

# Dynamics in U. S. egg production and trade and future perspectives for the egg industry

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## 1 The setting

Besides China, which contributed 41.3 % to global egg production in 2007, the USA ranked second with a share of 8.5 %, followed by India and Japan. In 2005, the USA ranked number seven among the top ten egg exporting countries with an export volume of 74,000 t. The contribution to global egg exports was 6.3 %. In the first part of this report, the recent dynamics and spatial patterns of U. S. egg production and trade will be analysed, also, projections of egg production and exports until 2017 will be presented. The second part will deal with the situation in Europe and possible impacts of the referendum in California on the future of the U. S. egg industry.

## 2 The role of egg production in U. S. agriculture

In contrast to poultry meat, egg production does not play a major role in U. S. agriculture, even though this sector of the livestock industry contributed 2.4 % to the value of agricultural production in 2007 (table 1). Between 2005 and 2007, the value increased by 2.3 bill. \$. This is the result of higher feed costs, an increasing domestic demand, and a growing export volume. Nevertheless, the role of egg production must not be underestimated, for its value was about 500 mill. \$ higher than that of cotton production.

Table 1:

Development of the contribution of hen eggs to the value of agricultural production in the USA between 2000 and 2007; data in mill. US-\$  
(Source: USDA, NASS)

Year	Agricultural production	Egg production	Contribution (%)
2000	218,800	4,359	2.0
2001	225,800	4,460	2.0
2002	218,700	4,285	2.0
2003	242,600	5,333	2.2
2004	279,000	5,303	1.9
2005	240,700	4,042	1.7
2006	239,300	4,388	1.9
2007	282,200	6,678	2.4
Increase (%)	29.0	53.2	-

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### 3 The development of U. S. egg production between 2000 and 2007

In a first step, this analysis will deal with the development of egg production between 2000 and 2007.

Table 2:

Development of the value of poultry production in the USA between 2000 and 2007; data in mill. US-\$ (Source: USDA, NASS: Poultry – Production and Value, various editions)

Year	Broilers	Eggs	Turkeys	Other poultry	Total
2000	13,984	4,359	2,828	64	21,228
2001	16,696	4,461	2,797	47	24,001
2002	13,437	4,285	2,732	51	20,505
2003	15,215	5,333	2,700	47	23,595
2004	20,446	5,303	3,065	59	28,873
2005	20,878	4,049	3,183	65	28,175
2006	17,739	4,432	3,574	53	25,798
2007	21,460	6,678	3,711	51	31,900
Change (%)	+ 53.4	+ 53.2	+ 31.2	- 20.3	+ 50.3

Table 2 shows that the value of U. S. poultry production increased by 10.7 billion \$ or 50.3 % between 2000 and 2007. The growth rates for broiler meat and eggs were almost identical whereas turkey meat fell far behind with only 31.2 %. The value of egg production varied considerably from one year to the other. Between 2002 and 2003 it increased by over 1 billion \$, remained fairly stable the following year and decreased again by almost 1.3 billion \$ between 2004 and 2005. A sharp increase in the value of production can be observed between 2006 and 2007. It will have to be analysed which steering factors caused this development.

Table 3:

Development of layer flocks and average eggs per layer and year in the USA between 2000 and 2007 (Source: USDA, NASS: Chicken and Eggs Summary, various editions)

Year	Layers (1,000)	Eggs per layer and year
2000	327,985	257
2001	335,012	256
2002	337,202	257
2003	338,393	259
2004	342,279	260
2005	343,792	262
2006	347,880	263
2007	344,385	263
Increase (%)	5.0	2,3

From the data in table 3 one can easily see that the number of layers at hand increased continuously between 2000 and 2006. One has to keep in mind, however, that the layers produce eggs for consumption as well

as hatching eggs for pullets and broilers. Broiler meat production grew by 3.5 mill. t in the analysed time period. This resulted in an expansion of the layer flocks for hatching eggs in the broiler industry. The comparatively high egg prices in 2003 and 2004 initiated higher placements of chicks for table egg production (table 4). Per capita consumption did, however, not increase in the same way. The opposite was the case, for it decreased from 257 eggs in 2004 to 255 eggs in 2005. The consequence was a collapse of egg prices and a substantial reduction of the number of layers in 2007. By these drastic measures, the egg price could be stabilised which helped the industry to become profitable again in spite of rising feed costs (table 5).

Table 4:

Development of U. S. egg production by type between 2000 and 2007; data in mill. pieces  
(Source: USDA, NASS: Chicken and Egg Summary; various editions)

Year	Table eggs	Hatching eggs	*Total
2000	71,415	12,971	84,386
2001	72,797	12,944	85,745
2002	73,787	12,904	86,698
2003	74,597	12,867	87,473
2004	76,236	12,896	89,131
2005	76,870	13,159	90,027
2006	78,276	13,050	91,328
2007	77,266	12,317	90,581
Increase (%)	8.2	2.7	7.3

\* sums do not add because of rounding

Table 5:

Development of the value of U. S. egg production between 2000 and 2007  
(Source: USDA, NASS: Poultry – Production and Value, various editions)

Year	Value of production	Price \$/dozen	Index (2000 = 100)
2000	4,359	0.62	100
2001	4,460	0.62	100
2002	4,285	0.59	95
2003	5,333	0.73	118
2004	5,303	0.71	115
2005	4,042	0.54	87
2006	4,388	0.58	94
2007	6,678	0.89	144
Increase (%)	53.2	43.5	-

#### 4 The changing spatial pattern of U. S. egg production

In a second step, the changing spatial pattern of egg production will be analysed. From table 6 one can see that the composition of the ten leading states in egg production did not change very much in the analysed time period. Only Minnesota was replaced by North Carolina. The same is true for the regional concentration. The contribution of the ten leading states to total production hovered around 64 %. A closer look

at the ranking of the states reveals, however, that the spatial pattern changed considerably.

Table 5:  
The ten leading states of the USA in egg production in 2000 and 2007  
(Source: USDA, NASS: Poultry – Production and Value, various editions)

2000				2007			
State	Layers (1,000)	Production (Mill. eggs)	% of U. S. production	State	Layers (1,000)	Production (Mill. eggs)	% of U. S. production
Ohio	31,129	8,163	9.7	Iowa	52,401	13,868	15.3
Iowa	28,098	7,554	9.0	Ohio	26,596	7,151	7.9
Pennsylvania	23,275	6,309	7.5	Indiana	24,885	6,673	7.4
California	24,056	6,293	7.5	Pennsylvania	22,514	6,392	7.1
Indiana	22,708	6,098	7.2	Texas	18,814	4,994	5.5
Georgia	20,816	5,114	6.1	California	19,234	4,938	5.5
Texas	17,423	4,423	5.2	Georgia	19,434	4,792	5.3
Arkansas	15,340	3,559	4.2	Arkansas	14,149	3,288	3.6
Minnesota	12,581	3,271	3.9	Nebraska	10,945	2,984	3.3
Nebraska	11,909	2,999	3.6	N Carolina	12,088	2,960	3.3
10 states	207,335	53,783	*63.7	10 states	221,060	58,040	*64.1
USA	327,985	84,386	100.0	USA	344,385	90,581	100.0

\* sum does not add because of rounding

In 2000, Ohio was the leading egg producing state with over 31 mill. layers and a production volume of 8.2 billion eggs. Iowa and Pennsylvania ranked as number two and three. Seven years later, Iowa had reached a dominating position in the U. S. egg industry. The number of layers at hand had increased by over 24 mill birds, the production by 6.3 billion eggs. The contribution to total egg production climbed from 9.0 % to 15.3 %. In contrast, Ohio lost 4.5 million layers in the analysed time period, the production volume decreased by 1 billion eggs. This development is closely related to the lasting discussion about the closure of former Croton Egg Farms, which were bought by Decoster Egg Farms and now run under Ohio Fresh Eggs. California, on fourth place in 2000, was ranked number 6 in 2007. This state lost 4.8 million layers and production dropped by almost 1.4 billion eggs. This sharp reduction is a result of constantly rising feed prices because of high irrigation costs in the Central Valley and growing transportation costs for feed components from the Midwest. In addition, stricter environmental directives and high energy prices have reduced the competitiveness of egg producers in California.

In Georgia, Arkansas, and North Carolina, large amounts of the production volume are hatching eggs for the broiler industry. In 2007, Georgia produced 2.6 billion table eggs and 2.2 billion hatching eggs. In Arkansas, hatching egg production (2.1 billion) was even higher than table egg production (1.2 billion).

Figures 1 and 2 show the spatial distribution of layer flocks and of egg production. One cluster reaches from Nebraska to Pennsylvania. Here,

the production of table eggs for the agglomerations along the Atlantic coast and at the Great Lakes is concentrated. The second cluster is closely related to the centres of broiler production in the Southeast. Besides table eggs, large amounts of hatching eggs are produced. This cluster reaches from Texas to South Carolina. An exemption is Mississippi. In this state, the headquarter of Cal-Maine Foods, the number one egg producing company, and several large egg farms are located. A third cluster developed along the Pacific coast. Because of the long transportation distances from the centres of egg production in the Midwest, the egg demand is met by local egg companies such as Valley Fresh Foods (California), Willamette Egg Farms (Oregon) and Wilcox Farms (Washington) as well as considerable imports from leading states in egg production.

## 5 The sectoral concentration process is going on

As in all livestock branches, sectoral concentration has been going on for decades in egg production. The main steering factors are a parallel consolidation in the food chains and economies of scale, i. e. a reduction of production costs with increasing layer flocks. This made eggs one of the most valuable and affordable food.

Table 6:  
The ten leading companies in U. S. egg production in 1998 and 2007  
(Source: United Egg Producers)

1998				2007			
Company	Headquarter	Layers (mill.)	% of USA	Company	Headquarter	Layers (mill.)	% of USA
Cal-Maine Foods	Jackson, MS	15.9	6.2	Cal-Maine Foods	Jackson, MS	22.8	8.1
Rose Acre Farms	Seymour, IN	15.7	6.2	Rose Acre Farms	Seymour, IN	22.6	8.1
Michaels Foods	Minneapolis, MN	15.0	5.9	Michael Foods	Minneapolis, MN	14.0	5.0
Buckeye Egg Farms	Croton, OH	10.0	3.9	Moark, LLC	Carthage, MO	12.0	4.3
Ft. Recovery Equity	Ft. Recovery, OH	7.8	3.1	Sparboe Summit Fa.	Litchfield, MN	12.0	4.3
Decoster Egg Farms	Turner, ME	6.5	2.6	Decoster Egg Farms	Turner, ME	10.5	3.8
Midwest Poultry Serv.	Mentone, IN	5.1	2.0	Daybreak Foods	Lake Mills, WI	7.9	2.8
ISE America	Newberry, SC	5.0	2.0	Ohio Fresh Eggs	Croton, OH	7.0	2.5
Mahard Egg Farms	Prosper, TX	4.8	1.9	Golden Oval Eggs	Renville, MN	6.8	2.4
Moark Production, Inc.	Neosho, MO	4.5	1.8	Ft. Recovery Equity	Ft. Recovery, OH	6.2	2.2
10 companies	-	90.3	35.6	10 companies	-	121.8	43.5
USA*	-	254.6	100.0	USA*	-	280.0	100.0

\* only layers for table egg production in farms with 30,000 and more birds

A comparison of the ten leading companies in 1998 and 2007 shows that their share of table egg flocks increased from 35.6 % to 43.5 %. Cal-Maine Foods and Rose Acre Farms grew parallel and could fasten their leading positions. Michael Foods Egg Products, the leading U. S. company in egg processing, could fasten its third rank in spite of a decrease of their hen population by 1 million. Decoster Egg Farms are ranked as number 6 with 10.5 million layers. The company controls, however, a considerable higher share of the U. S. egg industry. In 2007,

Decoster bought Ohio Fresh Eggs, the former Buckeye Egg Farms, and has also egg farms in Iowa.

## 6 Export patterns

In contrast to poultry meat, the USA are not in a top position regarding global egg exports. This is mainly due to the comparatively isolated location. As table eggs cannot be frozen, transportation distances have either to be short or the exported eggs can only be used for further processing. So it is not surprising that egg exports only contribute about 0.4 % to the value of agricultural exports (table 7). In contrast, the contribution of poultry meat was as high as 3.7 % in 2007. Because of the volatility of the egg prices, the export value of eggs varied between 3.3 % and 6.2 % of the total value of egg production (table 8). Broiler meat exports had a share of 10.8 % in 2007.

Table 7:  
Development of the contribution of egg exports to U. S. agricultural exports between 2000 and 2007; data in Mill. US-\$  
(Source: U. S. Department of Commerce; USDA, FATUS)

Year	Value of agricultural exports	Value of egg exports	Egg exports in % of agricultural exports
2000	51,265	173	0.3
2001	53,679	183	0.3
2002	53,143	169	0.3
2003	59,392	177	0.3
2004	61,426	215	0.4
2005	63,128	250	0.4
2006	70,948	258	0.4
2007	89,908	318	0.4
Increase (%)	75.4	83.8	-

Table 8:  
Value of egg exports in relation to value of egg production in the USA between 2000 and 2007; data in mill. US-\$  
(Source: USDA, NASS: Chicken and Eggs Summary, various editions; USDA, FATUS)

Year	Value of egg production	Value of egg exports	Egg value in % of production value
2000	4,359	173	4.0
2001	4,460	183	4.1
2002	4,285	169	3.9
2003	5,333	177	3.3
2004	5,303	215	4.1
2005	4,042	250	6.2
2006	4,388	258	5.9
2007	6,678	318	4.8
Increase (%)	53.2	83.8	-

Between 2000 and 2007, the value of egg exports increased from 173 mill. \$ to 318 mill. \$ or by almost 84 %. It increased faster than the value

of domestic egg production and of agricultural exports. Quite obviously, the USA Poultry and Egg Export Council has been able to find new international markets for their surplus production. This can be documented by the data in table 9. One can easily see that the share of ten leading importing countries fell from 82.7 % to 76.4 % in the analysed time period. The additional exports contributed to the stabilisation of the egg price in the domestic market.

A closer analysis of the composition and ranking of the ten leading countries of destination reveals that because of the above-mentioned problems to transport shell eggs over long distances, Canada and Mexico, the two NAFTA partner countries, rank as numbers one and three. In 2000, 34.3 % of the exports were directed to these two countries, in 2007, their share had dropped to 28.8 %. Japan still ranked on second place in 2007 in spite of a decreasing value of egg imports. It is surprising that three EU member states are to be found among the top ten importing countries for U. S. shell eggs. Most of the traded eggs are hatching eggs, this is also the case with Japanese imports. Because of the high value of these eggs, they are often transported by plane. Brazil, the Netherlands and Trinidad and Tobago replaced Nicaragua, the Republic of Korea and France. It is worth mentioning that in contrast to broiler and turkey meat, egg exports are not concentrated on one or two countries. This is mainly due to the fact that some of the leading hybrid companies for laying hens are located in the USA and that large amounts of hatching eggs from grandparent stock are exported all over the world.

Table 9:  
The ten leading countries of destination for U. S. egg exports in 2000 and 2007  
(Source: USDA, FATUS)

2000			2007		
Country	Exports (1,000 \$)	% of export value	Country	Exports (1,000 \$)	% of export value
Canada	40,686	23.5	Canada	62,420	19.6
Japan	38,292	22.1	Japan	29,792	9.4
Mexico	18,705	10.8	Mexico	29,310	9.2
China*	11,827	6.8	United Kingdom	27,050	8.5
Jamaica	8,798	5.1	China*	23,410	7.4
Germany	6,723	3.9	Brazil	16,483	5.2
United Kingdom	5,842	3.4	Jamaica	16,112	5.1
Nicaragua	4,312	2.5	Germany	15,612	4.9
Korea, Rep.	4,046	2.3	Netherlands	13,621	4.3
France	3,956	2.3	Trinidad a. Tob.	8,986	2.8
10 countries	143,187	82.7	10 countries	242,796	**76.4
USA	173,243	100.0	USA	317,725	100.0

\* includes Hong Kong

\*\* sum does not add because of rounding

The main results of the first steps of this analysis can be summarised as follows:

- The contribution of the egg industry to U. S. agricultural production varied between 1.7 % and 2.4 % over the last years.
- The volatility of egg prices had the consequence that the value of egg production varied considerably from year to year. A lasting phase of low market prices led to a substantial reduction of the laying hen flocks in 2007. A remarkable increase in egg prices was the result and the industry could remain profitable in spite of rising feed costs.
- The spatial pattern of egg production differs considerably from broiler production. Three clusters, one in the former *corn belt*, one in the Southeast and one along the Pacific coast can be distinguished.
- Egg exports contribute only about 0.4 % to U. S. agricultural exports. This is mainly due to the isolated location of the USA and the fact that shell eggs cannot be frozen. The export of hatching eggs from leading hybrid companies to a great number of countries has become more and more important.

## **7 Production and export perspectives until 2017**

In a second step, this analysis will present projections of the development of egg production and exports until 2017. The projections are based on the *USDA Agricultural Long-term Projections to 2017* und the *FAPRI 2008 Agricultural Outlook*.

An important steering factor in the future development of U. S. egg production will be the dynamics in per capita consumption. In contrast to poultry meat, the egg industry is confronted with a number of challenges which ask for reactions. One is the lasting discussion about the health risk connected with egg consumption because of the high cholesterol content, the other, the just beginning welfare discussion which aims at forbidding conventional cages. Both, *United Egg Producers* and the *American Egg Board*, have been working for years in these fields and been quite successful. The American Egg Board's campaign "The incredible edible egg" has been able to stop the downward trend of egg consumption und in connection with research work, financed through *United Egg Producers*, also helped to inform the consumers about the nutritional value of eggs. In spite of these activities, FAPRI projects a decrease of per capita egg consumption by 5 eggs or 1.9 % until 2017. The USDA is a bit more optimistic. It expects a downward trend until 2012 and an increase from then on until 2017 (table 10).



A second important steering factor for the future development of egg production will be the ability of the American Egg Board to find new markets for eggs which cannot be sold on the domestic market. From the data in table 11 one can see that the projections of the USDA and FAPRI differ considerably. Starting from the same basis, export of 2.76 billion eggs in 2008, the USDA expects an increase of the export volume until 2017 by 33.0 %, FAPRI of only 11.7 %. Even though Avian Influenza outbreaks have not very much impacted global egg demand in the past, the threat of such outbreaks may limit U. S. exports in future, is one argument of FAPRI.

Table 10:  
 Projected development of per capita egg consumption in the USA between 2008 and 2017; data in eggs per person and year  
 (Source: USDA, OCE 2008; FAPRI 2008 Agricultural Outlook)

Year	USDA projection	FAPRI projection
2008	250.6	249.3
2009	248.9	249.1
2010	247.9	248.5
2011	247.5	248.1
2012	248.0	247.7
2013	248.6	246.9
2014	249.2	246.1
2015	249.8	245.4
2016	250.4	244.9
2017	251.0	244.5
Change (%)	+ 0.2	- 1.9

Table 11:  
 Projected development of U. S. egg exports between 2008 and 2017; data in million eggs  
 (Source: USDA, OCE 2008; FAPRI 2008 Agricultural Outlook)

Year	USDA projection	FAPRI projection
2008	2,760	2,760
2009	2,868	2,796
2010	2,988	2,832
2011	3,108	2,868
2012	3,228	2,904
2013	3,336	2,940
2014	3,444	2,876
2015	3,528	3,012
2016	3,600	3,048
2017	3,672	3,084
Change (%)	33.0	11.7

Based on their projections of per capita consumption and exports, the USDA and FAPRI presented perspectives for the development of egg production (table 12). FAPRI projects a 2.6 billion eggs lower production volume in 2017 than the USDA. The difference is a result of the less optimistic assumption of the development of egg consumption and export possibilities. The increase in egg production is therefore mainly a

consequence of the expected population growth of about 25 mill. people within the next decade.

Table 12:

Projected development of U. S. egg production between 2000 and 2017; data in million eggs  
(Source: USDA, OCE 2008; FAPRI 2008 Agricultural Outlook)

Year	USDA projection	FAPRI projection
2008	91,500	90,828
2009	91,872	91,572
2010	92,328	92,160
2011	92,976	92,844
2012	93,900	93,528
2013	94,932	94,104
2014	95,976	94,656
2015	97,032	95,232
2016	98,100	95,868
2017	99,180	96,576
Increase (%)	8.4	6.3

If the projected production volume can be reached, depends on a number of steering factors. One is the threat of Avian Influenza outbreaks in the centres of poultry production in Europe or North America. This will have impacts on egg consumption even though the past outbreaks hardly impacted this product. A second is the accelerating discussion about keeping laying hens in battery cages. A third steering factor is the development of feed prices. The increase of feed costs in 2007 and 2008 was not only a result of the boom of bio-energy production, but the expansion of the bio-fuel industry has definitely added to this development (see Windhorst 2007). Higher food costs will be the inevitable results of higher feed and production costs. Because of the favourable feed conversion rates in egg and broiler meat production, demand for these two commodities will increase, as it will be cheaper to produce them than pork and beef, especially in the present harsh economical environment.

The main results of the perspectives on the future development of egg production and egg exports can be summarised as follows:

- The dynamics of egg production in the USA until 2017 will depend on the development of per capita egg consumption. The USDA and FAPRI estimate either a minor increase or even a decrease.
- Egg exports will increase over the next decade according to USDA and FAPRI projections. But it will also in future be mostly hatching eggs and eggs for further processing. Japan and some EU member states will also in the next decade be the main countries of destination besides the two NAFTA partners, Canada and Mexico.

- The threat of Avian Influenza outbreaks, the ongoing animal welfare discussion, and rising feed costs will be important steering factors for the future development of egg consumption and egg production. Table egg exports will also in years to come be of minor importance for the U. S. egg industry.

## 8 Banning of conventional cages – the European experience

There is no doubt that the European Union (EU) has one of the strictest legal regulations for keeping laying hens besides those countries which have already prohibited any form of cages, i. e. Switzerland and Norway. The discussion about this form of keeping laying hens for egg production is almost as old as the installation of cages in the 1960s. This is not the place to review the long history of the very controversial debates in national parliaments and the EU. It is, however, worth mentioning that the political success of the Green Party in Germany is closely related to their fight against cages in egg production and nuclear power plants. This combination alone shows the intensity with which animal welfare groups fought against this form of keeping laying hens (see also Windhorst 2004).

After long debates, the European Community passed directive 1999/74/EC laying down standards for the protection of laying hens. This directive distinguishes between provisions applicable to alternative systems and so called enriched cages. The directive says that all member states shall ensure that after January 1<sup>st</sup>, 2002 all the cages comply at least with the following requirements (*Journal of the European Communities*, 3. 8. 1999, L 203/55):

1. laying hens must have:
  - (a) at least 116 inches<sup>2</sup> (750 cm<sup>2</sup>) of cage area per hen, 93 inches<sup>2</sup> (600 cm<sup>2</sup>) of which shall be usable ; the height of the cage other than that above the usable area shall be at least 7.9 inches (20 cm) at every point, including the perch area, and no cage shall have a total area that is less than 310 inches<sup>2</sup> (2000 cm<sup>2</sup>);
  - (b) a nest;
  - (c) litter such that pecking and scratching are possible;
  - (d) appropriate perches allowing at least 5.9 inches (15 cm) per hen;
2. a feed trough which may be used without restriction must be provided. Its length must be at least 4.7 inches (12 cm) multiplied by the number of hens in the cage;

3. each cage must have a drinking system appropriate to the size of the group; where nipple drinkers are provided, at least two nipple drinkers or two cups must be within the reach of each hen;
4. to facilitate inspection, installation and depopulation of hens there must be a minimum aisle width of 35.4 inches (90 cm) between tiers of cages and a space of at least 13.8 inches (35 cm) must be allowed between the floor of the building and the bottom tier of cages;
5. cages must be fitted with suitable claw-shortening devices.

The member countries of the EU were allowed to pass stricter legal regulations. This was the case in Germany and Austria. The German *Bundesrat* (chamber of the states) first decided not to allow enriched cages, but then altered its decision by allowing so called *Kleingruppenhaltungen* (small group production system; similar to an enriched cage). This means that up to 60 laying hens can be kept in a facility that is similar to the enriched cage but demands at least 138 inches<sup>2</sup> (890 cm<sup>2</sup>) total space for hens with less than 2 kg weight and 152 inches<sup>2</sup> (990 cm<sup>2</sup>) for heavier hens. Even though it is agreed upon by leading scientists working in the field of poultry production and ethology that this form meets most of the demands of laying hens and in addition guarantees a high quality of eggs as well as the best protection against the introduction of highly infectious diseases, animal welfare groups and some political parties continue their fight with the argument “a cage is a cage”.

A second problem is the marketing of eggs produced in these small group production system. In the EU, marketed eggs have to be stamped with either:

0 = organic egg production

1 = free range

2 = floor management

3 = cage.

Even though the small group production system is not a conventional cage, the EU demands that eggs produced in such systems have to be stamped with “3”. Some of the leading retailers in Germany decided that they will not list eggs stamped with “3”, no matter if they come from conventional cages or small group production stems. A discussion is still under way if it will be possible to print such eggs with either a “3+” or a “4”. The latter is demanded by the German government and the egg

industry, but the EU Commission has not yet decided if this will be permitted.

The implementation of EU directive 1999/74/EC and the German directive for keeping laying hens will not only result in high investment costs but have far reaching impacts on the self sufficiency rate for eggs in Germany and the EU. A study of our institute showed that the transformation process from conventional cages to the small group production system and floor management or free range systems, in 2008, about 26 million layers were still kept in conventional cages, will require investments of about 612 mill. €. About 250 mill. layers were kept in cages in EU member countries in 2008. Investments of about 6 billion € will be necessary to fulfil the EU directive. It can be assumed that apart from the fact that it will not be possible to substitute conventional cages by either enriched cages or floor management respectively free range systems by the end of 2011, banks will hardly be willing to supply the egg industry with the necessary capital.

A particular critical situation will arise in Germany. If the government should enforce the directive which prohibits conventional cages from January 1<sup>st</sup>, 2019 on and small group production systems should not be installed in due time because of the economic risk that food retailers do not list eggs with a “3”, the self sufficiency rate will drop dramatically. In 2008, it was already as low as 67 % which resulted in an import volume of 5.7 billion shell eggs. It could easily happen that additional imports of 3.5 to 4 billion eggs will be necessary from 2010 on . Then about 9 to 10 billion eggs would have to be imported to meet the domestic demand. Such an amount of shell eggs is not available in the EU which had a self sufficiency rate of only 101 % (see also Windhorst 2008). Quite obviously, neither politicians nor food retailers are aware of the widening gap between egg demand and egg production. It will be of interest to see how the German government and the EU Commission will react.

## **9 Animal welfare – a crucial point in the future of the U. S. egg industry**

The *Humane Society of the United States* was the primary sponsor of California's *Prevention of Farm Animal Cruelty Act*. It was passed by voters on November 4, 2008 and will prohibit keeping laying hens in battery cages after 2015. This initiative could have far reaching impacts on the U. S. egg industry as other states may follow with similar acts. A first review of the decision and its possible impacts follows.

## 9.1 The result of the referendum

The result of the referendum, in which the voters could also decide on various law submissions along with the election of the President and the delegates in the House of Representatives, shows some notable developments. Firstly there was an unusually high participation in the voting. In California, over 10 million inhabitants exercised their right to vote. Of these, 9.9 million voted on the so-called Proposition 2, which was on the voting papers under the title: *“Standards for Confining Farm Animals”*. The citizens had to decide whether from 2015 the keeping of laying hens in cages, the fettering of breeding sows and the fattening of calves in narrow boxes should be banned. The clarity of the result surprised many observers, even in the USA, since 63.2 % of the voters voted for and only 36.8 % against a ban.

It is worth noting that out of the 58 Californian counties in 47 an agreement on the suggested law was reached and in only 11 counties the submission was rejected. The highest agreement figure achieved was 73.7 % in the San Francisco County and 73.5 % in the Santa Cruz County (south of San Francisco). The lowest agreement was in the Merced County (41.5 %) and Tulare County (43.8 %). Both are mainly agricultural counties in the southern parts of the Central Valley.

## 9.2 Who voted how?

Of particular interest is the question of who voted for or against the bill. Here some notable results can be recorded. Agreement to the bill took place above all:

- in the large urban centres on the Pacific coast,
- from people with a high standard of education (in all counties, in which over 15% of the voters had a university bachelor degree, the bill was accepted),
- from people who live in counties in which the average family income is above 60,000 US-\$ (here, in all counties a majority agreed to the bill).

It is furthermore noteworthy that the present financial crisis has obviously had no effect on the voting pattern, since even in the counties in which an above averagely high number of families lost their houses the bill was agreed to with a majority. The efforts of the opposition to the bill to effect a rejection with the threatened rise of eggs prices obviously were unsuccessful.

Some interesting connections can be noted. If one compares the number of votes for and against Proposition 2 in relation to the results of the presidential election, it is easy to see that here almost identical percentage values were achieved, as 61.4 % voted for Obama and 36.8 % for McCain. If one analyses the percentage results more closely, one can see that the critical limit was 55-56 % votes for the bill. If the value was below these limits, McCain could decide the county for himself, if the value was above, Obama won. The only exception is Orange County south of Los Angeles, since here McCain won, although 59.7 % voted for acceptance of the bill.

It is obvious that the Democrats succeeded in moving particularly young voters, many of which were first time voters, to take part in the referendum. They must have contributed quite decisively to the results in the presidential election and also Proposition 2. In particular voters under 30 years of age with a good education, living in cities and with a comparatively high income, have spoken out for Obama and the bill to ban keeping laying hens in cages.

Proposition 2 was rejected on the one hand above all in the counties in the southern and northern parts of the Californian Central Valley in which agriculture is of great importance and on the other hand in both extremely thinly populated counties in the north-east of California.

Table 13:  
Laying hen stocks in California and percentage of votes for the ban on cage keeping  
(Source: USDA, Agricultural Census 2002; Fresno Bee online)

County	Farms keeping Laying Hens	Stock of Laying Hens (1,000)	Proportion (%) of Laying Hen Stock in California	Proportion of Votes against keeping in cages
Riverside	168	5,437	27.0	63.5
Merced	70	4,462	22.1	41.5
San Diego	144	2,736	13.6	65.1
Stanislaus	128	2,370	11.8	44.4
San Bernardino	102	2,148	10.7	61.5
San Joaquin	85	1,780	8.8	55.6
Sonoma	176	1,126	5.6	63.2

An interesting question is how the voting result went in the counties in which the majority of the Californian laying hens are housed. In 2002, around 99% of the Californian laying hens were kept in the 7 counties taken into account in table 13. The results of the Census of Agriculture 2007 are not yet at hand. It is easy to see that the bill was rejected in only two counties (Merced and Stanislaus), however, it was accepted in the other five. The question of whether in a county egg production plays an important role as an economic factor obviously had no significant meaning regarding the voting pattern. The opponents of Proposition 2 quite obviously did not succeed, even in these

counties, to convince the population of the possible economic consequences of accepting the bill.

### 9.3 Initial reactions

As was expected, the reactions to the result of the vote were very varied. *The Humane Society of the United States (HSUS)*, based in Washington D.C., which prepared the bill from the point of view of animal rights and which mainly led the campaign, could without doubt register a success. On its internet page it thanked the 25,000 sponsors which made the historic victory possible with the funds made available amounting to around 9 million US-\$. This victory would be an incentive, the HSUS declared, to go down a similar route in other states as well. In a comment, Wayne Pacelle, President of the HSUS, stated that his organisation would now concentrate on introducing similar decisions in other states as well and move the food retail trade towards preferably listing eggs which have not been battery reared.

The initiative *Californians for SAFE Food* had to admit that in spite of a strong organisation of the campaign and in their opinion convincing arguments it had not achieved its goal of preventing the bill, although it had experienced broad financial support from the egg industry in other states (also approx. 9 mill. US-\$). It regretted that it had not succeeded in convincing the population of the possible consequences (price increase, reduction in food safety, loss of work places) and complained that the initiators of the bill would withdraw again to Washington and the egg farmers in California would be left alone with the solution to the problem.

The day after the vote, numerous daily newspapers already reported in detail on the result and possible consequences. The *San Francisco Chronicle* had the following headline: *Uncertain changes ahead for California's egg industry*. They also quoted initial comments from commerce, which made it clear that a complete cessation of egg production in California could be the consequence. Even though an adjustment period of six years would be available, it was highly questionable whether the necessary capital for change would be available.

The *Los Angeles Times* of the same day pointed out that in the mid-term the decision would have as a consequence a further reduction of egg production in California and an increase of egg imports from other federal states, which already amounted to one third, or Mexico.



## 9.4 Mid-term prospects

With regard to the mid-term prospects, which could result from the outcome of the referendum, opinions are clearly divided. In its edition of November 5<sup>th</sup>, 2008 the *Los Angeles Times* quoted a series of egg producers who, in view of the high conversion costs, plan to get out of keeping laying hens. They argue that cheaper to produce eggs from battery systems in other states or Mexico can continue to be sold in California and therefore considerably more expensive eggs from floor and free-range systems will only be sold in limited quantities. They are faced with the opinion of other producers who regard the conversion to floor-reared and free-range systems as a possible alternative, as there is a market for these eggs in the USA as a whole. Set against this optimistic estimate is that the fast receding development of egg production over the past 10 years has made it clear that California egg farmers are not competitive on a national level. Higher feed costs and long transport distances to the markets on the east coast and south of the Great Lakes make this path appear to promise little success.

In an interview with the *Los Angeles Times*, Gene Gregory, who has already been quoted, stated that one should not conclude from the result of the referendum in California that similar bills should be reckoned within all the other 49 states of the USA. He also made it clear that the text of the act submitted is very vague in its requirements and one should wait and see how the lawmaker will convert this into a final act and will also request adherence to it. In the bill it says in Section 3: "... a person shall not tether or confine any covered animal on a farm, for all or the majority of any day in a manner that prevents such animal from (a) lying down, standing up, and fully extend his or her limbs and (b) turning around freely." Under the statement extend its limbs and turn freely is understood, in the case of laying hens, that they "...can fully extend all limbs without touching the side of an enclosure or other egg-laying hens". This does not exclude keeping hens in closed holding pens, but the requested space requirement makes any form of a cage developed according to EU standards or the German small group system (colony nests) unviable. A particular problem is obviously the used terminology. As in the USA it is only distinguished between cage eggs and non-cage eggs, any alterations, such as the European enriched cage system or the German modification, the small group production system, will be listed under *cage* and therefore limit its introduction. It should be noted, however, that the same problem is affecting the European egg industry.

Under the conditions given, it must be assumed that the present hen houses and equipment will be used until 2015. Here it must be taken into

consideration that a not insignificant part of them is obsolete and no longer conforms to modern standards. Because of the high additional egg demand which will result from the banning of cages, a relocation of egg farms into neighbouring federal states or to Mexico may occur because of low transportation costs, but the majority of the additional egg imports will nevertheless have to be imported from states with lower feed and labour costs and less strict environmental regulations, such as the western states of the Midwest and the central and northern Great Plains. Some, albeit smaller hen keepers, will convert to floor and free-range keeping, in order to supply local or regional markets. It cannot yet be estimated how high the proportion of those farms with laying hen keeping will be, which will give up egg production. There appears, however, to be a general consensus that the Californian egg business will increasingly lose in importance up to 2015. It remains to be seen whether the estimate of agricultural economists of the University in Davis, which are assuming a complete cessation of egg production in California, will prove to be true.

## **9.5 Scenarios for the future development of the U.S. egg industry**

Regarding the impacts of the California referendum on the U. S. egg industry in general, two scenarios are possible.

Scenario 1 assumes that the leading food retailers in the USA stick to the ideal that the consumer will have a free choice between various products, i. e. cage eggs, eggs from barn and free range systems or organic eggs and that the egg industry will adapt their egg producing systems to the existing demand. There should be no doubt that the percentage of eggs produced in other systems than conventional cages will increase, but may not reach a market share higher than 20 %. Egg products will also in future mainly stem from eggs produced in conventional cages because the processors require a high safety of their raw material. To enable the consumers to choose, a marking of the eggs similar to the EU code seems to be inevitable.

Scenario 2 assumes that animal welfare groups will increase their activities, as HSUS already announced, to move the food retail trade towards preferably listing eggs which have not been cage produced. The European experience shows that similar activities were very successful in the United Kingdom, the Netherlands, Austria, and Germany. In the first named three countries there are hardly any cage eggs left in the food stores and in Germany most of the leading food retailers declared that they will no longer list cage eggs and also not eggs produced in small group production systems. The result in the USA could be a continuously decreasing demand for cage eggs and a growing share of barn raised and free range eggs. This will be a completely new challenge for most of the leading egg producing companies as they have

hardly any experience with running barn and free range systems as well as with corresponding rearing systems for pullets. A good advice for them would be to acquaint themselves and the farm personnel with these forms in time in order to avoid severe management problems.

It is the personal opinion of the author of this paper, based on the experience in the EU, that it will be very difficult, if not impossible, to stop such a movement once it has had a successful start. Therefore, the egg industry should be realistic enough to realise that at least in post-industrial societies egg production in confined cages may not be the form which a majority of the consumers is willing to accept. To avoid economic losses, the industry should start to develop strategies for this new situation. Unfortunately, several companies in the EU missed this point and are now in a very critical situation as they are running out of time. If the German animal welfare law regarding the banning of conventional cages should be enforced by January 1<sup>st</sup>, 2009 and only a limited number of exceptions be permitted it will not be possible to meet the egg demand. Either the egg price will increase sharply or egg imports will have to be increased by almost 7 billion eggs. A third possibility might be a drastic reduction of egg consumption.

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