

Scenario 1 - Colony cage egg production

| Score sheet | | Name of scorer: Expert 1 | | Comments Round 1 | | | | | | Comments Round 2 | |
|-----------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------|-------------------------|-----------------|-------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Welfare principles | Welfare criteria | <div><div></div><div>1 - Lowest level of welfare</div><div></div><div>Highest level of welfare = 100</div></div> | 1st round score | 90% certain lower bound | 90% certain upper bound | 2nd round score | 90% certain lower bound | 90% certain upper bound | | | |
| Good feeding | 1 | Provision and access to food. Animals should have appropriate access to the quantity and quality of appropriate foodstuffs for health and wellbeing | 55 | 55 | 65 | 50 | 50 | 60 | 60 Little to no opportunity for pleasure and interest from food tasks, texture smell and variety, autonomy, choice, no access to preferred foodstuffs or variety in methods of provision, no provision for highly motivated behaviour associated with food searching and acquisition. | post hatch access variable. Not enough calcium for lay. Feed reduced at end of lay. But positive is fed much, some variety and choice (not much) | |
| | 2 | Provision and access to water. Animals should have appropriate access to the quantity and quality of water for health and wellbeing | 70 | 70 | 80 | 70 | 70 | 80 | 80 physical water requirements met although access might be hindered due to lack of space, lack choice of water sources or behavioural problems | same | |
| Good housing | 3 | Animals should have comfort when resting | 30 | 30 | 40 | 30 | 30 | 40 | 40 Perch or rest or wire. No opportunity to seek elevation. No ability to dustbathe as comfort behaviour. Inability to perform comfort behaviour was identified as highly relevant welfare consequence in cages in EFSA. Lack of space to preen. No choice of substrates or perches to rest on, restricted room to stretch out/first comfortable positions. Lack of opportunity for pleasure e.g. substrate. Lack of autonomy as throughout. Disturbance. Resting problems have been identified as highly relevant welfare consequence for pullets in collective cages and/or floor system without elevated structures and for layer breeders in collective cages (single-tier and caged systems) (EFSA). | same | |
| | 4 | Animals should have thermal comfort being neither too hot nor too cold | 60 | 50 | 65 | 65 | 55 | 75 | 75 Units kept at even temperatures which are neither too hot nor too cold, but choice of comfortable temperatures not given. No ability to behaviourally and physiologically thermoregulate including control and environmental choice (ie variation) without constraint and provision of appropriate species relevant resources to facilitate this | Transport challenging | |
| | 5 | Animals should have sufficient space to move freely | 15 | 10 | 20 | 15 | 10 | 20 | 20 Birds given more space in enriched cages to move, but still so little space and certainly not able to move freely | | |
| Good health | 6 | Animals should be free from injuries and disorders (e.g. skin conditions, lameness, bone fractures etc.) | 45 | 30 | 55 | 45 | 30 | 55 | 55 Ruffer 2020 furnished cages, floor systems, and single-tier systems were associated with the highest average KBF prevalence. Infections (e.g. dermatophytosis/ingrown, pseudomonosis, staphylococci, viral diseases), ectoparasites | Osteoporosis. Issues to accessing birds needing culling. Wire hyperkeratosis. | |
| | 7 | Animals should be free from disease, including metabolic conditions, with high standards of health care and hygiene | 50 | 45 | 60 | 50 | 45 | 60 | 60 Metabolic disease - but high-energy diets but have limited exercise. Individual bird care lacking. | Vaccinated. | |
| | 8 | Animals should not suffer pain - for example as a result of poor management, handling, surgical or other procedures, slaughter etc. | 50 | 40 | 60 | 45 | 40 | 55 | 55 Pain from bone lesions, beak trimming, slaughter | Depopulation handling pain | |
| Appropriate behaviour | 9 | Animals should be able to express normal, non-harmful social behaviours (such as grooming and social bonding) | 10 | 10 | 15 | 10 | 10 | 15 | 20 Close confinement makes harmful social interactions more likely. Non-harmful social behaviour is mostly about being able to move away from each other and choosing which hens to be close with, and positive social behaviour is about being able to follow other, join each other in certain interactions. Hens do choose to spend time with certain other individuals e.g. Games et al 2022 results "demonstrate the importance of social relationships when considering the expression of individual behaviour." | No mother. Positive: small group. No natural behaviour or brooding/maternal behaviour. Unclear whether they have desire to do? Attachments might not be same as bonds - signs of stress if separated. | |
| | 10 | Animals should be able to express other normal behaviours (e.g. foraging, exploring) | 10 | 10 | 15 | 10 | 10 | 15 | 15 Very little opportunity to express these behaviours due to lack of space and resources especially choice of resources. Inability to perform exploratory or foraging behaviour has been identified as highly relevant welfare consequence for laying hens, pullets and layer breeders in cage systems (EFSA). | | |
| | 11 | Animals should be handled well with positive and not negative animal-human relationships | 10 | 10 | 20 | 60 | | 60 | Very little/no opportunity to foster good human-animal relationships | Not routinely handled but when handled it's not positive. Exposure to humans not always positive. | |
| | 12 | Additional aspects not already adequately covered above in relation to the balance between positive and negative affective states for animals | 10 | 10 | 15 | 15 | 15 | 20 | Boredom and apathy. No novelty. Sensory negative experiences and no positive ones. Noise, smells, no daylight. | | |

Scenario 2 - Barn egg production

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| Good feeding | 1 | Provision and access to food. Animals should have appropriate access to the quantity and quality of appropriate foodstuffs for health and wellbeing | 60 | 60 | 70 | 55 | 50 | 65 | 65 Same as cage but more room for better access | | | |
| | 2 | Provision and access to water. Animals should have appropriate access to the quantity and quality of water for health and wellbeing | 75 | 70 | 80 | 75 | 70 | 80 | 80 Same as cage but more room for better access | | Higher level of breakdown? Lower pecking order bird reduced access? | |
| Good housing | 3 | Animals should have comfort when resting | 60 | 55 | 70 | 50 | 50 | 60 | 60 Solid floor, litter, more perches, and most systems are multi tier so opportunity for elevation, but still little choice of preferred resting places and materials, little autonomy within the environment, possibly not all able to perform motivated resting behaviours (e.g. choose highest perch, rest may be disturbed due to large number of birds. Lack of natural light, no sunbathing?) | | Not enough provision, appropriate design. KBF mean uncomfortable resting? Reduces | |
| | 4 | Animals should have thermal comfort being neither too hot nor too cold | 70 | 60 | 70 | 67 | 60 | 70 | 70 More choice in thermal comfort, more ability to behaviourally thermoregulate | | more difficult to regulate temperature in large house | |
| Good health | 5 | Animals should have sufficient space to move freely | 55 | 50 | 60 | 45 | 45 | 55 | 55 Much more space, but not as much as free range and still somewhat high stocking density | | Some areas are more densely populated. Piling behaviour. | |
| | 6 | Animals should be free from injuries and disorders (e.g. skin conditions, lameness, bone fractures etc.) | 55 | 40 | 70 | 45 | 30 | 55 | 55 most barns are multi tier and Ruffer 2020 found KBF prevalence in aviaries was lower than furnished cages | | Severity of KBF in barn higher. | |
| | 7 | Animals should be free from disease, including metabolic conditions, with high standards of health care and hygiene | 60 | 40 | 70 | 50 | 45 | 60 | 60 More room to exercise improve metabolic disease. | | More infectious diseases, on average hygiene worse, but balances out with the improvements | |
| | 8 | Animals should not suffer pain - for example as a result of poor management, handling, surgical or other procedures, slaughter etc. | 60 | 40 | 70 | 40 | 40 | 55 | 55 Improvements above lead to decreased pain | | Severity of KBF in barns higher - hit with impact. Injury from depopulation. Smothering. Feather pecking. Electric shocks. | |
| | 9 | Animals should be able to express normal, non-harmful social behaviours (such as grooming and social bonding) | 55 | 50 | 60 | 30 | 30 | 40 | 40 More space to move away from negative interactions and synchronise behaviour, but not enough room to optimise this | | | |
| Appropriate behaviour | 10 | Animals should be able to express other normal behaviours (e.g. foraging, exploring) | 50 | 50 | 60 | 40 | 30 | 40 | 40 More space but still lack of opportunity to stimulate motivated behaviours, full behavioural repertoire, lack of choice, preference, autonomy, interest, novelty, variety. | | Only foraging in wood/hedges and droppings so not a lot of positive environment | |
| | 11 | Animals should be handled well with positive and not negative animal-human relationships | 30 | 20 | 40 | 65 | 50 | 65 | 65 More space may make interactions less onerous but | | | |
| | 12 | Additional aspects not already adequately covered above in relation to the balance between positive and negative affective states for animals | 30 | 20 | 40 | 20 | 10 | 30 | 30 lack of cognitive stimulation, natural light and other sensory considerations, biophilia | | | |

Free-range egg production (not including organic)

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| Good feeding | 1 | Provision and access to food. Animals should have appropriate access to the quantity and quality of appropriate foodstuffs for health and wellbeing | 80 | 70 | 90 | 65 | 65 | 80 | 80 Depends on quality of range but more opportunity to forage for food which brings choice, variety, interest, behavioural motivation attached to food acquisition | | |
| | 2 | Provision and access to water. Animals should have appropriate access to the quantity and quality of water for health and wellbeing | 80 | 70 | 90 | 75 | 70 | 80 | 80 Depends on range but potentially natural sources of water, choice, preference, mineral content/non chlorinated | | |
| Good housing | 3 | Animals should have comfort when resting | 75 | 70 | 80 | 65 | 50 | 70 | 70 More space and choice, less disturbance, natural light (opportunity for sunbathing) | | |
| | 4 | Animals should have thermal comfort being neither too hot nor too cold | 65 | 60 | 75 | 67 | 50 | 70 | 70 Potential for impact from cold but space and opportunity for choice of thermal environment, but often poor feather cover in large flocks, and due to dietary restriction towards end of lay | | |
| | 5 | Animals should have sufficient space to move freely | 80 | 70 | 90 | 70 | 60 | 80 | 80 More space but depends on quality of range | | |
| Good health | 6 | Animals should be free from injuries and disorders (e.g. skin conditions, lameness, bone fractures etc.) | 55 | 50 | 70 | 45 | 40 | 55 | 55 Some risk as barn for KBF | | |
| | 7 | Animals should be free from disease, including metabolic conditions, with high standards of health care and hygiene | 65 | 50 | 70 | 50 | 40 | 60 | 60 I don't think prevalence of disease is very high. Well managed free range systems have good hygiene and free from disease, large flock sizes mean individual health care can be difficult. Reduced stress increase immune function | | |
| | 8 | Animals should not suffer pain - for example as a result of poor management, handling, surgical or other procedures, slaughter etc. | 60 | 50 | 70 | 40 | 40 | 50 | 50 Same as barn | | |
| Appropriate behaviour | 9 | Animals should be able to express normal, non-harmful social behaviours (such as grooming and social bonding) | 70 | 60 | 80 | 55 | 45 | 60 | 60 More space to choose who to spend time with but large flock sizes remain an issue for harmful social behaviours | | |
| | 10 | Animals should be able to express other normal behaviours (e.g. foraging, exploring) | 75 | 60 | 90 | 70 | 65 | 75 | 75 Space and resources allow fuller behavioural expression, especially in well managed systems with enriched ranges, but unenriched ranges remain an issue | | |
| | 11 | Animals should be handled well with positive and not negative animal-human relationships | 50 | 40 | 60 | 65 | 50 | 65 | 65 Reduced opportunity for negative interactions due to more space to get away, but little opportunity to develop positive relationship due to large flock size | | |
| | 12 | Additional aspects not already adequately covered above in relation to the balance between positive and negative affective states for animals | 60 | 55 | 60 | 40 | 30 | 45 | 45 Improved sensory environment, natural light, access to nature (biophilia) but regulations don't necessarily mean enough environmental complexity, variety, novelty. But potentially increased fear from predation - Predation stress has been identified as a highly relevant welfare consequence for laying hens and quail in non-cage systems with outdoor access, including mobile housing (EFSA). Although in balance I don't think this is enough to outweigh benefits of range. | | |