Module

ASEAN Good Animal Husbandry Practices (GAHP) Animal Welfare and Environmental Sustainability Module, Layers, Broilers and Ducks

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1. Introduction and background

Global trade of chicken and chicken products is increasing as trade becomes freer. Changes in consumer lifestyles in the ASEAN region and throughout the world are driving the demand for assurance that chicken products are safe to eat and are produced and handled in a manner that, does not compromise the and does not cause harm to the environment. The impact of these trends has resulted in retailers wanting industry compliance with Good Animal Husbandry Practices (GAHP) programmes, and governments introducing legal requirements for food safety, worker health and safety, animal welfare and environmental protection.

The ASEAN Member States (AMS) have common farming practices, infrastructures, and weather patterns. However, the implementation of GAHP programs currently within the region varies. Some member states have different country certification and or accreditation systems and the level of awareness varies.

1.1. Purpose and Scope of ASEAN GAHP for Layers, Broilers and Ducks

GAHP programmes are becoming important throughout the world. ASEAN GAHP for Layers, Broilers and Ducks is a standard for good animal husbandry practices for poultry production in the ASEAN region.

As ASEAN progresses to a single economy it is essential that uniform standards are introduced across the ASEAN member States (AMS). There is some confusion when it comes to GAHP, with a number of issues covered by existing world standards and guidelines. The AMS are introducing GAHPs in modular form, and this animal welfare module for poultry will be the first in this field. It is intended that GAHP guidelines and standards will cover much more than just animal welfare. This module primarily covers animal welfare, but also addresses biosecurity issues, and husbandry practices that affect quality of animal product, the environment and the health and safety of farm workers. Whilst nearly all customers require food safety to be a mandatory requirement of the food they buy, only some customers value other standards related to environment, animal welfare and workers' health and safety. It also includes environmental sustainability[1]

[1] Environmental sustainability is the ability to maintain the qualities that are valued in the physical environment. (Sutton, P. 2004. A Perspective on environmental sustainability? A paper for the Victorian Commissioner for Environmental Sustainability. http://www.green-innovations.asn.au/A-Perspective-on-Environmental-Sustainability.pdf)

considerations regarding the impact of chicken and duck farms on the local environment and communities. Biosecurity has also been covered in the ASEAN biosecurity management manual for commercial poultry farming.

The AMS have addressed the ASEAN broiler, layer and duck industries first as these are important industries across all Member States. This document describes a GAHP for animal welfare in meat chickens (broilers), layer hens and ducks. It will be common across the ten Member States and will be known as ASEAN GAHP for Layers, Broilers and Ducks.

The ASEAN GAHP for Layers, Broilers and Ducks will enhance the harmonisation of GAHP programs within the ASEAN region. This will facilitate internal and external trade and increase the competitiveness of ASEAN's chicken products between AMS. It will also potentially open new global markets, improve viability for farmers, help sustain a safe food supply and assist efforts to minimise poultry farm impacts on the environment. Nonetheless, countries wishing to export poultry and poultry products will still have to comply with the Sanitary and Phytosanitary (SPS) requirements and other conditions imposed by the importing countries.

The scope of this ASEAN GAHP for Layers, Broilers and Ducks covers the production, handling and transportation of chickens and ducks on farms which are intended to be used for *commercial productions systems*. However, it is not a standard for certification of organic products or Genetically Modified Organism (GMO) free products.

How this ASEAN GAHP was developed

ASEAN GAHP for Layers and Broilers was developed by the AMS representatives shown in the acknowledgment section, with the support of the Centre for Animal Welfare and Ethics, University of Queensland, as consultants to the project, and the ASEAN secretariat.

Acronyms

AMS	ASEAN Member States
ASEAN	Association of South East Asian Nations
CODEX	Codex Alimentarius
GAP	Good Agricultural Practices
GAHP	Good Animal Husbandry Practices
GMO	Genetically modified organisms
GMP	Good Manufacturing Practices
ILO	International Labour Organisation
OIE	World Organisation for Animal Health
ppm	parts per million
SPS	Sanitary Phytosanitary Agreement under the WTO
WTO	World Trade Organisation

Definition of terms

Advisor – a technical advisor who is an expert in a particular field of knowledge, e.g. poultry nutrition, providing detailed information and advice about the issues.

Chicken - within this module, chicken refers to ‘domestic fowl (Gallus gallus domesticus) kept for meat production (broiler) or egg production (layer)’.

Duck - within this module, duck refers to ‘domesticated ducks (Anatidae anas).

1.2 Understanding Animal Welfare and its assessment and management

Animal Welfare is a complex public policy issue, influenced by culture, religion, moral and ethical values, economics and community views.

The World Organisation for Animal Health (OIE) comprises the government chief veterinary officers of 180 Member Countries. It has shown global leadership in the development of science-based international animal welfare standards and guidelines.

The OIE definition of Animal Welfare[2]:

> **'Animal welfare means how an animal is coping with the conditions in which it lives. An animal is in a good state of welfare if (as indicated by scientific evidence) it is healthy, comfortable, well nourished, safe, able to express innate behaviour, and if it is not suffering from unpleasant states such as pain, fear, and distress'.**

Good animal welfare requires disease prevention and appropriate veterinary treatment, shelter, management and nutrition, humane handling and humane slaughter or killing. Animal welfare refers to the state of the animal; the treatment that an animal receives is covered by other terms such as animal care, animal husbandry, and humane treatment.

The scientific basis of OIE animal welfare standards provides the foundation for creating a consensus amongst all OIE Member Countries to support their adoption.
Furthermore, animal welfare standards involve ethical concepts, as well as technical and scientific analyses which demand specialised expertise.

OIE Guiding Principles for animal welfare[3]:

1. That there is a critical relationship between animal health and animal welfare.
2. That the internationally-recognised 'five freedoms' (freedom from hunger, thirst and malnutrition; freedom from fear and distress; freedom from physical and thermal discomfort; freedom from pain, injury and disease; and freedom to express normal patterns of behaviour) provide valuable guidance in animal welfare.
3. That the internationally recognised 'three Rs' (reduction in numbers of animals, refinement of experimental methods and replacement of animals with non-animal techniques) provide valuable guidance for the use of animals in science.
4. That the scientific assessment of animal welfare involves diverse elements which need to be considered together, and that selecting and weighing these elements often involves value-based assumptions, which should be made as explicit as possible.
5. That the use of animals in agriculture, education and research, and for companionship, recreation and entertainment, makes a major contribution to the wellbeing of people.
6. That the use of animals carries with it an ethical responsibility to ensure the welfare of such animals to the greatest extent practicable.
7. That improvements in farm animal welfare can often improve productivity and feed safety, and hence lead to economic benefits.
8. That equivalent outcomes based on performance criteria, rather than identical systems based on design criteria, are the basis for comparison of animal welfare standards and recommendations.

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[2] http://www.oie.int/en/international-standard-setting/terrestrial-code/access-online/?htmfile=chapitre_aw_introduction.htm
[3] http://www.oie.int/en/international-standard-setting/terrestrial-code/access-online/?htmfile=chapitre_aw_introduction.htm

General principles for the welfare of animals in livestock production systems

In addition, the 180 countries of the OIE, including ASEAN countries, have endorsed the following important general principles for the welfare of animals in livestock production systems:

1. Genetic selection should always take into account the health and welfare of animals.
2. Animals chosen for introduction into new environments should be suited to the local climate and able to adapt to local diseases, parasites and nutrition.
3. The physical environment, including the substrate (walking surface, resting surface, etc.), should be suited to the species so as to minimise risk of injury and transmission of diseases or parasites to animals.
4. The physical environment should allow comfortable resting, safe and comfortable movement, including normal postural changes, and the opportunity to perform types of natural behaviour that animals are motivated to perform.
5. Social grouping of animals should be managed to allow positive social behaviour and minimise injury, distress and chronic fear.
6. For housed animals, air quality, temperature and humidity should support good animal health and not be aversive. Where extreme conditions occur, animals should not be prevented from using their natural methods of thermo-regulation.
7. Animals should have access to sufficient feed and water, suited to the animals' age and needs, to maintain normal health and productivity and to prevent prolonged hunger, thirst, malnutrition or dehydration.
8. Diseases and parasites should be prevented and controlled as much as possible through good management practices. Animals with serious health problems should be isolated and treated promptly or killed humanely if treatment is not feasible or recovery is unlikely.
9. Where painful procedures cannot be avoided, the resulting pain should be managed to the extent that available methods allow.
10. The handling of animals should foster a positive relationship between humans and animals and should not cause injury, panic, lasting fear or avoidable stress.
11. Owners and handlers should have sufficient skill and knowledge to ensure that animals are treated in accordance with these principles.

The OIE and non-government organisations are working with governments to assist animal welfare capacity building and the implementation of the OIE animal welfare standards.

Capability enhancement typically has three major stages:

- the *adoption of standards* based mainly on animal welfare outcomes, supported by capacity building through education and skills training.
- the *implementation of compliance auditing* to assess whether defined welfare outcomes are being met via ongoing monitoring and interventions, and;
- the incorporation of animal welfare outcome indicators, and management, into *industry-based Quality Assurance programs* that are recognised by competent authorities and retailers as delivering acceptable animal welfare outcomes.

This understanding underlies the key general attributes of effective animal welfare management systems. They are:

1. Direct observation of the animals themselves to determine whether a welfare problem exists, and if so, what the likely cause may be.
2. Evaluation of the external circumstances of the animals to see if there are inadequacies in feeding, the immediate physical environment, husbandry and veterinary care, staff training, knowledge and skills, and the design and use of facilities that contribute to a welfare problem that has been identified.
3. Direct husbandry or veterinary treatment and/or changing some other external circumstances of the animals to alleviate or eliminate the identified problem.

Note that attention is now also given to the promotion of positive experiences in animals, where that is practically feasible. This is done by, for example, providing benign non-threatening circumstances, enhanced environmental stimulation, and the company of other animals of the same or similar species.

Human-animal relationships can have marked effects on animal welfare. Good welfare-related knowledge, skills and attitudes towards animals by stockpersons enhance the welfare and productivity of livestock.

This animal welfare GAHP module for poultry draws upon these OIE principles and standards and other relevant publicly available resources and publications. It provides a strong foundation for the development and delivery of further work on audit and compliance frameworks for the standards.

1.3 Guide to sections

Section 1 summarizes the background to the ASEAN GAHP approach, understanding and defining animal welfare and internationally-agreed principles for managing animals in livestock systems.

Section 2 contains the specific animal welfare standards for broiler chickens, layer hens and ducks and the management considerations that affect the delivery of these animal welfare standards.

Sections 3 outlines the general considerations for poultry transportation.

Section 4 provides general considerations for the slaughter of poultry.

Section 5 contains the specific animal welfare standards and management approaches regarding environmental sustainability considerations for chicken and duck farms.

This module also has a number of annexes of relevance to the standards:

Annex 1 – Public health hazards to consider and manage in chicken, egg and duck farms.
This module should be read in conjunction with the ASEAN food safety GAHP module for layer hens and broilers as it covers related topics on minimising food safety and public health risks through better farm management practices.

Annex 2 – Environmental sustainability information.

Annex 3 – Record Keeping.

Annex 4 - Focal features for animal welfare assessment and criteria or measurables for the welfare of broilers from the World Organisation for Animal Health (OIE) global animal welfare standards.

Annex 5 – Self-assessment checklists for poultry.

Annex 6 – Examples of documents and records of relevance.

Appendices – Glossary of terms and references.

2. GAHP requirements

Based on the OIE Guiding Principles, European and other global research and development work, this ASEAN GAHP has been developed around the following key areas:

'Good feed and water'

1 Animals eat nutritious feed in amounts that maintain acceptable body condition scores.
2 Animals drink, or otherwise access, sufficient quantity and quality of water for their biological needs.

'Good indoor and/or outdoor environments'

3 Animals have comfortable areas to rest whether they are indoors or outdoors.
4 Animals have sufficient shade and/or shelter to maintain thermal comfort, i.e. they are not too hot.
5 Animals have sufficient space to be able to move around freely.
6 Animals should have sufficient fresh air ventilation to prevent adverse health and production impacts from a buildup of noxious gasses, dust or smoke.

'Good health'

7 Expert advice on treatment is sought and applied rapidly when signs of disease occur, and the rest of the animals are checked.

8 Injuries due to facilities design, accidents, fighting or victimisation are identified and the animals treated, and remedial actions are taken to minimise a reoccurrence.

'Appropriate behaviour'

9 Animals are able to express some species typical, non-harmful social and other behaviours that reflect positive emotional states.

Duty of care / Responsibilities

10 Good health is promoted and commercial flocks should develop a detailed health care programme, including preventative measures and high standards of hygiene.

11 Invasive husbandry procedures are avoided or conducted in ways that minimise pain and distress.

12 For large flocks in particular, persons responsible for the care of animals are well trained, experienced and dedicated.

13 They are skilled in animal husbandry and handle animals in ways that promote good human-animal relationships and are able to recognise the signs of good and poor welfare.

14 They have knowledge of the normal appearance and behaviour of animals that is essential to treat animals effectively and efficiently, and have consideration for the welfare of the animals.

BROILERS

2.1. Good feed and water

2.1.1. Feed

Animal Welfare Standards	Management Considerations[4]
2.1.1.1. All chickens must receive adequate quantities of feed and nutrients each day to enable them to: • maintain good health; • meet physiological demands • avoid metabolic and nutritional disorders. 2.1.1.2. Feed must be provided in such a way as to prevent undue competition and injury. 2.1.1.3. Any chicken that cannot access feed and water adequately must be removed during daily inspections and raised separately or humanely killed immediately. 2.1.1.4. Chicken growth and behaviour should not be adversely affected by feed changes. 2.1.1.5. The stocking density of sheds and location of feeders, must allow chickens appropriate space to access feeders without undue competition.	• Feed quality and composition meet published standards for broiler feeds. • Feed is sourced from suppliers who follow recognized good manufacturing practices and/or good hygiene practices and that meet quality and standard set by the country regulations act or Government directives. • The pellet and/or crumb size is appropriate for the size of the chickens. • Daily inspection is carried out to monitor competition and injuries, and corrective action is taken and documented as required. • If the sample growth rate varies by 10% or more from the expected growth chart, advice should be obtained. • If the mortality level within a shed exceeds 1% in a 24-hour period linked to a suspected feed problem, an investigation is undertaken and documented by the appropriate personnel.

[4] 'Management considerations' refers to particular issues or management procedures that will directly or indirectly influence delivery of the animal welfare standards. These points are not meant to directly correspond to any particular subset standard, but rather assist meeting the overall standard, in this case 2.1.1. Feed

2.1.2. Water

Animal Welfare Standards	Management Considerations
2.1.2.1. Chickens must have daily access to a supply of water at all times. The water must be potable, not harmful to health and at a temperature that does not inhibit drinking. 2.1.2.2. Farm operating procedures provide for the daily water needs of chickens via appropriate drinker equipment (bells, nipples or cups). 2.1.2.3. Any chicken that cannot access water adequately must be removed during daily inspections and raised separately or humanely killed immediately.	• Water reticulation systems are checked daily, any problems immediately rectified and the supply and use are monitored. • Water systems are regularly cleaned to prevent accumulation of hazardous materials – chemical, physical, or microbiological. • Drinking water sources are routinely monitored for microbiological and chemical content, quality and potability. The required frequency of monitoring will depend on the source. • The water reserves and flow are adequate for the average 24-hour demand. • Competition among birds is managed and does not prevent any chicken from having access to water. • The number of watering points and devices are appropriate for the number and size of chickens. • Alternative arrangements are in place in case of water equipment or supply failure to ensure that chickens receive their daily water requirements.

2.2. Good environments

2.2.1. Access to, and management of, an outdoor range area

Animal Welfare Standards	Management Considerations
Shelter and shade for chickens with access to outdoors 2.2.1.1. All chickens must have access to shelter from adverse weather that is likely to cause heat or cold stress, and to minimise the risk of predation. 2.2.1.2. If openings to the outdoor area are provided, they must be designed to minimise the adverse effects of the weather on the chickens and on the quality of litter. 2.2.1.3. Access to the outdoor range must be available during daylight hours unless prevented by bad weather or on veterinary advice.	**Shelter and shade for chickens with access outdoors** • Access to/from the outdoor area is not blocked. • The openings to the outside are sheltered from the weather and the litter around the openings is in good condition. • Chickens with access outdoors are observed to use the outside range frequently. • Overhead shade or shelter is provided on the outdoor at all times throughout the year in a manner that encourages full use of the range. • Chickens should not be exposed to extreme heat stress. • Ambient temperature (at the level of the chickens) is appropriate for chickens. It is measured and recorded on a continuous basis. • Chicken behaviour is monitored at least once per day (or more often when ambient external temperatures are greater than the chickens' thermal comfort zone. Corrective action is taken if signs of stress are observed (e.g. sneezing, prolonged panting and wing extension due to heat). • Protection from predators is provided. • Windbreaks are evident in exposed outdoor areas.
2.2.1.4. The outdoor range area must be managed actively to ensure that the ground conditions and vegetation are not harmful to the health and welfare of the chickens.	• The area immediately around the shed is managed to keep chickens' feet clean and there is minimal evidence of pugging, standing water and muddy, dusty or contaminated

2.2.1.5. The area immediately around the shed must be managed to prevent the ground becoming wet and muddy, to keep the chickens' feet clean and minimise parasite build up in this area. 2.2.1.6. An outdoor range management plan must be in place that addresses pasture quality, vegetation, and control of parasites and diseases.	conditions. • A system of range rotation is in place that takes account of the type of soil, drainage and flock size. • Measures to prevent parasite build up in the outdoor area are in place. • Vegetation on the range is maintained in good condition, free of poisonous plants and contaminants and nutrient build up is managed.

2.2.2. Indoor management

Animal Welfare Standards	Management Considerations
Housing and equipment 2.2.2.1. Precautions must be taken to secure the site and buildings at all times in order to protect the health and welfare of the chickens. 2.2.2.2. Chicken sheds must be designed, constructed and maintained to: • provide insulation, ventilation, heating, lighting, sanitation and hygiene requirements • allow the distribution of chickens over the floor to be controlled so as to keep young chicks within the heated area and prevent crowding of older chickens • allow ready access for handling and inspection of the chickens by having sufficient height, width and entrance size to minimise stress on the chickens.	**Housing and equipment** • Access to the premises is controlled and visitor access is recorded • Damaged equipment, sharp wire or metal edges is removed to prevent injuries to chickens. • Sheds are inspected daily and chicken distribution and behaviour is monitored and corrective action is taken to adjust light, temperature or ventilation as required to maintain chicken health and welfare. • A monitoring plan for the operation of automatic equipment is established and implemented. • There is an appropriate and documented pest control programme to control pests that may cause a biosecurity risk, or fear, distress or injury to chickens. • In order to ensure the performance of operating systems,

2.2.2.3. All surfaces in the chicken sheds and enclosures must be designed, constructed, and maintained to: • minimise the risk of injury and disease to the chickens; and • facilitate cleaning and disinfection of the shed surfaces. 2.2.2.4. All equipment used for rearing the chickens must be inspected as necessary ensure correct operational functions, and if required appropriate remedial action must be undertaken. 2.2.2.5. The chicken sheds must be subject to a pest (e.g. wild birds, mustelids, rodents) control plan. 2.2.2.6. All chicken sheds must be sited to minimise risks of natural and environmental hazards such as storm water drainage, extreme winds and to allow for appropriate management of dust. 2.2.2.7. Controlled environment housing must have adequate alarms that warn of power failure and/or significant temperature variance.	fire-fighting equipment and emergency power supplies are tested regularly in accordance with the maintainance schedule as recommended by the manufacturer and results are documented.

2.2.3. Lighting

Animal Welfare Standards	Management Considerations
2.2.3.1. Lighting intensity after placement of the chicks in the brooding area must be sufficient to enable them to learn the locations of feed and water. This training period must include at least one hour of continuous darkness each day, to accustom the chickens to blackout conditions and to prevent panic should	• Chicks are exposed to at least one hour of continuous blackout per day for no more than four days after being placed in the brooding area. • Light intensity after placement of chicks is sufficient for the chicks to learn the position of feed and water.

lighting fail. 2.2.3.2. After the training period described in 2.2.3.1. above, lighting patterns must encourage activity and provide a minimum period of darkness each day to ensure adequate rest in chickens, such that: • If only four hours of darkness is provided it must be continuous; • If more than four hours of darkness is provided, each dark period must be a minimum of three continuous hours. 2.2.3.3. Lighting levels during the lights-on period must allow the chickens to see one another and to visually inspect their surroundings. 2.2.3.4. Lighting levels during inspections must be sufficient to stimulate activity of the chickens and allow chickens and equipment to be inspected.	• After the first four days of placement, natural and/or artificial light intensity at chicken head height is at least 20 lux. [5] • Light levels during inspection are sufficient to ensure that all chickens and equipment in all parts of the house are clearly visible. • Chickens are distributed evenly across the floor. The lighting timetable is documented (number and duration of light and dark periods). **All light measurements use the 'box' technique, meaning, the 6 directions of the face of a cube (see reference 12 for more information on light intensity measurement).*

2.2.4. Temperature

Animal Welfare Standards	Management Considerations
2.2.4.1. Temperature in sheds must be maintained within a range that ensures good health and welfare of the chickens.	• Ambient temperature at the level of the chickens is appropriate for the age of the chicken. It is measured and

[5] European Union Council Directive 2007/43/EC, June 2007. Minimum rules for protection of chickens kept for meat production. Accessed on 5 April 2016 at http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32007L0043&from=EN

2.2.4.2. The brooding areas must be pre-heated before placement of chicks and the temperature maintained at a level that promotes good chick health and welfare. 2.2.4.3. Where evidence of temperature-induced distress is observed, remedial action must be taken immediately to rectify ambient temperature or air flow and to mitigate adverse effects on chickens.	recorded on a continuous basis and follows meat chicken company guidelines. • Chicken behaviour is monitored at least once per day (or more often when ambient external temperatures are greater than the chickens' thermal comfort zone). Corrective action is taken if signs of stress are observed (e.g. sneezing, prolonged panting and wing extension due to heat). • Chickens are evenly distributed across the shed floor.

2.2.5. Stocking density

Animal Welfare Standards	Management Considerations
2.2.5.1. Chickens must be managed at a stocking density that takes account of growth rate, housing system, normal posture, competition for space, age, weight, access to feeders and water, air temperature and quality, ventilation, humidity, litter quality and activity levels, so as to maintain good health and welfare. (for more information refer to OIE[6], Chapter 7.10 – Animal Welfare and Broiler Chicken Production Systems, Article 7.10.4.) 2.2.5.2. Outdoor stocking density must not exceed the capacity of the outside area or cause overcrowding.	• Chickens have access to feeders and drinkers without undue competition. • Chickens have unimpeded ability to stand, turn around, and flap their wings. • Chickens outdoors are able to move and forage freely. • If chickens are inactive because of overcrowding, stocking rate is adjusted accordingly. • Where the incidence of severe footpad lesions or hock burn is higher than 2%, stocking rate is adjusted accordingly. • Where the number of culls for lameness is higher than 0.3%, or is higher than that expected for the age and strain of the chickens, stocking rate is adjusted accordingly. • Chickens are stocked at a maximum of 10 chickens/m^2 stocking density outside.

[6] http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_aw_broiler_chicken.htm

	• There is minimal competition at shed openings.

2.2.6. Air quality/ventilation

Animal Welfare Standards	Management Considerations
2.2.6.1. Adequate ventilation must be provided in order to prevent the build-up of heat, humidity, dust and noxious gases to levels that are harmful to chicken health or that cause pain or distress to chickens. 2.2.6.2. Immediate and appropriate action must be taken to reduce ammonia levels if they exceed 25 ppm[7] at chicken head height. 2.2.6.3. In the case of ventilation system failure, an alternative ventilation system must be available.	• During daily inspections minimal signs of discomfort, distress or disease (e.g. panting and wing stretching if hot, huddling if cold, sneezing, drowsiness) are observed. • Temperature and humidity are monitored and recorded. • Chickens are distributed evenly over the floor. • Corrective action taken if ammonia is higher than 25 ppm or if any significant incidents caused by poor air quality occur • Neither chickens nor workers experience eye irritation due to ammonia. • Dust levels do not cause discomfort to chickens or workers.

2.3. Good health

2.3.1. Management of health and injury

Animal Welfare Standards	Management Considerations
2.3.1.1. Those responsible for the care of chickens must be competent at recognising the signs of good health, ill health, and injury, and they must consult a veterinarian as appropriate.	• Farm workers have received training or have suitable practical experience and demonstrate competence by appropriate responses to chickens and their needs

[7] OIE Terrestrial Animal Health Code, Chapter 7.10 – Animal Welfare and Broiler Chicken Production Systems, Article 7.10.4, Section 2c at http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_aw_broiler_chicken.htm

2.3.1.2. Chickens must be inspected at least once daily for evidence of ill health or injury, including any obvious gait deficit and any ill, injured or severely lame chickens must be treated or humanely killed immediately. 2.3.1.3. Medication must only be used in accordance with registration conditions, and veterinary prescription. 2.3.1.4. When early signs of a disease outbreak are detected (as according to OIE guidelines) or mortality level within a shed exceeds 1% in a 24 hour period, the cause must be investigated and remedial action taken promptly.	• A health program to manage the risk of infectious and parasitic diseases should be developed and implemented. • Abnormal conditions are noted, the cause identified and appropriate remedial action taken. • Disease outbreaks, health problems and remedial action are documented and reported to competent authorities. • Persons responsible for the welfare of chickens have an understanding of good farm biosecurity measures and adopt them. They should also have some knowledge of the signs of notifiable diseases (e.g. avian influenza, Newcastle disease) and what actions they need to take if concerned • Healthy uninjured chickens exhibit normal mobility, feeding, drinking and resting behaviour. Daily inspections are documented. • Dead chickens and culls are removed daily and numbers are recorded. • An appropriate response is undertaken to early signs of disease(s), lameness or mortality • Chickens that have failed to respond to treatment are killed humanely and promptly • Any chickens which have severe lameness or leg injuries and unable to access feed and water should be culled. • Chickens with an obvious gait deficit (gait score 4 or 5 on a scale of 0–5)[8] are culled • If the mortality level within a shed exceeds 1% in a 24-hour period, an investigation is undertaken and documented by the appropriate personnel.

[8] Garner JP, Falcone C, Wakenell P, Martin M, Mench JA. Reliability and validity of a modified scoring system and its use in assessing tibial dyschondroplasia in broilers. Br Poult Sci. 487-488 2002;43(3):355-63.

2.3.2. Emergency humane killing

Animal Welfare Standards	Management Considerations
2.3.2.1. The method(s) used for the humane killing of chickens including chicks, must ensure rapid death, which is confirmed by inspection. 2.3.2.2. People undertaking humane killing must be appropriately trained and must ensure that chickens are handled gently and calmly at all stages of the process. 2.3.2.3. Any equipment used to undertake humane killing must be well maintained and not overloaded, so that it operates effectively and efficiently. 2.3.2.4. Maceration equipment used for humane killing must be designed to cause very rapid and complete fragmentation of the material into small particles. 2.3.2.5. When using gas, the procedure must ensure the collapse of every chicken within 35 seconds of exposure to the gas. Chickens must remain in the gas for at least a further two minutes following collapse and be inspected to ensure that they are dead upon removal from the gas.	• Humane killing protocols are documented. • OIE has global endorsement for humane methods for the killing of chickens (referred to in the OIE Terrestrial Animal Health Code, which can be viewed at http://www.oie.int/en/international-standard-setting/terrestrial-code/access-online/). Any other methods used for humane killing of chickens are performed under veterinary supervision. • Acceptable methods are used. These include: - Electrical stunning followed by neck dislocation and exsanguination - Neck dislocation alone (recognizing the potential for fatigue in farm workers performing this procedure) - Gassing, using a mixture of inert gases and carbon dioxide - Immediate fragmentation/maceration for day-old chicks. • All chickens submitted for killing are inspected following the procedure to confirm death. • Chickens are confirmed unconscious within 35 seconds of exposure to gas. • Persons performing humane killing are appropriately trained and ensure that the chickens are managed gently and calmly at all stages of the process. • Staff training and supervision is documented and monitored • Equipment used to perform humane killing is never overloaded and is well maintained to ensure that it operates efficiently and maintenance is documented • Mass killing in cases of disease outbreak may be

	implemented under the supervision of the competent authority. (see https://www.aphis.usda.gov/animal_health/emergency_management/downloads/hpai/depopulationpolicy.pdf)

2.4. Appropriate behaviour

2.4.1. Poultry behaviour

Animal Welfare Standards	Management Considerations
2.4.1.1. Chickens must have the opportunity to express some of their inherent normal behaviours. These include, but are not limited to, feeding, drinking, sleeping, preening, walking, scratching, ground pecking, leg stretching, and vocalising.	• Chickens are active and alert, and observed to display all of their normal behaviours, which include feeding, drinking, sleeping, preening, walking, scratching, ground pecking, leg stretching, and vocalising. • Chicken activity is monitored and remedial action is taken as appropriate.

2.5. Good stockmanship

2.5.1. Physical handling

Animal Welfare Standards	Management Considerations
2.5.1.1. Chickens, including chicks in chicken boxes must be moved and handled at all times in a manner that minimises the risk of falls, pain and distress and avoids injury. 2.5.1.2. Chickens, including day-old chicks, must not be carried by a single wing or neck. 2.5.1.3. Stress of handling must be minimised by appropriate design of facilities, tools, equipment and training of personnel.	• No chickens show injuries attributable to poor handling. • Farm workers have received training or have suitable practical experience and demonstrate competence through the appropriate handling of chickens.

2.5.2. Handling and Catching

Animal Welfare Standards	Management Considerations
2.5.2.1. All members of the catching and transporting crews must be supervised and correctly trained in the handling of chickens. 2.5.2.2. A nominated member of the catching team must be responsible for supervising, monitoring and maintaining high welfare standards throughout the catching process and loading of chickens onto the transport vehicle. 2.5.2.3. Chickens should not be subjected to excessive period of feed withdrawal prior to the expected slaughter time. 2.5.2.4. Chickens must have access to water until the time of catching. 2.5.2.5. A catcher must carry chickens by both legs. 2.5.2.6. Crates and containers must be constructed and maintained to ensure there are no hazards likely to cause injury to the chickens. 2.5.2.7. Chickens must be placed into crates in such a way that they can rapidly obtain and maintain an upright position.	• Chicken transport crates are constructed of appropriate material to protect and secure the birds during transport and of sufficient height so that birds can extend their necks. • Transport boxes/crates for day old chicks are constructed of appropriate material to secure and protect the chicks during transportation (see Section 4 of this module). • Any conveyor used for loading crates of live chickens is operated in such a way that there is no pile up of chickens. There must be a contingency plan in case of power or mechanical failure. • The time at which feed is withdrawn from the chickens is recorded and accompanies the consignment of chickens until slaughter. • Crate density is recorded. • Crate size is documented. • Training records are available for inspection. • Responsibilities of the nominated person are documented. • Feed should not be withheld from chickens for more than 12 hours prior to slaughter. • Catching should be done during the coolest part of the day. • Catching should be done in dim light. • Severely injured chickens must be humanely killed immediately.

2.5.3. Loading and transport

2.5.3.1. All chickens, including chicks, selected for transport must be examined by the person in charge prior to loading to ensure they are fit for transport and are able to withstand the journey without suffering unreasonable or unnecessary pain or distress. 2.5.3.2. Persons responsible for the loading and transport of chickens must be trained in careful handling procedures and understand the effects that poor transport conditions may have on the welfare of the chickens. 2.5.3.3. Conveyances and containers must have sufficient ventilation, even when stationary, to prevent harmful concentrations of gases or water vapour, and to protect the chickens from climatic conditions that would compromise their welfare. 2.5.3.4. A contingency plan must be in place to address potential transport problems. 2.5.3.5. Drivers of vehicles must be properly briefed on the contingency plan. 2.5.3.6. Feed must not be withheld from chickens for more than 12 hours prior to arrival at the processing plant. 2.5.3.7. Day-old chicks must be held and transported in conditions of controlled temperature and airflow. 2.5.3.8. Crates and containers containing chickens must be handled with care and not thrown or dropped.	• All chickens are fit and healthy when transported and don't show injuries resulting from poor catching and loading practices. • Chicks are delivered to the place where they will be reared as soon as possible after hatching. • There are documented records of chickens injured or dead on arrival. • Chickens are transported in an upright sitting position. • Ventilation and stocking rate during transport are controlled according to weather and hen condition (e.g. weight, health and feather status). • There is no evidence of panting, huddling and shivering in the chickens. • There is a documented training record for loading and transport crews. • A documented contingency plan is evident. *NOTE: See additional considerations at Section 5.1, Transportation, Food Safety Module – Good Animal Husbandry Practices for Layers and Broilers in ASEAN Countries in Section 4 of this module.*

2.5.3.9. Chickens that are injured during the catching and loading procedures must be humanely killed immediately. 2.5.3.10. Conveyances and containers must have adequate ventilation to allow the free flow of air to all chickens, even when stationary, to prevent the build-up of harmful concentrations of gases or water vapour or temperature.	

2.6. Duty of care

2.6.1. Contingency planning

Animal Welfare Standards	Management Considerations
2.6.1.1. Persons in charge of chickens must have contingency plans to address events such as delays in transport and farm equipment breakdown. Drivers of consignments must be properly briefed about the contingency plan in place. 2.6.1.2. Alternative means of maintaining ongoing environmental control and provision of feed and water must be available in case of emergencies, including power or computer failure, natural disasters or mechanical breakdown. 2.6.1.3. A fire emergency plan and appropriate fire prevention measures must be in place. 2.6.1.4. Staff must be suitably trained to handle an emergency e.g. fire evacuation.	• A written contingency plan, covering catching, loading and transport is available for inspection. • Alternative arrangements are in place in case of equipment or supply failure to ensure chickens receive their daily requirements of feed and water, and temperature and air quality are maintained. • There are systems to indicate any power or computer failure. • All systems, fire-fighting equipment and emergency power supply are tested regularly and test results documented. • The emergency plan is documented and staff are trained to implement it.

2.6.2. Stockpersons

Animal Welfare Standards	Management Considerations
2.6.2.1 Chickens must be cared for by personnel who collectively possess the ability, knowledge and competence necessary to maintain the health and welfare of the chickens in	• Chicken health and welfare is in accordance with the standards listed here in this module.

accordance with the above standards.	• Those caring for and handling meat chickens are familiar with these standards and a copy is available on site at all times • Job descriptions and/or other documentation outlining the expectations of personnel and their performance are readily accessible and include reference to chicken health and welfare • All personnel in contact with the chickens are trained in areas of animal behavior and welfare, handling, biosecurity, general signs of disease, euthanasia, etc or have suitable practical experience and demonstrate competence by appropriate responses to chickens and their needs • A sufficient number of personnel is available in order to meet the requirements outlined here.

LAYER HENS

2.1. Good feed and water

2.1.1. Feed

Animal Welfare Standards	Management Considerations
2.1.1.1. All hens must receive adequate quantities of feed and nutrients each day to enable them to: • maintain good health; • meet physiological demands; and • avoid metabolic and nutritional disorders. 2.1.1.2. Hen growth and behaviour should not be adversely affected by feed changes. 2.1.1.3. The stocking density of sheds and location of feeders, must allow hens appropriate space to access feeders without undue competition. 2.1.1.4. Any hen that cannot access feed adequately must be removed during daily inspections and raised separately or humanely killed immediately.	• Feed quality and composition meet published standards for hen feeds and feed is sourced from suppliers who follow recognized good manufacturing practices and/or good hygiene practices and that meet quality and standards set by the country regulations act or government directives. • Feed particle size is appropriate for the size of the hens • Flock growth rates are monitored regularly, for example by representative samples of hens in each shed and age group being weighed on a regular basis • If the birds have lost 2% of their weight or more since the last weighing, corrective action should be taken (information on weights for breeds of hens can be obtained from breeding companies or avian veterinary services). • Feed nutrients are checked promptly if hens display negative behaviours (e.g. injurious feather pecking, cannibalism).

2.1.2. Water

Animal Welfare Standards	Management Considerations
2.1.2.1. All layer hens must have continuous access to water that is sufficient for their needs. It must be potable and not	• Water flow is checked daily and the supply and use are monitored and any problems immediately rectified.

harmful to their health, including up until the time of depopulation for slaughter. 2.1.2.2. Farm operating procedures and drinker equipment (bells, nipples or cups) provide for the daily water needs of chickens. 2.1.2.3. Any hen that cannot access water adequately must be removed during daily inspections and raised separately or humanely killed immediately.	• The water reserves and flow are adequate for the average 24-hour demand. • Drinking water sources are routinely monitored for microbiological and chemical content, quality and potability. The required frequency of monitoring will depend on the source. • Competition among hens is managed and does not prevent any hen from having access to water. • The number of watering points and devices are appropriate for the number and size of hens. • Alternative arrangements are in place in case of water equipment or supply failure to ensure that hens receive their daily water requirements. • Water systems are regularly cleaned to prevent accumulation of hazardous materials – chemical, physical, or microbiological.

2.2. Good environments

2.2.1. Outdoor management

Animal Welfare Standards	Management Considerations
Shelter and shade for hens with access outdoors 2.2.1.1. All hens must have access to shelter from adverse weather that is likely to cause heat or cold stress, and to minimise the risk of predation. 2.2.1.2. If openings to the outdoor area are provided, they must be designed to minimise the adverse effects of the weather on the hens and on the quality of litter.	**Shelter and shade for hens with access outdoors** • Hens with access outdoors are observed to use the outside range frequently. • Overhead shade or shelter is provided outdoors at all times throughout the year in a manner that encourages full use of the range. • Protection from predators is provided. • Windbreaks are evident in exposed outdoor areas. • The openings to the outside are sheltered from the weather and the litter around the openings is in good condition. • Ambient temperature (at the level of the hens) is appropriate for laying hens. It is measured and recorded on a continuous basis. • Hen behaviour is monitored at least once per day (or more often when ambient external temperatures are greater than the hens' thermal comfort zone. Corrective action is taken if signs of stress are observed (e.g. sneezing, prolonged panting and wing extension due to heat).
2.2.1.3. The outdoor range area must be managed actively to ensure that the ground conditions and vegetation are not harmful to the health and welfare of the hens.	• A system of range rotation is in place that takes account of the type of soil, drainage and flock size. • Measures to prevent parasite build up in the outdoor area are

2.2.1.4. The area immediately around the shed must be managed to prevent the ground becoming wet and muddy, to keep the hens' feet clean and minimise parasite build up in this area. 2.2.1.5. An outdoor range management plan must be in place that addresses pasture quality, vegetation, and control of parasites and diseases. 2.2.1.6. Access to the outdoor range must be available during daylight hours unless prevented by bad weather or on veterinary advice.	in place. • Vegetation on the range is maintained in good condition, free of poisonous plants and contaminants and nutrient build up is managed. • Access to/from the outdoor area is not blocked.

2.2.2. Indoor management

Animal Welfare Standards	Management Considerations
Housing and Equipment 2.2.2.1. Housing systems and mechanical equipment must be designed, constructed, cleaned and maintained to avoid injury, disease or harm to layer hens. 2.2.2.2. Housing systems must be sited to facilitate drainage of storm water away from buildings and to minimise risks posed by natural and environmental hazards. 2.2.2.3. Precautions must be taken to secure the site and buildings against unauthorized entry of people, to protect the	**Housing and Equipment** • All birds can be inspected with ease (i.e. there is good access to all birds and sufficient lighting). • Provisions are in place to control personnel accessing the premises. • Pest control is implemented and documented. • Environmental parameters of the housing system are in accordance with appropriate standards for Lighting, Ventilation, and Temperature. • Operation of equipment is monitored daily and corrective action is taken promptly and documented.

health and welfare of the hens. 2.2.2.4. Measures must be taken in and around hen housing and shelters to control all other animal species (e.g. birds, rodents, wildlife). 2.2.2.5. Controlled environment housing must have alarms that warn of power failure and/or significant temperature variance. 2.2.2.6. Housing systems, with the exception of cages, must provide facilities for roosting (e.g. perches), a surface for pecking and scratching, and a secluded nesting area. 2.2.2.7. All housing systems must be designed to allow hens to maintain a natural posture throughout. 2.2.2.8. The design, size and maintenance of the openings and doors of housing systems must be such that hens can be placed in, or removed from, them without injury or distress. ***The following specific design requirements apply, according to the housing system:*** ***Conventional Cages:***[9] 2.2.2.9. Multi-deck cages must be arranged so that the layer hens in the lower tiers are protected from excreta from above. 2.2.2.10. Manure must be removed from under a cage before it accumulates sufficiently to touch the cage floor.	• There is documented evidence of routine cleaning of the facilities and equipment so that transmissible diseases / parasites are avoided or managed. • In order to ensure the performance of operating systems, fire-fighting equipment and emergency power supplies are tested regularly in accordance with the maintainance schedule as recommended by the manufacturer and results are documented. • There is documented evidence of preventative maintenance in place for facilities and equipment. • Fail-safe flaps are fitted to fans, outlets and inlets to enable natural ventilation. • Wire nest floors are covered by a suitable substrate e.g. plastic matting, artificial turf or straw. • Perches are of a design and construction (including height and spacing) that minimises injury (such as keel damage) or ill-health (such as foot problems) or vent pecking. Perches should be preferably without edges and easily gripped by the bird. • 95% of all eggs are laid in the nesting areas. • Scratch pad area is sufficient to allow all birds to exhibit foraging behavior. • Perches provide at least 15cm of space per hen. • If a raised slatted floor is used for perching, the slatted area is at least 1/3 of the internal living space. • In barns, at least 1 nest is provided per 7 hens or, for group nests, at least 1m^2 of nesting space is provided per 120 hens. • In barns, at least 250cm^2 of litter/hen is provided and the

[9] Cage measurements taken from Layer Hens (2012). Animal Welfare (Layer Hens) Code of Welfare, National Animal Welfare Advisory Committee, Ministry for Primary Industries, New Zealand. Accessed on 16 April 2015 at http://www.biosecurity.govt.nz/files/regs/animal-welfare/2012-layer-hens-code-web.pdf

2.2.2.11. All cages for layer hens must be at an appropriate height and allow each hen access to at least two drinking points. ***Colony Cages****:* 2.2.2.12. A secluded nest area must be provided and the floor of the nest area must be covered with a suitable substrate that prevents direct contact of hens with the wire mesh floor. 2.2.2.13. Perches must be provided and designed to allow the hen to grip without risk of trapping its claws and must provide at least 15cm of space per hen to allow all birds to perch at the same time. 2.2.2.14. A scratching area must be provided. 2.2.2.15. Suitable claw shortening devices must be fitted. ***Sheds*** 2.2.4.16. Secluded nest areas must be provided and must be of adequate size and number to meet the laying needs of all hens, and ensure hens can lay without undue competition. 2.2.4.17. The floor of the nest area must be covered with a suitable substrate that prevents direct contact of hens with a wire mesh floor. 2.2.4.18. Perching areas must be provided and designed to allow the hen to grip without risk of trapping its claws and must allow all birds to perch at the same time. 2.2.4.19. Perches must be staggered to prevent the fouling of hens or their feed on lower levels and of a height that allows hens to use them easily and without risk of injury.	litter occupies at least one-third of the ground area to encourage pecking, scratching and dust-bathing behaviours. • Hens with outdoor access make regular use of the range. • Any failure or fault in housing or equipment (e.g. damaged flooring) is documented and immediately rectified. • Emergency management plan outlines actions to take in event of power failure. • Cage units are secured to prevent toppling. • Droppings are not falling on hens below. • Distribution and behaviour of hens using all facilities is monitored and recorded on a regular basis. • Hens are not displaying symptoms of overcrowding, such as excessive pecking or distress calls. • The majority of hens with access outdoors are observed to use the outside range.

2.2.4.20. Any slatted, wire or perforated floors must be constructed to support the forward facing claws. 2.2.4.21. In multi-tier systems the distance between the levels must be at least 45cm and the levels must be arranged so that the layer hens in the lower tiers are protected from excreta from above. 2.2.4.22. All hens must have access to good quality friable litter at all times to allow them to scratch and forage. 2.2.4.23. Openings to the outdoor area should be wide enough and evenly distributed along the building to allow hens free access without risk of smothering or injury. 2.2.4.24. Openings to the outdoor area must be designed to minimise the adverse effects of the weather on the hens and on the quality of the litter.	

2.2.3. Litter management in sheds

Animal Welfare Standards	Management Considerations
2.2.3.1. Litter material must be good quality and friable. 2.2.3.2. Litter condition must be managed to avoid levels of dustiness or dampness that could cause leg, respiratory, or other health problems such as the build-up of parasites or diseases.	• Most hens show scratching, foraging and dust bathing behavior. • Plumage and feet of hens are in good condition and are monitored regularly. • Litter is inspected regularly for signs of caking or greasiness and remedial action taken.

	• Litter is obtained from reputable sources and visually inspected before use. • If wood shavings are used they must be dry and not produced from chemical-treated timber. • Drinkers are managed to avoid leaks or spillage leading to wet litter. • Eye irritation due to ammonia should not be experienced by either chickens or operators. • Dust levels should not cause discomfort to chickens or operators.

2.2.4. Light

Animal Welfare Standards	Management Considerations
2.2.4.1. Lighting level should be provided at levels sufficient for the age and breed of the hen. 2.2.4.2. Chicks and pullets housed under artificial light must be exposed to short periods of darkness after placement, in order to train them to blackout conditions should lighting fail. 2.2.4.3. After the training period, where hens are housed under artificial light, lighting schedules must provide a minimum of eight hours of continuous darkness in each 24-hour period. 2.2.4.4. So that hens can see each other and their surroundings, lighting levels during the light phase must not be lower than 20 lux at hen level.	• Light control systems are working and are well maintained • Light levels during inspection are sufficient to ensure that all hens in all parts of the shed or barn are clearly visible, including at all levels in multi-tier systems • Natural and artificial lighting is evenly distributed to facilitate the distribution of the hens over the floor area and avoid overcrowding • There are no injuries caused by changes in the light intensity **All light measurements use the 'box' technique, meaning, the 6 directions of the face of a cube (see reference 12 for more information on light intensity measurement).*

2.2.4.5. Light levels during daily inspections must be sufficient to stimulate activity of the hens and allow hens and equipment to be clearly visible. 2.2.4.6. Where hens are housed under artificial light, the light intensity must be raised and lowered gradually over a 15-minute period to give them sufficient time to roost and come off perches without causing injury.	

2.2.5. Temperature

Animal Welfare Standards	Management Considerations
2.2.5.1. Temperatures inside housing systems must be maintained within a range compatible with good health and welfare of the hens. 2.2.5.2. When hens show signs of being too cold or too hot remedial action must be taken immediately. 2.2.5.3. The brooder area for newly placed chicks must be pre-heated and the temperature maintained at a level that promotes good chick health and welfare.	• Temperature at the level of the hens is monitored and within the temperature range specified in the breeding company guidelines, as appropriate for the age and breed of the hens. • Corrective action is taken if signs of stress (sneezing, prolonged panting and wing extension due to heat or huddling due to cold) are observed during daily inspection. • Temperature and hen behaviour is monitored more frequently when ambient temperatures are extreme and corrective action is taken if required. • Chick behaviour and distribution within the brooding area is monitored and remedial action is taken as required.

2.2.6. Air Quality/Ventilation

Animal Welfare Standards	Management Considerations
2.2.6.1. Adequate ventilation must be provided in order to prevent the build-up of heat, humidity, dust and noxious gases to levels that are harmful to hen health or that cause pain or distress to hens. 2.2.6.2. Immediate and appropriate action must be taken to reduce ammonia levels if they exceed 25 ppm[10] at hen head height. 2.2.6.3. In the case of ventilation system failure, an alternative ventilation system must be available.	• Hens do not display any signs of discomfort, distress or disease (e.g. panting and wing stretching if hot) • Hens do not have any eye or nasal irritation indicative of ammonia level over 25 ppm or other air quality problems • Temperature and humidity are monitored and recorded • Dust levels do not cause discomfort to hens or farm workers.

[10] OIE Terrestrial Animal Health Code, Chapter 7.10 – Animal Welfare and Broiler Chicken Production Systems, Article 7.10.4, Section 2c at http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_aw_broiler_chicken.htm

2.3. Good health

2.3.1. Management of health and injury

Animal Welfare Standards	Management Considerations
2.3.1.1. Every hen must be inspected at least once a day and steps must be taken to address any abnormalities in the flock. 2.3.1.2. Mortalities, including culls, must be monitored and recorded and dead hens must be removed as soon as possible. 2.3.1.3. Sick or debilitated hens must be removed and treated or be killed by a humane method as soon as possible. 2.3.1.4. Medication must be used only in accordance with registration conditions, manufacturers' instructions or professional advice. 2.3.1.5. Hens must not be subject to induced moulting by starvation. 2.3.1.6. If the early signs of a disease outbreak are recognised or suspected, or mortalities are greater than expected, appropriate intervention must be undertaken by a suitably qualified person. 2.3.1.7. Premises and equipment must be thoroughly cleaned before restocking to prevent the carry-over of disease-causing organisms to incoming hens.	**Management of Health and Injury** • Dead hens and culls are removed daily and numbers recorded • Disease outbreaks, health problems and remedial action are documented and reported to competent authorities. • Abnormal conditions are noted, the cause identified and appropriate remedial action taken • Sick or debilitated hens are removed to isolation pen with easy access to feed and clean water and treated • A health program to manage the risk of infectious and parasitic diseases should be developed and implemented. • Persons responsible for the welfare of hens have an understanding of good farm biosecurity measures and adopt them. They should also have some knowledge of the signs of notifiable diseases (e.g. avian influenza, Newcastle disease) and what actions they need to take if concerned • Sufficient inspections are undertaken during which temperature, light levels, availability of feed, feeding systems, water and all parts of the ventilation system are checked, and where problems are encountered, appropriate remedial action is taken to protect the welfare of the hens.

2.3.2. Beak Trimming

Animal Welfare Standards	Management Considerations
2.3.2.1. Beak trimming[11] must only be carried out by competent, trained operators. 2.3.2.2. Beak trimming, when undertaken, must be done using an effective method to minimize stress and injury, and should normally be performed no later than 7 days after hatching. 2.3.2.3. The trimming of beaks of individual hens after7 days of age must only be undertaken in an emergency with veterinary approval to help control outbreaks of cannibalism during the laying period. 2.3.2.4. The operator must not remove more than a quarter of the upper or lower beaks. This means for: • day old chicks, no more than 2mm of the beak; • hens, no more than the blunting of upper and lower tips.	• Beak trimming equipment is undertaken in accordance with supplier instructions. • Inspection of beaks is undertaken to ensure that the minimum amount is removed. • Staff training records are documented. • Methods of beak trimming that minimize the impact on welfare, such as those using infrared techniques, should be used where possible.

[11] United Kingdom (2002). Code of Recommendations for the Welfare of Livestock – Laying Hens. Accessed at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/435224/Laying_hens_code_of_recommendations.pdf on 5 April 2016.

2.3.3. Emergency humane killing

Animal Welfare Standards	Management Considerations
2.3.3.1. The method(s) used for the humane killing of layer hens must ensure rapid death, which is confirmed by inspection. 2.3.3.2. Persons undertaking humane killing must be appropriately trained and must ensure that the hens are managed gently and calmly at all stages of the process. 2.3.3.3. Any equipment used to undertake humane killing must be well maintained and not overloaded, so that it operates effectively and efficiently. 2.3.3.4. Maceration equipment used for humane killing must be designed to cause very rapid and complete fragmentation of the egg or day-old chick into small particles. 2.3.3.5 When using gas, the procedure must ensure the collapse of every hen within 35 seconds of exposure to the gas. Layer hens must remain in the gas for at least a further two minutes following collapse and be inspected to ensure that they are dead upon removal from the gas.	• OIE has published globally endorsed methods for humane killing of chickens (referred to in the OIE Terrestrial Animal Health Code, which can be viewed at http://www.oie.int/en/international-standard-setting/terrestrial-code/access-online/). Any other methods should be performed under veterinary supervision. • Acceptable methods are used. These include: - Electrical stunning followed by neck dislocation and exsanguination - Neck dislocation alone (recognizing the potential for fatigue in farm workers performing this procedure) - Gas using a mixture of inert gases and carbon dioxide - Immediate fragmentation/maceration for unhatched eggs and day-old chicks. • Humane killing protocols are documented. • Appropriate behaviour and handling of chickens, including chicks, is observed. • All chickens killed are inspected following the procedure to confirm death. • Chickens are confirmed unconscious within 35 seconds of exposure to gas. • Persons performing humane killing are appropriately trained and ensure that the chickens are managed gently and calmly at all stages of the process. • Staff training and supervision is documented and monitored. • Equipment used to perform humane killing is never overloaded and is well maintained to ensure that it operates efficiently and maintenance is documented.

2.4. Appropriate behaviour

2.4.1. Poultry behaviour

Animal Welfare Standards	Management Considerations
2.4.1.1. Hens should have the opportunity to express a range of normal behaviours.	• Normal hen behavior includes, but are not limited to, nesting, perching, scratching, ground pecking, and dust-bathing. • Layer hens are active, alert, calm, confident and inquisitive. • Layer hen behaviour is monitored and timely remedial action is taken when appropriate, including managing strategies to avoid pecking and cannibalism. • Layer hens show types and frequencies of activities that are normal for their age.

2.5. Good stockmanship

2.5.1. Physical handling

Animal Welfare Standards	Management Considerations
2.5.1.1. Hens, including chicks in chick boxes, must be moved and handled at all times in a manner that minimises the risk of falls, pain and distress and avoids injury. 2.5.1.2. Hens, including day-old chicks, must not be carried by the wings or neck. 2.5.1.3. Stress induced by handling must be minimised by appropriate design of facilities, use of suitable tools or equipment and training of personnel.	• No hens show injuries attributable to poor handling. • Farm workers have received training or have suitable practical experience and demonstrate competence through the appropriate handling of hens.

2.5.2. Handling and Catching

Animal Welfare Standards	Management Considerations
2.5.2.1. Layer hens must be handled in a manner that minimises pain and distress and does not cause injury. 2.5.2.2. Layer hens, must not be picked up or suspended by one leg, one wing or their neck. 2.5.2.3. The stress of handling, especially at depopulation for	• No injuries attributable to poor handling occur. • Any chicks that fall on the floor are picked up immediately. • There is evidence of training for catching teams. • Any injured or unfit hens identified during the catching process are immediately and humanely killed. • A documented depopulation plan is completed by the farm manager.

slaughter, must be minimised by appropriate design of the facilities. 2.5.2.4. All members of catching teams must be trained in the handling of layer hens, and a nominated member of the catching team must be responsible for supervising, monitoring, and maintaining welfare standards throughout the catching process. 2.5.2.6. Hens that are severely injured before or during the catching procedure must be humanely killed immediately.	• The time at which feed is withdrawn from the hens is recorded and accompanies the consignment of hens until slaughter.

2.5.3. Loading and transport

Animal Welfare Standards	Management Considerations
2.5.3.1. For laying hens going to slaughter, feed must not be withheld for more than 12 hours before depopulation. 2.5.3.2. All hens, including chicks, selected for transport must be examined by the person in charge prior to loading to ensure they are fit for transport and are able to withstand the journey without suffering unreasonable or unnecessary pain or distress. 2.5.3.3. Persons responsible for the loading and transport of hens must be trained in careful handling procedures and understand the effects that poor transport conditions may have on the welfare of the hen.	• All hens are fit and healthy when transported and don't show injuries resulting from poor catching and loading practices. • Chicks are delivered to the place where they will be reared as soon as possible after hatching. • There are documented records of hens injured or dead on arrival. • Hens are transported in an upright sitting position. • Transport boxes/crates for day old chicks are constructed of appropriate material to secure and protect the chicks during transportation (see Section 4 of this module). • Ventilation and stocking rate during transport are controlled according to weather and hen condition (e.g. weight, health and feather status).

2.5.3.4. Hens must be placed in transport crates gently and in a manner that allows them to rapidly regain an upright position. 2.5.3.5. Crates and containers must be constructed to ensure there are no hazards likely to cause injury to the hens. 2.5.3.6. Conveyances and containers must have sufficient ventilation, even when stationary, to prevent harmful concentrations of gases or water vapour, and to protect the hens from climatic conditions that would compromise their welfare. 2.5.3.7. A contingency plan must be in place to address potential transport problems. 2.5.3.8. Drivers of vehicles must be properly briefed about the contingency plan. 2.5.3.9. Crates and containers containing hens must be handled with care and not thrown or dropped. 2.5.3.10. Hens that are injured during the catching and loading procedures must be humanely killed immediately. 2.5.3.11. Conveyances and containers must have adequate ventilation to allow the free flow of air to all hens, even when stationary, to prevent the build-up of harmful concentrations of gases or water vapour or temperature.	• There is no evidence of panting or huddling and shivering in hens. • There is a documented training record for loading and transport crews. • A documented contingency plan is evident. • Responsibilities of the nominated person are documented. ***NOTE: See additional considerations in Section 4 of this module and Section 5.1, Transportation, in the Food Safety Module – Good Animal Husbandry Practices for Layers and Broilers in ASEAN Countries***

2.6. Duty of care

2.6.1. Contingency planning

Animal Welfare Standards	Management Considerations
2.6.1.1. Persons in charge of hens must have contingency plans to address adverse events, such as delays in transport and plant breakdown. Drivers of conveyances must be properly briefed about any contingency plan in place. 2.6.1.2. Alternative means of maintaining ongoing environmental control, and provision of feed and water must be available in case of emergencies, including power or computer failures, natural disasters and mechanical breakdown. 2.6.1.3. Appropriate fire prevention measures and a fire emergency plan must be in place. 2.6.1.4. Staff must be suitably trained to handle an emergency e.g. fire evacuation.	• A written contingency plan, covering potential adverse events, such as those affecting feed and water supply, environmental conditions, and housing is available for inspection, and staff are trained to implement it. • Alternative arrangements are in place in case of equipment or supply failure to ensure hens receive their daily requirements of feed and water, and also to ensure that temperature and air quality are maintained. • Alarms indicate the event of any power or computer failure. • All systems, fire-fighting equipment and emergency power supply are tested regularly and test results documented. • The emergency plan is documented and staff are trained to implement it.

2.6.2. Stockpersons

Animal Welfare Standards	Management Considerations
2.6.2.1. Layer hens must be cared for by personnel who possess the appropriate ability, knowledge and professional competence to maintain their health and welfare in accordance with the standards listed here.	• Layer hens are maintained in accordance with the standards listed here in this module. • Operational procedures are documented and implemented. • Documentary evidence of staff training and/or competence is maintained. • Personnel have an understanding of these standards and their obligations. • There is evidence of staff being trained in, and having practiced emergency management e.g. fire evacuation. • All personnel in contact with the hens are trained in areas of animal behavior and welfare, handling, biosecurity, general signs of disease, euthanasia, etc or have suitable practical experience and demonstrate competence by appropriate responses to hens and their needs

DUCKS

2.1. Good feed and water

2.1.1. Feed

Animal Welfare Standards	Management Considerations
2.1.1.1. All ducks must receive adequate quantities of feed and nutrients each day to enable each duck to: • maintain good health; • meet its physiological demands; and • avoid metabolic and nutritional disorders. 2.1.1.2. Feed must be provided in such a way as to prevent undue competition and injury. 2.1.1.3. Feeders must be of a design that ducks can feed easily. 2.1.1.4. Duck growth and behaviour should not be adversely affected by feed changes. 2.1.1.5. The stocking density of sheds and location of feeders, must allow ducks appropriate space to access feeders without undue competition. 2.1.1.6. Any duck that cannot access feed adequately must be removed during daily inspections and raised separately or humanely killed immediately.	• Feed quality and composition meet published standards for duck feeds and feed is sourced from suppliers who follow recognized good manufacturing practices and/or good hygiene practices and that meet quality and standards set by the country regulations act or government directives. • The pellet and/or crumb size is appropriate for the size of the ducks. • If the sample growth rate varies by 10% or more from the expected growth chart, advice should be obtained. • Appropriate advisory livestock personnel are consulted promptly if the sample growth rate varies by 10% or more from the expected growth chart. • Daily inspection is carried out to ensure that undue competition and injuries are minimised and corrective action is taken and documented as required. • Deaths and cull numbers (and reasons where available) are recorded.

2.1.2. Water

Animal Welfare Standards	Management Considerations
2.1.2.1. An adequate daily supply of water must be accessible to all ducks at all times. It must be potable, not harmful to health and at a temperature that does not inhibit drinking. 2.1.2.2. Farm operating procedures provide for the daily water needs of ducks via appropriate drinking equipment (such as bowls or drinker nipples). 2.1.2.3. Any duck that cannot access water adequately must be removed during daily inspections and raised separately or humanely killed immediately. 2.1.2.4. Ducks are able to submerge or shower water on their heads to allow a range of natural behaviours such as wet preening, head dipping and to maintain good plumage, clean eyes and nostrils.	• The water reserves and flow are adequate for the average 24-hour demand. • Water reticulation systems are checked daily, any problems immediately rectified and the supply and use are monitored. • Drinking water sources are routinely monitored for microbiological and chemical content, quality and potability. The required frequency of monitoring will depend on the source. • Alternative arrangements are in place in case of water equipment or supply failure to ensure that ducks receive their daily water requirements. • Watering points and devices are appropriate for the number and size of ducks. • Competition does not prevent any duck from having access to water. • Ducks are observed to head dip or shower and preen. • Regular cleaning of water systems to prevent accumulation of hazardous materials – chemical, physical, or microbiological.

2.2. Good environments

2.2.1. Outdoor management

Animal Welfare Standards	Management Considerations
Shelter for ducks raised outdoors 2.2.1.1. All ducks must have access to shelter from adverse weather that is likely to cause heat stress, and to reduce the risk of predation. 2.2.1.2. Shed openings provided for ducks to access an outside area must be wide enough to enable them to freely move to and from the outdoors at all times without the risk of smothering or injury. 2.2.1.3. Where access to outside areas is provided it must be managed to prevent the development around the housing of muddy, dusty or contaminated conditions to an extent that could be harmful to the ducks' health. 2.2.1.4. Precautions must be taken to protect ducks from pests, including predators.	**Shelter for ducks raised outdoors** • A management plan is followed that covers the management of the outdoor area to maintain vegetation cover and ground condition so that the risk of dusty or muddy conditions and disease is minimised • Ducks are observed to use the outside area regularly • Overhead shade or shelter is provided on the range throughout the year in a manner that encourages full use of the outdoor range • A management plan to minimise the risks of ducks being exposed to pests and/or predators is developed and implemented. • Each shed opening to the outside is of sufficient size to allow the passage of more than one duck at any one time. A suitable minimum dimension is 350 mm high and 400 mm wide.

2.2.2. Indoor management

Animal Welfare Standards	Management Considerations
Housing and Equipment 2.2.2.1. Precautions must be taken to secure the site and buildings at all times in order to protect the health and welfare of the ducks. 2.2.2.2. Duck sheds must be designed, constructed and maintained to: • provide insulation, ventilation, heating, lighting, sanitation and hygiene requirements • allow ready access for handling and inspection of the ducks • have sufficient height, width and space and entrance size to allow for catching methods that minimise stress on the ducks • allow the distribution of ducks in the shed to be controlled to keep ducklings within the heated area and prevent crowding of older ducks. 2.2.2.3. All surfaces in the duck sheds and enclosures must be designed, constructed and maintained to: • minimise the risk of injury and disease to the ducks; and • facilitate cleaning and disinfection of the shed surfaces. 2.2.2.4. All equipment used for rearing the ducks must be inspected as necessary to ensure correct operational functions, and if required appropriate remedial action must be undertaken. 2.2.2.5. The duck sheds must be subject to control plan of predators (e.g. wild birds, rodents)	**Housing and Equipment** • Access to the premises is controlled and visitor access is recorded. • Injury to ducks is prevented through, for example, removal of damaged equipment, sharp wire or metal edges. • Duck distribution and behaviour is monitored during daily inspections and corrective action is taken to adjust light, temperature or ventilation as required. • A monitoring plan for the operation of automatic equipment is established and implemented. • If duck health and welfare are compromised by equipment failure then corrective action is taken promptly and documented. • Control of pests that may cause a biosecurity risk, or fear, distress or injury to ducks, is achieved through an appropriate and documented pest control programme. • In order to ensure the performance of operating systems, fire-fighting equipment and emergency power supplies are tested regularly and maintained according to the schedule recommended by the manufacturer and results are documented.

2.2.2.6. All duck sheds must be sited to minimise risks of natural and environmental hazards, such as storm water drainage, extreme winds, and to allow for appropriate management of dust. 2.2.2.7. Controlled environment housing must have systems that warn of power failure and/or significant temperature variance.	

2.2.3. Lighting

Animal Welfare Standards	Management Considerations
2.2.3.1. Sheds should be designed to provide natural light to achieve the minimum light level of 20 lux*. 2.2.3.2. Lighting intensity for the first four days after placement of the ducklings in the brooding area must be sufficient to enable them to learn the locations of feed and water. This training period must include at least one hour of continuous darkness each day, to accustom the ducklings to blackout conditions and to prevent panic should lighting fail. 2.2.3.3. After the training period for ducklings described above, lighting patterns must encourage activity and provide a minimum period of darkness each day to ensure adequate rest in ducks, such that:	• Ducklings are exposed to at least one hour of continuous blackout per day for no more than four days after being placed in the brooding area. • After the first four days of placement, natural and/or artificial light intensity at duck head height is at least 20 lux[13]. • Light levels during inspection are sufficient to ensure that all ducks and equipment in all parts of the house are clearly visible. • Ducks are distributed evenly across the floor. The lighting pattern(s) are documented (number and duration of light and dark periods). **All light measurements use the 'box' technique, meaning the 6 directions of the face of a cube (see reference 12 for more*

• In a 24 hour period, no area must be lit at less than 20 lux[12] for at least a 9 hour continuous period; and • Outside this 9 hour continuous period, areas must be lit at no less than 6 lux; and • There must be a continuous period of darkness for at least 6 hours. 2.2.3.4. Lighting levels during the lights-on period must allow the ducks to see one another and to visually inspect their surroundings. 2.2.3.5. Lighting levels during inspections must be sufficient to stimulate activity of the ducks and allow ducks and equipment to be inspected.	*information on light intensity measurement).*

2.2.4. Temperature

Animal Welfare Standards	Management Considerations
2.2.4.1. Ventilation control or other measures must ensure housed ducks do not become overheated.	• Duck behaviour is monitored at least once per day (or more often when ambient external temperatures are greater than the ducks' thermal comfort zone. Corrective action is taken if signs of stress are observed (e.g. prolonged panting and wing extension due to heat).

[13] Royal Society for the Prevention of Cruelty to Animals (RSPCA) (2015). RSPCA welfare standards for domestic/common ducks. Accessed on 17 April 2015 at http://science.rspca.org.uk/sciencegroup/farmanimals/standards/ducks

[12] Royal Society for the Prevention of Cruelty to Animals (RSPCA) (2015). RSPCA welfare standards for domestic/common ducks. Accessed on 5 April 2016 at http://science.rspca.org.uk/sciencegroup/farmanimals/standards/ducks

	• Corrective action is taken if signs of stress (sneezing, prolonged panting and wing extension due to heat or huddling due to cold) are observed. • Ambient temperature at the level of the ducks is measured and recorded on a continuous basis and is appropriate for the age of the ducks. • Ducks are evenly distributed across the shed floor.

2.2.5. Stocking density

Animal Welfare Standards	Management Considerations
2.2.5.1. Ducks must be managed at a stocking density that takes account of growth rate, competition for space, access to feeders and water, air temperature and quality, humidity, litter quality and activity levels, so as to maintain good health and welfare. 2.2.5.2. Ducks must be managed at a stocking density that takes account of growth rate, housing system, normal posture, competition for space, age, weight, access to feeders and water, air temperature and quality, ventilation, humidity, litter quality and activity levels, so as to maintain good health and welfare. 2.2.5.3. Outdoor stocking density must not exceed the capacity of the outside area or cause overcrowding.	• Ducks have access to feeders and drinkers without undue competition. • Ducks have unimpeded ability to stand, turn around, and flap their wings. • Ducks outdoors are able to move and forage freely. • Information on live weight, stocking density and planning is recorded and made available for audit. • If ducks are inactive because of overcrowding, stocking rate is adjusted accordingly. • Where the incidence of severe foot lesions, breast burn or hock burn is high, a plan should be developed to manage the issue. • Where the number of culls for lameness is high, stocking density should be reduced. • There is minimal competition at shed opening to access the outdoor range.

2.2.6. Air quality/ventilation

Animal Welfare Standards	Management Considerations
2.2.6.1. Adequate ventilation must be provided in order to prevent the build-up of heat, humidity, dust and noxious gases to levels that are harmful to duck health or that cause pain or distress to ducks. 2.2.6.2. Immediate and appropriate action must be taken to reduce ammonia levels in sheds if they exceed 25 ppm[14] at duck head height. 2.2.6.3. In the case of ventilation system failure, an alternative ventilation system must be available.	• During daily inspections, minimal signs of discomfort, distress or disease (e.g. panting and wing stretching if hot, huddling if cold, sneezing, drowsiness) are observed. • Ducks are distributed evenly over the floor. • Corrective action taken if ammonia is higher than 25 ppm or if there is any significant incidents (e.g. thick smoke or dust) caused by poor air quality. • Temperature and humidity are monitored and recorded. • Eye irritation due to ammonia is not experienced by either ducks or farm workers. • Dust levels do not cause discomfort to ducks or farm workers. • Neither ducks nor workers experience eye irritation due to ammonia.

[14] In line with the ammonia levels agreed by OIE for broilers raised indoors.

2.3. Good health

2.3.1. Management of health and injury

Animal Welfare Standards	Management Considerations
Management of Health and Injury 2.3.1.1. Those responsible for the care of ducks must be competent at recognising the signs of good health, ill health, and injury and must consult a veterinarian as appropriate. 2.3.1.2. Ducks must be inspected at least once daily for evidence of ill health or injury, including any obvious gait deficit and any ill, injured or severely lame ducks must be treated or humanely killed immediately. 2.3.1.3. Medication must only be used in accordance with registration conditions, and veterinary prescription. 2.3.1.4. When early signs of a disease outbreak are detected (as according to OIE guidelines) or mortality level within a shed exceeds 1% in a 24 hour period, the cause must be investigated and remedial action taken promptly.	**Management of Health and Injury** • Healthy uninjured ducks exhibit normal mobility, feeding, drinking and resting behaviour. Daily inspections are documented. • Access to the premises is controlled and visitor access is recorded. • Farm workers have received training or have suitable practical experience and demonstrate competence by appropriate responses to ducks and their needs • A health program to manage the risk of infectious and parasitic diseases should be developed and implemented. • Abnormal conditions are noted, the cause identified and appropriate remedial action taken. • Disease outbreaks, health problems and remedial action are documented and reported to competent authorities. • Persons responsible for the welfare of ducks have a good understanding of good farm biosecurity measures and adopt them. They should also have some knowledge of the signs of notifiable duck diseases and what actions they need to take if concerned • Daily inspections are documented. • Dead ducks and culls are removed daily and numbers are recorded. • An appropriate response is undertaken to early signs of disease(s), lameness or mortality. • Ducks that have failed to respond to treatment are killed

	humanely and promptly. • Any ducks which have severe lameness or leg injuries and unable to access feed and water should be culled. • Ducks with symptoms of disease are removed to an isolation pen with easy access to feed and potable water and treated. • Ducks with an obvious gait deficit are culled.

2.3.2. Emergency humane killing

Animal Welfare Standards	Management Considerations
2.3.2.1. The method(s) used for the humane killing of ducks, including ducklings, must ensure rapid death, which is confirmed by inspection. 2.3.2.2. People undertaking humane killing must be appropriately trained and must ensure that ducks are handled gently and calmly at all stages of the process. 2.3.2.3. Any equipment used to undertake humane killing must be well maintained and not overloaded, so that it operates effectively and efficiently. 2.3.2.4. Maceration equipment used for humane killing must be designed to cause very rapid and complete fragmentation of the material into small particles. 2.3.2.5. When using gas, the procedure must ensure the	• Humane killing protocols are documented. • Acceptable methods are used. These include: - Captive bolt followed by exsanguination - Electrical stunning followed by neck dislocation and exsanguination - Neck dislocation alone (recognizing the potential for fatigue in farm workers performing this procedure) - Gas using a mixture of inert gases and carbon dioxide - Immediate fragmentation/maceration for unhatched eggs and day-old ducklings. • Appropriate behaviour and handling of ducks, including ducklings, is observed. • All ducks killed are inspected following the procedure to confirm death. • Ducks are confirmed unconscious within 35 seconds of exposure to gas. • OIE has published globally-endorsed methods used for

collapse of every duck within 35 seconds of exposure to the gas. Ducks must remain in the gas for at least a further two minutes following collapse and be inspected to ensure that they are dead upon removal from the gas.	humane killing of ducks (referred to in the OIE Terrestrial Animal Health Code, which can be viewed at http://www.oie.int/en/international-standard-setting/terrestrial-code/access-online/). Any other methods are performed under veterinary supervision. • Persons performing humane killing are appropriately trained and ensure that the ducks are managed gently and calmly at all stages of the process. • Employer supervision and training of farm workers is documented and monitored. • Equipment used to perform humane killing is never overloaded and is well maintained to ensure that it operates efficiently and maintenance is documented.

2.4. Appropriate behaviour

2.4.1. Duck behaviour

Animal Welfare Standards	Management Considerations*
2.4.1.1. Ducks must have the opportunity to express their normal behaviours. These include, but are not limited to; feeding, drinking, sleeping, preening, walking, leg stretching, wet preening, vocalising and head dipping to maintain good plumage, clean eyes and nostrils.	• Ducks are active and alert, and observed to display all of their normal behaviours, which include feeding, drinking, sleeping, preening, walking, leg stretching, wet preening, vocalising and head dipping to maintain good plumage, clean eyes and nostrils. • Duck activity is monitored and timely remedial action is taken as appropriate. *Poultry CRC (Cooperative Research Centre) Australia, accessed on 6 April 2015 at http://www.poultryhub.org/production/husbandry-

	management/poultry-behaviour/

2.5. Good stockmanship

2.5.1. Physical handling

Animal Welfare Standards	Management Considerations
Physical handling 2.5.1.1. Ducks, including ducklings in duckling boxes, must be moved and handled at all times in a manner that minimises the risk of falls, pain and distress and avoids injury. 2.5.1.2. Ducks, including day old ducklings, must not be carried by one or both wings, or by the neck without supporting the body weight. 2.5.1.3. Stress induced by handling must be minimised by appropriate design of facilities, use of suitable tools and equipment and training of personnel.	**Physical handling** • No ducks show injuries attributable to poor handling. • Workers have received training or have suitable practical experience and can demonstrate competence through the appropriate handling of ducks.

2.5.2. Handling and Catching

Animal Welfare Standards	Management Considerations
Handling and Catching 2.5.2.1. Day-old ducklings must be held and transported in	**Handling and Catching** • No ducks show injuries resulting from poor catching and

conditions of controlled temperature and airflow. 2.5.2.2. All members of the catching and transporting crews must be supervised and correctly trained in the handling of ducks. 2.5.2.3. A nominated member of the catching team must be responsible for supervising, monitoring and maintaining high welfare standards throughout the catching process and loading of ducks into crates and onto the transport vehicle. 2.5.2.4. Feed must not be withheld from ducks for more than 12 hours prior to slaughter. 2.5.2.5. Ducks must have access to water until the time of catching. 2.5.2.6. Crates and containers must be constructed and maintained to ensure there are no hazards likely to cause injury to the ducks. 2.5.2.7. Ducks must be placed into crates in such a way that they can rapidly obtain and maintain an upright position. 2.5.2.8. Crates and containers containing ducks must be handled with care and not thrown or dropped. 2.5.2.9. Ducks that are severely injured during the catching procedures must be humanely killed immediately. 2.5.2.10. Conveyances and containers must have adequate ventilation to allow the free flow of air to all ducks, even when stationary, to prevent the build-up of harmful concentrations of gases, water vapour or temperature.	loading practices. • All ducks are fit and healthy when transported. • The time at which feed is withdrawn from the chickens is recorded and accompanies the consignment of chickens until slaughter. • Training records are available for inspection. • Responsibilities of the nominated catching team person are documented.

2.5.3. Loading and transport

Animal Welfare Standards	Management Considerations
2.5.3.1. Ducks, including ducklings in duckling trays, must be moved and handled at all times in a manner that minimises the risk of falls, pain and distress and avoids injury. 2.5.3.2. Ducks must be carried by supporting the body and not just by a single or both wings or the neck. 2.5.3.3. Stress induced by handling must be minimised by appropriate design of facilities, use of appropriate tools and equipment and training of personnel.	• No ducks show injuries attributable to poor handling. • Farm workers have received training or have suitable practical experience and demonstrate competence through the appropriate handling of ducks.

2.6. Duty of care

2.6.1. Contingency planning

Animal Welfare Standards	Management Considerations
Contingency planning 2.6.1.1. Persons in charge of ducks must have contingency plans to address events, such as delays in transport and plant breakdown. Drivers of conveyances must be properly briefed on any contingency plan in place. 2.6.1.2. Alternative means of maintaining ongoing environmental control and provision of feed and water must be available in case of emergencies, including power or computer failure, natural disasters or mechanical breakdown. 2.6.1.3. Appropriate fire prevention measures and a fire emergency plan must be in place. 2.6.1.4. Staff must be suitably trained to handle an emergency, e.g. fire evacuation.	**Contingency planning** • A written contingency plan, covering catching, loading and transport is developed and available for inspection. • Alternative arrangements are in place in case of equipment or supply failure to ensure ducks receive their daily requirements of feed, water and temperature. Air quality is maintained. • Alarms indicate any power or computer failure. • All systems, fire-fighting equipment and emergency power supply are tested regularly and test results documented. • The emergency plan is documented and staff are trained to implement it.

2.6.2. Stock Person

Animal Welfare Standards	Management Considerations
Stockmanship 2.6.2.1. Ducks must be cared for by personnel who collectively possess the ability, knowledge and competence necessary to maintain their health and welfare in accordance with the above standards.	**Stockmanship** • Those caring for and handling ducks are familiar with the standards in this Module and a copy of them is available on site at all times. • Job descriptions and/or other documentation outlining the expectations of personnel and their performance are readily accessible and include reference to duck health and welfare. • Farm workers have received training or have suitable practical experience and demonstrate competence by appropriate responses to ducks and their needs. • A sufficient number of personnel is available in order to meet the requirements outlined in this document. • All personnel in contact with the ducks are trained in areas of animal behavior and welfare, handling, biosecurity, general signs of disease, euthanasia, etc., or have suitable practical experience and demonstrate competence by appropriate responses to ducks and their needs

3. Record Keeping

Records are an essential aid to management and Governments require some records to be kept as a condition of approval to farm. Examples of useful records include feed and water consumption, egg quality, health checks, behavioural abnormalities, maximum and minimum temperatures and ammonia levels. Mortality, culling levels should be closely monitored. Autopsies should be carried out in cases where mortality levels are significant or higher than breeder's targets.

The Food Safety Module - Good Animal Husbandry Practices for Layers and Broilers in ASEAN Countries, Section 6 – Record Keeping, stresses the importance of record keeping to help trace the source of problems such as diseases, chemical residues.

The Standard agreed by ASEAN Countries is that records must be kept for a minimum period of three years or a time specified by Government directives.

It is recommended that as far as practicable, farmers keep records of:

- Transportation
- Storage
- Feed
- Animal Health (Treatment and vaccination)
- Personnel Health
- Visitors
- Breed
- Laboratory
- Sanitation and hygiene
- Pest control
- Training
- Waste management
- Production
- Procurement
- Traceability (e.g. animal/lot/batch ID, customer records, etc).

4. General Considerations for Poultry Transportation

ASEAN has endorsed and published standards for transportation of layers and broilers in ASEAN Countries in relation to food safety requirements (Food Safety Module – Good Animal Husbandry Practices for Layers and Broilers in ASEAN Countries, Section 5.1 Transportation on page 10):

- *The transport of chickens from point of origin to final destination should be in a manner that does not cause stress throughout the journey and does not pre dispose them to injury and disease.*
- *Vehicles must be cleaned before using to transport chickens.*
- *Vehicles used to transport chickens must be exclusively used for chicken transport only.*
- *Transportation should be carried out at the coldest time of the day in order to avoid heat stress to animals.*
- *Day old chicks should be packed in appropriate packaging or restraining containers as required by the country regulations.*
- *Where appropriate, chickens should be segregated according to species, size, sex and age or according to customer requirements.*
- *A transport or movement permit must be obtained prior to shipping animals as required by the country regulations with animal health certificate signed by a veterinarian.*

While, these requirements for food safety are also relevant to this module, there are additional factors and issues to consider to ensure good animal welfare outcomes from poultry transportation.

Animal handlers must be experienced and competent in handling and moving poultry and should understand the behaviour patterns of animals that underlie the procedures necessary to carry out their tasks in an efficient and effective manner. Also, transport drivers must be trained in the special skills required to load, drive, monitor and unload animals in ways that secure their welfare throughout the journey.

The design, construction and maintenance of all facilities and vehicles require special attention to ensure that they are 'fit for purpose' in facilitating effective welfare management in all aspects of poultry transport operations.

<u>The Consignor of the poultry:</u>

- Is responsible for preparing poultry for transportation and ensuring that only poultry 'fit to load' are transported.
- Must provide records for inspection that contain details of the consignment, e.g. the date, the time that feed and water were withdrawn, and the time and the number of birds loaded.
- Must ensure that all persons handling poultry are competent or supervised by a competent person

- Must make contingency plans for the journey and provide emergency contact details.

Risks and critical control points for poultry transport include:

- Poor preparation of poultry to be transported; withdrawal of water availability over a long period is a key issue.
- Selection of birds that are not fit to load, e.g. emaciated, injured, unable to bear weight on both legs.
- Rough catching and handling of birds during the loading process into crates or unloading of birds from crates.
- Too high stocking density of birds per crate.
- Poorly designed vehicles for poultry that do not allow adequate airflow or do not protect birds during adverse weather events during the journey.
- Inadequate arrangements to inspect birds during the journey.
- The journey itself and the competency of the driver to minimise the risk of trauma to the animals.

Useful guidelines for transport floor space in crates/boxes[15]:

Class	**Crate floor space**
Day-old chicks	455 chicks per m^2 (≥22 cm2 floor space)
Poultry up to 1.6 kg	40 birds per m^2
Poultry 1.6–2.2 kg	36 birds per m^2
Poultry 2.2–3.0 kg	28 birds per m^2
Poultry 3.0–5.0 kg	20 birds per m^2
Poultry more than 5.0 kg	100 cm^2 per kg

In hot weather, chicks should have the crate/box stocking density reduced.

[15] Australian Animal Welfare Standards and Guidelines - Land Transport of Livestock. (2012). Guidelines for poultry transportation, page 97 at http://www.animalwelfarestandards.net.au/files/2015/12/Land-transport-of-livestock-Standards-and-Guidelines-Version-1.-1-21-September-2012.pdf

Transportation of poultry

The following issues must be taken into account when planning and undertaking transportation of poultry:

For land transportation of poultry

Pre-transport management

- A person takes overall charge of the transport operation to ensure that all its elements are properly planned, coordinated and delivered to a level that minimises risks to animal welfare. All persons involved in the transport operation from beginning to end are competent to perform their specific tasks or are supervised by a competent person.

Transport vehicles and drivers

- Transport drivers are trained in the special skills required to load, drive, monitor and unload poultry in ways that secure their welfare throughout the journey.
- Vehicles, handling facilities, crates and containers are constructed, maintained and operated in ways that minimise animal welfare risks.
- The design of vehicles and crates hold the animals safely and minimise welfare risks due adverse weather conditions.

Loading

- Poultry are selected, prepared and loaded by competent animal handlers to prevent injury and minimise stress.
- Only healthy birds are prepared for travel by adequate rest and appropriate withholding of feed and water.
- Birds that are not 'fit to travel' due to injury, poor body condition are not presented for catching and loading.
- Birds are caught and loaded in a manner that prevents injury and minimises stress.

Transportation

- The vehicle driver must check the birds regularly to assess their welfare and records any problems.

Unloading at the abattoir or market

- Poultry are unloaded in a manner that prevents injury and minimises stress.
- Injured birds or those unable to stand at the end of the journey are quickly and humanely killed.

For air transportation of poultry (chicks, ducklings)[16]:

- A nominated person takes responsibility for planning the air transportation consignment.
- Chicks/ducklings/poultry must be prepared, handled and loaded in a manner that prevents injury and minimizes stress in line with the animal welfare standards outlined in Section 2 of this Module.
- The most current container for chicks, ducklings or other poultry published by the International Air Transport Association (IATA) should be used, particularly to avoid sudden changes in temperature (to which newly hatched chicks are very vulnerable).
- Crates/containers containing poultry should be handled and carried carefully with no unnecessary tilting.

For transportation of poultry by sea

- A nominated person takes responsibility for planning the transportation by sea.
- Poultry must be prepared, handled and loaded in a manner that prevents injury and minimizes stress in line with the animal welfare standards outlined in Section 2 of this Module.
- Sea transportation is in appropriately designed crates/containers to ensure that poultry are secure and have good ventilation throughout the journey.
- Poultry containers should be positioned and secured on board the vessel so that the containers cannot fall.
- Poultry are regularly inspected and negative impacts, such as thermal stress, sea spray or ammonia are minimised.
- Poultry containers must be carefully unloaded at the destination port and a person in charge takes responsibility for transportation to the destination farm or enterprise to ensure the welfare of the poultry.

[16] World Organisation for Animal Health (2015). Terrestrial Animal Health Code, Chapter 7.4. Transport of Animals by Air. Articles 7.4.1 and 7.4.4. Accessed at http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_aw_air_transpt.htm on 6 April 2016.

5. General Considerations for the Slaughter of Poultry

The management of the abattoir and its veterinary services should ensure that abattoir staff are experienced and competent to perform their assigned tasks.

Competence may be gained through formal training that is recognised by the competent authority and/or practical experience, and demonstrated by a current certificate.

The key issues for the delivery of good animal welfare at slaughter include:

Planning and operating procedures

- Facilities and equipment are appropriately designed and maintained to hold each poultry species safely and to minimise welfare risks.
- The development and implementation of an abattoir management plan and standard operating procedures to protect the welfare of animals from their time of arrival to death.
- Evidence that these procedures are rigorously implemented.
- The development of contingency plans to deal with problems that could adversely affect the welfare of animals, such as power failure or equipment breakdown.
- The scheduling for slaughter is appropriate for the species, class and condition of poultry; maximum allowable time off feed and water; transport duration and other requirements as relevant e.g. food safety.
- Arrangements for emergency euthanasia; humane killing equipment is readily available, fully operational and appropriate for the species and class of poultry; with competent personnel available.

Management of poultry arriving at an abattoir

- There are sufficient numbers of competent staff to handle birds on the abattoir premises, including staff on-call to assist with out-of-hours duties, e.g. arrival of poultry.
- Animal handlers are experienced and competent in moving and handling poultry.
- Birds are unloaded from transport vehicles in a manner that prevents injury and minimises stress.
- Birds are inspected on arrival to confirm their health and welfare and facilities are available to care for or segregate weak, ill or injured animals.
- Staff are competent in the humane killing of all poultry species in the abattoir.

Slaughtering process

- Birds are hoisted onto shackles effectively for a minimum time prior to stunning.
- Experienced and competent staff effectively and efficiently stun and slaughter all poultry species presented for processing.
- Birds are monitored to ensure that they are effectively stunned with equipment appropriate for the species and class of animal, and bleed out is checked to the point of death, including monitoring for suboptimal exsanguination post-mortem (e.g. surveillance for 'red birds' following scalding).
- To aid bleed out, knives (including rotating blades) are kept very sharp and have a blade length appropriate to the species and class of bird.
- Animals are not plucked or dressed until confirmed dead.
- Stunning and slaughter equipment is tested, cleaned, maintained, operated and stored in accordance with the manufacturer's specifications.

Risks and critical control points for poultry in the abattoir include:

- Poor handling when positioning birds by their legs on the automated shackle line.
- In systems where birds are stunned electrically in a water bath, have systems in place for birds that raise their heads and are not effectively stunned, i.e. back-up system where a dedicated staff member manually stuns birds before neck cutting and entry into the scalding bath and feather removal.
- Inspection of processed birds for leg or wing injuries or excessive bruising that may allow trace-back to farm of origin to investigate poor handling or transportation.
- Rough catching and handling of birds during the loading process into crates or unloading of birds from crates.
- Excessive delays in lairage without adequate (i.e. sufficient space, temperature control) animal holding conditions available until slaughter and processing can resume.

6. Environmental sustainability considerations for chicken and duck farms

6.1. Air and Noise Pollution

Environmental Sustainability Standards	Management Considerations
6.1.1. Adequate ventilation must be provided in order to prevent the build-up of heat, humidity, dust and noxious gases to levels that are harmful to chicken and/or duck health or that cause pain or distress to the birds. 6.1.2. Adequate ventilation must be provided to maintain acceptable moisture content in the manure and litter to help prevent excessive odour generation. 6.1.3. Immediate and appropriate action must be taken to reduce ammonia levels if they exceed 25 ppm at bird head height. 6.1.4. A poultry farm should not emit noise that causes stress to the birds or disturbs people working on the farm or living in the vicinity.	• Installation of a vegetative screen or other suitable emission reduction control measure at the exhaust end of tunnel ventilated sheds should be considered. It should be established at a distance that does not affect the performance of the ventilation system. • The location and size of the fans and inlets deliver efficient ventilation and climate control. • Care should be taken to ensure fan outlets are directed away from neighbour's residences wherever practical to minimise noise, dust and odour impacts.

6.2. Water Pollution

Environmental Sustainability Standards	Management Considerations
6.2.1. If surface water is used, it should be treated to potable standards i.e. filtered and disinfected, to minimise disease risk, including disease transmission from wild birds and contamination of eggs and egg products.	• Fuels and chemicals, i.e. pesticides, disinfectants and pharmaceuticals, are labelled and stored securely to prevent contamination of water sources either through leaching to groundwater or run-off into surface water.

6.2.2. Waste water from the farm should be properly treated prior to discharging into the waterways.	• Chemicals are not stored within 200 metres of any significant wetland or waterway.

6.3. Carcass disposal

Management of dead birds is a daily operation and poor practices may contaminate ground and surface water, cause odour nuisance, spread infectious diseases and attract vermin. Dead bird treatment methods in order of minimising environmental impacts include:

- Rendering
- Composting
- Burial
- Incineration.

Environmental Sustainability Standards	Management Considerations
6.3.1. Dead birds must be removed daily and subject to appropriate treatment methods.	• There are operating procedures to deal with dead birds, e.g. dead bird pick-up arrangements for transportation off site for rendering, incineration or to designated land fill site. • There are approved operating procedures and permissions from government to undertake effective composting on site

6.4. Manure and waste management

Environmental Sustainability Standards	Management Considerations
6.4.1. Poultry manure must not be allowed to discharge into surface waters (irrigation and drainage channels, rivers, ponds and lakes). 6.4.2. Poultry manure, stale feed and waste must not be allowed to pollute the production environment and pose pollution and health risks to birds and humans.	• A manure and waste management plan is developed in consultation with local authorities and the community. The treatment and use of manure for soil improvement is encouraged. • There is a well-managed shed clean-out program to regularly remove manure and waste such as stale and uneaten feed from sheds and outdoor poultry runs. This prevents odour, environmental pollution and the build-up of harmful microbes, parasites and pest animals. • Manure and litter waste should be stockpiled and covered in a well-drained area away from storm or water runoff on an impermeable base to prevent leaching into the underlying soil. • Sheds are cleaned out during daylight hours to minimise noise impacts. This also reduces dust and odour impacts because of the increased dispersion potential of atmospheric conditions during daylight hours. • Carefully managing shed clean-outs to minimise the increased risk of odour, dust and noise emissions from the farm during this activity. • Cleaning up any manure and spent litter that is spilt outside the shed during clean out. • Covering vehicles that transport manure and spent litter off farm to minimise potential dust and odour impacts. • Opening the side shutters or curtains of sheds during manure or spent litter removal to prevent the build-up of gases in the shed that may threaten the health and safety of workers. • Considering wind direction and strength during shed clean

	out. If possible shed clean out should occur when the wind is blowing away from sensitive receptors/areas.

6.5. Pest Management

Environmental Sustainability Standards	Management Considerations
6.4.1. The poultry farm has a pest management plan to protect poultry birds from predation and harassment and to minimise biosecurity risks from transmissible diseases. 6.4.2. There are effective fences to contain poultry, particularly when they have access to outdoors, and to prevent the entry of predatory wildlife or stray domestic animals. 6.4.3. Sheds are designed and built to exclude wild birds, and feed spillages are cleaned up immediately so wild birds and rodents are not encouraged. 6.4.4. There is an effective rodent control and monitoring program in place. 6.4.5. There is an active insect pest control programme in place to control flies and beetles populations in litter using pesticides, composting and total shed litter clean out where possible.	• A pest management plan is developed in consultation with local authorities and the community. • The poultry farm has effective fencing to keep out stray dogs, cats and wildlife that could harass or kill poultry. • Farm dogs and cats are controlled to prevent entry into poultry sheds. • Wild birds are excluded to minimise the risk of infectious diseases, and water birds are discouraged from congregating on water storage and waste ponds and from having contact with domestic poultry. • Rats and mice are controlled through an active baiting program. • There is an active program of controlling beetles in litter using pesticides, composting and litter management. • Chemicals used for controlling insect pests do not prevent re-use of poultry litter as a fertilizer. • An effective fly control program is developed and implemented. • Records of all chemicals used are kept in accordance with appropriate procedures.

Annex 1. - Public Health Hazards

Context and Scope

Good Animal Husbandry Practices have the primary goal of protecting the health and welfare of the animals being managed. An important secondary goal is to protect the health of people associated with managed animals. This is often in the context of direct hazards to human health from contact with the animals or their immediate environments. It may also relate to food safety and hazards associated with contact with other animal-derived products. This section will deal with the former set of hazards, as feed-borne and related threats are more comprehensively dealt with in the ASEAN Good Animal Husbandry Practices for Layers and Broilers Food Safety Module.

Classical zoonoses are diseases that are transmitted from animals to humans, e.g. rabies. In many cases, these agents do not cause disease in the animal host. However, many infectious hazards represent shared threats to both animal and human health and welfare, i.e. they cause clinical disease in both poultry and humans, irrespective of source of the hazard. The same is often true for non-infectious hazards. Therefore, many attributes of management of human health hazards associated with poultry production are similarly shared with principles of management of animal health hazards. Generically, those that relate to management of biological hazards can be considered biosecurity practices. This section will provide Good Animal Husbandry Practice recommendations as they relate specifically to human health hazards, i.e. transmission from animals and their environment to humans. A more broad and detailed description of biosecurity practices as they relate to protection of animal health and productivity protection through minimizing animal-animal and farm-farm transmission of hazards is provided in the ASEAN biosecurity management manual for commercial poultry farming.

In the context of this section, a hazard is defined as a physical, chemical or biological agent with the potential to cause an adverse human health event. Risk is defined as the likelihood that exposure to a hazard will lead to a negative health consequence, based on the probability and dose of exposure, and the severity of outcomes following exposure. A brief description of the most significant human health hazards associated with poultry production follows. Guidelines for prevention and management of these hazards are then presented. For the purposes of this document, these hazards and preventive approaches are primarily discussed in the context of commercial production units, be they broiler or layer production systems. Many of the hazards and management guidelines also pertain to small-holder production systems but with modified risk in terms of hazard exposure, e.g. different prevalences of pathogens or use of agricultural and veterinary chemicals for different production situations. The following descriptions of hazards and risk management pertain primarily to the context of the ASEAN Member States.

Infectious Health Hazards

Avian influenza

Avian influenza (AI) is a viral disease that affects almost all domesticated bird species globally. Aquatic waterfowl are the natural reservoir of Influenza viruses, and can disseminate strains around the world via migration. These wildlife strains are typically low pathogenic AI (LPAI) in that they usually infect birds without causing significant disease. Some strains, however, mutate into highly pathogenic AI (HPAI) which can cause mass morbidity and mortality events in populations of birds exposed. HPAI are significant biosecurity and avian disease hazards.

Strains of AI, including HPAI, were not historically considered significant human health hazards. However, an outbreak of H5N1 AI in Hong Kong in 1997 heralded a new form of AI – zoonotic AI. These strains were transmitted directly from birds to humans. Since the initial outbreak, other strains of AI have been recognised to be zoonotic, e.g. H7N9 in China. Although human infection with zoonotic strains of AI is associated with a high case fatality rate, transmission from birds to humans is very infrequent, and occurs only under specific circumstances of high levels of contact with infected birds, e.g. slaughter processing, managing sick birds. Similarly, the typically low capacity for human to human transmission of these strains limits their pathogenic potential. Therefore, the risk for individual human infection with AI is low.

The main risk of zoonotic strains of AI is their potential to genetically mutate or recombine to form pandemic influenza strains. Pandemic strains are those that possess the ability to cause significant disease in humans, be transmitted readily between humans, and reduce human immune responses through their novel strain status. Emergence of pandemic strains is an important global health threat due to the number of people potentially affected, global distribution, high morbidity and mortality, and disruption to people's livelihoods and social amenity. Limiting the process of continual emergence and dissemination of new strains of AI among poultry is the mainstay of AI prevention. Limiting transmission from birds to humans and other livestock (particularly pigs, which are a classical 'mixing vessel' for new strain generation) is a priority of health organisations worldwide in preventing pandemic strain emergence.

Non-typhoid Salmonella

Salmonella are significant bacterial pathogens of humans. They are primarily associated with gastroenteritis, but also invade the circulatory system such that people can develop septicaemia, infections in various internal organs, and other complications that frequently lead to serious illness or death. Two serovars of *Salmonella* (Typhi, Paratyphi) are human communicable diseases, i.e. infection is human to human. All other *Salmonella* strains of human significance (i.e. non-typhoid) are zoonotic. Some serovars of Salmonella are poultry-adapted (e.g. S. Pullorum, S. Gallinarum) but are not typically zoonotic.

Salmonellosis is primarily a food-borne disease, with foods of animal origin, and poultry meat and eggs particularly, being the most commonly recognized vehicle for infection. Poultry meat is typically contaminated by *Salmonella* during the slaughter and processing period, via transfer of the bacterium from the gut or skin of birds to meat via personnel, equipment or processing environments. Eggs are usually contaminated via external soiling by poultry faeces, with consumers becoming infected through poor food handling and contamination of the interior of the egg by the external material. An exception is the *Salmonella* serovar Enteriditis, which can be vertically transmitted, i.e. is transferred into the contents of the egg via the bird's oviduct prior to being laid.

Beyond their significance as a food-borne pathogen, *Salmonella* are frequently transmitted to humans through direct contact with animals or their environment. This includes livestock production units, and poultry units specifically. Excretion of *Salmonella* by livestock can be prevalent even if the herd/flock is clinically healthy. Similarly, farm soil and litter, animal waste materials, feeds and water, husbandry equipment and facilities are often found to harbor *Salmonella* with zoonotic potential.

Other enteric Pathogens

Campylobacter are also significant pathogens of humans. Campylobacteriosis is typically less severe than salmonellosis, primarily causing gastroenteritis although occasionally progressing to more severe and chronic conditions. However, it is more prevalent, being recognized as the most common bacterial cause of gastroenteritis in humans worldwide. The main zoonotic species associated with poultry is *C. jejuni*, although *C. coli* is also significant. Campylobacter are common in the gastrointestinal tract of birds, and are excreted in the faeces. Most human transmission events are associated with food, with consumption of undercooked poultry meat considered the primary risk factor for campylobacteriosis. As per *Salmonella*, *Campylobacter* can also be transmitted to humans through contact with animals directly or their immediate environment.

Many strains of *E. coli* are zoonotic pathogens of humans, with transmission being primarily food-borne. Again, *E. coli* can be also transmitted directly from animal to human. *E. coli* are a common cause of gastroenteritis in humans, however some strains of *E. coli* (known as extra-intestinal *E. coli* or ExPEC) are also associated with urinary tract and wound infections, septicaemia and other complications. Although poultry aren't considered a major source of pathogenic *E. coli* for humans, recent evidence is suggesting that some strains of *E. coli* pathogenic to poultry (avian pathogenic *E. coli*, or APEC) may be associated with ExPEC infection in humans.

Antimicrobial resistance

Bacteria that are resistant to antimicrobial drugs emerge through natural selection wherever antimicrobials are used. Poor biosecurity practices and continued selection pressure (usually through continued use of antimicrobials) then allows these emergent strains to disseminate and persist at local and global levels. Antimicrobial resistant (AMR) bacteria represent significant threats to both animal and human health. They limit the drugs available to treat significant infectious diseases, prolong or complicate infection response, result in significantly increased morbidity and mortality rates, and increase costs in the human and

animal health care systems. They also threaten the marketability of animal-derived foods by virtue of their presence or associated drug residues. AMR bacteria that humans ingest via food may be pathogenic to humans, or bear genetic resistance traits that can be passed on to other pathogens later.

Use of antimicrobials (with respect to amounts and classes) on poultry farms varies greatly, depending on geographic location, disease endemicity, socio-economic factors, and regulatory environments. Problems emerge where antimicrobials are used excessively or inappropriately. Some are used for active treatment of diagnosed bacterial diseases in the flock. But much is used for prophylactic or metaphylactic disease prevention, or for growth promotion. Problems with poor diagnosis of infection, limited access to alternate prevention and treatment modalities, or relative ease of administration of antimicrobials leads to overuse and misuse. Some classes of antimicrobials (e.g. fluoroquinolones, 3rd and 4th generation cephalosporins, polymixins, streptogramins) are listed by most health agencies, including the World Health Organization, as antimicrobials of high public health importance. These are drugs for which alternatives to treatment of high impact diseases do not exist. Another particular threat is the emergence of bacteria that are resistant to many different classes of antimicrobial, i.e. multi-drug resistant (MDR) bacteria. AMR is considered one of the most urgent and potentially high impact public health threats at a global level. Many AMR pathogens, including MDR strains and those resistant to the WHO drug classes of high public health impact, have emerged in SE and sub-continental Asia.

HISTOPLASMA CAPSULATUM

Histoplasmosis is acquired by both birds and humans via inhalation of fungal spores from contaminated soil, although soil enriched by avian faeces, and therefore avian environments, are considered higher risk for exposure to *H. capsulatum.* The disease in humans manifests initially as influenza-like, but may progress to acute or chronic pulmonary forms, where severe respiratory symptoms may occur that are often confused with tuberculosis.

CHLAMYDOPHILA

Human infections with zoonotic strains of *Chlamydophila psittaci* are known as psittacosis or ornithosis. The disease manifests in humans as fever, body pains and severe respiratory symptoms, with occasional progression to chronic disease states. Pet birds (particularly parrots and pigeons) are the main reservoir for this bacterium, although human infections via exposure to ducks, turkeys and occasionally chickens have been reported. Airborne transmission via aerosolised excreta or dander is the usual mechanism for human exposure, with poor ventilation in poultry units being a particular risk factor. Because *C. psittaci* and other Chlamydia survive for long periods in the environment, poor cleaning and disinfection protocols are also incriminated.

MINOR POULTRY ASSOCIATED ZOONOSES

- Newcastle Disease (paramyxovirus): is a high impact disease of poultry but has only rarely been associated with zoonotic transmission, often through accidental self-vaccination. It causes low grade influenza-like symptoms and conjunctivitis.

- *Cryptococcus neoformans*: occasionally causes severe disease in humans, mainly immunocompromised individuals, typically affecting the respiratory system. This fungal disease is more typically associated with exposure to pigeon excrement or contaminated soil, but has been linked to poultry exposure.
- West-Nile Virus (WNV) is typically associated with wild birds and transmission to humans via mosquito bites. Disease in poultry, particularly water fowl, occurs and may be involved in the human transmission cycle, but only to a small degree.
- Fungi: Most zoonotic fungal infections manifest as dermatophytoses, with ringworm being the common cutaneous disease. Systemic mycoses are more severe but less common, occurring primarily in immunocompromised individuals. Poultry have been documented as sources of zoonotic *Microsporum spp..* Production of mycotoxins (below) is the more significant risk associated with the presence of fungi in production environments.

Non-infectious Health Hazards

ALLERGENS

A large range of allergens exist within poultry production units, being generated via dander from birds, animal secretions and wastes, litter, and microbial activity. Allergens can have significant human health impacts, inducing inflammation of respiratory, cutaneous, and gastrointestinal systems as well as irritation of conjunctiva. Occasionally, allergens can induce more serious and chronic immune disorders.

AGRICULTURAL, VETERINARY AND NATURAL CHEMICALS

Agricultural and veterinary chemicals are those intended for use in poultry units for prevention, control or treatment of various biological hazards. However, if improperly used, these chemicals can represent hazards themselves. Agricultural and veterinary chemicals reported to constitute actual or potential health hazards include:

- Those applied to animals directly, such as topical or systemic parasiticides (e.g. for management of mites, lice, coccidia), antimicrobials (for treatment and prevention of bacterial infections and/or for growth promotion), non-steroidal anti-inflammatory drugs, hormonal growth promotants, and other specific veterinary medicines.
- Those applied to the animals' environment, such as insecticides, rodenticides, cleaning and disinfection products, and herbicides (typically used in feeds production).

These agricultural and veterinary chemicals represent direct health threats to personnel through handling, inhalation or ingestion during use or exposure to animals or production environments. They also represent potential residue hazards for consumers in poultry-derived foods and other products.

Some naturally-produced chemicals, e.g. ammonia within excreta, induce symptoms such as mucus membrane irritation, nausea, and loss of consciousness. Other chemicals that may be commonly found in the primary production environment (e.g. fuels, cleaning agents, refrigerants) may be corrosive, flammable, explosive or toxic.

Mycotoxins

Many types of fungi produce secondary metabolic byproducts known as mycotoxins. Mycotoxins induce a range of adverse health events in animals and humans, including liver and kidney failure, acute and chronic nervous and/or immune system symptoms, and cancer. Mycotoxic chemicals that may be associated with poultry production include aflatoxins, ochratoxins, and fusarium toxins. The primary human and animal threat from mycotoxins arises through consumption of foods (in the case of humans) or feeds (for animals) in which mycotoxins have accumulated through fungal contamination. However, mycotoxins can also represent direct chemical and allergic health hazards to personnel exposed to them in the poultry production environment.

Mechanical and Physical Injury

Poultry production units offer multiple opportunities for exposure to mechanical hazards via accidents with machinery, repetitive strain and ergonomic injury, slippage, bites and scratches from birds. Thermal injuries may also occur through exposure to materials of extreme temperature (e.g. hot irons for beak trimming, refrigeration units) or working within extreme temperatures – typically excessively hot and /or humid environments.

Psychosocial

Aspects of poultry production can have adverse effects on workers' psychological and social wellbeing. Dealing particularly with issues relating to animal morbidity and mortality (especially mass events), as well as other general pressures of working in a primary production industry have been associated with negative health outcomes such as anxiety, isolation, substance abuse, or empathy desensitization.

Approaches to Managing Public Health Hazards

Biosecurity Approaches

A detailed description of general biosecurity practices appropriate to poultry production is beyond the scope of this section (but see the References section below). However, some specific recommendations for control and prevention of the hazards listed above follow.

- Facility design
    - Wild bird exclusion using nets, deterrent devices, etc. to reduce transmission of AI to domesticated flocks
    - Vermin control programs (exclusion, trapping, baiting) to reduce ingress and dissemination of pathogens including enteric bacteria, AMR bacteria
    - Insect control programs (screening, fogging, unit location) to avoid fly-borne transmission of pathogens and mosquito-borne diseases like West Nile Virus
    - Provision of designated staff rest and eating areas to avoid oral exposure to enteric pathogens and chemical hazards

    - Effective feeds management:
        - Vermin exclusion: reduce introduction and dissemination of pathogens and risk of rodenticide residues
        - Moisture exclusion: reduce bacterial growth and fungal mycotoxin production
    - Ensure adequate ventilation of the facility with appropriate air exchange and flow rates to reduce pathogen, chemical and allergen accumulation
- Cleaning and Disinfection
    - Removal of gross soiling from facility surfaces
    - Use of appropriate agricultural chemical disinfectants for inactivation of pathogens
    - Constitute and apply disinfectants as directed by the manufacturer to ensure efficacy and avoid personnel chemical hazards
    - Cleaning and disinfection of cages used for bird transport on and off farm
    - Provision of hand-washing stations for personnel, with adequate water supply and soap/disinfectant, and wastewater disposal
- Designated clothing use within the poultry unit
    - To reduce potential introduction of agents
    - To reduce personnel carrying hazardous pathogens and chemicals from the facility and exposing the general public
    - Use of designated footwear – either rubber boots that can be readily decontaminated or disposable boot covers
    - Possible use of shower systems on entry and exit
- Personal protective equipment
    - Use of gloves when managing birds under high risk situations to avoid contact zoonoses or chemical exposure
    - Use of P2 (or N95) respirators when managing birds where respiratory pathogens are a risk, particularly for AI, Newcastle Disease, *Chlamydophila, Histoplasma* and *Cryptococcus*, or chemical/allergens
    - Use of eye protection as above and to avoid conjunctival exposure to chemicals and pathogens
    - Use of hair nets/helmets to avoid exposure to or carriage of aerosolized pathogens or mechanical hazards under high risk circumstances
    - Systems of risk assessment and Standard Operating Procedures to define levels of personal protective equipment for various procedures
- Waste Management
    - Effective removal and treatment of poultry excreta to avoid dissemination and accumulation of faecal pathogens
    - Care with reducing dust generation when handling litter, excreta, soil – use of wetting or ventilation to reduce personnel exposure
    - Effective disposal of dead birds
    - Effective drainage and disposal/treatment of wastewater from the facility
- Vaccination

    - Vaccination of personnel for specific diseases: currently only relevant for human epidemic strains of influenza to reduce the likelihood of co-infection with zoonotic AI and recombination events
    - Vaccination of the flock to reduce their carriage and potential transmission of AI, Newcastle Disease, Salmonella to humans
    - Use of legitimately-sourced vaccines (avoid counterfeit or improperly produced/stored batches) as per prescribed methods
    - Proper training and personal protective equipment for personnel to avoid self-vaccination with live vaccine agents, such as Newcastle Disease virus and *Erysipelothrix*
- Feeds and water
    - Sourcing of feeds from reputable suppliers with documented quality assurance programs
    - Controlled milling of feeds as directed by a nutritionist and using procedures to exclude chemical and infectious hazards, and in accordance with antimicrobial prudent use guidelines
    - Screening of feeds for mycotoxins or other potential hazards, use of adsorbent ration additives
    - Feeder design to avoid excessive residual feed accumulation, which can harbor pathogens and fungal mycotoxin production
    - Provision of clean, potable water to flocks with appropriate flow rates and low capacity for spillage/accumulation
- Personnel
    - Training of staff to work to Standard Operating Procedures and other guidance documents
    - Staff education about specific hazards and risk mitigation approaches
    - Systems of staff health surveillance and reporting
- Procedural
    - Development of, training in, and documented use of Standard Operating Procedures that describe each of the approaches above
    - Antimicrobial stewardship guidelines for effective and prudent use of antimicrobials to avoid AMR emergence and chemical residues
    - Strict personnel entry and exit and vehicle decontamination procedures to reduce pathogen ingress and egress
    - Effective animal health surveillance systems to alert operators to disease outbreaks of relevance to human health
    - Prohibition of smoking or other materials being placed in the mouth to avoid oral transmission of chemical and infectious pathogens
    - Effective record keeping, particularly with respect to feeds management, use of agricultural and veterinary chemicals, herd health programs, personnel and visitor traffic
    - Aim for “all-in, all-out” flock management to allow complete depopulation between flocks and effective facility decontamination
    - Sourcing of seed stock from reputable suppliers, including evidence of quality assurance systems

Infrastructural requirements

Beyond the practical, operational activities listed above, a series of foundational systems need to be in place to effectively deal with public health and biosecurity issues. Much of this relies on governmental infrastructure, although industry level systems also contribute.

- Regional health systems:
  - Human health Surveillance, reporting and response systems
  - Animal health Surveillance, reporting and response systems
  - Food-borne disease surveillance
  - Diagnostic capabilities: analytical and reporting
  - Traceability processes: animal, feed, exports

- Regulatory mechanisms
  - Surveillance and reporting: local, national, international. Human and animal
  - Chemical/residue assurance schemes and analytical services
  - Outbreak response plans and agreements
  - Export and World Trade Organisation compliance
  - Food safety standards
  - Workplace Health and Safety standards
  - Biosecurity legislation: import, endemic and exotic threat management
  - Agricultural and veterinary chemical management: initial product registration, compliance management
  - Veterinary services registration and approval processes

- Technical expertise and access
  - Risk analysis approaches to managing human, animal and feed hazards
  - Risk assessment tools, including software and published risk assessments
  - Effective risk management and communication
  - Hazard Analysis Critical Control Point (HACCP) systems
  - Post-border and global import and export regulations
  - Systems for effective record creation, storage and access

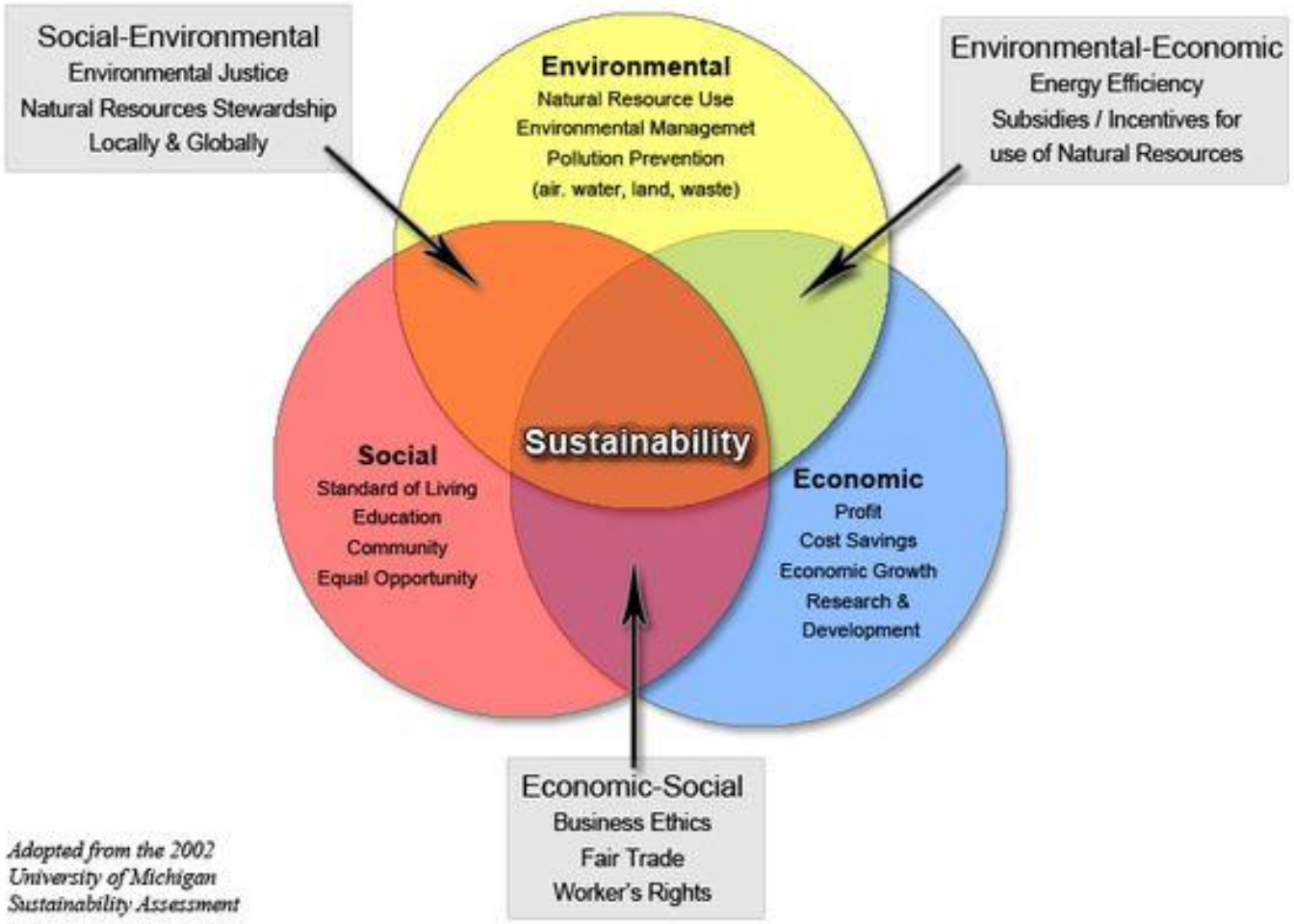
Annex 2: Environmental sustainability

There are many definitions of sustainability but most include concepts of:

- living within the limits of what the environment can provide
- understanding the many interconnections between economy, society and the environment
- the equal distribution of resources and opportunities.

Sustainable development is comprised of three major aspects, social, economic and environment:

The Three Spheres of Sustainability



Adopted from the 2002 University of Michigan Sustainability Assessment

The owners and managers of poultry enterprises in AMS are encouraged to develop an Environment Sustainability Plan for the farm. It should provide a system for documenting:

- The environmental risks of the enterprise.
- How these risks will be minimised by design and management.
- Measurement of the effectiveness of these strategies by monitoring.
- Reporting the results of the monitoring.

Key components of an **environmental management system** include:

- Identification and contact details, with a brief description of the operation and a commitment that it will be operated in an environmentally sustainable manner.

- Legal requirements of the enterprise, including applicable consents, approvals and/or licences to operate the enterprise and use water etc.
- Information on the natural resources and amenity issues of the property and surrounding area.
- Description of all the design and management facets of the operation.
- Identification of any environmentally vulnerable areas by examining how the location, design and management of the operation interact with the environment. Identification of a risk may mean regular monitoring or a change in design and management is required to minimise the risk.
- Monitoring to measure any environmental impacts. This may include soil sampling if by-products are utilised on-farm or chemical analysis of manure and spent litter sold off-farm.
- Contingency plans for emergency situations.
- Environmental training undertaken by staff.
- The periodic review of the system to update changes in regulatory requirements, operation, environment, design or management.

A relationship diagram explaining key factors and issues in an environmental management system is provided in Figure 1[17].

17

https://www.researchgate.net/publication/223570799_Integrated_farm_sustainability_assessment_for_the_environmental_management_of_farm_activities_Environmental_Impact_Assessment_Review_30_229-239

This figure encompasses the farm activities' effects on the local ecosystem, their influence on the quality of environmental factors, the economic performance, the effects on social interests of people involved (producers, farm workers and commercial partners), and the management relationships with local and potential international markets.

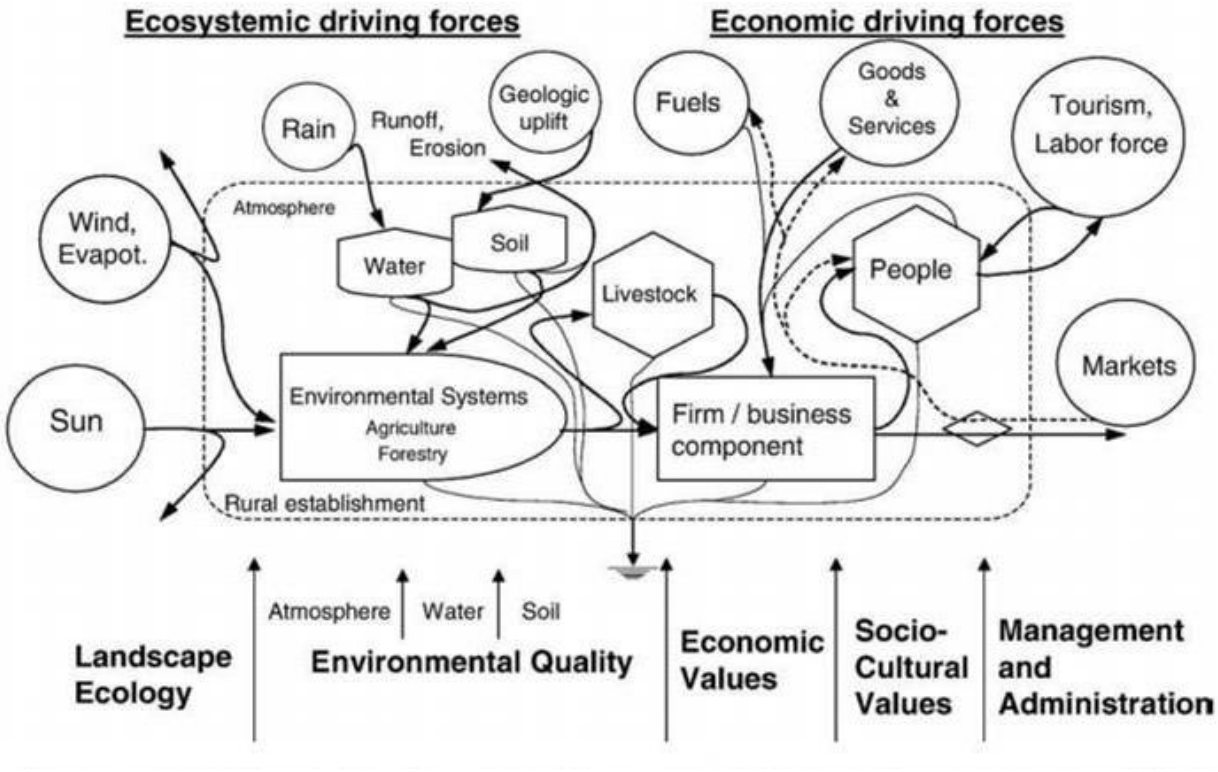


Figure 1. A systems diagram of the issues and factors interacting in an agricultural enterprise, its local ecosystem and its broader sustainability considerations.

Annex 3: Focal features for animal welfare assessment

The Poultry Cooperative Research Centre has supported the development of an information site called the Poultry Hub. Details of normal poultry behavior are available at http://www.poultryhub.org/production/husbandry-management/poultry-behaviour/.

Indicators of poultry health include:

- Alertness
- Clear, bright eyes
- Good posture
- Rapid movements/flight if unduly disturbed
- Active feeding and drinking
- Clean, healthy skin, shanks and feet.

Early signs of ill-health may include:

- loss of appetite and reduced feed intake
- lack of preening
- lack of chatter and vocalization
- inactivity
- reduced egg production
- change in egg quality e.g. soft shells or other egg shell defects.

The OIE has developed indicators for the welfare of broilers which provide a useful globally-agreed guide in the Terrestrial Animal Health Code, Chapter 7.10 – Animal Welfare and Broiler Chicken Production Systems at http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_aw_broiler_chicken.htm

Article 7.10.3.

Criteria or measurables for the welfare of broilers

The welfare of broilers should ideally be assessed using outcome-based measurables. Consideration should also be given to the resources provided and the design of the system. The following outcome-based measurables, specifically animal-based measurables, can be useful indicators of *animal welfare*. The use of these indicators and the appropriate thresholds should be adapted to the different situations where broilers are managed, also taking into account the strain of bird concerned.

Some criteria can be measured in the farm setting, such as gait, mortality and morbidity rates, while others are best measured at the *slaughterhouse/abattoir*. For example, at *slaughter flocks* can be assessed for presence of bruising, broken limbs and other injuries. The age of these lesions can help to determine the source. Back scratching and contact dermatitis and breast blisters are also easily observed at the *slaughterhouse/abattoir*. Other conditions such as ascites, leg deformities, dehydration and *disease* conditions can also be assessed at *slaughter*. It is recommended that values for welfare measurables be determined with reference to appropriate national, sectoral or perhaps regional norms for commercial broiler production.

The following outcome-based criteria and measurables are useful indicators of broiler welfare:

1. Mortality, culling and morbidity

Daily, weekly and cumulative mortality, culling and morbidity rates should be within expected ranges. Any unforeseen increase in these rates could reflect an *animal welfare* problem.

2. Gait

Broilers are susceptible to developing a variety of infectious and non-infectious musculoskeletal disorders. These disorders may lead to lameness and to gait abnormalities. Broilers that are lame or have gait abnormalities may have difficulty reaching the feed and water, may be trampled by other broilers, and may experience pain. Musculoskeletal problems have many causes, including genetics, nutrition, sanitation, lighting, litter quality, and other environmental and management factors. There are several gait scoring systems available.

3. Contact dermatitis

Contact dermatitis affects skin surfaces that have prolonged contact with wet litter or other wet flooring surfaces. The condition is manifested as blackened skin progressing to erosions and fibrosis on the lower surface of the foot pad, at the back of the hocks,

and sometimes in the breast area. If severe, the foot and hock lesions may contribute to lameness and lead to secondary *infections*. Validated scoring systems for contact dermatitis have been developed for use in *slaughterhouse/abattoir*.

4. Feather condition

Evaluation of the feather condition of broilers provides useful information about aspects of welfare. Plumage dirtiness is correlated with contact dermatitis and lameness for individual birds or may be associated with the environment and production system. Plumage dirtiness can be assessed as part of on-farm inspections, at the time of harvesting or prior to plucking. A scoring system has been developed for this purpose.

5. Incidence of diseases, metabolic disorders and parasitic infestations

Ill-health, regardless of the cause, is a welfare concern, and may be exacerbated by poor environmental or husbandry management.

6. Behaviour

a) Fear behaviour

Fearful broilers show avoidance of humans, and this behaviour is seen in *flocks* where *animal handlers* walk through the poultry house quickly when performing their tasks rather than moving more slowly while interacting with the broilers. Fearfulness (e.g. of sudden loud noises) can also lead to the broilers piling on top of, and even suffocating, one another. Fearful broilers may be less productive. Validated methods have been developed for evaluating fearfulness.

b) Spatial distribution

Changes in the spatial distribution (e.g. huddling) of the birds may indicate thermal discomfort or the existence of areas of wet litter or uneven provision of light, feed or water.

c) Panting and wing spreading

Excessive panting and wing spreading indicates heat stress or poor air quality, such as high levels of ammonia.

d) Dust bathing

Dust bathing is an intricate body maintenance behaviour performed by many birds, including broilers. During dust bathing, broilers work loose material, such as litter, through their feathers. Dust bathing helps to keep the feathers in good condition, which in turns helps to maintain body temperature and protect against skin injury. Reduced dust bathing behaviour in the *flock* may indicate problems with litter or range quality, such as litter or ground being wet or not friable.

e) Feeding, drinking and foraging

Reduced feeding or drinking behaviour can indicate management problems, including inadequate feeder or drinker space or placement, dietary imbalance, poor water quality, or feed contamination. Feeding and drinking behaviour are often depressed when broilers are ill, and intake may be also reduced during periods of heat stress and increased during cold stress. Foraging is

the act of searching for feed, typically by walking and pecking or scratching the litter substrate; reduced foraging activity could suggest problems with litter quality or presence of conditions that decrease bird movement.

f) Feather pecking and cannibalism
Feather pecking can result in significant feather loss and may lead to cannibalism. Cannibalism is the tearing of the flesh of another bird, and can result in severe injury. These abnormal behaviours have multi-factorial causes.

7. Water and feed consumption

Monitoring daily water consumption is a useful tool to indicate *disease* and other welfare conditions, taking into consideration ambient temperature, relative humidity, feed consumption and other related factors. Problems with the water supply can result in wet litter, diarrhoea, dermatitis or dehydration.
Changes in feed consumption can indicate unsuitability of feed, the presence of *disease* or other welfare problems.

8. Performance

a) Growth rate (gr) - an index that indicates the average daily gain of weight per average broiler of a *flock*.
b) Feed conversion - an index that measures the quantity of feed consumed by a *flock* relative to the total live weight harvested, expressed as the weight of feed required to produce one kg of broiler body weight.
c) Liveability - an index that indicates the percentage of broilers present at the end of the production period. More commonly this indicator is measured as its opposite, mortality.

9. Injury rate

The rate of these injuries can indicate welfare problems in the *flock* during production or harvesting. Injuries include those due to other broilers (scratches, feather loss or wounding due to feather pecking and cannibalism) and those due to environmental conditions, such as skin lesions (e.g. contact dermatitis) and those due to human intervention, such as catching. The most prevalent injuries seen during catching are bruises, broken limbs, dislocated hips, and damaged wings.

10. Eye conditions

Conjunctivitis can indicate the presence of irritants such as dust and ammonia. High ammonia levels can also cause corneal burns and eventual blindness. Abnormal eye development can be associated with low light intensity.

11. Vocalisation

Vocalisation can indicate emotional states, both positive and negative. Interpretation of *flock* vocalisations is possible by experienced *animal handlers*.

Annex 4: Self-assessment checklist for poultry

Animal welfare indicator	Status		
	Yes	No	Developing/ Not applicable/comments
GOOD FEED AND WATER Birds eat nutritious feed in amounts that maintain acceptable body condition scores.			
Birds drink, or otherwise access, sufficient water for their biological needs. For ducks, they have access to drinking water, showers (or ponds) to meet their behavioural needs.			
GOOD OUTDOOR AND INDOOR ENVIRONMENTS Birds have comfortable areas to rest.			
Birds have sufficient shade and/or shelter to avoid heat stress.			
Birds have sufficient space to be able to move around freely.			
Birds have sufficient fresh air ventilation to prevent health and production impacts from a buildup of noxious gasses, dust or smoke.			
GOOD HEALTH When signs of disease occur, expert advice is sought as soon as possible and the rest of the birds/sheds are also checked.			
Birds with injuries due to fighting, victimisation or problems with facilities are identified and treated, and remedial actions taken			

to prevent a reoccurrence.			
APPROPRIATE BEHAVIOUR Birds are able to express some species typical, non-harmful social and other behaviours.			
DUTY OF CARE/RESPONSIBILITIES There is a detailed health care programme, including preventative measures and high standards of hygiene.			
Poultry workers know the signs of normal healthy birds and normal poultry behaviour.			
Managers and workers responsible for the care of birds are well trained, experienced, dedicated and able to recognise the signs of good and poor welfare.			
Poultry workers handle birds in a way that promotes good human-bird relationships.			

Environmental sustainability checklist

Sustainable development targets include;

- achieving good animal welfare, ethics and procedures
- controlling effluents, chemical residues, contaminants, wastes and pollution
- increasing use of renewable, recyclable and recoverable resources
- minimising noise, dust, light or odour emissions
- preventing live cultured or held organisms from escaping into environment
- reducing emissions of greenhouse gases
- reducing energy use and improving energy efficiency
- reducing use of non-renewable resources
- undertaking environmental hazard identification, risk assessment and control.

Check List

Environmental Sustainability Issue	Status		
	Yes	No	Developing
OFFICIAL REQUIREMENTS Government permissions for approval of the farm and lay out of sheds and future development have been obtained and there is a list of relevant laws that are relevant to the operating of the			

farm.			
FARM SUSTAINABILITY PLAN A farm Environment Sustainability Plan has been developed and is reviewed regularly			
There is a farm management practice plan with details of land, layout of sheds, distance to neighbours			
There are areas of natural habitat on the premise, trees are retained where possible and weeds and pests are controlled			
The farm has access to a reliable, adequate and constant power supply to ensure water supply and feed delivery to the birds and to light and ventilate the sheds.			
The farm has standby generators with auto switch control installed to manage power supply in the event of mains supply failures.			
The farm has contingency plans to deal with emergency incidents, including natural disasters such as floods, fires, storms.			
The farm is involved with the community and engages local labour where possible			
The farm provides for the chicken sheds and feed silos, amenity block, storage sheds, internal roads, litter composting or stockpile areas (where appropriate) and dead bird management or storage areas, as well as relevant mitigation measures for odour and noise impacts.			
The farm has enough space near sheds for transport vehicles to manoeuver to load and unload			

The farm has enough space near sheds for transport vehicles to manoeuver to load and unload			
Visitors and vehicles are subject to restricted entry to ensure biosecurity and there is a biosecurity plan and procedures in place to prevent the entry or exit of pathogens via people or vehicles.			
AIR AND NOISE POLLUTION There is an active odour risk management plan to reduce the risks of odour to neighbours.			
The farm has operating procedures to reduce the impact of noise.			
The farm has farm roads, farm parking areas designed to minimise noise, dust and bio aerosols			
Sheds are sited, well designed and insulated to allow cooling and ventilation and to reduce condensation to maintain dry litter.			
Ventilation fans are positioned to direct any exhaust air away from sensitive land uses and reduce odour health impacts.			
There is an automated system to maintain optimum ventilation rates that monitors relative humidity and temperature and controlls evaporative cool pads, fans and mini vents.			
WATER POLLUTION The site is above the level of flooding and engineered to ensure gently sloping, wide, open drains that are well grassed and kept mown to manage storm water runoff from sheds and to minimise erosion.			

The site is above the level of flooding and engineered to ensure gently sloping, wide, open drains that are well grassed and kept mown to manage storm water runoff from sheds and to minimise erosion.			
There is a farm water security plan that ensure supply of potable drinking water to the farm. If surface water is used, it is regularly tested and filtered to ensure potable quality.			
Shed floors are constructed of impermeable material to eliminate the risk of ground water contamination.			
Feeders are installed and maintained to minimise feed wastage.			
Drinkers are installed to ensure minimal spillage onto the litter.			
Silos and feed lines are designed to avoid feed spillage and the incursion of rain water			
CARCASS DISPOSAL There is a litter storage and dead bird management plan in place.			
If on-farm composting is done, composting sites, dead bird management facilities and litter storage areas are located away from farm boundaries and neighbours.			
Dead bird composting or disposal areas and litter storage areas are located on a gently sloping site away from drainage lines and water sites.			

MANURE AND WASTE MANAGEMENT There are arrangements for managing poultry farm waste including: • shed cleanout with removal of poultry litter (bedding plus poultry manure) for productive re-use • any re-use of manure on the farm as a fertiliser • collection, storage and disposal of dead birds • disposal of used chemical containers and other refuse • prevention of contaminated run-off.			
Shed clean-out is undertaken during daylight hours to minimise the noise impact, reduce dust and odour impacts.			
Litter removal is undertaken when climate factors (wind and temperature) limit the likelihood of offensive off-site odour or dust impacts.			
Spent litter is removed from the farm or operational area immediately as sheds are being cleaned out.			
Used litter is transported from the farm in covered vehicles to avoid spillage and dust emissions.			
PEST MANAGEMENT Sheds are maintained to exclude wild birds			
Spilled feed is cleaned up immediately to avoid attracting wild birds			
A baiting program is operating to control rodents			

The farm has effective fences to prevent the entry of stray dogs, cats and wildlife that could kill or harass poultry.			
Beetle populations are controlled through an integrated pest management approach using pesticides, composting and total shed litter clean out.			
Chemicals used in pest control programs do not restrict the application of used litter onto land.			

Annex 5: Examples of documents and records

Red Tractor, UK at http://assurance.redtractor.org.uk/resources/000/999/162/Poultry_Free_Range_Checklist.pdf

USA National Chicken Council (2010). Animal Welfare Guidelines and Audit Checklist for Broilers. Accessed on 12 February 2016 at http://www.nationalchickencouncil.org/wp-content/uploads/2014/04/NCC-Guidelines-Broilers-April2014.pdf

United Kingdom AssureWel Layer Hen Assessment. Accessed on 11 February 2016 at http://www.assurewel.org/layinghens.

AssureWel Score Sheet: http://www.assurewel.org/Portals/2/Documents/Laying%20hens/AssureWel%20laying%20hen%20recording%20sheet.pdf

Australian Chicken Organisation Checklist: http://www.chicken.org.au/files/_system/Document/Animal%20Welfare%20Standards/ME%20074%20Chicken%20Standards%20-%20Farming%20Manual-2.pdf

Check list for pick up crews at http://www.chicken.org.au/files/_system/Document/Animal%20Welfare%20Standards/ME%20081%20Chicken%20Standards%20-%20Pick-Up%20Crew-1[1].pdf

New South Wales Government (2012). Best Practice Management for Meat Chicken Production in New South Wales – Manual 2 Meat Chicken Growing Management. http://www.chicken.org.au/files/_system/Document/NSW%20Best%20Practice%20Manuals/BPM-for-meat-chicken-production-in-NSW-manual-2.pdf

Appendices

Glossary of terms

Barn Laid (Eggs)– a production system where birds are housed in a shed with nesting boxes and roosts provided.

Beak Trimming - the blunting of the beak to remove the sharp point, which can be the cause of the most severe damage to other birds

Bedding – material placed on the floors of sheds to adsorb the manure produced by hens.

Biosecurity – protection from the introduction of potential disease organisms.

Breeding farms – farms keeping breeding hens and roosters to produce fertile eggs.

Broiler - bird of the species *Gallus gallus* kept for commercial meat production.

Cage Production - a production system where birds are kept in cages.

Chicks - young chickens**.**

Colony cages – also known as 'enriched' or 'furnished' cages, which have been designed to overcome some of the welfare problems associated with battery cages (e.g. perches, nesting box, scratching pad).

Commercial production system - a system of production aimed at producing commercial quantities of animal products.

Competent authority - an entity/agency which has the knowledge, expertise and authority, as designated by law.

Culls – chickens humanely killed for health or welfare reasons.

Day-old chicks – chickens aged not more than 72 hours after hatching.

Day-old duckling – duckling aged not more than 72 hours after hatching.

Depopulation - the removal of all birds from a house for slaughter.

Euthanase/euthanasia –A method of killing that minimises pain, distress, and anxiety experienced by the animal prior to loss of consciousness, and that causes rapid loss of consciousness, followed by stopping of the heart beat and breathing, as well as death.

Farm owner - Person or entity legally responsible for the activities of running an agricultural business.

Foot wear - Outer coverings for the feet, such as shoes or boots that protect the wearer and can be disinfected to prevent the spread of infection.

Free range – production system where birds have access to outside run area.

Good health status – Free from illness, injury or pain.

Groundwater – all water below the land surface that is free to move under the influence of gravity.

Laying hen - chicken of the appropriate age to lay eggs, generally ranged from 18-week old up to the depopulation period around 70-80 weeks old, depending on the breeds.

Leaching – process where soluble nutrients, e.g. nitrogen, are carried by water down through the soil profile.

Litter – the composite of poultry manure and adsorbent bedding.

Minimum standard – the least activity required; generally defined in the text by the use of the word “must” or similar words or phrases.

Office International des Épizooties (OIE) - see World Organisation for Animal Health

Personnel – Workers engaged by the business on a full time basis, part time basis or casual basis.

Potable water - Water that is free from diseases producing organisms and chemical substances deleterious to health.

Pollution – direct or indirect alteration of the environment causing contamination or degradation.

Poultry - all domesticated birds used for the commercial production of broilers, laying hens and ducks for meat or egg production for human consumption.

Protective clothing - garments that are specially designed, fabricated, and/or treated to protect personnel against contamination and dangerous working conditions.

Pullet – a young domestic female chicken up to the point of laying eggs.

Runoff – all surface water flow, both over the ground surface as overland flow and in streams as channel flow. It may originate from excess precipitation that can't infiltrate the soil or as the outflow of groundwater along lines where the water table intersects the earth's surface.

Vehicle - Any means of transporting animals, trains, ferries, ships and aircrafts.

Watercourse – a naturally occurring drainage channel that includes rivers, streams and creeks. It has a clearly defined bed and bank, intermittent flows. Refer to relevant state or territory acts for legal definition.

World Organisation for Animal Health (Office International des Épizooties – OIE) – the leading international organisation addressing animal health issues, comprising the Chief Veterinary Officers of 180 Member Countries. The organisation develops international animal welfare standards and other animal welfare resources to assist capacity building and implementation of OIE welfare standards.

References

General Animal Welfare

1. World Organisation for Animal Health (OIE). Terrestrial Animal Health Code (2015). Chapter 7.1. Introduction to the Recommendations for Animal Welfare. Article 7.1.1. – Definition. Accessed 9 February 2016 at http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_aw_introduction.htm
2. World Organisation for Animal Health (OIE). Terrestrial Animal Health Code (2015). Chapter 7.1., Introduction to the Recommendations for Animal Welfare. Article 7.1.2., Guiding Principles for Animal Welfare. Accessed on 8 February 2016 at http://www.oie.int/en/international-standard-setting/terrestrial-code/access-online/?htmfile=chapitre_aw_introduction.htm.
3. Fraser, D., Duncan, I.J.H., Edwards, S.A., Grandin, T., Gregory, N.G., Guyonnet, V., Hemsworth, P.H., Huertasm S.M., Huzzey, J.M., Mellor, D.J., Mench, J.A., Paranhos da Costa, M., Spinka, M. and Whay, H.R. (2013). General principles for the welfare of animals in production systems: The underlying science and its application. The Veterinary Journal 198, 19-27.
4. Grandin, T. (2014). Interpretation of OIE General Principles for Animal Welfare for Livestock and Poultry Production. Accessed at http://www.grandin.com/welfare.audit.using.haccp.html

Poultry - General

5. Poultry farming: welfare regulations (2013). United Kingdom Department of Environment, Feed and Rural Affairs. Accessed on 12 April 2015 at https://www.gov.uk/poultry-welfare-guidance-on-the-farm - welfare-code
6. Chickens, Turkeys and Breeders from Hatchery to Processing Plant (2003). Recommended Code of Practice for the Care and Handling of Farm Animals. Canadian Agri-Feed Research Council, Ottawa. https://www.nfacc.ca/codes-of-practice/chickens-turkeys-and-breeders
7. Domestic Poultry, 4th edition (2002). Primary Industries Standing Committee Model Code of Practice for the Welfare of Animals. CSIRO Publishing, Collingwood, Victoria, Australia. http://www.publish.csiro.au/nid/22/pid/3451.htm
8. Primary Industries Standing Committee (2002). *Model Code of Practice for the Welfare of Animals: Domestic Poultry (4th ed.).* Primary Industries Report Series 83. CSIRO Publishing. Retrieved from: http://www.publish.csiro.au/pid/3451.htm
9. World Organisation for Animal Health (OIE) (2015). Terrestrial Animal Health Code, edition 23, Chapter 6.4 Biosecurity Procedures in Poultry Production. Accessed on 15 February 2016 at http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_biosecu_poul_production.htm.
10. Poultry Cooperative Research Centre (2008). National Animal Welfare Standards for the Chicken Meat Industry at http://www.chicken.org.au/files/_system/Document/Animal%20Welfare%20Standards/ME%20074%20Chicken%20Standards%20-%20Farming%20Manual-2.pdf

11. Duncan, IJH and Hawkins, P (ed). 2010. The Welfare of Domestic Fowl and Other Captive Birds. 307 pp. Springer, Dordrecht.
12. Phillips, CJC and Forbes, JM. (ed) 1989. Photoperiodic manipulation of Cattle Production. Proceedings of the Farmelectric Workshop, Bangor 1988. Farmelectric Centre: Stoneleigh, U.K.
13. Meat Chickens (2012). Animal Welfare (Meat Chickens) Code of Welfare, National Animal Welfare Advisory Committee, Ministry for Primary Industries, New Zealand. Accessed on 6 April 2016 at http://www.biosecurity.govt.nz/regs/animal-welfare/req/codes/meat-chickens

Public Health

14. ASEAN biosecurity management manual for commercial poultry farming. www.asean.org/storage/images/archive/AMAF%2033%20Biosecurity%20Manual_Final%20Draft.pdf
15. World Organisation for Animal Health (2015). OIE Terrestrial Animal Health Code, Section 6 -Veterinary Public Health. Sections 6.3, 6.4 and 6.6. Accessed on 17 February 2916 at http://www.oie.int/index.php?id=169&L=0&htmfile=titre_1.6.htm
16. Australian Chicken Meat Federation Inc. (2010). National Farm Biosecurity Manual for Chicken Growers. Accessed on 12 February 2016 at http://farmbiosecurity.com.au/wp-content/uploads/2012/12/National-Farm-Biosecurity-Manual-for-Chicken-Growers.pdf.
17. The Centres for Disease Control and Prevention (CDC). Workplace Safety & Health Topics - Potential hazards to poultry workers. Accessed on 10 February 2916 at http://www.cdc.gov/niosh/topics/poultry/breed.html.
18. Risks and risk assessment in the poultry industry – British article at http://www.poultry-health.com/library/risk/rifede98.htm
19. Australian Chicken Meat Federation Inc. (2010). National Farm Biosecurity Manual for Chicken Growers. Accessed on 12 February 2016 at http://farmbiosecurity.com.au/wp-content/uploads/2012/12/National-Farm-Biosecurity-Manual-for-Chicken-Growers.pdf.
20. US Poultry and Egg Association (2016). Biosecurity. http://www.uspoultry.org/animal_husbandry/biosecurity.cfm
21. Australian Government Department of Agriculture, Fisheries and Forestry (2016). National Farm Biosecurity Manual for Poultry Production. Accessed on 12 February 2016 at http://www.farmbiosecurity.com.au/industry/chickens/

Meat Chickens

22. World Organisation for Animal Health (OIE) (2014). Terrestrial Animal Health Code, edition 23, Chapter 7.10. Animal Welfare and Broiler Chicken Production Systems. Accessed on 15 April at http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_aw_broiler_chicken.htm

23. Meat Chickens (2012). Animal Welfare (Meat Chickens) Code of Welfare, National Animal Welfare Advisory Committee, Ministry for Primary Industries, New Zealand. Accessed on 16 April 2015 at http://www.biosecurity.govt.nz/regs/animal-welfare/reg/codes/meat-chickens
24. Broiler Chickens (2012). US National Chicken Council Welfare Guidelines http://www.nationalchickencouncil.org/industry-issues/animal-welfare-for-broiler-chickens/
25. Chickens, Turkeys and Breeders from Hatchery to Processing Plant (2003). Recommended Code of Practice for the Care and Handling of Farm Animals. Canadian Agri-Feed Research Council, Ottawa. https://www.nfacc.ca/codes-of-practice/chickens-turkeys-and-breeders
26. Meat Chickens and Breeding Chickens (2002). Code of Recommendations for the Welfare of Livestock. DEFRA Publications, London, UK. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69372/pb7275meat-chickens-020717.pdf
27. Laying Hens and Broilers (2002). EU-specific Animal Welfare Rules. http://ec.europa.eu/feed/animal/welfare/farm/index_en.htm.
28. Garner JP, Falcone C, Wakenell P, Martin M, Mench JA. (2002) Reliability and validity of a modified gait scoring system and its use in assessing tibial dyschondroplasia in broilers. British Poultry Science;43(3):355-63.

Layer Hens

29. Layer Hens (2012). Animal Welfare (Layer Hens) Code of Welfare, National Animal Welfare Advisory Committee, Ministry for Primary Industries, New Zealand. Accessed on 16 April 2015 at http://www.biosecurity.govt.nz/files/regs/animal-welfare/2012-layer-hens-code-web.pdf
30. Pullets, Layers and Spent Fowl (2003). Recommended Code of Practice for the Care and Handling of Poultry Layers. Canadian Agri-Feed Research Council, Ottawa. https://www.nfacc.ca/codes-of-practice/poultry-layers
31. Laying Hens and Broilers (2002). EU-specific Animal Welfare Rules. http://ec.europa.eu/feed/animal/welfare/farm/index_en.htm

Ducks

32. Royal Society for the Prevention of Cruelty to Animals (RSPCA) (2015). RSPCA welfare standards for domestic/common ducks. Accessed on 17 April 2015 at http://science.rspca.org.uk/sciencegroup/farmanimals/standards/ducks
33. Royal Society for the Prevention of Cruelty to Animals (RSPCA) (2012). The welfare of farmed ducks information sheet. Accessed on 17 April 2015 at http://www.rspca.org.uk/adviceandwelfare/farm/ducks

34. Jones, T.A., Waitt, C.D., & Dawkins, M.S. (2008). Water off a duck's back: Showers and troughs match ponds for improving duck welfare. *Applied Animal Behaviour Science, 116 (1), 52-57.* Accessed on 17 April 2015 at http://users.ox.ac.uk/~abrg/papers/dawkins/Duck1.pdf
35. Primary Industries Standing Committee (2002). *Model Code of Practice for the Welfare of Animals: Domestic Poultry (4th ed.).* Primary Industries Report Series 83. CSIRO Publishing. Retrieved from: http://www.publish.csiro.au/pid/3451.htm
36. Australian Poultry Cooperative Research Centre. Poultry Hub. Accessed 17 April 2015 from: http://www.poultryhub.org/species/commercial-poultry/duck/
37. Campbell C. L., Colton S., Porter A., Haas R., Gerometta E., Lindberg A., Fraley S. M., Fraley G. S. (2014). Descriptive analyses of gait characteristics in Pekin ducks from hatch to market weight. J. Appl. Poult. Res.
38. Makagon MM, Woolley R, Karcher DM (2015). Assessing the waddle: An evaluation of a 3-point gait score system for ducks. Poult Sci. 94:1729-34.

Environmental Sustainable Agriculture

39. David Tilman, Kenneth G. Cassman, Pamela A. Matson, Rosamond Naylor and Stephen Polasky (2002). Agricultural sustainability and intensive production practices. *Nature* **418**, 671-677. Accessed 7 December 2015 from at http://www.nature.com/nature/journal/v418/n6898/full/nature01014.html .
40. Government of Western Australia (2004). Environmental Code of Practice for Poultry Farms in Western Australia. Accessed on 12 February 2016 at https://www.water.wa.gov.au/_data/assets/pdf_file/0010/5140/47509.pdf.
41. Australian Government Department of Agriculture Fisheries and Forestry (2008). Environmental Guidelines for the Australian Egg Industry. Accessed on 12 February 2016 at https://www.aecl.org/assets/Uploads/Resources/Environmental-Guidelines-for-the-Australian-Egg-Industry.pdf .
42. International Atomic Energy Agency (IAEA) (2008). Guidelines for Sustainable Manure Management in Asian Livestock Production Systems. Accessed on 12 February 2016 at http://www-pub.iaea.org/MTCD/PUBLICATIONS/PDF/TE_1582_WEB.PDF
43. Government of New South Wales Australia, Department of Trade and Investment, Regional Infrastructure and Services (2012). Best Practice Management for Meat Chicken Production in NSW. Manual 1 – Site Selection & Development. Accessed on 17 February 2016 at http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0019/448210/BPM-for-meat-chicken-production-in-nsw-manual-1.pdf.
44. Queensland Government Department of Agriculture, Fisheries and Forestry (2012). Queensland Guidelines Meat Chicken Farms. Accessed on 17 February 2016 at https://www.daf.qld.gov.au/__data/assets/pdf_file/0006/60567/chicken-meat-guidelines.pdf.
45. Rodrigues, G.S. et al., (2009). Integrated farm sustainability assessment for the environmental management of rural activities. Accessed on 17 February 2016 at

https://www.researchgate.net/publication/223570799_Integrated_farm_sustainability_assessment_for_the_environmental_management_of_farm_activities_Environmental_Impact_Assessment_Review_30_229-239

Poultry Transport

46. World Organisation for Animal Health (OIE) (2014). Terrestrial Animal Health Code, edition 23, Chapter 7.5. Land Transport. Accessed on 15 March 2015 at http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_aw_land_transpt.htm
47. Australian Government Department of Agriculture (former Department of Agriculture, Fisheries and Forestry) (2011). Australian Standards for the Export of Livestock (version 2.3). Accessed on 15 March 2015 at http://www.agriculture.gov.au/SiteCollectionDocuments/animal-plant/animal-welfare/standards/version2-3/australian-standards-v2.3.pdf
48. Australian Government Department of Agriculture (former Department of Agriculture, Fisheries and Forestry) (2012). Australian Animal Welfare Standards and Guidelines for the Land Transport of Animals Edition 1, Version 1.1. Accessed on 15 March 2015 at http://www.australiananimalwelfare.com.au/content/livestock-and-production-animals/lpa-resources
49. Transport within New Zealand (2011). Animal Welfare (Transport within New Zealand) Code of Welfare, National Animal Welfare Advisory Committee, Ministry for Primary Industries. Accessed on 19 March 2015 at http://www.biosecurity.govt.nz/files/regs/animal-welfare/req/codes/transport-within-nz/transport-code-of-welfare.pdf
50. Australian Government (2011). The Australian Livestock Transport and Guidelines: Land Transport of Poultry. Accessed on 19 April 2015 at http://www.australiananimalwelfare.com.au/app/webroot/files/upload/files/Poultry%20SG.pdf
51. Australian Government (2011). Australian Livestock Transport Standards and Guidelines: Poultry Transport Checklist. Accessed on 19 April 2015 at http://www.australiananimalwelfare.com.au/app/webroot/files/upload/files/Poultry%20Checklist.pdf
52. Transport within New Zealand (2011). Animal Welfare (Transport within New Zealand) Code of Welfare, National Animal Welfare Advisory Committee, Ministry for Primary Industries. Accessed on 19 March 2015 at http://www.biosecurity.govt.nz/files/regs/animal-welfare/req/codes/transport-within-nz/transport-code-of-welfare.pdf

Poultry Slaughter

53. Grandin, T. (2013). Turkey Farm and Processing Plant Tour. Accessed on 20 April 2015 at https://www.youtube.com/watch?v=852zxDEAR-Q
54. Unilever Sustainable Livestock Implementation Guide (2013). Poultry Production meat (broilers) and Eggs (layers). Pages 27-31. Accessed on 16 February 2016 at https://www.unilever.com/Images/uni2565liveg-sustainable_3_tcm244-409252_en.pdf