

# **Potential Implications of Animal Welfare Concerns and Public Policies in Industrialized Countries for International Trade<sup>1</sup>**

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The intensification of systems of agricultural production has generated increasing concern in some countries about the treatment of farm animals. Perhaps nowhere are these concerns more apparent than in Europe. Wide-ranging legislation governing the treatment of farm animals exists in many European countries and at the multinational level through the European Union. Private initiatives on the development of standards for the production and marketing of food products have emerged in some countries in response to public concerns over animal welfare. The European Union accounts for roughly 50 percent of OECD exports and imports of live animals, meat and livestock products.<sup>3</sup> Private and public actions relating to animal welfare have potentially broad-reaching implications for agricultural practices in the countries concerned, and beyond their borders through effects on international competition and trade.

This case study examines the current status of animal welfare measures, both private and public, in the European Union<sup>4</sup>. We do not attempt to address philosophical issues about whether society's preferences for animal welfare can be expressed through markets and the role of public policy in correcting market failure, since these issues have been dealt with elsewhere (Blandford and Fulponi, 1999). Our focus is on the nature of public concerns about animal welfare in the European Union and the way that these are being reflected in private initiatives and public policy. We examine the implications of the actions being taken for international competition and trade. Finally, we offer some suggestions on ways in which animal welfare preferences might be accommodated at the multinational level.

## **Nature and implications of animal welfare concerns**

### ***What is animal welfare?***

There are several approaches to defining animal welfare (see box). However, a widely used definition is that 'welfare' refers to the state of a being in relation to its environment (Broom 1991). This implies that it is possible to measure animal welfare by assessing an animal's ability to cope with its environment, and that failure to cope or difficulties in coping indicate poor welfare. Approaches to the measurement of welfare using science-based principles have emerged with the increase in social concern about the "quality of life" of farm animals. However, it is difficult to decide what should be measured and how these measurements should be weighted since there is no universally agreed definition of what constitutes higher versus lower levels of welfare. Consequently, it is typical to use a range of science-based indicators.

To the extent that the welfare of farm animals is dependent on human care, this raises the ethical issue of what are the duties of humans to animals, given generally

accepted moral principles in a society. The usual premise is that while animals can be used for the benefit of humans, such use carries certain obligations (Sandoe et al 1997, Tannebaum 1991). These are the provision of essential food, water and shelter, health care and maintenance, alleviation of pain and suffering, and the ability to enjoy minimal movement. Such obligations are reflected in the so-called “five freedoms” elaborated by the Brambell Committee of the U.K. Parliament in 1965 and in subsequent conventions on animal welfare agreed in the Council of Europe.<sup>5</sup> These conventions have been extremely important in guiding legislation on animal welfare in the European Union.

### **Measuring animal welfare**

There are three main science-based approaches to defining “animal welfare”:

1. Subjective experience of animals. This rests on the belief that animals can experience affective states (‘feelings’ or ‘emotions’). Thus animals can suffer if their living conditions are poor and enjoy if conditions are good. In order to assess the welfare status of an animal a number of indicators are used: behavioral (indicators of stereotyped behavior for pain, hunger, frustration and boredom), and vocalized and physiological (heart rate, secretion of stress hormones). The challenge is to link the unobserved affective experience of the animal to a set of observed phenomena.
2. Biological functioning of animals. This assesses the extent to which biological systems are functioning normally with respect to animal growth, reproduction and longevity. Also examined are the physiological and neuro-physiological responses of animals to different environments, as revealed by endocrine responses and abnormal behaviors. The connection between biological functions and animal welfare are not always clear, however. For example, the fact that a cow is producing more milk may not reflect an increase in its well being, though clearly an animal which ceases to reproduce at normal intervals is experiencing poor animal welfare.
3. The ‘nature’ of animals. This assumes that animals should be able to express the full range of movements compatible with their natural state and thus compares animals in the ‘wild’ state to their counterparts in confinement to assess deficiencies. An attempt is made to compare animal behavior under different environments to assess the implications of confinement. Animal behavior in the ‘wild’ is frequently an expression of adaptation for survival in a difficult environment and its usefulness in assessing welfare can be questioned. However, the prohibition of conditional behavior in response to specific circumstances may indicate poor welfare. (Adapted from Duncan and Fraser 1997).

In Europe, animal welfare concerns are frequently engendered by modern methods of intensive agriculture, which confine animals in specialized housing with limited space for movement, and often requiring prolonged antibiotic treatment to avoid the spread of disease. There are other concerns, relating to the transportation of animals over long distances as the result of the concentration of production and processing facilities. The conditions under which animals are slaughtered are also an issue.

## Public concerns about animal welfare

### *Level of concern*

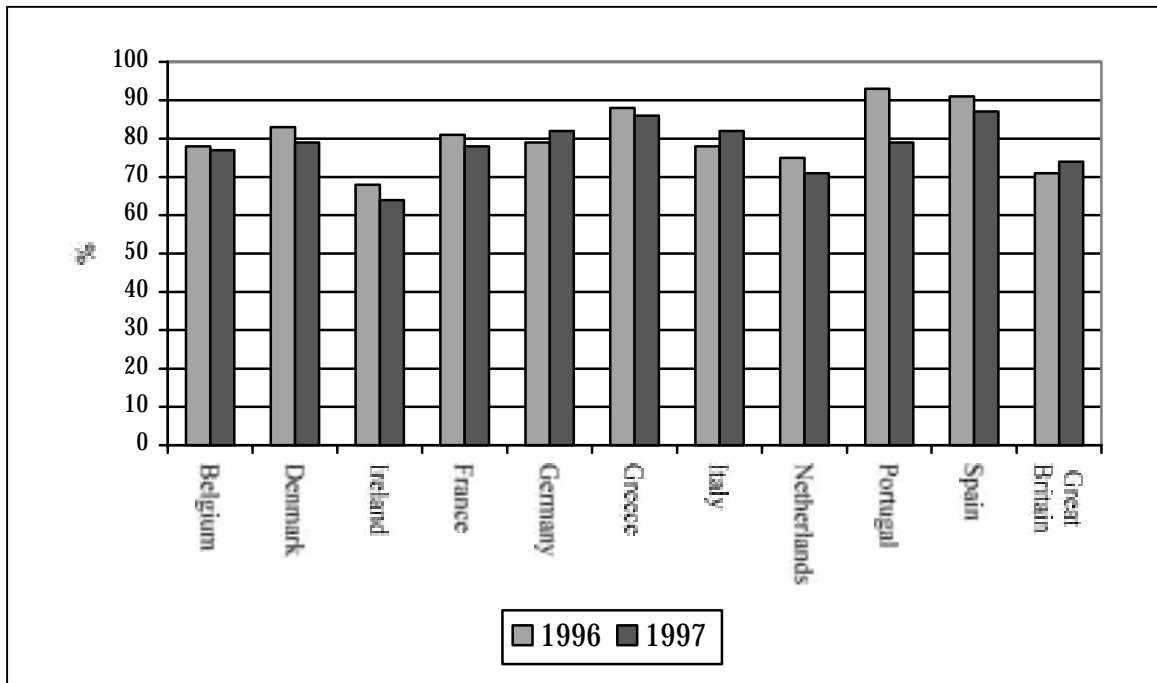
It is widely contended that consumers within the European Union have high levels of concern about the welfare of farm animals. The evidence used to support this assertion includes the results of national and pan-European consumer surveys and the growth in demand for so-called “animal friendly” food products (for example free-range eggs). However, there are few rigorous studies of consumer concerns about animal welfare and our understanding of such concerns is limited.

A number of studies have been conducted in individual EU member states (Association of Consumer Research 1998, Becker et al. 1997, Bord Bia 1995, Harper and Henson 1999 a and b, 2000a and b, Richardson et al. 1993, INRA-CORELA 1998, Issanchou 1996, MLC 1999, Noelle-Nuemann and Kocher 1997, Ziehlberg and Alvensleben 1998). In general, these studies suggest a high level of concern in the population as a whole. However, few studies have assessed the level of concern across EU member states in a consistent manner.

Figure 1 reports the results of a pan-European survey of primary food purchasers undertaken in 1996 and 1997 that aimed to assess consumer attitudes towards meat. As part of this survey, respondents were asked to indicate the extent to which they agreed with the statement “I worry about the welfare of animals used for meat production”. In all but one of the 11 EU member states covered by the survey, over 70 per cent of respondents agreed with this statement.

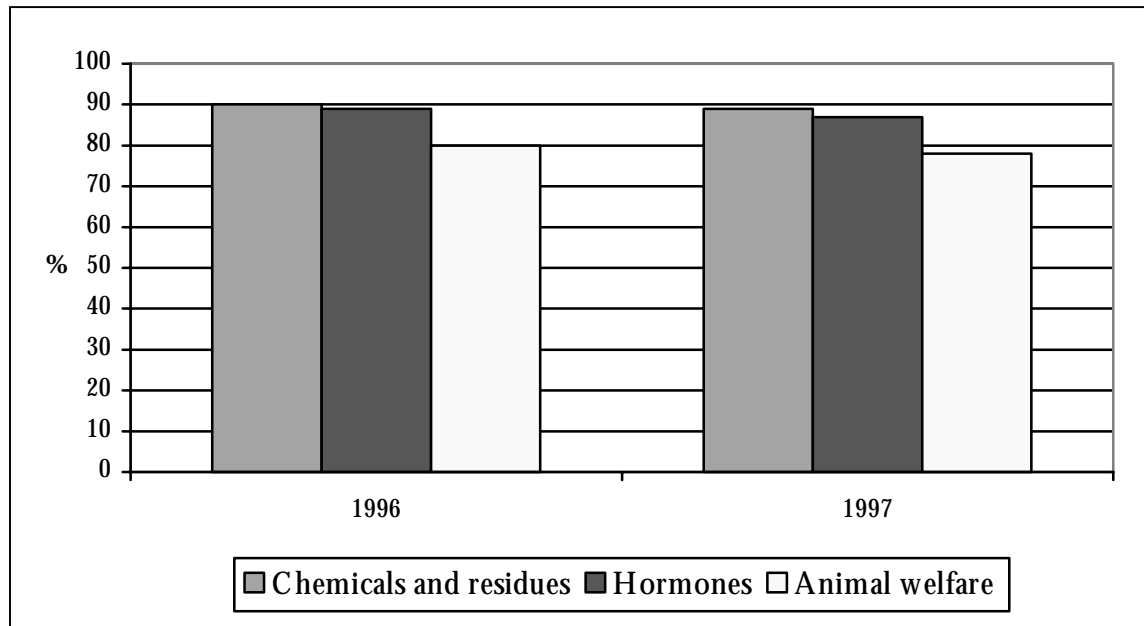
The results of the survey appear to contradict a commonly held belief that there is a north-south divide about animal welfare within the European Union, with northern member states (for example, Germany and the United Kingdom) exhibiting greater levels of consumer concern than southern member states (for example Greece and Spain). Indeed, the survey suggests that the level of concern is **greater** in southern member states. Further evidence refuting the notion of a north-south divide is provided by a study of consumers concerns about animal welfare in France, Germany, Ireland, Italy, and the United Kingdom (Harper and Henson 1999 a and b). Qualitative results from that study suggest that the level of consumer concern is comparable across EU countries. Results from the same study suggest that concern is greater over chemical residues and hormones in meat (Figure 2). This suggests that safety is a more prominent issue for consumers than animal welfare in EU member states.

Although replies to specific questions about animal welfare suggest high levels of concern amongst consumers within the European Union, this is not borne out by replies to general questions about issues associated with animal products. For example, **FIGURE 1. Proportion of respondents agreeing ‘strongly’ or ‘slightly’ with the statement “I worry about the welfare of animals used for meat production”**



Source: Meat and Livestock Commission 1997.

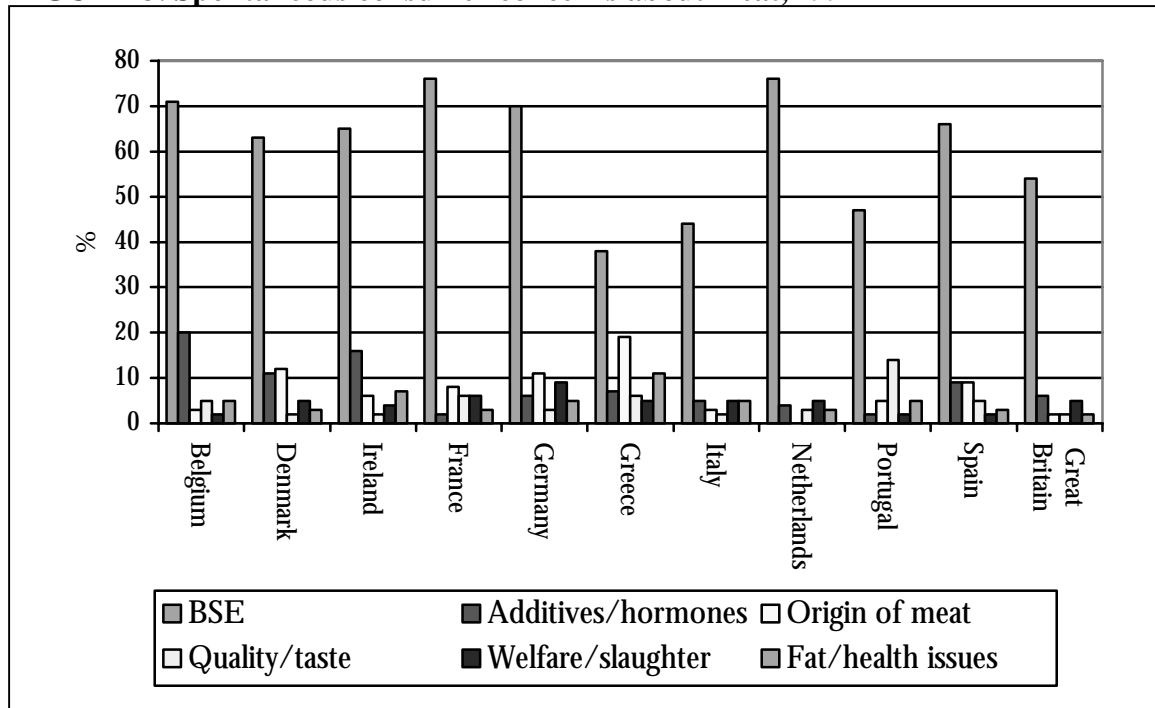
**FIGURE 2. Proportion of respondents agreeing with statements regarding concerns about meat**



Source: Meat and Livestock Commission 1997.

Figure 3 details the unprompted responses of respondents in the survey reported above. Across all the study countries, the proportion of respondents that spontaneously mentioned animal welfare as a concern associated with meat was less than 10 per cent, and in all but one case was 5 per cent or less. Similarly, Harper and Henson (1999b) report that, while animal welfare is mentioned spontaneously by consumers, it is far outweighed by spontaneous responses associated with food safety and human health, for example bovine spongiform encephalopathy (BSE), hormones, and genetically modified organisms (GMOs).

**FIGURE 3. Spontaneous consumer concerns about meat, 1997**



*Source: Meat and Livestock Commission 1997.*

In summary, the evidence suggests that EU consumers are concerned about the welfare of animals in the context of food production, but that such concerns are not at the forefront of their minds. There is evidence that concern about animal welfare in food production is closely related to, and indeed may be confused with issues such as animal experimentation and pet ownership (Harper and Henson 1999 a and b). This clearly has implications for the degree to which consumers take their concerns about animal welfare into account in their decisions on food purchases.

Research on consumer concerns about animal welfare demonstrates the importance of information and awareness in the development of consumer attitudes towards animal agriculture (Harper and Henson 1999 a and b). On the one hand, greater awareness is generally associated with greater levels of concern. On the other hand, consumers actively use avoidance of information as a strategy to deal with their concerns about animal welfare, as is evident in comments such as “I try not to think about it”.

### ***Nature of consumer concerns about animal welfare***

The available evidence suggests that concerns about farm animal is real in the European Union, but our understanding of the motivation and nature of such concerns is weak. There are two possible interpretations:

- consumers have moral objections to the ways in which animals are treated
- they view farm animal welfare to be associated with characteristics of animal products, for example safety and taste.

Survey results suggest that both of these interpretations are valid and that the concerns of individuals will reflect either or both factors. However, recent research (Harper and Henson 1999 a and b) indicates that the latter interpretation seems to predominate across EU consumers as a whole. While consumers may feel a moral obligation to avoid cruelty to animals and/or to care for animals, they perceive a number of personal benefits from high levels of animal welfare in terms of quality and/or safety of the end product. Thus, animal welfare (which is itself a credence characteristic) is used as an indicator of credence characteristics associated with the end product. Further evidence of this is provided by a study by Becker (1999) of several EU countries (Germany, Ireland, Italy, Spain and the United Kingdom). That study concluded that consumers view 'free range' as an important indicator of safety when purchasing chicken.

Very little research has been conducted on the relationship between consumer concerns about farm animal welfare and methods of production. The studies that have been undertaken (for example, Cowan and Manthion 1997, Harper and Henson 1999 a and b) suggest that concerns relate primarily to intensive methods of production, including lack of space and freedom of movement (encapsulated in images of battery cages for hens) and the use of hormones and antibiotics. Consumers seem to assess animal welfare in terms of their own well-being through anthropomorphization. Thus they put themselves in the place of the animals concerned in judging the acceptability of production practices. Reference is frequently made to concepts of 'natural' or 'humane'. Consumers may deem certain practices unacceptable that scientists do not consider as posing a major animal welfare issue.

### ***Responsibility for animal welfare***

An important issue is whom consumers view to be responsible for ensuring that the treatment of animals in food production is 'acceptable'. This has important implications for the extent to which consumer concerns about animal welfare will influence their food purchase decisions. Consumers will only make choices between products that are associated with different levels of animal welfare if they feel a personal responsibility for ensuring animals are well treated in the production process and/or that their choices will make a difference. In the European Union, minimum standards for animal welfare are determined by legislation, but beyond this there are gradations of welfare levels (e.g. in the production of eggs) that are left to consumer choice, backed up by labeling requirements underpinned by legislation.

Harper and Henson (1999 a and b) suggest that consumers frequently attribute the responsibility for ensuring ‘acceptable’ levels of animal welfare to government through legislation, and/or to producers and retailers. Consumers are not prepared to take responsibility for the welfare of animals on an individual basis but instead consider this to be a collective responsibility. The implication is that many consumers consider it unacceptable that any products offered for sale may have been produced with ‘unacceptable’ levels of welfare. Similarly consumers do not accept that they should be required to pay more for products associated with enhanced levels of welfare, although they often do this in practice by choosing to purchase products that are perceived to have more “animal friendly” characteristics.

This suggests that consumer concerns about animal welfare can manifest themselves in two ways: first, through the demand for government regulation; second, through demand for food products perceived to have different characteristics in terms of the welfare of animals in the production process. This has important implications for the way in which consumer concerns about animal welfare are evaluated. The use of ‘willingness to pay’ through product price (see for example Table 1) may be an unreliable measure because non-consumers may still demand regulation of the production practices employed in the supply of such products.

Because of the credence nature of animal welfare, trust in the information provided about the ways in which animal-based foods are produced is a major factor influencing consumer behavior. A key factor influencing the level of trust is the perceived credibility of the source of information and the means of verification/traceability employed by that source to ensure that the product complies with the standards of animal welfare claimed. There is evidence that EU consumers are cynical about labels on food products and that this may act as a barrier to changes in their food purchase behavior (Harper and Henson 1999 a and b). However, consumers may use mistrust in information as an *ex post* rationalization of their reluctance to change their purchasing behavior in accordance with their professed concerns.

**TABLE 1. Willingness of UK consumers to pay for legislation to ban battery cages through higher prices for eggs.**

Increase in Price of Dozen Eggs (Pence/1p=1.6US cents)	% Respondents
0	14
0 to 20	10
20 to 40	32
40 to 60	18
60 to 80	11
80 to 100	7
100 to 120	6
More than 120	3

Source: Bennett 1998.

### ***Impact on purchasing behavior***

Consumers may respond to concerns about animal welfare in a number of ways. First, they may cease to consume some or all animal-based food products. Thus, for example, many consumers in the United Kingdom and Ireland refuse to consume veal or Foie Gras because of concerns about the welfare of the animal in the production process. They may become vegetarian. Data for 1995 suggest that less than 1 percent of the population was vegetarian in France, compared to roughly 5 percent in Germany and the United Kingdom (Mintel 1996, Federacion Naturista Vegetariana 1996). However, there is evidence that the numbers of vegetarians is increasing across the Union. Survey results suggests that this reflects not only concerns about animal rights and animal welfare, but also issues associated with food safety, nutrition and health and the environment (Harper and Henson 1999 a and b).

Second, consumers may choose product variants that are perceived to be associated with higher levels of animal welfare. These may include products that are explicitly labeled as being produced with higher levels of welfare or products for which the consumer perceives this to be the case, for example organic products or those having a particular geographic origin. In certain cases, specific product descriptions allied with systems of production are defined legally. In the European Union, for example, this applies to eggs and chicken for which terms such as ‘free range’ can only be used if systems of production comply with specified standards. The market for such products is attractive to economists because it provides a mechanism through which the implied value of animal welfare can be derived. However, consistent data on the price and market demand for such products across EU member states are difficult to obtain.

Within the European Union, eggs are the product for which variants associated with different standards of animal welfare are presented most explicitly to consumers. In general, three product variants are available according to the method of production

**TABLE 2. Market share of free-range eggs in selected EU member states**

<b>Member State</b>	<b>Year</b>	<b>Market share (percent)</b>
Austria	1996	40
Denmark	1996	25
France	1996	8
Germany	1996	11
Italy	1997	3
Netherlands	1996	22
United Kingdom	1998	20

*Source: Leatherhead Food Research Association 1999.*

employed (as defined by the European Union): 1) conventional battery production; 2) barn production; and 3) free-range production. Eggs produced by each of these methods can be labeled accordingly and indeed in many member states all three variants are available side-by-side in retail food outlets. Table 2 reports the market share of free-range eggs, those with the highest animal welfare standards, in selected member states. The market for free-range eggs is well established and demand is growing at a rapid rate.

More generally, a number of surveys indicate that consumers are willing to pay a premium in terms of higher product prices to secure higher standards of animal welfare. For example INRA-CORELA (1998) report that 45 per cent of French consumers would be willing to pay more for enhanced animal welfare standards, particularly an increase in living space for battery chickens, pigs and veal calves. Similarly, Schulz (1997) reports that 88 per cent of German consumers would be willing to pay a higher price for food products associated with higher levels of animal welfare.

Finally, consumers may not change their food purchase behavior, even though they may be concerned about animal welfare. There may be many reasons for this. First, they may not perceive that their purchase decisions will not have any significant impact on how food is produced. Second, they may mistrust information provided on the manner in which food is produced. Third, they may not be able to afford the price premium associated with products perceived to be associated with higher levels of animal welfare.

### ***Political action***

Concerns about animal welfare have motivated political activities aimed at implementing stricter standards for the treatment of farm animals at both the EU and member state levels. These activities are of two forms. First, individuals have taken direct action to prevent practices that they consider cruel. Examples include protests against live animal exports, freeing of animals from production facilities and even attacks on producers. Radical movements have made it very difficult, for example, to market veal in the United Kingdom. Second, animal welfare groups are active in lobbying government at both the member state and EU levels. Within the European Union, for example, national animal welfare groups are represented by the Eurogroup for Animal Welfare, which is officially recognized by the Commission as a lobbying organization and meets with EU officials on a regular basis. It is also active in broader European institutions. National and pan-national lobbying groups are well organized and very influential in the debate on animal welfare policy in the European Union.

### **Animal welfare legislation<sup>6</sup>**

The Treaty of Rome, which established the European Economic Community in 1957, did not include any provisions on animal welfare. Much of the subsequent discussion on animal welfare issues was carried out in the Council of Europe of which the Community was a member. In 1968, the Council drew up a convention on the

protection of animals during international transport and in 1976 it agreed a further convention on the protection of animals kept for farming purposes. A convention on the protection of animals for slaughter was concluded in 1979.

The convention on animals kept for farming purposes was an extremely significant document for subsequent EC legislation. The European Council approved the convention in 1978<sup>7</sup>. The Convention was designed to apply “to the keeping of animals, and in particular to animals in modern intensive stock-farming systems.” Such animals are defined as those bred or kept for the production of food, wool, skin or fur or other farming purposes and the systems covered are those “which predominantly employ technical installations operated principally by means of automatic processes.”

The Convention specifies that animals must be housed, fed and cared for in a manner “which is appropriate to their physiological and ethological needs in accordance with established experience and scientific knowledge”. The Convention calls for the provision of appropriate: freedom of movement; space; environmental conditions (lighting, temperature, air circulation, ventilation, gas concentration, and noise intensity); food and liquids; inspection of the state of health of the animals; inspection and maintenance of any equipment affecting the welfare of the animals. It also called for the setting up of a standing committee to develop recommendations on detailed provisions for the implementation of these principles based on scientific knowledge for various species of animals.

In approving the Convention, the Council of the European Communities noted that its provisions covered areas for which the Community did not have common rules and that the protection of animals was not one of the Community’s objectives. However, it also noted that disparities between national laws on the protection of farm animals could affect competition between member states in agricultural markets. Because of the potential implications for the common agricultural policy of any competitive effects, the Council decided that it was necessary to participate in the Convention. The idea that animal welfare regulations can affect the competitive position of the member states of the Community has been a recurring one in the framing of subsequent legislation. The principal animals affected by Community legislation covering minimum welfare standards are laying hens, pigs and veal calves.

In 1980, a resolution of the Council<sup>8</sup> indicated that minimum standards should be developed for the protection of laying hens kept in cages, and requested the Commission to develop these standards. In 1985, the Commission established regulations for the production standards that must be met for eggs to be labeled as “free range”, “semi-intensive”, “deep litter” or “perchery (barn)” eggs<sup>9</sup>. In the following year, mandatory standards were approved by the Council for the protection of laying hens kept in intensive caged systems<sup>10</sup>. The European Court of Justice subsequently annulled these on procedural grounds and a revised set of standards was approved in 1988. The standards call for the provision of 450 cm<sup>2</sup> of cage area per bird, a feed trough of 10cm per bird, and a height of at least 40 cm over 65 percent of the cage area, with not less than 35 cm at any point. The floor of the cage must be constructed so as to support

adequately each of the forward-facing claws of each foot and the slope could not exceed 14 percent.

In 1999, the Council approved a new set of standards for birds kept in intensive caged systems<sup>11</sup>. These provide for 550 cm<sup>2</sup> of space per bird by 2003. From 2002, all newly constructed systems must satisfy a broader set of standards, including the provision of nesting space, perches, and a littered area. Regulations are also specified for systems that involve multiple levels and access to open runs. A maximum stocking density of nine laying hens per m<sup>2</sup> of available area is to be introduced into all non-intensive cage systems by 2007. Most important, the rearing of birds in intensive caged systems will be prohibited from 2012.

Minimum standards for the welfare of pigs came into effect in 1994<sup>12</sup>. These prohibited the use of tethers in units constructed from 1996 onwards and require the conversion of existing units by 2006. Standards are specified for the construction and maintenance of stalls and equipment, heating and ventilation, lighting, and inspection, feeding and veterinary treatment of the animals. The animals must be able to see other pigs. Minimum floor space requirements are specified for weaners and rearing pigs, depending on their weight. The requirements must be satisfied by 2006.

Minimum standards for the protection of veal calves were agreed in 1991<sup>13</sup>. These prohibited the use of tethers in units built from 1994 onwards. They also required a minimum size for crates that would allow calves to turn around, groom themselves and rest. The animals must be able to see other calves. Existing units must conform by 2003. The Directive permits calves to be fed on a diet devoid of roughage or iron, to keep veal pale in color. In 1997 a further Council Directive prohibited the confinement of calves in individual pens after eight weeks of age unless required to do so by a veterinarian, and specified precise space requirements. These came into force for all holdings brought into use from 1998 onwards.

Another area of legislation in the European Union relating to animal welfare is the use of bovine somatotropin (rBst) in dairy cattle. The use of this hormone has been prohibited in the Union since 1990<sup>14</sup>. Whereas the initial rationale for the ban was its potential impact on the dairy market, the well being of dairy cattle was presented as the rationale in 1994 when the ban was extended until the end of 1999<sup>15</sup>. The factors cited were the impact of the use of the hormone on the incidence of mastitis and associated metabolic disorders.

In summary, minimum animal welfare standards for the husbandry of laying hens, veal calves and pigs have been implemented by the European Union. The standards have targeted production practices, such as intensive egg production, that have generated the greatest public concern. However, it is important to note that the practices concerned are not necessarily associated with large and intensive production systems, the use of veal crates being a case in point, and the legislation specifically exempts small producers in many cases. The scope and level of the standards has been increasing. Standards are under development for other farm animals, in particular,

broilers and turkeys. Considerable controversy is associated with the traditional production method for goose liver (Foie Gras) which involves forced feeding. It is possible that standards may be developed for beef and dairy cattle. In addition to production, EU standards have been established for the transportation of farm animals and for slaughter.

Some European countries have adopted more stringent production regulations for animal welfare than those of the Union. For example, Switzerland prohibits the use of intensive cage systems for laying hens; the cage requirements are such that they constitute an effective ban on traditional cages<sup>16</sup>. Swedish legislation in 1988 banned the keeping of laying hens in battery cages from 1 January 1999. Beak trimming of hens is also not permitted in Sweden. In a number of Länder in Austria the use of cages for laying hens is to be forbidden and in Finland a ban on battery hen production will be effective in 2005. In Denmark the minimum space allowance is 600cm<sup>2</sup> /hen, while in Belgium and the United Kingdom the required space for single-bird cages is 1000 cm<sup>2</sup> /bird or 750 cm<sup>2</sup> /bird for two-bird cages. These figures may be compared to the 550 cm<sup>2</sup> /bird for the European Union. Austria and Finland provide minimal financial support for conversion of cage systems. Thus, current EU legislation should be considered as providing minimum standards for animal welfare in many European countries. It is unlikely to represent the final development of animal welfare legislation in Europe as a whole.

It is important to note that animal welfare legislation focuses on setting production standards that are believed to enhance animal welfare. There is only a loose linkage between these standards and any science-based indicators of welfare. The production standards adopted are a function of scientific evidence, public perceptions of what constitutes a welfare-improving production environment, and political acceptability. An additional issue is that fixed production standards can become outdated. This is because legislation takes a long time to implement and the phase-in period is often long. Furthermore, genetic modification of animals can make standards obsolete. For example, it is now possible to breed congenitally blind chickens. The existence of the current standard for lighting in the Union could be made obsolete by this development.

### **Private sector responses**

Concerns about animal welfare have generated private sector responses, in addition to legislative responses. The supply chain for animal products within the European Union has become progressively more concentrated at all levels, but in particular in processing and distribution. Major suppliers have attempted to minimize the risk posed to their brand capital by failure to satisfy consumer concerns about animal welfare. One mechanism through which this has been achieved is the development of private animal welfare standards. In many cases these have been a component of general attempts to improve the management of product quality and provide traceability of final products back to the producer. In turn, these initiatives reflect public concern about the efficacy of public regulation to ensure product safety

and quality in the wake of scares associated with BSE and contamination with chemicals (e.g. dioxin).

Private animal welfare standards have been implemented in two main ways. In most cases, animal welfare requirements have been specified as part of broader end-product quality standards. In many cases these have been promulgated by private businesses, either individually or through a trade organization. Examples are Carne con Amore in Italy and the Scottish Pig Industry Initiative (discussed below). In other cases they have been the initiative of public bodies, as with the Label Rouge quality assurance scheme in France.

In a limited number of cases, private animal welfare standards have been implemented. These are linked to explicit animal welfare labels or brands. One example, which is of particular interest in view of the fact that involves the largest animal welfare organization in the United Kingdom, is Freedom Food (see below).

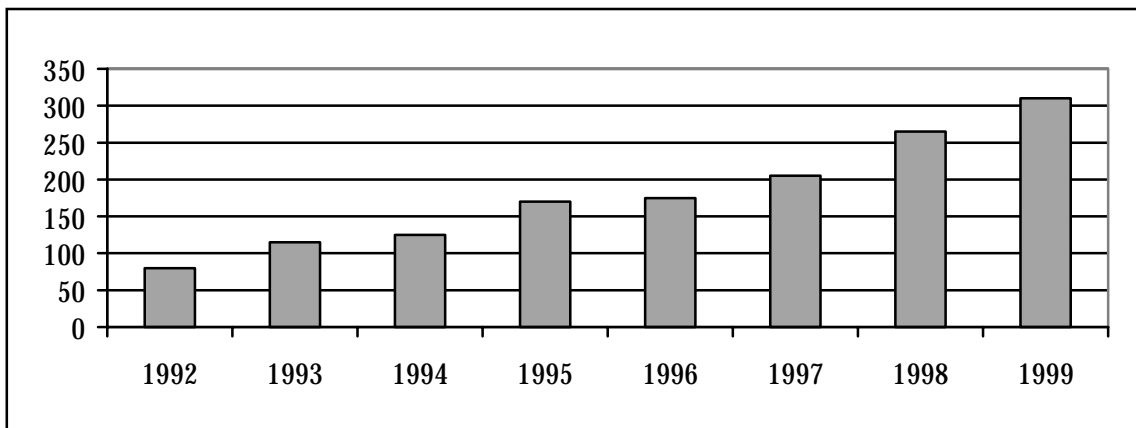
While private animal welfare standards are, by their nature, voluntary, in certain EU member states (for example, Ireland and the United Kingdom), the level and nature of consumer concerns is such that compliance with these standards has become the industry norm. For example, major retailers and/or processors typically require that producers implement these standards and that compliance is certified by a third party.

The development of private animal welfare standards raises a number of issues regarding the future role of public regulation. Given that private standards typically exceed the requirements of public regulation and can be changed with relative ease, it might be expected that in contexts where private standards become the norm, public regulation could become largely obsolete. Further, private standards can act as a mechanism to overcome trade distortions between countries. For example, while Denmark applies lower standards of welfare in pig production than the United Kingdom, Danish producers of pork and bacon have implemented private standards that certify that they satisfy UK regulatory requirements, as required by major retailers.

## CASE 1: Scottish Pig Industry Initiative

The Scottish Pig Industry Initiative (SPII) was established by the Scottish pig industry in 1990 as a quality assurance scheme for pork and bacon. The scheme sets standards for animal welfare and establishes controls on use of veterinary medicines, hygiene and end-product quality. While these standards are based on legal requirements, they also impose additional demands on members. Scottish Food Quality Certification Ltd. independently audits producers to ensure that they meet these standards.

**FIGURE 4. Number of Farms that are Members of the Scottish Pig Industry Initiative, 1992-99**



Since the launch of SPII, membership has grown significantly (Figure 4). Currently, the scheme covers over 300 farms, which collectively account for 92 percent of the Scottish pig herd. The scheme also encompasses eight approved processors that slaughter and process meat from member farms.

## **CASE 2: Freedom Food**

Freedom Food Ltd. is a not-for-profit scheme established in 1994 by the Royal Society for the Prevention of Cruelty to Animals (RSPCA), the United Kingdom's largest animal welfare organization. Members of Freedom Food are required to comply with animal welfare standards established by the RSPCA. Producers are inspected annually to ensure they comply with the scheme's standards, plus additional random checks are undertaken.

Table 3 details the membership of Freedom Food in July 1994, when the scheme was established and the current membership. The scheme has 4,000 members, including producers, livestock transporters and abattoirs. The end product is labeled with the Freedom Food logo. Roughly 6,000 food stores, including some of the major supermarket chains, carry these products. The most successful product is free-range eggs, annual sales of which are currently 72 million units.

**TABLE 3. Membership of Freedom Food, 1994 and 2000**

	<b>July 1994</b>	<b>April 2000</b>
Members	119	4,000
Retailers stocking Freedom Food Products	400	6,000
Animals	1 million	19 million

## **Economic impacts**

The application of higher standards for animal welfare is likely to increase the fixed and variable costs of production at least in the short run. Evidence suggests that feed costs increase through reduced conversion rates and that other variable costs, such as energy and labor, increase. Since higher standards generally require new investments in buildings and equipment, fixed costs are also likely to rise. The increase in costs is affected by a number of factors, including the divergence between existing production practices and the new standard and the availability of technical expertise and technologies to meet the standard. The impact will also be affected by the amount of time allowed to achieve compliance. Costs may also increase in other parts of the supply chain, due to the requirement for traceability of the product. Such costs are likely to be lower with simpler supply chains and more concentrated production.

On the positive side, health and mortality costs may go down with more animal-friendly systems. It should also be born in mind that the social costs associated with positive or negative externalities from animal agriculture may also be affected by changes in production systems. For example, pollution could increase or decrease depending on the nature of the change in systems.

### ***How much will production costs increase?***

The UK Ministry of Agriculture has estimated that the recently agreed standards for laying hens in the Union will cost existing producers roughly £10 (\$14) per bird.<sup>17</sup> For a 10-year old unit with 50,000 birds/5 birds per cage the non-recurring costs of compliance will amount to £833 thousand (\$1.2 million). Additional production costs for this type of unit are estimated to be over £36 thousand (\$50 thousand). The Ministry has also estimated that the non-recurring costs of complying with the standards for stalls and tethers and space requirements for pigs would cost between £39-£65 thousand (\$55-\$90 thousand), depending on the type of operation. Annual production costs would increase by 3-11 percent of total turnover.

According to the European Commission, egg production costs could be expected to increase by 5-7.5 percent when 600 cm<sup>2</sup> cage area per bird is required and by about 10-15% at 800 cm<sup>2</sup> per bird.<sup>18</sup> Assuming that not more than 80 percent of all eggs produced are sold as table eggs and that there is no change in the price of processing eggs, the farm price of table egg is expected to increase by 12-18 percent. Eggs produced in aviary, perchery, deep litter or free range systems command a premium price in certain areas, but it is not certain the premium will be maintained if most of the production is undertaken in a more welfare friendly alternative systems. In addition, the report notes that the additional expenditure for EC consumers is very small and is estimated to be 1.12 and 1.56 Euros (\$0.95-\$1.33) per head per year with the higher space requirement (800 cm<sup>2</sup>).

It has been estimated that in Italy, the adoption of EU regulations for laying hens will increase costs of production by 12-15 percent.<sup>19</sup> This includes increased feed consumption, greater losses (number of broken eggs), and increases in other variable costs and the depreciation of additional fixed costs. Other costs associated with the EU regulations are a reduction of output of 20 percent, which may result in a loss of 6,000 jobs. A study on animal welfare measures for pigs, commissioned by the Ministry of Agriculture, finds that the costs of new pig units would increase by 18 to 22 per cent. The cost of adapting existing units to conform to the greater area requirements was about L500 million (\$220 thousand) per firm. Where the firm decreases the number of animals to conform to the space requirements, a substantial loss of productivity is envisaged, due to the smaller number of pigs over which costs must be distributed<sup>20</sup>.

All the available studies indicate that substantial costs may be imposed on producers, under existing technology, from the imposition of higher animal welfare standards. These costs would likely influence the competitive position of the producers affected. In a closed economy, the increased costs would be passed on to consumers in the form of higher prices for the final products. However, induced innovation may eventually lead to some reduction in additional costs, as new technologies and production practices are developed. Demand for the product would be expected to fall, particularly if the own and cross-price elasticities are high. There could be some offsetting effects in that consumers who have ceased eating meat because of animal welfare concerns could re-enter the market. If the welfare standards for all animal agriculture are increased, the costs of animal products as a whole could rise. This would reduce the amount of switching of consumer demand among products that would be associated with the application of higher standards to only certain parts of the system.

### ***Implications for EU trade***

The European Union's trade in the poultry sector is likely to be most affected by higher animal welfare standards in the foreseeable future. The impact will depend on the type of standard imposed. In addition, technological change and structural adjustment will affect the impact.

As indicated above, the imposition of a higher standard on the number of chickens that can be kept per square meter can have a large effect on production costs. Economists from INRA, France, have examined the impact of a general shift in poultry production standards to those applied in less intensive production. They examined a reduction in stocking density from 21-23 to 18 birds per m<sup>2</sup>. Using data for 1998, they estimate an increase in production costs of 17%, through extra heating, building space (since the standard allows only 4.7 rather than 6.2 successive flock rotations per year), feeding and labor costs. The effect of reduction in productivity of 17 percent was introduced into the MISS model developed by L. Mahé and his colleagues at INRA-Rennes. With export subsidies at their 1998 level, the model predicts a 70 percent decrease in EU poultry exports (Jolly, 1998). This suggests that higher animal welfare standards in Europe are likely to have dramatic effects on trade flows.

Results like these tend to suggest that the impact of compliance with EU animal welfare legislation is likely to be substantial and that this will have a significant impact on the competitiveness of agricultural producers and processors within the European Union. In fact, there is some evidence that suppliers, particularly those oriented to export markets, are already responding in such a way as to minimize their exposure to these costs by developing a supply base in countries outside the Union. France is a major player on the world market of poultry meat, and two large companies, Doux and Tilly-Sabco produce mainly for export. Competition is severe in world markets and margins are thin. In 1999, the largest French producer, Doux, purchased Frangosul, a large Brazilian producer. This diversification has been partly driven by currency fluctuations, the need to adapt to GATT constraints on exports and stricter environmental regulations but changes in animal welfare regulations are also playing a part in influencing the location decisions of an industry which employs roughly 50 thousand people.

The impact of higher standards on competitiveness could be less dramatic once possible adjustments due to changes in technology and husbandry practices are taken into account. Although we do not have direct estimates of how important such adjustments could be, related work provides some insight. Porin (2000) examined the impact of two types of standards on production costs: 1. a reduction in stocking density in terms of kilos of chicken per square meter; and 2. a mandatory reduction in daily growth rate (increase in the feed-out period). Porin concluded that cost savings due to such factors as decreased mortality rate and changes in feed requirements could reduce the impact of higher standards. He found that a reduction from the current stocking density of 38 kg/m<sup>2</sup> to 25kg/m<sup>2</sup> would increase production costs by 8 to 10 percent in the intensive systems in Europe rather than the 17 percent assumed in the study discussed above<sup>21</sup>. With an increase in the feed-out period from 41 to 50 days (corresponding to an intermediate step between 'regular' chicken and gourmet or 'label' chicken) he calculates that the increase in production costs could be as low as 2-5 percent. Consequently, technological change and changes in husbandry practices could reduce the impact of higher standards on production costs and competitiveness, particularly over time.

### **Domestic and international policy responses**

With no trade restrictions and no differentiated product effect, higher cost domestic production is likely to be replaced by competing supplies in both domestic and international markets. Domestically, the only damper might be the “natural protection” provided by transport costs. Country of origin labeling could provide some protection if consumers interpret this to signify that certain foreign countries do not meet the higher welfare standard. The domestic industry would be likely to introduce labeling and to try to differentiate its product. There would be substantial incentives to do this.

With labeling, the impact on the domestic industry would depend on the increases in production costs brought about by the higher standard, and the proportion of population prepared to pay a price premium for products that meet the standard. With

no way to impose the domestic standard on foreign suppliers, there would be problems, particularly in the processed product market and in food delivery, since it would be difficult to maintain the identity of the original product and to communicate this to consumers. There are also practical difficulties with labeling in terms of what to indicate to consumers, for example, that certain products meet the standard or that some do not. In any event, with an open market the final effect of the higher standard would eventually revolve around consumers' willingness to pay for the conforming product. Given the difficulties with labeling and ensuring compliance by foreign suppliers the temptation will be to resort to import prohibition for products that do not meet the standard.

One possibility might be to use direct payments to offset the higher costs imposed on domestic producers from animal welfare standards. If one were to take the view that the public as a whole (consumers and non-consumers of animal products) benefits from improved methods of production, this would be a way to compensate producers for the higher costs of achieving conforming production. There would be the issue of whether such payments should be transitional or permanent and whether they should be linked primarily to the higher fixed costs involved or should also cover higher variable costs. Payments of this type would probably not qualify under existing green box criteria in the GATT, but their status could be addressed in future negotiations. In Europe, at least, the use of such payments might be seen as being consistent with the concept of "multifunctionality" or the pursuit of a European model of agriculture.

Another option might be to use the existing tariff structure to offset the competitive disadvantage faced by domestic producers as the result of the higher welfare standard. For example, one might define differential tariffs with the rates being inversely proportion to the conformity of foreign products with the domestic standard. Such a tariff structure could also be applied also within a Tariff Rate Quota system – with differential "preferential" rates being applied based on product conformity. To be in conformity with international obligations the highest tariff rate applied would have to be at the bound rate or below. Alternatively, country-specific tariffs could be used to favor imports from conforming countries, providing these are below the bound tariffs, although there could be challenges to such an approach on the basis that it violates the most favored nation principle. Substantial reductions in bound tariffs in any upcoming round of trade negotiations could make the use of tariffs to offset the competitive disadvantage created by higher welfare standards unworkable.

With respect to exports, export refunds could be used to overcome the competitive disadvantage created by the higher standard, particularly if it is not possible to extract a consumer premium in foreign markets for the conforming product. In practice, the use of such refunds would be limited by the constraints imposed on the use of subsidies agreed in the Uruguay Round and by any further negotiated reductions. Furthermore, the use of subsidies may limit the incentive to develop a market for the differentiated product internationally.

Any attempt to redress the competitive disadvantage created by the adoption of higher standards in the European Union would have implications for third countries and opens the possibility for trade diversion. Understandably a number of countries that are in the process of joining the Union (e.g., Czech Republic and Poland) are currently developing animal welfare standards that conform to those in the Union. However, some countries outside Europe are also taking action on this front.

The most interesting case is New Zealand. Roughly 40 percent of New Zealand's meat and livestock exports are destined for the European Union. In recognition of the growing importance that animal welfare concerns may have for New Zealand's animal-based export agriculture, the country passed the Animal Welfare Act in 1999. The act provides for the development of detailed codes based on the five freedoms, covering farm practices and management procedures for livestock producers to meet minimum standards for animal welfare and to promote best practices. Breaches of the code can result in legal action. It is now an offence to export a live animal without an animal welfare export certificate, provided by the Ministry of Agriculture, which certifies that appropriate conditions are provided for animals during transportation.

Richer exporting countries may be able to adjust relatively easily to the requirements of higher welfare standards in importing countries. It is not clear, how such standards would affect the competitive position of developing country exporters.

Finally, we might note that multinational food corporations who may have a lot to lose from negative consumer reaction to animal welfare concerns are taking steps to protect their position. The McDonalds corporation has instituted animal welfare programs for its suppliers and requires its suppliers to meet or exceed applicable laws, regulations and industry standards for animal welfare in the countries in which it operates. Regular audits of meat packing plants are conducted to ensure that standards for humane treatment are met. It is interesting to note that the company advertises its commitment to animal welfare as part of its "commitment to quality", thus positioning animal welfare clearly in terms of consumer concerns about product quality. McDonalds appears to be having an impact on standards in countries where these are not as wide-ranging as Europe. The company has announced that its U.S. egg suppliers will be required to increase the size of the cages for laying hens from 320 cms to 465 cms. It will also require its producers to abandon the practices of "forced moulting" and beak trimming.

## **Multilateral Issues**

An important issue is whether unilateral restrictions on non-conforming imports could be justified under existing international agreements. Animal welfare standards are not included as a reason for banning imports under Article XX of the GATT or in the Technical Barrier to Trade (TBT) or Sanitary and Phytosanitary (SPS) agreements. GATT panels have ruled that Article XX is not applicable to environmental protection (e.g. the dolphin/tuna and shrimp/turtle cases). Article III would seem to prohibit the

imposition of import charges or restrictions on “like” products. It is difficult to argue that products that are derived from production systems employing differing standards of animal welfare, differ in any objective sense, even though they may be viewed as such by some consumers.

Under the present interpretations of the GATT agreements the scope for applying import restrictions for non-compliance with domestic animal welfare production standards appears quite limited. Import ‘prohibition or restrictions’ on imports would constitute a violation of GATT, 1994, Article XI.1. This is in large part due to the limitations on trade restrictions for like products under Article III.4 of the GATT Agreement (1994):

“ The products of the territory of any contracting party imported into the territory of any other contracting party shall be accorded treatment no less favorable than that accorded to like products of national origin in respect of all laws, regulations requirements affecting their internal sale, offering for sale, purchase ....”

While it might be reasonable to interpret Article III as permitting production requirements/regulations if applied in an even manner to both domestic and foreign producers, a key issue is the interpretation of the ‘like product’ for purposes of comparing domestic and imported goods. The ‘likeness issue’ has been interpreted within the context of the aim and effect of the measure and whether de facto it offers protection to the domestic product<sup>22</sup> (Scott 1999, Noltkaemper 1996). Article III requires comparison between products and not between production processes or policies of the importing and exporting countries. In commenting on the United States shrimp/turtle panel report, Scott suggests that a crucial point in attempting to distinguish products by production processes is that it prejudices the imported product and hence the national treatment principle. Thus legal opinion has consistently interpreted the concept of national treatment as permitting only the application of domestic product standards to imported goods (Scott 1999). Animal welfare production measures do not, in general, alter the physical characteristics of the final product, thus the implication is that final products produced under animal welfare measures are like products and fall under Article III and XI.1.

However the Agreements do permit exceptions to the agreement rules, for reasons specified under Article XX :

“Subject to the requirement that such measures are not applied in a manner that would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement of measures

- (a) Necessary for the protection of public morals
- (b) Necessary for the protection of human, animal and plant health.”

In the past, a restrictive interpretation has been applied to the scope of the Article. However, production processes should not necessarily be assumed to be excluded from

Article XX, since XX(e) refers to methods of production by including goods produced with prison labor. However, it is also the case that common legal and academic interpretation has been against the use of trade measures to influence policies in third countries. The GATT has avoided approval of widespread use of Article XX exceptions to avoid the possibility of undermining the international trading system by permitting each country to apply its own specific production standards to permitted tradeable goods. The proliferation of differing standards could hamper the development of the trading system.

To permit appeal to any clause of Article XX it is necessary that the first part of the Article cited above be fulfilled. This means that a country would need to have attempted to reach a multilateral or bilateral agreement on standards or procedures before taking unilateral action, such as imposing an import ban or restriction. In fact, according to Perkins, in both the US shrimp/turtle and tuna/dolphin case, the GATT/WTO panels suggested that the US import ban might be justified if based on animal protection standards embodied in a multilateral agreement (which they were not). The leghold trap ban in the European Union is similar to the animal welfare production standards case, in that both attempt to provide for higher levels of animal welfare through regulation. In the leghold trap case an import ban has been passed, but only after the failure of the International Standards Organization (ISO) to develop a set of humane trapping standards. It was also understood that the ban would not be enforced on individual nations with which the European Union had negotiated or was negotiating an agreement on humane trapping standards (Perkins 1998).

One may also note that in the US shrimp/turtle case, the panel allowed by its choice of illustration that the legitimacy of applying domestic process standards to imported goods was not excluded, but would need to be treated on a 'batch by batch' basis, rather a country wide one. Thus the production process of a particular product could be prohibited, but not all products from a given country. If each case was individually judged as to its conformity to the importing country's production standard, it may be possible to restrict such imports (Scott 1999).

If the overall requirements of Article XX could be met, it would be possible to move on to examine conformity with one of the specific clauses, in particular (a) or (b). It is highly unlikely that animal welfare could fall under the protection of human, animal or plant health clause since animal welfare production standards are not strictly speaking an issue of animal health. Animal welfare measures could possibly fall under the exemption on 'moral' grounds. However, there is no case law relating to this clause. Furthermore its use would require an acceptance of the argument that certain farm animal production methods are offensive to public morals. The wording, if not interpretation, of article XX is ambiguous and could result in controversy if it were invoked to justify trade restrictions for animal welfare reasons. Nevertheless, the texts are sufficiently ambiguous that it is not certain that non-product production and process methods would have no possibility of justification. In any event, countries always have the option of using restrictions anyway and paying compensation.

While multilateral harmonization of differing production standards would be highly desirable in order to avoid trade conflicts, this may not be feasible. The challenge remains one of reconciling different standards in an open trading environment. Many of the issues relating to differences in product or process standards are similar whether they pertain to animal welfare, food safety, or environmental quality. Labeling, which allows consumers to distinguish between goods, is usually recommended as a practical solution.

Could labeling be required under current international law? The TBT agreement covers technical regulations and standards, including packaging, marking and labeling. Article 2 provides for the use of regulations and standards to achieve certain objectives “inter alia, national security requirements; the prevention of deceptive practices; protection of human health or safety, animal or plant life or health, or the environment”. Animal welfare is not specifically mentioned but the words “inter alia” would seem to imply that other objectives might be legitimate. In addition Annex 1 of the agreement defines technical regulation as a “document which lays down product characteristics or their related processes and production methods, including the applicable administrative provisions with which compliance is mandatory. It may also include or deal exclusively with ... labeling requirements as they apply to a product, process or production method.”

Any regulations applied should not create unnecessary impediments to trade. Where “appropriate” technical regulations are supposed to apply to the performance of products rather than the design of a product. There is a requirement to accord treatment no less favorable to like products of national origin and to like products originating in any other country and to notify other countries before introducing a standard. There is an obligation to accept equivalent technical regulations in other countries, even if these regulations differ, provided these regulations adequately fulfil the objectives of the domestic regulations. The agreement also calls for the participation of international bodies in developing and standardizing standards.

One such international body is Codex Alimentarius. Although this has mainly focused on safety, its deliberations on the use of rBST have an animal welfare dimension. The Codex has been trying to set standards for the use of rBST in milk production. The EU and Canadian bans on the use of rBST were justified (at least partially) on animal welfare grounds. It is possible that the Codex, or some other international mechanisms (ISO) could be used to establish minimum production standards that could be reviewed and updated as necessary, although it would be difficult in the animal welfare case to base these solely on scientific principles. The establishment of minimal standards would not preclude the adoption of higher standards in countries and their promotion to consumers through private labeling schemes. If in the future the ability to sell products to discriminating consumers is affected by the production methods used, the private sector will find ways to implement the higher standards in any case.

## **Concluding comments**

In a submission to the WTO on animal welfare and trade in agriculture, the European Commission has proposed that multilateral agreements be developed to deal with the protection of animal welfare; compulsory or voluntary labeling of products be used to inform consumer choice; and producer compensation be permitted to offset the higher costs of meeting welfare standards. The Commission would like these mechanisms to be sanctioned as part of the current round of negotiations on agriculture.

In the absence of multilateral action, the imposition of higher animal welfare standards seems likely to put EU exporters at a competitive disadvantage, unless improvements in husbandry practices and new technologies can offset the higher fixed and variable costs that will most likely result. It is difficult to assess whether EU exporters can develop a market for “animal friendly” exports.

At far as imports are concerned, it is likely that the behavior of consumers and food retailers in Europe will largely determine the importance of animal welfare standards in influencing EU trade in livestock products. Recent experiences with genetically modified foods seem to suggest that if exporters can not meet the demands of retailers and consumers with respect to key product attributes (including animal welfare), they will likely have fewer and fewer possibilities for selling their products in the European Union. Some exporting countries, most notably New Zealand, are already taking steps to protect their position in European markets by addressing animal welfare standards. Multinational corporations in the food industry, such as McDonalds are doing the same. In the final analysis, it will probably be the drive towards the implementation of private standards for animal welfare within an increasingly vertically coordinated food system that will drive the future of international trade in animal products.

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## Endnotes

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- <sup>1</sup> To be published in **Global Food Trade and Consumer Demand for Quality** edited by Mary Bohman, Caswell, and Barry Krissoff.
- <sup>2</sup> Blandford is a professor and head of the Department of Agricultural Economics and Rural Sociology at the Pennsylvania State University; Bureau is a professor at the Institut National Agronomique, Paris-Grignon; Fulponi is an economist with the Organization of Economic Cooperation and Development (OECD); Henson is a reader at the University of Reading. The opinions expressed do not necessarily correspond to those of the OECD or its member governments.
- <sup>3</sup> Data for 1998 from the OECD Foreign Trade Statistics database, excluding intra-EU trade.
- <sup>4</sup> We do not address animal rights issues. Most proponents of animal rights would not accept the use of animals in agricultural production.
- <sup>5</sup> The five freedoms for animals are the freedom to: turn around; groom themselves; get up; lie down; and stretch their limbs. The Council of Europe is one of the oldest pan-European inter-governmental institutions, founded in 1949. It focuses on issues such as human rights, education, culture and environment and currently has a membership of 40 countries, including the 15 member states of the European Union. The Council draws up conventions which, once signed and ratified by its members, become legally binding through national legislation.
- <sup>6</sup> The legislative process in the European Community has evolved as its membership has grown and its institutions have developed. However, the basic legislative process is one in which the European Commission draws up proposals for directives or regulations. Directives are binding on member states in terms of the results to be achieved; national authorities to implement legislation. Regulations are binding in their entirety and are directly applicable to the member states. The proposals of the Commission are subject to scrutiny and amendment in the Council of Ministers and the European Parliament.
- <sup>7</sup> Council decision on 19 June 1978 concerning the conclusion of the European Convention for the protection of animals kept for farming purposes. Official Journal no. L 323/12, 17/11/78. The Convention is included as an annex to the document.
- <sup>8</sup> Council Resolution of 22 July 1980 on the protection of layer hens in cages. Official Journal no. C 196, 2/8/1980.
- <sup>9</sup> Commission Regulation No. 1943/85 of 12 July 1985, Official Journal no. L 181/34, 13/7/85.
- <sup>10</sup> Council Directive of 25 March 1986 laying down minimum standards for the protection of laying hens kept in battery cages (86/113/EC), Official Journal no. L 95/45, 10/4/88.
- <sup>11</sup> Council Directive 199/74/EC of 19 July 1999 laying down minimum standards for the protection of laying hens, Official Journal no. L203/53, 3.8.1999.
- <sup>12</sup> Council Directive 91/630/EEC of 19 November 1991 laying down minimum standards for the protection of pigs, Official Journal L340, 11/12/1991.
- <sup>13</sup> Council Directive 91/629/EEC of 19 November 1991 laying down minimum standards for the protection of calves, Official Journal L340/28, 12.12.91.
- <sup>14</sup> Council Decision of 25 April 1990 concerning the administration of Bovine Somatotropin (BST) 90/218/EEC Official journal No. L 116/27, 8.5.90.
- <sup>15</sup> Council Decision of 20 December 1994 amending Decision 90/218/EEC concerning the placing on the market and administration of bovine somatotropin (BST.94/936/EC) EEC. Official journal L. 366, 31/12/1994.
- <sup>16</sup> The requirements are: perches (at least 14 cm per hen); nests (darkened, protected with soft floor or litter); stocking density (up to 10 hens at least 1400cm<sup>2</sup>/hen; 11-20 hens-1200cm<sup>2</sup>/hen; more than 40 hens –800/cm<sup>2</sup>/hen).
- <sup>17</sup> Personal communication. The exchange rates used here and subsequently relate to September 2000.
- <sup>18</sup> Communication from the Commission, on the protection of laying hens kept in various systems of rearing, Com (1998) 135 final 98/0092(CNS).
- <sup>19</sup> Estimates taken from “Analisi delle conseguenze economiche in italia del progetto di direttiva relativa alla tutela del benessere delle galline ovaiole”, Unione Nazionale dell’Avicoltura, Giugno 1999.
- <sup>20</sup> Summarized from personal communication.
- <sup>21</sup> In some countries, such as Spain, production costs would not be affected because of low stocking density.

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<sup>22</sup> Scott notes that according to T.J. Schoenbaum (1997. International Trade and Protection of the Environment: The continuing search for Reconciliation. *American Journal of International Law* 268:271) “mutual exclusivity of the two articles, XI and III often presents difficult and can be understood only in the context of correct methodologies for applying the tests of the two articles. The measure in question should first be analyzed as to whether it is protected by Article III”. See also Farber and Hudec 1996.