

Chapter 3

Indicators for welfare assessment, with specific relevance to New Zealand

3.1 Animal welfare science based approaches for practical on-farm assessment of pig welfare in New Zealand

Criteria that should be applicable to any assessment scheme will be presented, based on existing 'best evidence' from the scientific literature, and supported by scientifically robust logic. The principles of integration of indicators into a coherent assessment scheme, as well as techniques for benchmarking, will be briefly discussed. Specific indicators will not be presented; such indicators are included in much of the legislative and regulative documentation mentioned in section 2.2. It is an objective of the stakeholders' meetings to discuss and define these, and it is therefore anticipated that this exercise will follow subsequent to this review.

3.1.1 Criteria of the assessment protocol

The generic characteristics described below should be applied to any practical protocol, and have been taken from Webster (2005)³⁸. Also consult Figure A for reference.

Practicality

This refers to the actual implementation of on-farm assessment protocols, and is therefore discussed more thoroughly in section 3.2. The assessment requires active consultation, participation and compliance from the farmer; therefore, it must be carried out on ap-

pointment, at a time suitable for the farmer, and a realistic estimate of the time that should be budgeted for the assessment should be given.

The assessment should be straightforward for the assessor(s) to carry out. Its structure should be clear, and it should have a natural 'flow'. For instance, the assessment could commence with a questionnaire interview, after which the assessor(s) inspect the farm to complete the assessment.

Representativeness

As there is inevitably a degree of short-term variation in the conditions encountered on farm (which may be related to factors as diverse as the weather conditions, time of year, workload of the farmer and so forth), there is an inherent risk that the assessment does not capture the 'average' or representative situation. The farmer could be caught on a bad day; conversely, he could attempt to distort the situation by enhancing the conditions, e.g. by cleaning out shortly before the visit, or putting down extra bedding. The assessment should be robust enough for this not to significantly affect the final outcome. A method of doing this is by emphasizing traits which reflect the long-term consequences of husbandry practices, e.g. condition score, skin lesions etc.

Non-intrusiveness

A goal of the assessment is to observe the natural behaviour animals in their environment; disturbance should be minimised. Hence, the sequence of measures should start with the least intrusive (e.g. resting behaviour), and end with the most intrusive (e.g. actions that require physical handling). To a degree, intrusion is inevitable, but the reaction of the animals is in itself informative: for instance, apparent alarm reactions, fearfulness and not settling down are consequences of poor stockmanship.

Robustness

For indicators to be classified as robust, two criteria must apply: the observations must be representative, and they must be reasonably free of bias. The first point was touched on above. The second point is particularly pertinent for assessment of animal-based measures, which incorporate an element of subjectivity. Observer bias can never be entirely eliminated; rather, the issue is what can be done to minimise this. Inter-observer bias can be reduced by appropriate training of all assessors, so that the observations are standardised to the highest degree. Intra-observer bias (brought about by desensitisation or fatigue) can be limited by ensuring that assessors are not required to perform too many welfare assessments, or that there is variation in their work activities. In a situation where

gross neglect is suspected (e.g. following a complaint or tip-off from a member of the public) rather than a routine assessment, observer bias can be reduced by deploying a team of multiple assessors.

An interesting new avenue which can be explored is the advent of inexpensive digital recording technology. This means that digital cameras or video equipment (which also capture audio, which can certainly be relevant) can be routinely utilised; such evidence can be stored for later reference or evidence, or provided for second opinion.

3.1.2 Science-based assessment approaches

There has been a growing need for practically-based farm assessment tools worldwide; this can partly be attributed to increased public awareness of welfare, which has led to the development of farm assurance schemes. The application of scientific approaches is important as, by applying relevant techniques, it can help reduce bias and increase the degree of objective measurement.

Scientific understanding of welfare is at a relatively early stage of development, and has even been characterised as 'immature'. In analogy with diagnostic testing for disease, which has been extensively investigated and which, to a degree, is comparable, no 'Gold Standard' measure of welfare has been developed, which can be used to validate new measures or approaches¹⁸. This can be attributed to the lack of consensus of standardised definitions and approaches. Given the somewhat intangible nature of concepts such as 'welfare' or 'behaviour', definition of a 'Gold Standard' may not be feasible. On the other hand, this is a dynamic field of study and there have been numerous developments and advances in the past decennia; lively discussion and debate, and a willingness to 'borrow from' concepts and approaches such as Hazard Analysis and Critical Control Points (HACCP), evidence-based medicine (EBM) or Quality of Life (QoL) principles.

Validity and reliability

Again, these concepts are borrowed from the field of diagnostic testing. Validity refers to the degree to which an indicator measures or describes that which it purports to; it follows that animal-based measures are more valid indicators of welfare than environment-based measures, because the latter are indirect and can hence be considered 'proxies'. Reliability refers to the degree to which the outcome of an assessment, when repeated by different observers, results in the same outcome. The point is made by the Farm Animal Welfare Council¹⁸ that current assessment protocols are almost all of a format where the audit is performed by designated assessors; consequently, this audit is heavily influenced by the individual assessor's level of training, expertise, competence and diligence. In a scenario

where these assessors have a heterogeneous background (for instance in Australia – see Table 2.1), this will compromise the reliability.

Comparison of approaches

An early system for performing a systematic assessment for certification of minimum standards was the Animal Needs Index (ANI), which was piloted in Austria from 1988 onwards, for all species. This considered the degree by which housing criteria met animal needs, including a grading system to describe different standards of housing conditions with respect to animal welfare; the aim is to improve animal welfare as an incremental process. This, and similar schemes that have since been developed such as the Freedom Foods scheme, was based more or less on the Five Freedoms. Initially, indicators were more environment-based (as criteria were that they should be easy to apply, repeatable, easy to interpret and applicable across a range of conditions); subsequently, there has been an introduction of animal-based measurements.

An example of an approach used in risk assessment, Hazard Analysis and Critical Control Points (HACCP), is used by the MacDonald's Corporation to audit welfare during transport and slaughter of pigs and sheep²¹. The assessment flowcharts utilised by the Bristol Welfare Assurance Project reflect a similar principle¹⁰.

Other examples of scientific methods which have potential for adaptation and adoption include those developed in human social studies, e.g. measuring the quality of life (QoL), which is a complex composite index made up of a variety of weighted individual parameters, or human medicine, e.g. evidence-based medicine, which is defined as '... the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients' – in this context, care of individual patients may be substituted by 'welfare of individual or groups of animals'.

Integration of measures

By integration, we signify the compilation of the outcomes of assessment of individual welfare indicators into a single, composite score. This endpoint is beneficial from several perspectives: direct comparison of farms (benchmarking); explanation to, or interpretation by, the farmer; tracking the progression of welfare status of a farm in time (welfare profiles); and uptake by assurance schemes.

Obviously, it is important that the method of integration is transparent and based on sound arguments.

The two main philosophies, as described by the Farm Animal Welfare Council¹⁸, in developing such methods are presented below.

'Bottom-up' approach. This approach implies the collection of data on a large number of individual indicators (30 to 70 are mentioned¹⁸), across all management scenarios, incorporating all aspects of husbandry provision and animal-based assessments – hence this is the more common approach. These indicators are reduced to composite indices; this may be done in sequential fashion, to derive a single score. Several issues can be identified:

- The influence of some indicators may be larger than others; depending on the perceived relative importance, this may or may not be desirable. To compensate, weighting systems may be applied. This should be done on the basis of 'expert opinion' as it is inevitably a subjective process.
- The permissibility of compensation, i.e. whether below average scores in one aspect can be compensated by above average scores in another. On the one hand, the minimum standards generally prescribed by law are inflexible; on the other hand, the 'overall' welfare of an animal need not be seriously compromised if one of the applicable indicators falls short, while all others are well above the minimum requirement.

'Top-down' approach. Rather than use the physical elements of a production unit for the breakdown (i.e. age groups, housing areas etc.), this approach focuses on a limited number of key variables which are, in summation, assumed to represent an animal's welfare state. Examples include behaviour (as a proxy for mental wellbeing) and disease (as a proxy for physical wellbeing). These variables are in themselves integrative, i.e. a resultant of multiple variables, the interactions between which cannot always be quantified. As the number of integrative variables is relatively small, fewer measures need be taken, i.e. this is a more holistic approach. This approach is currently more experimental.

3.2 On-farm assessment methodology for use in New Zealand

This section addresses some of the more logistical issues related to the assessments, and will propose a methodology and framework of doing so, rather than developing and giving a detailed description of protocols for implementation. Underpinning this, the assumption is made that for routine assessments of welfare, the audit will be performed by a *single, trained observer* at a *single visit*. More complex cases may arise, for instance when neglect of welfare is expected; in such situations, multiple assessors may be involved, or more than one visit may be required.

The points below illustrate a number of the issues that have been discussed by the project team; outputs from the stakeholder workshops will be applied to further elaborate

these.

3.2.1 Objectives and approach

While it is also not the task of this project to make recommendations on who does the work, when, and on what basis, some due consideration should be given to this.

The level of training or expertise of the assessors will influence the design of the final protocols; e.g. veterinarians, purpose trained inspectors or an external agency. It would be assumed that a course of instruction would be part of the process, regardless of who will perform the audit.

Also, the objective of the assessments should be unequivocal – for example, whether all farms are periodically inspected (as in the European scenario), or whether inspections are only carried out in ‘problem cases’. This will shape the design of the protocols, i.e. how thorough it should be, and at what interval assessments should be scheduled.

3.2.2 On-farm assessment protocols

The assessment protocol should be as comprehensive and inclusive as possible, i.e. incorporate indicators representing a) environmental as well as animal-based measures of welfare, b) all management groups or stages of production, and c) the full range of housing and husbandry systems in use. Consequently, the assessment tool will be most effective if it is modular, which will enable assessment to be carried out in stages; for this, the SWAP²⁵ may provide a useful example. This allows the assessment to be tailored to each specific farm; in addition to being more efficient, this could give a more accurate reflection of the actual status. In practice, it may be carried out as described below.

Farm details, background and management

- It would be anticipated that this information would be captured by performing interviews, in the form of a structured questionnaire.
 - Taking down details of the farm should be the first element to be carried out; this allows the assessor to gain some insight into the farm while simultaneously acting as an ‘icebreaker’. The assessor would also explain the methodology of the assessment.
 - The questionnaire would include capturing key production characteristics; inspection of records could be necessary, but would be time-consuming. Likewise, data on health programmes, transport of animals, euthanasia etc. could be obtained.
 - Questions aimed at acquiring an indication of the level and competency of the stockmanship would also be integrated.
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- As an alternative, Webster (2005)³⁸ mentions that this could be performed on a self-audit basis, i.e. this section of the assessment is posted to the farmer in advance, who completes it before the actual audit takes place.

Detailed assessment protocols

- After completion of the questionnaire section, all areas of the farm are assessed following specific protocols. Inspection would start with the farrowing pens, and then work up through successive production groups of the breeding cycle.
- Per assessment site, the audit would start with the least intrusive observations (e.g. general impression of resting behaviour) and would end with the most intrusive observations (i.e. those that require physical handling).
- In terms of animal-based observations, emphasis would lie on indicators which reflect chronic changes, rather than short-term changes, as these are more representative of the overall welfare situation.
- The assessment tool will need the ability to cover all management systems and husbandry practices, of both indoor and outdoor production.
- It is recognised that there will inevitably be a variable range of conditions. For example, there will always be a number of less thrifty animals, so the presence of ill-thrifty pigs does not necessarily indicate that welfare is poor; but if the proportion of such animals is beyond what is reasonably expected, then a problem might be indicated. Even in such cases, there may be mitigating circumstances beyond the control of the producers (e.g. a recent disease problem or episode), which, if dealt with correctly, should have no repercussions. The assessment should be flexible enough to account for such scenarios, yet robust enough to identify genuine problems. This can only be achieved by coupling the information given by the farmer (or evident from farm records) with the direct observations made by the assessors. In other words, neither of these elements can be interpreted in isolation.

Deriving the overall outcomes

- The compilation and integration of the assessment as suggested in Figure ??, resulting in a final outcome, should be performed off farm. All scores are evaluated and a final score derived; further action also depends on the flow chart.
 - The farmer is to be notified as soon as possible. Personal discussion may be required for clarification and explanation.
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3.2.3 'Welfare profiles' of farms

Assuming the outcome of the audit is semi-quantitative, i.e. can give some indication of the quality of welfare, and furthermore, if welfare assessments are to be carried out periodically, comparison of the outcomes could give an indication of the progression of the level of welfare quality. Such 'welfare profiles' may be useful or applicable in the context of accreditation for welfare assurance schemes.

3.3 Indicators for on-farm assessment of welfare in New Zealand

The objective of this section is to generate a list of indicators which will be discussed in the stakeholder workshops to eventually give rise to the actual proposed on-farm assessment protocols.

The division of this list into sections and subsections more or less reflects the structure of other current assessment protocols and documents, which have been covered in Chapter 2. The consulted documents include the New Zealand Animal Welfare (Pigs) Code of Welfare²⁴, the Australian Model Code of Practice for the Welfare of Animal – Pigs (revised)³, the North American Pork Checkoff Swine Welfare Assurance Program²⁵, the British Code of Recommendation for the Welfare of Livestock: Pigs¹⁶, the RSPCA Freedom Food Welfare Standards for Pigs¹⁹ and the New Zealand equivalent, the RNZSPCA Welfare Standards for Pig Farming³¹. For further reference on these indicators, including measuring methods, the recent book by Velarde and Geers³⁷ is very useful.

Although there is considerable variability between the underpinning philosophies, methodological approaches and practical implementation of welfare assessment structures, the elements covered by these share a great deal of overlap and are, on the whole, directly comparable. Generally, the regulatory documents (e.g. New Zealand and Australian Codes^{24,3}) make provision for minimum standards; they present the assessment indicators per element of husbandry or management, discussing specific items per production group as required. The Defra Code¹⁶ is divided into two sections, a general section (which contains recommendations applying to all pigs) and a specific section (which considers production groups separately); this approach could be a good model as it permits a more modular assessment approach. In contrast, the welfare assurance approach of, for example, the RSPCA^{19,31} is to formulate the assessment in the Five Freedoms framework, discussing each Freedom in turn and how it should be assessed across the production unit. The SWAP protocol is structured somewhat differently than the others mentioned here; it is based on a self-audit principle and has a strong emphasis on recording of observations and practical, hands-on inspection. In addition, some of the welfare recommendations referred to in the documents above pay more attention to requirements relating to transport

and slaughter; these elements are not covered in detail here.

As noted elsewhere, the interpretation, stringency or threshold of the assessment parameters is variable, with the welfare organisations (e.g. RSPCA) tending to set the highest standards.

Further individual reference will not be made to these documents.

3.3.1 Feed and water

Quantity, frequency and delivery

Specific pre-determined levels of feeding cannot be given as the requirements vary between individuals, groups, breeds and production stages. Recommended nutrient requirements can, however, be formulated. The nature and quality of the diet should be appropriate for the animals' age and production stage. The design of feeding points, and space allocation (e.g. trough length) are also important.

The availability of sufficient drinking water is essential. Water temperature and quality should also be regulated. The design of the watering installations (including number of animals per watering point, and flow rate) should be adequate.

Monitoring by the producer

The design, frequency of feeding and monitoring of automated feeding systems (if used) can be generally prescribed. Monitoring of body score is an appropriate technique to ensure that the animals receive a correct amount of feed.

Automatic drinking systems should be checked daily. In hot temperatures, the increased requirements of the animals should be met.

3.3.2 Housing and shelter

A distinction is made between indoor and outdoor housing. Coverage is given to general factors such as site selection, design and maintenance of buildings; quality of fittings and equipment (including mechanical equipment, flooring and ventilation systems); amount and hygiene of bedding (if used); safety requirements; provisions for fire and other protection. Risk management systems in the case of defects, problems or breakdowns should be in place. The stimulation provided by environmental enrichment is being given increasing attention.

- **Indoor housing.** Specific factors include space requirements; ambient temperature; air quality / ventilation; and duration and amount of light provided.
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- **Outdoor housing.** Environmental factors such as temperature, shelter and facilities should be considered.

3.3.3 Provision of husbandry

General aspects of management

This is covered for different production groups separately, discussing pertinent issues specific to each group. There tends to be an emphasis on farrowing (duration and use of crates) and dry sows (stalls versus group housing).

The groups or stages in the production cycle that are covered include:

- Farrowing
- Weaners
- Grower and finisher pigs
- Sows and gilts
- Dry sows
- Boars

Elective procedures

In general, three elective procedures are covered. The degree to which these may be carried out, the timing and the requirements of the level of training or competence of the operators, are variable. The facilities and equipment, procedures and after-care should be adequately provided for.

- **Castration.** Age limit for the procedure, surgical technique and operator (veterinarian or 'competent operator').
- **Tail docking.** Provisions may be set for when it is permissible.
- **Teeth clipping.** Provisions may be set for when it is permissible.
- **Other procedures.** These include ear notching, placement of nose rings and tusk trimming. Such procedures are not universally tolerated.

Stockmanship

This element may be considered as a separate item, but has been included here under the husbandry section in reflection of Figure 1.1. General competence or training are prescribed, both in terms of stock handling as well as operation and maintenance of equipment; in general, this will be more difficult to assess objectively at the time of an audit. A good overall assessment can be attained by dialogue with, and observation of, the

producer, and the level of training and experience (including practical and applied on-farm training such as is provided by ProHand³⁰) may be relevant. The Freedom Food scheme requires designation of personnel as managers or stock-keepers. Some of the following items related to stock-keeping may be considered:

- **Mixing.** Formation of groups, or re-grouping animals, may lead to social problems, stress and injuries. Certain techniques or procedures can be implemented to minimise this.
- **Movement.** This requires certain handling skills, patience, and an understanding of, and sensitivity to, the pigs' natural behaviour and disposition.
- **Restraint and handling.** This should be performed following certain prescribed techniques, which differ according to the age and size of the animals, and requires a degree of skill and experience.
- **Inspection and observation of behaviour.** This includes frequency of observation of the animals, e.g. daily or twice daily. It requires an understanding of normal behaviour patterns, as well as the control of undesirable behaviour such as problems with aggression (tail and ear biting, bullying etc.).

3.3.4 Disease prevention and the alleviation of suffering

Inspection and monitoring

Livestock must be protected from pain, injury and disease. Health problems are typically manifested as physical symptoms, but may also be expressed as behavioural abnormalities. Therefore, for 'early warning' it is essential that the producer is familiar with the clinical expression of disease, as well as changes in normal behaviour which may indicate onset of disease. This is relevant both for individual animals, as well as on the group or herd level; symptoms may be clear but frequently are quite vague and rely on the perception of the stockperson that 'something is wrong'. On the individual level, observations of lameness, injuries and body condition score are important. The stock-keeper must be capable of responding adequately to such individual problems.

Provision of health care

A distinction can be made between preventive procedures and a response to the incidence of health problems. The first is typically dealt with in the form of a herd health programme or health plan; this is strongly recommended, or a requirement. It should extend to measures such as vaccination and parasite control, and requires a degree of record-keeping (see also 3.3.5 below). In the event of disease morbidity, prompt and timely intervention

is a requirement. If necessary, consultation of a veterinarian, and use of prescribed medication, are indicated. In New Zealand, the Animal Status Declaration, a document which accompanies pigs to the slaughter point, should record such treatments.

Facilities such as a sick bay should be available, and storage of medicines and disposal of medical waste should conform to requirements. A high standard of environmental hygiene should be maintained. As weaning is a high-risk period, specific care and vigilance is required around this time.

Pre-transport selection

This covers the aspects of selection, herding and loading of pigs; the aim is to minimise stress and injuries. The conditions and maximum permissible duration of transport are generally covered by accessory regulations.

Euthanasia

It is inevitable that animals will need to be destroyed on the farm premises from time to time, e.g. after chronic disease or acute serious injury (casualty animals). An important issue, which has not been given much coverage, concerns the elocution of guidelines to support the decision-making process which precedes euthanasia: in other words, the point at which the suffering of an animal (either in prolongation or in intensity) should be considered to be such that euthanasia is the best option for the prevention of further suffering. Handling of the animals before performing euthanasia should be performed in a humane manner, i.e. to prevent unnecessary further pain or distress, and euthanasia itself should be performed following well-prescribed techniques. Carcase disposal should also be correctly performed.

3.3.5 Quality management

This generally consists of a system of written procedures which covers the various aspects of production, and protocols pertaining to administration and record-keeping. This should give a comprehensive picture of production parameters on the unit. A health and welfare plan may make up part of this.

Quality assurance

Some assessment audits are carried out as part of larger farm assurance schemes. Others recommend that pig farms conform to industry-approved quality assurance guidelines or programmes that include animal welfare.

Record-keeping requirements and procedures

This is an integral part of quality assurance and farm management, and covers all areas of production, health etc. It thus provides a record of welfare, health and productivity data, as well as documenting evidence of management procedures, staff training, etc.
