

## The Virtuous Bicycle: a delivery vehicle for improved farm animal welfare

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### Abstract

This paper briefly reviews the development of monitoring procedures used for the assessment of husbandry and welfare within Farm Quality Assurance (QA) schemes. Most current protocols are based on measures of the resources, records and management provisions necessary to promote good husbandry. However, it is now generally accepted that monitoring protocols should be largely or wholly made up of direct, animal-based measurements of animal welfare. Whether based on provisions or outcomes, many current schemes lack impact, partly because they do not necessarily lead to effective action on-farm and partly through lack of public awareness or trust in the claimed benefits of the scheme. This paper proposes the concept of the 'Virtuous Bicycle' as a delivery vehicle for improvements in farm animal welfare through simultaneous operation of two virtuous cycles, one on-farm, involving assessment, action and review, the other at the retailer level, involving assurance and promotion, based on proof of compliance.

**Keywords:** animal-based protocols, animal welfare, consumer demand, financial incentives, quality assurance, welfare monitoring

### Introduction

The report of the Policy Commission on the Future of Farming and Food (the Curry Commission 2002) saw farm assurance schemes as a valuable way of communicating value to consumers. Surveys of public opinion in Europe have highlighted animal welfare as a major public concern and one that should form an essential element of farm assurance, together with other factors, such as food safety, quality and provenance (European Commission 2005). The need to incorporate proper assurance as to animal welfare within QA schemes has been recognised by the Farm Animal Welfare Council (2001, 2005) and forms the basis for the major multinational Welfare Quality® programme (www.welfarequality.net) funded by the Framework 6 programme of the European Commission and entitled 'Integration of animal welfare in the food quality chain: from public concern to improved welfare and transparent quality'. These initiatives were pre-dated by the RSPCA's 'Freedom Food' scheme, which began life in 1994. The aim of all QA schemes is twofold: to provide an independent audit of standards on farms and to provide assurance to consumers that the standards are being met. This paper deals specifically with the audit, assurance and promotion of good farm animal welfare within QA schemes whether this be the central pillar of the scheme (eg 'Freedom Foods') or just one measure of quality used to justify added value (eg Waitrose, www.johnlewispartnership.co.uk).

A welfare-based QA scheme should be able to provide evidence to demonstrate that standards of husbandry and

welfare on participating farms are consistent with the assurances it claims. So far as the animals are concerned, the aim of good husbandry is to promote a state of well-being, defined most simply as 'fit and feeling good' (Webster 2005). The protocols developed for the basis of welfare assessment must therefore incorporate measures of the elements of good husbandry (eg resources, records and stockmanship) and most current QA protocols give major attention to these things. However, there is now general acceptance that these protocols should include direct animal-based assessment of the physical ('fit') and emotional ('feeling good') elements of welfare, based on sound foundations of animal welfare science (Bartussek 1999; Algers & Berg 2001; Whay *et al* 2003a; Webster *et al* 2004).

The development of robust monitoring protocols for husbandry and welfare is an essential first element of welfare-based quality assurance. However, the scheme must also provide good evidence of quality control, namely proof that the monitoring procedure leads to effective action, designed both to ensure overall compliance with required standards, and to remedy specific areas where needs for improvement have been identified. Moreover, a market-led scheme that seeks to add value on the basis of assured standards of animal welfare that surpass the statutory minimum, must ensure that this added value is recognised by both consumers and producers and properly apportioned through all links in the food chain. If customers are to pay more, they need to be aware of, and trust, the assurances provided by the scheme. If retailers are to reward their

suppliers for their compliance with superior standards, they too need to promote the scheme to achieve financial reward through increased market share. If farmers are to invest increased time and resources in animal welfare they need a financial incentive, since most of them are doing the best they can with what they can currently afford. The farm animals, the objects of these good intentions, will only benefit if all three responsible parties can be persuaded to act together. To date, however, there is evidence to suggest that current, welfare-based QA schemes may be failing to achieve their desired impact (Whay *et al* 2003b; Huxley *et al* 2006). Possible reasons for this lack of impact include:

- Inadequate monitoring procedures
- Failure to develop action plans based upon information gathered during the monitoring procedures
- Lack of financial incentive for farmers to implement action plans
- Lack of consumer demand for ‘high-welfare’ produce, arising from lack of awareness, trust, or perceived added quality of individual QA schemes

If it is to succeed, a welfare-based QA scheme (or the animal-welfare element of a broader scheme) needs to operate both on the farm and at the retail level: in effect, two virtuous cycles of monitoring, action, review, reward and promotion, running together as elements of a single, continuous dynamic process. This may be described as a ‘Virtuous Bicycle’ (Figure 1). The design and development of this whimsical but conceptually-sound model will be described in detail in the subsequent text. At this stage, it is necessary only to indicate that the right wheel of the bicycle illustrates action to progress the quality of husbandry and animal welfare on-farm; the left wheel illustrates action to promote the market share for high-welfare products. The direction of this delivery vehicle is towards progressive improvement in overall standards of farm animal welfare and progressive increase in consumer demand, based on sound evidence to justify the assurance of high welfare standards.

### **The development of welfare-based Farm Assurance schemes**

The development and animal welfare implications of existing Farm Assurance schemes have been summarised by the UK Farm Animal Welfare Council (FAWC 2001, 2005) and reviewed more critically by Compassion in World Farming (CIWF 2002). All these schemes recognise the need to make proper provision for animal welfare, whatever the primary basis for the assurance. This may be provenance (eg British Food Standards 2000, [www.redtractor.org.uk](http://www.redtractor.org.uk)), ‘organic’ production methods (eg United Kingdom Register of Organic Food Standards, [UKROFS]), or animal welfare (eg the ‘Freedom Food’ scheme operated by the Royal Society for the Protection of Animals, [RSPCA]). All start from the basis of the Codes of Recommendations for the welfare of livestock produced by the UK Department for Environment, Food and Rural Affairs (DEFRA, [www.defra.gov.uk](http://www.defra.gov.uk)). The Codes outline the essentials of good husbandry, ie stockmanship, healthcare, accommodation,

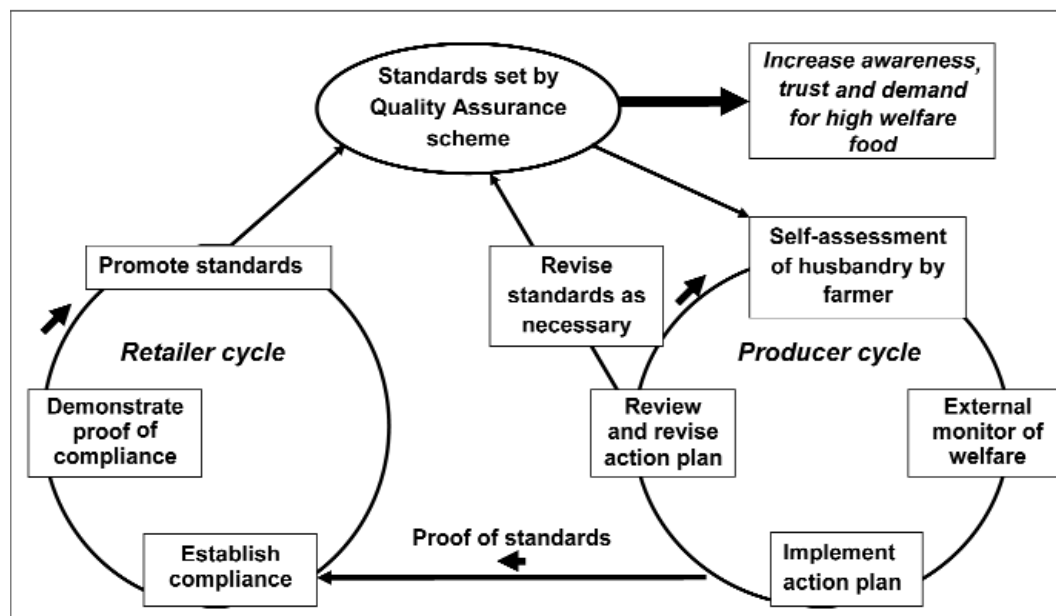
provision of food and water, and management specific to the needs of different classes and ages of animal. The elements of stockmanship are set out in detail, including the creation of a written health and welfare plan, acquisition of handling and husbandry skills (eg for castration, tooth clipping), and the ability to recognise early signs of ill health. One example of a system-based QA scheme that has met broad acceptance within the United Kingdom is the ‘Assured Dairy Farms’ scheme (formerly known as National Dairy Farm Assurance Scheme [NDFAS], [www.ndfas.org.uk](http://www.ndfas.org.uk)). This is intended to provide quality assurance with respect to all important aspects of dairy farming, including hygiene and food safety, biosecurity, maintenance of plant and equipment. However, the scheme also gives due attention to matters relating strictly to animal health and welfare under the headings of housing and facilities, provision of feed and water, herd health, stockmanship and training.

All these protocols acknowledge the ‘Five Freedoms’ (FAWC 1993) as principles by which to define standards of animal welfare. These are “freedom from hunger and thirst, freedom from physical and thermal discomfort, freedom from pain, injury and disease, freedom from fear and stress, and freedom to exhibit natural behaviour”. However, while the promotion of these freedoms is a stated aim, most protocols, to date, have been based almost entirely on audit of the provision of resources to the animals and records of management procedures, such as the provision of health-care. What they have lacked is a significant element of animal-based welfare assessment. In recent years, it has become generally accepted by those working in animal welfare science that that these observations and records of the provisions necessary to establish good husbandry should be augmented and, in many cases, replaced by animal-based measures that provide a more direct assessment of animal welfare (Bartussek 1999; Algers & Berg 2001; Whay *et al* 2003a; Webster *et al* 2004). This has become a central theme for three International Workshops on Animal Welfare Assessment at Farm and Group Level (WAFL). The European Commission, through Framework Programme 6, has funded a major, integrated study ‘Integration of animal welfare in the food quality chain: from public concern to improved welfare and transparent quality’ (Welfare Quality® [www.welfarequality.net](http://www.welfarequality.net)). Two of the key aims of this programme are:

- To develop robust on-farm welfare monitoring and information systems for selected farm animal species
- To implement a welfare-monitoring and information system and the welfare improvement strategies developed

These aims reflect the fact that quality assurance in the matter of farm animal welfare can only be guaranteed on the basis of robust protocols for assessment of the welfare state of the animals, backed up by proof of effective action to implement and sustain husbandry procedures necessary to promote satisfactory welfare and address any specific problems that may arise. The principles that underpin the monitoring protocols have been outlined by Botreau *et al* (2007a).

Figure 1



The 'Virtuous Bicycle': a vehicle designed to deliver improved animal welfare on-farm. The producer cycle illustrates a dynamic process of self-assessment, external monitoring, action and review, on-farm; the retailer cycle illustrates the process of quality assurance and quality control at the retailer level. The direction of the bicycle is towards increased awareness, trust and demand for high welfare food.

### On-farm monitoring protocols based on direct animal-based measures

It is necessary to make the distinction between welfare assessment and welfare monitoring.

#### Welfare assessment

This can involve any or all of the science-based physiological, behavioural or motivational methods used to determine the welfare of a sentient animal as it seeks to cope with the environmental challenges to its physical and mental state. Many of these methods have been developed under laboratory conditions and do not readily transfer to on-farm application. Moreover, most have been devised to address specific and increasingly subtle elements of welfare state, eg the motivation of hens to dustbathe (Duncan *et al* 1998) or the motivation of intensively-housed pigs to seek fresh air (Jones *et al* 1999).

#### Welfare monitoring

In the context of farm animal welfare, this describes the process whereby trained observers (monitors) seek to build up an accurate impression of overall welfare (or separate critical categories of overall welfare) in a population of farm animals from a series of measurements, according to standard agreed protocols. The procedures for incorporation into on-farm monitoring protocols must be underpinned by

scientifically-proven methods for assessment of the physical and mental state of the animals (such as those outlined above). They must also be robust, quantifiable and sufficiently objective to minimise between-observer variation (Main *et al* 2003; Webster *et al* 2004). Moreover, for any monitoring protocol to be accepted for a commercial QA scheme, each set of measurements will need to be accomplished with reasonable despatch (ie within a day or less) and without undue disturbance to the animals or to normal farm routines. This inevitably requires a degree of compromise. Protocols based on animal-based measures taken by an independent observer on a single day also raise the concern that they may be no more than snapshots which fail to reflect the long-term picture. However, this can be offset by selecting animal-based measures that integrate long-term consequences of past husbandry.

#### Development of protocols

Animal-based protocols have been developed at Bristol University for audit of animal welfare in dairy herds (Whay *et al* 2003b) and 'free-range' hens (Whay *et al* 2007): the original aim being to test the provision-based protocols that underpin the QA standards laid down by the RSPCA 'Freedom Food' Scheme and the Soil Association. Each protocol was structured according to the conventions of the 'Five Freedoms' (FAWC 1993). In the dairy cow protocol

**Table 1 The four principles and 12 criteria proposed by Welfare Quality® as elements of protocols for the direct, animal-based assessment of farm animal welfare (from Botreau *et al* 2007a).**

Welfare principles	Welfare criteria
Good feeding	Absence of prolonged hunger
	Absence of prolonged thirst
Good housing	Comfort around resting
	Thermal comfort
	Ease of movement
Good health	Absence of injuries
	Absence of disease
	Absence of pain induced by management procedures
Appropriate behaviour	Expression of social behaviours
	Expression of other behaviours
	Good human-animal relationship
	Absence of general fear

developed by Whay *et al* (2003b), physical and mental welfare were assessed within six categories: nutrition, reproduction, disease, external appearance, environmental injuries and behaviour. The protocol for laying hens (Whay *et al* 2007) included measures of attitude (arousal and response to novel object), activity (feather pecking, aggression and use of range) and physical welfare (mortality, body condition and egg quality). Selection of the more subjective measurements for inclusion in the protocol was based on consistency of measurement between trained observers.

Welfare Quality® ([www.welfarequality.com](http://www.welfarequality.com)) has developed a similar approach to the development of animal-based protocols for the assessment and categorisation of welfare (Botreau *et al* 2007). This is outlined in Table 1. The approach is similar, in essence, to the Five Freedoms: it recognises four principles of well-being, good feeding, good housing, good health and appropriate behaviour. These may be defined by 12 more specific criteria, each amenable to direct monitoring under farm conditions. For example, ‘good housing’ is defined by the criteria of comfort around resting, thermal comfort and ease of movement. The specific observations and measurements necessary to establish these criteria are still being tested for accuracy, robustness (ie insignificant variation between trained observers) and practicality.

Having developed a protocol based on robust measurements of welfare criteria, categorised in terms of the four principles of WQ or the five freedoms of FAWC, it is then necessary to agree on how best to use this information. The degree to which the separate welfare criteria can and should

be aggregated depends on how the information is to be used and by whom. If, for example, the aim is to improve welfare on an individual dairy farm by reducing lameness, then the monitor’s report should include specific information as to risks arising from hazardous flooring. If, at the other extreme, the aim is simply to state whether a particular unit does or does not meet the standards laid down by a particular QA scheme, then the individual criteria have to be aggregated to produce an overall score or, at least, a category of ‘pass or fail’. Such aggregation is necessarily subjective since it relies on value judgments as to the relative importance of the different principles or criteria. Botreau *et al* (2007b,c) explored how this might be carried out. If the decision as to compliance or non-compliance with the standards of a particular QA scheme is to be made simply on the basis of the monitor’s report, then aggregation becomes essential. This, however, becomes a good reason for not judging compliance simply on the basis of the report.

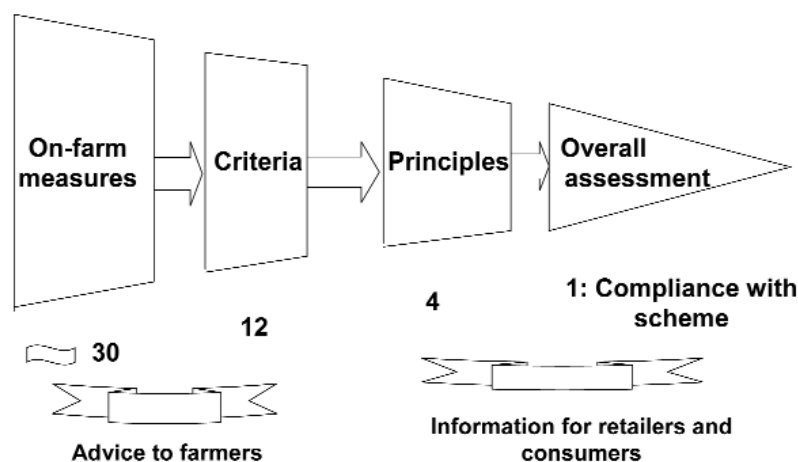
Welfare Quality® (WQ) has proposed the following approach to the characterisation, aggregation and interpretation of the animal-based measures to be incorporated in their protocols (see Figure 2). The four principles and 12 criteria of good welfare (Table 1) that form the structure of the protocol for each species are essentially used as the basis for value judgments. They are derived from a larger number (perhaps 30) specific, proven, robust measures of physical and mental state (eg body condition, prevalence of lameness, incidence of mastitis, evidence of feather pecking). It is proposed that the 12 Welfare criteria and the larger number of animal-based measurements from which these are derived will form the basis for communication of information to farmers and producers (Figure 2). The 12 criteria can form the basis of a strategic Welfare plan for each individual farm. The ca 30 individual records can form the basis for specific decisions as to actions to improve specific elements of feeding, housing and management. Communication of information to consumers will be based on the four principles and the single overall assessment. The four principles (or five freedoms) can be used in a generic sense to inform retailers and consumers as to the ethical and practical principles that underpin the standards laid down by the scheme. The single overall assessment defines the standard of each individual farm. In the WQ scheme, it is proposed that farms will be ranked on a four-point scale: unclassified, basal, good and excellent.

This approach shows promise, but unresolved issues remain. Questions that arise include, ‘How good is excellent?’, ‘Would it require evidence of positive welfare (eg happiness)?’ Perhaps the most serious objection to this proposal is that the honest proposal to rank farms as ‘unclassified, basal, good and excellent’ will be unacceptable within a commercial world that operates according to a different language of hyperbole where the word ‘best’ is more usually interpreted as the minimally acceptable standard within my shop or range of products. If there is to be a ranking system, my preference would be for one that was strictly numerical (eg 0–3 stars).



Figure 2

The characterisation of measures and criteria used for the basis of on-farm monitoring of animal welfare and possible routes for the integration of these measures for conveying information to farmers and consumers. (from Botreau *et al* 2007).



## Designing the virtuous bicycle

### Implementation of welfare assessment protocols and improvement procedures

The animal-based protocols outlined above represent a considerable advance towards the goal of guaranteed farm assurance with regard to animal welfare. However, the best designed and most scientifically-robust monitoring protocol cannot be expected to succeed unless it leads to effective action to promote and improve welfare on-farm. My proposal is that these animal-based monitoring protocols should be formally incorporated into a continuous process of self-assessment, external monitoring, action and review. This, the producer cycle, forms the right wheel of the 'Virtuous Bicycle' (Figure 1).

Each cycle begins with a formal, written self-assessment carried out by the farm owner with input from stockpeople and veterinarians as appropriate. The self assessment should be based on the standards of husbandry and provision set by the Quality Assurance scheme and will include housing and hygiene; records of feed provision; health; use of medicines etc; stockmanship and training; the existence and operation of a health and welfare plan). The farmer should also be required to outline any specific welfare concerns and priorities for action to address these concerns. The next stage of the cycle is the visit by the independent monitor, trained for and operating to the standards of the assurance scheme. The visit will include an interview with the farmer, to discuss and review the self-assessment and an inspection of the animals to assess welfare according to the animal-based criteria and principles described in the previous section. The report of the monitor will provide an assessment of compliance with the overall standards and the four principles of the scheme (Table 1). It will also contain strategic advice to the farmer relating to the various welfare criteria. It should identify and rank areas where it is desirable or necessary to improve

welfare, identify critical control points and prioritise an action plan designed to address these welfare issues. An approach to the identification of critical control points for the control of the severe welfare problem of lameness in dairy cattle has been described by Bell *et al* (2009). The next stage is for the farmer to see and provide written comment on this report, including his assessment of priorities for action, before it is submitted to the supervisors of the QA scheme. After an appropriate interval (eg one year), there is a further review of welfare in general and the effectiveness of specific prioritised actions. This should, once again, be based first on self-assessment, then independent monitoring.

This approach: self-assessment, independent monitoring, action and review is similar in essence to that involved in Teaching Quality Assessment (TQA) within British universities ([www.qaa.ac.uk](http://www.qaa.ac.uk)). The aim is to create a dynamic cycle of continuous improvement. The first benefit of starting with self-assessment is that the farmer can address elements of husbandry, provision and records in his/her own time, thus reducing the amount of work that has to be done at the time of the visit from the external assessor. It recognises that the farmer also knows most (if not necessarily best) the husbandry procedures that operate on his own farm and why they have evolved. As with the TQA, the aim of the visit by the independent assessor is to mount a fair challenge to the self-assessment. While the first visit will have to be comprehensive, subsequent assessments can concentrate on the most important issues arising from previous assessments and the success or otherwise of the action plan.

The practical merits of this approach are as follows:

- Elements of husbandry, including records of actions to ensure welfare, are included in the self-assessment. This recognises that much of the information necessary to assure the quality of welfare on-farm must be obtained from evidence relating to the provision of resources and manage-

ment on-farm, records of these provisions and records of outcomes, eg relating to animal health and use of medicines.

- Compliance with the standards of the scheme would not normally be based on the results of a single monitoring exercise but on the effectiveness of actions to promote welfare and address specific problems.
- Once the cycle of self-assessment, monitoring, action and review has been established, it should be possible for farmers and assessors to focus on the most important issues, thereby avoiding bureaucratic and time-wasting repetition of all elements of the assessment protocol at every visit.
- A scheme where compliance (and/or star rating) is based not on the assessment protocol but on evidence of the effectiveness of actions designed to promote welfare is sympathetic to the farmer since it reduces the risk of subjective bias in the assessor's report (and variation in standards between assessors). It is also more challenging to the farmer since it does not allow him to file away the assessor's report and forget about it until next year. He must provide evidence of effective action.

#### Promotion and assurance of improved welfare standards to retailers and consumers

The left wheel, the retailer cycle (Figure 1), is designed to improve the public awareness of, and demand for, food and other animal products from farms operating to proven high welfare standards. The aim is to create an improved, sustained, verifiable process of information transfer to the public and retailers relating to welfare standards and actions to ensure welfare standards on farms operating within the QA scheme. The welfare standards necessary for compliance within the scheme (or ranking within the scheme) are stated at the outset and freely available to all, both in outline and in detail. Entry to the scheme occurs when the farmer can establish compliance based on evidence that he has established the action plan for welfare. Subsequent cycles require continuous proof of compliance based on evidence of attention to improved welfare standards. Proof of compliance, supported by evidence, can then be used by the retailer to promote the scheme. The aim of the scheme, the direction of the bicycle, is towards increased awareness, trust and demand for high welfare food (Figure 1).

#### Riding the bicycle: the delivery process

The 'Virtuous Bicycle' cannot be powered by virtue alone. The scheme is more time-consuming and potentially costly to both producers and retailers than most of conventional QA schemes that tend to operate on the basis of an annual inspection, involving one day or less, and the probability that this will not impose any demand for action or expense. It is, therefore, unrealistic to expect it to succeed unless it brings real reward to all stakeholders, namely consumers, retailers, farmers and the animals themselves through proper recognition of the added value accruing through better attention to animal welfare. Thus, produce bearing the logo of a value-added scheme should retail at a price higher than that for food (etc) produced according to nationally approved (minimal) standards and a fair proportion of this increased

price should be passed to the producer. If it becomes pan-European policy to impose the monitoring standards and rating system proposed by Welfare Quality®, then it would be logical to equate 'unclassified' (or zero-star) with compliance with minimum legal standards assessed at annual inspection and not, in this case, impose an action plan to promote improved welfare. Awards of one-to-three stars (or rankings of basal-to-excellent) would reward increments of quality in terms of animal welfare with commensurate increments in the cash value of the produce.

The 'Virtuous Bicycle' is, at this stage, presented only as a concept. It is, however, a concept that emerges from the awareness that current welfare-based quality assurance schemes have a long way to go to achieve their joint aims of significant improvement in animal welfare at farm level and significant increase in consumer demand for proven high-welfare food. For these things to occur in practice, a quality assurance scheme must be seen to bring rewards to all those involved in the process: consumers, retailers, farmers and, of course, the animals. Farmers are unlikely to buy into the scheme without the assurance that it will bring them rewards in the form of increased income and security of contract. Consumers are unlikely to pay more and retain faith in the scheme unless they can trust the evidence upon which the assurance is based. In short, the 'Virtuous Bicycle' will only deliver when both wheels turn together. The success, (or otherwise) of this concept can only be established through experience of how it works in action. Nevertheless, I believe that it is necessary to introduce this concept now. Welfare-based quality schemes are a fact of life now and they are likely to become even more prominent in the future as results and strategies emerge from the Welfare Quality® programme. The tide of public opinion is with us but if we fail to deliver through piecemeal approaches that fail to complete the revolution of both cycles of challenge, action, promotion and reward, then consumers, retailers and farmers could lose faith and set back the cause for years.

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