

The importance of animal welfare and Veterinary Services in a changing world

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Summary

Animal welfare is an essential component of the future of sustainable agriculture and the United Nations Sustainable Development Goals. There is growing global recognition of the importance of animal welfare, which must always be considered as part of the decision-making around food and nutrition security. Veterinary Services, encompassing public and private veterinarians and para-veterinarians, are custodians of animal welfare and key players in future actions to improve it. To ensure that the welfare of animals is improved now, wherever it is needed, and follows a pathway of continuous improvement into the future, must be everyone's responsibility, from the individual farm and practitioner to policy-makers at the national and intergovernmental level. In this paper, after providing background information about current animal welfare issues and identifying animal welfare risks, the authors make a number of recommendations for action at

the institutional and individual level. They do so because they recognise that the former is essential to generate change at scale and effective resourcing, while the latter can create immediate action at a local level and drive change from the ground up. Without coordinated action from Veterinary Services, opportunities to improve animal welfare, alongside human and environmental health and well-being, may very well be lost, and animal welfare may fail to improve or even be at risk of decline.

Keywords

Animal welfare – Animal well-being – Five domains – One Health – One Welfare – Sustainable Development Goals – Sustainable production – Welfare.

Introduction

This paper discusses global challenges to animal welfare, and suggests how, where and why Veterinary Services can contribute to its improvement. There is a growing demand to improve animal welfare in both low- and middle-income countries (LMICs) and high-income countries (HICs). Achieving this throughout the world will require action from individuals on the ground all the way up to decision-makers at government and intergovernmental levels. Consequently, the veterinary professionals who make up each country's Veterinary Services need to be aware of recent developments in animal welfare; the individuals, communities and institutions seeking change; and those who must participate to achieve it.

This paper begins by describing the current understanding of animal welfare and its relevance globally. It then examines the role of Veterinary Services in maintaining and improving animal welfare, and the challenges they face. Finally, the authors describe the actions that Veterinary Services can take to help facilitate improvements to animal welfare.

Animal welfare and its assessment

Animals are sentient, meaning that they experience feelings, so it is important that their basic biological, behavioural and affective state needs are met. This principle underpins both practical and moral concerns when caring for animals and supports the need for a high standard of care, including a humane death. Animal welfare, rights and ethics are separate concepts that need to be interpreted consistently to facilitate discussions of animal welfare (Table I). Welfare can be interpreted as an animal's physical and mental state. Ethics provides the philosophical framework within which this well-being is interpreted and implemented and is influenced by

one's moral views. Animal rights are the product of a particular philosophical and moral viewpoint.

Animal health and animal welfare are complementary, but not synonymous, concepts. Without good health, there cannot be good welfare, but good health alone does not guarantee good welfare. Because of this, animal productivity cannot be a proxy for welfare. Animal productivity and welfare are often positively correlated, up to a certain level, in many production systems, including in LMICs. However, higher levels of productivity can compromise animal welfare (8). Background and profession can also influence how a person focuses on animal welfare. Those with an animal production and veterinary background tend to focus on biological indicators of welfare, whereas the general public tend to focus on natural living, and animal welfare science focuses on affective state (2).

Many Veterinary Service personnel are familiar with the 'Five Freedoms' framework for characterising animal welfare (5) (Table I), and the authors suggest building on these Five Freedoms with a next-stage framework. The 'Five Domains' framework for animal welfare comprehensively describes the essential components for an animal's quality of life (7) (Table I), by building on the Five Freedoms while addressing some of their limitations. For example, the Five Freedoms describe an absence of negative experiences, which is not possible (9), and does not recognise the positive experiences needed for an animal to have a 'life worth living' (7).

Animal welfare needs to be assessed to be understood and improved, and the Five Domains concept provides a framework for this evaluation. When we try to understand animal welfare, our assessments should focus on animal-based measures as they directly identify how well an animal is coping in its environment. Adding management and resource evaluation to animal-based measures under the Five Domains comprehensively identifies where actions need to be taken to correct or mitigate welfare issues.

There has been extensive research to develop animal welfare assessment tools, with a strong focus on European environments and high-resource and larger-scale production systems (10, 11). (One exception has been working equids in LMICs.) The authors suggest that these existing tools can be modified to local situations. A guide to considerations for specific situations is given in **Figure 1**.

Animal welfare as part of a sustainable world

The Food and Agriculture Organization of the United Nations (FAO) links sustainable livestock systems to all 17 of the Sustainable Development Goals (SDGs) (12), and considers animal welfare to be a core component of sustainable livestock production (13). Failing to consider animal welfare can prevent progress towards sustainable development. Animal welfare has financial, nutritional, psychological and health implications for humans, and positive implications for the environment. Demonstrating these relationships is important to create support for animal welfare in situations or circumstances where people may not recognise its intrinsic importance.

Animal welfare and the Sustainable Development Goals

The SDGs are a universal call to action to end poverty and protect the planet without leaving anyone behind (14). The United Nations (UN) 2030 Agenda for Sustainable Development envisages a world where ‘...other living creatures are protected’. Despite this, animal welfare is not recognised within the goals, and policy recommendations have been made to rectify this omission (15, 16).

The associations between the SDGs and animal welfare are multi-faceted (Fig. 2). One half of the 900 million poor people worldwide, who live on less than US\$ 1.90 per day (21), depend directly on livestock for their livelihoods, connecting animal welfare with SDGs 1 and 2: ‘No poverty’ and ‘Zero hunger’ (17, 18). Livestock contribute to three major pathways out of poverty by:

- a) increasing resilience
- b) improving smallholder and pastoral productivity
- c) increasing market participation.

In addition, increasing consumption of healthy and nutritious animal-source foods at the household level is a significant contribution to SDG 2 (21).

Approximately 800 million people’s livelihoods depend on fisheries/aquaculture worldwide (19), and SDG 14 (life below water) outlines steps for the careful management of this essential global resource. Sustainable Development Goal 14 recognises the need to end overfishing, but makes no reference to fish and invertebrate welfare, particularly that of farmed fish. For wild fish, improving catching methods will improve fish welfare and product quality, and reduce by-catch. In intensive fish farms, welfare can be compromised by overcrowding in poor conditions,

starvation, transportation and inhumane slaughter methods (22), and can be a significant source of antibiotic and antiparasitic drugs entering water systems (23). All of these problems threaten our ability to meet SDG 14 targets.

The concepts of One Health and One Welfare (described below) highlight the inextricable links between human health and well-being (SDG 3) and animal and environmental health and welfare. The spillover of zoonotic diseases into humans and overuse of antimicrobials both have their root causes in poor animal welfare (24). Accordingly, improving animal welfare creates an opportunity to reduce the potentially devastating impacts of these events on human well-being.

A largely invisible yet essential contribution to the SDGs comes from working livestock (20). Facilitating farming and transportation, they pull ploughs and carts, deliver goods to market, are essential for water collection for households and other livestock, and provide manure, an important organic fertiliser. Urban uses include construction, the transport of people and goods, and refuse collection (25). A clear connection in policy and practice should be made between working equine welfare and human development.

The livestock and aquaculture sectors are growing at a fast rate. There is an opportunity to steer the direction of this growth to mutually benefit both animal welfare and the attainment of the SDGs, as well as mitigating negative impacts on planetary health (26). One example would be to use current resources more efficiently to produce more animal-source food, or even to reduce the use of these resources. This concept of sustainable intensification can be beneficial to welfare and production when inputs are constrained, but may cause conflict in situations where animal welfare is compromised for other reasons.

One Welfare and One Health

One Health recognises that human, animal and ecosystem health are inextricably linked, and that to achieve sustainable change and optimal health in any of these areas, all three areas have to be addressed (27). One Welfare highlights connections not just between the health of animals, humans and the environment, but also among other aspects of their well-being, including sustainability (28). The One Health and One Welfare frameworks can be used in conjunction to ensure that concerns for people, animals and the environment have been adequately considered (Fig. 1). Examples of One Welfare connections include human livelihoods, personal

empowerment and cultural needs; animal behaviour and opportunities for ‘a life worth living’ (7); and environmental biodiversity, soil quality, and sustainable food systems.

Corollary impacts of improving animal welfare

The wider impacts that seeking to improve animal welfare may have on animal keepers should be understood in the context of livelihoods and animal production systems, as welfare improvement strategies can disproportionately affect particular communities or even countries. For example, improved animal welfare may be institutionalised through national or international quality assurance and compliance schemes. However, these can create discriminatory trade barriers that particularly disadvantage smallholders and small farms in LMICs and HICs, denying them the opportunity to meet welfare standards and/or provide the evidence required, perhaps because auditing is too expensive or records have not been kept (29, 30, 31). National or regional policies often seek to improve welfare by increasing access to formal Veterinary Services. This can directly or indirectly promote sedentarisation, threatening the traditional livelihoods of pastoralist societies, and the social and ecological benefits and public good that pastoralism brings. A better solution is to improve services and welfare through integrated animal health care (32). At a household level, seeking to improve animal welfare on farms by intensifying production, reducing wastage and improving outputs from animals may unduly burden those who usually care for these livestock. In many small-scale production systems, it is women who tend the livestock, manage their feed, water and environment, take care of vulnerable animals, and clean the home and/or pens. Such well-intentioned aims may cause a heavy increase to women’s workloads (33). Avoiding unintended consequences when attempting to improve animal welfare is essential if improvements are to be sustainable, and so diverse consultation, including women and other small-scale farmers, is an essential part of any decision-making process.

Changing global perceptions on animal welfare

A society that increasingly hungers for justice and equality, including progress for women, ethnic minorities and those living with disabilities, has adopted animal welfare as a rapidly evolving social concern. Animal welfare is increasingly recognised by the global community through policy and legislation (34), and there are a broad range of drivers behind this increased demand for improvement. Regional strategies for animal welfare are now available across

continents (e.g. 35). Harmonisation of animal welfare policy has been facilitated through the animal welfare standards set out by the World Organisation for Animal Health (OIE), which provide a scientific basis for management practices that aim to maintain an acceptable standard of animal welfare. Whilst legislation is increasingly being put in place across the world, actual enforcement of animal welfare legislation still remains poor and systems to support compliance are scarce and under-resourced, especially in LMICs (36).

Community-led actions often drive animal welfare change and can do so at a faster pace than industry or government. For example, consumer demand for animal products associated with improved welfare has been an important stimulus for changes in animal farming, leading to, for example, widespread adoption of free-range eggs in many HICs (37). This reflects the fact that animal welfare is becoming increasingly important as animal production becomes more intensive. This development is due partly to the emergence of animal welfare science and the body of work on animal sentience (38, 39).

Community-led action can also be a method for engagement, ownership of issues and the development of practical, sustainable strategies for improvement (e.g. 40, 41, 42). These community engagement strategies focus on participatory and representative decision-making and recognise that it is not only knowledge transfer that will achieve change, but an understanding of the motivations and opportunities of communities and individuals (43). While community-led action has improved animal welfare in many cases, it cannot be solely relied upon for animal welfare action. Behavioural changes around animal welfare are complex and multidimensional. However, with ‘attitude-behaviour gaps’ affecting farmers (44) and consumers (45), participatory approaches are one useful method to bridge the rift between people’s values and intentions and the actions they take.

Veterinary Services for animal welfare

The role of Veterinary Services in animal welfare

Veterinary Services – encompassing both veterinarians and veterinary para-professionals (VPPs) – are widely recognised as key custodians of animal welfare and have a key role in maintaining and improving it. Veterinarians who work directly and indirectly with animals are one of the groups in the livestock sector most likely to place importance on good animal welfare, to believe

that others would approve of them improving animal welfare (46), and to feel that they are expected by the community to improve animal welfare (47). Veterinarians and VPPs have the ability to support animal welfare through the ‘traditional’ veterinary activities of diagnosing, preventing and treating disease; understanding and managing pain; conducting welfare assessments; educating stakeholders, including policy-makers, about animal welfare; helping to develop and implement policy; promoting effective welfare assurance schemes; and undertaking scientific work to improve the understanding and practice of animal welfare (48). The scientific training of veterinarians is often identified as important in supporting evidence-based approaches to improving animal welfare (47, 49, 50, 51). Thus, Veterinary Services have both the opportunity and a clear, leading role to promote good animal welfare, locally, nationally and globally (52).

Capacity needs and opportunities

Despite evidence of the value of animal welfare, in many parts of the world animal welfare science is not recognised as a profession in its own right. It is not included within veterinary curricula or taught to a sufficient standard to meet recommended standards for graduating veterinarians (53). Nevertheless, there are good examples of improvement in these areas (54, 55). Similarly, animal welfare is now included in the recommended competencies for continuing VPP training (56). This is an important consideration, because VPPs are often strongly embedded in local production systems, yet their training is often less formal or organised than that of other animal service providers. Animal welfare and welfare assessment should be incorporated into veterinary and para-veterinary curricula and covered in open-source teaching materials for different animal health service providers, with adaptations to ensure that they are relevant to circumstances in different countries. This need is currently being met by animal welfare and veterinary non-governmental organisations in LMICs through irregular training sessions. These training sessions can be effective ways of making rapid changes in local animal welfare education but must be integrated or coordinated with national education systems to guarantee long-term efficacy.

As discussed below, animal welfare priorities will change over time. This must be reflected in continuing reviews of animal welfare content when teaching veterinarians and VPPs, and included in veterinary continuing professional development (CPD). Strong CPD systems also

ensure the quality of veterinary services provided by the private sector, which are well-established in HICs and gaining importance in LMICs.

Care and ethics for veterinary professionals

As well as capacity challenges, individual veterinarians and VPPs may face obstacles in acting on animal welfare because of the potential conflict between their obligations to their ‘clients’ – the owners or managers of animals (including governments) who pay for their services – and to their patients, the animals themselves (57, 58, 59). This may be a particular challenge in HICs, where mutual improvements in welfare and productivity may be less easy to achieve than in LMICs.

Veterinarians may work to implement, or be guided by, legislation that protects animal welfare, but its existence or extent varies widely across the globe (60). ‘Top-down’ approaches led by government policy and regulation are often used to improve welfare, but this can be hampered by lack of political will or the resources to implement such regulation. This is sometimes particularly the case in LMICs (61), or where legislation is not enforced – an issue in a variety of jurisdictions. Thus, veterinarians may need to work as individuals, in their daily activities, to improve animal welfare. However, this imperative is threatened by the fact that an individual’s capacity is limited. Moreover, legislation itself, when it is seen to be enforced, can be an important motivator for individuals and organisations to work to improve animal welfare (62). There may also be subconscious factors influencing a professional’s impact on animal welfare. ‘Compassion fatigue’ is a commonly reported issue that can affect the care provided to the animal, as well as the mental health of the professional (63, 64). Understanding motivations to improve animal welfare, and finding opportunities to incentivise such improvements, will be crucial in creating change.

Future challenges for animal welfare

Changing dietary needs and demands

Identifying global challenges facing animal welfare is important for agile and responsive action at the individual level and through to policy levels. The evolution of the global middle class (31) is changing dietary demands and values, simultaneously threatening animal welfare and providing important opportunities to improve it. Meeting changing consumer demands for higher

quality and safer food products could have positive impacts on animal welfare, especially in relation to disease control and during slaughter. In contrast, the sheer increase in animals needed to meet this dietary demand automatically puts more animals at risk of poor welfare. Intensification of livestock production (65) has been advocated worldwide as the way to meet this demand, but represents a clear threat to animals if it is not implemented with welfare as one of its operating criteria. A conflict between environmental and animal welfare concerns may also arise, because ‘climate-friendly’ human diets that are associated with lesser amounts of greenhouse gas generally promote animal-sourced products from intensified production systems, with the associated potential risk to animal welfare (66). For example, chicken meat is considered the most climate-friendly meat, but broiler chicken production is one of the greatest animal welfare concerns globally, due to the widespread occurrence of musculoskeletal lesions in birds (67) and the enormous number of broilers reared.

Environment and climate change

Environment-related welfare risks are likely to become more frequent and extreme as the impacts of climate change are felt. Extreme weather, heatwaves, an increase in the average and range of temperatures, changed rainfall patterns, droughts, emerging diseases and changing patterns of disease spread, and changes in plant growth and flora biodiversity are just some examples. Climate-related disasters such as fires and floods are also likely to increase. For example, the 2019–2020 bushfires in Australia were thought to have killed 69,000 head of livestock, burned millions of hectares of productive farmland and resulted in the death of one billion wild animals (68). The UN Sendai Framework for Disaster Risk Reduction (69) explicitly recognises the need to accommodate livestock and working animals, and the Livestock Emergency Guidelines and Standards (70) provide guidelines for rapid and slow-onset disasters.

Global pandemics and disease outbreaks

The impact of global disease outbreaks, such as COVID-19 and African swine fever in Asia (71), will continue to be felt in industries worldwide. Preventing or mitigating future pandemics must focus on animal management. Strategies include stopping or improving the world wildlife trade, using One Health approaches to manage animals and deliver veterinary services (72), increasing food safety, modifying industrial agricultural production practices to either reduce intensity and increase scale, and improving farm biosecurity. Animal welfare may be improved by default or

design in these strategies. There is also a risk that welfare will be compromised by ‘closed systems’ for biosecurity, which may lack transparency or promote mass slaughter and wastage during outbreaks, due to poor preparedness (73), or provide inadequate responses when disease outbreaks occur (74).

Looking forwards: opportunities for action and conclusions

The authors make a number of recommendations for action at an institutional and policy level, alongside individual and community actions, that seek to improve animal welfare through Veterinary Services (Table II). Veterinary Services that are working effectively to improve animal welfare are essential to achieve large-scale change at the national level, whilst the actions of individuals can create immediate change at the local level.

Veterinary Services have a key role in supporting improved animal welfare along with food and nutrition security. Without action from Veterinary Services to improve animal welfare, global human and environmental health and well-being may very well be at risk.

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L'importance du bien-être animal et des Services vétérinaires dans un monde en mutation

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Résumé

Le bien-être animal est une composante essentielle de l’agriculture durable de demain ainsi que des objectifs de développement durable des Nations Unies. La question du bien-être animal fait l’objet d’une attention croissante dans le monde et la nécessité de le prendre en compte lors des décisions relatives à la sécurité alimentaire et nutritionnelle est désormais bien perçue. Les Services vétérinaires, qui recouvrent les vétérinaires et les paraprofessionnels vétérinaires du secteur public et privé sont les garants du bien-être animal ainsi que les principaux acteurs des

activités futures pour l'améliorer. Il relève de la responsabilité de chacun, depuis l'éleveur et le praticien de terrain jusqu'aux décideurs politiques de niveau national et intergouvernemental, de veiller dès aujourd'hui à l'amélioration du bien-être des animaux partout où cela est nécessaire, et de tracer le chemin d'une amélioration continue à l'avenir. Après avoir décrit dans leurs grandes lignes les problématiques actuelles du bien-être animal et identifié les risques dans ce domaine, les auteurs formulent un certain nombre de recommandations sur les mesures qui peuvent être prises à l'échelle institutionnelle et individuelle. Ils procèdent de la sorte car ils considèrent que les institutions sont essentielles pour générer un changement de vaste envergure grâce à une mobilisation efficace des ressources, tandis que l'individu de son côté peut générer une action immédiate au niveau local et impulser le changement à partir de rien. À défaut d'une action coordonnée par les Services vétérinaires, on risque de passer à côté de certaines possibilités d'améliorer le bien-être animal en même temps que la santé et le bien-être humains et environnementaux, ce qui se traduirait par un ralentissement des avancées en matière de bien-être animal, voire par un recul.

Mots-clés

Bien-être – Bien-être animal – Cinq domaines – Objectifs de développement durable – Production durable – Protection des animaux – Une seule santé – Un seul bien-être.

Importancia del bienestar animal y los Servicios Veterinarios en un mundo en plena transformación

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Resumen

El bienestar animal es un componente esencial de la agricultura sostenible del futuro y de los Objetivos de Desarrollo Sostenible fijados por las Naciones Unidas. Su importancia está cada vez más clara en todo el mundo. El bienestar de los animales debe ser siempre tenido en cuenta en los procesos decisorios que tocan a la seguridad alimentaria y nutricional. Los Servicios Veterinarios, que comprenden tanto a los veterinarios públicos y privados como al personal paraveterinario, son custodios del bienestar animal y agentes clave de toda acción futura encaminada a mejorarlo. Para lograr que el bienestar animal mejore desde ahora mismo, allí donde haga falta, y asegurar que siga un rumbo de constante progreso en el futuro, es preciso que todos los interlocutores, desde los productores y cuidadores hasta los planificadores de políticas

de ámbito nacional e intergubernamental, hagan suya esta responsabilidad. Tras presentar información básica sobre los actuales problemas de bienestar animal y señalar los riesgos existentes en la materia, los autores formulan una serie de recomendaciones para actuar tanto desde las instituciones como a título individual, sabedores de que el primer nivel es fundamental para inducir cambios a gran escala y movilizar recursos eficazmente, mientras que el segundo puede generar inmediatamente acciones a escala local e impulsar desde ahí cambios en sentido ascendente. A falta de una labor coordinada de los Servicios Veterinarios, es muy posible que se pierdan oportunidades para mejorar el bienestar animal, junto con la salud y el bienestar de personas y ecosistemas, y que los niveles de bienestar animal no mejoren o, incluso, corran peligro de deterioro.

Palabras clave

Bienestar – Bienestar animal – Cinco dominios – Objetivos de Desarrollo Sostenible – Producción sostenible – Un solo bienestar – Una sola salud.

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Table I**A set of working definitions to provide a common starting point for discussion**

Term	Definition
Animal welfare	<p>According to the OIE, animal welfare is 'the physical and mental state of an animal in relation to the conditions in which it lives and dies' (1)</p> <p>Animal welfare is based on the principle that an animal should be treated in a way that meets its biological, behavioural and affective state needs, giving the animal a good quality of life (2). It can be assessed by using objective and subjective tools to measure how an animal is coping</p>
Animal ethics	<p>A moral and legal framework that is applied to evaluate whether actions proposed, involving the use of animals, should be performed. On a moral level, a person's values will influence their views on animal welfare and acceptability</p> <p>In some research circumstances, even if the welfare of an animal is not compromised, it may not be ethically responsible to conduct the research if the goal is not clear or the study has not been designed to answer the research question adequately</p>
Animal rights	<p>The moral philosophy that animals have interests that cannot be traded (3). Often it is believed that, in many instances, the use of animals for human benefit compromises these rights</p>
3Rs	<p>A framework applied to animals in all research contexts that prioritises the replacement of animals for research (not using animals at all); reduction (reducing the number of animals to the lowest number possible); and refinement (improving the way in which animals are used) in research studies and settings (4)</p>
Five Freedoms	<p>The Five Freedoms focus on experiences that should be avoided so as not to cause animal suffering: freedom from hunger and thirst; freedom from discomfort; freedom from pain, injury and disease; freedom to express normal behaviours; freedom from fear and distress (5, 6). This framework created a solid foundation from which animal welfare science has grown today</p>
Five Domains	<p>A modern animal welfare framework describes the essential components for an animal's quality of life and the balance of positive and negative experiences that define welfare status (7). The first four domains of nutrition, environment, health and behaviour influence the fifth domain of mental state</p>

OIE: World Organisation for Animal Health

3Rs: replacement, reduction and refinement of animal use in research

Table II

Recommendations for action to improve animal welfare by Veterinary Services at an institutional/policy level and an individual/local level

Action area	High level policy & institutional action	Individual & local action
Sustainable production & SDGs	<ul style="list-style-type: none"> - Incorporate specific animal welfare targets and indicators in the relevant Sustainable Development Goals (SDGs) - Design programmes to achieve SDGs with a One Health and One Welfare focus, to recognise synergies between improving animal welfare and other production and livelihood outcomes, and to minimise trade-offs 	<ul style="list-style-type: none"> - Use a One Health and One Welfare approach to identify the best methods for simultaneously improving animal welfare, production and livelihoods, e.g. making the connection between workplace satisfaction and animal handling can help workers to understand animal welfare issues and identify opportunities for improvement
Training	<ul style="list-style-type: none"> - OIE/UN Member States should integrate open-source teaching materials on animal welfare into Veterinary Services curricula, and encourage states to tailor material, including welfare assessment, to suit their circumstances and situation - Include animal welfare training in veterinary and VPP curricula with appropriate resourcing, including relevant 'Day 1' graduate skills consistent with OIE or other international accreditation standards - Include high-quality animal welfare learning content in Veterinary Services capacity building and the continuing professional development initiatives of international agencies, government and the private sector - Recognising animal welfare as a professional skill/profession will encourage training and continuous education 	<ul style="list-style-type: none"> - Use self/local reflection to generate awareness of ethical challenges and possible biases that can affect the care provided to animals - Include animal welfare in continuing professional development activities, including accessing free online resources - Include animal welfare when engaging with stakeholders and delivering training to identify its inherent value
Diverse engagement	<ul style="list-style-type: none"> - Seek broad consultation with diverse stakeholders (gender, ethnicity, socio-economics, education, livelihood activities, etc.) before action is taken to achieve equitable impact - Any action on animal welfare needs to 	<ul style="list-style-type: none"> - Understand the capacity, opportunities and motivations of animal owners/stakeholders when recommending action on animal welfare - Empower animal owners and

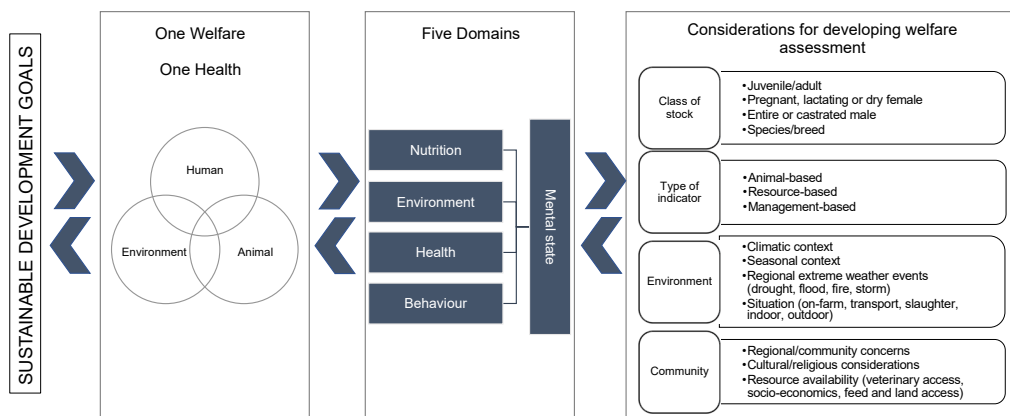
	accommodate public expectations, and can include wildlife and other non-owned animals	other stakeholders to create their own plans and accountability for animal welfare improvements (using techniques such as motivational interviewing)
Practical action & welfare assessment	<ul style="list-style-type: none"> - Develop and implement national animal welfare laws, guidelines and policies that are internationally harmonised with OIE standards - Implement systems for monitoring and enforcing animal welfare standards, including continual improvement processes, using evidence-based, objective criteria and assessment frameworks 	<ul style="list-style-type: none"> - Evaluate animal welfare at individual and group levels Consider the individual animal when evaluating welfare - Apply the Five Domains and specific-context needs when evaluating welfare (Fig. 1) - Encourage the publication of clear and transparent welfare assessment data from industries and organisations to act as a process for continuous improvement
Future focus	<ul style="list-style-type: none"> - Use country and regional projections of animal-source food demands as guidelines to help prepare for future animal welfare and Veterinary Services' needs, including capacity and regulation - Include animal welfare and community needs and expectations when developing strategies for food and nutrition security - Embed animal welfare and ethical considerations in disaster preparedness and disease outbreak action plans 	<ul style="list-style-type: none"> - Anticipate future trends, needs and opportunities for animal welfare and veterinary ethics - Create opportunities for continuous education and improvement of animal welfare in professional activities

OIE: World Organisation for Animal Health

SDGs: Sustainable Development Goals

UN: United Nations

VPP: veterinary para-professional



From left to right, the diagram shows the increased level of detail needed to address key considerations for animal welfare in relation to the United Nations Sustainable Development Goals (SDGs). The right-to-left arrows reaffirm that this detail is needed to understand and make progress towards these higher-level concepts. Progress to some SDGs can be achieved by applying a One Health and One Welfare framework. When considering animal welfare and health, the Five Domains framework describes the essential components that contribute to an animal’s quality of life. In addition to the survival and situation-related factors presented in the Five Domains framework, this list of interdependent considerations on the right-hand side of the figure acts as a checklist when developing a welfare assessment for livestock, working animals and aquaculture. When designing an animal welfare assessment, it should be regional and species-specific

Fig. 1
Connecting the concepts of the United Nations Sustainable Development Goals, One Health and One Welfare, the Five Domains and considerations for developing welfare assessments



Fig. 2

Proposed links between livestock, aquaculture and working animal welfare and the United Nations Sustainable Development Goals

Summarised from Doyle *et al.* (17), Keeling *et al.* (18), WorldFish (19), and the International Coalition for Working Equids (20). The animal icons represent examples of species within these groups