ASEAN GENERAL GUIDELINES ON ANIMAL WELFARE:

PIG PRODUCTION SYSTEMS

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ABBREVIATION

AMS	ASEAN Member States
ASEAN	Association of South East Asian Nations
GAHP	Good Animal Husbandry Practices
WOAH	World Organisation for Animal Health

ASEAN GENERAL GUIDELINES ON ANIMAL WELFARE: PIG PRODUCTION SYSTEMS

1. Introduction and background

Animal welfare refers to the physical and emotional state of animals. Animal handlers' attitudes and practices, the available resources to an animal and the environment in which the animal lives play an important role in the welfare of animals. To help assessing animal welfare conditions, a framework of the Five Freedoms developed in 1965 has been internationally well recognized. It outlines five aspects of animal's conditions under human control which are 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.

Animal welfare is not only an important feature of animal health, but also a prerequisite for the economic success of livestock production. The World Organisation for Animal health (WOAH) has introduced a new approach to assess animal welfare enhancing animal health, through animal-based measures or criteria which provides repeatable outcomes when applied by different users and practices under various farm conditions. Outcomes are generally measured by assessing the extent to which animals experience the "Five freedoms". The WOAH has established standards and animal-based measures or criteria to evaluate animal welfare at farm level, e.g. beef cattle, broiler chicken, dairy cattle and pig production systems.

In ASEAN, the ASEAN GAHP standards have been developed, which emphasize two modules: 1) Food Safety Module and 2) Animal Welfare and Environmental Sustainability Module. Currently, ASEAN GAHP on Animal Welfare and Environmental Sustainability Module is only available for layers, broilers and ducks. The standard was established in 2015 to provide recommendations on animal welfare focusing on management-based measures.

During the 4th Expert Working Group on ASEAN Good Animal Husbandry Practices (EWG-ASEAN GAHP) meeting (16 June 2020, Singapore, Video Conference), the Meeting agreed to develop the ASEAN animal welfare standards for major livestock species to be in line with the WOAH's standards with highlighting the importance of feasible practices for AMSs.

During the 5th EWG- ASEAN GAHP meeting (24 June 2021, Thailand, Video Conference), the Meeting noted the difference between two types of documents, i.e. standard and guidelines. Standard is recognized document for enforcement. Subsequently, the Meeting agreed to firstly develop the ASEAN General Guidelines on Animal Welfare to promote the mutual understandings on animal welfare practices among AMSs and to provide practical guidance on the implementation of animal welfare standard in ASEAN region.

During the 6th EWG- ASEAN GAHP meeting (26 April 2022, Vietnam, Video Conference), this draft ASEAN General Guidelines on Animal Welfare: Pig Production Systems was proposed by Thailand as an example model to facilitate discussion regarding the establishment of the ASEAN General Guidelines on Animal Welfare. The Meeting agreed to prioritize pig production system as the first module of the ASEAN General Guideline on Animal welfare

and agreed to propose the guideline as key deliverable for the Livestock sector in 2023 for ASEAN Sectoral Working Group on Livestock (ASWGL).

During the 7th EWG- ASEAN GAHP meeting (25 May 2023, Brunei Darussalam, Video Conference), the meeting agreed to finalise and endorse ASEAN General Guidelines on Animal Welfare: Pig Production System and proposed to ASWGL for approval.

2. Scope and purpose

This ASEAN General Guidelines on Animal Welfare: Pig Production Systems provide information on welfare practices of pig production applicable to the environment and conditions of ASEAN farming systems (Appendix A.1). The animal welfare indicators for pigs are described. The recommendations on good animal welfare for pig production cover breeding, rearing and management of pig farms from the receiving of pigs to catching of pigs before transport to the slaughterhouse or sale.

This document focuses on animal welfare practices established based on general principles for the welfare of animals in livestock production systems (Appendix A.2), and provides a guidance for the assessment of animal welfare outcomes in a farm (Appendix A.3), using animal-based criteria. It can be voluntary used as a supporting document in conjunction with the ASEAN GAHP on Food Safety Module or other relevant standards.

3. Definitions

3.1 Animal welfare means the physical and mental states of an animal in relation to the conditions in which it lives and dies.

3.2 Pig means animals in the Family Suidae with the scientific name of *Sus scrofa*. both domesticated and wild animals. Pig, hog, swine or Suids are synonymous.

3.3 Pig production systems means those systems in which the purpose of the operation includes some or all of the following production processes: breeding, rearing and management of pigs for the production and sale of pigs or pig meat.

4. Animal-based criteria (or measurables) for the welfare of pigs

Animal welfare indicators for pigs are the outcome-based measurable of pig rearing which can be directly observed from animal. These indicators can be used for the assessment of pig care management according to the animal welfare principle. The use of these indicators and their recognised thresholds depend on suitability of rearing management practices, such as regional differences, herd health status, pig breed, and climate, by which pigs are raised. The animal welfare indicators for pigs in the guidelines are behaviour, morbidity rates, mortality and culling rates, changes in body weight and body condition, reproductive efficiency, physical appearance, handling response, lameness and complications from common procedures. The detail of each indicator is provided below.

4.1 Behaviour

Specific types of animal behaviour are as follows.

4.1.1 Stereotypy

Stereotypy is a repetitive behaviour induced by frustration or central nervous system dysfunction. It is expressed as a sequence of abnormal behaviours which appears to have no obvious purpose or function. The stereotypies caused by permanent dysfunction of the central nervous system in response to stressful conditions may repetitive and not resolve despite later changes to the environment or other treatments such as those relating to feeding levels or diet composition.

Some stereotypies commonly observed in pigs include sham chewing, stone chewing, tongue rolling, teeth grinding, bar biting and floor licking.

Environments that induce stereotypies typically also reduce animal welfare. Although stereotypies are generally held to indicate poor welfare, there are some instances where there is a poor association between stereotypies and stress. For example, frustration-induced stress may be somewhat rectified if the behaviour itself reduces the underlying motivation. Within a group, individuals that perform stereotypies may thus be coping more successfully than those that do not.

Nevertheless, stereotypies indicate either a present problem or a past resolved problem for animal. As with other indicators, caution should be used when using stereotypies as an animal welfare indicator in isolation from other indicators.

4.1.2 Apathy

Apathy means that the animal ceases to respond to stimuli that would normally elicit a response. Furthermore, apathetic behaviour has been described as an abnormal or maladaptive behaviour, indicated by reduced activity, lack of interest or concern (i.e. indifference) and lack of feeling or emotion (impassiveness).

4.1.3 Agonistic behaviour

Agonistic behaviour is a continuum of behaviours expressed in conflict situations, and includes offence, defence and submissive or escape components. Agonistic behaviours may include contact, such as biting and pushing, or non-contact, such as threats in the form of body postures and gestures. Aggressive behaviour (i.e. fighting) is a component of agonistic behaviour.

4.1.4 Play behaviour

Play behaviour is characterised by specific neuroendocrinological responses and expressed by appearance of having fun. It is often prompted by novel or unpredictable stimuli, and is related to exploration. It functions to prepare animals for unexpected situations by increasing the versatility of movements and enhancing their ability to cope with unexpected stressful situations. Animals often actively seek for new stimulation while in play, deliberately relaxing their movements or putting themselves into disadvantageous positions.

Certain behaviours appear to be indicators of good animal welfare and health status in pigs such as play behavior and specific vocalisations, while other behaviours could indicate an animal welfare and health problem; namely,

1) Altered locomotory behaviour, sudden immobilisation, escape attempts
2) Agonistic behaviour including aggression
3) Apathetic behaviour including indifference
4) Stereotypy which appear to have no obvious purpose
5) Other abnormal behaviour such as altered lying time, postures and gestures, altered respiratory rate and panting, coughing, shivering and huddling, frequent high-pitched vocalisations.

4.2 Morbidity rate

Morbidity rates of infectious diseases and metabolic diseases, lameness, peripartum and post-procedural complications, injury and other forms of morbidity, above recognised thresholds, may be direct or indirect indicators of animal welfare at the herd level. Understanding the aetiology of the disease or syndrome is important for detecting potential animal welfare problems.

Mastitis and metritis, leg and hoof problems, shoulder ulcers in sows, skin lesions, respiratory and digestive diseases, and reproductive diseases are also particularly important animal health problems for pigs.

Scoring systems, such as for body condition, lameness and injuries, and information gathered at the slaughterhouse/abattoir, can provide additional information. Both clinical and post mortem pathologic examination, injuries and other problems are indicators of problems that compromise animal welfare.

4.3 Mortality and culling rates

Mortality and culling rates affect the length of productive life and may be direct or indirect indicators of animal welfare at the herd level. The estimation of mortality and culling rates can be obtained by analysing the causes of death and culling. Mortality and culling rates should be recorded regularly, e.g. daily, and used for the monitoring of monthly and annually data. Necropsy is useful in establishing the cause of death.

4.4 Changes in bodyweight, and body condition

In growing pigs, body weight changes outside the expected growth rate, especially excessive sudden weight loss, are indicators of poor animal welfare and health.

Body condition outside an acceptable range or large variation amongst individual animals in the group may be an indicator of compromised animal welfare and health, and reproductive efficiency in mature animals.

4.5 Reproductive efficiency

Reproductive efficiency can be an indicator of animal welfare and health status. Poor reproductive efficiency, compared with the targets expected for a particular breed or crossbreed, can indicate animal welfare problems. Examples may include:

1) low conception rates
2) high abortion rates
3) metritis and mastitis
4) small litter size (total born)
5) low numbers born alive
6) high numbers of stillborns or mummies

4.6 Physical appearances

Physical appearance may be an indicator of animal welfare and health. Attributes of physical appearance that may indicate compromised animal welfare include:

1) body condition outside an acceptable range
2) presence of ectoparasites
3) abnormal texture or hair loss
4) excessive soiling with faeces
5) skin discolouration, including sunburn
6) swellings, injuries or lesions
7) discharges (e.g. from nose or eyes, including tear staining)
8) feet and leg abnormalities
9) abnormal posture (e.g. rounded back, head low)
10) emaciation or dehydration

4.7 Handling responses

Improper handling or lack of human touches can result in fear and distress in pigs. Indicators of poor animal welfare may include:

1) evidence of poor human-animal relationship, such as marked avoidance of handlers and abnormal or excessive vocalisation when being moved or when animal handlers interact with pigs
2) animals slipping or falling during handling
3) injuries sustained during handling, such as bruising, lacerations and fractures

4.8 Lameness

Pigs are susceptible to a variety of infectious and non-infectious musculoskeletal disorders. These disorders may cause lameness and gait abnormalities. Pigs that are lame or have gait abnormalities may have difficulty reaching feed and water and may experience pain and distress. Musculoskeletal problems have many causes, including genetic, infectious and non-infectious diseases, nutrition, sanitation, floor quality, and other environmental and management factors. There are several gait scoring systems available.

4.9 Complications from common procedures

Some painful or potentially painful procedures such as surgical castration, tail docking, teeth clipping or grinding, tusk trimming, identification, hoof care, vaccination and sample collection are performed on pigs to facilitate management, meet market or environmental requirements and improve human safety or safeguard animal welfare. However, if these procedures are not performed properly, animal welfare and health can be unnecessarily compromised. Indicators may include:

1) post-procedure infection and inflammation
2) post-procedure lameness
3) behaviour indicating pain, fear, distress or suffering
4) increased morbidity rates, and increased mortality and culling rates
5) reduced feed and water intake
6) post procedure body condition and weight loss

5. Recommendations on good animal welfare

Ensuring good animal welfare of animals is dependent on several management factors, including system design, environmental management, and animal management practices which include responsible husbandry and provision of appropriate care.

This document provides recommendations for animal welfare practices as well as examples of relevant animal welfare indicators. Other indicators can also be used where appropriate.

5.1 Training of personnel

Pigs should be cared for by a sufficient number of personnel, who collectively possess the ability, knowledge and competence necessary to maintain the welfare and health of the animals. All people responsible for pigs should be competent through formal training or practical experience in accordance with their responsibilities. This includes understanding of and skill in animal handling, nutrition, reproductive management techniques, behaviour, biosecurity, signs of disease, and indicators of poor animal welfare such as stress, pain and discomfort, and their alleviation.

Animal-based criteria (or measurables): handling response, physical appearance, behaviour, changes in body weight and body condition, reproductive efficiency, lameness, morbidity rates, mortality and culling rates, and complications from common procedures.

5.2 Handling and inspection

Animal handlers with positive attitudes to handling and caring for pigs can lead to positive welfare outcomes. This may be shown by the length of time taken for the animals to approach a human, a short flight distance or willingness to interact with humans.

Pigs should be inspected at least once a day when fully dependent on humans to provide for basic needs such as feed and water and to identify welfare and health problems. Some animals need to be inspected more frequent, e.g. farrowing sows, new born piglets, newly weaned pigs, newly-mixed gilts and sows, sick or injured pigs and those showing abnormal behaviours such as tail biting.

Pigs identified as sick or injured should be given appropriate treatment as soon as possible by competent animal handlers. If animal handlers are unable to provide appropriate treatment, the services of a veterinarian should be sought.

Handling aids that may cause pain and distress, e.g. electric goads, should be avoided or used only when other methods fail and provided that the animal can move freely and is able to move away from the handling aid. The use of electric goads repeatedly on the same pig should be avoided. They should not be used in sensitive areas of pigs including the udder, face, eyes, nose, ears or anogenital region. Animal handlers should be alert for signs of stress in pigs and know when to release handling pressure by giving pigs more time and space to reduce the level of threat.

Exposure of pigs to sudden movement, loud noises or changes in visual contrasts should be avoided to prevent stress and fear reactions of pigs. Pigs should not be improperly or aggressively handled, e.g. kicked, thrown, dropped, held or pulled by one front leg, ears or tail. Pigs that become distressed during handling should be immediately attended.

Pigs should be restrained only for as long as necessary and only appropriate, well-maintained restraint devices should be used.

Animal-based criteria (or measurables): physical appearance, behaviour, changes in body weight and body condition, handling response, reproductive efficiency, lameness, morbidity rates, and mortality and culling rates.

5.3 Painful procedures

Some procedures such as surgical castration, tail docking, teeth clipping or grinding, tusk trimming, nose rings and identification should only be performed by trained personnel, when necessary to facilitate management, meet market or environmental requirements, improve human safety or safeguard animal welfare.

Painful procedures should be performed in such a way as to minimise any pain, distress or suffering to the animal. Thus, the internationally recognised 'three Rs' principle should be considered, namely;

1) replacement, e.g. using immunocastrated males rather than surgically castrated males
2) reduction, e.g. tail docking and teeth clipping only when necessary
3) refinement, e.g. providing analgesia or anaesthesia under the recommendation or supervision of a veterinarian

Animal-based criteria (or measurables): complications from common procedures, morbidity rates, mortality and culling rates, abnormal behaviour, physical appearance and changes in weight and body condition.

5.4 Provision of feed and water

The amount of feed and nutrients pigs require is affected by factors such as climate, the nutritional composition and quality of the diet, the age, gender, genetics, size and physiological state of the pigs (e.g. pregnancy, lactation, growth), and their state of health, growth rate, previous feeding levels and level of activity and exercise.

All pigs should receive adequate quantity and quality of feed and nutrients each day to meet its physiological requirements and requirements for foraging and feeding behaviour as well as enable them to maintain good health.

Feed and water should be provided in such a way that prevent excessive or injurious competition.

Pigs should be fed a diet with the intention of minimising the occurrence of gastric ulcers, e.g. increasing dietary fiber or reducing crude protein.

All pigs should have access to an adequate supply of drinkable water that meets their physiological requirements and is free from contaminants hazardous to pig health. Water flow rates in drinkers should be set according to the ages of pigs, stages of production and environmental conditions.

In outdoor systems where pigs have some autonomy over diet selection, stocking density should be matched to the area and available natural feed supply.

Animal-based criteria (or measurables): changes in body weight and body condition, physical appearance (emaciation, dehydration), behaviour (agonistic behaviour at feeding and watering places and abnormal behaviour such as tail biting), mortality and culling rates, and morbidity rates.

5.5 Environmental enrichment

Environmental enrichment means an adjustment of the animal's environment to provide physical and social diversity with aims to foster the expression of normal behaviour, reduce the expression of abnormal behaviour and improve the physical and mental state of the animal.

Animals should be provided with an environment that encourage the expression of natural behaviour (e.g. exploration, foraging such as rooting, biting and chewing materials other than feedstuffs, and social interaction), reduce abnormal behaviour, e.g. tail, ear, leg and flank biting, sham chewing, bar biting and apathetic behaviour, and improve their physical and mental state.

Pigs should be provided with enrichments that aim to improve their welfare through the enhancement of their physical and social environments, such as:

1) sufficient quantity of suitable materials to enable pigs to fulfil their needs to explore and look for feed, bite, root and manipulate materials. Novelty is important in maintaining interest in the provided materials
2) social enrichment that involves either keeping pigs in groups or individually with visual, olfactory and auditory contact with other pigs
3) positive human contact, such as regular direct physical contact associated with positive events, which may include feed, pats, rubs, scratching and talking when the opportunity arises.

Animal-based criteria (or measurables): physical appearance (injuries), behaviour (stereotypies, tail biting), changes in body weight and body condition, handling response, reproductive efficiency, lameness, mortality and culling rates, and morbidity rates.

5.6 Prevention of abnormal behaviour

A number of abnormal behaviours can be prevented or minimised with appropriate management procedures. Many of these problems are multifactorial and minimising their occurrence requires an examination of the whole environment and of several management factors. Management procedures that may reduce the occurrence of some of these behavioural problems include:

1) oral stereotypies, e.g. bar biting, sham chewing, excessive drinking, may be minimised by providing environmental enrichment and increasing feeding time and satiety by increasing fiber content in the diet or foraging roughage.
2) tail biting may be reduced by providing an adequate enrichment material and an adequate diet (avoiding deficiencies of minerals or essential amino acids), and avoiding high stocking densities and competition for resources, such as feed and water. Other factors to consider include animal characteristics (breed, genetics, gender) and social environment (herd size, mixing animals), general health, thermal comfort and air quality.
3) belly nosing and ear sucking may be reduced by increasing the weaning age, and providing feed to piglets prior to weaning to avoid the abrupt change of feed.
4) vulva biting may be reduced by minimising competition for resources, including feed and water, and reducing group size.

Animal-based criteria (or measurables): physical appearance (injuries), behaviour (abnormal behaviour), morbidity rates, mortality and culling rates, reproductive efficiency and changes in body weight and body condition.

5.7 Housing including outdoor production systems

When new facilities to accommodate pigs are planned or existing facilities are modified, professional advice on design in regards to welfare and health of animals, personnel health and safety requirements should be sought.

Housing systems and their components should be designed, constructed, inspected and maintained in a manner that reduces the risk of injury, disease and stress for pigs. Facilities should allow for the safe, efficient and humane management and movement of pigs. In systems where pigs could be exposed to adverse weather conditions they should have access to shelter to avoid thermal stress and sunburn.

There should be a separate pen or area where sick and injured pigs or pigs that exhibit abnormal behaviour can be isolated, treated and monitored. Certain animals may need to be kept individually. When a separated space is provided, this should accommodate all the needs of the pig e.g. lame pigs or pigs with severe wounds may require additional bedding or an alternative floor surface, and water and feed should be within reach.

Pigs should not be tethered as part of their normal housing systems.

Good outcomes in the welfare and health of animals can be achieved in a range of housing systems. The design and management of the system are critical for achieving these outcomes.

Sows and gilts, like other pigs, are social animals and prefer living in groups, therefore pregnant sows and gilts should preferably be housed in groups. Boars may need to be housed in individual pens to avoid injuries from aggressive behaviour.

Animal-based criteria (or measurables): physical appearance (injuries), behaviour, changes in body weight and body condition, handling response, reproductive efficiency, lameness, mortality and culling rates, and morbidity rates.

5.8 Space allowance

Insufficient and inadequate space allowance may increase stress to the pig, the occurrence of injuries and have an adverse effect on growth rate, feed efficiency, reproduction and behaviour such as locomotion, resting, feeding and drinking, agonistic and abnormal behaviour.

Space allowance should be managed by considering different groups (boars, sow, gilt, piglet) spacing requirements for lying, standing, feeding and elimination. Stocking density should not adversely affect normal behaviour of pigs and duration of time spent lying.

5.8.1 Group housing

Floor space may interact with a number of factors such as temperature, humidity, floor type and feeding systems to affect pig welfare. All pigs should be able to lie down simultaneously and to stand up and move freely. Sufficient space should be provided to enable animals to have access to feed, water, to separate lying and elimination areas.

Group housing systems should provide sufficient space and opportunities to avoid or escape from potential aggressors.

If abnormally aggressive behaviour is seen, corrective measures should be taken, such as increasing space allowance and providing barriers where possible or individually housing the aggressive pig.

Animal-based criteria (or measurables): changes in body weight and body condition (reduction or variation in body weight and body condition), agonistic and abnormal behaviour (e.g. tail biting), injuries, morbidity rates, mortality and culling rates, and physical appearance (e.g. excessive presence of faeces on the skin).

5.8.2 Individual pens

Pigs should only be housed in individual pens if necessary. In individual pens, pigs should be provided with sufficient space so that they can stand up, turn around and lie comfortably in a natural position, and that provides separate areas for elimination, lying and eating.

Animal-based criteria (or measurables): increasing abnormal behaviour (stereotypies), morbidity rates, mortality and culling rates, and physical appearance (e.g. excessive presence of faeces on the skin, injuries).

5.8.3 Stalls and crates

Feeding, insemination and gestation stalls and farrowing crates should be sized appropriately to allow pigs to stand up in their natural stance without contact with either side of the stalls or crates, the top bars, both ends of the stalls or crates. They could lie comfortably on their sides without disturbing neighbouring pigs or being injured by another pig, except in the case of stalls used only for feeding.

Animal-based criteria (or measurables): physical appearance (e.g. injuries), increasing abnormal behaviour (stereotypies), reproductive efficiency, lameness, mortality and culling rates, and morbidity rates (particularly young pigs).

5.9 Flooring, bedding, resting surfaces

In all production systems, pigs need a well-drained, dry and comfortable place to rest, except in situations where sprinklers or misters may be used to prevent heat stress.

Floor management in indoor production systems can have a significant impact on pig welfare. Flooring, bedding, resting surfaces and outdoor yards should be cleaned as conditions warrant, to ensure good hygiene, comfort and minimise risk of diseases and injuries. Areas with excessive faecal accumulation are not suitable for resting. The solid surfaces should be made of easily cleaned and disinfected materials.

Floors should be designed to minimise slipping and falling, promote foot health, and reduce the risk of claw injuries.

If a housing system includes areas of slatted floor, the slat and gap widths should be appropriate to the claw size of the pigs to prevent injuries.

Slope of the floor should allow water to drain properly and not pool.

In outdoor systems, pigs should be rotated between paddocks or pastures to ensure good hygiene and minimise risk of diseases.

Animal-based criteria (or measurables): physical appearance (e.g. injuries, presence of faeces on the skin, bursitis), lameness and morbidity rates (e.g. respiratory disorders, reproductive tract infections).

5.10 Air quality

Good air quality and ventilation are important for the welfare and health of pigs and reduce the risk of respiratory discomfort, diseases and abnormal behaviour. Dust, toxins, microorganisms and noxious gases, including ammonia, hydrogen sulphide, and methane caused by decomposing animal waste, can be problematic in indoor systems.

Air quality is influenced strongly by management and building design in housed systems. Air composition is influenced by stocking density, the size of the pigs, flooring, bedding, waste management, building design and ventilation system.

Proper ventilation, without draughts, particularly for young pigs, is essential for effective heat dissipation in pigs and to prevent the build-up of noxious gases, e.g. ammonia and hydrogen sulphide, including those from manure and dust in the housing unit. The ammonia concentration in enclosed housing should not exceed 25 ppm. A useful indicator is that if air quality at the level of the pigs is unpleasant for humans it is most likely a problem for pigs.

Animal-based criteria (or measurables): morbidity rates, mortality and culling rates, physical appearance (discharges from nose or eyes), behaviour (especially respiratory rate, coughing and tail biting), changes in body weight and body condition.

5.11 Thermal environment

Although pigs can adapt to a range of thermal environments, particularly if appropriate breeds and housing are used for the anticipated conditions, sudden fluctuations in temperature can cause heat or cold stress.

5.11.1 Heat stress

Heat stress is a serious problem in pig production. It can cause significant discomfort, as well as reductions in weight gain and fertility, or sudden death.

The risk of heat stress for pigs is influenced by environmental factors including air temperature, solar radiation, relative humidity, wind speed, ventilation rates, stocking density, shade and wallow availability in outdoor systems and animal factors including breed, age and body condition. At a given temperature, the heavier pigs are, the more susceptible they are to heat stress.

Animal handlers should be aware of the risk that heat stress poses to pigs and of the thresholds in relation to heat and humidity that may require action. If the risk of heat stress reaches too high levels the animal handlers should institute an emergency action plan that gives priority to access to additional water and could include provision of shade and wallows in outdoor systems, fans, reduction of stocking density, water-based cooling systems, e.g. dripping or misting, and provision of other cooling systems as appropriate for the local conditions.

Animal-based criteria (or measurables): behaviour (feed and water intake, respiratory rate, panting, lying postures and gestures, agonistic behaviour), physical appearance (presence of faeces on the skin, sunburn), morbidity rates, mortality and culling rates, and reproductive efficiency.

5.11.2 Cold stress

Protection from cold should be provided when conditions are likely to compromise the welfare of pigs, particularly in neonates and young pigs and others that are physiologically compromised, e.g. ill animals. Protection can be provided by insulation, extra bedding, heat mats or lamps and natural or man-made shelters in outdoor systems.

Animal-based criteria (or measurables): morbidity rates, mortality and culling rates, physical appearance (piloerection), behaviour (especially abnormal postures, shivering and huddling) and changes in body weight and body condition.

5.12 Noise

Exposure of pigs to sudden or prolonged loud noises should be avoided to prevent increased aggression, stress and fear.

Ventilation fans, feeding machinery or other indoor or outdoor equipment should be constructed, placed, operated and maintained in such a way that they cause the least possible amount of noise.

Animal-based criteria (or measurables): behaviour (e.g. fleeing and abnormal or excessive vocalisation), physical appearance (e.g. injuries), reproductive efficiency, changes in body weight and body condition.

5.13 Lighting

Indoor systems should have light levels sufficient to allow all pigs to see one another, to investigate their surroundings visually and to show other normal behaviour patterns and to be seen clearly by staff to allow adequate inspection of the pigs. The lighting regime should

be such as to prevent health and behavioural problems. It should follow a 24-hour rhythm and include sufficient uninterrupted dark and light periods, preferably no less than 6 hours for both.

Artificial light sources should be located so as not to cause discomfort to the pigs.

Animal-based criteria (or measurables): behaviour (locomotive behaviour), morbidity rates, reproductive efficiency, physical appearance (injuries) and changes in body weight and body condition.

5.14 Breeding

5.14.1 Semen collection and insemination

Appropriate facilities, equipment and tools should be provided and used in handling or restraining the animals for semen collection and insemination.

Animal breeding should take place when they have shown sexual maturity, attaining the appropriate body weight and health, free from any disease or from probable inherited abnormality.

Animal-based criteria (or measurables): bahaviour, morbidity rates, physical appearance, reproductive efficiency and handling response

5.14.2 Mating

Competent personnel should monitor matings to inhibit aggressive behaviours and injury to boars, sows or gilts.

Animal-based criteria (or measurables): bahaviour, morbidity rates, physical appearances, reproductive efficiency and handling response

5.15 Farrowing and lactation

Sows and gilts need time to adjust to their farrowing accommodation before farrowing. Nesting material should be available to sows and gilts, where possible, at least one day prior to. Sows and gilts should be observed frequently around their expected farrowing times. Natural farrowing without unnecessary human intervention is preferable. In case some sows and gilts need assistance during farrowing, there should be sufficient space and competent staff.

Farrowing accommodation should also provide comfort, warmth and protection to the piglets.

Animal-based criteria (or measurables): mortality and culling rates (piglets, gilts and sows), morbidity rates (metritis and mastitis), behaviour (restlessness and savaging), reproductive efficiency, physical appearance (injuries).

5.16 Weaning

Weaning is a stressful time for sows and piglets and good management is required. Problems associated with weaning are generally related to the piglets' size and physiological maturity. Weaned piglets should be moved into clean and disinfected housing separate from where sows are kept, in order to minimise the transmission of diseases to the piglets.

Piglets should be weaned at three weeks or older, expect for disease control and prevention purposes where early weaning can be performed. Early weaning requires good management and nutrition of the piglets. Delaying weaning to the age of four weeks or more may produce benefits such as improving gut immunity, less diarrhea and less use of antimicrobial agents.

Regardless of age, low weight piglets require additional care and can benefit from being kept in small groups in specialised pens.

Newly weaned pigs are susceptible to disease challenges, so adherence to high-level hygiene protocols and appropriate diet is important. The area that piglets are weaned into should be clean, dry and warm.

All newly weaned pigs should be monitored carefully during the first two weeks after weaning for any signs of ill-health or abnormal stress.

Animal-based criteria (or measurables): mortality and culling rates (piglets), morbidity rates (respiratory disease, diarrhoea), behaviour (belly nosing and ear sucking), physical appearance (injuries) and changes in body weight and body condition.

5.17 Mixing

Mixing of unfamiliar pigs can result in fighting to establish a dominance hierarchy, and therefore it should be minimized as much as possible. When mixing, strategies to reduce aggression should be implemented. Pigs should be observed after mixing and interventions applied if the aggression is intense or prolonged, to minimize stress and injury.

Measures to prevent excessive fighting and injuries can include:

1) providing additional space and a non-slippery floor
2) feeding before mixing
3) feeding on the floor in the mixing area
4) providing straw or other suitable enrichment materials in the mixing area
5) providing opportunities to escape and to hide from other pigs, such as visual barriers
6) mixing previously familiarised animals whenever possible
7) mixing young animals as soon after weaning as possible
8) avoiding the addition of one or small number of animals to a large established group.

Animal-based criteria (or measurables): morbidity rates, mortality and culling rates, behaviour (agonistic), physical appearance (injuries), changes in body weight and body condition and reproductive efficiency.

5.18 Genetic selection

Welfare and health considerations should balance any decisions on productivity and growth rate when choosing a breed or crossbreed for a particular location or production system.

Selective breeding can improve the welfare of pigs for example by selection to improve maternal behaviour, piglet viability, temperament and resistance to stress and disease and to reduce tail biting and aggressive behaviour. Including genetic characteristics related to social behaviour into breeding programmes may also reduce negative social interactions and may have major positive effects on group-housed animals.

Animal-based criteria (or measurables): physical appearance, behaviour (e.g. maternal and agonistic behaviour), changes in body weight and body condition, handling response, reproductive efficiency, lameness, mortality and culling rates, and morbidity rates.

5.19 Protection from predators and pests

In outdoor and combination systems pigs should be protected from predators.

Where practicable, pigs should also be protected from excessive numbers of pests such as rodents, birds, flies and mosquitoes.

Animal-based criteria (or measurables): morbidity rates, mortality and culling rates, behaviour, and physical appearance (injuries).

5.20 Biosecurity and disease prevention

Biosecurity system should be planned, implemented and maintained to achieve the best possible herd health status with available resources, infrastructure and current disease risk. These biosecurity plan should address the control of the major sources and pathways for spread of pathogenic agents including:

1) introductions to the herd, especially from different sources
2) semen
3) other domestic animals, wildlife and pests
4) human, including sanitation practices
5) equipment, including vehicles, tools and facilities
6) air, water, feed and bedding
7) waste, including manure garbage and disposal of dead animals

Animal-based criteria (or measurables): morbidity rates, mortality and culling rates, reproductive efficiency, changes in weight and body condition, physical appearance (signs of disease).

5.20.1 Animal health management

Animal health management should enhance the welfare and health of pigs in the herd. It includes the prevention, treatment and control of diseases and conditions affecting the herd in particular respiratory, reproductive and enteric diseases.

There should be an effective programme for the prevention and treatment of diseases and conditions, formulated in consultation with a veterinarian. This programme should include biosecurity and quarantine protocols, the acclimatisation of replacements, vaccinations, and good colostrum management, the recording of production data (e.g. number of sows, piglets per sow per year, feed conversion, and body weight at weaning), morbidity rates, mortality and culling rates, and medical treatments. It should be kept up to date by the animal handler. Regular monitoring of records aids management and quickly reveals problem areas for intervention.

For parasitic burdens (e.g. endoparasites, ectoparasites and protozoa) and insect and rodents control, a programme should be implemented to monitor, control and eradicate, as appropriate.

Lameness can be a problem in pigs. Animal handlers should monitor the state of feet and legs and take measures to prevent lameness and maintain foot and leg health. Those responsible for the care of pigs should be aware of early specific signs of disease, pain, distress or suffering, such as coughing, abortion, diarrhoea, huddle, fever, changes in locomotory behaviour or apathetic behaviour, and non-specific signs such as reduced feed and water intake, changes in weight and body condition, changes in behaviour or abnormal physical appearance.

Pigs at higher risk will require more frequent inspection by animal handlers. If animal handlers suspect the presence of a disease or are not able to correct the causes of disease, pain, distress or suffering, they should seek advice from those having training and experience, such as veterinarians or other qualified advisers, as appropriate.

Nonambulatory pigs should not be transported or moved unless absolutely necessary for treatment, recovery, or diagnosis. Such movements should be done carefully using methods that avoid dragging the animal or lifting it in a way that might cause further pain, suffering or exacerbate injuries.

Animal handlers should also be competent in assessing fitness to transport.

In case of disease or injury, when treatment has failed, is not feasible or recovery is unlikely (e.g. pigs that are unable to stand up unaided or refuse to eat or drink), or severe pain that cannot be alleviated the animal should be humanely killed as soon as possible. Disposal of destroyed carcass should be appropriately conducted.

Animal-based criteria (or measurables): morbidity rates, mortality and culling rates, reproductive efficiency, behaviour (apathetic behaviour), lameness, physical appearance (injuries) and changes in body weight and body condition.

5.20.2 Emergency plans for disease outbreaks

The emergency plans should cover the management of the farm in the event of a disease outbreak. The plan should be consistent with existing national disease control programs and recommendations of veterinary services as appropriate.

5.21 Contingency plans

The failure of electrical power, water or feed supply systems could compromise animal welfare. Therefore, pig producers should have contingency plans in place. These plans should be communicated to all responsible parties. The contingency plans may include the provision of fail-safe alarms/warning systems to detect malfunctions, back-up generators, contact information for key service providers, source of reserved water and feed and an alternative feed supply. Alarms and back-up systems should be checked regularly.

Contingency plans should be evaluated regularly for their effectiveness.

5.22 Disaster management

The disaster management plan should be in place to minimise and mitigate the effect of disasters, e.g. earthquake, fire, flooding and windstorm. Such plans may include evacuation procedures, identifying high ground, maintaining emergency feed and water stores, destocking and humane killing when necessary.

5.23 Humane killing

Any sick or injured animal should not be suffered or lingered unnecessarily in these conditions. Therefore, a prompt diagnosis should be made to determine whether the animal should be treated or humanely killed.

The decision to kill an animal humanely and the procedure itself should be undertaken by a competent person. Appropriate steps must be taken to ensure the rapid death of the pig.

Farms should provide documented procedures and necessary equipment for on-farm humane killing. Reasons for humane killing may include:

1) severe emaciation, weak pigs that are nonambulatory or at risk of becoming nonambulatory
2) severely injured or nonambulatory pigs that will not stand up, refuse to eat or drink, or have not responded to treatment
3) rapid deterioration of a medical condition for which treatment has been unsuccessful
4) severe pain that cannot be alleviated
5) multiple joint infections with chronic weight loss
6) piglets that are premature and unlikely to survive, or have a debilitating congenital defect

7) humane killing as part of disease control measures specified by veterinary authority
8) humane killing as part of disaster management response

REFERENCES

ASEAN, 2015. ASEAN GAHP on Animal Welfare and Environmental Sustainability Module: layers, broilers and ducks.

WOAH, 2019. Terrestrial Animal Health Code, Chapter 7.1 Introduction to the recommendations for animal welfare.

WOAH, 2019. Terrestrial Animal Health Code, Chapter 7.13 Animal welfare and pig production systems.

APPENDIX A.1
TYPES OF COMMERCIAL PIG PRODUCTION SYSTEMS

A.1.1 Indoor systems

These are systems in which pigs are kept indoors and are fully dependent on humans to provide basic animal needs such as feed and water. The type of housing depends on the environment, climatic conditions and management system. The animals may be kept in groups or individual.

A.1.2 Outdoor systems

These are systems in which pigs live outdoors with shelter or shade, have some autonomy over access to shelter or shade, but may be fully dependent on humans to provide for basic animal needs such as feed and water. Pigs are typically kept in paddocks or pastures according to their production stage. The animals may be kept in groups or individual.

A.1.3 Combination systems

These are systems in which pigs are managed in any combination of indoor and outdoor production systems.

APPENDIX A.2
GENERAL PRINCIPLES FOR THE WELFARE OF ANIMALS IN LIVESTOCK PRODUCTION SYSTEMS

The general principles for the welfare of animals in livestock production systems are listed below;

A.2.1 Genetic selection should always take into account the health and welfare of animals.

A.2.2 Animals chosen for introduction into new environments should be suited to the local climate and able to adapt to local diseases, parasites and nutrition.

A.2.3 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.

A.2.4 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.

A.2.5 Social grouping of animals should be managed to allow positive social behaviour and minimise injury, distress and chronic fear.

A.2.6 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.

A.2.7 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.

A2.8 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.

A.2.9 Where painful procedures cannot be avoided, the resulting pain should be managed to the extent that available methods allow.

A.2.10 The handling of animals should foster a positive relationship between humans and animals and should not cause injury, panic, lasting fear or avoidable stress.

A.2.11 Owners and handlers should have sufficient skill and knowledge to ensure that animals are treated in accordance with these principles.

APPENDIX A.3
GUIDING PRINCIPLES FOR THE USE OF MEASURES TO ASSESS ANIMAL WELFARE

Guiding principles for the use of measures to assess animal welfare are listed below;

A.3.1 The favourable outcomes for the animals should be emphasised in some circumstances for the guidelines to be effectively applied. It may be necessary to recommend specific conditions of the animals' environment and management. Outcomes are generally measured by assessing the extent to which animals experience the "Five Freedoms" described in Section 1.

A.3.2 For each principle listed in Appendix A.2, the most relevant criteria (or measurables), ideally comprising animal-based measures, should be included. Any given animal-based measure may be linked to more than one principle.

A.3.3 Recommendations should, whenever possible, define explicit targets or thresholds that are met for animal-based measures. Such target values should be based on relevant science and experience of experts.

A.3.4 In addition to animal-based measures, resource-based measures and management-based measures may be used and should be defined on the basis of science and expert experience showing that a welfare outcome is clearly linked to a resource or to a management procedure.

A.3.5 Users of the guidelines should select the most appropriate animal-based measures for their farming system or environment, from among those listed in the guidelines. Outcomes can be measured by an assessment of individuals or animal groups, or a representative animal, using data from establishments, transport or slaughterhouses/abattoirs. Competent Authorities should collect all relevant data for the users to set up target and threshold values.

A.3.6 Whatever the basis of the measure, if outcomes are unsatisfactory, users should consider what changes to resources or management are necessary to improve outcomes.