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Lessons learned from past experience with intensive livestock management systems

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Summary

The main impetus for 'modern' intensive animal production occurred after the Second World War, when Western governments developed policies to increase the availability of cheap, safe food for their populations. Livestock benefit under intensive husbandry by protection from environmental extremes and predators, and better nutritional and health management. Nevertheless, there are costs to the animal, such as impaired social behaviour, limited choice of living environment or pen mates, poor environmental stimulation and behavioural restrictions. The rapid progress in genetic selection of production traits has also, in some cases, adversely affected welfare by creating anatomical and metabolic problems. Above all, the intensively housed animal is heavily reliant on the stockperson and, therefore, inadequate care and husbandry practices by the stockperson may be the largest welfare risk.

In a future in which the food supply may be limited as the world's population grows and land availability shrinks, intensive animal production is likely to expand. At the same time, ethical considerations surrounding intensive farming practices may also become more prominent. Novel technologies provide the opportunity to enhance both the productivity and welfare of intensively kept animals. Developing countries are also establishing more intensive commercial systems to meet their growing need for animal protein. Intensive livestock production in such countries has the potential for major expansion, particularly if such developments address the key constraints of poor welfare, inadequate nutrition, poor reproduction, poor housing, and high mortality often seen with traditional systems, and if farmer access to emerging market opportunities is improved. However, as shown by previous experience, inadequate regulation and staff who lack the appropriate training to care for the welfare of intensively housed livestock can be major challenges to overcome.

Keywords

Animal management – Animal production efficiency – Animal welfare – Domestic livestock – Intensive farming – Intensive production.

Introduction

The hunting and consumption of animals for food by the predecessor of modern humans, *Homo habilis*, and the possible use of fire to cook food occurred possibly two-and-a-half million years ago (1, 2). The increased availability of protein in *H. habilis*'s diet, as a result of meat consumption and probably cooking, is credited with enabling an expansion in brain size, leading to the evolution of modern humans (*Homo sapiens*) (3). The continued use of animals by humans, including as a food source, is prominent in human history and seems relevant to the transition of humans from nomadic hunter-gatherers to herders and agrarians. The invention of agriculture and the so-called 'agricultural revolution', combining the cultivation of plants and the domestication of livestock, enabled humans to maintain a reliable and permanent food supply in close proximity to their place of living, thus improving food security (4, 5). According to the anthropologist Colin Turnbull, through

the domestication of animals, the herders of Africa began to 'control the world' (6).

Domestication is defined as 'the process by which a population of animals becomes adapted to man and to the captive environment by some combination of genetic changes occurring over generations and environmentally induced developmental events recurring during each generation' (7). For domestication to be successful humans must see a need to use the animal and each species needs a degree of developmental plasticity. A number of behavioural pre-adaptation characteristics that predispose particular animal species to domestication have been identified (8). These are related to social structure, intra- and inter-species aggressive behaviour, parenting behaviour, response to humans, temperament, locomotor ability and habitat choice, and feeding behaviour (7). The livestock species domesticated for food production are mainly ungulates (mammals) and galliforms (birds).

Ideally, domesticated livestock and the human herder or farmer exist in a mutually beneficial relationship. The general benefits to livestock include the provision of a managed food supply with adequate nutritional value, an improved level of care, including protection from predators, and better health management (7). However, livestock also incur costs associated with domestication, including the imposition of painful husbandry procedures, such as castration and dehorning, which are performed to improve their manageability. Other potential costs include constraints on reproduction; e.g. castrated individuals can neither perform sexual behaviour nor reproduce. Further, spatial and social behaviour may be restricted as domestic livestock usually have a limited ability to choose group mates, select their own environment or disperse. At the species or breed level there are also risks from artificial (genetic) selection and inbreeding for traits that may reduce biological fitness (9). For the human there are also costs and benefits with livestock domestication, such as the potential for zoonosis and the requirement for a sedentary life (2).

Intensive husbandry has occurred for all commonly farmed domesticated livestock species, which traditionally have been farmed extensively (10). Livestock potentially benefit under intensive husbandry from protection from environmental extremes and predators, and more frequent and closer inspection by the stockperson. Greater attention from the farmer offers the potential for better nutritional and health management. Nevertheless, there are costs to the animal, such as impaired social behaviour, limited choice of living environment or pen mates, poor environmental stimulation and restrictions in performing certain behaviours. Implicit in intensive husbandry, however, is the animal's heavy dependence on regular human inputs to secure optimum welfare and biological performance. Research over four decades has clearly identified the importance of the human–animal relationship for good animal welfare as well as efficient and profitable animal production (11). As the world population grows, an increase in intensive livestock production is considered to be inevitable because it has become an essential method for producing food. Additionally, those livestock industries that can produce food efficiently and with the least carbon footprint, such as the broiler and pork industries, may necessarily be preferred (12, 13). This paper aims to describe the lessons learned from past experience of intensive livestock production. The objective is to suggest where future caution should be applied. In a world in which the food supply may be limited, intensive animal production is likely to continue or even expand (14). What will this mean for the welfare of livestock in developed and developing countries?

Intensification of livestock production

Intensive animal production is not a new phenomenon. For example, sericulture, or the intensive farming of silkworm moths (*Bombyx mori*), began in China five to seven thousand years ago (15). Furthermore, over centuries dairy cattle have been intensively housed (tethered) in barns within/beneath farmhouses during the winter, calves have been intensively housed and fed surplus milk for veal production (16) and pigs fattened (17). However, the main impetus for 'modern' intensive animal production occurred after the Second World War, when Western governments developed policies to increase the availability of cheap, safe food (and especially protein) for their populations. At the same time as these events, farmers had to increase productivity to meet rising costs (18), and this could be achieved through intensive housing of livestock. The initial livestock industries that were 'industrialised' were poultry (eggs, broilers, turkeys, ducks, geese) (19), pigs (17, 20, 21), dairy (milk and veal) (16, 22), beef and lamb (feedlot finishing) (23, 24), and, more recently, sheep intensively housed in sheds ('shedded sheep') for fine-micron wool production (25, 26).

Intensive farming practices beneficially reduced environmental extremes and enabled control over photoperiod (hours of light compared to hours of dark per day) and temperature, thereby reducing the seasonality of production. This, and genetic selection, have made year-round breeding possible. Consequently, continuous production outputs result in regular cash flow and, in association with reduced labour costs, this perhaps encouraged increased capital investment. Such investment has been directed at an expansion of enterprises and/or specialisation of farming from multiple to single species, or from multi-stage to single-stage production (e.g. pigs:

farrowing farm versus growing farm; chickens: separation of layers and broilers). Thus, the key drivers underlying the establishment of intensive farms are largely economic, i.e. to decrease production costs, generate a regular cash flow and thereby offer a reasonable return on capital investment. Economies of scale and opportunities for vertical integration are also enhanced to further reduce production costs. In addition, relatively rapid gains in production efficiency can be achieved from monitoring production data collected under 'controlled' conditions.

In summary, better animal nutrition, feed conversion efficiency, health management, environmental control, control over reproduction, genetic selection of better-performing animals, and consistency of product quality and delivery to the marketplace are attractive features of intensive livestock production.

Since the 1960s, however, animal welfare concerns have been expressed over intensive livestock production or 'factory farming' – a term used by animal activists (27). In 1965, the Brambell Report was submitted to the United Kingdom government following an inquiry into the welfare of animals kept in intensive livestock husbandry systems. The Brambell Committee visited Great Britain, Denmark, the Netherlands and Northern Ireland, inspecting enterprises that intensively farmed pigs, cattle, sheep, turkeys, ducks and rabbits. Interestingly, the Committee decided to exclude dairy cattle from their inquiry, although issues involving veal calves and intensive beef production were reported. The Brambell Report commented adversely on tethering livestock, overstocking and close confinement, the use of slatted flooring, and poor lighting and ventilation for animals (10). Consideration of invasive husbandry procedures was limited in Brambell's main report to 'de-beaking' (beak trimming) of chickens and docking pigs' tails, although appendices to the report addressed pain and distress in animals, without referring to common husbandry procedures such as castration. In the decades since then, other welfare concerns have been added to this list, including the imposition of painful husbandry procedures without the use of anaesthesia or analgesia, the restriction of natural behaviour and the simplification/reduction in complexity of the animals' environment leading to under-stimulation and abnormal behaviours, such as stereotypies (28, 29). During the last 40 years, scientists from various disciplines have worked to develop and validate measures that enable animal welfare to be assessed objectively; for example, in response to intensive housing or the husbandry procedures imposed on livestock (30, 31).

Therefore, although intensive farming practices have revolutionised the availability and affordability of animal proteins, societal concerns soon arose about the ethical and welfare implications of intensive housing systems.

The main intensive livestock industries and selected examples of animal welfare challenges

A list of the main animal products sourced from intensive livestock farming and a selection of generic animal welfare challenges are shown in Table I. Note that several of these challenges overlap and interact. Table II adds detail in the form of examples of specific welfare issues experienced by the main species that are farmed intensively. General information is therefore provided in these tables. However, as not all animal welfare challenges can be easily rectified by the removal of the constraints that lead to them, two examples from Table II are discussed here.

Table I
General welfare issues for animals farmed intensively to provide a range of food and fibre products (9, 29, 32, 33)

General welfare issues	Pork	Cage eggs	Poultry meat	Milk	Feedlot meat	Fibre
Very high production level	X	X	X	X		
High mortality			X			
Infectious disease			X	X	X	
Painful procedures	X	X		X		
Heat load				X	X	
Restricted space (stalls/crates)	X	X				X
Large group size			X	X	X	
High stocking density	X	X	X	X	X	
Lack of exercise	X	X	X			X
Lameness	X	X	X	X	X	
Behavioural limitations	X	X	X		X	X
Barren environment	X	X	X		X	X
Abnormal behaviour	X	X			X	X

Table II
Examples of some of the main animal welfare concerns for intensively farmed livestock (9, 29, 32, 33)

Animal	Welfare concerns	Some of the specific challenges
Pigs (sows)	Housing sows in gestation stalls	Limited social contact, environmental enrichment and foraging; lack of exercise; concentrated diet; stereotypies; lameness
	Housing sows in farrowing crates	*Pre-partum* behaviours inhibited; lack of exercise; selection for large litters; inability of sows to avoid piglets later in lactation
Dairy cows	High milk production	Metabolic diseases; poor body condition; heat load (high temperatures and humidity)
	Hard floor surfaces	Lameness and pain
Beef cattle	Concentrated diet	Acidosis and metabolic diseases; social behaviour problems and bullying
	Exposure to weather extremes	Lack of shade; heat load; dust; high rainfall events bogging cattle in mud
Sheep	Feedlot lambs	Failure to eat; lack of shade; intestinal parasites
	Sheep in sheds	Lack of social contact; lack of specific dietary nutrients and foraging materials; abnormal behaviours
Laying hens	Cage housing	Low space allowance; beak trimming and pain; behavioural restrictions
	Bone fragility and osteoporosis	High egg production and lack of exercise; bone fractures at removal of spent hens
Broilers	Rapid growth and anatomical issues	Large body size; leg problems, lameness and pain; culling of non-viable chicks
	Quality of bedding	Contact injuries from wet litter and pain
Turkeys	Pen housing	High stocking density; rapid growth and large body size; aggression
Ducks	Pen housing	Access to free water; behavioural restrictions; feather pulling; cannibalism

Example 1: confinement versus non-confinement farrowing accommodation for sows

The majority of piglet deaths occur during the first three days after birth. In the 1950s, sows were farrowed 'loose' indoors in straw-bedded pens or outdoors in huts. Litter size averaged about ten piglets and piglet mortality exceeded 25% of piglets born, a level similar to that in wild pigs (34). Farrowing crates were developed around that time to help improve farm productivity by reducing piglet 'wastage' in three main ways (29, 35, 36). First, the design of the crate restricted sow movement with the aim of reducing piglet mortality due to crushing by the sow. Secondly, a better thermal environment during the neonatal period reduced piglet mortality caused by chilling and related starvation. Thirdly, improved hygiene through the use of perforated floors and better construction materials helped to reduce piglet morbidity and mortality due to infections. Farrowing crates have therefore been credited with halving piglet mortality (36, 37). Another issue was farm worker safety. This was also addressed by the crate, which restrained farrowed sows and stopped them from attacking the stockperson (in defence of their litter).

In the 1980s, however, farrowing crates were criticised for preventing pre-partum sows from performing species-specific nesting behaviour, with likely adverse effects on their welfare. This prompted the development of non-confinement pen systems for farrowing indoors (38, 39). However, a persistent problem with such farrowing pens is that piglet mortality is usually higher than with crates (40, 41). Pig producers will be reluctant to adopt farrowing pens for economic reasons, due to the higher piglet losses (41), leading to fewer weaned piglets per litter and higher costs from the extra floor space in comparison to crates (40). Also, sows accidentally crush and kill a higher proportion of their piglets in pens than in crates, which is a clear piglet welfare issue (40). In addition, selection during the past 50 years has produced sows with larger, longer and heavier bodies (42), and a higher average litter size approaching 14 piglets. Moreover, it seems likely that many of the genes for 'good' maternal behaviour in non-confinement housing systems have been lost through culling reactive sows in the earlier decades of intensive housing (43). The 'best' maternal behaviour in farrowing crates may correlate with the least activity or reaction by sows (44). If so, the adoption of farrowing pens will likely be hindered unless geneticists make a concerted effort to identify and select maternal behaviour genes appropriate for 'loose' farrowing environments (45).

Example 2: cages versus free-range housing for laying hens

The housing of laying hens in conventional ('battery') cages is a current international animal welfare topic for the egg industry. Considerable public opposition continues to be expressed to caged egg production. Indeed, some retailers have targeted this negative attitude to build their market share of table-egg sales through selling only 'non-cage eggs', i.e. eggs produced using 'alternative' systems as opposed to conventional cages. In 2006 the European Union published the LayWel review of hen welfare (46), which uses the Five Freedoms concept (47) as a baseline for animal welfare assessment. The scientific review considered four main categories of welfare risk:

– injury, disease and pain (including mortality)
– hunger, thirst and productivity
– behaviour
– fear, stress and discomfort.

Different housing systems were compared, including conventional (intensive 'battery') cages, furnished cages (containing a nest box, dust bath and perch), and large, indoor group systems, such as barns, aviaries and free range (i.e. with outdoor access). The authors of the LayWel report concluded that, apart from the conventional cage system, all other systems had the potential to provide satisfactory welfare for laying hens. However, of the 39 risk categories considered, cage housing was found to provide superior welfare for laying hens in 18 categories (46% of the criteria). Although hen welfare was reported to be substandard in cages, mainly on the basis of behavioural criteria (six of the seven risk categories), no evidence was advanced to justify assigning greater weight to behaviour than to, for example, hen mortality.

Clearly, there is strong political and public pressure in most developed countries to end the use of conventional cage systems for laying hens. Provided that consumers will pay for eggs produced from alternative systems and that those systems remain profitable, alternative egg production can proceed sustainably. However, hen welfare in alternative systems can be poor, based on a range of indicators such as flock mortality (higher, compared to cage systems), flock uniformity (greater liveweight ranges than in cages), hens producing fewer eggs, and greater occurrence of abnormal behaviours such as feather pecking and cannibalism. Amongst other factors, not trimming the birds' beaks has been shown to be responsible for higher hen mortality in alternative systems (48). Continued research is needed to produce genetic lines of hens that do not require beak trimming and are thus better suited to alternative housing systems, as it is unlikely that pressure to remove cage-egg systems will decline in developed countries.

In summary, the generic welfare issues associated with intensive livestock production usually relate to limitations of space for each animal, high stocking density in group-housing systems and behavioural restrictions (Tables I and II). While high stocking density increases the risk of disease transmission, the barrenness of the environment is often reflected in behavioural problems. Where rapid progress has occurred in the genetic selection of production traits, especially with laying hens (high egg numbers per hen), broiler chickens and turkeys (high growth and large body size), dairy cattle (higher volume of milk production) and pigs (rapid growth rate and large litter size), the welfare of these livestock may be adversely affected by anatomical and metabolic problems (Table II). Future research may determine whether metabolic problems such as acidosis cause sickness behaviours and chronic negative emotional states, and thus poor welfare. Above all, inadequate care by the stockperson may be the largest welfare risk for intensively managed livestock (11, 49, 50).

Summary of past learning on animal welfare

By 2050, the world population is predicted to exceed nine billion (51), with 80% of people living in developing countries. In addition, proportionally more people in the developing world are expected to have higher incomes, increasing the demand for developed-world diets, including access to animal proteins (meat, milk, eggs). The greatest increase in meat production in developing countries from 1961 to 2001 was from intensively farmed poultry and pigs (52). Continued growth into the future is predicted for the production of poultry meat, eggs, pork and milk (14). As populations increase, the amount of available arable land is expected to decline. Taken together, these predictions suggest a continuing move towards higher-density animal production systems, with an emphasis on smaller carbon footprints to ensure that people can be fed sustainably. An issue for the 20% of the total world population who live in the developed world is whether it is ethical to continue intensive livestock production. If so, what standards of animal welfare will be required?

Based on what has been learned over the past 50 years about the welfare of livestock in intensive production systems, progressive improvements may be expected by giving attention to the following:

– increasing the monitoring of individual animals
– improving the transparency of livestock farming operations to promote public involvement
– increasing space allowances
– minimising pain from invasive husbandry procedures
– providing environmental enrichment
– stimulating positive emotional states
– re-evaluating genetic selection for high production with the possible inclusion of welfare traits.

Several of these factors will now be considered in more detail.

To improve the welfare of animals managed under any production system 'adequate' levels of on-farm surveillance need to be agreed. 'Adequate' could imply both the frequency and duration of the checks performed, as well as

the level of attention given to individual animals. Greater transparency in farming operations is also required. In the developed world, changing views on the ethics of using animals for food, especially under intensive conditions, may lead to the imposition of special conditions to gain the 'right to farm animals intensively', which would require farming competency to be demonstrated by independent assessors. Furthermore, on-farm transparency, in a very real sense, may become a prerequisite when selling animal products; for example, through the compulsory use of Internet Protocol (IP) video cameras. Independent auditors or even the public may thus gain visual access to the interior of farming operations and judge the standards for themselves. This may also increase compliance with animal welfare codes. In addition, it might drive change beyond minimum code requirements to, for example, reduce stocking density and implement environmental enrichment to improve opportunities for animals to perform their 'natural' behaviour. This would enable farm operators to display their animal facilities in the best light.

The pressure to decrease labour inputs in intensive systems to reduce costs would increase the risk to animal welfare. For example, higher animal-to-human ratios would increase the likelihood that stockpeople would perform inspections inadequately as they would have less time and would perhaps be less motivated to deal with immediate issues. Since intensively housed animals are fully reliant on the stockperson to meet their needs, management is of the utmost importance to their welfare. Furthermore, complacency may occur if stockpeople responsible for very large numbers of animals become habituated to animal welfare problems and therefore fail to recognise, for example, lameness and stereotypies. Not only should a minimum ratio of animals per stockperson be set, but better training allied to higher pay for stockpeople should also be implemented.

Managing the frequency of inspections could be facilitated through using automatic or remote monitoring technology, including autonomous robots and video cameras (53, 54, 55, 56). Continuous monitoring is possible through the use of smart sensing devices, such as electronic feeding systems (57), cough-sound analysis to identify respiratory infection (58), radio-frequency identification (RFID) tags (59) and other wireless devices (60, 61). However, oversight by a skilled human operator remains essential.

As the 21st Century progresses, advances in genomics will need to provide new genotypes of livestock that are better suited to intensive conditions. The future may also include transgenic animals that are resistant to disease or show improved production under intensive housing conditions, allied to enhanced welfare (62). In addition, the location of farms has impacts on transport costs for feed and animal relocation, and capital costs involved in the construction of livestock facilities. These will remain significant issues in a world where competition for land and the cost of energy, feed, water and other relevant resources will increase. Society, however, may need to re-evaluate the location of intensive industries. At present, some intensive pig and poultry farms are considered to be noxious and are typically sited well away from human populations. A bold step might be to site intensively husbanded livestock in outdated, multi-storey apartment blocks on the peripheries of cities or in specially designed buildings, as suggested in the theoretical architectural project for farming pigs in cities, i.e. 'City-Pig' (63). From an animal welfare perspective, the latter might also provide opportunities for improved transparency of farm activities.

One of the larger challenges ahead for improving animal welfare in intensive production systems may relate to providing environments that are conducive to positive emotional states (64). Clearly, further research is required to improve our understanding of how to promote such positive states via practical and economic methods on intensive farms. If success could not be achieved through conventional means of manipulating stocking density, or through behavioural stimulation, might there be a form of pharmacological manipulation that would be acceptable for animals? Would this be ethical?

The developing world

Many developing countries have established more intensive commercial systems to meet the growing need for meat and eggs (65). There has been a 500% increase in *per capita* consumption of eggs and a 300% increase in that of meat over the last 50 years, linked mainly to the rapid increase in poultry production in developing countries worldwide. It is predicted that the greatest increase in livestock production in developing countries in the future will be in poultry meat, eggs, pork and milk production (14).

In many developing countries, however, the welfare of intensively housed livestock is not subject to regulation or codes of practice and staff often lack the appropriate training. Animal health problems cause significant economic losses in the form of high mortality, the high cost of animal health care, poor animal performance and lost market opportunities. One of the key factors responsible for poor health (especially with poultry) is inadequate nutrition (66). The current capacity of animal health services to identify, monitor and manage major animal health and welfare problems is very limited in many such countries (67, 68). In addition, especially with poultry, this may be exacerbated by hot climates (giving rise to thermal stress), high stocking densities and a lack of clean cool water, with further welfare challenges occurring during handling, transport and

slaughter (69). The economic contribution of the intensive livestock sector in developing countries has the potential for major growth, particularly if the key constraints of poor welfare, inadequate nutrition, poor reproduction, poor housing, and high mortality are addressed and if farmers' access to emerging market opportunities is improved.

Livestock make a significant contribution to the livelihoods of smallholder farmers in developing countries, mainly through subsistence and small-scale commercial production of pigs and poultry (Figs 1a to 1d). Small ruminants, cattle and inland aquaculture are also playing an increasing role. The food security and economic benefits from these livestock enterprises are often constrained by poor animal welfare. Generally, livestock health services are limited or absent, housing and nutrition are inadequate, reproduction is poor and the mortality of young stock high. A priority is to promote commercialisation of the smallholder agriculture sector and to enhance the participation of smallholder farmers in formal markets by improving their livestock's health and welfare, nutrition, housing, management and production. It is essential for developing countries to develop the capacity to detect and manage risks to animal welfare. However, many of them have limited animal health and welfare resources and there are many infrastructure impediments to be overcome. Thus, initiatives from the

a) Commercial layer facility for 5,000 birds in Tonga
Diets for layer hens were developed using Tongan feed resources to reduce production costs and minimise the use of expensive imported diets

b) A smallholder broiler farm in Papua New Guinea
Diets were formulated using Papua New Guinean ingredients (sweet potato and cassava) to replace imported grain to reduce the cost of broiler production, improve food security and enhance smallholder farmer livelihoods

c) Semi-commercial pig farm in Papua New Guinea
The owner has an extended family. Members of the family are assigned to look after particular pens. The aim of the project is to improve the use of Papua New Guinean sweet potato and cassava silage in pig diets to improve food security, pig management and smallholder village livelihoods

d) A smallholder pig facility in Simbu province, Papua New Guinea
Mrs Moro Paula Dagima (pointing) looks after the pigs. She cooks sweet potato tubers, vines and leaves for them every day, hence the smoke in the background. This ACIAR project is promoting an improved diet for the pigs to increase pig growth and improve food security, pig management and smallholder village livelihoods

Fig. 1
Projects funded by the Australian Centre for International Agricultural Research (ACIAR) to improve the use of local feed resources to enhance food security and improve livestock management

(Photographs: Dr Phil Glatz)

World Organisation for Animal Health (OIE), especially the development and implementation of Regional Animal Welfare Strategies and support for Animal Welfare Focal Points, as outlined in Section 1 of this issue, are welcome developments.

Conclusions

It seems inevitable that growth in the intensive production of pigs, poultry, dairy and beef cattle, and sheep will continue. Intensive farming practices were developed mainly for economic reasons and are effective methods for producing animal protein (meat, eggs, milk) to feed the increasing world population. In addition to increased demand for food, clean water, energy and other essentials, the growing world population will inevitably result in the expansion of cities and towns. This will reduce the availability of arable land for cropping to produce human food and livestock fodder and grain. Hence, intensive production will need to continue to improve the efficiency of land use.

While intensive livestock production provides both benefits and costs to animals in terms of welfare, concerns about their welfare will continue because of the intensive nature of farming. Although these sentiments are mainly expressed in the developed world, it would be incorrect to suggest that farm animal welfare is not a priority in developing countries. However, other priorities are more pressing in many developing countries, such as achieving better human health and nutrition. Thus, in developed countries – as compared to many developing nations – the priority currently accorded to animal welfare often differs. Although this situation may persist for some years, the OIE Global Animal Welfare Initiative, supported by all 178 Member Countries and Territories, is already bearing fruit and may be expected to further increase the profile of animal welfare as the 21st Century unfolds.

In the developed world, the justification for intensive livestock production will remain an issue of public debate. People will require improved levels of surveillance for monitoring livestock and better qualified stockpeople to manage them. While the application of smart-sensing technology will facilitate productivity and welfare gains, pressure will continue to at least modify confinement housing, including such improvements as keeping animals at lower stocking densities and with a greater space allowance, and providing increased environmental enrichment to stimulate animals. Genomics may help to address current welfare and production limitations by enabling the genetic selection of livestock more suited to intensive husbandry. Further, as science improves our understanding of positive emotional states in animals, farmers may be required to implement management practices that improve opportunities for animals to experience such states. In addition, farmers may be required to demonstrate their competency to operate, allied to a level of transparency that enables independent auditors or even the public to view the daily lives of the livestock; for example, via video cameras. At one extreme, public attitudes may even determine that livestock can no longer be husbanded intensively. If so, one unintended reaction may be that the intensive livestock industries could be relocated to developing countries, where other local pressures may dictate their continued use, but, it is hoped, with animal welfare standards improved by measures such as those just noted.

In the developing world, key drivers will continue to be food security and the need for animal protein. Intensive livestock production is thus likely to become more common. However, the efficiency of animal production and the associated economic benefits may continue to be constrained by poor animal welfare. This is problematic, because, without economic development, it is unlikely that such countries will be able to afford to invest significantly in, for example, the better animal health schemes, cost-effective nutrient sources and heat-resistant genotypes that are fundamental to improving animal welfare. The experience gained in the intensive management of livestock by developed countries since the Second World War, including the recognition of animal welfare problems that accompany changed husbandry practices, is now available to help the developing world to avoid the same pitfalls. However, unless a strong economic base can be established, it is unlikely that food supply limitations in the developing world will be solved. Thus, livestock will, of necessity, continue to be farmed intensively and their welfare in those farming systems may continue to be at risk.

Les leçons tirées de l'expérience passée dans les systèmes de gestion intensifs

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Résumé

L'essor des systèmes « modernes » de production animale intensive date des années qui ont suivi la deuxième guerre mondiale, avec la décision des gouvernements occidentaux de mettre en œuvre des politiques d'appui à l'offre de denrées alimentaires sûres et bon marché pour leurs populations. Les animaux élevés dans des systèmes de production intensive bénéficient d'une protection contre les conditions environnementales extrêmes et les prédateurs, et d'une meilleure gestion de leur alimentation et de leur état sanitaire. Néanmoins, ce type d'élevage a également un coût pour l'animal, car il induit un empêchement du comportement social, un choix du cadre de vie et des congénères limité, une rareté des stimulations environnementales et des restrictions aux manifestations comportementales normales. De même, les avancées rapides de la sélection génétique de traits de production entraînent parfois, dans certains cas, des problèmes anatomiques et métaboliques qui peuvent avoir des conséquences négatives sur le bien-être. Par-dessus tout, l'animal élevé dans des conditions intensives dépend fortement de la personne en charge de l'élevage ; par conséquent, l'insuffisance de soins ou les mauvaises pratiques zootechniques constituent certainement le risque le plus important pour le bien-être animal dans ce cadre.

Compte tenu du fait que les ressources alimentaires vont probablement s'amenuiser à l'avenir, à mesure que la population mondiale s'accroît et que la disponibilité des terres à vocation agricole se réduit, on peut s'attendre à une forte expansion des systèmes de production animale intensive. En même temps, les considérations éthiques liées aux pratiques d'élevage intensif vont certainement jouer un rôle de plus en plus déterminant. Les nouvelles technologies offrent des possibilités d'améliorer aussi bien la productivité que le bien-être des animaux élevés dans des conditions intensives. Les pays en développement commencent également à s'orienter vers des systèmes de production intensive afin d'être en mesure de satisfaire la demande croissante en protéines animales de leurs populations. Les systèmes intensifs ont un fort potentiel d'expansion dans ces pays, surtout si cette évolution parvient à résoudre les problèmes majeurs souvent associés aux systèmes traditionnels, à savoir des conditions médiocres de bien-être animal, une alimentation inappropriée, des taux de reproduction faibles, de mauvaises conditions de logement et des taux de mortalité élevés, et si l'accès des éleveurs aux marchés émergents se trouve facilité. Néanmoins, l'expérience passée montre qu'une réglementation inappropriée et l'absence de formation des personnels d'élevage aux problématiques du bien-être des animaux élevés dans des conditions intensives peuvent poser des problèmes considérables qu'il conviendra de résoudre.

Mots-clés

Animal d'élevage – Bien-être animal – Efficacité de la production animale – Élevage intensif – Gestion des élevages – Production intensive.

Enseñanzas extraídas de la experiencia con sistemas de gestión ganadera intensiva

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Resumen

El principal impulso a la «moderna» producción animal intensiva se dio después de la Segunda Guerra Mundial, cuando los gobiernos occidentales instituyeron políticas destinadas a incrementar las existencias de alimentos baratos e inocuos para nutrir a la población. Las técnicas de producción intensiva benefician al ganado porque le aportan protección frente a las inclemencias ambientales y los predadores, así como una mejor gestión nutricional y sanitaria. Pero el animal también paga un precio por ello, en forma por ejemplo de trastornos de la conducta social, escaso margen para elegir su medio vital y sus congéneres de establo, pocos estímulos ambientales y comportamiento encorsetado. En algunos casos, la velocidad a la que ha avanzado la selección genética de rasgos de producción también ha influido negativamente en el bienestar, generando problemas anatómicos y metabólicos. Pero ante todo y sobre todo, el animal sujeto a producción intensiva es extremadamente dependiente de su cuidador, en cuya persona puede residir el mayor riesgo para el bienestar cuando no cuida bien de los animales ni aplica métodos zootécnicos adecuados.

De cara al futuro, ante la presión que pueden imponer al suministro de alimentos el crecimiento de la población mundial y la menor superficie de tierras disponibles, es probable que la producción animal intensiva vaya en aumento. Al mismo tiempo, las consideraciones éticas que rodean los métodos de ganadería intensiva pueden cobrar también mayor relevancia. Las tecnologías de nuevo cuño ofrecen la oportunidad de mejorar a la vez la productividad y el bienestar de los animales sujetos a producción intensiva. Los países en desarrollo también están instituyendo sistemas comerciales más intensivos para satisfacer su creciente necesidad de proteínas animales. En estos países, la producción ganadera intensiva tiene margen para experimentar un gran desarrollo, sobre todo si a la vez se afrontan los problemas básicos de la falta de bienestar, la inadecuada nutrición, los problemas reproductivos, la estabulación deficiente y la elevada mortalidad que a menudo se observan en los sistemas ganaderos tradicionales, y si con ello mejora también el acceso de los ganaderos a las nuevas oportunidades de mercado. Sin embargo, como nos ha enseñado la experiencia, la falta de reglamentación adecuada y de personal debidamente formado para velar por el bienestar del ganado de producción intensiva puede constituir un obstáculo de gran envergadura.

Palabras clave

Bienestar animal – Eficiencia de la producción animal – Ganadería intensiva – Ganado doméstico – Producción intensiva – Zootecnia.

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