours
An integrated pig herd	33	60	0	93
An AMS dairy herd	6	70	0	76
An organic egg production system	25	45	40	110
A mink farm	5	2	30	37

data from the AMS-computer (Rousing *et al* in press). The herd size ranged from 60 to 120 cows with either 1 or 2 robots and the cows were housed in loose housing systems with cubicles.

The assessment included dairy cows only. The total time used on recordings was 76 man-hours per year with 6 visits during a one-year period. Behaviour parameters included were: the cows' responses in a human approach test, step/kick behaviour during milking, getting-up behaviour and queuing behaviour in front of the automatic milking unit. At each visit representative samples of cows were observed. Information on housing system was collected on a 4 hour visit by one technician. Management routines and observation of spontaneous behaviour and performance in the behaviour tests were monitored during 6 two-half-day visits by a technician. At 6 visits each lasting one and a half hours a veterinarian conducted a clinical examination including body condition and lameness scoring, as well as recording of udder and teat lesions, pressure sores, ectoparasites and hoof length. Automated data regarding milking (milking frequencies, success etc) was included in the welfare assessment.

A batch production example: organic layers

A welfare assessment system for organic layers has been described by Hegelund *et al* (2003). Each farm had 1-3 flocks. Average flock sizes were 3000 layers, with a density of 6 hens m^{-2}. Flocks were loose housed in a deep litter system, with daytime access to an outdoor area, often via a veranda. The extensive outdoor areas ($4m^2$ per hen) were fenced fields in rotation, wood/scrubland, orchards or a combination of the above. The welfare assessment system was based on information from two sources: farmer recordings of egg production, mortality and feed consumption, and an external person (technician) recording various animal-based indicators including use of the range area, fearfulness, plumage condition, feet health and bodyweight. Most producers already record data for the efficiency control, with a time consumption of 10-15 minutes per day. Including parameters for the welfare assessment will take extra 5 minutes each day, totalling to 80-110 hours for an entire production period. Half-day visits by a technician were scheduled for week 20, 24, 28, 36, 44, 52, and 60 for each flock. With two flocks the technicians spent 7 days recording per producer. Management routines were recorded through interviews, which took on average two and a half hours.

Data recorded for other purposes included: invoices from purchase and slaughter: total mortality, egg production, mortality, feed consumption for efficiency control.

A strictly synchronised production example: mink production

A welfare assessment system for the strictly synchronised mink production has been described by Møller *et al* (2003). The average farm size was 1000 breeding females. The female mink is kept individually in cages. Most data was taken from internal sources such as health data (bodyweight and condition, litter size, mortality), management routines (number of females per stockperson, weekly average of daily energy allowance, vaccination strategy, weaning procedure, use of bedding material), and housing (number of cages relative to number of mink, shed type, watering system). Other indicators such as: temperament, stereotypic behaviour, and physical injuries at pelting had to be recorded specifically for the welfare assessment. However, these can be obtained fast and easy, as eg the stick test for temperament can be performed in 15 seconds (Hansen & Møller 2001) and stereotypy can be observed in about 30 seconds for a pair of male and female kits during the growth season. A representative sample of 100 pairs tested twice for temperament and stereotypy would take 2 and a half hours. Bite marks at the flesh side of the pelt can be registered in a few seconds per pelt during the pelting procedure. Depending on the feeding procedure, the energy allowance per mink per day may be internally (in the farms using computerised individual feeding) or externally calculated by the feed producer that delivers fresh feed daily.

What is the total cost of an on-farm welfare assessment system?

The time used for data recording in the four examples is summarised in Table 1.

It appears from Table 1 that there are major differences in the proportion of hours used by internal and external people in the four assessments. Also, the use of existing data ie data recorded for other purposes shows major differences. For the welfare assessment in organic egg production systems half of the time is spent collecting data, which is recorded for other purposes. The differences seem to reflect the complexity of the assessment. In the integrated pig herd animal welfare is assessed for four different groups of animals, whereas in the cattle herd the focus has been reduced to milking cows only. In the synchronised mink

https://doi.org/10.1017/S0962728600031420 Published online by Cambridge University Press

production all measurements are conducted on similar animals making the sampling very effective.

Besides the cost of recording there will be costs incurred on data aggregation and presentation of the welfare assessment to the farmer. We assume that this time for all systems would be 8 working hours by external personnel in a commercial situation.

One hour of the farmer's time costs €15 and an external person costs €30 an hour. If we assume that the data recorded for other purposes can be used with no extra costs, the total costs of recording for the four welfare assessment systems will be €2535 for the pig herd, €2430 for the AMS-dairy herd, €2205 for the egg production system and only €375 for the mink farm.

Discussion

Costs in a welfare assessment system may be reduced by reducing the number of parameters in a given protocol. In the organic layer example the clinical examination on 50 hens could be changed with a fast flock plumage condition score. We would need to leave out the weight of the hens and foot health, but we will save 30% of external time and 20% of the costs.

Also, the frequency of recording and number of animals included (the sample size) may be reduced without losing validity. An example is given by Waiblinger and Menke (2003).

Costs may be reduced by collaborating with data recording systems for other purposes. For instance in the integrated pig example, the use of abattoir data could provide information on some of the health parameters in meat production units such as slaughter pig herds and thereby reduce the resources needed to conduct the data recording on-farm.

A change from external to internal recordings, ie making the farmer himself do some of the recording, may reduce costs. In the pig and the dairy example most of the system and management parameters may just as well be collected internally by the farmer him/herself.

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