

Animal welfare in poultry production systems: impact of EU standards on world trade

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Animal welfare receives more legislative attention in the European Union (EU) than in many other regions of the world. Animal welfare standards for poultry are generally taken to be higher in the EU than in producing countries exporting to the EU, particularly developing countries. The recent action plan for animal welfare introduced by the European Commission aims to further expand the body of regulatory standards. In broiler production worldwide, birds are mainly kept on litter. Recently the EU agreed on a new Directive to set standards for maximum bird density. However, this is not considered likely to have a great impact on global trade. At present, the difference in animal conditions, including bird density, in Brazil and Thailand is limited compared to the EU. In egg production the majority of commercial layers are kept in laying cages. There is wide variation in space allowance per bird from 300 to 400 cm² in Brazil, Ukraine and India towards the current minimum of 550 cm² per hen in the EU. After 2012, hens in the EU will be kept in enriched cages with a minimum space allowance of 750 cm² per hen. It is expected that this will have an impact on world trade in egg products and especially egg powder. Trade in table eggs will continue to be limited to the local region. The EU is considering the use of labelling to provide consumers with more information concerning the standard of production. Another option could be to use financial mechanisms such as taxes or tariffs to prevent imports from other countries with lower standards. The likelihood of a measure being challenged would depend on how difficult it was for exporters outside the EU to meet the requirements.

Keywords: poultry production; animal welfare; economics; international trade

Introduction

Animal welfare in commercial poultry production is an important topic in Europe. In other parts of the world too, there is an increasing focus on farm animal welfare. In some countries this interest is only driven by export opportunities for poultry meat, especially

to Europe. At the same time, increasing requirements pose a possible threat to the market position of meat not produced under upgraded animal welfare standards or without the guarantee that it was produced under such standards. This could be protection by means of import tariffs or other instruments for border protection. In this article we discuss the worldwide status of broiler and laying hen welfare at farm level and the impact of changes in welfare regulations and requirements in the EU on world trade.

The global diffusion of animal welfare standards

Poultry welfare is given more legislative attention in the EU than in many other regions. The EU position is partly induced by specific features of the production environment. In addition, policy makers claim that EU consumers have increasing preferences for the welfare of production animals (European Commission, 2006a).

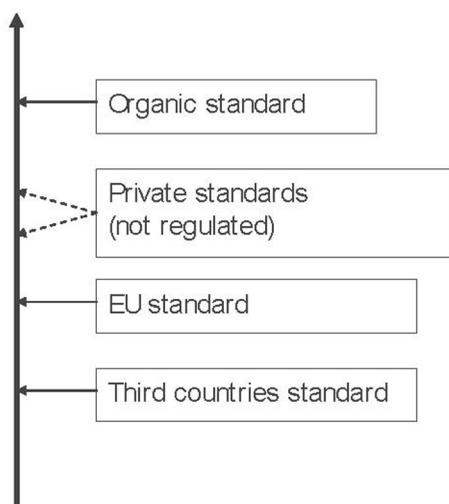


Figure 1 Current situation of regulatory and private standards for farm animal welfare in the EU and trading partners.

The current situation is presented in *Figure 1* (Eaton *et al.*, 2005). The vertical line represents a range of lower to higher standards of animal welfare. The legislated standards are placed along the line with no attention given to relative distance at this point. The organic standard for animal welfare gives the highest level in the market, far above the regulatory minimum. Producer labels are distributed along the line. This means that some producers, in Europe and elsewhere, maintain standards above the regulatory minimum, usually under a premium-quality label. Consumer researchers have revealed a wide divergence in the ambitions and motivations of private labels in the EU (Ingenbleek *et al.*, 2007). Also some producers in developing countries achieve standards that exceed regulatory minimum levels to a different degree. Selected production chains in developing countries already comply, or will potentially comply with EU standards for farm animal welfare and are allowed to export their products to the EU.

The difference in standards concerning animal welfare around the world seems related to income, culture and religion. The extent of animal welfare legislation generally reflects

income levels for a number of reasons. Firstly, the consumption of livestock products grows with rising income levels, first showing increased demand for quantities, then rising quality requirements and increased demand for superior types of meat and other animal products. Secondly, demands for public goods rise as much with income as demand for private goods. Animal welfare regulations typically comprise elements of providing a public good (McInery, 2004). Countries in more advanced stages of development have governments that are more effective in supplying such advanced public goods.

To show the relationship between the level of welfare legislation and income, a comparison was made. First of all, a survey was conducted to investigate what level of legislation exists in various countries to regulate the welfare of poultry. For broilers, the level was determined by the maximum bird density per m² and for layers the space allowance per hen and the status on mutilations (*e.g.* beak trimming) It should be pointed out that these standards are not necessarily good indicators of poultry welfare; they are actually *selected* standards on welfare which are not, on their own, good indicators. Their weakness as indicators of bird welfare is illustrated by the fact that *e.g.* non-beak trimmed pullets may well have higher levels of feather pecking + cannibalism leading to higher mortality (& poorer welfare), as laying hens. Each country was given a score on a scale of 1 to 5 for the level of legislation on poultry welfare. A country's income was also scored on a similar scale. The gross national income (GNI) per person of each country is available (FAO, 2007). For this paper, the classes are: 5 for GNI above 30,000 dollars, 4 for GNI between 20,000 and 29,999, 3 for GNI between 10,000 and 19,999, 3 for GNI between 5,000 and 9,999 and 1 for GNI below 4,999 dollar. *Figure 2* gives an overview of the results.

Figure 2 Poultry welfare regulation level (layers and broilers) and income level of selected countries around the world.

Welfare regulation level	Income level	Countries
5	5	Switzerland
4	5	Northern Europe: Denmark, Finland, Norway, Sweden
4	5	Western Europe: Austria, Germany, Netherlands, UK
3	5 / 4	Southern EU: France, Spain, Italy
3	3	Eastern EU: Poland, Hungary
2	5	Australia, Canada, USA
1	5	Japan
1	4 / 3	Middle East: UAE, Saudi Arabia
1	2 / 3	South America: Argentina, Brazil, Chile
1	2 / 3	East Europe: Ukraine, Russian Fed.
1	1 / 2	Asia: China, Thailand, India

Figure 2 shows that Switzerland has an exceptional position with a high standard for poultry welfare. Despite minor differences within the countries in Northern and Western Europe, all these countries have a higher standard for the welfare of either layers or broilers than the EU Directives require. In general, southern and eastern members of the EU have no poultry welfare legislation beyond that required by EU Directives. The new EU member states, *e.g.* Poland and Hungary, have a medium level gross national income but are obliged to work with the EU standards. Outside Europe, only the USA, Canada, Australia and New Zealand show any interest in animal welfare.

Broilers

HOUSING SYSTEMS FOR BROILERS

Broilers are generally held in large groups in either environmentally controlled housing or open, naturally ventilated poultry houses or in smaller groups on free range. Broilers are usually kept free loose housed on litter with (automated) provision of feed and water. In most countries, commercial breeds are used which are selected for rapid growth; slower growing genotypes are used in free range and organic production. Farmers around the world understand that in order to raise the birds with maximum efficiency, many conditions must be fulfilled: stress prevention, supply of good feed and water and sanitation. In providing these conditions, farmers ensure a basic level of animal welfare. However, there is a growing consensus of opinion that good productivity and health are not sufficient indicators of good welfare (Jones, 1996).

WELFARE REGULATIONS FOR BROILERS

Following a long period of discussion among the member states, in May 2007 the European Commission agreed on a new Directive covering the welfare of broilers (European Commission, 2007). All European producers will have to meet minimum standards by June 2010. According to the EU Commissioner, the Directive was needed because 'EU consumers repeatedly expressed concern at the welfare problems arising in intensive chicken farming'. The main provision of Directive 2007/43/EC is to reduce the stocking density by setting a maximum density of 33 kg/m². Under certain conditions, with a good ventilation and temperature control system, the maximum can be 39 kg/m². Under exceptionally high welfare conditions, the density can be increased by a further 3 kg/m². This can be achieved by low mortality rates. The Directive also sets conditions covering lighting, litter, feeding and ventilation requirements. Although scientists include more aspects when assessing the welfare of broilers, such as the high growth rate, leg and foot disorders, ascites and respiratory problems (SCAHAW, 2000), in this paper it is assumed that the welfare of broilers, according to the EU Directive, can be measured by bird density and mortality.

In the EU there was previously no regulation on broiler welfare. However, Denmark and Sweden already had a maximum density of 40 kg/m² and 36 kg/m² poultry house respectively (Berg and Algers, 2004). Also in Germany and the UK, the density was controlled by voluntary guidelines. Switzerland, not a member of the EU, maintains a stringent limit for broiler production of 30 kg/m² poultry house. As far as the authors are aware, there is no other country outside Europe with any regulation and legislation on maximum broiler density. In the USA, the National Chicken Council has developed Animal Welfare guidelines to ensure the proper care, management and handling of broilers. However this is a voluntary guideline for the US industry. In this guideline, the bird density (with a live weight between 2 and 2.5 kg) is 38 kg/m² poultry house (Hess *et al.*, 2007). In Brazil there are no regulations on the density of broilers. Due to the warm climate, Brazilian farmers keep broilers at a relatively low density of approximately 35 kg/m².

TRADE IN POULTRY MEAT

The international trade in broiler meat has grown very rapidly in recent years. Poultry is increasingly preferred in many regions as an affordable source of animal protein, which unlike pork or beef is accepted for consumption by most of the major religions in the world. *Figure 3* provides an overview of the global poultry meat trade in 2004 (PVE, 2007). In 2004, 12% of the produced poultry meat reached the world market (Windhorst,

2006). The main exporters of poultry meat are the United States, Brazil and the EU. The main importing regions are Russia, North Africa and the Middle East, China and the EU.

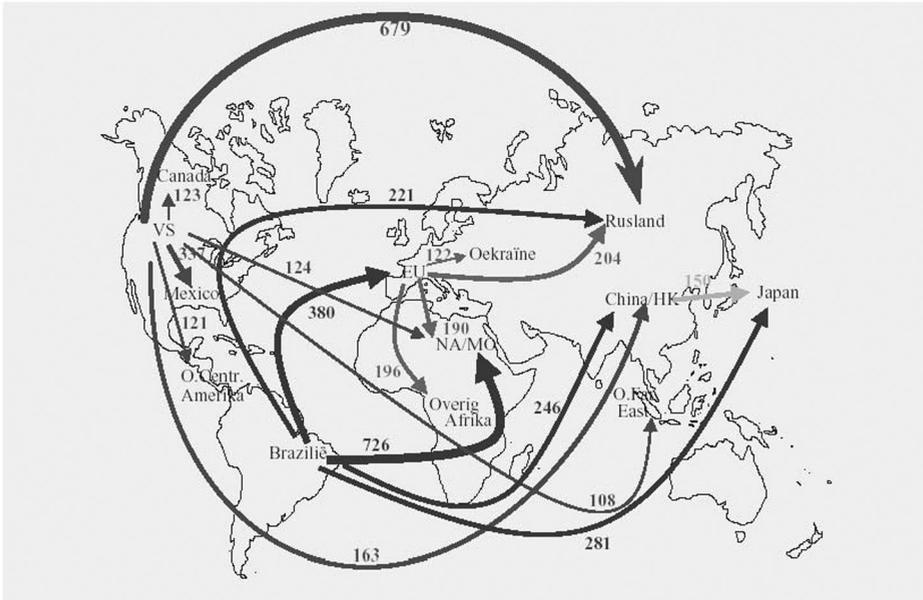


Figure 3 Main trade flows in poultry meat in 2004 (in 1000 tons).

Market developments and outbreaks of diseases (like Avian Influenza) affect the make-up and flows of trade in poultry products. While the effects of most outbreak-related disruptions fade after one to two years, other endemic diseases may have a lasting impact on trade. Other factors that exert an influence are related to the cost of production and consumer preferences (Dyck and Nelson, 2003). In addition, trade policies are particularly determinants of poultry trade. Each element will be discussed separately.

Production costs

Natural resources and the costs of feed and labour are the main determinants of the competitiveness of livestock and meat processing sectors. Van Horne and Bondt (2006) analysed the differences in production costs for broiler production across countries.

Based on that study, Figure 4 compares the production costs in several EU countries with the USA and Brazil. In 2004, the US production costs of broiler meat were 36% lower than in the Netherlands and in Brazil the production costs were more than 40% lower. The lower production costs in the USA and Brazil compared to the EU countries were largely due to the lower feed price (local supplies of feed raw materials) and the favourable conditions (e.g. climate, low labour cost). The production is carried out by means of efficiently-organised integrations. The broilers are kept in relatively simple and cheap poultry houses. In addition, in both countries production costs are lower because of lower levels of legislation and regulations, e.g. with respect to the use of meat-and-bone meal in feed.

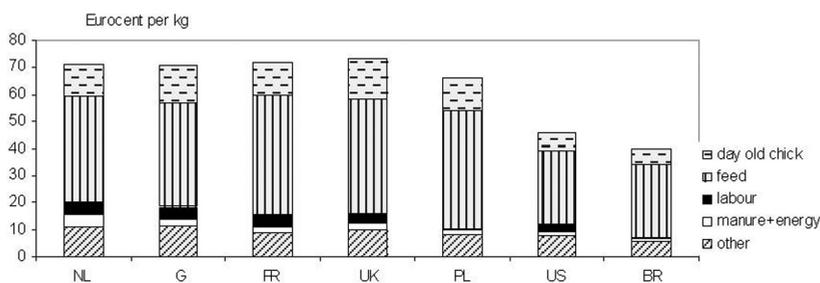


Figure 4 Production costs for broiler meat (eurocent per kg live weight) at farm level in the Netherlands, Germany, France, United Kingdom, Poland, USA and Brazil in 2004.

Consumer preferences

Much of the global trade in poultry meat is explained by variations in consumer preferences across the globe. While consumers in the US and the EU largely favour breast cuts, consumers in Asia prefer the meat on legs and wings. Producers export the cuts to markets where they get the best price (Dyck and Nelson, 2003). The EU provides an example of the way this trade works. All breast cuts from EU slaughterers are sold on EU markets, while the meat of legs and wings is exported to Russia. Imports from Brazil and Thailand satisfy the excess demand for breast cuts in the EU. Similarly, the US poultry industry supplies boneless chicken breasts to the home market, where consumers pay a relatively high price. The other parts of the carcass are exported to foreign markets where a higher price can be fetched. This explains why meat-producing countries both import and export, and why most of the trade in poultry products takes place in cuts and not whole carcasses.

Trade policy

Trade policy on broiler meat has a large impact on trade flows, in particular the policies in the EU. In order to accommodate a higher domestic price level for poultry by limiting imports, the EU allocates quota for imports from a selected number of exporters, most importantly Brazil and Thailand. US poultry meat is banned from EU markets for sanitary and phytosanitary (SPS) reasons. The EU only accepts cooked poultry meat from Thailand in the aftermath of the Avian Influenza outbreak in 2003-2004 (Eaton *et al.*, 2005).

WORLD TRADE IN RELATION TO THE WELFARE OF BROILERS

It is considered unlikely that raising the upgrade of legal EU animal welfare standards will have a large impact on the composition of global trade in poultry meat. The EU reached agreement with Brazil and Thailand on maximum import quotas. Brazil can compete with breast meat on the European market due to very low production costs. Thailand can compete with breast meat on the European market as a result of a preference for dark leg meat on the regional market. The production costs in the EU are expected to increase following the implementation of the EU Directive on broiler welfare. The implementation of the broiler Directive may therefore strengthen the call of EU producers for continued border protection to check the competitive pressure from foreign producers, raising the question whether EU animal welfare standards provide a basis for continued protection.

There are at least two economic arguments to consider it inappropriate to apply border protection for broiler meat on the grounds of animal welfare requirements. Firstly, the

difference in animal conditions is currently limited, although there are apparent limitations to a reliance on bird density. The density of broilers in the exporting countries is already at the EU target level. Secondly, the incremental costs of a further reduction in Brazil and Thailand are lower than in the EU due to lower costs for housing and labour. Producers in exporting countries are likely to respond to regulatory demands in the EU for increased animal welfare if they were to be implemented. Meat exporting firms have demonstrated a willingness and capacity to respond. Bowles *et al.* (2005) provide preliminary evidence of restructuring and certification within Argentinean and Thai broiler meat supply chains in response to altering buyer demands in the EU. Both observations raise questions whether continued border protection for EU poultry producers serves as an economically rational instrument to achieve an upgraded level of animal welfare in the consumption of broiler meat in the EU. Furthermore, these points demonstrate that, in principle, an upgrade of EU regulation requirements for animal welfare in imported broiler meat should not operate as a non tariff barrier to exporters, but rather as an opportunity to create additional value added.

Layers

HOUSING SYSTEMS FOR LAYERS

The majority of all commercial layers in the world are kept in confined housing systems with light control, power ventilation and mechanical feeding. The space per hen in conventional cages is very limited making it impossible to express natural behaviours like sand bathing and wing flapping. To accommodate societal concerns about animal welfare, in Europe alternative housing systems have been developed to improve the welfare for the layers. In general, today's egg producer has the choice of three main housing systems:

- *laying cages*. Conventional ones are small enclosures with welded wire mesh sloping floor; enriched ones are larger and also equipped with perches, nest boxes and litter.
- *barn systems*. Large enclosures (barns) with litter on the floor and freedom of movement for the birds within the poultry house.
- *free range systems*. Similar to barn systems, but with access to an outdoor run.

Laying cages are still the most economic way to produce eggs (van Horne, 2006) and the best system for disease prevention (Hulzebosch, 2006).

Figure 5 gives an overview of the share of hens kept in cages, barn system and free range systems in 30 countries around the world. The data were provided by the IEC reporters in the member countries (IEC, 2007).

Figure 5 shows that the widest variation in housing systems is found in the EU. Outside the EU, only Australia and New Zealand have some commercial non-cage systems. In all other countries, farmers mainly work with cage systems. In China, India and South Africa, the numbers with non-cage housing probably refer to non-commercial backyard farming (IEC, 2007). Also within the EU there is a wide variation in the percentage of hens in non-cage systems. Due to growing concern about animal welfare in cages, especially in North-West Europe, farmers are investing in alternative housing systems. EU countries with less than half of the hens in cage systems are Austria (30%), Sweden (39%) and the Netherlands (47%). Hens are mainly kept in cages in Spain, Hungary, Italy and Greece. Switzerland, not a member of the EU, already has a ban on conventional cages and as a result all hens are kept in alternative systems.

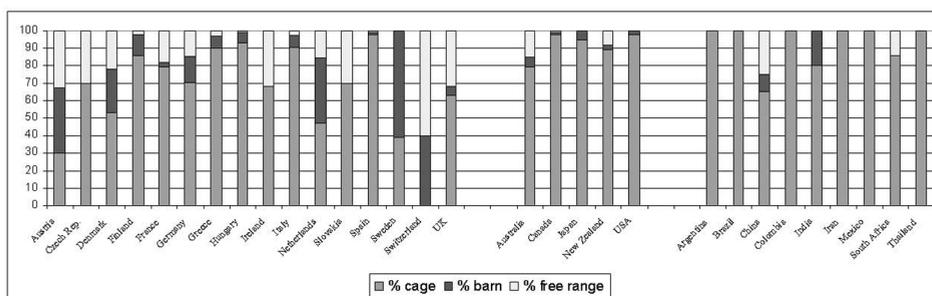


Figure 5 Share of hens kept in cages, barn or free range systems in 30 countries around the world.

WELFARE REGULATIONS FOR LAYERS

In the EU a Directive (1999/74/EC) established European standards for improving the welfare of commercial hens. By 2012, all conventional cages in the EU should be replaced by enriched cages or alternative housing systems. In an enriched cage, each hen has at least 750 cm², a perch, a nest box and litter. In the current situation, layers kept in conventional cages within the EU have access to at least 550 cm² per hen. This is an EU Directive and national countries are allowed to have stricter laws. This is the situation in Austria, Germany and Sweden (Berg and Yngvesson, 2006). In the Netherlands, a possible ban on all cage systems is being discussed (summer 2007). In this article we take the EU Directive as a guideline to define the main welfare components. The space allowance per hen, enrichment of the cage and proper beak trimming are the main components regulated in the EU. However, scientists also discuss expression of natural behaviour, induced moulting, cannibalism, injuries, osteoporosis and depopulation processes (Mazzuco, 2007).

In the USA, some fast food chains are demanding minimum standards for housing densities from their suppliers. In 2008, United Egg Producers (UEP) will start a voluntary certification programme to implement a housing density of at least 430 cm² per hen. In Canada, a code of practice recommends a similar density. In Brazil there is no nationwide legislation governing the welfare of poultry (Mazzuco, 2007).

In general it can be stated that in countries in Asia and South America, there is no legislation at all to regulate the welfare of layers. An inventory (van Horne and Bondt, 2005) showed that hens in India, Ukraine and Brazil are kept in cages with a space allowance of 300 to 400 cm² per hen. Farmers choose this density as the economic optimum giving the highest income per cage. American calculations (Bell, 2000) show that in purely economic terms, 350 to 400 cm² per hen gives the highest income for a US farmer.

Mutilations, like beak trimming, have also been disputed for many years. Beak treatment of laying hens is regulated in the EU. In order to prevent feather pecking and cannibalism, EU member states may authorise beak trimming, provided it is carried out by qualified staff on chickens that are less than 10 days old. However, within Europe there is substantial variation in both legislation and practice between countries (Fiks-van Niekerk and Jong, 2007). Beak trimming is fully prohibited in Sweden, Norway and Finland. Beak trimming is strictly regulated in Austria, Belgium, Denmark, Germany, the Netherlands, Switzerland and the UK. Most Southern and Eastern European countries, *e. g.* France, Italy, Poland, Hungary and Spain only have the basic requirements of EU Council Directive 1999/74/EC.

TRADE IN EGGS AND EGG PRODUCTS

Worldwide trade in eggs is very limited. In 2004, only 2% of the eggs reached the world market (Windhorst, 2006). The main exporters are the Netherlands (26% of total world trade), Spain (10%), China (8%), Belgium (8%) and USA (7%). Eggs are mainly traded regionally within European as well as Asian countries. Besides trade in shell eggs, there is some trade in egg products. Trade in egg powder is particularly increasing. Egg powder can be stored for a long period and involves low transportation costs. It is expected that in the near future egg powder will be produced in low cost countries and exported to the food industry (bakeries, pasta and sauce factories) in developed countries (Tacken *et al.*, 2003).

Cost of production

Trade in eggs and egg products is mainly influenced by differences in production costs. Van Horne and Bondt (2006) analysed the differences in production costs for egg production across countries. In this study, the USA and Brazil were selected as examples of the situation outside the EU. In 2004, the production costs of eggs in the US were 30% lower than in the Netherlands, whilst in Brazil the production costs were more than 40% lower.

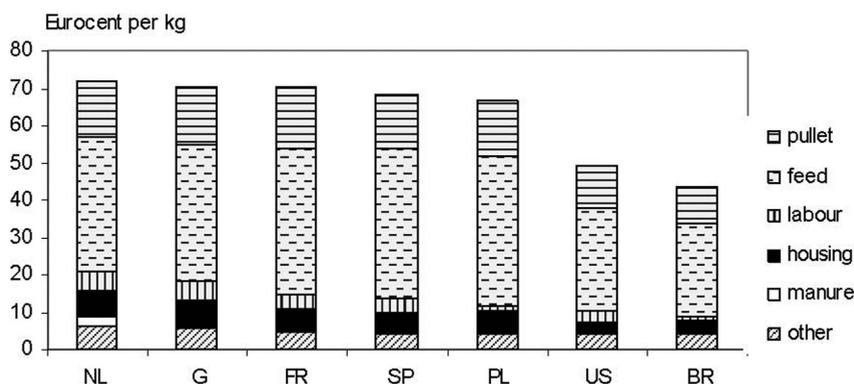


Figure 6 Production costs for eggs (eurocent per kg eggs) at farm level in the Netherlands, Germany, France, Spain, Poland, USA and Brazil in 2004.

Figure 6 gives a breakdown of the cost components. The lower production costs in the USA and Brazil were largely due to lower feed prices (local supplies of feed raw materials) and the favourable conditions. In addition, both production costs in both countries are lower due to lower levels of legislation and regulations, more specifically related to a) the absence of legislation on housing requirements (the floor area per hen is between 350 and 400 cm² versus at least 550 cm² in the EU), b) permission for the use of meat-and-bone meal in animal feed and c) the absence of legislation on beak trimming.

COMPARING PRODUCTION COST IN HOUSING SYSTEMS FOR LAYERS

In general there is a relation between production costs and the space standard for laying hens.

Figure 7 gives an overview of the relationship between costs and the space standard for laying hens in different parts of the world. These calculations were made to assess the impact of a possible ban on enriched cages in the Netherlands (van Horne *et al.*, 2007). If

the enriched cage were prohibited unilaterally in the Netherlands in 2012 all laying hens would be kept in barn housing systems with a minimum area of 1111 cm²/bird. Since 2003, layers in the EU get at least 550 cm² and after 2012 layers will be kept in enriched cages with at least 750 cm² per hen. In the United States, voluntary rules apply which are based on 430 cm²/hen with effect from 2008. In the other countries in the world, hens are mainly kept in cages with 300 to 400 cm²/hen. *Figure 7* shows that the production costs of eggs increase when the area per bird in cage housing is increased from the world level (350 cm²) to the US standard (430 cm²) to the current EU minimum level (550 cm²). The production costs further increase when there is a switch to enriched cages (750 cm²), German kleingruppenhaltung (mini-aviary) system (890 cm²) and barn/deep litter systems (1111 cm²).

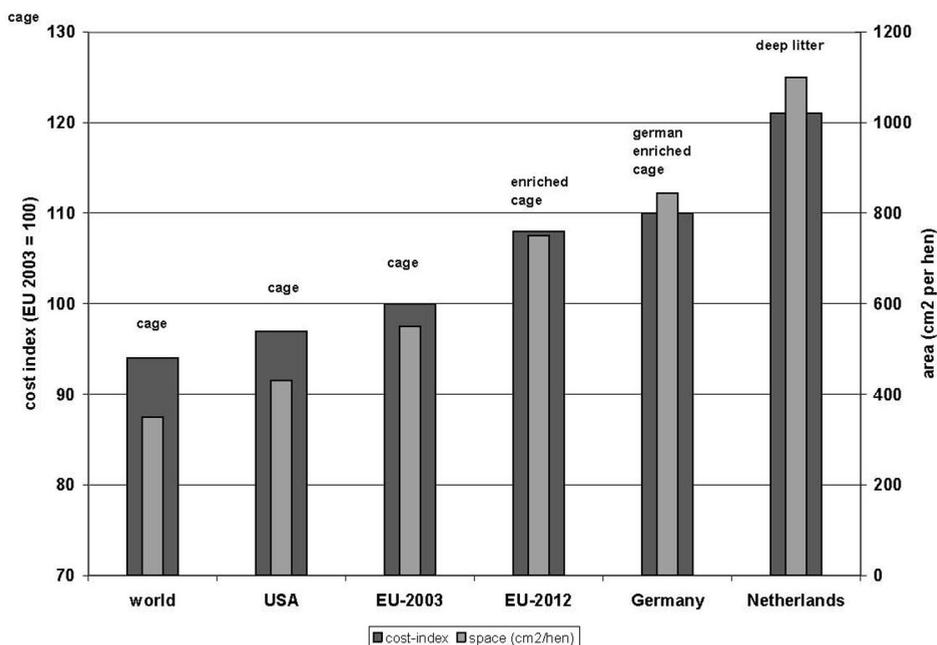


Figure 7 Relationship between costs for animal welfare (wide bar; left-hand axis) and the area per laying hen (small bar; right-hand axis).

WORLD TRADE IN RELATION TO WELFARE OF LAYERS

The international trade in table eggs continues to be limited primarily to the region. This also applies to liquid egg products. Some eggs are processed into egg powder. Because of its long keeping qualities and the relatively low transport costs, there is an international trade in this product. In some countries, such as Brazil and India, the production cost of eggs is much lower compared to the EU. This is due to cheaper feed (supply of local feed ingredients) and the absence of animal welfare legislation. The European market is currently protected by import duties which, together with the transport costs, compensate for the difference in production costs. On the one hand, the European purchase price of eggs is increased by animal welfare measures and, at the same time, the EU intends to reduce the import tax in the context of the WTO negotiations. In this situation it is economically more attractive for the food industry to replace European liquid egg product with powdered egg from countries outside the

EU. Consequently, egg products will be purchased from third countries where animal welfare standards are significantly lower than in the EU.

Conclusion

Poultry welfare is of more legislative concern in the EU than in many other regions. This is especially the case for laying hens. Some producer labels operate animal welfare standards above the regulatory minimum. Also producers in some developing countries achieve levels of animal welfare that exceed EU regulatory minimum levels to a different degree. Animal welfare concerns should not motivate *categorical* trade restrictions on imports of poultry products from developing countries into the EU. The European Commission, backed by a group of core member states in north-western Europe, has defined strong ambitions for improving animal welfare in the EU and its trading partners (European Commission, 2006b).

The EU focuses on animal welfare via various paths. EU countries are among the driving partners in discussions on animal protection within the World Organization for Animal Health (OIE) which has a working group on animal welfare. The OIE is accepted under the WTO agreement as the body that sets the standards on veterinary issues in global trade. Currently, the WTO has not explicitly recognised animal welfare as a legitimate concern *i.e.* a cause for impeding trade. The EU has placed the issue of animal welfare on the agenda for negotiations under the Doha Round but there has been very little discussion on the subject recently. Since the 2005 annual meeting, the member countries of OIE agree on general guidelines for animal welfare in relation to slaughter, protection for animals during transport and the killing of animals for disease control purposes (OIE, 2004). For the coming years, it cannot be expected that the OIE will provide comprehensive global standards on animal welfare at farm level.

Meanwhile, one option is to promote either voluntary or mandatory use of labelling to provide consumers with more information concerning the standard of production. Consumers could then make better informed choices with respect to their concerns for animal welfare. The aim of such labelling could also be to provide an incentive for domestic and foreign producers to increase animal welfare standards above the EU's minimum requirements. In addition to providing more information to consumers by means of labelling, there is also the possibility of using financial mechanisms such as taxes or tariffs to reduce the price difference for consumers. A European label, tax or tariff based on animal welfare performance, as all measures based on performance standards, is contentious under international trade law. Such a scheme is open to challenge under WTO rules if considered discriminatory against producers of livestock products that want to export to the EU. The likelihood that a measure is challenged depends on how difficult it is for exporters to meet the requirements and the expected effectiveness of the label or (border) tax in segmenting the meat market.

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