

The impact of laying hen welfare competitiveness of the EU egg

The European Union has introduced animal welfare legislation to protect the welfare of laying hens. This will prohibit the use of conventional cages from 2012, but authorises the use of enriched cages. This will increase the production cost of eggs. Meanwhile a new round of World Trade Organisation (WTO) negotiations are set to further liberalise trade in agricultural products. What effect will all this have on the EU egg industry?

By PLM van Horne, (LEI), The Hague, The Netherlands

Over the past years the worldwide production of eggs grew tremendously, from 32.5 million tonnes in 1985 to 57.8 million tonnes in 2002. China is by far the largest producer of eggs and between 1985 and 2002 China's share of world production increased from 18 to 40%, compared with a decrease in the EU, the USA and the Russian Federation. During the same period total production and also the share of world production grew in Mexico, India and Brazil. Total production in the EU 15 was 5.5 million tonnes in 1985 and 5.3 million tonnes in 2000 and 5.2 million tonnes in 2002. Over time the self-sufficiency rate for eggs in the EU has dropped to 102% and may drop further in future.

European policy

In 1999 the European Union introduced the EU Directive 'welfare of laying hens', which will be fully implemented on European poultry farms by 2012. Traditional cage systems are then forbidden and must be replaced by enriched cages, aviary or free-range systems. Calculations tell that production of eggs in enriched cages will then give the lowest production cost, but compared to the traditional cage the cost for housing, feed and labour will be increased. However it can be expected that the design of enriched cages will be further improved to



In 2012 the EU Directive 'welfare of laying hens' will be fully implemented.

obtain technical results that are equal or better than those in traditional cages. Still, well designed enriched cages will increase in cost by at least 13%.

The Dutch Agricultural Economics Research Institute (LEI) studied the effect this Directive has on the competitiveness of the EU egg industry in a global market. They researched the production cost of table eggs and whole egg powder in the main EU egg producing countries: the Netherlands (NL), France (FR), Germany (DE), Spain (ES), Italy (IT) and the United Kingdom (UK) and the non-EU countries:

Poland (PL), Ukraine (UKR), the United States of America (USA), Brazil (BR) and India (IN). In all countries data were collected on prices (feed, young hens), technical results (egg production, feed intake, mortality), investment (poultry house, cages) and other costs (interest rate, labour, manure disposal). For egg processing, data were collected on investment in buildings, equipment and labour cost. The base year for the data was 2001 whereby the total costs were converted to Euros with the average exchange rate in the year 2001.

Figure 1 - Cost of primary production in cages in EU countries (cents per kilogram egg)

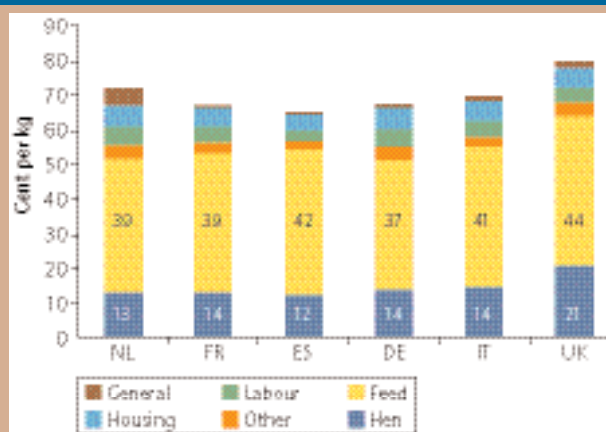
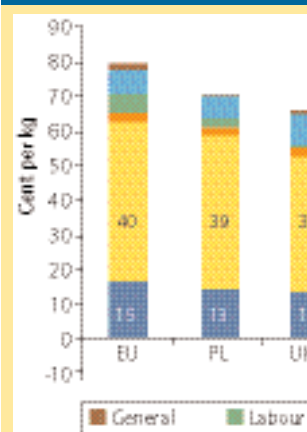


Figure 2 - Cost of primary production in cages in non-EU countries (cents per kilogram egg)



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Table 1 - Most important assumptions for labour and investments in the various housing systems for laying hens

	Cage (450 cm ²)	Enriched cage	Aviary
Labour			
No. of hens/worker	50,000	45,000	32,000
Buildings			
Animal density (hens per m ² pen)	30	17	18
Surface area per pen (gross m ²)	1,900	3,000	1,900
Investment			
Inventory (Euros per place per hen)	7.49	10.44	10.44
Other inventory (Euros per place per hen)	3.18	4.54	4.54

Table 2 - Most important assumptions for the production results in the various housing systems for laying hens (laying period is 390 days)

	Cage (450 cm ²)	Enriched cage	Aviary
No. of eggs per hen per place (units)	319	319	314
Feed consumption per hen per day (grammes)	114	117	120
Mortality (%)	7	7	9

Production cost in 2001

The production cost of shell eggs in 2001 between the six main egg producing EU countries ranged from 79 in the UK to 65 Euro cents per kg of eggs in Spain (see Figure 1). The average for those six countries is 70 Euro cent per kg. Processing cost for whole egg powder also differs within the EU countries from 23.6 in Germany to 20 Euro cents per kg shell eggs (input) in Spain.

The differences in costs for the primary production are mainly caused by differences in feed costs, the price of young

hens, housing costs and manure disposal costs. Within the European countries the price of feed in Germany is the lowest and in the UK is the highest. Despite the relatively expensive feed, young hens are the cheapest in Spain. While Dutch farms have good technical results, the production cost in a European context is relatively high. This is caused by higher housing costs, but also particularly by high manure disposal costs.

When comparing the production costs of eggs with those in some non-EU countries (see Figure 2) it was shown that the

Impact of EU reform on the feed price

In the past the EU market and price policy had a great impact on the price of poultry. Grain prices were kept on a higher level than the world market price. As a result of the 'Mac Sharry' reforms and more recently Agenda 2000 intervention prices of grain are reduced. In the comparison for the different countries feed prices paid by farmers were collected for the year 2001. It is estimated that from 2001 towards 2012 the difference in feed prices for layers between the EU and the rest of world will be reduced by another 5%. At the same time grain substitutes could be imported without virtually any import restrictions. As a result, the areas nearby seaports in particular could obtain relatively cheap feed.

Cost of consumer demands

A recent Dutch study the authors showed that from the year 2000 to 2005 production costs will increase by 4% in Spain and up to 8% in the Netherlands due to the extra cost to implement legislation to improve animal welfare, food safety and for environmental protection. The cost increase towards 2005 was based on: an increase in space allowance per hen (550 cm² in 2003), a ban on de-beaking of hens (Germany and the Netherlands), salmonella control, the ban on Meat and Bone meal (MBM), reduction of ammonia emissions (Germany and the Netherlands) and the introduction of a energy tax on electricity. In this report only the ban on MBM and the improved welfare (enriched cages) is taken into account. Apart from the food safety issues the mentioned themes are not discussed in the non-EU countries.

production costs for shell eggs in 2001 were lower in Poland (88%), USA (86%), Ukraine (83%), Brazil (66%) and India (59%). The differences in costs for the primary production are mainly caused by differences in the costs of feed, young hens, labour and housing. For Brazil also the revenues for manure disposal are relevant. In the Ukraine the extra value of the spent hens means a more than 3-cent reduction of the net production costs. As a result of transportation costs and import levies there are barely no imports from those countries to the EU. For whole egg powder the mentioned non-EU countries are however more competitive. Compared to the average level within the EU the production costs of whole egg powder in 2001 were lower in Poland (85%), USA (88%), Ukraine (78%), Brazil (66%) and India (60%). Although cost of transportation of powder is relatively low, current import levies protect the EU from large amounts of imports from the mentioned countries. However, the offer price of whole egg powder from India is calculated to be below the EU-15 average.

Production costs in 2012

Following a transition period, laying hens in the EU can, from 2012 on, exclusively be housed in so-called enriched cages or in alternative systems. These *enriched cages* must provide each hen 750 cm² surface area, a perch, a nest box and litter. The alternative system described in the

Production in cages in EU countries (cents per kilogram egg)

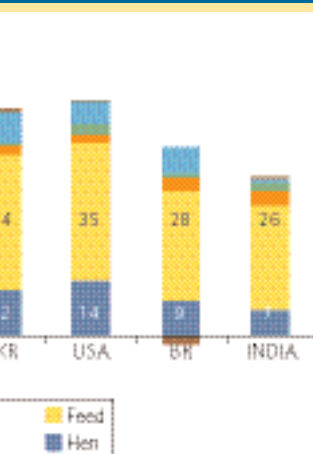
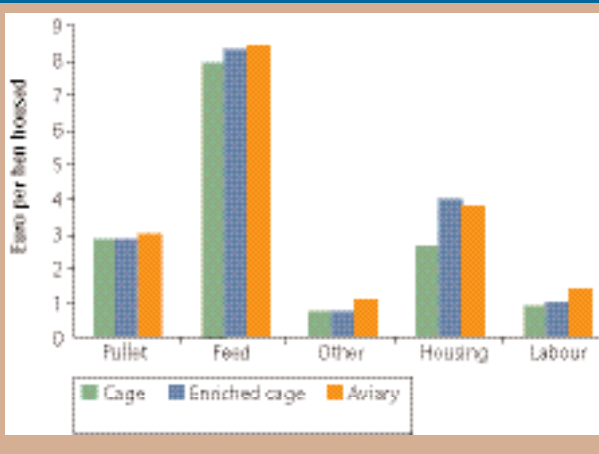


Figure 3 - Build-up of production cost for various housing systems



EU guidelines most resembles *the aviary system*, as has been known for many years in the Netherlands. Each hen has 1,100-cm² of living space, (part of) the surface area of the pen is covered with litter and in the pen there are enough nest boxes, elevated floors and perches for the birds.

For both systems mentioned the production costs of eggs have been calculated. It is clear that with the enriched cages there is little practical experience. This means that the calculations are indicative. There are still uncertainties particularly in the field of technical results (egg production, quality of eggs, mortality of hens) and the labour requirements. The main assumptions for labour and investments for various housing systems are in *Table 1*. Here it seems that for all new systems the labour needs and investments for house and equipment per place per hen are increasing. The basic assumptions for the technical results are in *Table 2*. The most important difference to the traditional cage is the higher feed consumption caused by lower density and a higher level of movement of the hens. On the basis of the accepted debit terms the costs for house and equipment are calculated for

Egg production will move

The impact improved animal welfare has on world trade has been calculated by using the GTAP model. GTAP stands for Global Trade Analysis Project and is used by several Universities in Europe and the USA in order to simulate the impact of legislation on world trade. The list of member institutions in the GTAP consortium includes, among others, the World Bank, the European Commission and the World Trade Organisation. In this project there were limited possibilities to make detailed calculations with the model. The LEI did run the model to provide an impression of the impact of a 13% increase in production cost after implementing the EU welfare Directive. The results show an 11.4 and 4.2% decrease in production volume in respectively North Europe and South Europe. This production capacity will move towards East Europe (+5.8%), USA (+2.8%), South America (+3.2%) and East Asia (+1.1%). It should be emphasised that in the current GTAP model, intensive livestock farming is combined into one product group. This means that the effects that apply to the laying hens sector may be influenced by the aggregation in the model. It is recommended that the GTAP model is adapted by bringing in specific data for eggs and egg products. With this adapted model the impact on world trade as a result of lower import levies combined with increased production costs for improving animal welfare could be calculated.

all housing systems. All variable costs are also calculated for each system (see *Table 3*) In the enriched cage the production costs in relation to the present cage accommodation (450-cm² per hen) are 13% higher. In the aviary system this is +21%.

Effect on egg products

As a result of an increase in egg prices the price for egg powder will be affected

too. The results for the situation in 2012 are presented in *Tables 4 and 5*. *Table 4* provides the production cost of whole egg powder in the EU after implementation of the EU welfare Directive compared to the USA, Ukraine, Brazil and India. This is the 'best case scenario' with the full import levy and no change in exchange rates for the non-EU currency. Following these calculations India and Brazil can offer whole egg powder at a lower price than the EU countries.

Table 5 gives the 'worst case scenario' with a 36% decrease in import levy and a 15% devaluation of the exchange rates for the non-EU currency. In this scenario all countries, including the USA, can offer whole egg powder at a lower price than the EU countries.

Competition however is not only based on price. Other factors like quality of the product, good distribution/logistics and quick response to changes in the market can be crucial in marketing a product.

A survey among manufacturers and buyers of egg products learned that price and microbiological composition are the most important purchasing factors. Both of these factors score 35%. The producer of egg products (traditional versus innovative) scores 20% and less important are the housing system (cage, barn or free range eggs) and country of origin (local, Europe or world) with 7 and 2% respectively. It can be concluded that, given a certain minimum quality level of the product, the market for egg products can be described as a price market. At the present time the demand for processed products using non-cage raw materials (such as barn and free-range eggs) is still negligible. While the market for organic processed products is growing, it is still typified as a niche market.

In general it can be concluded that:

- compared to the average level within the EU the production costs of whole egg powder in 2001 were lower in Poland (85%), USA (78%), Ukraine

Table 3 - Build up of production costs (in Euros) for various housing systems for laying hens

Costs per hen housed (Euro)	Conventional cage (450 cm ²)	Enriched cage	Aviary
Purchase of hen	2.77	2.77	2.88
Feed costs	7.91	8.30	8.41
Variable costs	0.69	0.71	1.06
Housing	2.60	3.92	3.74
Labour	0.85	0.94	1.33
General costs	0.15	0.16	0.22
Revenue spent hen	-0.36	-0.36	-0.35
Total costs per hen housed	14.61	16.44	17.30
Production cost per egg (cent)	4.54	5.17	5.49
Production cost per kg eggs (cent)	0.73	0.83	0.88
Increase (in %)	-	13	21

Table 4 - Offer price of whole egg powder (in Euro cents per kg) in Germany in 2012 with full (2001) import levy and no change in exchange rate of currency

	Production cost	Transport levy	Import	Total	Difference (% of EU total)
EU 15	444	3	-	447	-
USA	366	17	137	520	116
Ukraine	323	9	137	469	105
Brazil	275	21	137	433	97
India	246	21	137	404	90

Table 5 - Offer price of whole egg powder (in Euro cents per kg) in Germany in 2012 with lower import levy (-36%) and 15% devaluation of the currency exchange rate in non-EU countries

	Production cost	Transport levy	Import	Total	Difference (% of EU total)
EU 15	444	3	-	447	-
USA	311	17	88	416	93
Ukraine	275	9	88	372	83
Brazil	234	21	88	343	77
India	209	21	88	318	71

Market for table eggs

In 2000 a study was conducted on the future position for Dutch table eggs. In combination with a desk study, interviews were held in the Netherlands and Germany at egg packing stations and retailers. The main conclusion in this report was that retailers strongly prefer locally produced table eggs. Particularly regarding aspects such as freshness, food safety and traceability, EU eggs are far ahead of eggs produced in non-EU countries. In the same report it was concluded that non-cage eggs have a future. However, it is questioned if the growth will continue. There are signals that growth has stabilised in the Netherlands and Germany.

(88%), Brazil (66%) and India (60%). Although the transport cost of whole egg powder is relatively low, current import levies protect the EU from large volumes of imports from the mentioned countries;

- in the year 2012 the EU Directive 'welfare of laying hens' will be fully implemented on European poultry farms. Production of eggs in enriched cages will give the lowest production cost. Compared to the traditional cage the cost for housing, feed and labour will be increased. It can be ex-

pected that the design of enriched cages will be further improved to obtain good technical results. Even with good enriched cages the increase in cost will be at least 13%;

- in 2012 the production cost of shell eggs in the EU is on average, and including cost of transport, 80 Euro cents per kilogram. The results of the scenario calculations show that in a competition on the German market for shell eggs Ukraine, USA, Brazil and India cannot compete on price. This is a result of high cost for transportation and import levies. However, in scenario 4, with a 36% lower import tariff and a 15% lower exchange rate, Ukraine and India could compete;
- in 2012 the production costs of whole egg powder in some non-EU countries are predicted to be lower in comparison to the EU. In a situation where import levies and currency exchange rates remain unchanged the Brazil and India will be competitive on the European market. Including transport and import levy the offer price from Brazil and India is respectively 3 and 10% below the EU price. In a scenario with a 36% lower import levy and a 15% devaluation of the dollar exchange rate, the USA can also offer lower prices for whole egg

powder than the EU countries; the market for egg products can be described as a price market. Given a minimum level of quality, manufacturers compete on price. It can be assumed that the quality of American whole egg powder will be equal to European quality. In the year 2012 imports of large volumes of egg powder can be expected from the USA or, depending on the quality, from 'low cost' countries like India and Brazil;

- in the countries outside the EU 15 mentioned in this report there are no animal welfare regulations to protect laying hens. In the USA there is discussion on increasing the space allowance per hen (towards 432 cm² in 2008) on a voluntary basis. However, it is unclear if those welfare guidelines will be accepted by egg processors. At this moment most hens in the USA are kept in six-bird colony cages with 342 cm² per bird. In Brazil, India and Ukraine layers are kept in cages with a space allowance of 300 to 400 cm² per hen. USA calculations show that, purely from an economic point of view, 350 to 400 cm² per bird gives the highest income for the poultry farmer. ■