

PHYSICAL ENVIRONMENT



THE UNIVERSITY of EDINBURGH
The Royal (Dick) School
of Veterinary Studies

The Jeanne Marchig International Centre
for Animal Welfare Education

What you will learn: The way welfare aspects of the physical environment impact on pigs

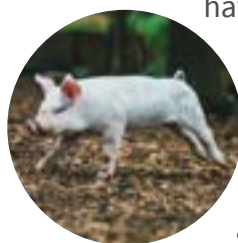
The differences in the life cycle of wild pigs in nature and pigs in commercial farms.

How most commercial farms for pigs are structured and managed.

Main welfare issues to look for in the pig industry and opportunities to promote positive animal welfare.

Outdoor pigs

Pigs in free-range and outdoor systems have more freedom to express natural behaviour (**Behavioural Interactions**); however, they may be subject to extreme weather condition if they do not have access to adequate shelters, increased risks for diseases, and injuries caused by other animals, humans and others (e.g. agricultural equipment or vehicles), predator attacks and thefts. Pigs are very sensitive to extreme temperature changes, predisposing them to neonatal hypothermia in piglets and hyperthermia in adulthood. These states can trigger physiological



alterations and increase risk of disease and mortality due to thermal stress. Alongside an increased thermal risk from natural temperature fluctuations outdoors, pigs exposed to sun have increased risk of sunburn. Different breeds of pig have different sensitivities to this; with pigs with coloured coats suffering less. Allowing pigs access to a wallow (a shallow muddy pool) can reduce the risk of sunburn. The outdoor system has a more complex environment compared to the indoor system, providing pigs with a range of sensory stimuli, spatial dimensions, and opportunities to interact with materials, root in substrate, social interactions, novelty and cognitive challenges. Interactions with complex environments allows opportunities for pigs to experience positive emotions and is associated with improved brain health and immune function.



Confinement systems

Indoor management systems have the benefit of eliminating the impact of outside weather conditions and allows more control of climate conditions. Trade-offs of these system for the physical environment can mean space is often very limited in confinement systems, and animals may not be able to exercise or escape others who are being aggressive, resulting in high levels of aggression and other damaging behaviours (**Behavioural Interactions**). In addition, there might be a higher incidence of respiratory and digestive diseases in indoor systems than in outdoor systems, mainly because of higher stocking densities and risks of poor ventilation, giving higher concentrations of air pollutants (dust, stable gases) (**Health**). Injuries caused by other animals, humans and agricultural equipment or vehicles can also happen in confined systems.

Sows and gilts

About a week before farrowing, sows/gilts enter the farrowing unit to give birth either in a farrowing crate (main housing system globally) which restricts the movement of sows/gilts, or in an individual farrowing pen where sows/gilts have some space for movement and some bedding materials. The farrowing crate is the most common housing for farrowing sows/gilts, which is a similar design to the gestation stall (**Restriction of natural behaviour in gestational stalls**) except it is fixed within a slightly larger pen to accommodate a litter of their piglets during lactation. The floors are partially slatted to allow dung and urine to drop easily into a slurry collection tank underneath the unit. The crate is designed to reduce piglet mortality by reducing

accidental over-lying/crushing of piglets by the sow, providing optimal microclimate for piglets and allowing for safe interventions by humans. However, this represents significant welfare challenges for the sow, and still does not completely prevent piglet mortality. Evidence demonstrates that piglet mortality in conventional crates averages the same as piglet mortality when pigs are raised under outdoor conditions. Advances in farrowing system design have been successful in creating environments that allow the sow freedom of movement whilst still providing features to protect the piglets. Welfare issues and possibilities for farrowing/lactating sows in farrowing crates will be discussed in more details in **Behavioural Interactions**.

Piglets

There is a growing body of evidence that shows substantial impacts of early life events on the development of behaviour, physiology and cognition in young animals. Both physical and social environments in the first weeks of piglet life (e.g. from birth to early post-weaning) can have life-long effects on the brain development – including the development of stress regulation systems, cognitive abilities, associations formed during early learning, social skills, and cumulative effects of experienced emotional states. All of which affect pig behaviour and welfare.

Aspects of the physical environment that lead to these life-long effects includes space allowance, bedding materials, smells and thermal conditions, and examples of social environment includes the presence of the mother and siblings, (re) grouping with unfamiliar piglets after weaning, and interactions with human. Social environment and its welfare challenges will be discussed in **Behavioural Interactions** section.



Piglets are born in the farrowing crate or pen and stay for about the first 4 weeks of life with the mother, and are able to freely move in the crate/pen. At weaning, the same litter of piglets are moved to a group pen, where they stay with the same litter or are mixed with other litters of piglets of similar age/size.

They may be moved into different pens and mixed with other groups during the weaner/finisher stage until they are transported for slaughter. The type of pens used for this stage varies in size and can vary from solid or slatted floors without bedding through to large pens of pigs on deep bedding.



Compared to the solid flooring system, pens with fully slatted or partially slatted floors are easier to maintain high levels of hygiene and control climate conditions, which reduces the risk of infectious diseases and heat/cold stress. However, they often lack bedding materials, as these can be difficult for waste management ('slurry system').

Pens with deep bedding materials promote piglets to engage in natural behaviour, such as exploratory and rooting behaviours (**Behavioural Interactions**) but are more labour intensive in terms of maintaining high levels of hygiene and optimal climate conditions, which leads to heat/cold stress and higher risk of diseases. Lack of sufficient biologically relevant rooting materials is an important risk factor for the development of tail biting (**Painful Procedures in Health**) and constitutes a welfare risk as pigs cannot express their behavioural need for exploration with their snout.

Piglets that experience enriched neonatal environments play more, which is associated with better social and cognitive development (positive affective states). There are also growth rate advantages compared to piglets reared in barren environments, and an increasing body of evidence suggests that environmental enrichment for new-born piglets can enhance the robustness of a piglet's immune system.

The lack of environmental stimuli caused by barren early environments (e.g. barren farrowing pen) can

inhibit normal brain development. However, if the quantity of enrichment materials is insufficient (e.g. single straw dispenser per pen for weaned piglets), it may not benefit welfare or may even lead to added stress due to competition. Providing large amounts of enrichment material is not feasible for many farmers. However, small amounts of good quality enrichment can have a significant benefit. For example, providing straw in raised racks can help to reduce tail biting without impeding waste management systems.



CC-BY-NC: ILRI/Tu Mai

Key points for maximising positive effects of environmental enrichment:

- Regularly replenished enriched materials
- Sufficient volume of enriched materials to avoid competition
- Provision of suitable enriched materials according to the housing system

The Jeanne Marchig International Centre for Animal Welfare Education

E: JM.Welfare@ed.ac.uk

W: www.ed.ac.uk/vet/jeanne-marchig-centre

© University of Edinburgh, CC-BY-NC



THE UNIVERSITY of EDINBURGH
The Royal (Dick) School
of Veterinary Studies

The Jeanne Marchig International Centre
for Animal Welfare Education

