



Acting on animal welfare for sustainable livestock transformation – policy brief

Recognition of the role of animal welfare in sustainable livestock & agrifood systems

Animal welfare has long been recognised by the United Nations system, particularly FAO, as a crucial contributing factor to addressing environmental crises and advancing sustainable development.

Recent examples include:

- 2014-2016: Strong recommendations to promote and improve animal welfare in the livestock sector by the Committee on World Food Security¹.
- 2019: The Global Sustainable Development Report² highlighted animal welfare as a key issue to be specifically addressed by the UN system.
- 2020: The UN Secretary-General recognised animal sentience and expressed the need to promote animal welfare in his Report on Harmony with Nature (A/75/266, paragraph 42)³, in which he noted that “*non-human animals are sentient beings, not mere property, and must be afforded respect and legal recognition*”.
- 2022: Member States adopted UNEA resolution 5/14 on “Animal welfare, the environment and sustainable development Nexus” in which it was acknowledged that “*animal welfare can contribute to addressing environmental challenges, promoting the One Health approach and achieving the Sustainable Development Goals*”.
- 2023: UN Member States called to “*strengthen global efforts to ensure that animal health and welfare can contribute to addressing challenges and achieving the Sustainable Development Goals*” in UN General Assembly Resolution 78/168 on “Agriculture Development, Food Security and Nutrition”⁵.
- 2023: FAO acknowledges the need to integrate work on livestock production with animal, environmental and human health and welfare as pillar 4 of its strategic framework for sustainable livestock transformation⁶ and clarifies that Sustainable Livestock Transformation requires that attention be “*given to animal health and welfare due to their links with improved productivity, human health, and environmental health*”⁷.

Annex 1 provides further detail of the increasing consensus amongst UN Member States, UN organisations, international institutions, and the scientific community as to the critical role of promoting animal welfare in achieving sustainable development across its three dimensions.

¹ 2014 - Principles for Responsible Investment in Agriculture and Food Systems (RAI), www.fao.org/3/a-au866e.pdf, and 2016 - Sustainable Agricultural Development for Food Security and Nutrition, What Roles for Livestock?,

www.fao.org/fileadmin/templates/cfs/CFS43/MS207_Food_Sec_General_SAD_Livestock_en.pdf

² https://sustainabledevelopment.un.org/content/documents/24797GSDR_report_2019.pdf

³ <https://undocs.org/en/A/75/266>

⁴ UNEP/EA.5/Res.1, Animal welfare – environment – sustainable development Nexus,

<https://wedocs.unep.org/bitstream/handle/20.500.11822/39795/ANIMAL%20WELFARE%e2%80%93ENVIRONMENT%e2%80%93SUSTAINABLE%20DEVELOPMENT%20NEXUS.%20English.pdf?sequence=1&isAllowed=y>

⁵ A/RES/78/168, Agriculture development, food security and nutrition, <https://www.undocs.org/A/RES/78/168>

⁶ FAO. 2023. Sustainable livestock transformation – A vision for FAO’s work on animal production and health. Rome. <https://doi.org/10.4060/cc7474en>

⁷ FAO Global Conference on Sustainable Livestock Transformation; Concept Note, September 2023,

<https://openknowledge.fao.org/server/api/core/bitstreams/1e7c61b7-a115-4266-8c91-ab4b5fc0b90d/content>



Recommendations for consideration by the FAO COAG Subcommittee on Livestock

From the above, it is clear that UN Member States and the UN Food and Agriculture Organization (FAO) acknowledge the cumulative benefits and thus the critical role of improving and promoting animal welfare to achieving sustainable livestock transformation. The FAO's Committee on Agriculture (COAG) Subcommittee on Livestock is therefore encouraged to consider the following:

Under agenda item: Sustainable livestock systems for food security, nutrition and inclusive economic growth

- Call on FAO to explicitly consider the cumulative benefits of improving animal welfare to achieving sustainable livestock transformation in the 'Global assessment of the contribution of livestock to food security, sustainable agrifood systems, nutrition and healthy diets', particularly in the development of components 3 and 4;
- Include the improvement of animal welfare in the priorities and actions of the 'Global Plan of Action for Sustainable Livestock Transformation' that is to be adopted at the ad hoc extraordinary session of the COAG Sub-Committee on Livestock to be convened in October 2025; and
- Call on FAO to strengthen its support for the implementation of UNEA resolution 5/1 on the "animal welfare, environment, and sustainable development nexus".

Under agenda item: Animal, public and environmental health through the One Health approach

- Call on the UN General Assembly High-Level meeting on antimicrobial resistance (AMR) – to be convened in September 2024 – to recommend to 'Transform agrifood systems to significantly reduce antimicrobial use (AMU) while optimising animal health and welfare' as proposed by the FAO-led AMR Multi-stakeholder Platform in its "Call for actionable steps in response to the rising threat of antimicrobial resistance (AMR)"⁸; and
- Call on FAO to explicitly include action to improve animal welfare as a driver to reduce animal and zoonotic diseases and antimicrobial use in the implementation of the Progressive Management Pathway for Terrestrial Animal Biosecurity (PMP-TAB).

Under agenda item: Natural resource use, climate change and biodiversity

- Call on FAO to explore the specific role of improving animal health and welfare to reduce greenhouse gas emissions in the context of the development of a guidance document on the opportunities for Members to participate in compliant and voluntary carbon markets within the livestock sector under the Paris Agreement;
- Call on FAO to explore how improved animal welfare can contribute to sustainable nitrogen management and a reduction by half of nitrogen waste and pollution as per target 7 of the Kunming-Montreal Global Biodiversity Framework and UNEA resolution 5/2; and
- Call on FAO to explore the specific contribution of improving animal welfare in livestock production to the full integration of biodiversity and its multiple values in national efforts to achieve sustainable livestock transformation and to deliver on target 14 of the Kunming-Montreal Global Biodiversity Framework.

⁸ Call for actionable steps in response to the rising threat of antimicrobial resistance (AMR), Key recommendations for action on antimicrobial resistance for consideration by UN Member States in the United Nations General Assembly High-Level Meeting on AMR, FAO, 2024, <https://openknowledge.fao.org/bitstreams/f252d9e2-91f2-48d7-a20c-50da25539234/download>

Annex 1. The evidence for animal welfare as a driver to achieve sustainable livestock transformation

The following sections set out some of the evidence as to the role of animal welfare as a driver for delivering a future sustainable livestock sector as developed through or acknowledged by UN intergovernmental processes, UN organisations, international institutions, and scientific publications. This is structured using the agenda of the FAO COAG Subcommittee on Livestock as a guide.

Sustainable livestock systems for food security, nutrition and inclusive economic growth

1. Food security, livestock and animal welfare

All human beings have the right to adequate food, including all the nutritional elements needed to live a healthy and active life, and the right to be free from hunger⁹. Food security is a public responsibility and a crucial aspect of sustainable development. Its realisation is inextricably linked to health and education outcomes, economic growth, and environmental sustainability. However, the unsustainable production of food can undermine food security in the long run. This is because such food systems can contribute to deforestation, soil degradation, water scarcity, and pollution and greenhouse gas emissions. These negative impacts can ultimately undermine the long-term viability of food production and lead to shortages, price hikes, and reduced access to food, especially for vulnerable populations. Therefore, a shift to sustainable food systems is essential.

Good animal welfare practices can contribute to food security by improving the productivity, health, and well-being of farm animals. They can reduce waste and the economic losses associated with disease outbreaks and other production losses, as well as help maintain the long-term sustainability of food systems by reducing the environmental impact of animal production. Animal welfare is indispensable for ensuring food security and nutrition¹⁰.

The industrial production of animal products, particularly livestock, relies heavily on using human-edible food such as cereals as animal feed. Between 36-40 per cent of global crop calories are used as animal feed^{11 12} with even higher proportions in countries with mostly industrial livestock farming^{13 14}. Most feed grain, 69 per cent, is used in the highly industrialised pig and poultry sectors.

The use of grain and other human-edible food reduces the global food balance as livestock convert grain inefficiently into meat and milk. According to the FAO, they convert the carbohydrates and protein contained in grain into a smaller quantity of energy and protein than humans could have gained directly by consuming the grain¹⁵ (162). For every 100 calories of human-edible cereals fed to

⁹ The Right to Adequate Food; Fact sheet no. 34, OHCHR and FAO, <https://www.ohchr.org/sites/default/files/Documents/Publications/FactSheet34en.pdf>

¹⁰ Making a difference in food security and nutrition, Committee on World Food Security, 2016, <http://www.fao.org/3/a-ms023e.pdf>

¹¹ Redefining agricultural yields: from tonnes to people nourished per hectare, IOP Science,

<https://iopscience.iop.org/article/10.1088/1748-9326/8/3/034015/meta>

¹² Embodied crop calories in animal products, IOP Science, 2013 <https://iopscience.iop.org/article/10.1088/1748-9326/8/4/044044/meta>

¹³ Cereals, oilseeds, protein crops and rice, European Commission,

https://agriculture.ec.europa.eu/farming/crop-productions-and-plant-based-products/cereals_en

¹⁴ Redefining agricultural yields: from tonnes to people nourished per hectare, IOP Science, 2013,

<https://iopscience.iop.org/article/10.1088/1748-9326/8/3/034015>

¹⁵ World Livestock 2011. Livestock in food security, FAO, 2011, <https://www.fao.org/policy-support/tools-and-publications/resources-details/en/c/1262785/>



animals, only 17-30 calories enter the human food chain^{16 17}, and for every 100 grams of grain protein fed to animals, just 43 grams enter the human food chain as meat or milk. Similarly, 90 per cent of the wild fish used in animal feeds could instead be eaten directly by humans¹⁸. "Almost a third of the total food value of global crop production is lost by "processing" it through inefficient livestock systems"¹⁹.

Industrial animal agriculture entails conditions that are detrimental to the welfare of animals. Alternative high welfare systems can allow for increased productivity without threatening sustainable development. In 2014, the CFS promoted "supporting animal health and welfare (...) to sustainably increase productivity, product quality, and safety"²⁰, and in 2016, it further recommended "improve animal welfare delivering on the five freedoms and related WOA standards and principles"²¹. Even, the way humans work with, respond to, and interact with animals in food systems can improve or reduce production²². For example, in dairy cows and goats, negative interactions with or fear of humans can lead to reduced milk production²³. In pigs, negative handling can lead to impaired growth and lower reproductive performance²⁴. And in poultry, fear of people can lead to lower egg production and poorer quality and slower growth²⁵. Additionally, better animal welfare practices can lead to reduced mortality rates²⁶.

Higher levels of animal welfare can also result in healthier and safer food for people. Farming of free-range animals that consume fresh forage and have higher activity levels has been shown to provide meat with better nutritional quality than industrially reared animals. For example, pasture-fed beef and free-range chicken have a lower fat content and higher levels of beneficial omega-3 fatty acids compared to grain-fed beef and industrially farmed chicken^{27 28}.

2. Livelihood protection, livestock and animal welfare

According to FAO and the World Bank, livestock supports the livelihoods of at least 1.3 billion people worldwide²⁹, being the primary productive asset of around one billion of the world's poorest³⁰. The International Fund for Agricultural Development (IFAD) has estimated that one billion smallholders in developing countries depend on livestock for food and income³¹. Animals help rural households

¹⁶ The Environmental Food Crisis: The Environment's Role in Averting Future Food Crises, GRID (UNEP partner), 2009, <https://www.grida.no/publications/154>

¹⁷ Saving Water: From Field to Fork - Curbing Losses and Wastage in the Food Chain, FAO, 2008, <https://www.fao.org/sustainable-food-value-chains/library/details/en/c/266050/>

¹⁸ Most fish destined for fishmeal production are food-grade fish, Bloom association, 2016, https://www.bloomassociation.org/wp-content/uploads/2017/02/Cashion_et_al-2017-Fish_and_Fisheries-1.pdf

¹⁹ Global Land Outlook, First Edition, United Nations Convention to Combat Desertification (UNCCD), 2017, https://www.unccd.int/sites/default/files/documents/2017-09/GLO_Full_Report_low_res.pdf

²⁰ Principles for Responsible Investment in Agriculture and Food systems, Committee on World Food Security (CFS), 2014, <https://www.fao.org/3/au866e/au866e.pdf>

²¹ Sustainable Agricultural Development for Food Security and Nutrition: What Roles for Livestock, Committee on World Food Security (CFS), 2016, <http://www.fao.org/3/a-bq854e.pdf>

²² Why does compassionate handling matter?, The Brooke, 2020, <https://www.thebrooke.org/sites/default/files/Downloads/Compassionate%20Livestock%20Handling%20-%20English.pdf>

²³ The relationship between attitudes, personal characteristics and behaviour of stock people and subsequent behaviour and production of dairy cows, Science Direct, 2002, [https://doi.org/10.1016/S0168-1591\(02\)00155-7](https://doi.org/10.1016/S0168-1591(02)00155-7)

²⁴ Effects of frequent interactions with humans on growing pigs, Science Direct, 1986, [https://doi.org/10.1016/0168-1591\(86\)90119-X](https://doi.org/10.1016/0168-1591(86)90119-X)

²⁵ Assessing the human-animal relationship in farmed species: A critical review, Science Direct, 2006, <https://doi.org/10.1016/j.applanim.2006.02.001>

²⁶ Cow mortality as an indicator of animal welfare in dairy herds, Science Direct, 2018, <https://www.sciencedirect.com/science/article/abs/pii/S003452881830359X>

²⁷ Nutritional Benefits of Higher Welfare Products, Compassion in World Farming (CIWF), 2012, https://www.ciwf.com/media/1236041/nutritional-benefits-of-higher-welfare-animal-products_report_june2012.pdf

²⁸ Research demonstrating the health benefits of Pasture for Life meat, Pasture for Life Certification Mark, <https://www.pastureforlife.org/media/2018/10/PFL-Health-Benefits-at-14-Sept-FINAL.pdf>

²⁹ Animal Production, FAO, <https://www.fao.org/animal-production/en/>

³⁰ Minding the Stock: Bringing Public Policy to Bear on Livestock Sector Development, World Bank, 2009, <https://openknowledge.worldbank.org/handle/10986/3043>

³¹ Let's give smallholder livestock farmers in the developing world a chance, IFAD, 2018, <https://www.developmentaid.org/news-stream/post/32115/lets-give-smallholder-livestock-farmers-of-the-developing-world-a-chance>



achieve their livelihood objectives by providing food for families, generating additional income, and acting as a buffer during crises. Additionally, animals supply manure for crops, draught power for tilling, and transport for products and families.

The fisheries sector similarly is an important source of livelihoods globally, with an estimated 58.5 million people engaged as full-time, part-time, occasional or unspecified workers in fisheries and aquaculture. Of these, approximately 21 per cent were women. By sector, 35 per cent were employed in aquaculture and 65 per cent in capture fisheries³².

The importance of animal welfare in securing livelihoods and aiding poverty eradication is underexplored. However, indications are that the growth in low-welfare industrial animal agriculture is affecting the livelihoods of the rural poor. In contrast, the introduction of high welfare systems can be a catalyst for poverty eradication and addressing environmental challenges.

Since the beginning of this millennium, it has been recognised that the industrialisation of animal agriculture has a distinctly negative impact on smallholder producers, employment options in the rural economy, and poverty. As early as 2003, FAO pointed out that industrial animal production “*may occur at the expense of diminishing the market opportunities and competitiveness of small rural producers*”³³. The World Bank went one step further and noted that the intensification of livestock production brings “*a significant danger that the poor are being crowded out*”³⁴. The CFS has more recently confirmed that “*intensive agricultural systems are associated with negative effects on employment, wealth distribution, ancillary economic activity in rural areas and service provision in rural areas*”³⁵.

As animals are often the primary productive asset of the poor, enhancing the welfare of animals (through better veterinary care, feed, shelter, etc.) will enhance their productive capacity and increase food security and income. IFAD notes that such animal welfare-enhancing activities include vaccinating animals against major diseases, building them shelters, preserving fodder for difficult times, and promoting silvopastoral and other sustainable systems³⁶. Similarly, better welfare can also be associated with improved financial returns for working equids, from brick kilns to resilience after disasters³⁷.

According to the World Bank, “*growth in agriculture remains in general two to three times more effective at reducing poverty than an equivalent amount of growth generated in other sectors*”³⁸. Growth in high-welfare livestock systems is even more effective in this regard and is the only route to doing so sustainably, as confirmed by the CFS, which stated in 2014: “*supporting animal health and welfare promotes human safety and health and is a prerequisite to sustainably increase agricultural and livestock*

³² The State of World Fisheries and Aquaculture, FAO, 2022,

<https://www.fao.org/3/cc0461en/online/sofia/2022/fisheries-aquaculture-employment.html>

³³ World agriculture: towards 2015/2030, FAO, 2003, <http://www.fao.org/3/a-y4252e.pdf>

³⁴ Livestock Development; Implications for Rural Poverty, the Environment and Global Food Security, World Bank, 2001,

<http://documents.worldbank.org/curated/en/306051468740146162/pdf/multi0page.pdf>

³⁵ Sustainable agricultural development for food security and nutrition: what roles for livestock? A report by The High Level Panel of Experts on Food Security and Nutrition, Committee on World Food Security (CFS), 2016, <https://www.fao.org/3/i5795e/i5795e.pdf>

³⁶ Let's give smallholder livestock farmers in the developing world a chance, IFAD, 2018,

<https://www.developmentaid.org/news-stream/post/32115/lets-give-smallholder-livestock-farmers-of-the-developing-world-a-chance>

³⁷ One welfare: Linking poverty, equid ownership and equid welfare in the brick kilns of India, Cambridge University Press, 2023,

<https://www.cambridge.org/core/journals/animal-welfare/article/one-welfare-linking-poverty-equid-ownership-and-equid-welfare-in-the-brick-kilns-of-india-erratum/C4A876983EFBE4E65B417B2F3D17B3E3>

³⁸ Five new insights on how agriculture can help reduce poverty, World Bank, 2018,

<https://blogs.worldbank.org/jobs/five-new-insights-how-agriculture-can-help-reduce-poverty>



*productivity and to secure product quality and safety*³⁹. In 2016, the CFS further stressed the importance of animal welfare and included in its policy recommendations “*to improve animal health and welfare in all livestock systems*”⁴⁰.

A recent World Bank case study in Colombia that involved the conversion of nearly 32,000 hectares of degraded land to silvopastoral systems had, between 2011 and 2018, achieved a 17 per cent increase in milk production, 18.5 per cent reduction in production costs, and an increase in incomes by up to US\$523 per hectare/per year. Like shade-grown coffee, shade-grown cows in silvopastoral systems are more productive and more sustainable than cows raised in open fields: the shade lowers the animals’ heat stress so they produce less methane, while the diversified vegetation improves their diet and productivity. In addition, the high-welfare silvopastoral system of livestock production has allowed for the capture of CO₂ and the conservation of native biodiversity^{41 42}.

Animal, public and environmental health through the One Health approach

3. One Health, livestock and animal welfare

Zoonotic disease emergence

Human activities have a significant effect on the health and well-being of humans, animals, and ecosystems. The emergence of zoonoses and AMR are prime examples of this.

Industrial animal agriculture is particularly linked to the emergence, transmission, and amplification of pathogens, including zoonotic diseases⁴³. Poor welfare practices associated with large-scale indoor production, overcrowding, inadequate nutrition, and increased reliance on high-performance breeds of farm animals that develop illnesses can undermine animals’ immune systems, increasing their risk of contracting diseases. On-farm stressors, concluded the European Medicines Agency and the European Food Safety Agency, “*interfere with the normal behaviour of the animals and have been shown to alter the immune system of animals and susceptibility to diseases*”⁴⁴.

A recent study of nearly 2,500 European pig holdings, nearly all of which are farmed industrially, found in over 50 per cent of the farms a year-round presence of up to four major swine influenza A virus lineages with the potential to play a crucial role in the generation of new human pandemic viruses⁴⁵. This is part of a global trend of zoonotic disease emergence coinciding with the large-scale industrial production of pigs, poultry, and farmed wildlife species.

³⁹ Principles for Responsible Investment in Agriculture and Food Systems, FAO, 2014, <http://www.fao.org/3/a-au866e.pdf>

⁴⁰ Sustainable Agricultural Development for Food Security and Nutrition: What Roles for Livestock, Committee on World Food Security (CFS), 2016, <http://www.fao.org/3/a-bq854e.pdf>

⁴¹ Moving Towards Sustainability: The Livestock Sector and the World Bank, World Bank, 2021,

<https://www.worldbank.org/en/topic/agriculture/brief/moving-towards-sustainability-the-livestock-sector-and-the-world-bank>

⁴² Trees and Cows Offer Path to Recovery in Colombia, World Bank, 2019,

<https://www.worldbank.org/en/news/feature/2019/07/08/trees-and-cows-offer-path-to-recovery-in-colombia>

⁴³ Industrial Livestock Production and Global Health Risks, Pro-Poor Livestock Policy Initiative; A Living from Livestock Research Report, 2007, <https://www.fao.org/3/bp285e/bp285e.pdf>

⁴⁴ EMA and EFSA Joint Scientific Opinion on measures to reduce the need to use antimicrobial agents in animal husbandry in the European Union, and the resulting impacts on food safety (RONAFA), European Food Safety Authority, 2017,

<https://www.efsa.europa.eu/en/efsajournal/pub/4666>

⁴⁵ Surveillance of European Domestic Pig Populations Identifies an Emerging Reservoir of Potentially Zoonotic Swine Influenza A Viruses, NIH, 2020, <https://pubmed.ncbi.nlm.nih.gov/32721380/>



The greater the number of farmed animals, the higher the risk of zoonotic outbreaks⁴⁶. “A certain way to reduce risk of zoonosis and emerging infectious diseases globally (...) is to reduce dependence on intensive animal-based food production systems”⁴⁷. In addition, good animal welfare practices can help minimise the risk of disease transmission in several ways. Ensuring adequate space and ventilation can reduce overcrowding and the spread of diseases. Raising slower-growing, regionally appropriate breeds of farm animals and promoting genetic diversity within farm animals that are kept in higher welfare systems improves their immune systems, health, and welfare⁴⁸. In aquaculture, appropriate stocking densities, feeding, and environmental enrichment specific to species and life stages can reduce stress and thus reduce the risk of infection, disease amplification, and transmission. Further, providing animals with good nutrition to strengthen their immune systems and proper sanitation measures, such as regular cleaning and disinfection, can also reduce the risk of disease transmission. All of these prevention strategies should be the first line of defence against disease.

Anti-Microbial Resistance

Globally, 70 per cent of all antimicrobials are used in farm animals⁴⁹, with a significant portion being vital in human medicine. This is mainly done to maintain the health and productivity of the animals. They are routinely administered to whole herds or flocks of healthy animals to promote growth and prevent diseases that may arise from crowded and stressful living conditions as well as the reliance on high-growth breeds that are prone to illnesses. Industrial animal farming results in higher use of antimicrobials per animal than high-welfare farming systems. For instance, research shows that weaning piglets at 22-25 days of age, which is common in industrial pig farming, results in 15-20 times higher use of antimicrobials compared to later weaning at around 35 days or more^{50 51}. Fast-growing meat chickens receive more antimicrobials per bird compared to slower-growing birds. The overuse of antimicrobials in industrial farming contributes to AMR in animals which can then be transferred to humans, undermining the efficacy of antimicrobials in human medicine. This is true in aquatic as well as terrestrial systems. Heuer et al. warned in the journal *Clinical Infectious Diseases* a decade ago: “Intensive use of antimicrobial agents in aquaculture provides a selective pressure creating reservoirs of drug-resistant bacteria and transferable resistance genes in fish pathogens and other bacteria in the aquatic environment”⁵².

Industrial animal farming systems also lead to the prevalence of antibiotic-resistant bacteria in soil⁵³ and spread AMR through animal waste⁵⁴. Widespread environmental releases of biological AMR pollutants, such as animal waste not typically treated and produced in copious amounts in industrial animal farming operations, establish a major exposure point for AMR in the environment, particularly

⁴⁶ The infectious disease trap of animal agriculture, *Science Advances*, 2022, <https://www.science.org/doi/10.1126/sciadv.add6681>

⁴⁷ Situation analysis on the roles and risks of wildlife in the emergence of human infectious diseases, IUCN, 2022, <https://www.iucn.org/resources/publication/situation-analysis-roles-and-risks-wildlife-emergence-human-infectious>

⁴⁸ Review: Mitigating the risks posed by intensification in livestock production: the examples of antimicrobial resistance and zoonoses, NIH, 2021, <https://pubmed.ncbi.nlm.nih.gov/33573940/>

⁴⁹ Global trends in antimicrobial use in food animals, *PNAS*, 2015, <https://www.pnas.org/doi/10.1073/pnas.1503141112>

⁵⁰ Quantitative and qualitative antimicrobial usage patterns in farrow-to-finish pig herds in Belgium, France, Germany and Sweden, NIH, 2016, <https://pubmed.ncbi.nlm.nih.gov/27435645/>

⁵¹ Antibiotic and medical zinc oxide usage in Danish conventional and welfare-label pig herds in 2016-2018, NIH, 2021, <https://pubmed.ncbi.nlm.nih.gov/33556801/>

⁵² Human health consequences of use of antimicrobial agents in aquaculture, NIH, 2009, <https://pubmed.ncbi.nlm.nih.gov/19772389/>

⁵³ Environmental and human health challenges of industrial livestock and poultry farming in China and their mitigation, *Science Direct*, 2017, <https://www.sciencedirect.com/science/article/pii/S0160412017304749>

⁵⁴ Complexities in understanding antimicrobial resistance across domesticated animal, human, and environmental systems, NIH, 2019, <https://pubmed.ncbi.nlm.nih.gov/30924539/>



in water, soil, and air. These help antimicrobial-resistant microbes to spread between and among people, animals, and other environmental reservoirs, disrupting the microbial composition of environmental media and affecting biodiversity and ecosystem services⁵⁵.

By improving living conditions and reducing animal stress levels, disease incidence can be reduced, and the use of prophylactic and subtherapeutic antimicrobials can be eliminated. Moreover, good nutrition, hygiene, vaccination, and effective disease and herd management can reduce the entry and spread of infections, reducing the need for antimicrobials. Thus, *“farming systems with heavy antimicrobial use should be critically reviewed, to determine whether/how such systems could sustainably reduce the use of on-farm antimicrobials. If a sustainable reduction in the use of on-farm antimicrobials is not achievable, these systems ideally [should] be phased out”*⁵⁶.

The United Nations One Health Quadripartite organizations together with a host of stakeholders (governments, industry, academia, civil society) are aligned on the importance of animal welfare as a driver to reduce antimicrobial use in agrifood systems and have recently called on all UN Member States to consider the need to *“Transform agrifood systems to significantly reduce antimicrobial use while optimizing animal health and welfare”* during the planned 2024 UN General Assembly High Level Meeting on Antimicrobial Resistance⁵⁷

One Health

In this context, One Health and similar holistic approaches offer an ideal frame for comprehensive strategies to prevent diseases with pandemic potential. According to OHHLEP, prevention refers to “preventing the critical first step, i.e. preventing a pathogen from transferring from animals to humans.” It adds, “prevention includes addressing the drivers of disease emergence, namely ecological, meteorological and anthropogenic factors and activities that increase spillover risk”⁵⁸. According to WHO, FAO, WOAHA and UNEP, One Health is essential “to sustainably balance and optimise the health of people, animals and ecosystems”⁵⁹.

Animal well-being is at the centre of sustainable public health. The improved state of animals’ well-being can enhance their health, reduce disease incidence, and avoid the need for routine antibiotic use. Such improvements can help promote global health by, for instance, reducing the risk of zoonotic diseases and AMR. In this way, improving the treatment of animals is critical for achieving One Health, which requires humans to acknowledge responsibility for adopting sustainable solutions that protect animal welfare and ecosystem integrity. These are essential for the well-being of current and future generations⁶⁰.

⁵⁵ Summary for Policymakers - Environmental Dimensions of Antimicrobial Resistance, UNEP, 2022,

<https://www.unep.org/resources/report/summary-policymakers-environmental-dimensions-antimicrobial-resistance>

⁵⁶ EMA and EFSA Joint Scientific Opinion on measures to reduce the need to use antimicrobial agents in animal husbandry in the European Union, and the resulting impacts on food safety (RONAFA), European Food Safety Authority, 2017,

<https://efsa.onlinelibrary.wiley.com/doi/full/10.2903/j.efsa.2017.4666>

⁵⁷ Call for actionable steps in response to the rising threat of antimicrobial resistance (AMR), Key recommendations for action on antimicrobial resistance for consideration by UN Member States in the United Nations General Assembly High-Level Meeting on AMR, FAO, 2024,

<https://openknowledge.fao.org/bitstreams/f252d9e2-91f2-48d7-a20c-50da25539234/download>

⁵⁸ Prevention of Zoonotic Spillover from relying on response to reducing the risk at source, OHHLEP White paper/Opinion,

<https://cdn.who.int/media/docs/default-source/one-health/ohhlep/ohhlep-prevention-of-zoonotic-spillover.pdf>

⁵⁹ Tripartite and UNEP support OHHLEP’s definition of “One Health”, WHO, 2021,

<https://www.who.int/news/item/01-12-2021-tripartite-and-unep-support-ohhlep-s-definition-of-one-health>

⁶⁰ One Health: A new definition for a sustainable and healthy future, PLOS Pathogens, 2022,

<https://journals.plos.org/plospathogens/article?id=10.1371/journal.ppat.1010537>

Natural resource use, climate change and biodiversity

4. Climate change, livestock and animal welfare

Using a Tier 2 methodology (IPCC, 2006) and life cycle assessment approach, FAO estimates that animal agriculture contributes 14.5 per cent of total anthropogenic emissions⁶¹. In 2019, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) estimated an even higher contribution of the sector, finding that “approximately 25 percent of the globe’s GHG emissions come from land clearing, crop production and fertilization, with animal-based food contributing about 75 percent of that.”⁶²

A closer examination of livestock-related contributions to climate change shows that the production and processing of feed for industrial systems of animal agriculture, primarily due to land-use change, accounts for almost half of the sector’s GHG emissions, according to FAO. Manure storing and processing associated with industrial production adds around ten per cent, with an additional six per cent coming from the processing and transportation of animal products⁶³.

Conversely, higher welfare and lower input systems can be a part of the solution. Silvopasture and agroecological solutions and grass-based and mixed farm systems have greater capacities for carbon sequestration⁶⁴. For example, on degraded land, such carefully managed systems could offset a share of the emissions from livestock⁶⁵. Local breeds are more adaptable to local climate conditions and often have lower emissions per unit of production⁶⁶.

This shift should happen in tandem with a move towards more plant-rich food systems, which are instrumental to meeting the climate goals as “impacts of the lowest-impact animal products typically exceed those of vegetable substitutes”⁶⁷, according to research published in Science.

The Intergovernmental Panel on Climate Change (IPCC) states that “diets high in plant protein and low in meat and dairy are associated with lower GHG emissions”⁶⁸. This is consistent with UN long-standing guidance, including from WHO and FAO. The EAT-Lancet Commission also recognises that “food is the single strongest lever to optimize human health and environmental sustainability on Earth”.

The role of enhancing animal welfare in food systems and reducing the reliance on industrial animal agriculture has also been acknowledged by IPBES, “Feeding the world in a sustainable manner, especially in the context of climate change and population growth, entails food systems that ensure adaptive capacity, minimize environmental impacts, eliminate hunger, and contribute to human

⁶¹ Tackling Climate Change through Livestock, FAO, 2013, <http://www.fao.org/3/a-i3437e.pdf>

⁶² The Global Assessment report on Biodiversity and Ecosystem Services; Summary for Policymakers, IPBES, 2019, https://ipbes.net/sites/default/files/2020-02/ipbes_global_assessment_report_summary_for_policymakers_en.pdf

⁶³ Tackling Climate Change through Livestock, FAO, 2013, <http://www.fao.org/3/a-i3437e.pdf>

⁶⁴ Transforming the livestock sector through the Sustainable Development Goals, FAO, 2018, <https://www.fao.org/3/ca1201en/ca1201en.pdf>

⁶⁵ Reducing food’s environmental impacts through producers and consumers, Science, 2018, <https://www.science.org/doi/full/10.1126/science.aag0216>

⁶⁶ Greenhouse gas emissions of livestock raised in harsh environments, UNEP, 2018, <https://unepdtu.org/publications/greenhouse-gas-emissions-of-livestock-raised-in-a-harsh-environment/>

⁶⁷ Reducing food’s environmental impacts through producers and consumers, Science, 2019, <https://josephpoore.com/Science%20360%206392%20987%20-%20Accepted%20Manuscript.pdf>

⁶⁸ Climate change 2022: Mitigation of climate change, IPCC, 2022, <https://www.ipcc.ch/report/sixth-assessment-report-working-group-3/>



health and animal welfare"⁶⁹. "Reducing intensively farmed meat consumption is good for people and the planet"⁷⁰ says UNEP.

5. Biodiversity loss, livestock and animal welfare

Biodiversity loss refers to the decline in the variety and number of living organisms in a particular habitat or on Earth. Globally monitored population sizes of mammals, fish, birds, reptiles, and amphibians have declined an average of 68 per cent between 1970 and 2016⁷¹. These drastic species population reductions are an indicator of planetary health, revealing a broken relationship between humans and the natural world, as well as insufficient action to protect planetary health to date.

Agriculture uses half of the world's habitable land, with more than three quarters of it utilised for grazing and cultivating crops for animal feed - animal farming accounts for 77 per cent of globally available farming land⁷² and about 40 per cent of global arable land⁷³. Agricultural expansion, driven largely by the need to sustain industrial systems of animal agriculture, is the primary cause of land-use change causing biodiversity loss.

The industrialisation of animal farming is further leading directly to biodiversity loss through the disappearance of local varieties and breeds of domesticated plants and animals. IPBES notes that by 2016, over 9 per cent of the domesticated breeds of mammals used for food and agriculture had become extinct, and at least 1,000 are threatened⁷⁴. Agricultural industrialisation for feed production leads to population declines in birds, insectivorous mammals, and insects, including through the recurrent use of chemical fertilisers and pesticides⁷⁵. In addition to these being important issues in themselves, they pose serious risks to global food security by undermining the basis for and resilience of many agricultural systems to threats such as pathogens and climate change.

Conversely, integrating and promoting animal welfare as an essential policy concern has the potential to significantly help preserve biodiversity and restore and regenerate the world's ecosystems. The International Panel of Experts on Sustainable Food Systems highlights the need for a transition to agroecological systems that are integrated within ecosystems and their biodiversity, which they state is necessary and viable irrespective of whether the starting point is highly specialised industrial agriculture or forms of subsistence farming in developing countries⁷⁶. Major financial institutions, such as JPMorgan Chase, have also recognised the need for transformative

⁶⁹ The Global Assessment report on Biodiversity and Ecosystem Services; Summary for Policymakers, IPBES, 2019, https://ipbes.net/sites/default/files/2020-02/ipbes_global_assessment_report_summary_for_policymakers_en.pdf

⁷⁰ Every bite of burger boosts harmful greenhouse gas emissions, UNEP, 2018, <https://news.un.org/en/story/2018/11/1025271>

⁷¹ Living Planet Report, WWF, 2020, https://wwf.in/assets/panda.org/downloads/lpr_2020_full_report.pdf

⁷² Half the world's habitable land is used for agriculture, Our World in Data, 2024, <https://ourworldindata.org/global-land-for-agriculture>

⁷³ Livestock: On our plates or eating at our table? A new analysis of the feed/food debate, Science, 2017, <https://www.sciencedirect.com/science/article/abs/pii/S2211912416300013?via%3Dihub>

⁷⁴ The Global Assessment report on Biodiversity and Ecosystem Services; Summary for Policymakers, IPBES, 2019, https://ipbes.net/sites/default/files/2020-02/ipbes_global_assessment_report_summary_for_policymakers_en.pdf

⁷⁵ Worldwide decline of the entomofauna: A review of its drivers, Science, 2019, <https://www.sciencedirect.com/science/article/abs/pii/S0006320718313636>

⁷⁶ From Uniformity to Diversity, IPES Food, 2016, <https://ipes-food.org/report-summary/from-uniformity-to-diversity>



change throughout the food system to avoid further massive depletion of forests and grassland, overuse of water, food-related health problems, and dangerous levels of climate change⁷⁷.

In this context, FAO recommends holistic approaches, such as agroecology, agroforestry, and conservation agriculture⁷⁸. The IPCC has also recognised the potential of these methods to reduce climate risk for food systems and enhance their sustainability. Done well, these approaches work in harmony with animals and their place within natural processes. They can support biodiversity and ecosystem services (such as pollination, temperature regulation, and carbon sequestration), positively impacting food security, nutrition, health and well-being, and livelihoods⁷⁹.

UN organisations recognise systems of consumption and production that embrace concerns for animal welfare as effective for delivering on the biodiversity goals agreed upon in the 2030 Agenda and the recently adopted Kunming-Montreal Global Biodiversity Framework (GBF)⁸⁰. For instance, transitioning to high animal welfare systems that primarily rely on animal feed grown in integrated crop-livestock farms would significantly reduce the impetus for land-use change. Together with a shift towards plant-rich diets, this could free up a significant portion of land for restoration⁸¹. It would further be an invaluable strategy for achieving the GBF's goal of protecting 30 per cent of land and water by 2030. Such a transition would also greatly reduce total agricultural climate emissions and restore natural carbon sequestration by forests and biodiverse grasslands⁸².

⁷⁷ Establishing a Framework for Food and Agriculture Sustainability Transition (FAST), J.P. Morgan Chase & Co, 2022, https://www.jpmorgan.com/content/dam/jpm/cib/complex/content/investment-banking/center-for-carbon-transition/Establishing_a_Framework_for_Food_and_Agriculture_Sustainability_Transition.pdf

⁷⁸ The future of food and farming; Trends and challenges, FAO, 2017, <https://www.fao.org/3/i6583e/i6583e.pdf>

⁷⁹ Climate change 2022: Impacts, Adaptation and Vulnerability, IPCC, 2022, <https://www.ipcc.ch/report/ar6/wg2/>

⁸⁰ CBD/COP/DEC/15/4, Kunming-Montreal Global Biodiversity Framework, Convention on Biological Diversity, 2022, <https://www.cbd.int/doc/decisions/cop-15/cop-15-dec-04-en.pdf>

⁸¹ If the world adopted a plant-based diet, we would reduce global agricultural land use from 4 to 1 billion hectares, Our World in Data, 2021, <https://ourworldindata.org/land-use-diets>

⁸² Tackling Climate Change through Livestock, FAO, 2013, <http://www.fao.org/3/a-i3437e.pdf>