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Animal welfare during a period of intensification: The views of confinement and alternative pig producers

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Abstract

In Hungary, where intensive and non-intensive pig production co-exist, in-depth interviews were used to explore the views and priorities of pig producers regarding animal welfare and ethical animal production. Farmers using confinement systems and those with alternative, non-confinement systems shared certain core values such as attachment to animals and to traditional community values. Both groups agreed on most key elements of animal welfare (health, nutrition, etc) but had different priorities for how to achieve these within their production systems. Alternative producers considered unconfined, semi-natural environments important for animal welfare, and confinement producers with medium-sized operations (400–600 sows) generally agreed. Only the three largest producers (> 1,000 sows) expressed strong confidence in confinement methods. Different producers emphasised different features for ensuring animal welfare. Producers with large-scale confinement systems depend strongly on staff and automation and require the means to find and retain good staff. Those with medium-scale confinement systems see automation and personal involvement with animals as crucial, and they need economic conditions that allow herd size to remain within their personal capacity. Those operating alternative systems see small herds and non-confinement systems as crucial for animal welfare and need markets that encourage such systems. Subsidies, regulatory systems and technological developments would need to be tailored to meet the different needs in order for producers to improve animal welfare in the different systems and according to their own values and priorities. Medium-scale confinement producers could better act on their values if economic conditions allowed them to use more natural systems.

Keywords: *animal welfare, confinement, ethics, intensification, pig, values*

Introduction

Social scientists have carried out substantial research into the values and beliefs of animal producers and of the general public regarding animal welfare and the ethical raising of farm animals. In general, producers using intensive, indoor production systems have been found to emphasise physical health as the key element of animal welfare, and express confidence in confinement systems to safeguard health through hygiene, controlled environments and biosecurity. They also frequently cite the efficient growth and productivity of animals in such systems as evidence of good health and hence good welfare (eg Te Velde *et al* 2002; Vanhonacker *et al* 2008; de Rooij *et al* 2010; Spooner *et al* 2014a).

In contrast, producers using alternative, non-confinement systems — including organic systems — tend to associate good animal welfare with animals living under reasonably natural conditions including access to the outdoors (eg Lund & Röcklinsberg 2001; Verhoog *et al* 2004; Lund 2006). When asked, many members of the public adopt this view of animal welfare and assume that animals must experience poor welfare if confined indoors under artificial conditions (eg Te Velde *et al* 2002; Lassen *et al* 2006; Vanhonacker *et al* 2008; Miele *et al* 2011; Spooner *et al* 2014b).

This stark division of opinion tends to create an impasse to improvement. Those changes that confinement producers would support — especially those that contribute to health and productivity — appear little valued by their customers or the general public. The major overhaul of production that would be required to meet the public perception of animal welfare is seen by mainstream producers as both unfeasible and contrary to animal welfare as they conceive it. And most consumers seem unlikely to pay a substantially higher price for products from alternative production systems (Verbeke 2009).

The research that lies behind this understanding has mostly been carried out in western Europe and the English-speaking countries where the move toward large-scale, specialised confinement systems is far advanced. A valuable

contrast is provided by pig farming in Hungary which still involves a wide range of non-confinement operations as well as large- and medium-scale confinement units.

Previously, we have reported the views of pig farmers operating confinement and alternative systems on how external factors — economic constraints, subsidies, and regulations including those of the European Union — influence their production practices (Molnár & Fraser 2020). In this paper, we report their views of animal welfare and ethical animal production, and how the different systems require different means of supporting improvement.

Materials and methods

Interviews and farm visits were conducted with 24 farmers raising pigs in Hungary using a wide range of production methods and herd sizes. In contrast to western Europe, Hungary has undergone multiple transitions in farming, from traditional mixed farming, to collective quasi-industrial systems, and back to smaller-scale private ownership (Molnár & Fraser 2020), and now has a wide mixture of intensive and non-intensive production.

As described by Molnár and Fraser (2020), semi-structured interviews, conducted between 1 September 2015 and 30 June 2016, were based on a protocol adapted from a format proposed by Arskey and Knight (1999). The protocol was pilot tested twice with an experienced qualitative researcher who was knowledgeable in pig farming. This allowed the researcher to assess interview techniques, refine the questions and reflect on the use of prompts. Questions were designed to guide interviews in a flexible manner, allowing the researcher to follow the logic of the participant. All interviews were conducted in Hungarian. After the fifth and tenth interview, a detailed review of the research process and progress was carried out based on a post-interview reflective exercise adopted from Arksey and Knight (1999).

Interview questions were designed to explore farmers' views on animal welfare and animal production ethics, with special attention to identifying participants' values, analysing the level of consistency in their values, comparing the values of confinement and alternative farmers, and identifying possible influences on their values. Interviews lasted between 50 and 95 min until the desired level of clarity was achieved. With the consent of participants, interviews were recorded with an Olympus VN-731PC digital voice recorder (Olympus Imaging Corporation, Tokyo, Japan) and were later transcribed *verbatim*. Transcriptions were uploaded for analysis into the qualitative data analysis software Atlas.ti (version 7.5.16; ATLAS.ti Scientific Development GmbH, Berlin, Germany). Primary data consisted of the 24 in-depth semi-structured interviews plus post-interview notes. These were based on discussions that continued after the formal interview ended and that provided further insights into the research topic (see Arksey & Knight 1999). Secondary data included detailed objective/reflective notes and research memos that were produced during data collection, transcription, coding and analysis.

The research aimed to provide a purposive sample of participants who were residents of Hungary and kept 50 or more breeding sows for commercial purposes. Twelve participants used confinement methods with domestic pigs of modern white breeds kept in indoor housing, predominantly with mechanical ventilation and feed provided in troughs or dispensers. Herd size ranged from 400 to > 1,000 sows. Twelve used alternative methods in which commercial breeds, *Mangalica* (a traditional Hungarian breed) or wild boar were housed predominantly outdoors with manual labour for tasks such as feeding and cleaning, and herd size of 50 to 80 sows. Of the 24 participants, 22 were male and two female. Almost all had a high exposure to farming from an early age: 22 came from farming families, while two originated from families with close contact to rural life. Twenty-two possessed a university degree (mostly veterinary or agricultural) while two had secondary education also in agronomy or animal production — qualifications that are not uncommon among animal producers in Hungary.

Participants were recruited by a snowball sampling method, which "relies on people identifying other people or cases to investigate" (Taylor-Powell 1998; p 7) with the aim of capturing a diverse but non-representative sample (Creswell 2003; Spooner *et al* 2014a). Post-interview reflective exercises considered both the sample of participants and data quality, and both were considered appropriate. Participants were invited to take part in the research voluntarily. Sample size was determined by data saturation as defined by Guest *et al* (2006).

In line with Grounded Theory (Glaser & Strauss 1967), transcribed interviews were coded in several rounds. Initial coding involved a random sample of six interviews (three confinement and three alternative); these were coded by an open coding strategy (Strauss & Corbin 1990) which yielded a detailed list of emerging themes in the form of initial codes. The initial codes were then re-examined and revised into themes and codes. In the second round of focused coding (Strauss & Corbin 1990) interviews were coded (or re-coded) based on the revised set of themes (n = 9) and codes (n = 82), and numerous analytic memos were added to the transcripts.

Data analysis also involved an iterative process. First, the coded data, post-interview notes and secondary data (analytic memos) were freely explored to identify grounded findings and differentiate these from speculations (Charmaz 2006). The analytic memos were used to compare coded data segments with other data segments, codes, and themes. Next, a comparative analysis of disassembled parts of the data allowed the final conceptual categories or themes to be identified (Charmaz 2006). Data analysis continued until theoretical saturation (Charmaz 2006), the state when no new properties emerged. Representative data segments (interview quotes and post-interview notes), with participants identified by fictitious names to preserve anonymity, were chosen to illustrate findings. Data validity was ensured by a number

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of reflective exercises including data triangulation and the critical assessment of negative evidence or rival explanations (Creswell 2003; Miles *et al* 2014). Finally, in line with a Grounded Theory approach, the interpretation of results was critically re-examined to enable "the most plausible explanation" (Charmaz 2006; p 104) of findings.

The research followed the Central European University Ethical Research Policy rules and was approved by the Prospectus Defence Examination Committee.

Results

Views on animal welfare

In most respects, confinement and alternative producers expressed a similar understanding of the elements of animal welfare, but their views on how good welfare should be achieved differed depending on the type of system they used.

Animal health

Both confinement and alternative farmers emphasised that animal health is a priority, closely linked to animal productivity and thus farm economy.

> …a healthy animal produces more, which is good for the farmer and the animal… So, health, welfare and business interests go hand-in-hand [Confinement Farmer Henry, post-interview notes].

Farmers also emphasised prevention in the case of disease, injury or parasitism. Both confinement and alternative farmers claimed that high-health herds, appropriate environmental conditions, good hygiene and good management practices are essential to avoid health problems, minimise economic losses and prevent animal welfare challenges.

Participants saw low stress levels as important to maintain immunocompetence, but a difference was noted between confinement and alternative farmers. Most confinement farmers believed that low stress levels are important during specific events such as weaning, mixing, handling, herding and transport.

> We need to minimise stressful interactions with animals, because they are counter-productive to our businesses [Conventional Farmer George, post-interview notes].

In contrast, alternative farmers emphasised low stress throughout life by the use of housing conditions that match the natural adaptations of pigs and fulfil their behavioural needs.

> We insist on keeping animals in near-natural conditions, providing them with natural feed, and allowing them at least double the time [that intensively kept white pigs have] to grow. But at least this way we ensure them a good life, the possibility to wallow, bathe, rest and eat [Alternative Farmer David].

Some alternative farmers saw their traditional breeds (*Mangalica* and Duroc) as helpful in achieving good welfare by avoiding problems of white breeds such as stress sensitivity, abnormal behaviour, leg and claw weakness, disease susceptibility and (for outdoor pigs) sunburn.

> We wanted to use the adaptability of *Mangalica* pigs to more modest conditions. I would not say… that *Mangalica* pigs are undemanding, but [in comparison to white pigs] they are certainly more [durable] and are also very appreciative of good stockmanship [Alternative Farmer Edmond].

Nonetheless, some alternative farmers chose to keep white pigs in their systems and considered it possible to keep these high-performing breeds in semi-outdoor, low-intensity systems as long as the producer is competent, recognises the differences between white and other pig breeds, and manages the farm according to the needs of the animals.

Confinement farmers expressed awareness that farm scale and high stocking densities can influence the health and welfare of their animals. They openly acknowledged that confinement systems are susceptible to certain animal health problems (especially respiratory diseases) and infectious diseases that could be introduced to the farm. They believed that health threats reinforced the need to keep the pigs indoors and thus prevent the entry of disease and the need for routine use of antibiotics and other treatments.

> I think [indoor confinement farming] is a 'necessary evil' [Confinement Farmer Oliver].

Participants using alternative systems believed that small scale, low stocking density and access to outdoor areas ensured the health and welfare of animals. They acknowledged that alternative farming systems are susceptible to health problems such as parasitism, lameness, sunburn and injuries, but considered these problems to be avoidable with good management.

> What is the most important aspect of working with farm animals? It is attention. The farmer has to be vigilant [Alternative Farmer Edith].

Hence, while confinement and alternative farmers agreed on the need to ensure the health of farm animals, they disagreed over which type of management and environment best achieves this goal.

Affective states

Confinement and alternative farmers commonly alluded to certain affective states of animals, including thermal and/or physical comfort and pain related to handling or invasive procedures. Fear and distress, however, were regarded as 'extreme' states linked to animal abuse or neglect. These were seen as 'abnormal', 'detestable' and likely caused by farmers experiencing economic hardship or poor mental health.

> I do not know whether you have ever been to a farm which is close to bankruptcy: it is catastrophic. I have been to see such a farm…When you see animals in the winter in the cold, without food, water… it is a real disaster [Confinement Farmer Harry].

In terms of painful or stressful procedures, most farmers identified group mixing, castration, tail-docking (performed only on confinement farms), ear-notching, ear-tagging and parturition. Fighting, tail-biting and other injuries were also highlighted as raising animal welfare concerns, but artificial insemination and early weaning were rarely mentioned.

Neither confinement nor alternative farmers believed analgesia to be required for tail-docking, piglet castration, ear-notching or tagging. Farmers explained that handling, by itself, triggers increased stress in animals, and that injuries caused by the procedures heal quickly and without long-term consequences. Hence, neither confinement nor alternative farmers saw these procedures as significant welfare problems.

> I once suffered an accident abroad… and my forehead was stitched up without an analgesic, and I had to cope… The castration of a piglet takes a minute. It heals very quickly. If the piglet also gets… anti-inflammatory treatment [post-operative analgesia], then it is not that bad [Confinement Farmer George].

Parturition, however, was often mentioned by confinement farmers as a cause of major pain to sows, and some farmers believed it to be necessary to mitigate the pain to ensure both economic benefits and sow welfare. Thus, farmers seemed to focus on certain painful or stressful procedures but not others.

In the case of positive welfare provisions, confinement farmers noted that good climatic conditions can make animals comfortable, but they rarely mentioned other aspects of good welfare. Some confinement farmers indicated that pigs need bedding but most acknowledged that confinement systems, especially the use of slatted floors and liquid manure handling, make this impossible. Some farmers tried to provide a degree of environmental enrichment as prescribed by EU legislation (Council Directive 2008/120/EC), but many were unsure about its effectiveness:

> We provide toys, a piece of wood and a chain, for animals on a slatted floor system. It is in our interest — otherwise we do have instances of cannibalism. It does not eliminate the problem, but it helps reduce it [Conventional Farmer Oliver].

Thus, while some farmers identified the advantages of bedding, their ability to use bedding was limited by confinement technology.

Participants also emphasised that the priority of confinement farms is to be easily managed rather than 'enjoyable' for either farmers or the animals.

> Our farms have to be functional [Confinement Farmer Philip, post-interview notes].

> The intensification of farming led to a new principle, whereby it became unimportant how animals feel, but very important how much meat can a farmer produce on one square meter… in a year [Confinement Farmer Henry].

For alternative farmers, on the other hand, animal welfare provisions need to include provisions for positive affective states for the animals. While mentioning functionality, some participants emphasised that their farms had to provide high welfare conditions for both farmers and their animals.

> I believe that the animal feels good if I also feel good with it… If the animal and I both feel good… then [the farming system] is working [Alternative Farmer David].

Thus, confinement and alternative farmers were aligned on negative affective states, especially painful invasive practices, but differed on the balance of practical considerations vs positive animal welfare provisions.

Natural adaptations and animal agency

Both confinement and alternative farmers acknowledged that pigs are naturally inquisitive animals that require small, relatively stable social groups, but only alternative farmers emphasised a need to engage in natural behaviours such as rooting and foraging. Confinement farmers seemed to believe that white, commercial breeds are generally well adapted to indoor environments and their needs are substantially different from those of their wild ancestors.

> Wild boars are wild boars, because they have lived in the wild for — who knows — millions of years. They have developed an immunity that combats all illnesses. But not an over-selected white pig, which has been bred to produce as much meat as possible on a square meter of space either directly or through its offspring. These are two entirely different things [Confinement Farmer Henry].

Thus, confinement farmers did not associate the physical and behavioural restriction of pigs on their farms with welfare problems such as frustration, abnormal behaviour and aggression.

Alternative farmers, on the other hand, emphasised that domestic (commercial and *Mangalica*) pigs still resemble their wild ancestors. Hence, these farmers preferred more natural housing conditions. One described keeping sows in farrowing crates as:

> …completely unacceptable… The animals cannot explore their environments… It is awful to think that the sow cannot move freely. Ten minutes after piglets are born [on our farm], they are out in the sunshine playing… which is very important for their development [Alternative Farmer Angela].

Most confinement farmers felt that giving animals too much freedom of action would cause welfare problems such as aggression and competition, whereas automated systems distribute welfare provisions reliably and evenly among the animals.

> The industry of technologies is able to react to every kind of need… They have specialised feeders for dry feed, liquid feed… They can tell by the minute what the animal will need and how quickly it will grow… You just set it in the computer and that day the animals will be fed 5–6 times in the dose you wish… tailored to the needs of sucking piglets, weaned piglets, boars and breeding sows [Confinement Farmer Bruce].

Farmers working with alternative technologies, on the other hand, saw alternative systems as allowing farm animals to act on their needs.

> …if I want to produce the best meat possible, I cannot do it by imposing my own agenda or view of 'goodness' on my livestock… Just an example: it's raining in the summer and we have a roof above the building so the animals don't get wet. OK, but this pig wants to go out into the rain. Why? Because it feels good… I don't need to protect it from that. But if it is raining for two weeks, the animal does not want to stand in the rain anymore — it wants to go in a dry place, and so I have to provide it with this opportunity also [Alternative Farmer Walter].

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Thus, animal agency was considered important to ensure good welfare outcomes. The contrast between attitudes was illustrated by an alternative farmer who had previously worked on a confinement farm:

> While I would never use confinement technologies on my own stock, I will not judge confinement farmers. Good [confinement] farmers work very hard… I have learned a lot from some of them… But there is no way to provide better [animal welfare] conditions for the high number of animals kept on confinement farms… If you want better welfare, then you need to decrease your stock and decrease the intensity of your farming operation… and allow animals more freedom [Alternative farmer Frank, post-interview notes].

Basic needs

Participants' views on the basic welfare needs of animals also showed both similarities and differences between confinement and alternative farmers.

First, all participants agreed that animals require good quality feed with sufficient calories, essential nutrients, palatability and (depending on the phase of production) rationing. Both groups also agreed on the need to minimise wastage while maintaining ease of sourcing, storage and handling. Some confinement farmers noted that their liquid manure handling technology severely limits their ability to provide roughage and constrains other choices such as pellet size. However, conventional farmers seemed most concerned with measurable attributes of feed and aimed to find 'optimal components' and 'efficient conversion rates':

> We have a detailed list of the nutritional needs of animals in our feed protocol. Animals have different requirements… for proteins or amino acids depending on the phase of production… Feed is very expensive, so the aim is to have the highest conversion rates per kilogram of meat [Conventional Farmer Henry].

> Naturally, in a modern livestock farm, it is essential to have professional feed technology. By this I mean that the most price efficient or cheapest raw material is used to feed animals… with pre-defined nutritional values [Conventional Farmer Philip].

Alternative farmers on the other hand reported 'naturalness' as the most important attribute of feed, along with freshness and variety:

> The land… where the animals graze is free from chemicals and fertilisers… If I give them natural feed, then my animals will be healthy and will produce higher quality meat [Alternative Farmer Nick].

Second, both groups of farmers agreed that animals should have *ad libitum* access to clean water, but the preferred delivery systems differed: while alternative farmers believed that drinking troughs are adequate, confinement farmers aimed to install high-quality watering technologies.

> An up-to-date watering system… ensures sufficient [water] pressure and hygienic conditions for the animals [Conventional Farmer Philip].

Third, both groups agreed on the need for adequate lighting, but used different criteria. The confinement farmers generally agreed that artificial lighting is an acceptable substitute for natural light and emphasised appropriate duration and intensity, for example, to regulate breeding:

> Every animal's reproductive cycle is regulated by the sun. We know exactly how much lux they need for fertilisation and to keep the pregnancy. We can control that… and are able to model natural lighting patterns [Conventional Farmer Richard].

In contrast, alternative farmers saw sunshine as a fundamental need of livestock, irreplaceable with artificial light, because of natural patterns and additional animal health benefits of disinfection and vitamin synthesis.

> I do not agree with exposing animals to sunshine all the time, but they most certainly need daily access… to sunshine [Alternative Farmer Walter].

Fourth, all farmers considered air quality to be important for animal welfare. Confinement farmers emphasised temperature, dust levels, humidity, the concentration of noxious gases, and a rate of air flow adjusted to the season.

> In a modern building it is possible to provide animals with optimum temperature which (depending on the season) means that in the summer the humidifiers are operating, while in the winter we provide additional heating [Conventional Farmer Philip].

In contrast, alternative farmers believed that passive ventilation is appropriate to ensure adequate air quality indoors and that animals must be well adapted to the local climate and able to move freely between indoor and outdoor spaces to maintain a comfortable temperature.

> I cannot over-emphasise the importance of fresh air… It is so important that…. it would be ideal to have every farm animal spend at least two hours per day on pasture and fresh air [Alternative Farmer Walter].

Finally, both confinement and alternative farmers saw adequate space as crucial for good welfare:

> We need to provide adequate space [Conventional Farmer Peter].

For confinement producers, adequate space tended to mean avoiding the crowding caused by high stocking density in group housing, but confinement farmers did not seem to reflect on space for exploration, cleanliness and unrestricted movement especially in the case of sows kept in gestation and farrowing crates. Alternative farmers saw space very differently. They believed it to be essential for all animals to exercise freely and perform natural behaviour, and they allowed this by providing natural or near-natural outdoor areas and loose-housing indoors.

> Our animals are able to move [freely] around here. There is ample space and the outside runs provide them with the possibility even to wallow [Alternative Farmer Edith].

Core and context-specific values regarding animal welfare and ethical animal production

Participants also revealed core values that were generally shared by both confinement and alternative producers, and context-specific values that were more closely associated with the type of production system used.

Core values

Regardless of their production system, participants acknowledged an emotional attachment to the animals they keep.

> Once I had a beautiful bull… which I had to sell to a slaughterhouse. On arrival to the plant, its leg got caught during unloading and the bull fell over and was unable to stand up… Slaughterhouse workers could not get it back on its feet, so they started to beat my bull… and I shouted 'What on earth are you doing?'… But they told me to mind my own business. The deal was done, I had my money and they told me to leave… So, I did, but I cried [Alternative Farmer Kevin, post-interview notes].

By using such words as 'love' and 'respect', participants indicated that they empathise with their animals and have 'compassion' for them. Farmers believed that these positive emotions prevented them from inflicting 'unnecessary pain' and allowed them to provide the 'best possible care' for their farm animals.

> Animals are not kept by anyone who does not love them. If you love your animal, you will not cause unnecessary suffering. You will keep it according to its needs [Conventional Farmer Peter].

Thus, participants in both groups unanimously claimed to be emotionally 'engaged' with farm animals and believed that — due to their desire to provide farm animals with their needs and care for those who are dependent — they are motivated to ensure good lives for farm animals.

But farmers — both confinement and alternative — also recognised the need to deliberately manage their level of emotional attachment.

> When my first-ever batch reached slaughter weight… and the truck left, I stood outside and I cried. I was thinking that every animal born here goes through my hands… Obviously, I am not saying that I am attached to every single animal — we have far more than that — but I still know that they were born here and if I look at them and check their numbers, I know which pen they were born in… I know who their mothers are… So, my feelings have to be managed, because our pigs have to provide us with an income [Alternative Farmer Nick].

Farmers saw their values and perceptions as greatly influenced by direct interaction with animals, usually from an early age.

> I am from an agricultural family… From the age of 6 until I was 12, I was a shepherd… I think that it is essential for someone working with farm animals to observe and interact with them from a young age [Alternative Farmer Walter].

Indeed, most participants believed that direct interaction is important for all those working with livestock. They argued that in order to understand animals and actively provide for their needs, farmers had to learn from experience.

In addition, participants attached value to the norms of their farming ancestors which they generally associated with non-confinement farming methods and traditional markets. These norms represented a perceived ideal for many, including some who now use confinement methods.

> My mother… had cattle and pigs, so I think I take the love of animals and agriculture after my mother and her ancestors. My father's ancestors were also from the peasantry… We have always had a few fattening pigs and breeding sows around the house [Confinement Farmer George].

Farmers saw these core values as aligned with the norms of farming communities and of wider society whereby necessary harms (slaughter) are accepted but both human well-being and animal welfare need to be taken into consideration.

Participants also valued the trustworthiness and accountability that they associated with traditional farming communities. One participant contrasted trustworthiness with a modern HACCP (Hazard Analysis and Critical Control Point) system:

> How much has the world changed? You can either use an HACCP system with 287 stamps and 48 members of staff or you can do as those social groups who learned from experience, where honour and trustworthiness were the certificates and trademarks. If somebody was found to sell weevil-infested beans for consumption or a scabby animal for slaughter… then they had a negative record and were immediately outcast from producer groups… This method [of accountability] has been completely degraded [Alternative Farmer Walter].

Values specific to alternative systems

In addition to shared core values, participants also expressed context-specific values that appeared closely linked to the type and scale of their farming operation.

Alternative farmers argued that to ensure animal welfare, their responsibility is to maintain direct interaction with the animals, as well as with staff, and to minimise or avoid the use of confinement or automation.

> The most important aspect of working with farm animals… is [the farmer's] attention. You have to be vigilant and realise that… there are always exceptional or unique cases that need to be addressed [Alternative Farmer Edith].

This emphasis on personal attention to animals was consistently articulated. Thus, animal welfare in alternative farming was seen to depend primarily on the performance and vigilance of the farmer and on keeping a herd size small enough that the farmer could actively engage with the animals.

Alternative farmers also expressed scepticism of confinement farming technologies and of companies engaged in large-scale meat processing. Their beliefs led them to avoid commercially processed products.

> I asked [the processors], how on earth do they produce 800 HUF per kg [~2.50€] sausages from 1,000 HUF per kg [~3€] meat?... And they opened my eyes and I was unable to touch anything ever again… So, I told my wife that she could not buy anything from the food stores [Alternative Farmer Ryan].

Alternative farmers were thus found to reflect critically on different production methods, and they made a deliberate choice to align their practices with their principles and keep animals in near-natural conditions.

Values specific to confinement systems

Confinement farmers in general argued that their primary responsibility is to achieve the most efficient production possible and ensure a sufficiently large scale to remain competitive in the market. They also saw their tasks as co-ordinating staff, monitoring animals, and using automated technologies to ensure that the farm is managed according to their standards.

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There appeared, however, to be a division of opinion that correlated with farm size. Nine of the confinement producers operated medium-sized units of 400–600 sows. These participants emphasised that they need to be personally engaged — with the staff, the animals and the technology — in order to ensure high standards of farm and animal management:

> I believe that whatever your [farming] technology if you have several thousand sows, you will never be able to supervise your operation as in a 400-sow farm like this one [Confinement Farmer Martin].

The three participants with large operations (roughly 1,000 sows or more) noted that they have limited direct engagement with animals and that their primary tasks are to hire appropriate staff, obtain veterinary and other expert advice, and obtain appropriate technology and inputs, and that these create the best possible scenario for animal farming.

> I have high working standards and requirements for my manager. I am happy with him and he is happy with me, otherwise we could not work together. And this system goes down in a pyramid… We have an official vet… specialised vets… and experts… They come in three-week to six-month intervals… and we work [in the office] until we can solve problems that arise… and reach a consensus [Confinement Farmer Harry].

Medium-scale confinement farmers also expressed some unease with confinement farming technologies. Indeed, most agreed that in ideal circumstances animals should be kept in more natural conditions, and some were found to keep pigs for personal consumption separate from their confinement systems, usually at home or with a friend or relative. This finding emerged during the fourth interview; thereafter all participants were asked whether they kept pigs for personal consumption in different conditions, and all seven of the remaining medium-scale producers did so. Hence, the medium-scale confinement farmers used the same methods as large-scale confinement farmers in producing for the market, but they used methods more like those of alternative farmers when producing for personal consumption.

In contrast, the large-scale confinement farmers showed strong confidence in confinement production and in the commercial meat-processing sector. One participant noted that they do not perform on-farm slaughter for their personal consumption:

> My wife does not want the hassle of pig slaughter, processing and freezing. It's perfect for her if the food is half done... Assuming that in the professional processing plant, the frozen hamburger really does not contain any anthrax [Conventional Farmer Harry].

In summary, large-scale confinement producers depended strongly on staff, technology and external inputs to ensure animal welfare, and expressed strong confidence in confinement systems and commercial meat processing, whereas medium-scale confinement producers considered it important to limit the size of the herd so that the producer could remain closely involved, and they — like alternative producers — expressed scepticism of confinement rearing and commercial meat processing.

Discussion

Much previous research has emphasised the differences in values relating to animal welfare between animal producers using confinement vs alternative or organic systems. Confinement producers are known to focus primarily on health and high productivity whereas alternative producers focus on providing animals with reasonably natural lives (eg Te Velde *et al* 2002; Verhoog *et al* 2004; Lund 2006; Vanhonacker *et al* 2008; de Rooij *et al* 2010; Spooner *et al* 2014b). The participants in our study were largely aligned with these findings but also gave a more nuanced picture both of animal welfare and of ethical animal production in general.

First, confinement and alternative farmers appeared generally to share certain core values including emotional attachment to animals, and they saw such attachment as important for ensuring farm animal welfare. Both groups also expressed a need to manage their emotional attachment, perhaps using what Wilkie (2005) has called "concerned detachment." Both groups considered long experience of animals to be important; they identified with the values of their farming ancestors; and they also valued the trust and accountability that they saw as existing in the marketing of farm products in earlier generations.

Second, there was considerable agreement as to what constitutes good animal welfare but differences between groups in how they saw this being achieved. Confinement and alternative producers agreed on the need for good nutrition, but confinement producers emphasised the use of carefully formulated diets evenly distributed to all animals by technology, whereas alternative producers valued natural foods with the animals given choice. Both also recognised the need for satisfactory light and air quality, with confinement producers trying to provide these through artificial lighting and ventilation whereas alternative producers emphasised natural light and fresh air. Both groups agreed on the importance of good health, but confinement producers focused on preventing disease by keeping animals indoors whereas alternative producers emphasised the need for good management to protect animals from injuries, sunburn and other challenges seen in loose and outdoor systems.

Regarding affective states, confinement producers emphasised comfort which they saw as requiring control over barn conditions, whereas alternative producers emphasised allowing animals the freedom to choose their environment, and they saw enjoyment (arising from natural activities like wallowing) as important for welfare. Both groups agreed that animals should not be subjected to stress but they applied the term differently: confinement producers associated stress with disruptive events such as weaning and mixing groups, and they emphasised good management of these processes; alternative producers saw open, semi-outdoor systems as preventing stress that might be caused by confinement. Also, both groups agreed that most painful procedures do not require pain management and all farmers believed that they do not cause long-term suffering or excessive pain.

In the above respects, therefore, there was remarkable agreement over the concerns but disagreement over how the

concerns should be addressed, largely reflecting differences in the priorities and opportunities created within the different farming systems.

An area of some disagreement centred on the value attached to naturalness in the lives of animals. Here, alternative producers saw a near-natural environment and natural behaviour as of prime importance, whereas some confinement producers tended to see technology as helping to prevent welfare problems that might be caused by aggression, competition or human error under less controlled conditions. In addition, some confinement producers saw modern pigs as so remote from their wild ancestors that they do not require natural living conditions.

Of the twelve confinement farmers, however, the nine with medium-scale enterprises (*circa* 400–600 sows) were somewhat critical of intensive indoor systems even though they used them. In fact, their narratives on ideal conditions resembled those of alternative farmers: they generally agreed that farm animals should be kept in more natural, low-intensity systems, and most kept a few pigs in such conditions for their own consumption.

The three farmers with large-scale (> 1,000 sows) confinement operations provided a noticeable contrast. These farmers seemed uncritical of confinement farming methods, and they did not keep more naturally raised animals for personal consumption. Thus, they largely conformed to the views of confinement producers that have been widely reported elsewhere (eg Te Velde *et al* 2002; Vanhonacker *et al* 2008; Spooner *et al* 2014a) which de Rooij *et al* (2010) called the "entrepreneurial discourse" of animal production and which Fraser (2008a) described as reflecting an industrial rather than an agrarian world view.

Producers with large herds also functioned differently, managing a hierarchical staff system and having limited personal interaction with the animals. Thus, from this limited sample of confinement farmers, it appeared that the scale of operation rather than the kind of technology was most correlated with complete confidence in confinement methods. Much of the previous research on farmers' values regarding ethical animal production may differ from ours because the work was done in countries where large-scale, highly intensive confinement systems had become the norm, so that the critical views expressed by our medium-scale confinement farmers were less apparent.

In an earlier analysis (Molnár & Fraser 2020), we noted that confinement producers felt highly constrained by economic pressures in two respects. First, with many producers selling the same generic product to a small number of processors who could source from a wide area, profits per pig were so low that producers felt they had to achieve high output at low cost in order to stay in business, and they saw confinement methods as a way of achieving this. Second, having invested so much in their indoor systems, they experienced a sense of technological lock-in where their only option was to continue using the large capital investment and produce with greater and greater efficiency (see also Hendrickson & James 2005; Fraser 2008b). Such economic constraints may explain why some producers used confinement systems even though they saw them as non-ideal. Thus, constrained circumstances did not necessarily affect these farmers' values regarding ethical animal production but had a marked effect on their production practices. If economic conditions allowed medium-scale producers to use more traditional, natural production methods, they could raise animals more in accordance with their own values.

Animal welfare implications

The findings suggest that to protect animal welfare, different types of farmers have quite different needs. Those with large operations and limited direct contact with animals depend strongly on automation, staff and outside experts to deliver good animal care. For them, a key need is to find and retain well-qualified staff and expertise while remaining competitive. Medium-scale confinement producers see direct engagement with the animals as crucial. These producers need technologies and profit levels that allow them to continue producing at a modest scale of operation. Given the right economic conditions, this group seems most likely to incorporate more natural production methods. For both of the above groups, a regulatory approach (for example, through EU and national legislation) may have some value if it prevents competitors from cutting corners on space allowance, staff time and other factors in ways that drive down prices and force others in the sector to sacrifice animal care to remain competitive. And, for both of these groups, animal welfare might be improved by better technology such as systems that allow the use of bedding and roughage. The alternative producers clearly saw small herds, non-confinement systems and personal contact with animals as crucial for animal welfare. Hence, they need marketing opportunities that would allow the size and type of farms they operate to thrive. Subsidies, regulatory systems and technological developments would need to be tailored to meet these different needs so that producers can improve animal welfare in ways that match their own values and priorities.

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