BVA British Veterinary Association | Policy statement

# BVA Position on UK sustainable animal agriculture

## Executive summary

As the world population continues to grow and the number of people that can afford to eat meat increases[1], global consumption of animal-derived food is expected to double by 2050.[2] With increasing recognition that animal agriculture can be a significant contributor to environmental degradation, climate change, habitat loss and waste, changes in animal production and farming practices are necessary to increase efficiency of agriculture and mitigate environmental impact.

Ensuring the health and welfare of sentient animals is important as a marker of social progress, as well as for the role it plays in achieving other sustainability objectives. Some have noted that achieving good animal welfare is not always advanced as a policy objective in the sustainable development agenda, despite a growing moral imperative to do so and the utility value of healthy and happy animals in helping to achieve the UN Sustainable Development Goals.[3]

With this in mind, the veterinary profession has a key role to play in advancing the roles and status of animals within this debate and ensuring that the highest standards of health and welfare for production animals are maintained and recognised as a key sustainability objective.

As part of the overarching Vet Futures ambition to be clear and assertive about veterinary professionals' role in wider society[4] in its Animal Welfare Strategy 'Vets speaking up for animal welfare', BVA committed to developing a policy position on sustainable animal agriculture and outlining the contribution that the veterinary profession can make to the sustainability agenda in the UK.

The veterinary profession is an integral part of the agricultural and food sector, working collaboratively with others to protect animals, people and the environment they share. Veterinary surgeons provide preventive healthcare and treatment for livestock, as well as carry out health monitoring and disease surveillance, promote good biosecurity, promote high animal health and welfare, undertake research and development, and optimise food productivity and sustainability.[5] Further, veterinary surgeons uphold necessary legislation and international standards pertaining to animal welfare, food safety,

[1] Food and Agriculture Organisation of the United Nations (FAO), 2011. *Mapping supply and demand for animal-source foods to 2030* Available at: http://www.fao.org/docrep/014/i2425e/i2425e00.pdf

[2] Food and Agriculture Organisation of the United Nations (FAO). *Meat and Meat Products.* Available at: http://www.fao.org/ag/againfo/themes/en/meat/home.html

[3] United Nations, 2015. Sustainable Development Goals. Available at: http://www.un.org/sustainabledevelopment/sustainable-development-goals/

[4] Vet Futures Ambition 2:
*Veterinary professionals' role in wider society: That the veterinary professions are clear and assertive about their wider roles in society, including in public health and environmental sustainability, and the critical importance of our scientific expertise is recognised and valued both within our professions and by the public*

[5] British Veterinary Association, Position on veterinary scanning surveillance (animal health and disease monitoring), 2018

accurate certification and traceability. By carrying out surveillance and enforcement from farm to-fork, Official Veterinarians (OVs) certify the trade in animals and animal products thus contributing to economic prosperity, the protection of public health (including from zoonotic disease incursion and antimicrobial resistance) and the sustainability of food production.

Therefore, as animal health and welfare specialists and advocates from farm to fork, the veterinary profession is well-placed to advise and influence sustainable animal husbandry practices at whole system levels; safeguarding animal health and welfare whilst at the same time facilitating production efficiency and environmental protection. [6]

## Sustainability and animal health and welfare

Sustainable animal agriculture can be defined as animal agriculture[7] carried out in a way that meets the needs of the present without compromising the ability to meet the needs of the future. Sustainable animal agriculture should be undertaken in a way that is environmentally, ethically and economically acceptable for consumers, producers and wider society. As part of this, animal health and welfare should not be unnecessarily compromised to address human need and in order to be considered sustainable, agricultural systems must work towards the positive health and welfare of all farmed animals raised within them.

As a health-centred profession and key stakeholder in the One Health agenda, the veterinary profession also recognises that policies relating to sustainable animal agriculture must address the use of natural resources, protection and conservation of wild species, habitats and biodiversity in order to better protect the environment which both humans and animals share and reduce the ecological footprint of animal agriculture as a whole.

## BVA recommendations

Our specific recommendations to enable the veterinary profession and other key stakeholders to contribute to the sustainable animal agriculture agenda centre on eight areas:

- Animal health and welfare as a key sustainability objective
- Sustainable resource management to protect and conserve species, habitats and biodiversity
- The role of the veterinary profession from farm to fork
- Welfare outcome assessment, including at slaughter
- Emerging trends: breeding, technology and innovation
- Innovative whole farm management systems to deliver both environmental and animal health and welfare public goods
- Alternative sources of protein
- Consumers and sustainable consumption of animal-derived products

Our specific recommendations are:

**Animal health and welfare as a key sustainability objective**

[6] Food and Agriculture Organisation of the United Nations (FAO), 2011. *Mapping supply and demand for animal-source foods to 2030* Available at: http://www.fao.org/docrep/014/i2425e/i2425e00.pdf

[7] Where animal agriculture includes aquaculture and gamebirds

**Recommendation 1:** Animal welfare should not be unnecessarily compromised to address human need, in order to be considered sustainable agricultural systems must work towards the positive health and welfare of all farmed animals raised within them. BVA supports the Farm Animal Welfare Committee (FAWC)'s principles for sustainable agriculture and animal welfare.

**Recommendation 2:** To be considered sustainable, agricultural systems must provide for the five animal welfare needs, positive health outcomes and adhere to OIE standards for animal health and welfare, offering stimulating living environments to allow for the performance of highly motivated behaviours; opportunities for positive welfare outcomes, such as comfort, pleasure, interest and confidence; and excellent health outcomes.

## Sustainable resource management to protect and conserve species, habitats and biodiversity

**Recommendation 3:** Policies relating to sustainable animal agriculture must address the use of natural resources, protection and conservation of species, habitats and biodiversity in order to better protect the environment which both humans, domestic and wild animals share and reduce the ecological footprint of animal agriculture as a whole.

## The role of the veterinary profession from farm to fork

**Recommendation 4:** All veterinary surgeons should be able to articulate the contributions that the profession can make to the sustainable agriculture agenda; at the levels of individuals (communicating directly to animal keepers and owners), communities (eg. veterinary practices serving as credible and informed animal welfare hubs) and nationally (eg. veterinary associations developing and advocating policy).

## Welfare outcome assessment, including at slaughter

**Recommendation 5:** BVA would welcome the further development of animal welfare metrics across species and sectors where they do not currently exist so that indicators of positive welfare, emotional and behavioural states are incorporated into welfare outcomes assessment and lifetime welfare assessment where possible.

**Recommendation 6:** To avoid oversimplification when considering how different production systems address animal health and welfare needs, animal health and welfare outcome assessments should form part of production system key performance indicators.

**Recommendation 7:** The Government should use public money to incentivise and support animal health and welfare outcomes as public goods.

## Emerging trends: breeding, technology and innovation

**Recommendation 8:** Further consideration should be given to how breeding and genetic modification can be used in an ethically responsible way to improve animal health and welfare within sustainable agriculture.

**Recommendation 9:** Whilst BVA recognises the role of new technologies and innovative methods in monitoring animal health and welfare outcomes, addressing animal health and welfare conditions and optimising the contribution of each animal to agriculture systems, automatic systems should not replace the regular physical assessment of welfare and behavioural needs and appropriate human interventions by skilled veterinary professionals and keepers.

**Recommendation 10:** New technologies and innovative whole farm management models used to improve the contribution of animals, be that in terms of the production of food, animal feed or environmental goods, must not compromise the welfare needs of the animals in question.

## Alternative sources of protein

**Recommendation 11:** To progress towards being a key stakeholder in the production of insects as a food source, the veterinary profession should develop further understanding and specific expertise in relation to insect rearing health and welfare issues, husbandry systems and assuring food safety for human consumption.

## Consumers and sustainable consumption of animal-derived products

**Recommendation 12:** Within the context of One Health, the veterinary profession should promote the benefits of sustainable consumption and the concept of “less and better”, which sees some citizens reduce consumption of animal derived products, whilst maintaining proportional spend on high animal health and welfare products.

**Recommendation 13:** The veterinary profession should promote the benefits of properly valuing quality animal-derived products, where quality encompasses good animal health and welfare, food safety, environmental protection and fair returns for producers.

# BVA Position on UK sustainable animal agriculture

## Introduction

As the world population continues to grow and the number of people that can afford to eat meat increases[8], global consumption of animal-derived food is expected to double by 2050.[9] With increasing recognition that animal agriculture can be a contributor to environmental degradation, climate change, habitat loss and waste, changes in animal production and farming practices are necessary to increase efficiency of agriculture and mitigate environmental impact.

Ensuring the health and welfare of sentient animals is important as a marker of social progress, as well as for the role it plays in achieving other sustainability objectives. Some have noted that achieving good animal welfare is not always advanced as a policy objective in the sustainable development agenda, despite a growing moral imperative to do so and the utility value of healthy and happy animals in helping to achieve the UN Sustainable Development Goals.[10]

With this in mind, the veterinary profession has a key role to play in advancing the roles and status of animals within this debate and ensuring that the highest standards of health and welfare for production animals are maintained and recognised as a key sustainability objective.

As part of the overarching Vet Futures ambition to be clear and assertive about veterinary professionals' role in wider society[11] in its Animal Welfare Strategy 'Vets speaking up for animal welfare', BVA committed to developing a policy position on sustainable animal agriculture and outlining the contribution that the veterinary profession can make to the sustainability agenda in the UK.

The veterinary profession is an integral part of the agricultural and food sector, working collaboratively with others to protect animals, people and the environment they share. Veterinary surgeons provide preventive healthcare and treatment for livestock, as well as carry out health monitoring and disease surveillance, promote good biosecurity, promote high animal health and welfare, undertake research and development, and optimise food productivity and sustainability.[12] Further, veterinary surgeons uphold necessary legislation and international standards pertaining to animal welfare, food safety, accurate certification and traceability. By carrying out surveillance and enforcement from farm to-fork, Official Veterinarians (OVs) certify the trade in animals and animal products thus contributing to economic prosperity, the protection of public health (including from zoonotic disease incursion and antimicrobial resistance) and the sustainability of food production.

Therefore, as animal health and welfare specialists and advocates from farm to fork, the veterinary profession is well-placed to advise and influence sustainable animal husbandry practices at whole

[8] Food and Agriculture Organisation of the United Nations (FAO), 2011. *Mapping supply and demand for animal-source foods to 2030* Available at: http://www.fao.org/docrep/014/i2425e/i2425e00.pdf
[9] Food and Agriculture Organisation of the United Nations (FAO). *Meat and Meat Products.* Available at: http://www.fao.org/ag/againfo/themes/en/meat/home.html
[10] United Nations, 2015. Sustainable Development Goals. Available at: http://www.un.org/sustainabledevelopment/sustainable-development-goals/
[11] Vet Futures Ambition 2:
*Veterinary professionals' role in wider society: That the veterinary professions are clear and assertive about their wider roles in society, including in public health and environmental sustainability, and the critical importance of our scientific expertise is recognised and valued both within our professions and by the public*
[12] British Veterinary Association, Position on veterinary scanning surveillance (animal health and disease monitoring), 2018

system levels; safeguarding animal health and welfare whilst at the same time facilitating production efficiency and environmental protection.

## Animal health and welfare as a key sustainability objective

Sustainable animal agriculture can be defined as animal agriculture[13] carried out in a way that meets the needs of the present without compromising the ability to meet the needs of the future. Sustainable animal agriculture should be undertaken in a way that is environmentally, ethically and economically acceptable for consumers, producers and wider society. As part of this, animal health and welfare should not be unnecessarily compromised to address human need and in order to be considered sustainable, agricultural systems must work towards the positive health and welfare of all farmed animals raised within them. BVA supports the Farm Animal Welfare Committee (FAWC)'s principles for sustainable agriculture and animal welfare[14]:

> ***Animal welfare is integral to sustainable agriculture:***
>
> *i. Agriculture cannot be considered sustainable if it is achieved at an unacceptable cost to animal welfare.*
>
> *ii. Sustainable agriculture must take account of the fact that farmed animals are sentient individuals.*
>
> *iii. Sustainable agriculture must include a duty of care for the physical and mental needs and natures of farmed animals, and should not depend on prolonged or routine use of pharmaceuticals, or on mutilations.*

Approaches to, and policies on, sustainable animal agriculture must ensure that farm animals have a good life and a humane death. To be considered sustainable, production systems should work towards positive health outcomes, the five animal welfare needs[15] and adhere to OIE standards for animal health and welfare, offering stimulating living environments to allow for the performance of highly motivated behaviours; opportunities for positive welfare outcomes, such as comfort, pleasure, interest and confidence; and excellent health outcomes.[16]

These five animal welfare needs are set out in the UK Animal Welfare Acts as:

- The need for a suitable environment
- The need for a suitable diet
- The need to be able to exhibit normal behaviour patterns
- The need to be housed with, or apart from, other animals
- The need to be protected from pain, suffering, injury and disease

**Recommendation 1:** Animal welfare should not be unnecessarily compromised to address human need, in order to be considered sustainable agricultural systems must work towards the positive

[13]Where animal agriculture includes aquaculture and gamebirds
[14] Farm Animal Welfare committee (FAWC), 2016. *Sustainable agriculture and animal welfare.* Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/593479/Advice_about_sustainable_agriculture_and_farm_animal_welfare_-_final_2016.pdf
[15] Animal Welfare Act 2006, Animal Health and Welfare (Scotland) Act 2006, Welfare of Animals Act (Northern Ireland) 2011
[16] Farm Animal Welfare Committee (FAWC), 2009. "Farm Animal Welfare in Great Britain: Past, Present and Future". Available at: https://www.gov.uk/government/publications/fawc-report-on-farm-animal-welfare-in-great-britain-past-present-and-future

health and welfare of all farmed animals raised within them. BVA supports the Farm Animal Welfare Committee (FAWC)'s principles for sustainable agriculture and animal welfare.

**Recommendation 2:** To be considered sustainable, agricultural systems must provide for the five animal welfare needs, positive health outcomes and adhere to OIE standards for animal health and welfare, offering stimulating living environments to allow for the performance of highly motivated behaviours; opportunities for positive welfare outcomes, such as comfort, pleasure, interest and confidence; and excellent health outcomes.[17]

## Sustainable resource management to protect and conserve species, habitats and biodiversity

As a health-centred profession and key stakeholder in the One Health agenda, the veterinary profession recognises that policies relating to sustainable animal agriculture must also address the use of natural resources, protection and conservation of wild species, habitats and biodiversity in order to better protect the environment which both humans and animals share and reduce the ecological footprint of animal agriculture as a whole. As highlighted by the Food and Agriculture Organization of the United Nations:

*"If managed sustainably, agricultural sectors can contribute to important ecosystem functions. These include maintenance of water quality, nutrient cycling, soil formation and rehabilitation, erosion control, carbon sequestration, resilience, habitat provision for wild species, biological pest control and pollination."* [18]

**Recommendation 3**: Policies relating to sustainable animal agriculture must address the use of natural resources, protection and conservation of species, habitats and biodiversity in order to better protect the environment which both humans, domestic and wild animals share and reduce the ecological footprint of animal agriculture as a whole.

## The role of the veterinary profession

The veterinary profession has a clear role within sustainable animal agriculture to advise on, develop and conduct further research into management systems and husbandry practices that work towards sustainable models of production, both in terms of positive animal health and welfare, public health and food safety, as well as the local environment and economic sustainability for producers. This role includes taking an evidence-based approach to advising on the practical steps needed to improve existing systems such as building design, husbandry practices, biosecurity, the responsible use of medicines and disease prevention and control mechanisms. In addition, some members of the profession have the skills and capabilities required to fulfil an expert role in these areas on a national, as well as international, platform.

Further, as an evidence-based, scientific profession, the veterinary voice is also valued by both producers and consumers as an 'honest-broker' of information about animal-derived food. With this in mind, the profession has a role to play in informing and educating the public as to the provenance, pricing and value of food, as well as dispelling common misconceptions about how production systems and new technologies impact on animal health and welfare.

Future animal agriculture not only has several sustainability objectives (eg. mitigating climate change; water usage efficiency; preventing antimicrobial resistance; ensuring high animal health and welfare; preventing biodiversity loss and restoring habitats; food safety, nutrient quality and affordability) but

[17] Farm Animal Welfare Committee (FAWC), 2009. "Farm Animal Welfare in Great Britain: Past, Present and Future". Available at: https://www.gov.uk/government/publications/fawc-report-on-farm-animal-welfare-in-great-britain-past-present-and-future

[18] FAO, 2017. Sustainable agriculture for biodiversity: Biodiversity for sustainable agriculture. Available at: http://www.fao.org/3/a-i6602e.pdf

also multiple stakeholders (those whose interests are affected by agricultural methods and policy, including producers, citizens, farmed animals, wildlife and the natural environment). The veterinary profession, both at practitioner and policy levels, is familiar with identifying and weighing multiple, sometimes conflicting, interests. As an animal welfare-focused profession, we are clear in our duty to give primary consideration and weight to the welfare interests of sentient animals, and to advocate for their best interests, enabling policy-makers and the public to make informed decisions on how to legislate and consume.

From this underlying principle, all veterinary surgeons should have a good level of knowledge in these areas and be able to articulate the contributions that the profession can make to the sustainable agriculture agenda; for example, at the levels of individuals (communicating directly to animal keepers and owners), communities (eg. veterinary practices serving as credible and informed animal welfare hubs) and nationally (eg. veterinary associations developing and advocating policy). Examples of activities at each level could include the following:

### Individuals

- Creating farm health and welfare plans to prevent and control disease, increasing efficiency and welfare
- Using benchmarking tools to monitor and reduce, for example, lameness and antibiotic use
- Advising on and promoting higher welfare systems at times of farm investment, such as building redesign
- Always taking a "3Rs" (Replacement, Reduction and Refinement) approach when advising on mutilations – aiming to prevent the need for procedures and using modern analgesia protocols when the procedures are absolutely necessary
- Considering eating "less and better" by reducing consumption of meat while maintaining proportional spend so that this spend is directed towards higher health and welfare products
- Promoting the value of farm assurance schemes. The BVA position on farm assurance schemes and the BVA #ChooseAssured: UK Farm Assurance Schemes Infographic can be used as reference tools when talking to clients or other members of the public about the value of farm assurance schemes and how they can choose ethical and sustainable animal food products
- Upholding existing legislation with regard to protecting public health (the prevention of zoonotic disease), food safety and food hygiene and reporting and monitoring food chain information
- Safeguarding and promoting animal welfare at slaughter and welfare during transport in line with existing legislation

### Practices

- Creating practice policies on mutilations based on the "3Rs" (Replacement, Reduction, Refinement) and modern analgesia protocols
- Distributing educational materials (eg. The BVA position on farm assurance schemes and the BVA #ChooseAssured: UK Farm Assurance Schemes Infographic to help clients make informed and ethical food choices (NB this can be undertaken by all practices, eg. companion and equine, as well as farm practices)
- Creating and communicating a practice food procurement policy, to be used, for example, when providing animal-derived food to hospitalised patients, or when selecting venues for staff

meetings and gatherings. The BVA food procurement policy, incorporating sustainability of harvest, animal health and welfare, fair conditions for producers and food miles, could be adopted for this purpose

- Offering visits to local politicians and key opinion leaders, to discuss the challenges of future animal agriculture and to advocate the best interests of animals when considering solutions

### Associations

- Raising awareness of the challenges facing the global food system, providing thought leadership, opportunities for informed debate and consistently advocating the importance of animal health and welfare as a sustainable development goal
- Considering the interests of all stakeholders when developing policy related to animal agriculture and ensuring that primary consideration and weight is given to the welfare interests of animals
- Promoting the practical experience, scientific expertise and ethical reasoning abilities of veterinary surgeons to policy makers involved with the future of animal farming
- Collaboratively developing policy on welfare problems affecting farmed animals, as mandated by the BVA Animal Welfare Strategy: Vets speaking up for animal welfare
- Developing and signposting evidence-based information to citizens on farm assurance schemes, to enable them to make informed, sustainable and more ethical purchases

**Recommendation 4:** All veterinary surgeons should be able to articulate the contributions that the profession can make to the sustainable agriculture agenda; at the levels of individuals (communicating directly to animal keepers and owners), communities (eg. veterinary practices serving as credible and informed animal welfare hubs) and nationally (eg. veterinary associations developing and advocating policy).

## Welfare outcome assessment

BVA recognises that from an animal health and welfare point of view, it is not sufficient to carry out a tick-box exercise in terms of inputs. BVA supports welfare outcome assessment in assurance schemes as a tool to drive continuous improvement of animal management and husbandry practices (including welfare at slaughter and food hygiene), in turn promoting high animal health and welfare. The standardised assessment of welfare outcomes provides a practical and scientifically informed method of assessment that aims to provide a more objective, accurate and direct picture of animal welfare. Indicators of positive welfare should be incorporated into welfare outcome assessments whenever possible, as promoted by the Farm Animal Welfare Committee (FAWC)'s "good life" framework.[19] Behavioural opportunity for animals can be a key differentiator between some production systems, which is linked to the potential for good animal health and welfare when delivered with excellent health and welfare outcomes.

A welfare outcomes approach also contributes to informed considerations of the advantages and disadvantages of different production systems, assisting producers and consumers to consider how well a production system holistically meets all of an animal's health and welfare needs.

We would welcome the further development of animal welfare metrics across species and sectors where they do not currently exist so that indicators of positive welfare, emotional and behavioural

[19] Ibid.

states are incorporated into welfare outcomes assessment and lifetime welfare assessment where possible.

In the context of sustainable intensification[20, 21], it is important to avoid oversimplification when considering how different production systems address animal health and welfare needs and recognise that welfare outcomes are not solely dependent on the type or size of different production systems.

As such, animal health and welfare outcome assessments should form part of production system key performance indicators and the Government should utilise public money to incentivise and support animal health and welfare outcomes as public goods.

**Recommendation 5:** BVA would welcome the further development of animal welfare metrics across species and sectors where they do not currently exist, so that indicators of positive welfare, emotional and behavioural states are incorporated into welfare outcomes and lifetime welfare assessment where possible.

**Recommendation 6:** To avoid oversimplification when considering how different production systems address animal health and welfare needs, animal health and welfare outcome assessments should form part of production system key performance indicators

**Recommendation 7:** The Government should use public money to incentivise and support animal health and welfare outcomes as public goods

## Emerging trends: breeding, technology and innovation

The following are areas where novel approaches are ripe for veterinary influence to ensure animal health and welfare is advanced as a key sustainability objective:

### Breeding

Further consideration should be given to how breeding and genetic modification can be used in an ethically responsible way to improve animal health and welfare within sustainable agriculture. For example, choosing breeds that are suitable for the local environment (eg. the Herdwick sheep[22], which has adapted to live and rear young on the high fells of the Lake District[23]); selecting animals with certain anatomical and conformational traits that eliminate the need for mutilations (eg. polled animals); or animals that have been bred for increased disease resistance to achieve optimal animal health, welfare and environmental outcomes.

Existing examples across species sectors currently include:

**Cattle** - With regards breeding a more robust and sustainable cow there are several initiatives in this area for dairy and beef cattle. The Agriculture and Horticulture Development Board (AHDB) fund the collection of data on bulls used in the dairy industry and produce estimated breed values. This

[20] Sustainable intensification is defined in the Government Office for Science (2011) The Future of Food and Farming: Challenges and choices for global sustainability report as "…simultaneously raising yields, increasing the efficiency with which inputs are used and reducing the negative environmental effects of food production. It requires economic and social changes to recognise the multiple outputs required of land managers, farmers and other food producers, and a redirection of research to address a more complex set of goals than just increasing yield."

[21] Farm Animal Welfare Committee (FAWC), 2012. FAWC advice on sustainable intensification of livestock agriculture. Available at: https://www.gov.uk/government/publications/fawc-advice-on-sustainable-intensification-of-livestock-agriculture

[22] Dianna Bowles , Amanda Carson, Peter Isaac, 2014. Genetic Distinctiveness of the Herdwick Sheep Breed and Two Other Locally Adapted Hill Breeds of the UK. Available at: http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0087823

[23] Bowles, D., Carson, A. and Isaac, P, 2014. Genetic distinctiveness of the Herdwick sheep breed and two other locally adapted hill breeds of the UK. PLoS One 9, e87823

includes many factors regarding animal health and welfare and efficiency, these range from ease of calving, confirmation, fertility, somatic cell count as well as yield and milk constituents.

**Goats** - Goat dairy producers are working with research institutions such as Scotland's Rural College (SRUC) to develop goat genomics to increase outputs from reduced inputs, whilst improving the health, welfare and longevity of the herd. These genomic breeding programmes deliver breeding values for yield, fat and protein, conformation, mastitis resistance, longevity and feed efficiency.

**Poultry –** Due to the highly centralised and integrated nature of the poultry sector, along with a relatively short generation interval, any changes in genetics can be rapidly and widely disseminated across both the poultry egg and meat sectors. Examples of such selection changes are; improved leg health and cardiovascular health in broiler chickens leading to lower mortality rates on broiler farms along with lower levels of ascites.

**Pigs** – The usefulness of routine collection of on-farm data to model and predict selection of pigs for disease resistance and disease tolerance has been emphasised as sustainable, economically feasible and desirable. [24, 25]

**Sheep** – Electronic Identification (EID) can support data collection for performance recording and estimated breeding values in sheep, allowing for the identification and sorting of sheep into different mating groups based on health and welfare outcomes and efficiency.[26]

**Recommendation 8:** Further consideration should be given to how breeding and genetic modification can be used in an ethically responsible way to improve animal health and welfare within sustainable agriculture

## Technology and innovation

We recognise the role of new technologies and innovative methods in monitoring animal health and welfare outcomes, addressing animal health and welfare conditions and optimising the contribution of each animal to agriculture systems eg. Precision Livestock Farming.[27] We would welcome the innovative use of existing technologies eg. camera and sensory technologies to generate automated health and welfare outcome measures and monitor and reduce environmental impacts.

Existing examples technology across species sectors currently include:

**Cattle** - Dairy automation or automated milk harvesting systems are becoming more prevalent in the dairy industry to improve health and welfare outcomes alongside milk quality. There are also many examples of technologies that are used to monitor health and welfare parameters in cattle, such as the use of video monitoring, temperature monitoring, data input into phone applications etc. See National Mastitis Council for more details.

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[24] Stear M. J., Bishop S. C., Mallard B. A., Raadsma H. (2001). The sustainability, feasibility and desirability of breeding livestock for disease resistance. Res. Vet. Sci. 71, 1–7 10.1053/rvsc.2001.0496

[25] Guy, S. Z. Y., Thomson, P. C., & Hermesch, S., 2012. Selection of pigs for improved coping with health and environmental challenges: breeding for resistance or tolerance? *Frontiers in Genetics*, *3*, 281. http://doi.org/10.3389/fgene.2012.00281

[26] Morgan-Davies C; Wishart H; Lambe NR; Kenyon F; McBean D; Waterhouse A; McCracken DI, 2015. EID and other technological advances in small ruminant research. Available at: http://animalhealthmedia.com/wp-content/uploads/2015/12/IT-EID.pdf

[27] Precision Livestock Farming is the creation of 'a management system based on continuous automatic real-time monitoring and control of production/reproduction, animal health and welfare, and the environmental impact of livestock production'. Berkmans, D., 2014 Precision livestock farming technologies for welfare management in intensive livestock systems. Rev. sci. tech. Off. int. Epiz., 2014, 33 (1), 189-196. Available at: https://www.oie.int/doc/ged/D13666.PDF

**Fish -** Integrated multi-trophic aquaculture (IMTA) systems are used to recycle the by-products from one species (eg. unused food, nutrients and energy) to become inputs for another, enabling a range of species to be farmed together at the same site (eg. seaweed, shellfish and finfish).[28]

**Goats** – Similarly to cattle, dairy automation or automated milk harvesting systems are becoming more prevalent in the dairy industry to improve health and welfare outcomes alongside milk quality, many dairy cow technologies are available and have been specifically adapted for goats. Further, electronic identification is allowing for the plotting of multiple data points per individual goat to build a picture of herd health, yield, production and genetic data that facilitates the delivery of sustainable herd improvements.

**Pigs** – Researchers are currently developing a 3D camera system to help identify the early signs of tail biting. 3D cameras automatically measure how pigs hold their tails (up or down), indicating early signs of tail injury, allowing early intervention and the prevention of tail biting outbreaks.

**Poultry** - In the poultry sector, in-ovo sexing is currently being explored and developed so that male embryos that are not suitable for egg production can be destroyed before hatching. The poultry sector also widely utilises sensory technology to both better understand, and achieve the most appropriate environmental conditions to improve poultry welfare on farm.

**Sheep** – Electronic Identification (EID) in sheep has led to increased monitoring of individual animals allowing early detection of problems and targeted solutions. For example, with the use of EID, the Moredun Research Institute has carried out a research project focussing on lamb worming management to target individual requirements, which has the potential to slow anthelmintic resistance. [29,30]

Although technologies have the potential to assist in the assessment of health and welfare outcomes, automatic systems should not replace the regular physical assessment of welfare and behavioural needs and appropriate human interventions by skilled veterinary professionals and keepers.[31] Further, new technologies used to improve the contribution of animals in any given system must not compromise the welfare needs of the animals in question.

**Recommendation 9:** Whilst BVA recognises the role of new technologies and innovative methods in monitoring animal health and welfare outcomes, addressing animal health and welfare conditions and optimising the contribution of each animal to agriculture systems, automatic systems should not replace the regular physical assessment of welfare and behavioural needs and appropriate human interventions by skilled veterinary professionals and keepers.

## Innovative whole farm management systems to deliver both environmental and animal health and welfare public goods

The role of livestock in protecting soil health

The use of innovative whole farm management systems that integrate the delivery of environmentally beneficial outcomes as well as high quality animal health and welfare food products is paramount to

[28] Global Food Security, 2014. Insight: The UK Aquaculture Industry. [pdf] Available at: https://www.foodsecurity.ac.uk/publications/insight-issue-four-uk-aquaculture-industry.pdf
[29] Kenyon, F., McBean, D., Greer, A.W., Burgess, C.G.S., Morrison, A.A., Bartley, D.J., Bartley, Y., Devin, L., Nath, M. & Jackson, F., 2013. A comparative study of the effects of four treatment regimes on ivermectin efficacy, body weight and pasture contamination in lambs naturally infected with gastrointestinal nematodes in Scotland. Int J Parasitol Drugs Drug Resist. 3, 77-84
[30] Greer, A.W., Kenyon, F., Bartley, D.J., Jackson, E.B., Gordon, Y., Donnan, A.A., McBean, D.W. & Jackson, F., 2009. Development and field evaluation of a decision support model for anthelminitc treatments as part of a targeted selective treatment (TST) regime in lambs. Vet. Parasit. 164, 12-20
[31] Farm Animal Welfare Committee (FAWC), 2007. Stockmanship and farm animal welfare., Available at: https://www.gov.uk/government/publications/fawc-report-on-stockmanship-and-farm-animal-welfare

ensure environmentally sustainable agriculture. In terms of soil health, in 2010 the annual external cost to farmers from soil erosion and compaction from agriculture in England and Wales was estimated to be £305 million.[32] With this in mind, it is important to recognise the role livestock can play in optimising soil quality and productivity with whole farm management models that minimise environmental degradation and use resources and energy more efficiently.

Under certain circumstances and with the right conditions, inputs and attention to animal health and welfare, management options such as rotational grazing, incorporated within the context of whole farm management, can assist with restoration or improvement of soils and biodiversity.

Mob grazing or managed intensive rotational grazing (MIRG) for example is a form of rotational grazing whereby a high stock density is grazed in a paddock with short grazing periods and long rest periods.[33] This approach ensures that:

- Forage is harvested
- Soil erosion is minimised through rest periods to prevent livestock from continuously treading and compacting the same area
- Manure is dispersed through hoof action, reducing fertilizer maintenance costs and mitigating against the environmental impact of some fertilizers

Veterinary input in the design of managed intensive rotational grazing systems is vital to ensure that provisions are in place across rotations to adequately meet ruminant and non-ruminant nutrient, water, shade and shelter requirements and maintain animal health.

Ensuring sustainable animal feed

In addition, consideration should be given to enabling the sustainable production of animal feed that will be needed to support the projected growth of animal agriculture. It is forecast that meat production will increase by almost 70%, dairy by 55% and aquaculture by 90% by 2050.[34] Consequently, a further 280 million hectares of additional land will be needed by 2030 to produce sufficient animal field to meet this future demand.[35]

With this in mind, there is a need to progress towards 'future-fit' animal feed[36] that minimises competition for land with restorative and biodiversity practices, as well as minimising water use, pollution and overfishing. These aims should be achieved whilst maintaining the current high nutritional value of animal feed in order to continue to support animal health and welfare standards.

**Recommendation 10:** New technologies and innovative whole farm management models used to improve the contribution of animals, be that in terms of the production of food, environmental goods or animal feed must not compromise the health and welfare needs of the animals in question.

## Alternative sources of protein

As demand for animal derived protein increases, BVA recognises the potential contribution of insect protein in addressing the rising need for sustainable human food and animal feed. The production of

[32] Defra, 2018. The Future Farming and Environment Evidence Compendium [pdf] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/683972/future-farming-environment-evidence.pdf
[33] Undersander, D., 2015. Pastures for Profit: A guide to rotational grazing. [pdf] Available at: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1097378.pdf
[34] Alexandratos, N. and Bruinsma, J., 2012. World agriculture towards 2030/2050: The 2012 revision. ESA Working paper No. 12-03. FAO, Rome
[35] Wirsenius, S. et al. ,2010. How much land is needed for global food production under scenarios of dietary changes and livestock productivity increases in 2030? Agricultural Systems, 103, 621-638. doi:10.1016/j. agsy.2010.07.005.
[36] Forum for the future, 2018. Feed compass: the feed behind our food. Available at: https://www.forumforthefuture.org/sites/default/files/files/feed%20behind%20our%20food_artwork_lr_compressed(2).pdf

insects for food and feed carries potential environmental and health benefits, with insect species having a high feed conversion efficiency, low environmental footprint and high-quality protein and nutrients comparable to meat and fish.[37] In some farming sectors such as aquaculture and poultry insects are already being used as feedstock and are likely to become more prevalent. Further, in developing countries where the poorest members of society have an increasing need for the protein and nutrients provided by animal derived products, insect rearing and harvesting presents an accessible form of food and an entrepreneurial opportunity for those in transitional and developing economies.

Given the profession's leadership role in the health and welfare of food producing animals and assuring the safety and quality of animal derived food products, vets have the potential to be a key stakeholder in the production of insects. There are many parallels between the animal health and welfare issues surrounding the production of insect species and more traditional livestock species. These include husbandry, public health (the prevention of zoonotic disease), food safety and food hygiene, ethics, bio-security, food chain information and One Health considerations. With this in mind, there is a need for the profession to develop further understanding and specific expertise in relation to insect rearing health and welfare issues, husbandry systems and assuring food safety for human consumption.

**Recommendation 11:** To progress towards being a key stakeholder in the production of insects as a food source, the veterinary profession should develop further understanding and specific expertise in relation to insect rearing health and welfare issues, husbandry systems and assuring food safety for human consumption.

## Consumers and sustainable consumption of animal-derived products

Vets are a key stakeholder in food production and a key driver in the One Health agenda. As such, the profession has a role to play in influencing discussions around sustainable, healthy consumption and assessing the sustainability of demand-led production models. BVA notes and supports the Farm Animal Welfare Committee (FAWC)'s observations in this regard:

*Rather than entailing ever-increasing production to satisfy consumer demand, consideration of sustainability should call into question demand-led developmental models. The per capita consumption and production of meat and animal products would need to fall, or at the very least, the rate of increase in their consumption and production would need to reduce, if these are to be sustainable, especially in the context of a growing global population.*[38]

It is important to recognise that fewer healthier and happier animals with better productivity have less of an impact at all levels compared to numerous animals with poorer health and welfare outcomes. Considering sustainable consumption and production together can therefore have a positive impact on animal welfare and provide an opportunity to drive consumer demand for high animal welfare products.

Within the context of One Health, the veterinary profession should promote the benefits of sustainable consumption, coupled with properly valuing quality animal-derived products, where quality encompasses good animal health and welfare, food safety, environmental protection and fair returns for producers. In this way, the concept of "less and better" sees some citizens reducing consumption while maintaining proportional spend and directing this spend towards higher health and welfare products. To facilitate this, BVA has produced a position on farm assurance schemes with seven guiding principles to assist its members and the wider public to understand how farm assurance schemes promote higher animal health and welfare, as well as the BVA #ChooseAssured: UK Farm

[37] Food and Agriculture Organisation of the United Nations (FAO), The Contribution of Insect to Food Security, Livelihoods and the Environment. Available at: http://www.fao.org/docrep/018/i3264e/i3264e00.pdf

[38] Farm Animal Welfare committee (FAWC), 2016. *Sustainable agriculture and animal welfare.* Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/593479/Advice_about_sustainable_agriculture_and_farm_animal_welfare_-_final_2016.pdf

Assurance Schemes Infographic to aid the public in their purchasing choices of high health and welfare products.

BVA recognises that in some developing countries public health may benefit from an increase in animal-derived foods and that, to be achieved sustainably, the global veterinary profession plays a pivotal role in increasing efficiency and productivity while ensuring the animals' physical and mental needs are met.

**Recommendation 12:** Within the context of One Health, the veterinary profession should promote the benefits of sustainable consumption and the concept of "less and better", which sees some citizens reduce consumption of animal derived products, whilst maintaining proportional spend on high animal health and welfare products.

**Recommendation 13:** The veterinary profession should promote the benefits of properly valuing quality animal-derived products, where quality encompasses good animal health and welfare, food safety, environmental protection and fair returns for producers.