Is Big Bad?

Can Large Intensive Systems match the 5 Freedoms for Pigs?

Alistair Lawrence
Campaigners warn against rise of the 'mega-farms': Could massive pig, fish and dairy units harm the environment?
Mega pig-farm could breach human rights, council warned

Controversial plans to build a US-style mega farm pose serious health risks to those living and working nearby, campaigners say

Rebecca Smithers, consumer affairs correspondent

guardian.co.uk, Friday 10 February 2012 15.26 GMT
What is animal welfare?

‘An ethical concern for the mental and physical well-being of animals under our care’

Sentience

The capacity to experience / to feel

Videos courtesy of ASAB
Why Big?
Economies of scale

..economies of scale are the cost advantages that enterprises obtain due to size, with cost per unit of output generally decreasing with increasing scale as fixed costs are spread out over more units of output...
Why Bad?
1964: ‘Animal Machines’: Ruth Harrison, an ‘expose’ of the changes in livestock industries since WWII

‘Close confinement’
Lack of ‘behavioural freedom’
‘Abnormal behaviour’
Development of ‘modern’ animal welfare concerns

1964: ‘Animal Machines’: Ruth Harrison an ‘expose’ of the changes in livestock industries since WWII

- ‘High stocking densities’
- ‘Barren environments’
- Lack of ‘behavioural freedom’
- ‘Tail biting/ docking’
Development of ‘modern’ animal welfare concerns

- 1964:
  - ‘Animal Machines’: Ruth Harrison
    - an ‘expose’ of the changes in livestock industries since WWII
- 1965:
  - The Brambell Report
- 1979:
  - The UK Farm Animal Welfare Council (FAWC) established
Development of ‘modern’ animal welfare concerns

• **FREEDOM FROM HUNGER AND THIRST**
  - by ready access to fresh water and a diet to maintain full health and vigour.

• **FREEDOM FROM DISCOMFORT**
  - by providing an appropriate environment including shelter and a comfortable resting area.

• **FREEDOM FROM PAIN, INJURY OR DISEASE**
  - by prevention or rapid diagnosis and treatment.

• **FREEDOM TO EXPRESS NORMAL BEHAVIOUR**
  - by providing sufficient space, proper facilities and company of the animal's own kind.

• **FREEDOM FROM FEAR AND DISTRESS**
  - by ensuring conditions and treatment which avoid mental suffering.

http://www.fawc.org.uk/
Beyond cruelty: Positive welfare

Farm Animal Welfare in Great Britain: Past, Present and Future

October 2009
How do we understand/assess positive welfare?
Big can be seen as an aspect of Sustainable intensification:

...defined as achieving more output from a given area of land whilst reducing negative impacts and increasing other benefits (e.g. to ecosystem services)....
Animal welfare is an aspect of sustainable development
Aims today:

Use 5 freedoms to explore *some* of the challenges that will need to be considered if future intensive pig production systems are to be sustainable with respect to pig welfare:

- **FREEDOM FROM HUNGER**
- **FREEDOM TO EXPRESS NORMAL BEHAVIOUR**
Food is about more than nutrition -
Food restriction as a cause of stereotypic behaviour in tethered gilts
Animal Production, 1987

Measuring hunger in the pig using operant conditioning – The effect of food restriction
Animal Production, 1988

- Food restriction of sows results in ‘hunger’

- Hungry sows are motivated to forage (the converse also appears true)

- ‘Frustrated’ foraging can result in ‘abnormal behaviour’
Either reduce hunger/increase satiety

- Food restriction of sows results in ‘hunger’
  - Hungry sows are motivated to forage
  - ‘Frustrated’ foraging can result in ‘abnormal behaviour’
Freedom from ‘hunger’

‘dry pregnant sows and gilts must be given a sufficient quantity of bulky or high fibre food as well as high energy food to satisfy their hunger and need to chew’.

But which fibres reduce hunger?
‘Freedom from hunger’ and preventing obesity: the animal welfare implications of reducing food quantity and quality

D’Eath et al Animal Behaviour, 2009
FREEDOM FROM HUNGER

‘Effects of dietary fibres with different fermentation characteristics on feeding motivation in adult female pigs’
Souza da Silva et al. 2013

Fibres which have slow fermentation rates and produce butyrate appear to be the most successful in reducing hunger and reducing abnormal behaviours.
FREEDOM FROM HUNGER

Either reduce hunger/increase satiety

or

Allow sows to forage

- Food restriction of sows results in ‘hunger’

- Hungry sows are motivated to forage

- Lack of opportunity to forage can result in ‘abnormal behaviour’
- Foraging is a complex behaviour
- We don’t know the minimum requirements to satisfy foraging in the sow (e.g. Lack of substrate)

The Edinburgh Food Ball
Leibniz Institute for Farm Animal Biology (FBN)


Kirchner et al., 2012: Individual calling to the feeding station can reduce agonistic interactions and lesions in group housed sows. *Journal of Animal Science* 90:5013–5020

Food restriction of sows is necessary

However the behavioural and welfare implications need to be understood

There are potential conflicts between satisfying the hungry sows’ behaviour and large scale production either in terms of:

- Finding solutions to reducing hunger
- Allowing adequate expression of foraging behaviour in sows
FREEDOM TO EXPRESS NORMAL BEHAVIOUR

Normal behaviour?
Some behaviour is regulated in such a way as to make its expression effectively outside of our control.

We can ‘control’ hunger/foraging in the sow.
Nesting behaviour in the pig

Nest-building in the sow is stimulated by parturition – it is not an option.
Effects of ‘frustrated’ nesting behaviour

Lawrence et al., 1994. AABS, 39: 313-330
Taking account of sow, piglet and farmer requirements

Nest-building & maternal behaviour

Warmth/ Safe access to udder

Safety/ Efficient labour input/ Profit
Danish loose farrowing research activities in 2007/09

- Close collaboration of industry body, Universities, The Danish Animal Welfare Society

>500 pens on commercial farms being monitored
The ‘PigSAFE’ system
PigSAFE

e.g. Baxter et al., 2011 Animal, 5: 580.
Some behaviour is regulated in such a way as to make its expression effectively outside of our control.
The activity and straw directed behaviour of pigs offered foods with different crude protein content


Pigs given high protein food or a choice (able to balance intake to their requirements) showed no reduction in oral behaviours

Exploration in growing pigs is not (entirely) under the control of feeding motivation
‘Exploration’ in younger pigs

Directive 2001/93/CE establishes that “pigs must have permanent access to a sufficient quantity of material to enable proper investigation and manipulation activities, such as straw, hay, wood, sawdust, mushroom compost, peat or a mixture of such, which does not compromise the health of the animals”.

What are the requirements to satisfy ‘exploration needs’ in younger pigs? Can these minimum requirements be provided in intensive systems? Much of the focus has been on prevention of tail-biting as opposed to satisfying exploration needs.
‘Exploration’ in younger pigs

An Answer by the European Commission (E-5360/09EN) states that: “since indestructible objects such as chains or tyres are not sufficient to provide for the manipulatory need of pigs, they may be used as supplement to destructible and rooting materials but not as a substitute for them.”
‘Exploration’ in younger pigs

The Pigs Directive also provides that tail-docking must not be carried out routinely, but only where there is evidence that injuries to other pigs’ tails have occurred. The law stipulates that before carrying out tail-docking “other measures shall be taken to prevent tail biting and other vices taking into account environment and stocking densities”.

What are the requirements to satisfy ‘exploration needs’ in younger pigs?

Can these minimum requirements be provided in intensive systems?

Much of the focus has been on prevention of tail-biting as opposed to satisfying exploration needs. The Pigs Directive also provides that tail-docking must not be carried out routinely, but only where there is evidence that injuries to other pigs’ tails have occurred. The law stipulates that before carrying out tail-docking “other measures shall be taken to prevent tail biting and other vices taking into account environment and stocking densities”.
‘Exploration’ in younger pigs

Currently many intensive units are not meeting these requirements
Normal (natural) behaviour = behaviours where we currently have little ‘control’ over their expression
  – i.e. They will be expressed whatever the environment and there is a strong argument that in sustainability terms they should be ‘catered for’
Farrowing systems are being developed & adopted that allow expression of maternal behaviour whilst accommodating piglet and stockperson requirements
Currently there remains the issue of how we satisfy exploratory behaviour in growing pigs on large intensive units
  – Principle issue is that the lack of space and access to appropriate substrates which tend to have been features of intensive pig production methods
How do we reconcile pig welfare with BIG production?

Can we better balance the human (& other) benefits against animal costs?
Options: Explore trade-offs

Sustainable Development of Food Production: A Case Study on Scenarios for Pig Production

To study future, sustainable production systems, a stepwise method was used to create three future scenarios for pig production based on different sustainability goals. The first scenario focused on animal welfare and the natural behavior of the animals. The second targeted low impacts on the environment and an efficient use of natural resources. The third scenario aimed at product quality and safety. Each scenario fulfilled different aspects of sustainability, but there were significant conflicts because no scenario fulfilled all sustainability goals. The scenarios were then parameterized. The environmental impact was calculated using the life-cycle assessment (LCA) methodology, and the economic cost was calculated from the same data set. The cost per kilo of pork was highest for the animal welfare scenario and similar for the other two scenarios. The environmental scenario had the lowest environmental impact, and the product-quality scenario the highest. The results are discussed based on different future priorities.

INTRODUCTION

The phrase “sustainable development” was launched by the United Nations-based Brundtland Commission in the report Our Common Future (1) and was formulated as “a development, which meets the needs of today without destroying the possibilities for future generations to satisfy their needs.” Four system conditions have been used to describe a sustainable society, specifically: system should not be subjected to: (i) systematically increasing concentrations of substances extracted from the earth’s crust; (ii) systematically increasing concentrations of substances produced by society; (iii) degradation by physical means; and (iv) that human needs are met worldwide (2, 3).

As a means toward implementing these conditions, the Swedish research program FOOD 21—Sustainable Food Production (1997-2004) formulated sustainability goals that could serve as a guide for research and development toward more sustainable solutions in food production systems (4). The FOOD 21 sustainability goals cover eight main aspects related to a sustainable food production system:

(1) To use natural resources efficiently, including optimizing the use of soil, feed, energy, soil, and water resources;
(2) To aim at a low impact on the environment, air, and water, in terms of eutrophication, greenhouse gases, pesticides, and pharmaceutical residues;
(3) To foster good animal welfare, provide an environment for animals to exhibit natural behaviors, and promote animal health with fewer drugs;
(4) To aim at ensuring that consumers and producers accept the production form based on ethical considerations;
(5) To produce high-quality products in the primary producer as a basis for nutritious foods without hazardous contaminants;
(6) To obtain consumers’ confidence in the safety and quality of food;
(7) To promote the development of new and alternative food products and food processing methods;
(8) To ensure that producers have a satisfactory working environment, both physically and socially.

Stern et al 2005 Ambio, 34

Compared 3 scenarios:

(1) Animal welfare and natural behaviour;
(2) Low environmental impacts and the efficient use of natural resource;
(3) Product quality and safety.

(1) Animal welfare had the highest cost/kilo of pork; this was similar for the other two scenarios.
(2) The environmental scenario had the lowest environmental impact, and the product quality scenario the highest.
Innovation Systems Approach

2. Structured design

1. System & actor analysis

3. Anticipating niche & structural change

(System analysis)

Future visions

Key actors & needs

Briefs of requirements

Networks & ownership

Identif. of institutional barriers

Prop. & interventions for change

Pilots & trials in niche

Detailed proposals

Design concepts

Gen. of solutions

Morph. Function Diagram

Key Functions

Key challenges
The ‘PigSAFE’ system
Design Concept: Intensive Poultry Production (Roundel)

- Functional differentiation in layout of system
- Outdoor as integrated element of the system
- Design fits specific submarkets of consumers

Source: Groot Koerkamp
Conclusions:

• BIG will usually equate to intensive production
• Intensive pig production has posed serious challenges to pig welfare since WW2
• Some of these challenges can currently be overcome on large intensive units, others not – e.g.
  ?/✓ hunger in sows
  ✓ free-farrowing
  ?/X exploration in growing pigs

• If BIG is to accommodate pig welfare in the future we need:
  – (In some cases) to refine our understanding of what is required to satisfy pig requirements
  – Innovation
  – Develop approaches that can help optimise these requirements against other ‘demands’ (social and natural sciences)
Conclusions:

Question: Is Big Bad with respect to pig welfare?
Answer: Not necessarily

However
BIG units should:
- not repeat ‘mistakes’ of the past
- innovate to deal with welfare challenges and improve standards
Thanks to funders