

Fields of innovation: How technology ensures farm animal health and welfare in food production

Animal welfare | Animal diseases | 26 August 2015

Livestock farmers have the difficult task of raising animals to produce safe food for a growing global population. In addition, consumers are increasingly demanding that food meets high standards of quality and animal welfare — all at an affordable price. Within these challenges lie opportunities for embracing new technologies in food production that are critical to ensuring a safe, secure and sustainable food supply.

With the increasing global population, the demand for food, and particularly meat, is higher than ever. Over the past few decades, intensive farming systems have been adopted, allowing for more efficient animal and crop production. This has resulted in a more plentiful and affordable global food supply.

Animal welfare

Recently, European consumers have become increasingly concerned with farm animal health and welfare.¹ In the EU, farmers must comply with legislation that applies to the protection of all farm animals and species-specific provisions that apply to calves, pigs and poultry.²⁻⁵ [The EU Strategy for Animal Welfare 2012-2015](#) aims to support farmers in meeting the welfare standards required by EU law, and to benefit consumers by providing increased transparency and better information.⁶

Good animal welfare, as outlined by the [World Organisation for Animal Health \(OIE\)](#) means ensuring that animals are “healthy, comfortable, well nourished, safe, able to express innate behaviour, and [...] not suffering from unpleasant states such as pain, fear, and distress.” To achieve this, farmers must take measures to prevent disease, secure appropriate veterinary treatment, provide adequate shelter, ensure good nutrition and engage in humane handling and slaughter practices.⁷ Several of these aspects have been addressed through technological developments which have led to an increase in the standards of farm animal welfare. Some of these advances are outlined below.

Precision management

On modern livestock farms, farmers are gaining greater control over production processes thanks to precision management technologies that combine internet communications, IT-based management systems, and real-time data monitoring and analysis. By tracking inputs, such as feed, water and energy, these technologies allow farmers to monitor resources, as well as the health, welfare and performance of their animals — sometimes with just the tap of a tablet button.⁸

Precision management systems can be used specifically to improve farm animal welfare. For example, real-time automatic video monitoring of chicken houses can detect zones of low or abnormal occupation, problems with climate control or malfunctioning feed or water lines, and trigger an automatic alarm

alerting the farmer.⁸ Addressing these problems swiftly ensures the animals are free from hunger, thirst, discomfort and pain, in line with the widely accepted [Five Freedoms of animal welfare](#).⁷

Potential future applications of these systems include electronic tagging and “virtual fencing” of free-ranging grazing cattle. These technologies combine auditory signals (sounds) with positive reinforcement (e.g. small amounts of food or fresh pasture) to guide cattle towards food, fresh water or shelter as needed and to monitor for injuries or illness, without limiting their freedom to behave normally.⁹

Advances in selective animal breeding

For hundreds of years, farmers have been selectively breeding animals and plants resulting in the many varieties we now use in the modern food supply. The main focus has historically been to encourage development of favourable characteristics that increase productivity (e.g. by increasing egg production in chickens or milk production in cows) or reduce disease susceptibility.

In recent years, advances in genetic analysis have allowed the development of selective breeding practises that limit anti-social or undesirable behavioural traits. One example is feather pecking in chickens which can cause injury. Farmers can select against harmful behaviours by observing, over several generations, the behaviour of individual chickens before breeding.¹⁰ However, this is prohibitively time-consuming and expensive in modern intensive farming.

To speed up the process, biological samples are sent to a laboratory for genetic analysis to identify the relevant genes responsible for harmful behaviours such as feather pecking.¹¹ Selective breeding can also reduce the need for alternative methods such as beak trimming, which has its own welfare concerns as it is painful for the animals.

Conclusion

Farm animal welfare is an important issue for consumers, farmers, regulators and NGOs. Livestock farmers today face the challenge of effectively meeting consumer concerns about product safety and animal welfare, at reasonable costs. Technological developments have led to an increase in the standards of farm animal health, welfare and product quality.

References

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3. [Council Directive 2008/119/EC laying down minimum standards for the protection of calves \(codified version\).](#)
4. [Council Directive 2008/120/EC laying down minimum standards for the protection of pigs, p. 5 \(codified version\).](#)

5. [Council Directive 2007/43 laying down minimum rules for the protection of chickens kept for meat production.](#)
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