



# **Opinion on Free Farrowing Systems**

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**Farm Animal Welfare Committee,  
Area 4B, Nobel House,  
17 Smith Square,  
London, SW1P 3JR.**

## FAWC Opinions

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The Farm Animal Welfare Committee is an expert committee of the Department for Environment, Food and Rural Affairs in England and the Devolved Administrations in Scotland and Wales. Information about the Committee can be found at: <https://www.gov.uk/government/groups/farm-animal-welfare-committee-fawc>.

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<sup>1</sup> Where we refer to "Government" we are addressing the Department for Environment, Food and Rural Affairs in England, the Scottish and Welsh Governments and other responsible Government Departments and Agencies.

## **Opinion on Free Farrowing Systems**

### **Scope**

1. The UK indoor pig industry has relied on close confinement of sows in farrowing crates during the farrowing and lactating period for the last 50 years. During that time, farrowing crate design has varied and evolved, and while many attempts have been made to farrow sows indoors without close confinement, no such system has been adopted commercially until recently. This Opinion will review recent developments in indoor farrowing, considering outdoor systems only for comparison.

2. The objectives of this Opinion will be:

- To examine the free farrowing (sometimes called ‘loose farrowing’) systems that have been developed in research or commercially and correlations between research and commercial experience;
- To explore those aspects of free farrowing that influence sow and piglet welfare and how they interrelate, e.g. total freedom vs partial/temporary confinement, flooring systems, handling of sows and litters (implications for both stockpeople and pigs), usable space, breed;
- To explore the production advantages and disadvantages of free farrowing for sows, e.g. disease control and hygiene, piglet mortality, sow appetite, milk production, piglet growth;
- To explore breed/genetic influences;
- To investigate the welfare outcomes for sows, e.g. freedom to move, opportunity to express other behaviour (including social behaviour), lesions;
- To investigate the welfare outcomes for piglets, e.g. mortality, injury, disease, growth/weaning weight, behaviour;
- To explore the cost of installation of free farrowing housing compared to existing systems, and other economic factors such as labour requirements;
- To consider how take-up might be encouraged, if there are welfare benefits but economic barriers to adopting free farrowing systems.

### **Background**

#### **Number of animals involved, duration and extent of welfare issues**

3. The UK female breeding herd is somewhat over 400,000 sows and served gilts, with approximately 60% housed<sup>2</sup>.

4. The norm on the indoor pig breeding farm is for sows to be confined in farrowing crates from up to a week before farrowing and until weaning (up to 28 days after farrowing), or longer for sows fostering a second litter (see paragraph 16). Recent scientific research and industry innovation has led to the development of more open systems for farrowing sows that are just reaching the market or are involved in commercial trials.

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<sup>2</sup> Pig Health and Welfare Council. Biennial Report 2013-2014. July 2015

5. The principal rationale for farrowing crates was to preserve piglet life by reducing crushing (due to the sow being about 150 times the size of the offspring) and other injuries, to ease handling of sows and litters and improve safety for stockpeople. However, there are conflicting interests of sow and piglet welfare where the sow in a crate has her mobility reduced and her ability to express behaviour such as nest building frustrated.

### **Legal context**

6. The Welfare of Farmed Animals (England) Regulations 2007 (as amended) (and similar legislation in Scotland and Wales) provide protection for the welfare of farmed animals. Schedule 8 of these regulations covers the additional welfare requirements for the keeping of pigs and implements Council Directive 2008/120/EC (a codified version of previous EU legislation laying down minimum standards for the protection of pigs).

7. Schedule 8 requires that accommodation must allow pigs to turn around without difficulty at all times; that the dimensions of any accommodation used for holding individual pigs must be such that the internal area is not less than the square of the length of the pig; and no internal side is less than 75% of the length of the pig. However, this does not apply to a female pig for the period beginning 7 days before the predicted day of farrowing and ending when the weaning of her piglets is complete, or if the pig can enter or leave a crate or pen at will.

8. The legislation requires the provision of nesting material unless it is not technically feasible for the slurry system used. Farrowing pens where sows or gilts are kept loose must have some means of protecting the piglets, such as farrowing rails, as well as a source of heat and a solid, dry and comfortable lying area for the piglets. Where a farrowing crate system is used, the piglets must have sufficient space so they can be suckled without difficulty.

9. The Code of Recommendations for the Welfare of Livestock: Pigs<sup>3</sup> sets out the legislative requirements, and suggests good practice in terms of body condition at farrowing; farrowing accommodation construction and space sufficient to allow the sow to rise up and lie down without difficulty; provision of nesting material to minimise stress; the different environmental requirements of the sow and litter; the security of heat sources; and stockperson competence.

### **International considerations**

10. Norway, Sweden and Switzerland have banned farrowing crates. Free farrowing systems are also being developed and marketed in other European countries, particularly Denmark and the Netherlands, and there is interest in Australia and discussions on this issue in the USA.

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<sup>3</sup> <https://www.gov.uk/government/publications/code-of-recommendations-for-the-welfare-of-livestock-pigs>

## **Commercial interests and developments**

11. The 20:20 Pig Health and Welfare Strategy<sup>4</sup> published by the British Pig Executive (BPEX - now AHDB Pork, the industry's levy and support body in England and Wales) in 2011 committed the industry to focus on 'finding solutions to ... freedom around farrowing'. A number of commercial UK producers and smallholders have installed free farrowing systems, either alongside crate systems or in their place. Some retailers are supporting trials of free farrowing systems to build a data-set that might persuade the industry toward adopting non-crate systems. Some assurance standards, e.g. RSPCA Assured (formerly Freedom Food), already require sows to be able to turn around freely at all times (without hindrance from fixtures or fittings in the pen)<sup>5</sup>.

## **Farrowing systems**

### **Historical context**

12. Prior to the middle of the 20<sup>th</sup> century, pig keepers on UK farms took a traditional approach with small breeding populations, extensively kept and often fed at least in part on waste food. The 1960s saw a revolution in pig keeping with populations increasing on individual farms, tighter management control of breeding and feeding, greater use of specialist compound diets and an overall intensification. Herds started to be kept wholly indoors.

13. At this time there was a drive to increase productivity and this was seen to require greater control of the farrowed sow. This was achieved by segregation and increasing confinement of the sow during the farrowing period and beyond. In many early systems the sow was confined in a crate for farrowing, and once the litter was established (at around 3-5 days) either the crate was removed to leave the sow and litter in an individual pen (e.g. Solari system) or the sow and litter were moved to an individual rearing pen (sty) until weaning. With time, the majority of indoor herds changed to a system of close confinement of the farrowed sow and litter through to weaning.

14. Under the Welfare of Farmed Animals (England) Regulations 2007 piglets must not normally be weaned from the sow at an age less than 28 days. However, they may be weaned earlier if the health or welfare of the sow or piglets would otherwise be adversely affected, or if certain housing or husbandry practices are met.

15. In practice, with weaning typically occurring on a single day each week there will be a range of ages of pigs at weaning. We were informed during consultations that the average weaning age for the UK in 2013 was nominally about 26 days, meaning that pigs typically ranged from 22-30 days of age at weaning and the sow would be restrained in a farrowing crate for this time.

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<sup>4</sup> <http://pork.ahdb.org.uk/media/2233/2020-pig-health-and-welfare.pdf>

<sup>5</sup> <http://science.rspca.org.uk/sciencegroup/farmanimals/standards/pigs>

16. Furthermore, husbandry practices of fostering and batch farrowing (every few weeks rather than weekly) can extend this range even further. An individual sow may rear a second consecutive litter as a foster sow, thus remaining restrained for up to 9 weeks in total.

17. Despite the growth of the commercial outdoor pig breeding sector in the UK over the last 25 years, such that currently approximately 40% of sows are kept outdoors, the majority of the remaining 250,000 or more sows kept indoors will be subject to close confinement in a farrowing crate for the full duration of lactation. This is the norm in most major pig keeping industries throughout the world.

18. In discussing the close confinement of sows the Brambell Report (1965)<sup>6</sup> stated that:

*“The farrowing sow is often still more closely confined in the interests of the piglets but to this we do not object as it is only during the period of parturition and the succeeding few days.”*

However, research has now shown that peak nesting behaviour occurs during these days. Furthermore, sow confinement in farrowing accommodation has since extended well beyond “a few days”.

19. Over the last 30 years or so, individual farmers have developed and tried various free farrowing systems, largely driven by the desire to create a differentiated market or to obtain the marketing premium that the outdoor sector has enjoyed. The RSPCA Welfare Standards for Pigs as applied by Freedom Food used to allow the crating of the sow up to 5 days after farrowing (2010/2012 Standards) but this was withdrawn at the end of 2013 with crating no longer permitted at all. The RSPCA has reviewed the technical aspects of its standards with respect to free farrowing and issued an amendment<sup>7</sup>.

20. Systems such as the Farrowing Nest were tried for groups of unconfined sows, but these were generally unsuccessful, resulting in high levels of disease, mis-mothering and piglet deaths, and have largely fallen into disuse. A number of Solari systems still exist, particularly in southwest England, with or without a removable farrowing crate.

21. A general observation from our consultations is that straw yard or group farrowing systems are not suitable, that solitude at farrowing is desirable or essential, and most producers provide this.

22. Major changes occurred to the UK pig industry in the late 1990s. Amongst these, two significant changes were a ban on close confinement and tethering of pregnant sows in 1999 (in advance of EU requirements), and a collapse in the market for pigmeat in the autumn of 1998<sup>89</sup>. The overall result

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<sup>6</sup> Report of the Technical Committee to enquire into the welfare of animals kept under intensive livestock husbandry systems. Chairman: Professor F. W. Rogers Brambell. Cmnd. 2836, December 3 1965. Her Majesty's Stationery Office, London.

<sup>7</sup> <http://science.rspca.org.uk/sciencegroup/farmanimals/standards/pigs>

<sup>8</sup> <http://www.parliament.uk/business/committees/committees-archive/environment-food-and-rural-affairs/efra-pig-industry/>

was a considerable reduction in the UK sow population with the majority of the decline seen in the indoor sector.

23. In the last 10 years or so, as a result of market pressures, ethical concerns and potential for legislation, renewed interest has been shown in developing alternatives to the farrowing crate that do not routinely confine the sow throughout farrowing and lactation. This desire was recognised by BPEX (now AHDB Pork) in 2011. A variety of systems has developed around the world in the last 10-15 years (Table 1).

Table 1. Examples of free farrowing systems developed in research facilities or on farms (from various sources). The terms Complex and Open pen are explained below.

Name	Where	Date/duration	Type
PigSAFE	UK	2008 onwards	Complex pen
Hut and Run	UK	2004 onwards	Indoor arcs (or arks)
360° Farrower	UK	2009 onwards	Open pen
Werribee Farming Pens	Australia	2000-2008	Complex pen
Danish Freedom Farrower	Denmark	2009-2010	Complex pen
SWAP (Sow Welfare and Piglet Protection) (Combi-pens)	Denmark	2011	Complex pen
UMB Pens	Norway	2007	Complex pen
FAT 1 and 2	Switzerland	2000-2008	Complex pen
Get Away Pens	Canada	1998	Complex pen
Mushroom Pens	UK	2004	Open pen
Farrowing Nests	UK	1990s	Communal farrowing

## Current systems

24. Farrowing crates are still being installed and used on many farms as the industry norm at a global level. There is a wide variation in crate design, pen size and shape, flooring, bedding provision and creep area design, which complicates comparison with free farrowing systems.

25. As part of FAWC's investigation we have received detailed information on three major types of non-confined farrowing accommodation. Hut and Run is the simplest, with the sow farrowing and rearing her litter in an indoor arc (a farrowing hut, with or without insulation, on a concrete floor within a barn). Occasionally these arcs may be in groups, but in line with the trend in outdoor farrowing management most provide an individual area for each sow separate from others. Several of these systems are believed to exist but information provided suggests they are largely restricted to smaller herds (200 sows or less) and are present on a number of educational farms.

26. A second approach is to adapt the same footprint as a conventional farrowing pen with crate (typically 1.6-1.8m wide by 2.4m long), perhaps using existing buildings (sometimes called retro-fitting), thus keeping the same number of farrowing spaces. The pen may contain a crate, but if so it can be moved or opened, to allow confinement of the sow (for example during the perinatal period) but also to allow the sow free access to the whole pen. We were told that in practice the crate is usually only closed to control the sow for

<sup>9</sup> <http://pork.ahdb.org.uk/prices-stats/industry-structure/uk-pig-breeding-herd/>

handling; the majority of sows farrow and suckle completely unrestrained. Although different areas of the pen may have different features they are generally not sub-divided. This system we have termed the Open Pen approach.

27. A third approach we have termed a Complex Pen: a pen sub-divided to offer different areas for sows and piglets and/or different activities. A number of these have been researched and developed in different countries (Table 1).

28. The “PigSAFE” (Piglet and Sow Alternative Farrowing Environment) is a Complex Pen system developed in a Defra funded project by Newcastle University and Scotland’s Rural College (SRUC) at Edinburgh, involving detailed observational studies of sows and litters<sup>10</sup>. In the basic design, each unit occupies 3.7 x 2.4m, more than twice the area of a conventional farrowing pen. There is an enclosed, heated creep area for piglets, a solid-floored bedded area for the sow with sloping walls which is separated from the dunging area with a single nest entrance to provide enclosure, and a slatted feeding and dunging area including a feeding stall, in which the sow can be confined for management tasks.

29. Some farms have installed small numbers of Complex Pens to investigate their suitability, and in at least two cases retailer support has enabled more extensive and prolonged investigation. It is clear that producers have tried to achieve acceptable welfare and production standards and to this end some adaptations and alterations to the original PigSAFE design have been made, including removal of feeding crates and alteration of nest sizes. In Complex Pen systems experience has shown that the details of the design are important to stimulate good maternal behaviour and small changes may alter system success (see paragraph 36).

### **Design considerations**

30. After overall design, the most important decisions concern flooring, bedding and space. The RSPCA Welfare Standards for Pigs applied by RSPCA Assured (to which many farms operating free farrowing aspire) require solid flooring in the lying area. This can lead to manure accumulation (see the System Performance section). However, bedding material is generally provided, for comfort and to enable behaviour including nest building. If a partially or wholly slatted or perforated floor is provided to allow manure to drop into a tank below, the disposal of waste becomes an issue when straw is provided. Depending on the material used, it may not be practical to store mixed slurry and bedding under the slatted area and so flushing systems may be required. These add to installation costs by requiring the construction of new buildings.

31. The size (‘footprint’) of the whole pen or the nest area is important for both performance and welfare. This affects installation and capital costs and the number of units of a specific pen design which can be fitted in a house.

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<sup>10</sup> Project AW0143 <http://www.freefarrowing.org/freefarrowing/>



This is particularly relevant to producers who wish to convert from conventional farrowing pens with crates but to keep the same footprint.

32. There is no standard approach to organising farrowing, and performance and welfare are affected by factors such as herd size, farm layout, room layout (including the number of farrowing places), feeding, cleaning and monitoring systems, and farm-specific management practices adopted at farrowing, fostering, weaning and so on.

### **System performance**

33. Performance data for the types of system investigated (stillbirth rates, mortality including causes of death, growth rates, weaning weights, treatment levels, sow injuries) are limited, and where they exist are often not recorded in a way which allows direct comparison between systems.

34. Very few performance figures are available for Hut and Run systems, nor data that would allow comparisons with the outdoor systems on which these are based. We were told at consultations that Hut and Run systems frequently suffer from poor hygiene and difficulty in actively managing the sow and litter, resulting in disease, increased mortality and poor performance.

35. Limited data are available for Open Pen systems. Some sows are restrained at farrowing and for up to 72 hours afterwards. In small scale comparisons with farrowing crates on the same farm, piglet mortality has been equal or occasionally better (lower), and the 26 day weaning weight has been increased by up to 1kg (approximately 15%) in some cases. Some producers told us that piglets from Open Pens grow faster after weaning than those from crated systems, but no systematic data on this are available.

36. Complex Pens achieve comparable and acceptable performance to crates in research environments with high levels of management, but these have not yet been realised consistently in commercial environments. In Complex Pens installed on farms, mortality was reported to us (through consultations and at visits) to be variable but, in some cases, equivalent to or lower than that in farrowing crate systems. Exact design does seem to matter to results in Complex Pens. Some Complex Pen designs can produce results similar to crated systems but adaptations used in commercial trials have been reported to have higher mortality and lower weaning weights. It is difficult to be definitive about what is increasing mortality as there are so many factors involved. For example, perhaps surprisingly, increasing nest size tends to increase mortality<sup>11</sup>.

37. Few farms to date use only free farrowing. Comparisons between different systems on the same farm are possible, but are affected by the fact that sows do not experience the same system for all their parities: each is more-or-less randomly assigned to either a crate or a free pen for each

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<sup>11</sup> EM Baxter, OO Adeleye, MC Jack, M Farish, SH Ison and SA Edwards 2015 Achieving optimum performance in a loose-housed farrowing system for sows: the effects of space and temperature. *Applied Animal Behaviour Science*, 169, 9–16.

farrowing. It is therefore difficult to assess whether sows can adapt to free systems over their lives, with better performance resulting. However, Complex Pens are reported to be widely employed on a whole farm basis in Denmark, with varied reports of mortality<sup>12</sup>.

38. In all systems, hygiene was highlighted as critically important and a view offered to us at consultations and farm visits was that when floors were predominantly solid this has the potential to cause greater faecal contamination and wetness, and hence more disease in piglets and need for treatment.

39. Biting of piglets by their own mother causing injury or death (savaging) was reported to be rare in free farrowing systems and published research<sup>13, 14</sup> suggests that when it does occur it is less intense and of shorter duration. Savaging is believed to be affected by body condition (particularly in gilts), feed and water availability and gut fill, as well as genetics, so some effects of systems may be indirect.

40. Sows suffer a range of injuries by interaction with the floor, pen furniture and piglets, including shoulder sores (by abrasion or pressure necrosis), leg injuries (skin damage or internal joint damage) and teat damage. Injuries were claimed to be less common and less severe with free farrowing systems than with crates, but no data were available. Lower leg abrasions were not seen in free systems; shoulder sores were seen but might have originated in previous lactations. To avoid these, the floor should provide sufficient friction to prevent sows slipping, but not be abrasive. This may be a more important welfare consideration than whether the sow can turn around.

41. Free farrowing sows we observed were calm, and were reported to be active in nest building prior to farrowing.

42. The free farrowing systems we observed had high pen divisions to prevent the sows getting out, and this limits contact between sows. It is not clear whether this has implications when sows are mixed after weaning. High pen sides may also affect ventilation and hence pen wetness. Vertical bars above solid divisions (which only need to be high enough to restrain piglets) may be preferable for these reasons.

43. The only production data available to FAWC came from individual farms on which the different free farrowing systems have so far been implemented. No advantages or disadvantages could be consistently identified in any particular system.

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<sup>12</sup> [http://en.fvm.dk/fileadmin/user\\_upload/ENGLISH\\_FVM.DK/Themes/animal-welfare/2015-075\\_IPWC\\_Abstract.pdf](http://en.fvm.dk/fileadmin/user_upload/ENGLISH_FVM.DK/Themes/animal-welfare/2015-075_IPWC_Abstract.pdf)

<sup>13</sup> Baxter E M; Lawrence AB & Edwards SA 2011 Alternative farrowing systems: design criteria for farrowing systems based on the biological needs of sows and piglets. *Animal* 5, 580-600.

<sup>14</sup> Sarah H. Ison, Cynthia M. Wood, Emma M. Baxter, Behaviour of pre-pubertal gilts and its relationship to farrowing behaviour in conventional farrowing crates and loose-housed pens, *Applied Animal Behaviour Science*, Vol 170, September 2015, 26-33

## **Advice by FAWC and EFSA**

44. A FAWC Assessment of Pig Production Systems in 1988<sup>15</sup> made brief comment about farrowing crates for sows and gilts, but made no recommendation. There has been no subsequent advice from FAWC.

45. A Council of Europe Recommendation concerning pigs was adopted on 2 December 2004<sup>16</sup>. This recognised that sows and gilts could be kept in individual stalls in the week before farrowing but called for free housing systems for sows to be the aim in the perinatal and suckling periods.

46. A Scientific Opinion of the EFSA Panel on Animal Health and Welfare on animal health and welfare aspects of different housing and husbandry systems for adult breeding boars, pregnant, farrowing sows and unweaned piglets was published on 10 October 2007<sup>17</sup>. This Opinion's conclusions included:

- Housing sows in farrowing crates severely restricts their freedom of movement, increasing the risk of frustration;
- The motivation to nest build is high whether housing allows for it or not, so lack of nesting material is very likely to cause stress and impaired welfare;
- Piglet welfare and mortality remain major problems. Mortality is multifactorial and causes vary between different farrowing systems.

47. EFSA's recommendations included that:

- Farrowing systems should allow for the handling of destructible material and take account of the welfare of piglets in nest building activities;
- Free housing should only be implemented if piglet mortality is no greater than the mean level in confined systems;
- Large-scale epidemiological studies should cover the wide range of factors that impact the welfare of sows and piglets in farrowing systems, some of which favour the welfare of sows and others that of the piglets;
- Research was required:
  - To assess the requirements for manipulative materials and quantify the detrimental effects of not being able to express nest building behaviour;
  - To evaluate the impact of crates on sow-piglet interaction;
  - To assess the impact of maternal ability on piglet welfare;
  - To pursue the causes of piglet mortality in different types of farrowing system.

48. It is noted that EFSA's recommendation that "Free housing should only be implemented if piglet mortality is no greater than the mean level in confined systems" requires accurate data to be available to allow robust comparisons

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<sup>15</sup> Farm Animal Welfare Council. Assessment of Pig Production Systems. February 1988

<sup>16</sup> [http://www.coe.int/t/e/legal\\_affairs/legal\\_co-](http://www.coe.int/t/e/legal_affairs/legal_co-)

[operation/biological\\_safety\\_and\\_use\\_of\\_animals/farming/Rec%20pigs%20rev%20E%202004.asp](http://www.coe.int/t/e/legal_affairs/legal_co-operation/biological_safety_and_use_of_animals/farming/Rec%20pigs%20rev%20E%202004.asp)

<sup>17</sup> <http://www.efsa.europa.eu/en/efsajournal/doc/572.pdf>

between systems, and has the potential to stifle innovation in free farrowing system development.

### **Welfare of sows and piglets**

49. The decision to adopt any particular system of production will be based on a multitude of factors including finances, morbidity, mortality and welfare considerations for both the piglets and the sow, practicality and precedent, as well as equipment availability, space constraints and legal requirements.

50. In the case of farrowing accommodation these factors will continue to be present whilst other factors have influence on the animals, the producer and the consumer in relation to decisions on practical, economic and welfare considerations for farrowing systems. During stakeholder discussions, a number of factors were identified that are addressed below. What is not apparent is the relative weight or importance that can be ascribed to the different factors, and it is this that is the core of the difficulty in achieving consensus.

51. A farrowing pen contains one sow and multiple piglets, confined for up to about 28 days (longer for the sow if she is used to foster a further litter). However, relative weighting of sow and piglet welfare is clearly not just about numbers. For example, a crated sow experiences acute physical restriction, at repeated farrowings, while the piglets can move around the whole pen. Injury and mortality of piglets has a high welfare and productivity impact. Balancing different welfare costs and benefits to different individuals is very difficult.

52. Some observers criticise early weaning, and FAWC has supported such criticism<sup>18</sup>, but late weaning can lengthen sow confinement. Again a judgement needs to be made on the balance of welfare costs and benefits to sows and piglets.

### **Welfare considerations for the sow**

#### *Confinement*

53. Confinement of the sow for more than a few days is a significant restriction of behaviour. Some current farrowing systems do not permit any full turning around, some systems may restrict turning for a period and then are opened to allow full turning within a day or so of farrowing, and some systems allow unrestricted turning at all times.

54. To offer the same degree of comfort, larger sows must be given more room than smaller sows. The physical restriction of all sows in conventional farrowing crates is significant. There may be limited capacity to move forward or backward, difficulty in standing up and lying down, and in extreme cases injuries can result where the sow is simply too big for the crate. Most sows in

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<sup>18</sup> Farm Animal Welfare Council. Assessment of Pig Production Systems, February 1988

2015 are longer and taller than those used 15 years ago, and may be farrowing in crates designed for smaller sows<sup>19</sup>. The crated sow is unable to react to changes in the environment by moving, or to interact fully with her piglets.

### *Comfort*

55. When possible, pigs make choices for thermal and physical comfort (for example, avoiding draughts). Different farrowing systems limit such choices to variable degrees, and opportunities for comfort could be offered by the use of mats, bedding material, cooling pads, and lying surfaces designed to allow the sow to lie, sit and stand with minimal damage.

56. The capacity for the sow to find comfort will be greatly influenced by the nature and interaction of the bedding (if any) and the floor surface provided. These factors may directly affect injuries, hygiene, and the ability to express behaviours; for example, the availability of material to form a bed is considered of significant behavioural and comfort value. How bedding (if used) integrates with manure handling systems will affect how successful the system is in providing both comfort and practical management. We were informed during a visit that the flushing system fitted under slats at that premises had shown a reduction not only in ammonia levels but also in fly populations.

57. Legislation requires there to be no sharp edges accessible to pigs. However, skin, shoulder, hock and foot lesions are relatively common in sows. These may not be due to sharp edges *per se* but to the hard nature of the environment. Several of these injuries are particularly linked with farrowing crates, and there were claims from those consulted/visited of reduced shoulder sores in free farrowing systems. With reduced restriction, lower incidences of skin lesions and lameness are also likely.

### *Nesting and suckling*

58. Restriction of nest building is stressful. The behaviour is dependent on availability both of nesting material, such as straw, and of sufficient space to perform nest building activity prior to farrowing. The sow's ability to interact with her piglets, including for suckling, is also affected by the amount of space and by the presence of physical restrictions such as bars, but the implications of this for her welfare are not known.

59. Removal of a sow's litter at weaning time or before and its replacement with a second younger litter or a made-up litter of excess piglets from other later-farrowing sows (referred to as shunt, bump or late fostering, with nurse sows) is common practice. It increases the duration of the lactation and extends the time for which the sow is in the farrowing accommodation but increases the chances of piglets from sows with large litters or restricted milk supply to survive.

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<sup>19</sup> V.A. Moustsen, H.P. Lahrmann, R.B. D'Eath, Relationship between size and age of modern hyper-prolific crossbred sows, *Livestock Science*, Vol 141, Iss 2-3, Nov 2011, 272-275

### *Feeding*

60. Sows need an appropriate quantity and quality of feed to produce milk and maintain body condition. Access to feed is important, but maximising this should not dominate pen design as freedom of movement is also important. Some designs have two sows sharing a trough. Free farrowing was reported to us by farmers consulted/visited to increase both feed intake and milk production.

### *Disease*

61. The choice of farrowing system may have impacts on disease through differences in hygiene (e.g. reduced slatted floor area for removal of faeces), ease of contact between stockpeople and sows, movement by the sow, or through capacity for the sow to make thermal and physical comfort choices, hence influencing disease susceptibility. The design of farrowing system needs to be hygienic to reduce disease challenge and build-up of antimicrobial use.

### *Grouping*

62. Mixing sows post weaning can cause aggression. Systems that allow either the formation of stable groups of sows moving out of the farrowing accommodation, or contact between sows before creating new groups, help to reduce fighting. Some free farrowing systems allow contact between neighbours. Other approaches include letting sows into passages before weaning to allow such contact, and use of 'contact pens.'

## **Welfare considerations for the piglets**

### *Mortality*

63. National levels of pre-weaning mortality supplied by AHDB Pork are considered high compared to other livestock sectors. Any management practice that does not achieve the same or better levels of mortality than previous methods is not likely to provide higher piglet welfare. However, in commercial circumstances it is difficult to meet the EFSA recommendation that "Free housing should only be implemented if piglet mortality is no greater than the mean level in confined systems." It may be that lower mortality can be achieved with experience and refinement of free farrowing systems, but that trials in which mortality can be higher may be needed to achieve this.

64. Pigs have more offspring per litter, which are less developed at birth than other livestock, and their wild relatives also have higher neonatal mortality than some species producing single offspring. High mortality should be neither commercially nor ethically acceptable in the controlled environment of farming, but it is not known what is the minimum consistently achievable.

65. In any farrowing system, most deaths occur during the first 72 hours of life, either from crushing (overlying or trampling) or from hypothermia or starvation, or both. The potential advantages of increased stockperson supervision require further investigation, as 24 hour cover may be beneficial, although probably uneconomical on all but the largest farms. Pen design should address causes of mortality. We were told by farmers during visits that increased pen size has been linked to increased mortality in the first few hours of life, possibly due to piglets straying from the sow and the warm creep area. If crates are used, however, a supplementary heat source is sometimes placed at the rear of the sow to dry her piglets after birth, which may reduce mortality.

### *Suckling*

66. It is unlikely to be possible to design a system in which piglets can suckle with absolutely no risk of crushing, so an appropriate balance between teat access, piglet protection and restrictions to both sow and piglets should be sought. Any factor which limits piglets' ability to suck freely, such as obstructing bars or an inability of the sow to present the udder conveniently, is likely to increase morbidity and mortality of piglets.

67. When high numbers of piglets are born, this sometimes leads to increased aggression between siblings at the udder and to lower weaning weights. We have seen no evidence to indicate that free farrowing may reduce these problems, although easier access to the udder might reduce aggression.

### *Savaging*

68. Savaging, where sows attack and kill their own piglets, was reported in consultations to be less common in free farrowing than in confined systems. Causes of savaging are not well understood, but one factor may be inability of the sow to interact fully with the piglets (see also paragraph 39).

### *Disease*

69. Systems which create poor hygiene and lead to increased use of medicines should not be used. One of the major diseases that piglets face is coccidiosis, which is almost entirely preventable by effective hygiene measures, often in combination with strategic anticoccidial treatment.

## **Impacts on the stockperson that affect pigs**

### *Safety and ease of management*

70. The safety and welfare of stockpeople is important, and should be a consideration in the design of any farrowing system. Furthermore, if stockpeople are not able to perform tasks which require good access to the animal, this will compromise animal welfare. The actual and perceived safety of the stockperson are critical in ensuring that the animals can be tended.

71. Stockmanship<sup>20</sup> is key to all livestock systems. Farrowing a sow in a crate is very different to overseeing it in free farrowing, and workers may be initially reluctant to change their work routines, even if evidence suggests that change might improve production or welfare.

### *Training*

72. Appropriate training is needed for staff who use farrowing equipment, including training in the maintenance of hygiene and comfort in the systems in use.

### *Time*

73. Staffing levels need to allow sufficient time for operations to be carried out without compromising either pig welfare or stockperson wellbeing. The size of the farm may be a factor in this, as larger units may be of sufficient size to warrant 24 hour cover.

74. If time has to be spent cleaning out pens and administering medicine as a result of poor hygiene, this will reduce the time available to tend to animals. Conversely, if resource can be provided for sufficient time to clean pens and maintain a hygienic farrowing environment, this will reduce the time and money spent treating and managing sick animals.

## **Financial information**

75. An evaluation of the cost per sow per year of different indoor systems, based on annualised capital costs provided to FAWC by Newcastle University and SRUC<sup>21</sup>, indicated that the installation cost was £368 for a traditional farrowing crate, £425 for an Open Pen and between £441 and £509 for two Complex Pens.

76. For any system providing bedding, installation cost will be increased by the need for a method to deal with bedding in manure, such as underfloor flushing. This may not even be possible within existing buildings.

77. Higher installation costs of free farrowing systems may be offset by benefits in production or premium payments for the product, particularly if consumers indicate a willingness to pay for products identifiably originating in these systems. Some systems claim lower stillbirths, higher weaning weight,

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<sup>20</sup> Farm Animal Welfare Council. Report on Stockmanship and Farm Animal Welfare. 2007

<sup>21</sup> [Economic evaluation of high welfare indoor farrowing systems for pigs](#). Guy JH et al ANIMAL WELFARE 21 1 19-24 2012



shorter time to slaughter, fewer sow injuries and better sow condition than in crates, while a smaller number also claim lower piglet mortality.

78. A typical farm might produce 120 weaned piglets per year from each farrowing place; for example, a farm with 100 farrowing places might produce 12,000 weaned pigs per year. The additional installation costs for free farrowing, given above, range from £57 to £141 per sow, representing a potential cost increase of between £0.48 and £1.18 per weaned pig (calculated from installation costs quoted in paragraph 75). This will be recoverable during the lifetime of the system if the benefits claimed in the previous paragraph are achieved, even without premium payments.

79. However, during FAWC visits to commercial farms using some of these systems, some of the perceived economic and production benefits had not materialised and some farms reported increased costs with no current production benefit. Other financial considerations include the lifespan of systems, not yet evaluated, and the requirements of legislation or assurance standards.

80. Norway, Sweden and Switzerland have banned farrowing crates but have higher production costs. It was suggested that the UK pig industry is not ready for a complete change to free farrowing without financial backing.

### **Breed or genetic effect**

81. Not all sows are suitable for, or adapt to, free farrowing. To judge the likely ongoing success of a sow in free farrowing pens, her behaviour with piglets needs to be assessed at first farrowing. A 'hyper-responding' sow that steps on her piglets may be as harmful to them as a negligent sow. This individual variation may be partly genetic. If restless individuals are identified, even as gilts, confinement during the perinatal period may be appropriate. If this is not possible, it may be better not to use such individuals for breeding at all.

82. There had been, until recent research began at SRUC and Newcastle University, no systematic consideration of whether choice of specific breeds, or genetic selection for specific characteristics, would be advantageous for free farrowing. Breeds have been developed, intended to be suitable for outdoor farrowing, but testing of these breeds in indoor, free farrowing systems seems to be limited at present. Initial results might suggest that genotypes developed for outdoor use might not transfer easily to indoor free farrowing.

83. It is likely that some breeds and crosses are better suited to indoor or outdoor rearing systems and the same could also be the case for free or confined farrowing systems. No one breed can necessarily be preferred over another, as usually there is as much variation within a breed as there is between breeds. However, there is a dearth of knowledge in this area which may identify particular individual animal traits that better suit them to free

farrowing systems. Research at SRUC and Newcastle University should provide valuable information in this regard.

### **Ethical issues**

84. FAWC believes that society should provide farmed animals with “a life worth living” and an increasing proportion with “a good life”<sup>22</sup>. For sows, a good life may require farrowing accommodation without crates and enhanced opportunity to perform nesting behaviour. However, the period of confinement can be a relatively small proportion of the life of a sow. If the rest of the life experience is good, then the sow could be considered to have a life worth living. For piglets, a life terminated by crushing could be considered a life not worth living. The potential for enhanced interaction with a sow that is better able to express maternal behaviour may improve the quality of life of piglets.

85. A balancing of the ethical issues involves an informed consideration of the position of the different animals (sow, piglet), and is challenging, as

- a) the numbers of animals involved varies (e.g. one sow vs numerous piglets);
- b) the severity and duration of welfare compromises may be different for each group (e.g. for piglets, severe acute trauma from crushing, medium term hunger; and for sows, long term frustration of behavioural needs, potentially chronic injuries);
- c) for most sows, the issues extend beyond a single litter, with repeated farrowings and lactations across a productive life.

86. One solution may be to weight the issues relevant to sows, piglets and stockpeople<sup>23</sup>, although deciding the best procedure for this is likely to be difficult (see paragraph 96).

### **Critical issues**

87. For sows: The major issue is whether sows should be kept in confinement. Where confinement is considered to be essential, there are two main issues: the conditions during that confinement and its length. Stress of confinement can be reduced by allowing as much movement as possible, by provision of manipulable material to allow some nest building behaviour, and by training and habituation to the farrowing accommodation, but some stress persists. Regarding length of confinement, it is questionable whether cross fostering should be used to rear excess piglets if it significantly increases the time an individual sow spends in confinement. If excess pigs are born it may be better for the sow for them to be reared artificially, although this may cause welfare problems for the piglets.

88. For piglets: It is obviously important for both production and welfare that as few piglets as possible should die in the pre-weaning period, and

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<sup>22</sup> Farm Animal Welfare Council. Farm Animal Welfare in Great Britain: Past, Present and Future. 2009

<sup>23</sup> Cf. Baxter, Lawrence and Edwards. 2012. Alternative farrowing accommodation: welfare and economic aspects of existing farrowing and lactation systems for pigs. *Animal*, 6: 96-117.

effects of farrowing and lactation housing on this are critical. It is also important whether breeding technologies deliver litters of a size that sows are able to suckle on the number of teats available, and for which they experience maternal instincts. However, very low pre-weaning commercial mortality rates may not be achievable (see paragraph 64).

89. For stockpeople: A safe and supportive working environment is needed to foster positive interaction with the animals.

90. Knowledge: There is a lack of knowledge of the optimal farrowing accommodation for consistent piglet survival in a commercial environment.

91. Window of risk: The first 72 hours of life are the most critical in piglet survival, as in any system most deaths occur during this time, and the effects of pen design on minimising risk in this period are particularly important.

92. Supervision: Direct human supervision during the highest risk periods for piglet mortality is currently often quite limited. In many cases, no stockperson is present during the night, when many farrowings take place. Supervision of farrowing houses by CCTV has been suggested but we believe that this is unlikely to be as effective as direct supervision and may reduce the urgency of direct supervision in addressing immediate farrowing problems like crushing and piglet exposure.

93. Behavioural and spatial restriction: The impact of potentially long term, close restraint of sows, in terms of both behavioural and physiological stress, is not fully understood, but is thought to be considerable.

94. Data: There is a lack of reliable (rather than anecdotal) industry data available to producers who may be considering the installation of a free-farrowing system.

95. Pen hygiene: The impact of disease in piglets associated with reduced hygiene, including in free farrowing systems, is not currently known but is of concern. Free farrowing systems may reduce hygiene, as sows may soil large areas of the pen, and solid floors may result in the accumulation of faeces from both sow and piglets. Reduction and ideally elimination of such problems is desirable.

96. Net welfare benefits of free farrowing: These are largely unproven in a commercial setting. The requirements of some 'welfare added' farm assurance schemes may have unintended adverse welfare consequences (e.g. the effect of banning slats on hygiene). When new systems are being developed, producers or companies should undertake a Hazard Assessment and Critical Control Point (HACCP) analysis to identify the stages or critical points in the design or process where the greatest welfare risks occur. HACCP may be used to identify the areas in need of most improvement, alteration, research effort or management.

## **Conclusions**

97. The fact that sows' confinement in farrowing crates has extended beyond the "few days" envisaged in the 1965 Brambell Report to a few weeks (the full length of farrowing and lactation) indicates that the pig industry and management practices have changed significantly since that time, suggesting a need for a parallel change in the way that sow accommodation is now viewed and considered.

98. Pre-weaning piglet mortality is high in both standard and free farrowing and lactation accommodation<sup>24</sup>, with the first 72 hours of life the most critical in survival.

99. Nest building by the sow is an important behavioural trait, but cannot be undertaken in many current confined farrowing systems.

100. Methods to quantify the relative weight of sow welfare, piglet welfare and stockperson wellbeing have not been widely researched, so it is not yet clear how such weightings should be applied to the design and approval of systems.

101. All the types of free farrowing systems considered (Hut and Run, Open Pen and Complex Pen) can provide increased capacity for movement and choice for the sow, and some can provide nest building material. There is insufficient information to make definitive judgements between these types on piglet mortality, on pen hygiene, on access by the stockperson and on space and economic constraints. Furthermore, any differences in performance in Open Pens and Complex Pens can be confounded by factors thought to be important such as nest size and floor type that often differ between systems while not being intrinsic to their design. Free farrowing systems have not yet translated fully to commercial practice and adaptations may have skewed their performance.

102. FAWC favours movement in the pig industry towards well designed and operated free farrowing systems. Universal use of such systems should be the aim, but their commercial development is not yet sufficiently advanced to recommend compulsory replacement of farrowing crates.

103. The industry and other stakeholders should continue to explore ways to encourage uptake of free farrowing systems. Early adopters may continue to encounter practical, financial and welfare challenges, so retailers and consumers may need to demonstrate willingness to pay for the potential benefits to sows and to piglets (for example, their increased interaction or increased requirement for supervision). When standards for such systems are set by retailers or labelling organisations, they should be soundly based, established in consultation with farmers, and stable for long enough that farmers can recoup investments.

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<sup>24</sup> <http://pork.ahdb.org.uk/prices-stats/costings-herd-performance/>

104. A stockperson is not always present to supervise farrowing in the day, and rarely at night, and this contributes to mortality rates. While future developments in technology may aid supervision, we do not believe that CCTV would currently be an effective substitute for direct supervision.

105. Currently, many sows produce litters that are too large for them to rear, because litter size exceeds the number of functioning teats. Whilst confinement remains the norm, the industry and breeding companies could work to ensure that a typical litter of piglets does not exceed the number a sow is capable of rearing, because late fostering results in a sow being confined for a prolonged period. This problem is mitigated in free farrowing systems.

### **Recommendations**

106. FAWC recommends that, in considering which farrowing system to adopt or support, farmers, the pig industry as a whole and other stakeholders such as retailers should consider the welfare of both sows and piglets, and be aware that they are not necessarily benefitted by the same things. These considerations should include:

- Sow comfort and freedom to express nest building; nest building material should be available in the period before and after farrowing;
- Avoidance of sow injuries, from interaction with the floor, pen furniture or piglets; floor design should be given more priority in design of farrowing accommodation;
- Protection of piglet welfare, including prevention of injury/death and an environment in which they can thrive;
- Promotion of hygiene and avoidance of disease in both sows and piglets;
- Designs that promote positive sow-piglet interaction;
- Designs that enable contact between neighbouring sows and litters, without high, solid walls.

107. FAWC recommends continued development of commercial free farrowing systems with the aim of replacing farrowing crates, with robust information from these systems available to interested stakeholders.

108. Adoption of free farrowing systems should be reviewed in 5 years, and compared to that in other countries. If judged necessary for full adoption, the possibility of legislation to phase out farrowing crates should then be considered. For commercial reasons this may require action at EU level.

109. The pig industry, government and research establishments should direct efforts towards:

- Optimising welfare and commercial performance of free farrowing systems in commercial settings;
- Collation of data to inform decisions on optimal farrowing accommodation for piglet survival and performance in commercial environments;
- Stockperson behaviours that can influence sow and piglet welfare;

- Sow genetics for optimal performance in commercial free farrowing accommodation;
- Shortening confinement of sows.

110. Farmers and the wider pig industry should increase direct supervision of farrowing and the post-farrowing period, irrespective of the design of the farrowing system, to reduce piglet deaths.

111. The pig industry should promote training for managers and stockpeople operating all farrowing systems, including in maintenance of hygiene and opportunity for normal behaviour of sows and piglets.

112. While confinement of sows throughout lactation is practised, the pig industry and breeding companies should work to ensure that a typical litter of piglets does not exceed the number a sow is capable of rearing.

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Martin Barker declared a commercial interest in one of the systems under consideration, and did not participate in discussions about conclusions and recommendations for or against such systems.

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AHDB Pork (formerly British Pig Executive)  
Compassion in World Farming  
Defra  
Ermine Farms  
Farm Animal Initiative  
Garth Veterinary Partnership  
Midland Pig Producers Ltd  
DP Morgan, Pockthorpe Farms  
National Pig Association  
Pig Health and Production Consultancy (PHPC)  
Pig Veterinary Society/George Veterinary Group (PVS)  
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Royal Society for the Prevention of Cruelty to Animals (RSPCA)  
Sainsbury's plc  
Scotland's Rural College (SRUC)  
Scottish Government  
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Welsh Government  
World Animal Protection UK