

## Animal welfare and legislation

Donald M. Broom

Centre for Animal Welfare and Anthrozoology, Department of Veterinary Medicine, University of Cambridge, Madingley Road, Cambridge CB3 0ES, United Kingdom; dmb16@cam.ac.uk

### Summary

Animal welfare has been more and more widely accepted as a scientific discipline during the last 25 years and our knowledge of animal functioning, including the extent to which they are sentient, has increased. One result of this has been that the public have demanded more legislation to protect animals and this has been passed in increasing numbers of countries but there are still many countries that do not have adequate laws protecting animals. One of the key ways to improve animal welfare in the long term is for all those who use or have responsibility for animals to receive adequate education and training about the biological functioning of those animals, including ways in which their welfare might be made better or worse. To date, retailers' codes of practice have had the major effect on the welfare of farm animals although both laws and codes are needed. Further scientific studies on animal welfare are also needed and it is important to develop better methodologies for the enforcement of laws and codes and to provide adequate manpower to do this. Where the impact of different factors on animal health, or any other aspect of animal welfare, is being reviewed, careful analysis should involve not only risks but also benefits. Legislators are not just risk managers and a balance has to be struck between risks and benefits in every area of legislation.

**Keywords:** attitudes to animals, risk-benefit analysis, enforcement

### 1. Introduction: do people know what animal welfare is?

The term animal welfare is familiar to many people in Europe and other parts of the world. To most, the concept indicates the individual being happy, not suffering and not having serious problems in life. For some it relates only to their pets. For others it relates to a wider range of animals, including farm and laboratory animals, and to the most knowledgeable it concerns a group of animals with a particular level of biological complexity linked to the idea of sentience. The EU Treaty of Amsterdam is of substantial importance in relation to the number of people who are in this last category because it refers to animals as being sentient.

Poor welfare is one of the factors that can lead to an animal husbandry system or procedure being unacceptable to the public and hence unsustainable. However, which animals should be protected and what degree of protection is required? Animals vary in the extent to which they are aware of themselves (De Grazia, 1996) and of their interactions with their environment, including their ability to experience pleasurable states such as happiness and aversive states such as pain, fear and grief (Panksepp, 1998). This capacity may be referred to as their degree of sentience. A sentient being is one that has some ability to evaluate the actions of others in relation to itself and third parties, to remember some of its own actions and their

consequences, to assess risk, to have some feelings and to have some degree of awareness (Broom, 2006b). Awareness is defined here as a state in which complex brain analysis is used to process sensory stimuli or constructs based on memory (Broom, 1998).

Despite the concerns about which animals are sentient, the term welfare applies to all animals, both sentient and non-sentient so welfare assessment does not necessitate determination of sentience. However, for most people, in a sequence of animals of different complexity the threshold at which animals should be protected by legislation is linked to sentience. Whilst few people would want to protect an amoeba or a nematode worm, increasing proportions of people would be concerned about operations without anaesthetic when earthworms, snails, bees, crabs, octopus, goldfish, frogs, lizards, robins, dogs and chimpanzees are considered. The functioning of some aquatic animals in relation to protection is discussed by De Grazia (1996), Mather (1995, 2004), Chandroo *et al.* (2004) and Broom (2007b). The remarkable abilities of some birds (Clayton and Dickinson, 1999; Pepperberg, 2000) now force many people to put them in the same category as the most complex mammals.

It is generally accepted by animal welfare scientists and those considering human welfare that the concept of welfare refers to the measurable state of the individual on a scale from very good to very poor. It was suggested by Hughes (1982), following the writings of Lorca, that welfare means being in harmony with nature. This has proved to be a valuable idea but being in harmony is a single state and could not vary so it is not a definition of welfare that is usable in welfare assessment. Broom (1986) defined welfare in a way that includes feelings and health: 'The welfare of an individual is its state as regards its attempts to cope with its environment.' The definition refers to the extent to which the individual is failing to cope, or is having difficulties in coping, or is easily coping. The origin of the concept is how well the individual is faring or travelling through life and the definition refers to state at a particular time (Broom and Fraser, 2007; Broom and Johnson, 2000). Since feelings are a part of function, it is not correct to say that this definition of welfare is a functional one, rather than one that refers to suffering and other feelings (Broom, 1991, 1998, 2003; Broom and Fraser, 2007). The definition takes account of biological function but does not imply that a natural environment is necessary for good welfare.

The concept of welfare and the methods for its scientific study developed for non-human animals applies to humans. The discussions by Irwin (2001), Lutgendorf (2001) and Carter (2001) are amongst those that emphasise this. Welfare is a measurable biological variable that is just as important to humans as it is to animals used by, or not used by, humans. The concept of quality of life is essentially the same as the concept of welfare except that welfare can refer to very short-lasting effects while quality of life would not be used unless a period of a few days or more is being considered (Broom, 2007a).

## 2. Do people want animal welfare legislation?

Moral actions are directed more towards those identified as 'us' than towards those considered to be 'them'. Categories included as us may be: (a) individuals readily recognised as close relatives, (b) all of those who know who I am, (c) those who might have access to the same

information that I have, or (d) sentient beings who share characteristics with me (Broom, 2003, 2006b). Increased communication efficiency is revolutionising our degree of concern for other humans and extending our area of moral concern to other species. Companion animals will be in category (a) for some people as Serpell and Paul (1994) found that many pet owners stated that they regarded their pets as part of their family. Most people who have regular contact with individual animals would include them in category (b) and many who know about the functioning, especially the behaviour, of animals would include some or many other species of animals in categories (c) or (d). In many societies now, education levels are high and there is easy access to good quality information about animals whose abilities are complex. Hence people are becoming less likely to cause poor welfare or tolerate it in animals perceived to be aware. Changed attitudes to animals appear to be linked more closely to the educational level of people than to their affluence. In countries where the majority of people are relatively poor but well educated, interest in animal welfare is such that many people are willing to incur some degree of financial loss rather than benefit from poor welfare in animals.

If we use a living animal in a way that gives us some benefit, we have some obligations to that animal. One obligation is to avoid causing poor welfare in the animal except where the action leads to net benefit to that animal, or to other animals including humans, or to the environment. A utilitarian approach is not sufficient to determine all obligations, however, and a deontological approach is also needed because there are some degrees of poor welfare which are never justified by benefit to others.

It is my view (Broom, 2003, 2006a) that all human behaviour and laws should be based on the obligations of each person to act in an acceptable way towards each other person and to each animal that is used. It is better if strategies for living are based on our obligations rather than on perceived rights. This is because many so-called rights can result in harm to others. There are occasions when people state that they have a right to say what they want, or drive as fast as they want, or carry a gun, or select the sex or genetic make-up of their children. In each of these cases the action could cause harm to others which would be accepted by very few people. Whilst arguments based on a concept of rights may sometimes be clearly wrong, arguments based on the obligation of one individual towards others do not suffer from such problems. Hence my conclusion that the concept of rights is not the best to use and that each person should always focus on how they ought to behave. As far as animal rights are concerned, there are no legal rights stated but there are many statements, codes of conduct, or unwritten rules which explain the obligations towards animals of those people who use the animals. This argument is also applicable to references to the freedom which an individual asserts or which it is said should be given. Efforts to list the freedoms which should be allowed to the animals which we keep have been of use as a general guide to management but with the development of information about the needs of animals, it is now possible to be more precise in laws or guidelines for animal care and all of these should refer to needs rather than to freedoms.

It is very old and widespread idea in human society that animals used by people should not be treated like inanimate possessions but should be protected from actions that might cause suffering (Broom, 2006b; Dawkins, 1980; Fraser, 2008). Many people have condemned those

perceived as being cruel to animals, whether or not this is stated in a law. On the other hand, cruelty is part of some forms of human entertainment.

The treatment of animals is an area in which codes of conduct and descriptions of good practice exist. Even amongst groups of people whose objective is to kill animals, there have long existed unwritten codes of conduct concerning what actions are or are not permissible. For example, as discussed by Serpell (1986, 1989), people using guns and dogs to hunt mammals or birds would expend energy and resources trying to ensure that, firstly animals were shot in a way likely to kill quickly and secondly that shot animals were found and killed rather than being left to die slowly. More recently, codes of practice relating to animals kept for food production and other purposes have been produced by various organisations.

Public concern about animal welfare has increased in many countries during the last forty years and especially in the last twenty years. Evidence for this is summarised in Table 1.

Members of the public exert influence by letters to government, other public bodies and commercial organisations and by statements that appear in the media. Members of the European parliament report that they receive more letters about animal welfare than about any other topic. Politicians respond by raising the issues, including them in manifestos, seeking scientific information, encouraging further research and teaching, and passing laws.

The views of the general public are largely made known to farmers and others involved in animal usage via the media. There is frequent coverage of animal welfare issues in newspapers, on radio and on the television and this, by bringing scientific knowledge about animal complexity to the attention of people, affects their attitudes. Farmers and some other animal users may see themselves portrayed as uncaring. Some such portrayals are unfair but others are correct and the farmer cannot hide from them by putting animals in buildings and associating only with other farmers. When public demonstrations about animal welfare issues occur, the people who use the animals need to take note of them. The demonstrations by great numbers of largely orderly and apparently normal people against the shipping of calves to conditions that were illegal within the United Kingdom, had a big influence on farmers and politicians alike. The greatest influence on animal users or politicians is exerted by moderate people who represent a groundswell of public opinion, rather than by the most vociferous people, who may be rather extreme in their views. For some years now, in many surveys in Europe animal welfare has been shown to be an important issue for the general

Table 1. Evidence for increased concern about animal welfare (Broom, 1999).

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1. Letters from the public, media coverage
  2. References in parliamentary discussions and government statements
  3. Requests for scientific evidence concerning animal welfare
  4. Activity of scientific and other advisory committees
  5. Funding of scientific research on animal welfare
  6. Increased teaching and conferences
  7. More legislation
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public. For example about three quarters of people questioned in France regarded animal welfare as a problem affecting their purchasing of veal or eggs (Ouedraogo, 1998) and 34% of 420 schoolgirls questioned in Dublin stated that they avoided eating meat, principally (53%) for animal welfare rather than nutrition (29%) reasons (Ryan, 1997).

Laws intended to prevent cruelty to dogs and horses were passed in Europe as long as 200 years ago and were gradually extended to other kinds of animals (Fraser, 2008; Radford, 2001). Most early laws referred to companion animals and working animals but not to farm animals. Some laws protected animals against the forms of animal experimentation which were considered likely to cause substantial pain to the animals. Laws were also passed which proscribed some forms of entertainment involving animals as being cruel but others were still permitted. Laws aimed at preventing poor welfare in animals have become more wide-ranging, both in terms of species and the different animal uses, and have been passed in more and more countries.

As explained by Radford (2001), members of the public have expectations that legislation will result in the worst causes of poor welfare in animals being prevented. Where the law is based upon a necessity for unnecessary suffering to be proved, many practices that result in poor welfare can occur without successful prosecution of the perpetrators. The U.K. Animal Welfare Act, 2006, imposes a duty of care on all who are responsible for animals. This wording can result in a prosecution if the animal has not been cared for in a reasonable way. However, the wording of this Act still refers to unnecessary pain, suffering and distress and this retains the problem that some actions might be deemed necessary, not for the benefit of the animals but for the convenience or profit of the animal user.

The expectations of people about the efficacy of laws vary somewhat from country to country. In the United Kingdom, Germany or Sweden, most people would assume that animal protection laws would protect animals but in Italy or Mexico, many people would be dubious about whether laws would have much impact. The doubts are related to ideas about whether or not the average person would obey the law and the extent to which there would be effective enforcement. However, the differences among countries in these respects appear to be lessening.

### **3. What actually affects the welfare of production animals?**

The welfare of animals can be very poor because of the design of animal accommodation or of facilities on farms, for transport or for slaughter. Management systems also have substantial effects on welfare. If the building or management system causes unavoidable problems, as some do, however good the care given to the animals, welfare will not be good. For example, the welfare of social animals deprived of social contact, or of confined animals deprived of exercise or opportunity to groom, cannot be good at all times however well the animals are cared for in those systems.

People who run farms, work on farms, or otherwise use animals are influenced by a variety of factors when they are deciding on their housing and management policies and when

they are executing these policies. Attitudes of animal users depend upon early training, traditional practices, acquisition of knowledge from others subsequent to any training, personal experience and general beliefs and philosophy (Broom, 1999, 2004). Training did not, until recently, include much information about animal welfare except where it impinged on profitability. Even diseases were often mentioned in agriculture training only in relation to effects on growth, offspring production or product quantity and quality. However, education of people who use animals is of key importance in encouraging the improvement of animal welfare in the future and animal welfare courses are becoming more widespread (Broom, 2005; Hewson *et al.*, 2005; Webster, 1994).

Farmers and other animal users have to live with their families, friends and neighbours. If these people are critical of the effects on the welfare of animals of the methods used, the farmer may change these methods. The views of the general public are largely made known to farmers and others involved in animal production via the media. There is frequent coverage of animal welfare issues in newspapers, on radio and on the television and this, by bringing scientific knowledge about animal complexity to the attention of most people, affects the attitudes of people and then comes to represent it. Farmers see themselves portrayed as uncaring in some respects. In many recent surveys in Europe, animal welfare has been shown to be an important issue for the general public.

#### **4. The relative importance of legislation and standards in affecting animal welfare**

Legislation is generally initiated by pressure from voters on elected politicians. The politicians would usually seek advice from civil servants before formulating new legislation. In recent years in Europe, whenever any legislation on animal welfare is proposed, advice is sought from committees or working groups of scientists. The non-governmental organisations who lobby the politicians, whether they are producers' organisations or animal protection organisations, will have some access to scientific advice so it is important for the legislators to know the latest state of scientific knowledge on the subject. As a consequence, the European Union has set up, via the European Commission, scientific committees on a range of subjects. The former committees were the Scientific Veterinary Committee, Animal Welfare Section and the Scientific Committee on Animal Health and Animal Welfare. The present committee is the European Food Safety Authority Scientific Panel on Animal Health and Welfare. Legislation within European countries and E.U. Directives and Regulations have often been preceded by Recommendations from Council of Europe committees such as the Standing Committee of the European Convention on the Protection of Animals Kept for Farming Purposes.

On a world-wide scale the Office International des Épizooties (OIE) or World Organisation for Animal Health is now producing sets of recommendations which are likely to be treated as laws by most nations in the world, just as OIE recommendations on animal disease are respected.

Farmers often sell animals or their production of milk, eggs etc. to single purchasers who represent large retail chains or wholesale distribution companies. The increase in direct

selling to supermarket chains has led to considerable power being placed in the hands of these supermarket companies. It is possible for these purchasers to lay down conditions for animal production and to enforce these by inspection. The standards set by the supermarket chains are determined by what people will buy and by their reputation with the public.

The public image of large companies which retail food, including supermarket chains and fast-food companies, is of great importance to them. Bad publicity because of a risk to public health, a risk to the environment or the occurrence of poor welfare at any stage of the production process can be very damaging. Hence it is in the interest of such food companies to avoid any scandal which might threaten their good image (Broom, 1999). When these companies receive many letters from consumers complaining about a product which they sell, they have to take notice of the points which are being made.

As a consequence of consumer pressure, food retail companies are adopting animal welfare standards which they impose on their suppliers. In some cases, these standards are quite simple, for example Albert Hein in the Netherlands and elsewhere limited their sales of eggs to 'scharreleieren' which meant that the hens were reared in conditions where they could scratch in litter. Marks and Spencer in the U.K. and elsewhere stopped selling eggs from battery cages. In other cases, elaborate standards have been described in detail and sent to suppliers. One of the first systematic attempts to provide comprehensive information about the conditions under which animals were kept in the course of food production was the 'Freedom Foods' scheme run by the R.S.P.C.A. in the U.K. In this scheme, the standards for housing and management have been set by a widely respected animal protection society and farms are inspected by Freedom Foods staff. Retailers who subscribe to the scheme are allowed to use the Freedom Foods logo which is accepted as honest by the purchasing public. Acceptance, by the public, of products which are produced in such a way that the welfare of the animals is good, depends upon trust in the organisation which is carrying out the labelling and inspection. Some large supermarket chains and other food retailers are trusted because it is thought that they could not afford to be found out if they were not labelling and policing adequately.

The enforcement of standards by food retailers has led to substantial changes in the welfare of animals on farms because every producer has to conform to the standards in order to sell their products. The rapid development of such schemes in several countries has, in general, been based on scientific evidence about animal welfare.

As trade in farm products becomes more and more international, and consumers in increasing numbers of countries demand good welfare standards during animal transport, the necessity for international standards for animal welfare during housing, transport and slaughter becomes more important. The OIE standards are likely to be a minimum that most countries will follow. However, the standards enforced by food retail companies in some countries will be higher. Hence many countries will choose to use the higher standards. In general, retailer standards are likely to have a more substantial effect on the welfare of farm animals than legislation.

## 5. The role of risk management in legislation

The risks that a toxic substance will be in a foodstuff, or that a pathogen will enter an animal and proliferate in it, or that a management procedure will result in poor welfare in a farm animal have always been considered in scientific reports like those produced by the European Food Safety Authority (EFSA) or its predecessors in the EU. However, in recent years the methodology for assessing risk has become more sophisticated and systematic so it is now used in many reports on topics like those exemplified above. This has resulted in scientists being more rigorous in their analyses of potential problems. If a quantitative or qualitative risk analysis is carried out, it is less likely that factors that affect the harm under consideration will be missed. Also, the relative importance of the factors involved will often be estimated more accurately. This approach was stimulated by the initial failures in the late 1980s and early 1990s to properly evaluate the risks associated with the outbreak of bovine spongiform encephalopathy (BSE) in cattle and Creutzfeldt-Jakob Disease in humans who had consumed some cattle products. A reluctance to harm the cattle and cattle-feed industries led to inadequate analysis of risk to cattle and humans. This might have resulted in the deaths of millions of people, although fortunately the number will be very much lower than this, and actually caused much more harm to the industries than there would have been if a proper risk analysis had been conducted at an early stage.

The inclusion of risk analysis in scientific reports and opinions produced by EFSA and other organisations has helped decision makers to take appropriate action, for example to minimise animal disease and improve animal welfare. It is desirable that this approach should be continued, with suitable modification according to the limitations associated with the relevant data.

Some factors that affect animals have beneficial effects rather than leading to a greater risk of a harm. This is most obvious when the wide-ranging components of animal welfare are considered. Food, access to other resources, human contact, social interactions and many other factors can result in benefit to the individual. Any one of these factors may also stimulate the immune system of an animal and hence confer benefit by reducing the likelihood of clinical disease. Hence every scientific review of welfare in general or of a component of health, such as the occurrence and effects of a pathological condition, should consider the possible beneficial effects of factors as well as their impact on risk. It is never sufficient in such reports to merely conduct a risk analysis.

Those who formulate laws, such as government ministers or the staff of the European Commission, have to take account of all factors in determining the best course of action so they are never just risk managers. Much of what they are trying to achieve is benefit, not just reduction of risk. This is true in legislation to reduce disease and to promote good health as well as, more obviously, in the animal welfare area. Legislation can promote good welfare and it often does.

## 6. Who has to consider the risk of poor welfare and factors contributing to good welfare?

Where two or more systems for housing and managing animals exist and they differ in their effects on welfare, many people may have an interest in action being taken to provide the best welfare for the animals. As a consequence, a wide range of people may wish to consult accurate scientific reports on the factors that affect welfare. Some members of the general public will inform themselves about the facts so that they can adopt a position on the subject to use in discussion and, on occasions, when voting. They will often be informed by the media, sometimes accurately and sometimes in a sensationalist way. The aims of the media include providing information so they will also wish to consult authoritative scientific reports on animal welfare or those who have thoroughly studied them.

Documents explaining the way in which various factors contribute to good or poor welfare will also be used by stockpersons, individual producers and producer organisations. Many of those directly involved in caring for and managing animals have a personal concern to try to improve the welfare of those animals so they will wish to inform themselves by reading reports or attending courses or lectures by those who have. Those who own or manage businesses centred on animal use and those who work for producer organisations will be aware of the public interest in animal welfare so they will need to obtain good information on factors affecting welfare so that they can act to modify methodologies or building design as necessary. Those who act early are less likely to be criticised. Action to improve animal welfare will, in some cases, allow that animal production area to flourish rather than decline. If a significant number of consumers consider a product to be produced in a morally unacceptable way, they may boycott it. Hence preservation of the good name of an industry into the future may depend on acquiring and acting on information about animal welfare.

There has been a substantial change over the last twenty five years in the way in which animal protection societies act when trying to achieve change. Most societies, like most government agencies and some producer groups, now commence any campaign or the formulation of any document by endeavouring to obtain good quality scientific information about the issue under consideration. They do this because they are more likely to be listened to by government and by the public if what they say is accurate. Hence scientific reports by EFSA are read carefully and where there is no good review of a subject, the animal protection society may commission one from a scientifically-based group or may produce a report from within their own staff.

## 7. The role of animal welfare science in deciding on legislation

Animal welfare scientists provide objective information about the welfare of animals. Most welfare indicators will help to pinpoint the state of the animal wherever it is on the scale from very good to very poor. Some measures are most relevant to short-term problems, such as those associated with human handling or a brief period of adverse physical conditions, whereas others are more appropriate to long-term problems. Tests of avoidance and positive preference help in the design of better conditions and procedures. In all welfare assessment

It is necessary to take account of individual variation in attempts to cope with adversity (Koolhaas *et al.*, 1983; Mendl, *et al.*, 1992) and in the effects which adversity has on the animal. The general methods for assessing welfare are summarised by Broom and Fraser (2007).

The central role of animal welfare scientists is to further develop their discipline and to carry out studies in which they evaluate the welfare of animals housed or treated in different ways. The collection and analysis of data by animal welfare scientists should be carried out in an objective way that is independent of any ethical view about the outcome of the research. After the results have been obtained, scientists, like any member of the public, may make judgements about what should be done.

When scientific reports on animal welfare matters are produced, these are easier for legislators and other informed persons to use and have greater effect if the primary scientific literature is quoted giving full references. However, evaluation of the quality of the scientific information is also important. The conclusions from the data reviewed should be quoted and recommendations made based on the evidence available. Where there is little scientific information, conclusions and recommendations should still be made but should make this clear. In some cases, it is valid to use information from related species but in other cases it is not. For example, every social animal will be adversely affected by being tied up and prevented from showing social as well as normal maintenance behaviour so a report on a social animal that has not been studied directly in this respect could refer to studies of other species. On the other hand, a pathogen that causes infection in one species may not cause infection in another so extrapolation from species to species is not reliable.

Laws can have a significant effect on the ways in which people manage animals. As an example of events leading to an EU Directive, the welfare of calves may be considered. From 1960 onwards there was some public concern that close confinement and inadequate diet lead to poor welfare in calves reared for veal production. This was a focus of the book *Animal Machines* by Harrison (1964) which led to the setting up of a national committee on farm animal welfare in the U.K. In the 1970s and 1980s there were research results giving evidence for serious welfare problems in closely confined calves. In 1988 the recommendation concerning the welfare of cattle from the Council of Europe Standing Committee on the Protection of Animals Kept for Farming Purposes stated that cattle should be able to make all normal movements for grooming, exercise etc. Some European countries passed legislation banning calf-crates. The 1990 report by a group of scientists coordinated by the European Commission was followed in 1991 by Directive 91/629/EEC laying down minimum standards for the protection of calves. This allowed the use of crates of a minimum size but required a report from E.U. Scientific Veterinary Committee by 1/10/97 which Ministers would act on. In the 1990s there was further welfare research on the effects of diet, confinement, space in groups etc. on calf welfare and in 1994-1995 much public pressure for action. The scientific report was requested early so in 1995 the 'Report on the welfare of calves' was produced by the E.U. Scientific Veterinary Committee, Animal Welfare Section. In 1996 there was a proposal for legislation from European Commission staff and the scientific report was considered by Ministry staff from each member state. A revised proposal was discussed by Ministers from each Member state and the 1997 Directive 97/2/EC, phasing out the use of veal crates and inadequate diets, was passed.

Similarly, within the European Union (EU), the Council Regulation (EC) No 1/2005 'On the protection of animals during transport and related operations' takes up some of the recommendations of two separate reports: (1) the E.U. Scientific Committee on Animal Health and Animal Welfare Report 'The welfare of animals during transport [Details for Horses, Pigs, Sheep and Cattle]' (March 2002) and (2) the European Food Safety Authority 'Report on the welfare of animals during transport' (2004) which deals with the other species. There are now many other examples of legislation based on information from scientific reports in the EU and elsewhere.

## 8. Enforcement and animal welfare science

The actual effect of legislation on the welfare of animals depends upon the responses of those owning and managing the animals. This response, in turn, depends upon the nature of any enforcement. Some systems for farm animal production will not continue if they are made illegal because they depend upon large manufacturers who are easily forced to change to a legal system. Other aspects of legislation can be enforced only by checks on farm, transport vehicles, markets, slaughterhouses etc. and the extent of law-breaking will be significantly affected by the frequency and quality of the checks. In most aspects of animal welfare law, little good information on the extent of compliance exists. For many transgressions, unannounced inspections are necessary if transgressors are to be discovered. There are regional and national differences in the extent to which legislation is viewed seriously by those involved in the animal production business. The general direction of movement within the European Union in this respect is towards better enforcement in all member states because it is manifestly unfair for there to be significant differences in the extent of compliance with the law.

Enforcement of 'retailers' codes of practice is likely to be better than enforcement of many national laws because, in order to protect the company's reputation, the retailers will have more inspectors than the government is willing to pay.

Where inspection of animals occurs, as a part of the enforcement process, scientific papers can help to determine which are the best measures of welfare outcomes to monitor. For example, general principles are explained by Botreau *et al.* (2007) and a protocol devised by Whyte *et al.* (2003) is appropriate for aspects of dairy cow welfare.

## 9. Conclusions

### 9.1 What has been achieved?

Animal welfare has been more and more widely accepted as a scientific discipline during the last 25 years and our knowledge of animal functioning, including the extent to which they are sentient, has increased. One result of this has been that the public have demanded more legislation to protect animals and this has been passed in increasing numbers of countries. Welfare is affected by the education and attitudes of those responsible for the animals,

as well as by codes of practice and laws. To date, retailers' codes of practice have had the major effect on the welfare of farm animals although both laws and codes are needed. The introduction of risk-assessment methodologies has led to more rigorous scientific analyses of the dangers of toxicity in food or the spread of disease.

## 9.2 What has been neglected?

There are still many countries, including large countries like the United States, that do not have adequate laws protecting animals. The dissemination of information relevant to the improvement of animal welfare has sometimes been blocked, or at least not promoted, by those who view it as having an adverse effect on their business. When laws and codes exist, their efficacy is greatly affected by the quality of the enforcement system. There has been a tendency in many countries to reduce the numbers of staff who check on farm animal welfare, including health. For all analyses of the welfare of humans or other animals, including the impact of disease, the beneficial effects of the various factors should be carefully considered but benefit analysis is seldom carried out.

## 9.3 What needs to be done?

One of the key ways to improve animal welfare in the long term is for all those who use or have responsibility for animals to receive adequate education and training about the biological functioning of those animals, including ways in which their welfare might be made better or worse. Further scientific studies of animal welfare are needed but it is also important to develop better methodologies for the enforcement of laws and codes and to provide adequate manpower to do this. Where the impact of different factors on animal health, or any other aspect of animal welfare, is being reviewed, careful analysis should involve not only risks but also benefits. Legislators are not just risk managers and it is seriously misleading to describe them in that way without reference to the balance that has to be struck between risks and benefits in every area of legislation.

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