

## TERRESTRIAL ANIMAL HEALTH STANDARDS COMMISSION

SEPTEMBER 2010 REPORT

DRAFT CHAPTER X.X.X.

**ANIMAL WELFARE AND  
BROILER CHICKEN PRODUCTION**

Article X.X.1.

**Definitions**

For the purpose of this chapter:

***Broiler***

means birds of the species *Gallus gallus* kept primarily for commercial meat production.

***Cage housing system***

In a cage housing system the caretaker accesses the birds from outside the enclosure in which the birds ~~they~~ are kept.

***Deep litter housing system***

In a deep litter housing system the birds are kept on floors that are is covered with bedding material.

***Harvesting***

means the catching and loading of birds on farm for transportation to the slaughterhouse.

***Slatted floor housing system***

In a slatted floor means a housing system where the birds broilers are kept on raised floors, on which droppings do ~~n<sup>o</sup>t~~ accumulate, but fall through.

***Litter***

Is a layer of absorbent material covering the floor of the poultry house.

***Poultry house***

is a covered facility designed to house commercial birds.

Article X.X. 2.

**Scope**

These recommendations cover the production period from arrival of the chicks on the farm to harvesting the broilers in commercial production systems. These systems include broilers kept in cages, on slatted floors, litter or dirt and indoors or outdoors. Backyard flocks are not included even if the ~~animals~~ broilers or products are traded locally.

This chapter should be read in conjunction with Chapters 7.2., 7.3. and 7.4. on the welfare of the broiler during transport to the ~~abattoir~~ slaughterhouse.

Note 2: ~~Recommendations on the management of the breeding flock and hatchery and for the period between hatching and arrival on the farm to be developed.~~

## Article X.X.3.

**Commercial broiler production systems**

Commercial broiler production systems include:

1. Intensive systems

Birds Broilers are completely confined in a ~~roofed structure~~ poultry house, with or without environmental control and usually at a higher *stocking density* than in other production systems. Birds Broilers may be kept in cages, ~~with (e.g. wire or plastic floor or deep litter floor) or on deep litter, or slatted floors or a combination,~~

2. Semi intensive systems

Birds Broilers are confined in a ~~roofed structure~~ poultry house but provided with ~~an~~ access to a restricted outdoor area. ~~They may be kept in cages (e.g. wire or plastic floor or deep litter floor) or on deep litter, a slatted floor or a combination of the two.~~

3. Extensive systems

Birds Broilers are not confined throughout their production period in a ~~roofed structure~~ poultry house and are usually kept at a lower *stocking density* than in intensive or semi intensive systems.

## Article X.X.4.

**Criteria or measurables for the welfare of broilers**

Measurables can be based on the outcomes for the broiler (outcome based criteria) or the design of the system (resource or design based criteria). Outcome based measurables may give a better indication of welfare than resource based measures because they reflect the complex interaction of several variables (e.g. experience and attitude of handlers and disease situation) that may be overlooked when relying on criteria that focus on the design of the system.

It would be impractical at this time to assign numeric values to measurables (e.g. to specify a certain mortality rate as 'acceptable' or 'optimum', due to the large variations in the commercial production systems used by OIE Members. However, numeric values can be valuable in benchmarking performance. Benchmarking can be accomplished by evaluating the current incidence of outcome based measurables on commercial farms, and then determining the extent to which those problems can be reduced by management and genetic selection. Some measurables can be measured in the farm setting (e.g. gait, mortality and morbidity rates), while others are best measured at the slaughterhouse. For example, at slaughter *flocks* can be assessed for presence of bruising, broken limbs and injuries. The age of these lesions can help to determine the source (e.g. catching) (Nicol & Scott, 1990). Back scratching, hock and feet burns and breast blisters are also easily observed. Other conditions such as ascites, leg deformities, dehydration and disease conditions can be assessed. 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 measurables are useful indicators of broiler welfare:

1. Mortality (dead, culled) and morbidity

Daily, weekly and cumulative mortality (dead or culled) and morbidity rates should be within expected ranges. Any abrupt increase in the daily mortality or morbidity rate not connected to a specific *disease* could reflect an animal welfare problem.

## 2. Gait

Broilers are susceptible to developing a variety of infectious and non-infectious musculoskeletal disorders (see review in Mench, 2004). If severe these disorders may lead to overt lameness, and if less severe to gait abnormalities. Broilers that are lame or have more serious gait abnormalities may have difficulty reaching the food and water, may be trampled by other broilers, and may experience pain. Musculoskeletal problems have many causes, including related to genetics, nutrition, sanitation, lighting, litter quality, and other environmental and management factors (see Mench, 2004; Dawkins et al., 2004). Broilers in commercial flocks should be assessed for gait abnormalities, and corrective actions identified to reduce the incidence of problems in subsequent flocks. There are several gait scoring systems available (Kestin et al., 1992; Garner et al., 2002; Webster et al., 2008; Weeks et al., 2002; Berg and Sanotra, 2003). Regardless of the scoring or assessment system used, broilers that are unable to access feed or water should be humanely euthanized as soon as possible after they have been observed.

## 3. Contact dermatitis

Contact dermatitis affects skin surfaces which have prolonged contact with litter or other flooring surfaces, the foot pad, rear surface of the hock and, when severe, the breast area. The conditions are 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 or serve as a portal of entry for secondary infections. Scoring systems for contact dermatitis have been developed (Welfare Quality®, 2009).

## 4. Feather condition

Evaluation of the feather condition of broilers provides useful information about aspects of welfare. Plumage dirtiness is correlated with both hock burns and lameness for individual birds (Arnould and Colin, 2009). Plumage dirtiness can be assessed when the broilers are caught for transport to the slaughterhouse. A scoring system has been developed for this purpose (RSPCA, 2008).

## 5. Incidence of diseases, metabolic disorders and parasitic infestations

Ascites, sudden death syndrome and respiratory diseases (including infectious bronchitis, avian pneumovirus infection and mycoplasmosis) are of great economic and welfare significance in broilers (SCAHAW, 2000).

## 6. Normal behaviour

Broiler behaviour can be a sensitive indicator of welfare problems.

### 6.1. 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 (Cransberg et al., 2000). 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 (Hemsworth et al., 1994).

### 6.2. Spatial distribution

Changes in the spatial distribution of the birds may indicate thermal discomfort (e.g. broilers will huddle when they are cold) or the existence of areas of wet litter or uneven provision of light, food or water (if broilers are unevenly distributed).

### 6.3. Panting and wing spreading

Panting and wing spreading indicate heat stress.

### 6.4. Dust bathing

Dust bathing is an intricate body maintenance behaviour performed by many birds, including broilers (Olsson and Keeling, 2005). During a dust bathing bout, broilers work loose material (like litter in bedded systems) 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 that is wet or not friable.

### 6.5. 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 feeding is also reduced during periods of heat stress and increased during cold stress. Foraging is the act of searching for food, 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 (e.g. gait problems).

## 7. Abnormal behaviour - feather pecking and cannibalism

Feather pecking is the pecking or pulling of the feathers of other broilers, and can result in significant feather loss. Cannibalism is the tearing of the flesh of another bird, and can result in severe injury, and even the death of the pecked broiler. These are abnormal behaviours (Mench and Keeling, 2001; Rodenberg and Koene, 2004; Newberry, 2004) with multi-factorial causes that are not usually seen in commercial broiler stocks, although they can occur under some circumstances. Feather pecking may sometimes lead to cannibalism or may occur independently; once started, these problems can spread rapidly through the flock.

## 8. Water and feed consumption

Monitoring daily water consumption can be 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, or dehydration.

Changes in feed consumption can also indicate the presence of disease and other welfare conditions of the flock as well as suitability of the feed.

## 9. Performance

9.1. Growth rate - an index that indicates the average daily gain (gr) of weight per average broiler of a flock.

9.2. Feed conversion - an index that indicates the quantity of feed (kg) that is necessary for a gain of bodyweight of one kilogram of the average broiler of a flock.

9.3. 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 (see point 1 of Article X.X.4).

## 10. Injury rate

Broilers are susceptible to a number of injuries, and the rate of these injuries can indicate welfare problems in the flock. Injuries include those due to other broilers (scratches, feather loss or wounding due to feather pecking and cannibalism) and those due to environmental conditions (e.g. skin lesions) or humans. The most frequent injuries seen during catching are bruises, broken limbs and damaged wings. Fractures are located mainly on femur, radius, ulna, furcula and ischium. Dislocation of the femur at the hip joint is the most common traumatic injury.

## 11. Eye condition

Conjunctivitis can indicate the presence of irritants such as dust and ammonia. High ammonia levels will also cause corneal burns and eventual blindness (Morrow 2008:541).

The following outcome (animal) based measurables can be useful indicators of welfare. The following outcome (animal) based measurables can be useful indicators of welfare and should be measured at appropriate times by the caretaker (in no particular order):

- ~~Mortality rate (dead, culled)~~
- ~~Gait~~
- ~~Contact dermatitis~~
- ~~Feather condition~~
- ~~Disease incidence / morbidity rates~~
- ~~Ascites / sudden death syndrome (SDS)~~
- ~~Respiratory disease~~
- ~~Parasitic diseases~~
- ~~Carcass and meat quality (condemnations)~~
- ~~Behaviour: fear, thermal distress, illness~~
  - ~~Human avoidance behaviour~~
  - ~~Spatial distribution:~~
  - ~~Panting and wing spreading.~~
  - ~~Dust bathing~~
  - ~~Feather pecking~~
  - ~~Cannibalism~~
  - ~~Feeding and drinking~~
- ~~Water consumption~~
- ~~Growth rate~~
- ~~Feed conversion~~
- ~~Injury rate~~
- ~~Eye condition.~~

## Recommendations

### 1. Biosecurity and animal health

#### 1.1.a) Biosecurity and disease prevention

Biosecurity means a set of measures designed to ~~protect a flock from the entry of infectious agents~~ maintain a *flock* at a particular health status and to prevent the entry (or exit) of specific infectious agents.

~~Biosecurity programmes should be implemented, commensurate with the risk of disease and in accordance with relevant recommendations found in Terrestrial Code chapters on OIE listed diseases.~~

Biosecurity programmes should be designed and implemented, commensurate with the desired flock health status and current disease risk (endemic and exotic or transboundary) that is specific to each epidemiological group of broilers and in accordance with relevant recommendations found in *Terrestrial Code* chapters on OIE listed diseases.

These programmes should address the control of the major routes for disease and pathogen transmission:

- a) ~~Poultry~~
- b) ~~Other animals~~
- e) ~~People~~
- f) ~~Equipment~~
- e) ~~Vehicles.~~
- a) direct transmission from other *poultry*, domesticated and wild animals and humans,
- b) fomites, such as equipment, facilities and *vehicles*,
- c) vectors (e.g., arthropods and rodents),
- d) ~~vi~~ aerosols ~~Air~~,
- e) ~~vii~~ water supply,
- f) ~~viii~~ feed.

Outcome based measurables: ~~disease incidence of diseases, metabolic disorders and parasitic infestations,~~ mortality ~~growth rate and feed conversion~~ and performance.

#### 1.2.b) Animal health management / preventive medicine / veterinary treatment

Animal health management means a system designed to ~~prevent diseases occurring in a flock and provide treatment if disease occurs in order to~~ optimise the health and welfare of the *flock broilers*. It includes prevention, treatment and control of *diseases* and adverse conditions.

Those responsible for the care of ~~birds~~ broilers should be aware of the signs of ill-health or distress, such as a change in reduced food feed and water intake, reduced growth, changes in behaviour, abnormal conditions appearance of their feathers, ~~or droppings~~ faeces, or other physical features.

If persons in charge are not able to identify the causes of ill-health or distress or to correct these or suspect the presence of a listed reportable disease, they should seek advice from those having training and experience, such as poultry *veterinarians* or other qualified advisers. Veterinary treatments should be prescribed by a qualified *veterinarian*.

There should be an effective programme for the prevention and treatment of *diseases* consistent with the programmes established by the *Veterinary Services* as appropriate.

*Vaccinations* and other administered treatments ~~to chickens~~ should be undertaken with consideration of the welfare of the ~~birds~~ broilers by people skilled in the procedures.

~~Culling of~~ Sick or injured ~~birds~~ broilers should be ~~done in a humane manner~~ culled humanely as soon as possible. Similarly, killing broilers ~~birds as may be required~~ for diagnostic purposes should be done in a humane manner according to Chapter 7.6. of the *Terrestrial Code*.

Outcome based measurables: ~~disease~~ incidence of diseases, metabolic disorders and parasitic infestations, mortality and ~~poor~~ performance.

## 2. Environment and management

### 2.1. Thermal environment

~~In intensive and semi-intensive production systems every attempt should be made to keep thermal conditions within the recommended range.~~

~~A table of recommended ranges will be included~~

Thermal conditions for broilers should be appropriate for their stage of development. For the growing stage the Thermal Heat Index (THI) can assist in identifying the comfort zones for the broilers at varying temperature and relative humidity levels.

When environmental conditions move outside these zones, various strategies can be used in different production systems to mitigate the adverse effects on the broilers: e.g. high air speeds and getting the birds to stand can alleviate the affects of high heat and humidity in intensive systems.

Ventilation should aim at controlling relative humidity to prevent the development of wet litter. Assessing litter condition on a regular basis is recommended.

Management of the thermal environment should be checked at least twice a day.

Outcome based measurables: normal and abnormal behaviour, mortality, contact dermatitis, water and feed consumption, performance, feather condition.

~~In extensive production systems appropriate management to mitigate the effects of extreme thermal conditions should be implemented.~~

~~Outcome based measurables: rates of mortality, rate of contact dermatitis, water consumption, feed consumption, growth rate, feed conversion and behaviour.~~

### 2.2. Lighting

There should be an adequate period of continuous darkness during each 24 hour period to allow the ~~birds~~ broilers to rest. There should also be an adequate period of continuous light. Reference should be made to relevant national, regional or international recommendations.

The light intensity during the light period should be sufficient and homogeneously distributed to allow the ~~chicks~~ broilers to find feed and water in the first few days after they are placed in the poultry house, to stimulate ~~bird~~ activity, and ~~to~~ allow adequate inspection ~~of the birds~~.

~~Birds~~ Broilers should be gradually adjusted to lighting changes.

Outcome based measurables: gait lameness, metabolic disorders, performance ~~feed and water consumption~~, normal and abnormal behaviour and injuries rate.

### 2.3. Air quality

Adequate ventilation is required at all times to provide fresh air ~~and is one means of controlling temperature and humidity~~.

Ammonia concentration should not routinely exceed 25 ppm at ~~bird~~ broiler level (Kristenssen and Waathes, 2000; Jones et al., 2005).

Dust levels should be kept to a minimum. Methods for doing that can include maintaining appropriate ventilation and ~~optimal relative humidity~~ satisfactory litter moisture levels (50%—80%). Where the health and welfare of broilers depends on an artificial ventilation system, provision should be made for an appropriate back-up power and alarm system.

Outcome based measurables: incidence of respiratory diseases, metabolic disorders and parasitic infestations (respiratory diseases), behaviour (panting, huddling), eye condition, growth rate, feed conversion, performance, contact dermatitis and spatial distribution of the birds.

### 2.4. Acoustic environment Noise

Exposure of ~~birds~~ broilers to sudden or loud noises should be minimized where possible to prevent stress and fear reactions (e.g. piling).

Note: Location of farms should, where possible, take into account existing environmental conditions local sources of noise.

Outcome based measurables: daily mortality rate, morbidity, performance ~~growth rate~~, ~~food conversion~~, injuries rate and fearfulness and fear behaviour.

### 2.5. Nutrition

Broilers ~~Birds~~ should always be fed a diet appropriate to their age and genetics, which contains adequate nutrients to meet their requirements for good health.

Feed and water should be palatable and free from contaminants potentially hazardous to ~~bird~~ broiler health.

Cleaning ~~The~~ water system should be cleaned ~~done~~ regularly to prevent growth of hazardous microorganisms.

Broilers ~~Birds~~ must should be provided with adequate accessibility to feed on a daily basis. Water should be available continuously.

Special provisions should be made to enable young chicks ~~to~~ access to appropriate feed and water.

Outcome based measurables: feed and water consumption, performance ~~growth rate~~, ~~food conversion~~, normal and abnormal behaviour, gait lameness, disease incidence of diseases, metabolic disorders and parasitic infestations, mortality ~~morbidity~~ and carcass and meat quality injury rate.

## 2.6. Flooring, bedding, resting surfaces (litter quality)

The provision of loose material is desirable in order to encourage dust bathing and foraging.

The floor of a poultry house building should preferably be easy to clean and disinfect.

~~If~~ Litter is ~~recycled~~ it should be managed to minimize any detrimental effects on welfare and health. Litter should be replaced or adequately treated when required to control a *disease outbreak* in the next *flock*.

Day-old birds chicks should be placed on a appropriate type of flooring housed on a floor suitable for their size to prevent injury. ~~Flooring conditions have an important impact on the welfare of chickens.~~

If housed on litter based systems, before ~~the one~~ day-old birds chicks enter the building poultry house, the floor should have a bedding of uncontaminated ~~new~~ substrate (e.g. wood shavings, straw, shredded paper, treated used litter) of sufficient depth to elicit normal behaviour and to protect them from the floor.

Litter quality is partly related to the type of substrate used and partly to different management practices. The type of substrate should be chosen carefully. Litter should be maintained so that it is dry and friable and not dusty, caked or wet.

~~The floors of cages and slatted systems~~ Slatted floors should be designed, constructed and maintained to adequately support the birds broilers and prevent injuries and ~~to~~ ensure that manure can fall through or be adequately removed.

Outcome based measurables: contact dermatitis, ~~breast blisters~~ feather condition, metabolic disorders ~~ascites, gait lameness~~, behaviour (dust bathing and foraging), eye condition, incidence of diseases, metabolic disorders and parasitic infestations (respiratory disease) and performance growth rate.

## 2.7. Social environment

Management methods (e.g. reducing light intensity, providing foraging materials, nutritional modifications, reducing stocking density, selecting the appropriate genetic stock) should be implemented to reduce feather pecking and cannibalism in growing systems where these behaviours are a potential problem.

If these management strategies fail, therapeutic beak trimming should be considered as the last option and after a thorough investigation.

Outcome based measurables: injuries rate, normal and abnormal behaviour, feather condition and mortality; ~~carcass and meat quality~~.

## 2.8. Stocking density

Broilers chickens should be housed ~~in~~ at an acceptable stocking density.

To determine the appropriate stocking density so that the floor space provided will ensure good welfare (comfort, ability to express normal postural adjustment and to access feed and water), the following factors should be taken into account: management capabilities, ambient conditions, housing systems, production systems, litter quality, ventilation, biosecurity strategy, selection of genetic stocks, and market age and weight of broilers ~~birds should be taken into account so that the floor space provided will ensure good welfare (comfort, ability to express normal postural adjustment and to access feed and water).~~

Outcome based measurables: ~~rates of injuries rate, rates of contact dermatitis, rates of mortality,~~ normal and abnormal behaviour, performance and growth rate, feed conversion, plumage feather condition ~~and carcass quality.~~

## 2.9. Outdoor areas

Broilers can be given access to outdoor areas as soon as they are old enough to range safely. There should be sufficient exit areas to allow birds to enter and leave the poultry house freely.

Management of outdoor areas is important in extensive and semi-intensive production systems. Land (pasture) management measures should be taken to reduce the risk of ~~birds~~ broilers being infected by parasites ~~transmitted~~. This might include limiting the stocking density and / or using several pieces of land consecutively (rotation).

Outdoor areas should be managed appropriately to minimize swampy conditions and mud. Outdoor areas should preferably be placed on well drained grounds.

Outdoor areas should be managed appropriately to ensure that they are free of poisonous plants and other contaminants.

Particularly in extensive systems where ~~birds~~ broilers do not have access to an indoor area, protection from adverse climatic conditions (e.g. heat, cold, rain) should be provided.

Outcome based measurables: normal and abnormal behaviour, incidence of parasitic infestations ~~diseases~~, performance growth rate, contact dermatitis, feather condition ~~and mortality rate and morbidity.~~

## 2.10. Protection from predators

Broilers should be protected from predators.

Outcome based measurables: fear behaviour, mortality and injuries rate.

## 3. Management

### 2.11. Genetic selection

Welfare and health considerations, in addition to productivity, should be taken into account when choosing a strain for a particular location or production system.

Outcome based measurables: gait lameness, metabolic disorders ~~ascites~~, sudden death syndrome (SDS), mortality and performance feed conversion and growth rate.

## 2.12. Painful interventions

Commercial broilers chickens are not typically subjected to management practices that cause pain. However, prophylactic beak trimming may be required in case of outbreaks of feather pecking and cannibalism, as described earlier. Guidelines for beak trimming to minimize negative impacts on bird health and performance are presented in Glatz and Miao (2005). Only the minimum amount of beak needed to prevent beak re-growth before market age (ideally, only the hook at the end of the upper beak) should be removed, and the trim should be performed so as to prevent subsequent distortion or deformation of the beak. The beak should be cauterized after cutting to minimise bleeding. Trimming at an early age (before 10 days of age; Hester and Shea-Moore, 2003) is preferred to prevent long-term pain, but since feather pecking and cannibalism develop when the birds are somewhat older prophylactic trimming will likely occur after this time.

There is a small specialty market for capons (castrated male broilers). Because the testes of male chickens are located inside the abdominal cavity, this procedure is a major surgery (Jacob and Mather, 2000) that should be performed only by skilled individuals and with measures to minimize pain, injury, and bleeding. The procedure is described in Jacob and Mather (2000).

Painful interventions (e.g. beak trimming, toe trimming, dubbing) should not be routinely practiced on broilers.

If therapeutic beak trimming is required, it should be carried out by trained and skilled personnel and care should be taken to remove the minimum amount of beak necessary using a method which minimizes pain and controls bleeding (Glatz and Miao, 2005; Hester and Shea-Moore, 2003).

Surgical caponisation should not be performed without adequate pain and *infection* control methods and should only be performed by veterinarians or trained and skilled personnel under veterinary supervision.

Outcome based measurables: use of any of the above procedures.

## 2.13. Handling and inspection

Broilers should be inspected at least twice every a day. ~~This inspection~~ inspection should have three main objectives: ~~to pick up dead birds;~~ 1) to identify sick or injured birds broilers to treat or cull them, ~~and~~ 2) to detect and correct any welfare or health problem in the *flock* (e.g. related to the supply of feed and water, thermal conditions, ventilation, litter quality), ~~and~~ 3) to pick up dead broilers.

Inspection should be done in such a way that birds broilers are not unnecessarily disturbed, for example ~~personnel~~ animal handlers should move quietly and slowly through the *flock*.

When birds broilers are handled they should not be injured or unnecessarily frightened or stressed.

Birds Broilers which have an incurable sickness, significant deformity or injury should be removed from the *flock* and humanely killed as soon as possible.

Cervical dislocation is an acceptable method for killing small numbers of birds broilers if carried out competently (see Article 7.6.17. of the *Terrestrial Code*). For a complete description of killing methods see Article 7.6.475. of the *Terrestrial Code*.

Outcome based measurables: normal and abnormal behaviour~~feat~~, performance, injuries~~y~~ rate, mortality and morbidity.

#### 2.14. Personnel training

All people responsible for the broilers should receive appropriate training so that they are ~~be~~ competent ~~according to their~~ to carry out their responsibilities and should have sufficient knowledge of broiler behaviour, handling techniques, emergency euthanasia procedures, biosecurity, general signs of disease, and indicators of poor *animal welfare* such as stress and pain ~~and fatigue~~, and their alleviation.

Outcome based measurables: all measurables could apply.

#### 2.15. Emergency Plans

~~Poultry Broiler~~ producers should have emergency plans to minimize and mitigate the consequences of: natural disasters, *disease* outbreaks and the failure of mechanical equipment. Planning may include the provision of fail- safe alarm devices to detect malfunctions, back up generators, access to maintenance providers, alternative heating arrangements, ability to store water on farm, access to water cartage services, adequate on farm storage of feed and alternative feed supply and emergency ventilation.

An emergency plan for animal health should be developed consistent with national programs established or recommended by *Veterinary Services* as appropriate.

#### 2.16. Location, construction and equipment of farms

The location of poultry farms should be chosen to be safe from the effects of fires and floods and other natural disasters to the extent practical. In addition farms should be sited to avoid or minimize biosecurity risks, exposure of birds to chemical and physical contaminants, noise and adverse climatic conditions.

~~Housing~~ Poultry houses, outdoor areas and equipment to which ~~poultry broilers~~ have access should be designed and maintained to avoid injury or pain to the birds.

~~Buildings~~ Poultry houses should be constructed and electrical and fuel installations should be fitted to minimise the risk of fire and other hazards.

~~Poultry Broiler~~ producers should have a maintenance programme in place for all equipment that, in case of failure, can jeopardize broiler welfare.

#### 2.17. On farm harvesting

~~Feed~~ Broilers should not ~~be removed at a suitable~~ be subject to an excessive period of feed withdrawal ~~time prior to catching~~ the expected *slaughter* time.

Water should be available ~~for as long as possible~~ up to the time of catching.

~~Injured and sick birds~~ Broilers that are not fit for *transport* (severely injured or severely ill) should be culled ~~or separated~~ prior to harvesting the *flock*.

Catching should be carried out ~~done~~ by skilled ~~workers~~ *animal handlers* and every attempt should be made to minimize stress and fear reactions, and injury. If a broiler is injured during catching it should be culled.

~~The~~ Broilers should not be picked up by their neck or wings.

~~The~~ Broilers should be carefully ~~put~~ placed in the *transport container* ~~carefully~~.

Mechanical catchers, where used, should be designed, operated and maintained to minimize injury, stress and fear to the ~~birds~~ broilers. A contingency plan is advisable in case of mechanical failure.

Catching should preferably be carried out under dim or blue light to calm the broilers ~~birds~~.

Catching should be scheduled to minimize the time to *slaughter* as well as climatic stress during catching, *transport* and holding.

Stocking density in *transport containers* should suit climatic conditions and maintain comfort.

*Containers* should be clean and disinfected and designed and maintained to avoid injury to the broilers ~~birds~~.

Outcome based measurables: ~~incidence of injuries~~ rate and mortality rate (dead on arrival) ~~and carcass quality~~.

## 2.18. Humane killing

Injured and sick birds should be killed humanely.

Cervical dislocation is considered a humane method for killing small numbers of broilers ~~birds~~ (see Article 7.6.17. of the *Terrestrial Code*).

For a description of other methods for the humane killing of broilers see Article 7.6.5. of the *Terrestrial Code*.

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