the Australia and New Zealand School of Government

CASE PROGRAM 2011-127.1

The chicken or the egg?: Regulating battery cage farming in South Australia (A)

In August 2000, growing animal welfare concern prompted the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) to propose a number of new regulations pertaining to domestic poultry kept for commercial purposes. These regulations included increasing the size of new battery hen cages and phasing out or modifying existing cages by 2008. Although accepted by ARMCANZ (now the Primary Industries Ministerial Council) in May 2002 as part of an updated Model Code of Practice, it was up to each state to implement these standards through legislation. How and to what extent they were implemented could vary between jurisdictions. By the end of 2006, South Australia was one of several states yet to amend its animal cruelty legislation even though the changeover date was fast approaching. The new regulations had substantial implications for egg producers with many anxious for clarity before deciding whether to invest in upgraded cages or exit the industry. This situation was occurring against a backdrop of falling egg prices and rising operational costs as well as increasing public awareness about environmental sustainability and the treatment of livestock.

Egg production in Australia

The Australian egg industry had an annual turnover of $340 million during 2005-2006. In June 2005 there were approximately 423 egg producers in Australia and 13.2 million layer hens producing an annual 203 million dozen eggs.[1] The nationwide trend over the past decade was towards greater productivity from fewer producers *(Exhibit A).* Most eggs were produced

This case was written by Marinella Padula, Australia and New Zealand School of Government for Dr. George Rivers, Monash University, as a basis for class discussion rather than to illustrate either effective or ineffective handling of a managerial situation.

[1] c.f. 'Proposed South Australian Prevention of Cruelty to Animals (domestic poultry) Regulations: Regulatory Impact Statement' Tim Harding & Associates, 2006, p.60.

for the shell egg market which accounted for approximately 87 percent of all eggs consumed.[2] The remaining eggs were sold as a wide range of value-added, processed products such as egg pulp and omelette mix; these lines were in growing demand in the food and retail sectors. While some processed egg products were imported into Australia, fresh shell eggs were not. Once harvested, eggs would be sold by farmers to one of several national producers and marketing organisations *(Exhibit B)*. These organisations bought shell eggs in ungraded form (or took their own if vertically integrated) and then, tested, graded, packed, distributed and marketed eggs to the:

- *Trolley Market* – whole shell eggs for supermarkets and other retailers (65 percent of market share for national retail sales);
- *Box Market* – whole shell or pulped eggs for the food service industry such as caterers, hospitals and restaurants (26 percent of the market) and;
- *Food Processing Market* – pulped eggs for food processing manufacturers (9 percent of market share).[3]

In 2004-2005, the South Australian egg market was worth $30.8 million in annual turnover (gross value of production) and in 2005, the state accounted for about 9.2 percent of national production or 18,739,000 dozen eggs.[4] Since deregulation in 1992, the number of egg producers had varied, hitting a peak of 47 producers in 2000 then falling to 30 in 2002.[5] By 2006, South Australia had 40 egg farms with approximately 776,000 layer hens – down from 997,000 the year before. The decline in layer numbers was partly due to cheaper interstate egg imports (as cheap as 60 cents per dozen) which began to enter the South Australian market in July 2005. By the end of that year South Australia's largest egg producer, Golden Eggs, had already culled 70,000 layer hens with plans to cull more.[6]

Farming systems

Domestic chickens (*Gallus gallus domesticus*) can be traced back to 6000BC in China. Social animals, they naturally live in flocks and establish a clear hierarchy (pecking order). Originally bred for fighting rather than food, modern chickens still retain aggressive tendencies which cause problems including cannibalism, particularly when confined in large groups. Beak trimming is routinely practiced for this reason. Commercial egg layers are drawn from light, medium and heavy breeds, with a strong preference towards lighter, high yielding varieties. Most commercial layer hens have a lifespan of approximately 18 months after which point they are typically on-sold to processors for their carcasses. The lifespan of chickens kept domestically, however, can exceed 10 years.

Commercial egg farmers in Australia generally utilised one of three main systems:

Cages, often referred to as "battery farming", are by far the dominant production system. Cages minimise the amount of land required to run a poultry farm while they maximise efficiency and protect birds from many environmental hazards. In the mid-2000s, close to 80 percent of all eggs in Australia and approximately 85 percent of shell eggs sold in

[2] ibid, p.3
[3] ibid, pp.65-66.
[4] ibid, p.iv.
[5] ibid, pp.61.62.
[6] ibid.

supermarkets were from intensive cage systems, although the proportion of barn-laid and free range eggs was increasing *(Exhibit C).* Cage systems also featured in more than 50 percent of South Australian egg farms *(Exhibit D*). Intensive egg farming sheds feature a series of welded wire cages, usually housing two to six hens each. Large economies of scale are possible as sheds can accommodate up to 30,000 layers each. These farms tend to be located relatively close to population centres to reduce transport and other costs.[7]

In 2006, South Australian Prevention of Cruelty to Animals Regulations (under the *Prevention of Cruelty to Animals Act 1985*) mandated that hens weighing less than 2.4kg (the majority of layers) must by law have at least 450cm^2 of floor space including the baffle area, and hens above 2.4 kg must have a minimum 600cm^2.[8] However, this did not include space the bird could utilise outside its allocated space, for example by sticking its head outside the cage. Minimum cage heights were not specified. Layer hens generally begin their productive life at around 18 weeks when they are permanently enclosed in cages until removed 14 or so months later when they are deemed "spent". Older cage systems operate on a single level while newer cages are stacked in layers. The older system allows for more natural light and ventilation, more space for birds and easier inspection but requires more room and manual egg collection *(Exhibit E).* New cage systems provide automatic egg collection but require climate control systems, restrict sunlight and limit bird movement more than older cage systems *(Exhibit F).*

Aside from superior economies of scale, cages offer shelter from extreme weather and predation whilst ensuring a constant supply of food and water. It is also easier for handlers to identify and manage disease/infestation issues. Cages, however, prevent birds from performing a full range of movements and exhibiting normal behaviours such as dust bathing. The lack of exercise renders chickens vulnerable to problems such as osteoporosis and this, combined with small cage openings, means that spent hens are often injured when being removed for transport resulting in hours of considerable discomfort. Cage systems were of considerable concern to animal welfare organisations and many, including the RSPCA, had lobbied against their use.

Barn-laid eggs are produced in sheds containing anywhere from 500 – 5000 birds (usually 1000+) and allow moderate economies of scale. Approximately 6 percent of Australian eggs are barn-laid. Barn layers have the freedom to spread their wings, stretch and socialise, as well as dust-bathe, perch and scratch for food. Barns are laid with deep litter such as straw and closed to the elements and predators. While hens have a greater capacity to exhibit natural behaviours, these also include social competition (resulting in fighting). Barn systems also produce a greater rate of bird injury (during laying) and egg damage.[9]

The RSPCA has endorsed the barn-lay system as a more humane alternative to cage systems and has accredited a number of farms across Australia where flocking densities do not exceed 7 birds per square meter, not more than two thirds of a shed is slatted; and beaks are only mildly trimmed. The RSPCA receives a royalty of 2 cents on every RSPCA-accredited egg (about $200,000 annually) which pays for inspectors who perform checks on accredited facilities.[10]

[7] ibid, pp.56-57.
[8] ibid, p.17.
[9] ibid, pp.58-59.
[10] ibid.

Free-range hens are able to move across open paddocks during the day before returning to housing sheds at night. The typical size of a commercial free-range flock is 1000 to 2000 layer hens which precludes significant economies of scale. Free-range farms account for 15 percent of total egg production in Australia. Although free-range hens have a greater capacity to scratch, forage and exhibit other normal behaviours this also encompasses negative social interactions. Other disadvantages include exposure to predators, parasites and weather extremes. Only two free-range farms (both in South Australia) have received RSPCA accreditation, partly due to the difficulty in ensuring birds have adequate shelter. Free range farms also require more land, supervision and feed per layer.[11]

Existing and emerging issues

Campaigns by animal welfare groups in recent decades have brought farming practices under greater scrutiny, particularly the treatment of battery hens. This has, in part, prompted slowly growing consumer awareness about more "chicken friendly" products such as barn-laid and free-range eggs. There is also the perception in the marketplace (though not necessarily empirically based) that these eggs are of superior quality and flavour. The RSPCA supports barn-laying and free-range production methods as alternatives to cage farming but some animal welfare organisations do not endorse any commercial egg farming methods, considering them all to be unacceptably cruel and exploitative. For legislators, issues of animal welfare present a number of quandaries – not least of which is the difficulty of pinning down a definition of animal welfare and an appropriate ethical framework. One approach put forward in the UK during the mid-1960s, dubbed the "Five Freedoms", held that all farmed animals should have:

> **1.** Freedom from hunger and thirst - by ready access to fresh water and a diet to maintain full health and vigour.
> **2.** Freedom from discomfort - by providing an appropriate environment including shelter and a comfortable resting area.
> **3.** Freedom from pain, injury or disease - by prevention or rapid diagnosis and treatment.
> **4.** Freedom to express normal behaviour - by providing sufficient space, proper facilities and company of the animal's own kind.
> **5.** Freedom from fear and distress - by ensuring conditions and treatment which avoid mental suffering.[12]

One problem with this approach, however, was that "freedom to express normal behaviour" also entailed freedom to express behaviours that might result in pain, injury, fear or other forms of suffering. The homeostasis approach was one alternative which assessed the risks to animal welfare by focusing on:

- what has to be done by the animal in order to cope with its environment (for instance functioning of body repair systems; immunological defences, physiological stress responses and a variety of behavioural responses); and
- how successful such attempts at coping are (for instance the lack of deterioration in growth efficiency, reproduction, health and freedom from injury).[13]

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[11] ibid, p.59.
[12] ibid, p.85.
[13] ibid, 86.

Using this method, researchers from a number of UK universities compared layer hens in different cage set-ups using a variety of physiological and behavioural indicators of wellbeing. They found that increasing cage height from 38cm to 45cm had no significant effect on productivity, morbidity or behaviour patterns. Meanwhile, an earlier French study found that increasing cage height from 40cm to 60cm led to higher rates of cannibalism.[14] However, the UK study did find an effect for stocking density: that birds with more room had a higher rate of lay and feed intake when space was increased from 609cm^2 to 870cm^2. There was no significant impact on overall health or gross behaviour. However, a separate 2003 study indicated that within the range of 300cm^2 to 650cm^2 per bird, increases in space had a positive impact not only on egg production and food consumption but also weight gain and mortality rates.[15] Other research has also pointed to good animal handling in mitigating the negative impacts of egg farming on layer hens.

While there was greater general awareness in the community about the plight of battery hens, it wasn't necessarily matched by an in-depth understanding about egg farming or the trade-offs involved in different production methods. As a result some brands appeared to be free-range or barn-laid when they in fact weren't. Moreover, producers were not legally required to declare how eggs were farmed on carton labels. In terms of consumer support for barn-laid and free-range products, it was difficult to gauge to what extent ethical concerns might influence economic decisions. Estimates suggested that Australian consumers were relatively insensitive to egg prices, specifically, that a 10 percent increase in egg prices would result in only a 1.5 percent reduction in retail sales.[16] That said, the majority of consumers based their egg purchasing decisions on price.

A UK study conducted in the mid 1990s examined how much consumers might be willing to pay for the abandonment of cages. Extrapolating the results to the Australian context, it was estimated that people would be prepared to pay between 31c and $1.06 extra per dozen. However, the low survey response rate (30 percent) meant that it was hard to make assumptions about non-respondents, or Australian consumers for that matter.[17] Furthermore, eggs found their way into numerous products, not all of them foodstuffs. It was very hard for consumers to identify the origins of processed eggs and most people were not aware of the extent to which they were used. There was also the danger survey respondents gave the answer they thought they "'should" rather than what they would likely do.

Farmers, meanwhile, were confronted with a different set of issues. The past decade had seen a dramatic concentration of market power by the national supermarket chains, resulting in reduced farm gate egg prices and increased margins for retailers. The major chains were also increasingly expanding their "own-label" brands, further enhancing their buying power. At one point in 2005, cheap interstate eggs had pushed local prices down to 75 cents a dozen in some major supermarkets. The arrival of European supermarket chain Aldi in the early 2000s put additional pressure on egg prices with their $2.00 per dozen store brand eggs, which was matched by Coles and Woolworths.[18] In turn, large and efficient integrated operations, such

[14] ibid, p.88
[15] ibid, pp.86-89.
[16] ibid, p.77.
[17] ibid, pp.93-94.
[18] ibid, p.24.

as Farm Pride with 30 percent of the national wholesale market, had also emerged, further pushing prices down.[19]

At the same time farmers were grappling with increased labour and grain costs, the latter rising by more than 10 percent in 2004-2005.[20] Feed grains represented 40 percent of production costs *(Exhibit G*) which in 2001 were $1.41/dozen, $1.91/dozen and $2.43/dozen, for cage, barn-laid and free-range systems, respectively. That same year the average farm gate price for all producers was $1.56 per dozen but needed to exceed $1.61 per dozen to ensure viability.[21] In 2004, the Australia Productivity Commission estimated that the costs of barn and free-range production were roughly 35 percent and 72 percent higher than cage farming.[22]

According to a 2003 analysis of the Australian egg industry, South Australia needed a major restructure with the formation of large state-of-the-art farms that could perform to best practice standards and be profitable at very low prices. Farms would need at least 50,000 layers to remain profitable. However, they couldn't sustain further price drops.[23] To compete for national tenders, farms would require a minimum of 300,000 layers, although even they would be vulnerable to price drops exceeding 10 percent.[24] While speciality producers such as barn-laid or free-range, could command a premium price for their eggs, supermarkets and large producers were increasingly creating their own speciality egg products with vastly superior economies of scale. Thirty-five of South Australia's 40 producers had flocks under 50,000; most of those were under 25,000 *(Exhibit H).* Only one producer, Golden Eggs, had a flock exceeding 100,000 birds.[25]

However, farmers wanting to expand and upgrade their operations faced a number of obstacles. Firstly, banks were reluctant to lend farmers' the necessary funds and most farmers (approximately 75 percent) lacked the capacity to finance redevelopment themselves. Secondly, most South Australian egg farms were located in peri-urban areas making expansion a complex process.

Changing the rules

In August 2000, the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) – later known as the Primary Industries Ministerial Council (PIMC) – convened to review the welfare regulations governing commercial poultry. Established in 1993, ARMCANZ was a peak ministerial council created to consult, coordinate and, where possible integrate government actions on agriculture, land and rural and urban water issues. It was supported by the Standing Committee on Agriculture and Resource Management (SCARM) which comprised the chief executive officers of the relevant Australian/State/Territory and New Zealand government agencies. From, the meeting it was decided that the existing 1995 *Model Code of Practice for the Welfare of animals – Domestic Poultry* would be updated and extended. Changes under the new 2001 Model Code included:

[19] ibid.
[20] ibid, p.25.
[21] ibid, p.23.
[22] ibid, p.27.
[23] ibid,p.25.
[24] ibid, p.v.
[25] ibid,p.26.

- That all new cage systems commissioned from 1 January 2001 must provide a floor space of 550 square centimetres per bird including the baffle;
- Cages commissioned prior to 1 January 2001 have until 1 January 2008 to meet the 1995 standards (a minimum space allowance per bird of 450 cm^2 where there are 3 or more fowls (<2.4kg) per cage) and may continue to be used for 20 years from the date they were commissioned or until 1 January 2008, whichever is the later. (The ARMCANZ decision establishes an economic life for cages of 20 years from the date the cages were commissioned).
- That all cages from 2008 must have minimum height (40cm over 65 percent of cage floor area and not less than 35cm at any point, as per the 1995 Model Code).
- That cage doors open to the full height of the cage and are at least 50cm wide.[26]

ARMCANZ also made two other significant decisions. The first required the egg industry to develop a quality assurance (QA) program applicable to commercial use of cage, barn and free-range systems of egg production. The second required major components of the QA system, including hen welfare components, to be backed by state or territory legislation. However, it was up to each jurisdiction to determine exactly how that would be done. (While these changes had major ramifications for the egg industry, the chicken meat industry was less affected as no meat chickens were raised in cages.) By 2006, Queensland, Tasmania and the ACT had introduced the new standards but the remaining states had yet to finalise their approach, however, at least two other states proposed to implement the ARMCANZ decisions in full. In September 2002, there were three categories of cages applying to the South Australian egg industry *(Exhibit I):*

- *Type 1:* Cages installed before 1988 which would have to be replaced in the normal course of business as they would have passed their economic life by 2008;
- *Type 2:* Cages installed after 1988 **and which meet** the 1995 Code of Practice, which would not have to be scrapped prematurely or modified and could be use up to their imputed economic life;
- *Type 3:* Cages installed after 1988 that **do not fully meet** the 1995 Code of Practice which would have to be modified or dismantled before the completion of their economic life and would incur a direct capital cost as a result of doing so.[27]

Cages could be modified at a cost of $2-5 per unit. Approximately 26 percent of South Australia cages were suitable for modification. Overall, Type 3 cages would incur a national direct capital redundancy cost of up to $4.62 million (2006 dollars) as a result of the cage reforms.[28] Small farmers were more likely to have Type 3 cages than large operators, and thus be disproportionately affected by the proposed changes. There were no Type 2 cages in South Australia.

Costs and benefits

Research commissioned by the South Australian government determined that the cost of implementing the new regulations would be in excess of $5.7 million over 10 years including enforcement *(Exhibit J).* Egg production costs were projected to rise by 3.5 percent which

[26] ibid, p.iii.
[27] ibid, p.73.
[28] ibid, pp.73-74.

would likely be passed on to consumers.[29] The additional cost to consumers was estimated to be $5.37 million *(Exhibit K).* It was not envisaged that this increase would have major economic or social impacts on regional areas. While states with Type 2 cages would enjoy a temporary economic advantage over South Australia it was possible that South Australian eggs might be perceived as having a greater welfare value. However, the proposed regulations were likely to have significant impacts on small producers and retirees as part of a cumulative series of industry changes. The following case example illustrates some of the issues involved:

Case example

> A married couple, now aged in their early 70s, purchased an egg farm in the mid-1990s as the main income source for their retirement. The farm consists of six laying sheds with a total capacity of 17,000 hens. All cages are Type 1, i.e. they were installed prior to 1998 and do not meet the 1995 Model Code of Practice. The couple occupies the house on the farm, which is leased to an egg farmer, for which they receive monthly lease income of $2400. The lessee pays all power, water and 50 percent of the Council rates. When the farm cages become non-compliant with the proposed regulations (on 1 January 2008) the farm will have to be shut down, the couple's income stream will cease and they will be left with six large unsaleable sheds. The quotes for dismantling the sheds range from $5000 to $10,000 per shed. The property cannot be subdivided due to Council zoning.[30]

In addition, the new regulations also presented the possibility of environmental impacts from the relocation and/or the rebuilding of sheds for caged layer hens, e.g. noise, odour, aesthetics. There were also risks to soils and groundwater from any large-scale land disposal of culled hens; and the demolition and disposal of existing sheds and cages.

The response

Dr Bidda Jones, chief scientist with the RSPCA supported any incremental improvement to layer hen welfare but believed the ARMCANZ regulations did not go nearly far enough: "We didn't get what we wanted. What we want is to have all hens out of battery cages, and all that we got, in terms of battery cages, was a slight increase in cage size."[31] The RSPCA and other groups pledged to continue the fight against battery farming. They wanted to see bans similar to those in Sweden which was the first country to ban the cage system. More recently, the European Union (EU) had issued a directive on welfare of laying hens, requiring that conventional laying cages be phased out in member countries by 2012. The only exception would be furnished or "enriched laying cages". Meanwhile, Australian Egg Corporation[32] Managing Director James Callaway believed that the regulations would be simply too difficult for most farmers to meet:

> "There [are] only three jurisdictions, being Queensland, the ACT and Tasmania, who have actually legislated any parts of the code. So, there is certainty for the industry in those jurisdictions. All other jurisdictions - and we're talking about the majority of the industry - are yet to know what the black-letter law is, if you like, of those changes. Therefore, there is a very uncertain investment environment for the egg industry... People are finding it very hard

[29] ibid, p.32.
[30] ibid,p.46.
[31] Adams, P. 'Laying hens to get bigger cages' Landline ABC transcript, www.abc.net.au, 4 June 2006.
[32] The Australian Egg Corporation (AECL) is a producer owned company which integrates marketing, research and development and policy services for approximately 400 commercial egg producers across Australia.

> to invest. Financial institutions will not lend in this current environment. Some financial institutions suggest that they are exposed sufficiently in this industry. Other financial institutions are saying no, they are not willing to lend, simply because of the uncertainty. At the end of the day…we're talking about an investment here that is 70% to 80% of the total asset base of these businesses, and that is a significant cost impost for any small to medium-sized business operator…It's D Day to the extent that any egg producer who wishes to purchase new-laying chicks - those chicks will have an economic life beyond January '08. So they need to ensure that those birds are going into complying facilities."[33]

"We keep talking about animal welfare," he added. "We need to start entering into the debate human welfare. We talk about changing and significant changes to the cost of egg producers here, then we need to start considering human welfare implications as well."[34] The South Australian Farmers Federation (SAFF) also had concerns about the South Australian egg industry while accepting that some form of new regulations was inevitable. However, they too were keen for clarity. In April 2006 SAFF wrote to the Minister for Agriculture, Food and Fisheries asking that the Government decide exactly what was to be regulated, in the interests of certainty for the South Australia egg and chicken meat industries.

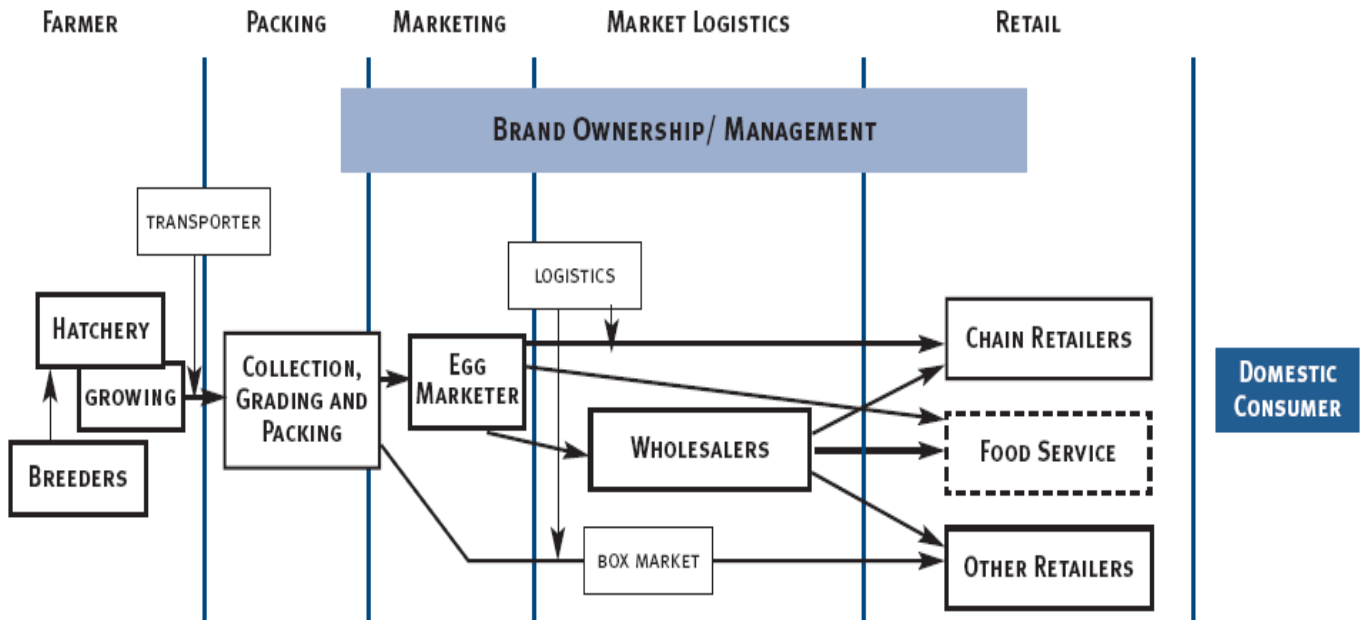
[33] opcit.
[34] ibid.

Exhibit A: Productivity in the Australian Egg Industry (1996 to 2005)

year	Quantity of eggs (million dozen)/annum	Number of egg producers	Average production per producer per annum
1996 (a)	175	507	345,168 dozen eggs
2002 (b)	187	481	389,583 dozen eggs
2004 (c)	215	474	453,586 dozen eggs
2005 (d)	203	423	479,905 dozen eggs

Source: (a) McKinna et al, 2003 + (b) ABARE (2004); (c) ABS, Year Book Australia, 1301.0, 2006; and (d) ABS, *Agricultural Commodities Australia*, 7121.0, 2004-05.

Exhibit B: Cage eggs supply chain



Source: 'Price Determination in the Australian Food Industry: A report' Department of Agriculture, Fisheries and Forestry, 2004, p.87.

Exhibit C: National Australian Egg Statistics by Production System
(a comparison between 2002 and 2005)

Production system (type of egg)	Share of total egg production (2002) (a)	Production Million dozen eggs (2002) (b)	Share of total egg production (2005) (c)	Production Million dozen eggs (2005) (d)
Cage	92%	172.04	79%	160.4
Free-range	5.5%	10.29	15%	30.45
Barn-laid	2.5%	5.08	6%	12.18

Source: (a) McKinna et al, 2003. + (b) ABARE (2004); and (c) Australian Egg Corporation (2005-2006); and (d) ABS, *Agricultural Commodities Australia*, 7121.0, 2004-05, Canberra

Exhibit D: South Australian Egg Statistics by Production System
(a comparison between 2002 and 2006)

Production System	Number of Layers (% of total) (2002)	Number of Layers (% of total) (2006)
Cage	596,466 (88%)	635,978 (82%)
Barn-lay	44,800 (7%)	47,432 (6%)
Free-range	36,500 (5%)	93,000 (12%)
All	**675,766[220] (100%)**	**776,410 (100%)**

Source: Runge, G, (September 2002) and Runge, G, (September 2006).

Exhibit E: Distribution of egg production systems in South Australia amongst farms (September 2006)

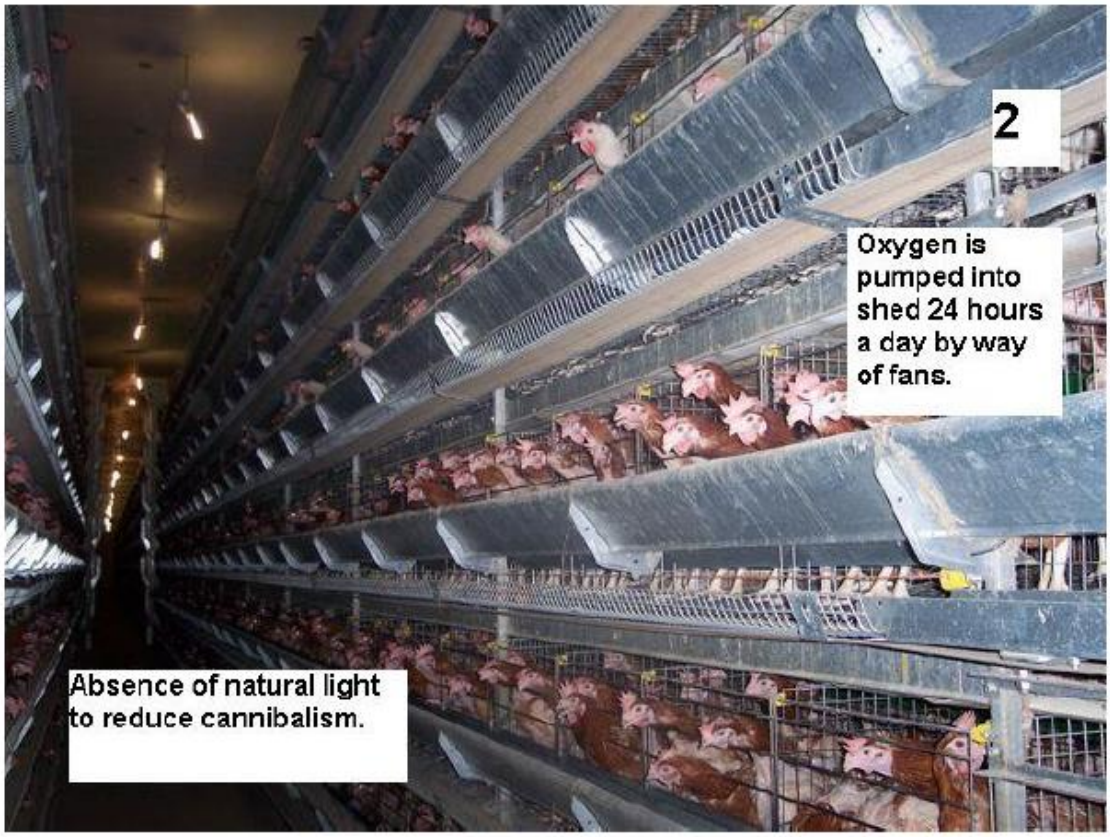
	Number of farms	Production system
Farms with Cages	13	cage only
	6	cage and free-range
	2	cage and barn-lay
	2	cage, free-range and barn-lay
Non-cage Farms	12	free-range
	4	barn-lay
	1	free-range and barn
	40 farms in total	

Source: (a) Runge, G, (September 2006).

Exhibit F: Older cage systems

Source: 'Proposed South Australian Prevention of Cruelty to Animals (domestic poultry) Regulations: Regulatory Impact Statement' Tim Harding & Associates, 2006

Exhibit G: Newer cage systems



Source: 'Proposed South Australian Prevention of Cruelty to Animals (domestic poultry) Regulations: Regulatory Impact Statement' Tim Harding & Associates, 2006

Exhibit H: Break-up of egg production costs 2003-2004

Description of variable/fixed costs	Percentage of total cost
Feed grains (i.e. wheat, barley, sorghum, other coarse grains, bran/pollard/offal, lupins and other beans, field and other peas, grain meals) + 'other feed' (i.e. additives (such as Avizyme, Methionine and Lysine) and roughage) (a)	40%
Freight, packing and grading (b)	20%
Hens (b)	10%
Labour (b)	8%
Vaccines and utilities (b)	1%
Fixed capital costs (shedding, equipment, ventilation, fencing and land) (b)	20%

Source: (a) McKinna et al, 2003; and (b) ABARE (2004).

Exhibit I: Age Distribution of cages by State and according to percentage of September 2002 capacity

State	Type (1) cages installed before 1988	Type (2) cages installed after 1988 and meet the 1995 code	Type (3) cages installed after 1988 that do not fully meet the 1995 code
NSW	85%	9.4%	5.6%
Qld	-	-	3.1%
SA	96.6%	0%[256]	3.4%
VIC	66%	13.3%	20.7%
WA	54%	37.4%	8.6%
NT & TAS	-	-	4.8%
Australia	**74.2%**	**16.4%**	**9.4%**

Source: ABARE, (2004).

Exhibit J: Number (percentage) of cage farms by farm size (i.e. number of layers) September 2006

State	1-999 (layers)	1,000-9,999 (layers)	10,000-24,999 (layers)	25,000-49,000 (layers)	50,000-99,000 (layers)	100,000 (layers) +	Total
NSW	2 (2%)	23 (19%)	38 (32%)	23 (19%)	21 (18%)	13 (11%)	120 (100%)
Qld	4 (7%)	17 (28%)	17 (28%)	11 (18%)	5 (8%)	7 (11%)	61 (100%)
SA	6 (15%)	13 (33%)	13 (33%)	3 (8%)	4 (10%)	1 (3%)	40 (100%)
VIC	7 (8%)	31 (36%)	16 (19%)	12 (14%)	7 (8%)	13 (15%)	86 (100%)
WA	3 (6%)	16 (33%)	15 (31%)	12 (25%)	0 (0%)	2 (4%)	48 (100%)
NT & TAS							12 (100%)
Australia	**22 (6%)**	**100 (27%)**	**99 (27%)**	**61 (17%)**	**37 (10%)**	**36 (10%)**	**367 (100%)**

Exhibit K: Total estimated quantifiable costs of the proposed regulations as compared to the "base case"

Reg No. and description of cost	Costs imposed on	Annual cost	Present value of cost over 10 years (2006 dollars)
Capital redundancy cost	Egg producers	<$11,536	<$90,000
Production cost (increase of 3.5%)	Egg producers, wholesalers and retailers are likely to pass on this cost to consumers of shell eggs due to their low price sensitivity	$688,312	$5,370,000
Enforcement costs	RSPCA SA	$35,000	$273,059
Total cost		**$0.73 million**	**$5.73 million**

Exhibit L: Estimates of shell egg consumer costs by State/s Territories and share of total consumer cost ($71.1 million) (present value 2006 dollars) between 2007-2008 and 2016 – 2017, resulting from new floor space requirements for layer hens (including new cage opening requirements)

State/s Territories	State/s Territories direct consumption of eggs (million dozen) per annum. (a) Population x 138eggs per person[285] per annum/12	State/s Territories current consumption as a % of total national direct consumption of shell eggs (236.35 million dozen[286]). (b) = (a)/236.35 million dozen x 100	State/s Territories -additional production/consumer cost of new floor space and cage opening requirements in 2008 (c) = (b) x $71.1 million (present value 2006 dollars)
VIC	5,078,500[287] x 138 eggs = 58.4 million dozen	24.7%	$17.57million
NSW	6,817,100 x 138 eggs = 78.4 million dozen	33.2%	$23.58 million
QLD	4,035,700 x 138 eggs = 46.41 million dozen	19.6%	$13.96 million
SA	1,552,300 x 138 eggs = 17.85 million dozen	7.6%	$5.37 million
WA	2,042,800 x 138 eggs = 23.49 million dozen	9.9%	$7.07 million
NT & TAS	694,600 x 138 eggs = 7.99 million dozen	3.4%	$2.40 million
ACT	328,100 x 138 eggs = 3.77 million dozen	1.6%	$1.14 million