UPDATE ON THE IMPACTS OF RETAILERS' NON-CAGE COMMITMENTS FOR EGGS

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EXECUTIVE SUMMARY

Most of the UK retail sector will have stopped selling eggs from enriched cages in 2025.

The major retailers who already sell only free range and organic eggs (including the Co-op, Marks and Spencer, Sainsbury's, Waitrose and now Morrison's) currently have a combined retail market share of around 36%. Those committed to making the move to non-cage eggs from 2025 (Aldi, ASDA, Iceland, Lidl and Tesco) represent a further 51%. Together, the two groups represent some 87% of the retail sector.

Retailers in the '51% group' have made a commitment to non-cage eggs rather than specifically to free range and organic. This leaves open the possibility of them selling barn as an 'entry level' egg, to replace enriched cage production. At present, sales of enriched cage eggs by these five retailers are understood to represent an average of around 35% of their total shell egg sales, with free range and organic comprising the remainder (65%). The most price-sensitive customers of these retailers are expected to continue buying eggs from enriched cage systems for as long as they remain available.

This report concludes that farm production costs will be lower in barn systems than for free range and so barn eggs will be more attractive to price-sensitive consumers. Using existing, older buildings (converted from enriched cage systems) for barn production is likely to provide a substantial cost advantage over free range. Other likely cost advantages for barn production include lower labour requirements, slightly higher egg output and lower feed consumption.

Based on current average costs and typical flock performance for 2025, this report estimates the cost of barn production at farm level to be around 75.5 pence per dozen, assuming compliance with BEIC Lion Code requirements. This reduces to around 71 pence per dozen for any non-Lion barn production.

Comparable figures for free range production in 2025 are based on a 'high performance / low cost' model. This is considered most appropriate for a 2025 comparison with barn but it does assume an important change from a 2020 'average' free range cost model. On this basis, the cost of free range production is just below 89 pence per dozen and so cost reductions for barn are around 15% (BEIC Lion) and 20% (non-Lion) respectively. Sensitivity calculations for barn egg production indicate that higher cost assumptions for this system could reduce the cost differential between free range and BEIC Lion Code barn to around 9%.

If all retail customers switch to 'barn' when eggs from enriched cages are no longer supplied in 2025 (as the lowest price alternative) and there are no other changes, then no additional free range eggs will be required. However the forecast UK human population increase of around 3% between 2020 and 2025 is likely to lead to some increase in demand. This may be met in part by an assumed, gradual increase in free range flock productivity in the coming years e.g. due to a combination of management, feeding, health and genetic advances.

If *per capita* egg consumption increases or if there is a continued gradual and voluntary customer switch to free range, then requirements would increase. For example, if the free range and organic egg market share increased from an average of 65% to an average of 75% across Aldi, ASDA, Iceland, Lidl and Tesco, an additional 1.1 million cases of eggs would be required annually. This would require some additional 1.4 million laying hen places.

Finally, it should be noted that future consumer requirements for eggs may be affected by changing economic and trading conditions arising for example from the current Coronavirus outbreak and the completion of the Brexit transition period at the end of 2020. Previous years' trends may not necessarily be an accurate indicator of future requirements for eggs.

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1 INTRODUCTION

This report sets out the relative production costs for barn and free range eggs. It also provides an estimate of current egg supplies in the UK and forecasts likely consumer requirements in 2025 to help the free range sector to plan for the future.

1.1 Background

In 2016, several major multiple retailers in the UK announced that they would stop selling shell eggs from enriched cage systems from 2025. These included Aldi UK, ASDA, Iceland, Lidl, Morrison's and Tesco. Since the Co-operative, Marks and Spencer, Sainsbury's and Waitrose were already stocking only free range and organic eggs, the result is that almost all the UK retail sector will be selling only non-cage shell eggs in 2025.

Retailer commitments made in 2016 were not specifically for free range and organic eggs which means that barn production remains an option for the future. The commitments made were also in respect of shell eggs only. A move to non-cage production for all egg products was not envisaged at the time. This was mainly because of the number of different products which include eggs as an ingredient (sometimes in only very small quantities) and the consequent difficulties in guaranteeing provenance. Since then, there has been some movement on this issue, for example with Morrison's and Tesco both making announcements regarding the use of cage-free ingredients by 2025.

In 2017, the British Free Range Egg Producers Association (BFREPA) commissioned a report by ADAS on the likely impacts of the commitments made by retailers for 2025[1]. Since then, there has been expansion in the UK egg sector, with marked growth in the production of free range eggs. In addition, production standards for barn systems have become clearer and retailer intentions have evolved.

The 2017 report stated that some additional free range production would be needed in the UK by 2025 - mainly due to the expectation of growth in free range sales and market share in the intervening years. This was based on previous trends and on forecasts at the time. Retailers generally anticipated that customers still buying shell eggs from enriched cage systems in the run-up to 2025 would switch to the cheapest available option when these were no longer available.

Forecasts in the 2017 report assumed that egg consumption per person would be unchanged over the period to 2025. In addition, it was assumed that the proportion of eggs sold at retail level and by the six retailers who had already committed to non-cage would also be constant. However, UK *per capita* egg consumption has increased by around 4% since the previous report which in turn has meant an increase in requirements since that time.

1.1.1 Barn egg production standards

In 2017, future barn production standards were unclear. At the time, it was possible that some retailers might adopt their own specifications, leading to a range of different production systems and thus to variation in production costs.

Since then, the BEIC Lion Code has set out clear standards for barn egg production. These specify a new maximum stocking density; they place a limit on colony size and they prohibit the use of 'combination' systems which would allow conversion of enriched cages to barn

[1] The Impacts of Buyers' Intentions to Purchase Only Non-Cage Eggs from 2025; Report for BFREPA by ADAS (July 2017)

production. The establishment of these standards now enables a more informed assessment to be made of likely on-farm barn production costs and thus the typical cost differential between barn and free range.

1.1.2 Free range sector growth

Since 2017, there has been considerable growth in the UK egg sector. Defra statistics for the first three months of 2017 showed that a total of 7.37 million cases of eggs (all production systems) were packed at UK packing centres. For the first three months of 2020, this total had increased to just over 7.8 million cases. Whilst this represented a slight reduction compared to totals in 2019, it was still a 6% increase compared to 2017.

Supply totals for the first quarters of 2017 and 2020 also show changes in the proportions of eggs from different production systems. Table 1 below shows that the market share for enriched cage egg production fell by 5.7% over this period, whilst there were increases in free range (+3.7%) and in barn and organic (both +1%).

Table 1 Percentage market shares by production system in UK, 2017 and 2020 (Source, Defra egg statistics[2])

	Enriched cage	Barn	Free range	Organic	Total
Eggs packed as a percentage of the total in 2017 (Q1)	48.3	1.5	47.9	2.3	100
Eggs packed as a percentage of the total in 2020 (Q1)	42.6	2.5	51.6	3.3	100

Further analysis of Defra figures for the first quarters of 2017 and 2020 (January to the end of March) shows that:

- UK free range egg production increased from 3,531 to 4,032 cases, representing sector growth of 14%;
- UK enriched cage egg production reduced from 3,563 to 3,326 cases, representing sector shrinkage of 6.7%.

1.2 Report objectives

This report provides a comparison of farm costs of production for barn and free range eggs. This will help to assess the likely future choices of consumers for whom price is the key consideration. The costs are therefore based on the expected average physical performance of free range and barn production flocks in 2025, rather than on current average performance.

[2] https://www.gov.uk/government/statistics/egg-statistics

Whilst BEIC Lion Code standards are expected to be widely-adopted for barn eggs, there may also be some 'non-Lion' production in which costs are generally lower. The likely effects of this are also considered, enabling a comparison to be made between farm costs for free range eggs (produced to Lion Code standards) and barn eggs (both to Lion and non-Lion requirements).

Forecast requirements for eggs in 2025 are then compared with current supplies. A simple gap analysis is undertaken to estimate changes and developments that are likely to be needed in the free range sector between 2020 and 2025.

2 PRODUCTION COSTS FOR FREE RANGE AND BARN EGGS

Typical current production costs for free range and barn eggs at farm level are calculated and compared in this section on a 'pence per dozen' basis. The price differential between systems is important since it is likely to impact upon retailers' policies and on consumers' purchase decisions.

In all production systems, there is a natural variation between flocks and between farms in terms of physical performance and costs. Actual figures for individual farms may therefore differ from those presented here.

Flock performance assumptions for each production system are important in calculating costs on a 'per dozen eggs' basis. Producers with high performing flocks can spread their costs over more eggs and so the cost per dozen is lower. Conversely, if egg numbers per bird are low, costs per dozen are likely to be higher.

2.1 Free range costs of production

The cost of production for free range eggs is reviewed and updated each month for BFREPA by ADAS. Costs are based on current prices and a series of physical performance and other assumptions. Compound feed prices are monitored particularly closely due to their volatility and because they represent a large proportion of on-farm production costs.

2.1.1 Flock performance in free range systems

The cost of production figures produced for BFREPA are currently based on 'average' and on 'high performing / low cost' free range flocks. This recognises that costs are lower on some farms - for example due to their location, scale or production efficiency.

Looking ahead to 2025, the expectation is that free range egg production will become increasingly efficient. The current 'high performing / low cost' flock scenario is therefore considered the most appropriate for 2025 free range projections of physical performance and for comparisons with barn production. However, this does assume an important increase in free range flock output over the next five years. Financial assumptions are based on typical current prices. The key physical and financial assumptions for free range production are set out in Table 2 below.

Table 2 Physical and financial assumptions for free range

Physical or financial factor	Assumption
Eggs per hen housed to 76 weeks	345
Feed consumption (grams per bird per day)	126
Capital investment (£ per bird)	35
Net old hen value after catching (pence per bird)	5
Feed cost (£ per tonne)	240
Pullet purchase price (£ per bird)	4.15

2.1.2 Production costs for free range eggs

Based on these assumptions and including all other production costs, Table 3 below sets out the current cost per dozen for eggs from high performing, low cost free range flocks. A full breakdown of costs and assumptions is provided in Appendices 1 and 2.

Table 3 Cost of production for free range eggs

Cost item	Cost per dozen (pence)
Feed	44.2
Pullet	14.4
Labour	6.3
Water and electricity	2.0
Litter	0.2
Veterinary, clean out and related products	2.7
Range related costs	0.8
Other costs	2.6
Depreciation and interest on buildings and equipment	15.6
Total	**88.8**

The conclusion is that the current cost of production for high performing and low cost free range is just below 89 pence per dozen (88.8p). This includes depreciation and interest charges on new buildings and equipment, based on an initial capital cost of £35 per bird.

2.2 Barn costs of production (BEIC Lion Code standards)

BEIC Lion Code standards for barn egg production were published in 2019 and are expected to be used in most of the systems operating in 2025. The key requirements are as follows:

- A maximum floor stocking density of 16.5 birds per m^2;
- A maximum colony size of 6,000 birds;
- A maximum of four levels;
- Nests must not have wire or plastic-coated wire in contact with birds;
- Enrichment must be provided, based on two items per 1,000 birds.

The use of combination ('Combi') systems which enable enriched cages to be converted to barn production is prohibited in the BEIC Lion Code. This does not prevent the re-use of houses which

previously contained enriched cages, so long as the house is re-equipped to meet the above requirements.

The Lion Code also states that natural light and a veranda *may be considered* in future for new builds, following research and development. These are not currently required and therefore they are not included in the cost calculations that follow, although separate, indicative figures are provided.

2.2.1 Housing costs for barn production

Barn production in 2025 is expected mainly to be undertaken in houses which were originally built for enriched cages. Almost all of these houses were constructed before the 2012 ban on conventional cages but they are generally considered to remain in good condition.

Future market requirements are almost certainly going to mean that there are surplus enriched cage places for laying hens. House conversions to barn production therefore provide an opportunity to continue in egg production without the need to build new houses.

For building conversions, existing enriched cages must be dismantled. At present, enriched cage houses are typically either single-storey or two-storey, the latter having a raised gangway enabling access to the birds on the higher level. These houses have a single ventilation system, since air can pass through the enriched cage systems and through the perforated flooring of the gangways.

A barn conversion from a single-storey enriched cage system is likely to be the cheapest and easiest to undertake - the main tasks being the removal of old cages and the installation of new equipment. In general, the existing ventilation system is likely to be able to meet future requirements.

For two-storey enriched cage houses which are converted to two-storey barn systems, there are added complications with ventilation because separate systems are required for each storey. This is because the perforated gangways used in enriched cage systems must be replaced by a solid floor. Whilst the existing ventilation systems may still be used in one part of the house, substantial additional equipment is likely to be needed elsewhere.

The number of birds that can be housed in barn production is likely to be substantially lower than the number previously housed in enriched cages. Some equipment suppliers and producers suggest that the average reduction in bird numbers may be around 30% following conversion to BEIC Lion barn production standards (e.g. reducing a 40,000 bird enriched cage building to 28,000 capacity in barn production). This does vary however depending on the width and the height of the building and on the particular barn system selected.

Based on discussions with equipment suppliers and producers, current cost estimates of typical building conversions to barn are approximately £18 per bird for a two-storey building, reducing to around £10 per bird for a single-storey building. These figures relate to BEIC Lion requirements and to the number of bird places in barn systems, rather than the number previously in enriched cages. They assume re-use of existing ventilation, manure handling and egg collection equipment where possible.

Dismantling and disposal of current enriched cages and associated equipment is an additional cost. This may be around £2 per bird, taking the totals for conversion to £20 and £12 per bird respectively for two-storey and single-storey systems. An average cost of conversion of £16 per bird has therefore been used in the calculations that follow.

At this stage, no extra costs have been included in respect of the possible future addition of a veranda or windows. If in future, the BEIC Lion Code were to require this, the typical cost for a veranda for example could be around £3 per bird.

Given that even houses built just prior to the conventional cage ban in 2012 will be approaching 15 years old by 2025, it is assumed that all depreciation and interest charges which apply to the building itself will have been re-paid. In these calculations, depreciation and interest charges have therefore been applied only to dismantling and conversion costs (£16 per bird). It is recognised however that some housing may be depreciated over a longer period and therefore small additional costs may still apply. This possibility has been included in separate sensitivity analyses (see section 2.5).

2.2.2 Flock performance in BEIC Lion barn systems

A small increase in egg numbers is forecast in barn production compared to free range. Feed consumption and feed price per tonne are both expected to be lower in barn production - the latter due to economies of scale on (what are likely to be) larger sites. Key physical and financial assumptions for barn egg production are set out in Table 4 below, with (high-performing) free range figures in brackets for comparison. An important issue is that the average cost of equipment for barn system conversions (£16 per bird) is substantially lower than the likely cost of housing and equipment for a new free range system (£35 per bird).

Table 4 Physical and financial assumptions for BEIC Lion Code Barn (free range in brackets)

Physical or financial factor	Assumption
Eggs per hen housed to 76 weeks	350 (345)
Feed consumption (grams per bird per day)	122 (126)
Average equipment cost per bird (£)	16 (35)
Net old hen value after catching (pence)	5 (5)
Feed cost (£ per tonne)	235 (240)
Pullet (£)	4.15 (4.15)

2.2.3 Production costs for BEIC Lion barn eggs

Table 5 below sets out the current cost per dozen for barn eggs produced to Lion Code requirements.

The costs are based on the figures in Table 4 and assumptions of typical differences between barn and free range production. For example, a 25% reduction in labour requirements is assumed for barn, which reduces the labour cost from £1.80 per bird for free range to £1.35 per bird for barn. A full breakdown of individual cost items and the assumptions made is set out in Appendices 1 and 2.

Table 5 Costs of Production for BEIC Lion Code Barn

Cost item	Cost per dozen (pence)
Feed	41.3
Pullet	14.2
Labour	4.6
Water and electricity	2.0
Litter	0.2
Veterinary, clean out and related products	2.4
Other cost items	2.6
Depreciation and interest on building conversion and equipment	8.2
Total	**75.5**

On this basis, the calculated average farm cost of production for barn eggs produced to BEIC Lion Code standards is 75.5 pence per dozen, inclusive of the equipment and conversion costs associated with re-equipping the existing house.

2.3 Barn costs of production (non-Lion Code)

BEIC Lion Code standards are likely to be widely adopted for barn eggs in 2025, however it is possible that some market requirements will be filled by non-Lion production. If this is the case, the main differences in a non-Lion system are likely to include:

- Higher stocking density;
- Possible use of combination systems i.e. conversions from enriched cages;
- Higher limits on colony size.

The maximum stocking density would be determined by the requirements of current legislation or customer requirements, perhaps guided by standards in other countries. In practice, commercial advice suggests that systems may be stocked at up to 22 birds per square metre in UK non-Lion systems (although in some other countries, higher levels are used). This figure is around one-third higher than the 16.5 birds allowed for barn production in the BEIC Lion Code.

2.3.1 House conversion costs

Increasing the stocking density (i.e. the number of birds within a specific area) requires more feeders, drinkers and nests. In addition, the ventilation system may also need to be upgraded. However, savings can normally be made in the cost of central control units for egg collection, manure handling and ventilation on a 'per bird' basis. The overall effect is likely to be a lower conversion cost per bird in non-Lion systems and the assumption is made that there would be a *pro rata* reduction in costs per bird as stocking density increases e.g.

a 10% increase in stocking density would equate to a 10% reduction in house conversion costs per bird.

As before, no depreciation or interest charges associated with the building structure have been included here, due to the expected use of converted enriched cage buildings. However, it should be noted that if a new house were to be built for barn production, the housing cost on a 'per bird' basis would be higher in Lion Code systems than in non-Lion systems, due to the difference in stocking density. The difference in costs between Lion Code and non-Lion Code barn egg production systems on a 'pence per dozen' basis would therefore be expected to increase.

Table 6 below uses the house conversion costs for BEIC Lion Code production to calculate the conversion costs for non-Lion barn systems stocked at 22 birds per square metre. This is based on the assumed price change being *pro rata* to the change in stocking density (as above). The result is a conversion cost that ranges from £9-15 per bird, depending on whether the development is single or two-storey.

Table 6 Calculation of house conversion costs for Non-Lion barn systems

	Single storey barn	Two storey barn
Lion Code Stocking density (birds per m^2)	16.5	16.5
Conversion cost for Lion Code at 16.5 birds per square metre from Table 4 (£ per bird)	12	20
Calculated conversion cost per square metre (based on stocking density x assumed equipment and conversion costs)	198 (16.5 x 12)	330 (16.5 x 20)
Assumed stocking density in non-BEIC Lion systems (birds per m^2)	22	22
Cost per bird (£) for non BEIC Lion systems based on costs of £198 and £330 per m^2 respectively	9 (198/22)	15 (330/22)
Average house conversion cost (£ per bird)	12	

An average conversion cost of £12 per bird has therefore been used in the calculations that follow.

2.3.2 Flock performance in barn systems (non-Lion)

Levels of flock performance are expected to be broadly similar in BEIC Lion and non-Lion barn systems although there may be some small differences due to the higher stocking density in the latter. The assumptions made are shown in Table 7 below with the equivalent figures for BEIC Lion Code in brackets.

Table 7 Physical and financial assumptions for non-Lion barn egg production (with Lion Code barn production in brackets)

Physical or financial factor	Assumption
Eggs per hen housed to 76 weeks	345 (350)
Feed consumption (grams per bird per day)	120 (122)
Average conversion cost per bird from Table 6 (£)	12 (16)
Net old hen value after catching (pence)	5 (5)
Feed cost (£ per tonne)	235 (235)
Pullet (£)	4.15 (4.15)

2.3.3 Production costs in barn systems (non-Lion)

Table 8 below sets out the current average cost per dozen for barn eggs which are produced to non-Lion standards with comparative figures for Lion Code in brackets. These figures have been based on a stocking density of 22 birds per square metre and an average equipment cost of £12 per bird.

The costs are based on the figures in Table 7 and assumptions of other costs. Here for example, a further 25% reduction in labour requirements is assumed, compared to Lion Code barn systems. This further reduces the labour cost from £1.35 (Lion Code) to £1.01 per bird (non-Lion). As before, a full breakdown of individual cost items and the assumptions made is set out in Appendices 1 and 2.

Table 8 Costs of Production for non-Lion Code Barn (with Lion Code costs in brackets)

Cost item	Cost per dozen (pence)
Feed	41.2 (41.3)
Pullet	14.4 (14.2)
Labour	3.5 (4.6)
Water and electricity	1.6 (2.0)
Litter	0.2 (0.2)
Veterinary, clean out and related products	2.1 (2.4)
Other cost items	2.0 (2.6)
Depreciation and interest on building conversion costs and equipment	6.2 (8.2)
Total	**71.3 (75.5)**

The calculated cost of production for barn eggs produced to non-Lion standards, based on 22 birds per square metre is therefore just over 71 pence per dozen eggs.

2.4 Comparison of production costs

A summary of the calculated production costs for free range and barn systems is set out in Table 9 below based on information contained in Tables 2-8. An index of costs is also provided, based on the production cost for free range eggs being set at 100%.

Table 9 Summary of calculated average costs of production for free range and barn

System	Cost per dozen (pence)	Index (free range=100)
Free range	88.8	100
Barn to BEIC Lion standards	75.5	85
Barn to Non-BEIC Lion standards	71.3	80

Based on these assumptions, the cost of producing barn eggs to Lion standards is expected to be around 15% lower than the cost of producing free range eggs. The adoption of non-Lion production standards for barn would further reduce barn production costs and thus increase the cost difference compared to free range to 20%. Note that the free range figures assume high performance and low costs, rather than current averages.

It should be noted that these costs relate to UK production. If non-Lion barn eggs were imported to the UK for example, production costs could be different.

2.5 Sensitivity analysis

Costs and performance levels differ between farms and a sensitivity analysis helps to quantify the effect of changing the key assumptions in these calculations. Changes in the relative costs of free range and barn eggs may in turn impact upon consumer purchase decisions.

Using the figures in Table 9 as a basis, the cost difference between free range and barn would reduce if for example:

- House conversion costs for barn production were higher and some building depreciation and interest still applied;
- The improvement in egg output per bird (in favour of barn production) was lower;
- There was less difference in feed intake per bird between free range and barn;
- The saving in labour requirements in barn compared to free range was lower.

These scenarios are assessed in Table 10 with comparisons between free range and barn eggs produced to BEIC Lion standards[3]. All the assumptions here are based on increases in barn production

[3] Figures are rounded to one decimal place

costs. This is intended to determine whether there are realistic scenarios whereby barn eggs could have a higher cost of production than free range eggs.

Table 10 Effect of changed assumptions for barn eggs (BEIC Lion standard)

Cost component	Assumed change in barn production	Effect on barn production costs (compared to 75.5p per dozen)	Effect on index (free range at 88.8p = 100)
Housing and conversion costs for barn	Increased from £16 to £22 per bird (based on +£2 over the typical cost of a two-storey system)	Increases production costs to 78.6p per dozen	89
Egg output for barn	No difference compared to free range (345 eggs per bird)	Increases production costs to 76.6p per dozen	86
Feed intake for barn	Increased by 2 grams per bird per day	Increases production costs to 76.2p per dozen	86
Labour cost	Increased by 20p per bird	Increases production costs to 76.2p per dozen	86
Combined effects of: i) higher house conversion costs ii) lower egg output iii) higher feed intake iv) higher labour cost	Combined changes as above	Increases production costs to 81.1p per dozen	91

Table 10 shows that even if all of these changes are combined, the cost of production for barn (Lion Code standards) increases by nearly six pence, to just over 81 pence per dozen. This is still around 9% lower than the current calculated cost of free range production, shown in Table 3 as 88.8 pence per dozen.

If the future inclusion of a veranda and natural lighting in some new barn systems added (for example) a further £5 per bird to barn conversion costs, this would be equivalent to adding around four pence per dozen to production costs for these systems. It is emphasised though that this is not a current requirement for barn under the BEIC Lion scheme (see section 2.2).

If a new building was constructed for barn production (as opposed to a house conversion) then the costs of production for barn would be higher than those presented here.

Table 3 (which relates to free range egg production) shows that depreciation and interest costs account for around 15.6 pence per dozen eggs. Any free range producer who had re-paid all

investment costs could in theory be producing for a lower figure of around 74-75 pence per dozen which is approximately the same as the cost of barn production to BEIC Lion standards. However, this would be dependent upon achieving the same high levels of free range egg output and production efficiency which is likely to be increasingly difficult as buildings get older.

If current average performance for free range is assumed rather than 'high performance / low cost', then production costs would increase.

In the scenarios presented here though, the cost of production at farm level for free range exceeds the cost of production for barn. If these differences are carried over to retail level, price-sensitive consumers currently purchasing enriched cage eggs are likely to select barn eggs over free range when 'enriched' are no longer available.

3 REQUIREMENTS FOR EGGS IN 2025

When retailer commitments for non-cage eggs are fulfilled in 2025, there will be important implications for egg producers since demand for enriched cage eggs will decrease.

The overall number of laying hens needed to meet UK requirements in 2025 will be influenced by the UK human population at the time, *per capita* egg consumption and the average output (productivity) of laying hens at that time.

In this section, expected changes in the retail sector in 2025 are set out and the quantity of free range and organic eggs expected to be required for retail, food service and processing is calculated, with numbers rounded to the nearest 0.1 million cases of eggs.

3.1 Retail requirements for non-cage eggs in 2025

The retail sector in 2025 is expected to comprise the following:

- Major retailers who are **committed to non-cage eggs** and expected (at present) to include barn in addition to free range and organic;
- Major retailers who are **committed to free range and organic eggs (only)** who will therefore not stock eggs from barn systems;
- Smaller retailers and those which have made **no commitments** regarding future egg production systems.

These retailers' likely requirements for eggs in 2025 are set out in turn below.

3.1.1 Major retailers committed to 'non-cage' (expected to include barn eggs)

This group comprises Aldi UK, ASDA, Lidl, Iceland and Tesco. They are currently understood to have a combined retail market share of around 51%[4] and at present, they continue to sell eggs from both enriched cage and non-cage systems. Current data and intelligence received from industry indicates that free range and organic eggs represent an average of around 65% of all their shell egg sales.

Previous discussions have indicated that these retailers generally expect customers who continue to purchase eggs from enriched cages for as long as they remain available, to switch to the cheapest available alternative afterwards. Based on the figures in Section 2 of this report, this is expected to be barn egg production.

If this is the case, demand for free range and organic will be unaffected unless for instance there is sales growth prior to 2025.

3.1.2 Major retailers committed to free range and organic eggs only

This group includes the Co-op, Marks and Spencer, Sainsbury's, Waitrose and Morrison's, following the latter's recent commitment to free range and organic eggs only.

Together, these five companies are understood to have a retail market share of 36% (source as above). All the shell eggs they sell are already either free range or organic and so requirements in 2025 will increase only as a result of increased sales.

[4] Retailer market shares are based on data on www.statistica.com and information from Kantar

3.1.3 Other retailers

With the major retailers above comprising 87% of the retail total, all other retailers therefore account for the remaining 13%. These outlets include some specialist retailers which are likely to sell only free range and organic eggs at present. Also included are discount-type shops, where the emphasis is strongly on price. Here, sales of enriched cage eggs may continue after 2025 or there may be a switch to barn eggs. In either case, the impact on free range sales is likely to be limited.

Based on the above, retailer requirements for free range and organic eggs in 2025 are unlikely to change significantly as a result of current 'non-cage' commitments, but they may still arise for other reasons.

3.2 Current UK laying hen numbers

The UK egg sector has been increasing in size and recent data for laying hen numbers are set out in Table 11. These figures take account of recent changes in data collection methods which were introduced in June 2020.

Table 11 Laying hens housed and UK housing capacity (July 2020)

	Total birds in place (millions)	Total housing capacity (millions)
Free range	24.2	27.2
Enriched cage	12.5	14.5
Organic	1.5	1.7
Barn	1.1	1.3
Total	39.3	44.7

Source: Ranger magazine (BFREPA) August 2020

The total number of birds in place is now reported to be around 39.3 million whereas the reported figure in the 2017 report was 35.5 million (a difference of 3.8 million places and an increase of 11%). Free range currently represents over 60% of this total.

3.3 Current UK egg output and consumption

Defra statistics for the first quarter of 2020 show that 7.8 million cases of eggs were packed at UK packing centres (see section 1.1.2) with a further 1.1 million cases bought by UK egg processors. This gives a combined quarterly figure of 8.9 million cases. Extrapolating this figure on an annual basis therefore gives a total output of 35.6 million cases per year.

This figure has been checked against reported UK egg consumption levels. Total UK egg consumption (shell eggs and egg products) was estimated to be 197 eggs per person in 2019 (based on information from www.egginfo.co.uk). With a current human population of 66.4 million, it is calculated that some 36.3 million cases of eggs would be needed to meet current annual requirements.

These two figures are within 2% of one another and the higher figure is likely to include consumption from imported eggs. The calculations that follow are therefore based on 36.3 million cases per year, since this is thought to best reflect overall UK egg requirements at present.

3.4 Current UK egg market

Retail sales were reported to account for 54% of all eggs in the 2017 report but this has now increased to 59%, as shown in Table 12. As a result, both the food service and the processing sectors have contracted slightly in percentage terms.

Table 12 Egg market shares and estimated annual sales by outlet

Market outlet	Current market share % of total (2017 data in brackets)	Calculated current annual sales of all eggs in millions of cases (based on 36.3 million cases required per year)
Retail	59 (54)	21.4
Food service	21 (23)	7.6
Processing	20 (23)	7.3
Total	100	36.3

Source www.egginfo.co.uk

3.5 UK human population forecasts for 2025

According to the Office of National Statistics, the current UK human population of 66.4 million is projected to rise to 68.7 million in 2025, an increase of around 3%. The population forecast for 2025 is now lower than the figure predicted in 2017.

As a result of these changes, the overall requirement for eggs (all production systems) would increase from 36.3 to 37.3 million cases in 2025, assuming no *per capita* change in egg consumption. If the retail market share remains at 59%, this would account for 22.0 million cases and the combined total of all eggs to food service and processing would increase from 14.9 million to 15.3 million cases.

3.6 Summary of forecast free range and organic requirements in 2025

The total requirement for free range and organic eggs in 2025 is calculated in Table 13 below. This is based on these representing:

- 67% of retail sales (source: Kantar data, as reported on www.egginfo.co.uk);
- 41% of food service sales (source: industry estimate);
- 53% of eggs for processing (source: industry estimate).

Table 13 Free range and organic egg requirements in 2025 (with 3% UK human population growth)

Outlet	Market share	Total eggs (million cases)	Free range and organic share (%)	Free range and organic eggs (million cases)
Retail	59	22.0	67	14.7
Food service	20	7.5	41	3.1
Processing	21	7.8	53	4.1
Total	**100**	**37.3**		**21.9**

The annual requirement for free range and organic eggs is therefore calculated as 21.9 million cases in 2025. The vast majority of this is forecast to be sold through retailers. Forecasts assume unchanged *per capita* consumption of 197 eggs per person and that market shares for the three different outlets remain unchanged.

3.7 Free range production requirements in 2025

In Table 13 above, the forecast requirement of 21.9 million cases in 2025 includes both free range and organic eggs. In order to calculate the number of free range laying hen places needed in 2025, it is assumed that organic will comprise 2% of the combined free range and organic total. On that basis, the annual requirement for free range eggs (only) in 2025 is calculated to be **21.5 million cases** (i.e. 98% of the combined total).

3.7.1 Requirements for free range bird places in 2025

Table 14 below calculates the number of bird places needed to produce the required annual total of 21.5 million cases of free range eggs.

In Section 2 of this report, production costs for free range eggs in 2025 assume that the output per bird will increase from a current average of 330 eggs to a new average of 345 eggs to 76 weeks of age. The same assumption is used here, but clearly the number of bird places required will increase if average egg output is lower than this and it will decrease if average output is higher. It is also assumed that all eggs produced can be sold into one of the three market outlets listed with, for example second quality eggs being sold for processing.

Table 14 Comparison of current free range production places with the number required in 2025 to meet forecast requirements

	Number
Current UK free range housing capacity (millions)	27.2 (see Table 11)
Assumed average number of eggs produced per bird in a 60 week cycle in 2025	345 (see Table 2)
Calculated number of eggs produced per bird in 52 weeks (assumes a 4 week turnaround period)	280
Calculated annual UK free range egg production (million cases)	21.2
Calculated annual free range egg requirements in 2025 (million cases)	21.5
Difference (million cases)	0.3

Based on Table 14, there is a calculated small annual shortfall of 0.3 million cases of free range eggs. This is equivalent to just under 400,000 bird places but due to rounding and estimates made, this figure should be treated with some caution.

It should also be noted that this assumes that all UK egg consumption is home-produced whereas at present a small proportion is imported, mainly for the processing sector. However, if accurate a shortfall of 0.3 million cases of eggs would represent expansion of less than 2% between now and 2025.

4 CONCLUSIONS

This report has considered two main issues which have implications for the UK free range egg production sector and for its prospects for the next five years. The main conclusions are set out here.

4.1 Relative costs of production for free range and barn

The report shows that the on-farm costs of producing free range eggs are higher than the costs of producing barn eggs.

The typical current cost difference is calculated to be around 15% or 13 pence per dozen. This is based on both free range and barn eggs being produced to BEIC Lion Code of Practice requirements. If higher stocking rates are used in non-Lion barn systems (i.e. increasing bird numbers by one-third) then costs are lower and the price differential with free range could increase to around 20% or 17 pence per dozen.

A key factor in these differences is that barn production is typically expected to be undertaken in existing buildings, previously fitted with enriched cages. Many of these are already at least 10 years old and so any repayment and interest charges are likely to be low. The cost of house conversion to barn is typically less than half that of building new free range housing.

If cost and performance assumptions for barn production to Lion Code standards are changed to reflect possible scenarios in which costs increase beyond those used in the initial analyses, the outcome is that the cost differential between barn and free range narrows but free range will still cost 7-8 pence per dozen (9%) more.

Free range costs in this report are based on expected higher average flock performance in 2025. If this is not achieved, then free range costs will be higher than forecast here. The price differential between free range and barn will potentially increase.

In addition, it should be noted that the calculations here relate to 'on-farm' costs for free range and barn. They therefore take no account of other costs in the supply chain or pricing policies. It should be noted though that barn production is likely to incorporate in-line grading systems. Cost savings are therefore expected compared to free range, for example due to lower transport costs and savings on plastic trays.

Retailers wishing to offer a lower-priced, 'entry level' egg when they no longer offer eggs from enriched cage production systems are therefore very likely to include barn within their product range.

4.2 Supply and demand for free range eggs in 2025

If the five main retailers currently selling eggs from enriched cage systems simply replace these with barn eggs in 2025, then in theory there will be no impact on the free range sector.

Free range growth may still occur for other reasons though, for instance if there is:

- UK human population growth;
- An increase in *per capita* egg consumption;
- A gradual and continuing voluntary consumer switch to free range eggs in the years until 2025, perhaps led by younger consumers buying for the first time;
- Any further retailer movement from a 'non-cage' specification to 'free range and organic only'.

If increases in egg output per bird are achieved over the next five years, this will partly meet the increased requirements arising from expected human population growth. On this basis, the calculations in Section 3.7 suggest that the number of free range bird places would need to increase by only around 2% to meet the forecast requirements for eggs in 2025.

This would increase if demand for free range eggs increases over the next five years. For example, if the market share for five major retailers (Aldi UK, ASDA, Iceland, Lidl and Tesco) increases from the current average of 65% to 75%, then calculations indicate that an extra 1.1 million cases of free range and organic eggs would be needed annually. This is turn would require approximately 1.4 million additional free range and organic production places[5].

Finally, it should be noted that future requirements for eggs may be affected by the current Coronavirus outbreak. This is likely to have important and long-term economic implications for purchase power and for consumer choice. In turn, there could be implications for both egg consumption and price sensitivity. Added to this, the completion of the Brexit transition period at the end of 2020 is likely to change trading conditions which again could have economic implications. Previous years' trends may not necessarily be an accurate indicator of future requirements for eggs.

[5] This is based on these five representing 51% of retail sales, therefore 11.2 million cases out of a total of 22 million cases. If 65% of these are free range and organic, the current total is 7.3 million cases. An increase to 75% would increase the total to 8.4 million cases, a difference of 1.1 million cases. With 280 eggs per bird place per year (Table 16), an extra 1.4 million places would be required.

APPENDIX 1 COST OF PRODUCTION FREE RANGE AND BARN

All cost assumptions are shown in the following table. Some individual cost items have been aggregated here for consistency with the tables in the main body of the report.

	Free range (pence per dozen)		Barn Lion Code (pence per dozen)		Barn non-Lion Code (pence per dozen)	
Feed	44.18		41.28		41.20	
Pullet	14.43		14.23		14.43	
Labour	6.26		4.63		3.51	
Litter	0.21		0.21		0.21	
Water	0.31	2.01	0.31	1.99	0.31	1.60
Electricity	1.70		1.68		1.29	
Vet and med	0.80	2.71	0.58	2.43	0.59	2.09
House clean down costs	1.46		1.44		1.11	
Disinfectants	0.31		0.31		0.24	
Dead bird disposal	0.14		0.10		0.14	
Range management costs	0.38	0.83	0	0	0	0
Land rental	0.45		0		0	
Repairs	0.66	2.61	0.65	2.57	0.49	2.02
Pest control	0.17		0.17		0.14	
Insurance	0.66		0.65		0.49	
Vehicle and fuel	0.21		0.21		0.17	
Telephone	0.21		0.21		0.17	
Bank charges	0.56		0.55		0.42	
Egg printing	0.14		0.14		0.14	
Depreciation and interest	15.55		8.19		6.24	
Total	**88.8**		**75.5**		**71.3**	

APPENDIX 2 COST OF PRODUCTION ASSUMPTIONS

An outline of the key assumptions made in section 2 of the report and (where appropriate) the rationale is set out in the table below. Note that cost items are 'per bird' (except for compound feed, which is on a 'per tonne' basis) and not 'per dozen' and therefore they take no account of assumed egg numbers.

The assumed performance and costs for free range production are taken from current figures prepared by ADAS for BFREPA. These have been used as the basis for assessing the likely costs for barn production systems.

	Free range	Barn - Lion Code	Barn non-Lion Code
Eggs per bird (to 76 weeks)	345	350	345
Feed consumption (g/bird/day)	126	122	120
Capital to build or convert (£ per bird)	35 (new build)	16 (converted)	12 (converted)
Feed (£ per tonne)	240	235	235
Pullet (£ per bird)	4.15	4.15	4.15
Net old hen value (pence per bird)	5	5	5
Labour (£ per bird)	1.80	1.35 (reduced by 25%)	1.01 (further 25% reduction)
Water (£)	0.09	Same	Same
Electricity (£)	0.49	Same	Reduced due to stocking
Litter (£)	0.06	Same	Same, assumes that there is more litter top-up but less litter per bird at the outset
Vet and med (£)	0.30	Vet cost per bird lower with larger flock size, possible less medication	Same as BEIC barn
House clean down costs (£)	0.42	Same	Reduced due to stocking
Disinfectants and other chemicals (£)	0.09	Same	Reduced due to stocking

	Free range	Barn - Lion Code	Barn non-Lion Code
Dead bird disposal (£)	0.04	Lower due to reduced mortality	Same as free range
Range management costs (£)	0.11	Not applicable	Not applicable
Land rental (£)	0.13	Not applicable	Not applicable
Repairs (£)	0.19	Same	Reduced due to stocking
Pest control (£)	0.05	Same	Reduced due to stocking
Insurance (£)	0.19	Same	Reduced due to stocking
Vehicle and fuel (£)	0.06	Same	Reduced due to stocking
Telephone (£)	0.06	Same	Reduced due to stocking
Bank charges (£)	0.16	Same	Reduced due to stocking
Egg printing (£)	0.04	Same	Same