'One Welfare':
a framework to support the implementation of OIE animal welfare standards

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Summary

The 'One Welfare' concept emphasises the link between animal welfare, human wellbeing, biodiversity and the environment. It builds upon and complements the development of the 'One World, One Health' concept to achieve fully comprehensive approaches in support of global sustainable development.

Background

Animal welfare (Box 1) is a complex and multifaceted issue involving scientific, ethical, economic, cultural, social, religious and political dimensions [1]. This shows how animal welfare is interconnected with human wellbeing, biodiversity and the environment at the different levels of society.

Just as 'human health and animal health are interdependent and bound to the health of the ecosystems in which they exist' [2], preserving and improving animal welfare has various direct and indirect connections with human wellbeing and environmental issues. These cover a number of areas that sometimes overlap with those covered by the 'One World, One Health' strategic framework and the 12 Manhattan Principles (Box 2).

Box 1
Definition of animal welfare and human wellbeing

Animal welfare is defined in Article 7.1.1. of the *Terrestrial Animal Health Code* – it means 'how an animal is coping with the conditions in which it lives. An animal is in a good state of welfare if (as indicated by scientific evidence) it is healthy, comfortable, well nourished, safe, able to express innate behaviour, and if it is not suffering from unpleasant states such as pain, fear, and distress.

Good animal welfare requires disease prevention and appropriate veterinary treatment, shelter, management and nutrition, humane handling and humane slaughter or killing. Animal welfare refers to the state of the animal; the treatment that an animal receives is covered by other terms such as animal care, animal husbandry, and humane treatment.'

In this paper *'human wellbeing'* is used as an equivalent term for humans.

Box 2
The Manhattan Principles on 'One World, One health' [3]

1. Recognize the essential link between human, domestic animal and wildlife health and the threat disease poses to people, their food supplies and economies, and the biodiversity essential to maintaining the healthy environments and functioning ecosystems we all require.

2. Recognize that decisions regarding land and water use have real implications for health. Alterations in the resilience of ecosystems and shifts in patterns of disease emergence and spread manifest themselves when we fail to recognize this relationship.

3. Include wildlife health science as an essential component of global disease prevention, surveillance, monitoring, control and mitigation.

4. Recognize that public health programs can greatly contribute to conservation efforts.

5. Devise adaptive, holistic and forward-looking approaches to the prevention, surveillance, monitoring, control and mitigation of emerging and resurging diseases that take the complex interconnections among species into full account.

6. Seek opportunities to fully integrate biodiversity conservation perspectives and human needs (including those related to domestic animal health) when developing solutions to infectious disease threats.

7. Reduce the demand for and better regulate the international live wildlife and bush meat trade not only to protect wildlife populations but also to lessen the risks of disease movement, cross-species transmission, and the development of novel pathogen-host relationships. The costs of this worldwide trade in terms of impacts on public health, agriculture and conservation are enormous, and the global community must address this trade as the real threat it is to global socio-economic security.

8. Restrict the mass culling of free-ranging wildlife species for disease control to situations where there is a multidisciplinary, international scientific consensus that a wildlife population poses an urgent, significant threat to public health, food security, or wildlife health more broadly.

9. Increase investment in the global human and animal health infrastructure commensurate with the serious nature of emerging and resurging disease threats to people, domestic animals and wildlife. Enhanced capacity for global human and animal health surveillance and for clear, timely information-sharing (that takes language barriers into account) can only help improve coordination of responses among governmental and non-governmental agencies, public and animal health institutions, vaccine or pharmaceutical manufacturers, and other stakeholders.

10. Form collaborative relationships among governments, local people, and the private and public (i.e. non-profit) sectors to meet the challenges of global health and biodiversity conservation.

11. Provide adequate resources and support for global wildlife health surveillance networks that exchange disease information with the public health and agricultural animal health communities as part of early warning systems for the emergence and resurgence of disease threats.

12. Invest in educating and raising awareness among the world's people and in influencing the policy process to increase recognition that we must better understand the relationships between health and ecosystem integrity to succeed in improving prospects for a healthier planet.

'One Welfare' is not intended as a replacement for 'animal welfare' but as a tool to mainstream animal welfare more effectively into wider policy frameworks and projects globally to help improve communication, coordination and collaboration. Integrating 'One Welfare' with 'One World, One Health' can strengthen and help to better integrate stakeholder liaison by capturing all relevant issues involving animals and our society in a holistic way.

The Fourth OIE Global Welfare Conference included two full plenary sessions focusing on the 'One Welfare' concept. Many of the speakers highlighted the relevance of this concept as a complement to 'One Health' and the importance of recognising the interconnections between animal welfare and other disciplines in support of global sustainable development. A One Welfare approach is consistent with the United Nations Sustainable

Development Goals in animal-related areas by helping to 'build economic growth and address a range of social needs including education, health, social protection, and job opportunities, while tackling climate change and environmental protection' [4]. Speakers also highlighted the benefits of a One Welfare approach as a tool for increasing engagement and communication among different stakeholder groups in relevant areas [5]. Together, all this supports the implementation of OIE standards.

Given the complex interconnections at different levels, One Welfare is a very broad concept, making it necessary to define a set of areas or categories to provide a conceptual framework. Once the categories are established, it will be easier to gather and order the available evidence. It will also allow stakeholders from relevant disciplines to work together towards a common goal for improving animal welfare, human wellbeing, biodiversity and the environment.

Developing the One Welfare framework: approaches in practice

Whilst progress has been made in recent decades to establish and implement animal welfare standards, many challenges remain for the sustainable improvement of animal welfare. One of the key reasons might be that animal welfare is often considered and worked upon in isolation, rather than integrating it with other relevant areas in a given field. Integrating animal welfare and increasing collaboration and communication among different players could lead to more effective and efficient ways of working.

Many publications and projects have already highlighted the connection between animal welfare and a number of other areas relevant to human wellbeing and the environment. A report by the Food and Agriculture Organization of the United Nations (FAO) in 2014 suggested that global organisations 'could proactively include animal welfare as a basic element of their projects, integrated with, and contributing to, other goals such as food safety and security, human and animal health, environmental sustainability, worker safety, rural development, gender equality, and social justice' [6]. Since then, a number of projects have begun to integrate animal welfare into a One Welfare approach. This has brought additional benefits to ongoing projects.

Incorporating the One Welfare concept into projects makes it possible to increase recognition and gather evidence on the direct and indirect benefits of integrating animal welfare with other disciplines.

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Examples presented at the Fourth OIE Global Welfare Conference include [5]:

– reminders of the links between animal welfare and productivity (i.e. 'well-managed animals are more profitable; healthy farm animals reduce farming costs; improved animal handling results in increased meat yields');

– evidence from ongoing studies into conventional pasture and silvopastoral farming systems (i.e. trees, shrubs and pasture) points at improved animal welfare (i.e. more affiliative behaviour and less foraging during the hottest and wettest periods) alongside more sustainable farming (i.e. greater biodiversity and more ecosystem services), when compared to a monoculture system;

– the role of animals in supporting human livelihoods, where animals are a source of food, income, social status and cultural identity, as well as companionship and security;

– the role of improved animal welfare within the World Food Security agenda[1];

– the importance of responsible dog ownership and following a 'One Health, One Welfare' approach

by combining the animal health and community aspects within dog population control programmes as a means of achieving more effective results.

There are many other examples and, from the brief summary above, it is clear that the disciplines involved fall naturally to different stakeholder groups and policy areas. Therefore, to aid clarity and implementation of a One Welfare approach it is advisable to develop and define a conceptual framework where relevant stakeholders and policies can be ordered according to the different One Welfare outputs. A recent publication described and enumerated a number of areas that could benefit (or are already benefiting) from a One Welfare approach [7]. The outcomes described can now be used as the basis for developing a conceptual framework[2]. Defining categories under the broader concept of One Welfare will help to define in greater detail what One Welfare encompasses and will provide a mechanism to support more efficient and organised collaboration and evidence-gathering at global level (Box 3).

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1. Details about the World Food Security agenda and the Sustainable Development Goals can be found at: www.fao.org/cfs/en/
2. A public consultation to define a One Welfare conceptual framework was held during the first quarter of 2017 on the website www.onewelfareworld.org

Box 3
Proposed areas within a One Welfare conceptual framework [6]

1. **Reduction in animal and human abuse** – covers all aspects of the link between animal abuse, family and social violence. It supports reduction of incidence of crime and violence internationally, in particular domestic violence and abuse of elderly people and children.

2. **Improved animal welfare and social aspects** – covers cases involving animal welfare, socioeconomic indicators and offences in other areas mainly taking place within inner city areas or troubled communities. Improvements in animal welfare at this level support interventions tackling other social issues within inner cities. (i.e. homelessness, hoarding, dog fighting, separation anxiety, etc.). It overlaps with One Health where mental health issues are involved.

3. **Improved animal welfare** – addressing poverty and local community support – covers the connection between poor states of human welfare and poor states of animal welfare. Promoting the integration of animal welfare as part of general livelihood improvement programmes is seen as a key to success.

4. **Improved animal welfare and food safety** – covers all aspects of links between animal welfare and food safety. Improvements in animal welfare support better food safety.

5. **Improved animal and farmer welfare – improved farming productivity** – includes elements linking farmer wellbeing with animal welfare. This extends to the farming environment and sustainable production practices.

6. **Improved animal welfare and improved food security and sustainability** – covers work focusing on the beneficial aspects of animal welfare improvements to wider areas of societal concern such as climate change, farming sustainability and disaster management.

7. **More efficient multidisciplinary approaches** – a more joined-up and multidisciplinary approach could be more efficient and effective. For example, animal welfare indicators can be used as a sign of a farmer being successful or failing to cope and could be used to detect poor farmer health/wellbeing. Equally, poor farmer wellbeing detected by a medical practitioner could indicate a risk of poor animal welfare on the farm. Different professionals could all play a part in improving both farm animal welfare and farmer wellbeing.

8. **Mutual rescue, improved life chances** – comprises animal assisted interventions and paired human rehabilitation and animal rehoming programmes which can be beneficial both to the people and the animals involved.

9. **Improved biodiversity conservation, environmental aspects and human wellbeing** – comprises the links between environmental and conservation issues and animal welfare/ human wellbeing.

Conclusions

Applying a One Welfare approach can serve to 'improve animal welfare to improve human welfare (and vice versa); coordinate actions between veterinary and other services and protect the environment as a fundamental step for both human and animal welfare' [8].

Recognising the links between animal welfare, human wellbeing and the environment represents a step forward in the implementation of animal welfare standards and policies, with the aim of integrating animal welfare with other relevant areas for the benefit of all.

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'One Welfare': towards sustainable

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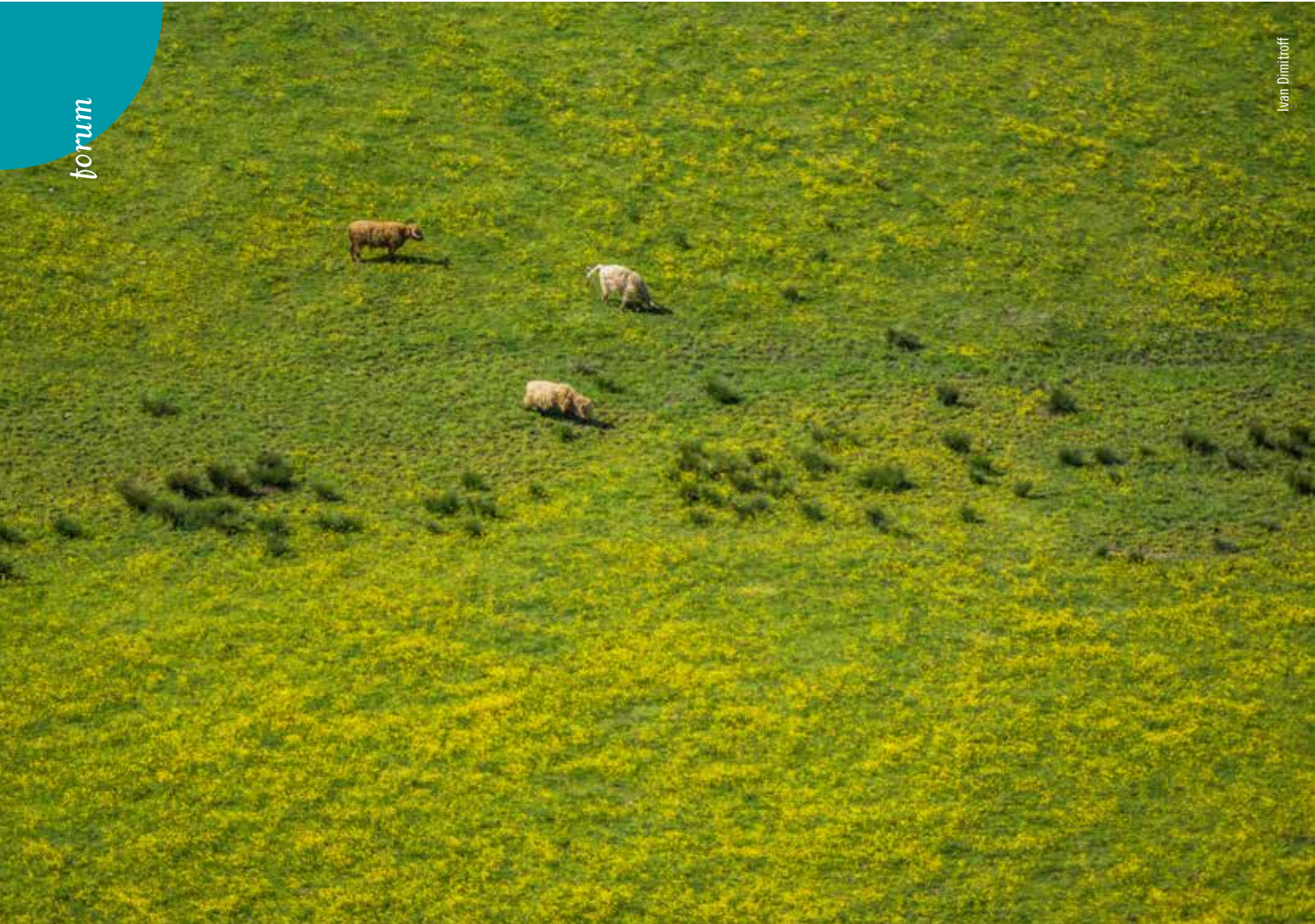
livestock production systems

Annie-Spratt

Summary

Its volume of livestock production destines the Americas to become one of the world's leading suppliers of animal-source foods. Increasing demand for livestock products and growing concern about animal welfare and the environmental impact of conventional livestock systems call for work to develop sustainable livestock production systems in the region. This entails identifying reliable environmental, socioeconomic and animal welfare indicators and criteria of sustainability to quantify synergies and trade-offs among the various systems and supply chains. This article describes a transdisciplinary research project currently being conducted on grazing systems in Yucatan, Mexico, including intensive silvopastoral systems (ISS) of trees, shrubs and grasses. The results have shown ISS to be an efficient way to produce food, provide environmental services and promote animal welfare. As not all systems have such synergies, it is important for the OIE animal welfare agenda to address these challenges to ensure that the recently adopted OIE regional animal welfare strategy for the Americas can be successfully implemented, with support from the OIE Regional Representation for the Americas, OIE Member Countries and the OIE Collaborating Centre for Animal Welfare and Livestock Production Systems (Chile–Mexico–Uruguay). One of the objectives of the animal welfare strategy, which will guide future policy on the basis of a regional approach, is to ensure that animal welfare is considered to be a key element in livestock sustainability.

Background

Latin America is a complex and diverse region, both geographically and culturally. It is home to most of the planet's natural ecosystems, a wide variety of ethnic groups and many different livestock systems. In addition, supply chains and conditions for animal transport and slaughter differ widely in the region as a result of countries' distinctive geographical, social and economic characteristics [1]. Its economic importance and volume of animal production destine the Americas to play an important role as one of the world's leading food suppliers [2].

Population growth, and the consequent increasing demand for animal-source products, is a major global challenge. In many regions of the world, conventional livestock systems, and supply chains generally, are also linked with serious animal welfare issues, not only ethically but also in terms of high incidences of infectious diseases and production inefficiency stemming from economic losses and poor product quality. Another major challenge is to mitigate the environmental impact of conventional livestock production systems, particularly the impact of greenhouse gas (GHG) emissions, deforestation and loss of biodiversity [3]. The volume of production in Latin America makes it one of the regions with the highest GHG emissions in the world and, because it is a highly diverse region, deforestation caused by agricultural

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practices has been linked with outbreaks of emerging and re-emerging diseases resulting from biodiversity loss. In short, conventional livestock production, both intensive and extensive, has been associated with loss of environmental services. In addition, a wide range of social issues remain to be addressed in the region. In many countries, the burden of rural poverty leads to problems of child malnutrition and high mortality. New forms of agricultural production need to provide smallholder farmers with competitive advantages, and these farmers need to see animal welfare and sustainability issues as an incentive for more effective product marketing.

Given that sustainability criteria are of increasing importance to consumers all around the world, livestock systems that consider only short-term market factors, while widespread today, will not be sustainable. This means that, now or in the relatively near future, the public will demand a gradual change [4].

To address these challenges, urgent work is required to develop sustainable livestock production systems in the region, seeking tools to quantify synergies and trade-offs among the social, economic, environmental and animal welfare dimensions of sustainability, and to define a comprehensive public policy for the region. This approach is in keeping with the 'One Welfare' agenda in terms of environmental and social sustainability, and of animal health and welfare. The recommendations made at global level include working to build efficient and sustainable livestock production systems, ensuring the provision of environmental services and addressing social and animal welfare issues. This poses a major challenge for the region. Animal welfare is therefore part of a complex matrix of sustainability criteria and should be considered as a key element of sustainable livestock production in the region, from the dual standpoint of economics and future markets [4].

Integration of animal welfare and environmental service indicators: case study in Yucatan (Mexico)

Recent studies suggest that silvopastoral systems can be useful in striking a balance among productivity, the provision of environmental services (including biodiversity) and animal welfare [4]. Until now, most studies of agro-silvopastoral systems have focused on animal nutrition, basically comparing monoculture systems with systems combining grasses and legumes. While this has been useful for understanding the different ways to feed livestock, a broader and more comprehensive measurement of synergies and trade-offs among sustainability indicators is also needed, for example by considering biodiversity and its impact on health, the GHG balance in the system, productivity and reliable indicators of animal welfare, along with socioeconomic aspects of these systems.

Few studies have included different scales of analysis of agricultural landscapes to better assess the impact of silvopastoral systems from a perspective of landscape ecology and in terms of land use and distribution strategies, as well as conservation alternatives. For this reason, a study is being conducted in the Yucatan Peninsula that takes an integrative, multi-scale approach to analysing the relationships between livestock production and the provision of different environmental services.

The study has used indicators of biodiversity (such as diversity indices of birds, rodents and bats), landscape composition and carbon sequestration on 20 farms (landscape units) ranging in size from 100 hectares to 300 hectares.

The 20 farms represent landscapes with a range of vegetation structures arising from different combinations of livestock production systems (extensive monoculture, extensive polyculture, intensive bi-culture, and intensive polyculture), other agricultural activities (tree plantations, forage crops, food crops) and vegetation (primary forest, secondary forest). A positive relationship ($P < 0.05$) between species diversity and habitat structural complexity was found, as well as a trend ($R = 0.52$, $n = 15$, $P = 0.09$) showing that the most productive farms – in terms of kilograms of meat per hectare per year – are those with the greatest forest cover (including hedgerows), with most of the land given over to grazing. No significant relationships were found between total forest cover and total species present (bats, rodents and birds combined) or the richness of specific groups. However, the three least common mammal species – the big-eared climbing rat (*Ototylomys phyllotis*), the endangered Hatt's vesper rat (*Otonyctomys hatti*), also known as the Yucatan vesper rat, and the endemic Yucatan yellow bat (*Rhogeessa aeneus*) – were found mainly on farms that intentionally preserved at least one forested area (including one silvopastoral

farm). *Ototylomys phyllotis* was also found on a farm where 97% of the land area was devoted to mono-cropping. A point of note is that most of this farm's perimeter is adjacent to forest, suggesting that high-quality surrounding habitats could serve as a source of individuals in predominantly grassland landscapes. However, it is customary for monoculture landscapes to comprise few generalist species of bats, rodents and birds. Interestingly, cases of West Nile virus occurred in some of these generalist species [5]. To ensure more conclusive results, future studies should monitor differences in the structure of large-scale landscapes, as well as differences in the size of the farms studied.

Differing microclimatic conditions in grazing areas as a result of differing vegetation structure and cover may be important for livestock welfare [4]. Intensive silvopastoral systems (ISS) can provide shade and reduce excess heat [6]. As part of this case study, Amendola *et al.* (2016) reported that the temperature–humidity index on ISS farms was significantly lower than under a monoculture system (MS). The mean skin temperatures of cattle under ISS were lower than under MS (37.88 ± 0.3 °C compared with 39.09 ± 0.4 °C), and the temperature gap remained for up to two hours after cattle had left the meadow and entered a pen (Fig. 1). Cows under ISS
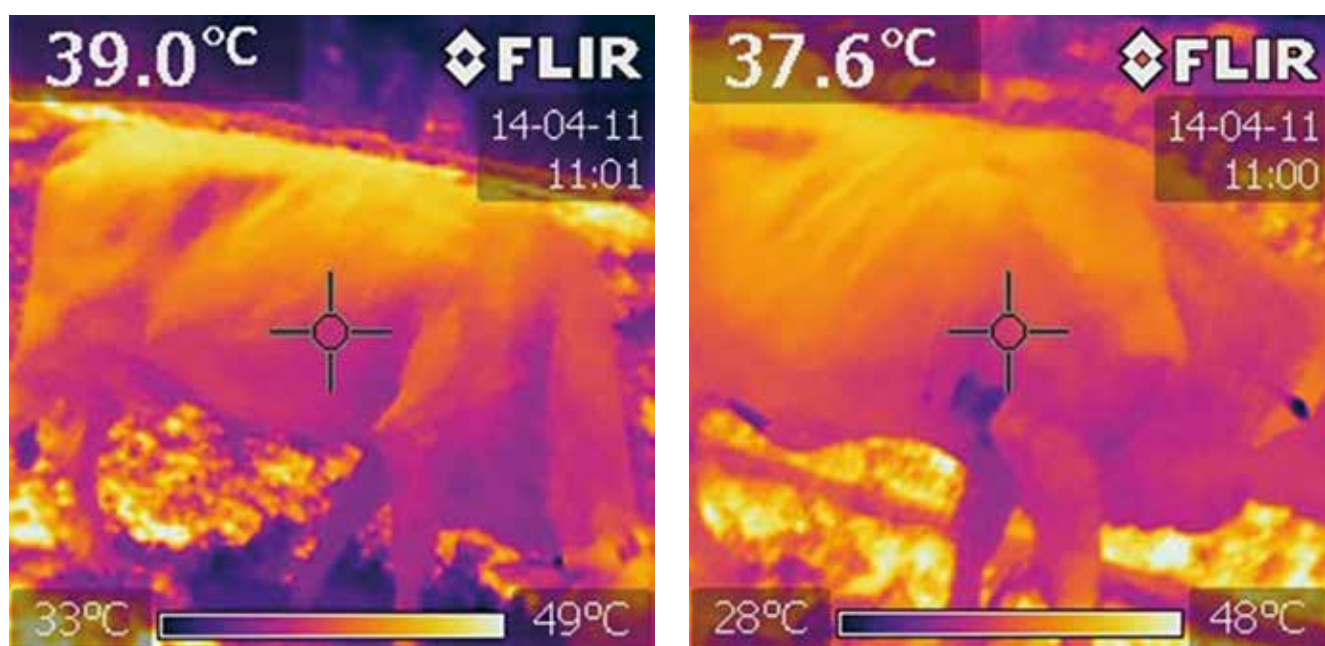
spent more time at rest than cows under MS (ISS = 203.74 ± 3.94 min per animal; MS = 116.15 ± 3.84 min/animal) and distributed their rest time over longer periods (ISS = 78.38 ± 1.88 min/animal; MS = 50.44 ± 1.46 min/animal) [6]. In addition, animals under ISS exhibited more affiliative behaviour than those under MS (ISS = 4.04 ± 0.76 per herd per day; MS = 2.40 ± 0.39 per herd/day), leading to more stable social groups [6]. Under systems with greater tree cover, livestock optimise dry matter intake at the hottest times of day, unlike those with low tree cover [7]. Mancera *et al.* [8] reported a smaller percentage of cows in poor body condition under ISS than under MS. Animals under ISS also appear to be less stressed and disturbed when they approach humans, indicating good wellbeing.

As part of this multidisciplinary study, the synergies and trade-offs among sustainability indicators were evaluated at different scales and by different methods, including life cycle analysis, the Framework for Evaluation of Natural Resource Management Systems incorporating Sustainability Indicators (MESMIS is the acronym in Spanish) and the FAO Sustainability Assessment for Food and Agriculture (SAFA) Tool. These methods considered four dimensions (environment, social impact, economic impact and animal welfare).

The initial results show that a three-tier vegetation structure, with edible plants, provides more ecosystem services, greater biodiversity (abundance of bird and mammal species) and improved livestock welfare. Livestock farms with broader and more complex plant cover have significantly higher rates of native and specialist species of birds, bats and rodents (P < 0.05). In contrast, more generalist and invasive species are found on monoculture farms (P < 0.05). Life cycle analysis also found a positive relationship between environmental protection and animal welfare scores. Therefore, ISS seems to be a good option for conversion to more sustainable systems in terms of biodiversity, welfare and livestock production, and should be further investigated. More studies are needed on the use of tools to assess sustainability indicators in both extensive and intensive systems.

Monoculture system

Intensive silvopastoral system

Fig. 1

Thermal images of cows under a monoculture system and under an intensive silvopastoral system

Images by Adelis Márquez

Leon Ephraim

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Concluding remarks

Given the need for parallel work on animal welfare and on environmental and socioeconomic sustainability, it is important to integrate the 'One Welfare' concept into a global agenda. This requires transdisciplinary research approaches, and groups need to be involved in order to identify reliable sustainability indicators, considering the social, animal welfare, economic and environmental dimensions. The goal is to quantify synergies and trade-offs among these indicators in different intensive and extensive livestock systems, leading to the development of a science-based public policy based on a holistic approach. It will be necessary to incorporate this approach into education and training programmes for public policy implementers.