Enacted No.5-Chikusan-1065 on July 26, 2023

Technical Guidelines for Management of Pigs

The “Technical Guidelines for Management of Pigs” were developed and issued by the Ministry of Agriculture, Forestry and Fisheries of Japan (MAFF-J), based on the standards for animal welfare in the Terrestrial Animal Health Code of the World Organisation for Animal Health. This document is the English version of the guidelines translated by MAFF-J. While every effort has been made to ensure that the translation is as accurate as possible, the accuracy and completeness of the content is not entirely guaranteed. For accurate and up-to-date information, please refer to the original Japanese version.

Ministry of Agriculture, Forestry and Fisheries of Japan
Livestock Industry Bureau

Table of Contents

Section 1. Management method 1
1. Observation and recording 1
2. Handling of pigs 2
3. Reproduction 3
4. Farrowing 4
5. Management of newborn piglets 4
(1) Castration 4
(2) Tail docking 4
(3) Teeth clipping or grinding 5
6. Weaning 5
7. Identification 6
8. Tusk trimming 7
9. Nose rings 7
10. Control of diseases and accidents 8
11. Cleaning and disinfection of pig pens 9
12. Biosecurity measures on farms 9
13. Promoting understanding of animal welfare 10
Section 2. Nutrition 12
1. Nutritional and water requirements 12
2. Ensuring the quality of feed and water 12
3. Feeding and water supply methods 13
Section 3. Housing 14
1. Pig house with natural ventilation system 14
2. Pig house with forced Ventilation system 14
Section 4. Rearing system, structure, and space allowance 16
1. Rearing system 16
(1) Individual housing system (stalls, pens or crates) 16
(2) Group housing system 16
(3) Outdoor system 17
2. Flooring 17
3. Space allowance 18
(1) Growing and fattening pigs 19
(2) Breeding sows (including sows after farrowing and during lactation) 19
(3) Sire pigs 20
Section 5. Environment of pig house 21
1. Thermal environment 21
2. Ventilation 21
3. Lighting 22
4. Noise 23
5. Environment enrichment 23
Section 6. Confirmation of the situation related to animal welfare 25
1. Confirmation of animal welfare status 25
2. Inspection and management of equipment 25
3. Emergency response 25
Section 7. Criteria or measurables for the welfare of pigs 27

1. Behavior 27
2. Morbidity and injury rates 27
3. Mortality and culling rates 28
4. Changes in body weight and body condition 28
5. Reproductive efficiency 28
6. Physical appearance 29
7. Handling responses 29
8. Lameness 29
9. Complications from common procedures 29
10. Euthanasia 30
Appendix I 31
Appendix II 32

Section 1. Management method

1. Observation and recording

It is important to keep track of the health of pigs ensure they are being reared comfortably. Signs of poor health in pigs include changes in posture, changes in the coat condition, eye discharge, nasal discharge, diarrhea, loss of appetite, fatigue, rapid and irregular breathing, persistent coughing or panting, trembling, lameness, and abnormal behaviors.

It is important to keep daily records to ensure that the rearing environment is comfortable for the pigs. The items to be recorded include the health status of the pigs, the occurrence and causes of diseases and accidents, the number of deaths, the presence of tail biting, reproductive performance (such as conception rates and litter sizes), feed rations or intake, adequate water supply, as well as maximum and minimum temperatures, and humidity.

[Actions recommended for implementation]

Pigs should be observed at intervals appropriate to management practices and risks to health and animal welfare, at least once a day. In particular, the frequency of observation should be increased when there are newborn piglets, newly weaned pigs, farrowing sows, pigs immediately after surgical procedures, newly-mixed gilts and sows, sick or injured pigs, pigs showing abnormal behaviors such as tail biting, or immediately after changes in the rearing environment, such as moving from stalls to herd housing, or during hot or cold seasons to prevent the occurrence of sickness and injuries.

When observing pigs, their health status should be assessed by observing factors, including their body condition, feeding behavior, presence of injury or lameness, presence of tail biting, and their resting conditions. The absence of any signs indicating a deterioration in animal welfare should be confirmed by referring to the animal welfare measurables shown in Section 7, and it should also be checked that feed and water are being administered appropriately, ventilation and lighting are adequate, and the flooring, bedding, and surfaces of the resting areas and outdoor paddocks are being maintained clean and comfort.

If pigs show signs of health deterioration, clinical and lesion observations should be utilized to immediately take appropriate measures. Pigs identified as sick or injured should be given appropriate treatment as soon as possible by the manager (e.g., owner) or handler (person actually involved in the management of the pigs). If the manager or handler is unable to provide appropriate treatment, the services of a veterinarian should be sought. When a pig dies, the carcass should be promptly removed from the pen, and the cause of death should be ascertained.

Daily records should be kept of the health status of pigs, the occurrence of diseases and accidents, as well as their causes, the number of deaths, the presence of tail biting, reproductive performance (such as conception rates and litter size), feed rations or intake, adequate water supply, maximum and minimum temperatures, and humidity. In particular, for the occurrence of diseases and accidents, and the circumstances in which they occur, the mortality rates, morbidity rates, and culling rates, along with the causes of any increase or decrease and the details of treatment should be checked and recorded regularly; i.e., daily, monthly, annually. Items to be recorded should be added in accordance with what the situation requires, such as when a behavior that

may be causing animal welfare problems is observed (see Section 7. 1) .

[Actions recommended for future implementation]

None

2. Handling of pigs

Pigs are animals that are curious, but also timid and sensitive to changes in their surrounding environment; therefore, it is important for managers and handlers to carefully interact with the pigs and build good relationships with them during daily management, which will lead to improved animal welfare. It is also necessary to recognize that fighting behaviors can cause injury or death because of their habit of fighting to secure feed and space for activities, and to establish a dominance hierarchy.

[Actions recommended for implementation]

When managers and handlers work inside pig pens or approach the pigs, they should avoid sudden movements that may cause unnecessary stress. The pigs should not be improperly or aggressively handled (e.g., kicked, thrown, dropped, walked on top of, held or pulled by one front leg, ears or tail) and should be handled as gently as possible.

Pigs that become distressed during handling should be attended to immediately. In addition, pigs should be kept from contact with animals other than pigs so that they do not feel stressed.

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

When transporting pigs, the loading, transportation, and unloading should be conducted appropriately according to the "Technical Guidelines for the Transport of Farm Animals."

Exposure of pigs to sudden movement, loud noises or changes in visual contrasts (such as abrupt changes in brightness or color) should be minimized where possible to prevent stress and fear reactions.

Handling aids that may cause pain and distress (e.g., electric goads) should only be used on the hindquarters of pigs when other methods fail and provided that the animal can move freely and is able to move away from the handling aid. Such tools should not be used repeatedly on the same animal, and not be used in sensitive areas including the udder, face, eyes, nose, ears, or anogenital region. Goads and other aids should not be used repeatedly if the pig fails to respond or move, and in such cases, it should be investigated whether some physical or other impediment is preventing the animal from moving. 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. Pigs should be restrained only for as long as necessary and only appropriate, well-maintained restraint devices should be used.

[Actions recommended for future implementation]

None

3. Reproduction

Reproduction methods include natural mating, artificial insemination, and embryo transfer, which are selected based on factors such as the rearing environment and management policy. Animal welfare problems may arise when various reproductive data, such as low conception rates, high abortion rates, high incidence of uteritis and mastitis, low total litter size or number of surviving piglets, or a high number of stillbirths and mummified fetuses, are significantly below the expected standard values for that particular breed or crossbreed.

[Actions recommended for implementation]

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

For breeding, in addition to considerations to avoid risks associated with genetic defect traits, it is important to consider genetic characteristics (such as reproductive performance, behavioral traits, and stress tolerance) and the condition of breeding sows. Implantation, insemination, and mating should not be performed in a such a way that the progeny results in increased risk to sow and piglets' welfare. In particular, gilts (young breeding sows that have not yet farrowed) should not be bred before they are physically mature enough to ensure the health and welfare of both the sow and her offspring.

When performing artificial insemination or embryo transfer, a qualified person, such as a veterinarian or livestock insemination specialist, should carry out the procedure by using appropriate equipment and instruments at the appropriate timing based on reliable detection of estrus to minimize any pain and stress to the pig. If necessary, the procedure should be performed under the administration of anesthesia or analgesia by a veterinarian.

Excessive obesity increases the risk of dystocia and metabolic disorders in late pregnancy or the postpartum period; therefore, pregnant sows should be managed during pregnancy so as to achieve an appropriate body condition range, since excessive fatness increases the risk of dystocia, and both excessive condition gain and loss increase the risk of metabolic disorders during late pregnancy or after parturition (see Appendix I: Body Condition Score (BCS) for Sows).

When a sire is used for natural mating, safe floor or ground conditions should be ensured for the pig to prevent injuries due to slips or other causes.

Ovariectomy should not be performed without anesthesia and prolonged analgesia. Immunological prevention of estrus should be encouraged to avoid ovariectomy.

[Actions recommended for future implementation]

None

4. Farrowing

While it is most important that farrowing takes place without problems, cases such as dystocia, premature birth, stillbirth, or retained placenta (retained afterbirth) may require the assistance of a manager or handler, which can be very stressful for the sow.

[Actions recommended for implementation]

Sows and gilts should be moved to the farrowing area at an appropriate time before farrowing, based on the gestation period and farrowing signs. Sows and gilts should be observed frequently around their expected farrowing times.

The flooring in the farrowing area should be kept clean and dry to provide comfort, warmth and protection to the piglets. Nesting material should be available to sows and gilts where possible for at least one day.

As some sows and gilts need assistance during farrowing, there should be sufficient space and competent staff. Farrowing assistance should be provided only to assist in cases of dystocia and not for the purpose of shortening the delivery time. In addition, it should be performed so as not to cause excessive pain and distress.

[Actions recommended for future implementation]

None

5. Management of newborn piglets

Some procedures such as castration, tail docking, and teeth clipping or grinding may be performed to facilitate management and to improve human safety or safeguard animal welfare. In addition, options for enhancing animal welfare in relation to these procedures include the internationally recognized "three Rs": replacement (e.g., using immunocastrated males rather than surgically castrated males), reduction (e.g., tail docking or teeth clipping only when necessary), and refinement (e.g., providing analgesia or anesthesia by a veterinarian).

(1) Castration

When male pigs are fattened without castration, their meat develops boar taint that is specific to male pigs. In addition, when uncastrated male pigs are raised in herds, they begin to frequently mount other pigs starting around five months of age, which results in frequent injuries. Therefore, in Japan, it is common practice to surgically castrate male pigs for meat production.

Immunocastration technology has been developed as a method to avoid the pain caused by surgical castration, with the administration of these immunological agents controlling the boar taint. This technique has been put into practical use in Europe, and in Japan the use of such agents has also been approved based on the “Act on Securing Quality, Efficacy and Safety of Products Including Pharmaceuticals and Medical Devices (Act No. 145 of 1960).”

(2) Tail docking

When pigs are under stress, such as high humidity during the rainy season or hot

temperatures in the summer, behaviors such as tail biting, ear biting, or belly biting can sometimes be observed. In particular, when tail biting occurs, this behavior quickly spreads throughout the herd. Pigs that are bitten on the tail may lose feed intake and weight gain due to stress, and if severely injured, they may die.

It is suggested that tail biting can be reduced to some extent by providing feed that has an appropriate mineral and essential amino acid content, expanding the available rearing space, suppressing competition over feed and water, improving ventilation, separating injured pigs or pigs that initiate tail biting, providing enrichment toys, and reducing stress. However, if tail biting cannot be prevented despite various efforts, tail docking may be considered as one of the options, but only as a last resort.

(3) Teeth clipping or grinding

Newborn piglets are born with eight sharp teeth, which can potentially injure other piglets when competing for the sow's teats, or harm the sow's teats due to sucking. Additionally, if the sow dislikes having her damaged teats bitten and refuses to nurse, she may suddenly stand up, which could result in injuries or crushing of the piglets. Teeth clipping or grinding is one of the measures to prevent such accidents; however, considering the potential adverse effects, there are cases where teeth clipping or grinding is not performed.

[Actions recommended for implementation]

Some procedures such as castration, tail docking, and teeth clipping or grinding are painful or have the potential to cause pain. Therefore, they should only be performed by trained personnel, when necessary to improve human safety or safeguard animal welfare, in such a way as to minimize any pain, distress, and suffering to the animal. Also, such procedures should be performed at as early an age as possible under the recommendation or supervision of a veterinarian or other qualified personnel, while taking care to prevent excessive stress and infection in piglets. If necessary, these procedures should be performed using anesthesia or analgesia by a veterinarian.

After the procedures, the pigs should be carefully observed, and if signs of infection, such as suppuration, are observed, the pigs should be promptly treated or cured, and the procedure should be rechecked, confirmed, and revised as necessary.

When performing teeth clipping or grinding, either the method of grinding down only the tips of the teeth with a file (grinder) or cutting them with nippers should be selected to prevent piglets from developing gingivitis or other conditions. However, if using nippers, there is a risk of tooth fractures, and appropriate tools should be used by paying attention to the cutting position.

[Actions recommended for future implementation]

None

6. Weaning

Weaning is a stressful time for both piglets and sows, and good management is required.

Weaning of piglets is generally carried out at three weeks or older. Early weaning before three weeks is one effective method for controlling the specific diseases in piglets, but it can also lead to abnormal behaviors such as piglets nosing the bellies of other piglets or sucking on their ears. Such abnormal behaviors can be mitigated by providing the post-weaning feed before weaning or by feeding a liquid milk replacer.

Delaying weaning to four weeks or older can provide benefits such as improved gut immunity, decreased diarrhea, and reduced use of antibiotics. Regardless of age, low-weight piglets may require additional care, and it may be beneficial to rear them in small herds within a special enclosure until they are able to be moved to a communal rearing area.

It is also known that early weaning can alleviate stress in sows.

[Actions recommended for implementation]

Weaning is a stressful time for both piglets and sows, and it should be carried out with careful consideration and planning to minimize its impact as much as possible.

Piglets should be weaned at three weeks or older, unless otherwise recommended by a veterinarian for disease control purposes. Early weaning systems require good management and nutrition of the piglets.

Weaned piglets should be moved into clean and disinfected housing separate from where sows are kept, in order to minimize the transmission of diseases to the piglets.

The area that piglets are weaned into should be clean, dry, and warm, and all newly weaned pigs should be monitored carefully during the first two weeks after weaning for any signs of ill-health or abnormal stress.

[Actions recommended for future implementation]

None

7. Identification

Individual identification is a useful means for conducting management, such as understanding the health status of individual pigs or herds, and is particularly necessary for sows to facilitate management including mating. Methods for individual identification include ear notching, ear tags, and tattoos. In addition, options for enhancing animal welfare in relation to these procedures include the internationally recognized "three Rs."

[Actions recommended for implementation]

Some procedures such as ear notching are painful or have the potential to cause pain; therefore, they should only be performed by trained personnel, when necessary to safeguard animal welfare, in such a way as to minimize any pain, distress, and suffering to the animal. Also, such procedures should be performed at as early an age as possible while taking care to prevent excessive stress and infection in piglets. If necessary, these procedures should be performed using anesthesia or analgesia by a veterinarian.

After the procedures, the pigs should be carefully observed, and if signs of infection, such as suppuration, are observed, the pigs should be promptly treated or cured, and

the procedure should be rechecked, confirmed, and revised as necessary.

[Actions recommended for future implementation]

None

8. Tusk trimming

The tusk in pigs continue to grow throughout their lives, and even in pigs that have undergone teeth clipping, the tusk will grow as they mature. For breeding pigs (particularly sires), which are kept for a longer period compared to pigs for meat, tusk trimming is an effective procedure to prevent accidental injuries to managers and handlers. In addition, options for enhancing animal welfare in relation to these procedures include the internationally recognized "three Rs."

[Actions recommended for implementation]

As tusk trimming is painful or has the potential to cause pain, it should only be performed by trained personnel when necessary to safeguard animal welfare or improve human safety, in such a way as to minimize any pain, distress, and suffering to the animal. Additionally, it should be carried out under the guidance of a veterinarian or other qualified personnel, with attention paid to preventing excessive stress and infections in pigs. If necessary, these procedures should be performed using anesthesia or analgesia by a veterinarian.

After the procedure, the pigs should be carefully observed, and if signs of infection, such as suppuration, are observed, the pigs should be promptly treated or cured, and the procedure should be rechecked, confirmed, and revised as necessary.

[Actions recommended for future implementation]

None

9. Nose rings

Pigs have a natural desire for the exploratory behavior of rooting, where they dig up soil with their snouts. To prevent the loss of vegetation and topsoil in pastured areas due to excessive rooting, nose rings may be attached to pigs, although this practice is not common in Japan. Options for enhancing animal welfare in relation to these procedures include the internationally recognized "three Rs."

[Actions recommended for implementation]

As the attaching of a nose ring is painful or has the potential to cause pain, it should only be performed by trained personnel when necessary to safeguard animal welfare, in such a way as to minimize any pain, distress, and suffering to the animal. Additionally, it should be carried out under the guidance of a veterinarian or other qualified personnel, with attention paid to preventing excessive stress and infections in pigs. If necessary, these procedures should be performed using anesthesia or analgesia by a veterinarian.

After the procedure, pigs should be carefully observed, and if signs of infection, such as suppuration, are observed, the pigs should be promptly treated or cured, and the procedure should be rechecked, confirmed, and revised as necessary.

[Actions recommended for future implementation]

None

10. Control of diseases and accidents

The prevention of disease and injury through daily management is of utmost importance. Managers and handlers need to acquire knowledge to identify and appropriately address pigs affected by chronic diseases or injuries.

[Actions recommended for implementation]

Animal health management should optimize the health and welfare of pigs in the herd.

There should be an effective program for the prevention and treatment of diseases and conditions, formulated in consultation with a veterinarian. This program should include biosecurity and quarantine protocols, acclimatization of replacements, vaccinations, and good colostrum management, the recording of production data (e.g., numbers of sows, piglets per sow per year, feed conversion, and body weight at weaning), morbidity, mortality and culling rate and medical treatment. It should be kept up to date by managers or handlers. For parasitic burdens (e.g., endoparasites, ectoparasites and protozoa) and insect and rodents control, a program should be implemented to monitor, control and treat, as appropriate.

Managers and handlers should acquire the knowledge to identify and deal with pigs affected by diseases or injuries and should consult with veterinarians as needed. If handlers suspect the presence of a disease or are not able to correct the causes of disease, pain, or distress or suffering, they should seek advice from those having training and experience, such as veterinarians or other qualified advisers, as appropriate.

Vaccinations and other treatments administered to pigs should be undertaken by people skilled in the procedures and on the basis of veterinary advice in accordance with the “Veterinarians Act (Act No. 186 of 1949)” and other relevant laws and regulations, and in consideration of the welfare of the pigs.

Pigs identified as sick or injured should be separated as carefully as possible, and given appropriate treatment. In the case special isolation is required, consideration should be given to all the requirements of the pigs, including additional bedding and alternative flooring. Non-ambulatory pigs should not be transported or moved unless absolutely necessary for treatment 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. Non-ambulatory pigs should have access to water at all times and be provided with feed at least once daily.

For sick and injured pigs, a prompt diagnosis should be made to determine whether the animal should be treated or humanely killed. In case of disease or injury, when treatment has failed, is not feasible or recovery is unlikely, or severe pain that cannot

be alleviated, the decision to conduct an emergency shipment or on-farm euthanasia should be undertaken by a competent person. On-farm euthanasia, except for cases where culling is carried out in accordance with the “Act on the Prevention of Infectious Diseases in Livestock (Act No. 166 of 1951)”, should be conducted as soon as possible, following the documented procedures and utilizing appropriate equipment, with reference to the "Technical Guidelines for On-Farm Euthanasia of Farm Animals."

Records of diseases and accidents should be kept, and if the frequency of occurrence is high, consultation with a veterinarian or relevant experts should be sought for appropriate action, as the presence of disease may be suspected, or the causes of disease, pain, distress, or suffering may not have been improved.

Managers or handlers should monitor the state of feet and legs and take measures to prevent lameness, and maintain foot and leg health.

[Actions recommended for future implementation]

None

11. Cleaning and disinfection of pig pens

Ensuring a comfortable environment for pigs is important for maintaining good hygiene and minimizing the risk of disease and injury. Additionally, areas where manure is left for long periods are not suitable for resting.

[Actions recommended for implementation]

Flooring, bedding, resting surfaces and outdoor yards should be cleaned as conditions warrant, to ensure good hygiene and comfort, and minimize risk of diseases and injuries.

Areas in contact with pigs, including facilities and equipment, should be cleaned and disinfected to keep the facilities and equipment clean.

For all in - all out management, cleaning, disinfection, and drying should be completed before introducing new pigs.

Manure should be properly removed, and a comfortable environment should be provided for the pigs.

[Actions recommended for future implementation]

None

12. Biosecurity measures on farms

In the event of the entry of highly infectious pathogens such as foot-and-mouth disease virus into a farm, there is a high risk that the disease will spread simultaneously throughout the entire herd, posing a significant problem for animal welfare.

To prevent the outbreak of infectious diseases and maintain the pigs' health, it is necessary to implement thorough biosecurity measures to prevent the entry of pathogens into the farm. Additionally, pest animals such as rodents and flies not only contribute to the transmission of various pathogens but also degrade the rearing

environment by causing feed contamination and damage to facilities and equipment (e.g., electrical wiring).

[Actions recommended for implementation]

In addition to the complying with the "Biosecurity Standards" as outlined in the "Act on Prevention of Infectious Diseases in Livestock," managers and handlers should design, implement, and periodically review "Biosecurity plans" and acquire the necessary knowledge for the daily prevention of infectious disease outbreaks. In the case of any abnormalities observed in pigs or other necessary situations, managers and handlers should consult. When specific symptoms outlined in the "Act on the Prevention of Infectious Diseases in Livestock" are confirmed, they should notify that to the Livestock Hygiene Service Center immediately.

When vehicles enter or leave a farm, or people enter or leave a pig house, they should be disinfected appropriately.

Where practicable, pigs should also be protected from pest animals such as excessive numbers of flies and mosquitoes.

[Actions recommended for future implementation]

None

13. Promoting understanding of animal welfare

It is necessary to understand that ensuring good animal welfare involves management practices such as designing management systems, maintaining rearing environments, responsible rearing, and providing appropriate care, and that serious problems may arise if these factors are compromised.

Good pig management is essential for ensuring good animal welfare. Managers and handlers should always recognize that having the appropriate knowledge, skills, and competencies related to animal welfare contributes to reducing culling rates due to diseases or reproductive disorders in sows and leads to reduced losses and improved growth in fattening pigs.

[Actions recommended for implementation]

Managers and handlers should be competent with relevant experience or training to equip them with the necessary practical skills and knowledge of pig behavior, handling, health, reproductive management, biosecurity, physiological needs and welfare (early specific signs of disease or distress, such as coughing, abortion, diarrhea, changes in locomotory behavior or apathetic behavior, and non-specific signs such as reduced feed and water intake, changes in weight and body condition, changes in behavior or abnormal physical appearance, as well as abnormal behaviors including tail biting, and stereotypic behaviors such as bar biting or sham chewing). In particular, they should acquire knowledge and skills to identify and appropriately manage non-ambulatory pigs, those recently farrowed, and those suspected of being affected by chronic illness or injured, as well as the knowledge to evaluate the suitability of transportation and the appropriate body condition (see Appendix I: "Body Condition Score (BCS) for Sows").

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.

[Actions recommended for future implementation]

None

Section 2. Nutrition

1. Nutritional and water requirements

To ensure health and support normal growth, reproduction, and other activities, it is necessary to provide pigs with feed containing appropriate nutrition according to their growth stage, avoiding both excess and deficiency.

The required amount of feed and nutrients depends on factors such as climate, nutritional composition and quality of the feed, the age, sex, genetics, size, physiological status (e.g., pregnancy, lactation, growth condition), health condition, growth rate, past intake, activity and exercise level.

The body condition score of sows is a good indicator of nutritional control and the health status.

[Actions recommended for implementation]

All pigs should receive adequate quantity and quality of feed that contain appropriate nutrition and water each day to enable each pig to maintain good health, meet its physiological requirements and meet its requirements for foraging and feeding behavior. The body condition should also be managed so as not to allow it to fall outside an acceptable range according to their breed and physiological state, leading to the pigs being able to maintain their health and engage in normal growth and reproduction. Pigs should be fed a diet with the intention of minimizing the occurrence of gastric ulcers and behaviors such as bar biting and tail biting (e.g., increasing dietary fiber or reducing crude protein, and minerals and essential amino acids).

Water requirements are influenced by factors such as age, temperature, humidity, body weight, and feed composition. Water flow rates in drinkers should be set properly and 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.

In outdoor systems, stoking density should be matched to the available natural feed supply.

The "Japanese Feeding Standards for Swine," "Japanese Standard Tables of Feed Composition," and other sources should be referred to for information on the types and quantities of required nutrients.

In particular, pigs should be fed a diet with the intention of minimizing the occurrence of gastric ulcers (e.g., increasing dietary fiber or reducing crude protein).

[Actions recommended for future implementation]

None

2. Ensuring the quality of feed and water

When feed or water is stored in feeders or drinkers for long periods, problems such as contamination due to the growth of mold or bacteria will occur.

Contamination of feed and water with excrement of wild animals such as rats and wild birds can lead to diseases.

[Actions recommended for implementation]

Feeders and drinkers should be easy to clean and properly maintained through regular inspections and cleaning in consideration of the frequency recommended by the equipment manufacturer. Concerning water, attention should be paid to high temperatures in summer and freezing in winter.

Feedstuffs and feed ingredients should be of satisfactory quality to meet nutritional needs, be managed to minimize contamination and degradation, and be tested for the presence of substances that would impact on pig health.

Measures to prevent the entry of wild animals should be taken to avoid contamination of feed and water with excrement from rats, wild birds, and other animals that could cause diseases in pigs.

In outdoor systems, attention should be given to contaminated puddles, poisonous plants, and other potential hazards to the pigs.

[Actions recommended for future implementation]

None

3. Feeding and water supply methods

When installing feeders and drinkers, it is necessary to ensure that all pigs have adequate access to feed, water, and nutrition without any problems, and to keep in mind that the requirements of feed and water vary according to age, weight, etc.

It is known that measures such as extending feeding times to reduce competition for feed and water and minimizing periods of hunger, as well as providing opportunities to forage, can help to reduce behaviors such as tail biting, bar biting, and sham chewing.

[Actions recommended for implementation]

In all production systems, feed and water provision should allow all pigs to have access to feed, water, and nutrients without difficulty.

Managers or handlers should design feeding and watering systems to minimize agonistic behavior, ensure sufficient space according to the systems, and take appropriate measures.

When introducing pigs into a new pen, it should be confirmed that they are able to consume feed and water.

All pigs should be fed at least once a day with the required amount of feed containing the required nutrients, and feeding time should ideally be consistent every day. During hot weather, feeding should be avoided during the hottest hours of the day.

When new feed is introduced, it should be introduced in a planned and gradual manner.

[Actions recommended for future implementation]

None

Section 3. Housing

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 should be sought, while considering the "five freedoms" and evaluating the impacts of climate and geographical factors. To mitigate the negative effects of these impacts, efforts should be made to adapt the breed to the location of the farm or to consider alternative locations. In addition, consideration should be given to the following: (1) ensuring the environment inside the pig house is comfortable for pigs, and fresh air can be supplied to the entire pig house at all times; (2) prevention of the invasion of pathogens, wild animals, rodents, flies, and other pest animals; (3) maintaining stable temperature and humidity inside the pig house, avoiding significant changes due to fluctuations in the weather environment, such as heat and cold; (4) designing the pig houses to facilitate daily management and observation of the pigs, equipped with necessary management facilities; and (5) providing a structure that enables appropriate manure management.

It is necessary to strive for appropriate management, including repairs to prevent pigs from being injured by damaged parts of the pig house or equipment.

Types of ventilation systems include natural ventilation system and forced ventilation system.

1. Pig house with natural ventilation system

Natural ventilation system uses the natural flow of air to ventilate the space.

2. Pig house with forced Ventilation system

Forced ventilation system uses mechanical ventilation systems to control airflow in which the ceiling, walls, and floor are covered with insulation or other materials.

[Actions recommended for implementation]

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 should be sought to ensure that the environment is comfortable for the pigs. Housing systems and their components should be designed, constructed, regularly inspected, and maintained in a manner that reduces the risk of injury, disease, and stress for pigs.

Facilities should allow for the safe, efficient management and movement of pigs without any pain.

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

The pig house should be designed, constructed, and maintained to minimize negative impacts on health and welfare of the pigs that are caused by significant changes in temperature and humidity due to fluctuations in the weather conditions such as heat and cold.

Attention should be paid to prevent pigs from being injured by damaged parts of the

pig house.

The pig house should be designed and managed to control the invasion or occurrence of pathogens, wild animals, rodents, flies, and other pest animals.

The structure should be designed to facilitate daily management and observation of pigs and equipped with the necessary facilities, ensuring proper manure management.

[Actions recommended for future implementation]

None

Section 4. Rearing system, structure, and space allowance

1. Rearing system

There are various options for the rearing systems of pigs.

To provide a comfortable environment for pigs, in addition to the importance of management skills of managers and handlers, sufficient training is required for the proper use of equipment.

In general, growing pigs and fattening pigs are kept in group housing (some are pastured), sire pigs are kept in individual pens, and sows are kept in individual housing (in stalls), in group housing, or pastured systems.

[Actions recommended for implementation]

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

[Actions recommended for future implementation]

Breeding sows, like other pigs, are social animals that prefer to live in groups. Therefore, efforts should be made to house pregnant sows and gilts in groups as much as possible.

(1) Individual housing system (stalls, pens or crates)

Individual housing is a method where each pig is individually housed in a pen with a feeder and drinker, divided by a fence, etc. This method is used for housing sire pigs, breeding sows, and injured pigs, among others.

[Actions recommended for implementation]

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 be provided separate areas for elimination and eating.

When rearing pigs in stalls or crates, stalls and crates should be sized appropriately to allow pigs to stand up in their natural stance without simultaneously touching both ends of the stall or crate, and without contact with either side of the stall or crate and the top bars. The stalls and crates should also be large enough to allow pigs to lie comfortably on their sides without disturbing neighboring pigs or be injured by other pigs.

To improve social behavior, pigs should be allowed visual, olfactory, and auditory contact with other pigs.

[Actions recommended for future implementation]

None

(2) Group housing system

Group housing is a method where multiple pigs are housed together, allowing them to move freely within pens or houses. It is used for breeding sows, growing pigs, and fattening pigs.

As one type of group housing system for breeding sows, the electronic sow feeding (ESF) system (a system that provides the required amount of feed to each individual pig by using electronic identification) has been put into practical use (see Appendix II).

[Actions recommended for implementation]

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 and water, to separate lying and elimination areas, and to allow avoiding of aggressive animals. Group housing systems should provide sufficient space and opportunities to avoid or escape from potential aggressors. If abnormally aggressive behavior is seen, corrective measures should be taken, such as increasing space allowance and providing barriers where possible, or individually housing the aggressive pig.

To prevent excessive fighting and injuries related to the establishment of a dominance hierarchy, mixing should be minimized as much as possible. When mixing, measures to reduce aggression should be implemented, which include mixing previously familiarized animals whenever possible, feeding before mixing, providing opportunities to escape and to hide from other pigs, such as visual barriers, feeding on the floor, and providing straw.

[Actions recommended for future implementation]

None

(3) Outdoor system

Outdoor system is a method of rearing pigs outdoors (in paddocks or pastures).

Outdoor electronic sow feeding (ESF) system has been researched and developed as individual management systems for pigs during pasturing.

[Actions recommended for implementation]

Pigs should be rotated between paddocks or pastures to ensure good hygiene and minimize risk of diseases.

In systems where pigs could be exposed to adverse weather conditions, they should have access to shelter to avoid thermal stress and sunburn.

Additionally, pigs should be protected from predators.

[Actions recommended for future implementation]

None

2. Flooring

Floor management can have a significant impact on pig welfare. To prevent thermal stress, pigs need well-drained and dry resting areas, except when sprinklers or misters are being used. Areas where manure is left for long periods are not suitable for resting.

Floor structure and materials need to be comfortable and safe for pigs to prevent injury from slips, etc.

Pens and stalls should be constructed without protrusions that may cause injuries and ideally should use materials that allow for easy cleaning, disinfection, and replacement.

[Actions recommended for implementation]

Slope of the floor should allow water to drain and not pool. Floors should be designed to minimize slipping and falling, promote foot health, reduce the risk of claw, and ensure safety and comfort for pigs.

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.

Flooring such as rubber matting, bedding, resting surfaces, and outdoor yards should be maintained to provide pigs with a clean, dry and comfortable place on which to lie and minimize the risk of diseases and injuries. They should be cleaned as conditions warrant.

Pens and stalls should be properly designed, maintained and be free from sharp edges and protrusions to prevent injury to pigs, while also using materials that allow for easy cleaning, disinfection, and replacement.

[Actions recommended for future implementation]

None

3. Space allowance

Since the required rearing space varies depending on factors such as the breed and weight of the pigs, house structure, ventilation, rearing system, and the number of pigs per herd, it is difficult to uniformly mention the appropriate level. What is important is that managers or handlers observe the pigs carefully and assess whether the space is adequate.

When the space is overcrowded, this causes stress to pig and leads to abnormal behaviors such as tail biting, as well as diseases and fighting.

[Actions recommended for implementation]

Pigs should be offered adequate space for comfort and socialization. Space allowance should be managed taking into account different areas for lying, standing, feeding, and elimination. All pigs in a herd should have sufficient space to lie down, rest, and stand up at the same time without disturbance. Stocking density should not adversely affect normal behavior of pigs and duration of time spent lying, and if abnormal behavior is seen, corrective measures, such as increasing space or readjusting the lying areas, should be taken. Where there are areas that are not suitable for resting such as excessive water and fecal accumulation, these areas should not comprise the whole of usable area available to the pigs.

When determining space, factors such as age, weight, environment, biosecurity policies, feeding and watering systems, flooring, genetic traits, house structure,

management capacity, production system, available space, and ventilation capacity should be considered.

[Actions recommended for future implementation]

None

(1) Growing and fattening pigs

Growing and fattening pigs are generally kept in groups. The managers or handlers should carefully observe the pigs to determine if the area per pig is appropriate, depending on the weather conditions and the rearing conditions, such as flooring.

When pigs are kept on non-slatted floors, such as fermentation beds (e.g., pens with a thick layer of sawdust), a larger space is required compared to when pigs are kept on fully slatted floors. To prevent the growth of pathogens, the floors should be properly managed by removing muddied areas.

[Actions recommended for implementation]

None

[Actions recommended for future implementation]

None

(2) Breeding sows (including sows after farrowing and during lactation)

The space requirements for breeding sows vary depending on whether they are housed individually or in groups.

[Actions recommended for implementation]

The space required for individual housing system varies depending on the breed; however, pregnant sows should be kept in a space large enough to prevent accidents such as their abdomens being compressed by barriers and their udders being stepped on by neighboring pigs, since they have difficulty sleeping and getting up.

When rearing sows after farrowing or during lactation, consideration should be given to the preventing of piglets from being crushed and allowing them to nurse freely from their sows.

When rearing pigs in group housing systems, consideration should be given to the following: minimizing variations in weight among the pigs in the group to prevent fighting; ensuring that all pigs can rest at the same time; providing opportunities to avoid or escape from aggressive pigs (e.g., increasing space or barriers); and implementing a feeding system that prevents competition and fighting (e.g., providing sufficient space or individual management).

[Actions recommended for future implementation]

Breeding sows, like other pigs, are social animals and prefer to live in groups.

Therefore, efforts should be made to house pregnant sows and gilts in groups whenever possible.

(3) Sire pigs

In general, sire pigs should be kept individually to prevent fighting and other issues.

[Actions recommended for implementation]

When housing sire pigs individually, sufficient space should be provided depending on their body weights.

[Actions recommended for future implementation]

None

Section 5. Environment of pig house

1. Thermal environment

Although pigs can adapt to a variety of temperature conditions, sudden changes in temperature can cause heat or cold stress.

The optimum temperature range for pigs is about 10 to 25°C, although it varies depending on their growth stage.

When it is too hot for pigs, they may experience increased respiratory rate, decreased appetite, and reduced reproductive performance. When it is too cold for pigs, they may experience increased feed intake, stiffness, and shivering behaviors.

[Actions recommended for implementation]

Managers and 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.

Pig comfort is affected not only by temperature, but also by environmental factors such as sunlight, humidity, wind speed, ventilation method, stoking density, floor structure, availability of shade and puddles in pastured systems, and other factors on the pig side such as breed, age, and body condition; therefore, pigs should be carefully observed to maintain their comfort. In doing so, managers and handlers should maintain temperatures that are appropriate for the developmental stage and genetic characteristics of the breed, and avoid extreme heat, high humidity, and cold by insulation, window openings, ventilation, and airflow.

Since pigs have few sweat glands, it is important to prevent heat stress in the summer. A contingency plan or crisis management manual outlined in Section 6. 3 should include that when the risk of heat stress reaches too high levels, handlers give priority to access to additional water and could include provision of shade and wallows in outdoor systems, planting trees and spraying water around the pig house, reduction of stoking density, fans, cooling pads (heat control device using vaporization heat of water), water-based cooling systems (dripping or misting), and provision of cooling systems as appropriate for the local conditions.

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). In particular, neonates require sufficient measures to maintain warmth due to their underdeveloped thermoregulation functions. Protection can be provided by using heating boxes, heaters (gas brooders, lamps, etc.), heated mats, and extra bedding.

[Actions recommended for future implementation]

None

2. Ventilation

Maintaining good air quality and providing adequate ventilation in pig houses are important for the health and welfare of pigs, as they are effective in reducing discomfort and the risk of disease among the pigs.

The air composition is influenced by stoking density, pig body size, flooring, bedding, manure management, pig house design, and the ventilation system.

In order to provide a constant supply of fresh air and keep a comfortable environment for pigs, adequate ventilation should be provided to remove ammonia, hydrogen sulfide, carbon dioxide, dust, and moisture generated in the pig house to the outdoors. It should also be noted that ventilation during hot weather has the effect of discharging heat in the pig house and helping body heat dissipate by using the airflow from fans, and it is not solely intended to blow air directly to the bodies of the pigs.

In particular, inadequate ventilation leading to the retention of ammonia and other substances inside the pig house poses risks not only to the pigs but also to human health by causing damage to the respiratory organs and other organs. Since ammonia is generated from pig manure, its amount and concentration vary greatly depending on the ventilation system and the manure treatment conditions.

[Actions recommended for implementation]

The ventilation system should be designed to provide a constant supply of fresh air throughout the pig house.

The ammonia concentration in enclosed housing should not exceed 25 ppm at the level of the pigs, at which managers and others working in the house do not experience unpleasant odors, and it is important to provide a constant supply of fresh air and ensure thorough ventilation and manure removal.

[Actions recommended for future implementation]

None

3. Lighting

Pig houses should have appropriate lighting as needed to allow pigs to show behaviors such as feed and water intake normally and to be seen clearly by managers and handlers to allow adequate inspection of pigs.

Although pigs are known to be less sensitive to light, it is recognized that they need a certain level of light for reproduction.

[Actions recommended for implementation]

Indoor systems should have light levels sufficient to allow all pigs to show normal behaviors such as feed and water intake, to see one other, to investigate their surroundings and to be seen clearly by managers or handlers to allow adequate inspection of the pigs.

Lighting should be located so as not to cause discomfort to pigs and should be managed to prevent health and behavioral problems. The lighting regime in pig houses with forced ventilation system should follow a 24-hour rhythm and include sufficient uninterrupted light and dark periods (preferably no less than 6 hours for both) for pig rest and stress reduction.

[Actions recommended for future implementation]

None

4. Noise

Excessive noise can startle pigs, causing sudden movements that may result in fractures, abortions, or other accidents. It may also induce anxiety and fear, increase aggression, hindering normal resting or sleeping, resulting in stress.

[Actions recommended for implementation]

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.

Exposure of pigs to sudden or prolonged loud noises, including those caused by people, should be avoided to prevent stress and fear.

[Actions recommended for future implementation]

None

5. Environment enrichment

To foster the expression of normal behaviors (e.g., exploration, foraging such as rooting, biting and chewing materials other than feedstuffs, and social interactions), reduce the expression of abnormal behaviors (e.g., tail, ear, leg, and flank biting, sham chewing, bar biting, and apathetic behavior), and improve both physical and mental states, it is necessary to increase the complexity of the animal's environment wherein pigs can engage in various activities, behave as they wish, and have their senses stimulated.

[Actions recommended for implementation]

Pigs should be provided with enrichments that aim to improve the physical and mental state of the animal and to improve their welfare through the enhancement of their physical and social environments. Animals should be provided with an environment that provides complexity, manipulability, and cognitive stimulation to foster normal behavior, reduce abnormal behavior and improve their physical and mental state. Examples include:

- sufficient quantity of suitable materials to enable pigs to fulfil their needs to explore and look for feed (edible materials), bite (chewable materials), root (investigable materials), and manipulate materials. Novelty is another aspect that is important in maintaining interest in the provided materials;
- social enrichment that involves either keeping pigs in groups or individually with visual, olfactory, and auditory contact with other pigs;
- 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).

[Actions recommended for future implementation]

None

Section 6. Confirmation of the situation related to animal welfare

1. Confirmation of animal welfare status

It is important to confirm and record the current management of pigs on the farm in order to address the concept of animal welfare appropriately.

2. Inspection and management of equipment

If automated systems for feeding, watering, ventilation, or manure removal are installed, their failures can negatively affect the health of pigs and the rearing environment, and they should be appropriately maintained and managed.

[Actions recommended for implementation]

All facilities should be constructed, maintained, and managed to minimize risks to the welfare of pigs. Additionally, the equipment should be inspected at least once a day to ensure proper operation, considering the frequency recommended by the manufacturer. If any failures are detected, they should be repaired promptly.

[Actions recommended for future implementation]

None

3. Emergency response

Outages of the electricity, water, and feed supply systems may compromise animal welfare. Therefore, to respond to emergencies such as fires on the farm, flooding, power outages, water outage due to natural disasters, and feed supply disruptions due to road conditions, and to prevent adverse effects on the health of pigs and their rearing environment, each farm should take measures such as obtaining contact information for main service providers, considering stockpile of feed and fuel, water intake methods, and equipping their own power generators or alternative systems for equipment like manure removal systems.

[Actions recommended for implementation]

To address the failure of electricity, water, and feed supply systems, as well as to minimize and mitigate the effects of natural disasters or extreme climatic conditions (e.g., earthquakes, fires, droughts, floods, blizzards, typhoons, high temperature stress), managers and handlers should have contingency plans to cover the failure of these systems by being familiar with them and sharing them with all relevant parties, rather than dealing with the consequences of the disaster. The contingency plan or crisis management manual should cover the procedures for euthanasia of sick or injured pigs and the management of the farm in the face of emergency disease outbreaks, consistent with the farm animal hygiene measures of national and prefectural Veterinary Services.

In case of feed shortages due to drought or other reasons, managers and handlers should take measures to minimize the reduction period of feed supply and to mitigate risk of damage to the health and welfare of pigs. Management decisions, including

consideration of the reduction of the herd size, should be made as early as possible.

When reducing the herd size to prevent starvation, methods such as relocation, sale, slaughter, or euthanasia should be taken.

Backup systems such as alarms and generators should be inspected regularly, considering the frequency recommended by the equipment manufacturers.

If there is a risk of damage to pigs or pig houses as a result of natural disasters, preventive measures should be taken in advance whenever possible. Among the advance measures, the evacuation plans should include feasible actions, such as relocating pigs to lower-risk areas on the farm site. In addition, measures to prevent the spread of damage should be implemented after the weather conditions have recovered.

[Actions recommended for future implementation]

None

Section 7. Criteria or measurables for the welfare of pigs

Animal-based criteria can be useful indicators of animal welfare. These criteria can be considered as tools to monitor the impact of design and management, given that both of these can affect animal welfare.

[Actions recommended for implementation]

Consideration should be given to the design of the system and animal management practices. The use of these indicators and their appropriate thresholds should be adapted to the different situations in which pigs are managed, such as regional differences, herd health, pig breed or crossbreed, and climate. Caution should be used when using stereotypies listed in "1. Behavior" as a welfare measure in isolation from other indicators.

1. Behavior

Certain behaviors appear to be indicators of health and good animal welfare in pigs (e.g., play and specific vocalizations).

Certain other behaviors could indicate an animal welfare and health problem. These include sudden immobility, escape attempts, changes in feed and water intake, altered locomotory behavior or posture, altered lying time, postures and patterns, altered respiratory rate and panting, coughing, shivering and huddling, high-pitched vocalizations and increased call rate, increased agonistic (including aggression), stereotypic, apathetic or other abnormal behaviors.

Additionally, 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 behavior itself reduces the underlying motivation. Within a group, individuals that perform stereotypies may thus be coping more successfully than those that do not. Stereotypies indicate either a present problem for the pig or a past problem that has been resolved.

(Examples of normal behaviors)

Exploration, foraging, rooting, biting and chewing materials other than feedstuffs, and social interactions, etc.

(Examples of abnormal behaviors)

Tail, ear, leg and flank biting, sham chewing, bar biting and apathetic behavior, etc.

2. Morbidity and injury rates

Rates of infectious and metabolic diseases, lameness, and peripartum and post-procedural complications, injury and other forms of morbidity, above recognized thresholds, may be direct or indirect indicators of animal welfare at the herd level.

Understanding the etiology of diseases or syndromes 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 health problems for pigs.

Scoring systems, such as for body condition, lameness, and injuries, and information gathered at slaughterhouse/abattoir, can provide additional information.

Both clinical and postmortem pathologic examination should be utilized as indicators of diseases, injuries, and other problems that may compromise animal welfare.

3. Mortality and culling rates

Mortality and culling rates affect the length of productive life and, like morbidity and injury rates, may be direct or indirect indicators of animal welfare at the herd level. Depending on the production system, estimates of mortality and culling rates can be obtained by analyzing the causes of death and culling, as well as their temporal and spatial patterns of occurrence.

Mortality and culling rates, and their causes, should be recorded regularly (e.g., daily) and used for monitoring (e.g., monthly or annually).

Necropsy is useful in establishing the cause of death.

4. Changes in body weight and body condition

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

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 pigs.

5. Reproductive efficiency

Reproductive efficiency can be an indicator of pig health and welfare status.

Poor reproductive efficiency, compared with the targets expected for a particular breed or crossbreed, can indicate animal welfare problems. Examples may include:

- low conception rates;
- high abortion rates;
- metritis and mastitis;
- small litter size (total born);
- low number born alive; and
- high numbers of stillborns or mummies.

6. Physical appearance

Physical appearance may be an indicator of pig health and welfare, as well as the conditions of management. Attributes of physical appearance that may indicate compromised animal welfare include:

- body condition outside an acceptable range;
- presence of ectoparasites;
- abnormal texture or hair loss;
- excessive soiling with feces;
- skin discoloration, including sunburn;
- swelling, injuries, or lesions;
- discharges (e.g., from nose or eyes, including tear staining);
- feet and leg abnormalities;
- abnormal posture (e.g., rounded back, head low); and
- emaciation or dehydration.

7. Handling responses

Improper handling or lack of human contact can result in fear and distress in pigs. Fear of humans may be an indicator of poor animal welfare. Indicators may include:

- evidence of poor human-animal relationship (e.g., marked avoidance of handlers and abnormal or excessive vocalization when being moved or when animal handlers interact with pigs);
- pigs slipping or falling during handling; and
- injuries sustained during handling, such as bruising, lacerations and fractures.

8. Lameness

Pigs are susceptible to variety of infectious and non-infectious musculoskeletal disorders that 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, nutrition, sanitation, floor quality, and other environmental and management factors. There are several gait scoring systems available.

9. Complications from common procedures

Some painful or potentially painful procedures, such as surgical castration, tail docking, teeth clipping or grinding, tusk trimming, identification, nose ringing, and hoof care are performed on pigs to facilitate management, improve human safety or safeguard animal welfare. However, if these procedures are not performed properly, pig health and welfare can be unnecessarily compromised. Indicators of problems associated with these procedures could include:

- post-procedure infection and swelling;
- post-procedure lameness;
- behavior indicating pain, fear, distress, or suffering; increased morbidity, injury, mortality, and culling rates;

- reduced feed and water intake; and
- post procedure body condition and weight loss.

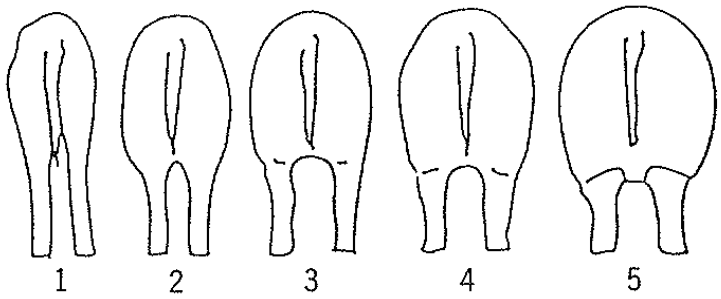
10. Euthanasia

At least, the following reasons may be considered when deciding that euthanasia is appropriate:

- severe emaciation, weak pigs that are non-ambulatory or at risk of becoming non-ambulatory;
- non-ambulatory pigs that will not stand up, refuse to eat or drink, or have not respond to therapy;
- rapid deterioration of medical condition for which therapies have been unsuccessful severe, debilitating pain
- multiple joint infections with chronic weight loss;
- Congenital defects causing weakness and low survival probability piglets that are premature and unlikely to survive, have a debilitating congenital defect, or otherwise unwanted; and
- part of disaster management response.

Appendix I

Body Condition Score (BCS) for Sows



Score	Condition	Body shape
1	Emaciated	Landmark bones (spinous processes and hook bones) are prominent even without palpation
2	Thin	The bones can be easily felt with slight pressure
3	Ideal	The bones can be felt when palpating with firmly pressure
4	Fat	The bones are undetectable with palpation
5	Overly fat	The bones are undetectable with palpation and are heavily covered in fat

(Source: Japanese Feeding Standards for Swine)

Appendix II

Electronic Sow Feeding (ESF) System (Electronic Identification System)

ESF system enables one to provide the required amount of feed to each individual pig through electronic identification by an IC chip, which is attached to the ears of sows and an automatic feeding device with a built-in computer.

This allows for the rearing of large herds of sows (40 to 80 heads).

While no extra facility costs are incurred beyond the feeding equipment and system, it is said that even experienced managers are limited to managing a herd of around 150 to 200 sows.