

Farm Animals and Climate Change

Introduction

At least a billion of the world's poorest people depend on animals for food, fibre, income, social status, security, and companionship. Climate change is expected to cause an increase in weather-related disasters and extreme weather events, such as droughts, heat waves, storms, desertification, and increases in insect infestations. Long-term changes in climate will jeopardise the future of all animals—including those in oceans, on farms, in forests, in wilderness areas, and in our homes. All climate change related hazards and their related disasters have a negative impact on animals.

Animal agriculture—the raising of animals for food, clothing, and draught power—is a major contributor to climate change, responsible for 18% of greenhouse gas (GHG) emissions¹ (9 % CO₂, 37 % methane and 65 % N₂O). Climatic changes will have a negative impact on all animals, but particularly livestock who are associated with certain activities that directly contribute to climate change. It is therefore imperative that animal agriculture practices and the welfare of animals be considered when developing climate change policies and programmes, both as potential victims and causes. Such policies and programmes that minimise the impact animal production has on the environment should not be at the expense of animals and/or their caregiver's welfare. The climate debate may lead to a greater increase in intensive production practices at the expense of medium and long term environmental and animal welfare friendly extensive production methods. Harming the health and well-being of animals directly compromises the societal, economical, physiological, and cultural aspects of humans.

Effects of Climate Change on the Spread and Emergence of Animal Diseases

As global temperatures increase, the effects will be quite complex and vary from region to region. Though the extent of these effects is uncertain, it is known that those communities and regions with the least resources², such as rural agricultural areas³, will be the most vulnerable to climate change.

Warmer and wetter weather (particularly warmer winters) will increase the risk and occurrence of animal diseases, as certain species who serve as disease vectors, such as biting flies and ticks, are more likely to survive year-round. Certain existing parasitic diseases may also become more prevalent, or their geographical range may spread, if rainfall increases⁴. This may contribute to an increase in disease spread, including zoonotic diseases.

Transportation of animals for personal, entertainment, or agricultural purposes also increases the possibility for the introduction and subsequent presence of diseases and pests, including ticks and parasites, previously considered exotic. The viral infection Bluetongue Disease, for example, was once only a threat in Africa, now affects cattle and sheep in the whole of Europe⁵.

Conditions inherent in industrial animal agriculture facilities can increase the emergence of diseases that affect humans and animals alike. Outbreaks of diseases such as Foot & Mouth

Disease or Avian Influenza affect very large numbers of animals and contribute to further degradation of the environment and surrounding communities' health and livelihood.

Recommendations:

- Develop a comprehensive plan (e.g. health, disaster reduction) to deal with the migration of disease due to climate change;
- Take into consideration the rights of indigenous, migratory and pastoral people
- Develop positive animal welfare contingency plans to control zoonoses caused by climate change;
- Use vaccinations (e.g., rabies vaccines) as a control measure where appropriate in regions where disease is endemic;
- Improve biosecurity at animal production sites that also safeguard animal welfare; and
- Limit transportation of live animals.

Effects of Climate Change on Farm Animals and Their Caregivers

Animals, pastoralists and farmers are intrinsically dependent on the environment, and any fluctuations in weather and climate can affect them through water and land changes, such as desertification, and feed and water availability, access, and appropriateness. Climate change will not only impact the health and welfare of animals, but also the more than billion people who depend on them.

Desertification and climate change are inextricably linked through feedbacks between land degradation and precipitation: less rain leads to soil compaction and hardening, making the land unable to absorb rainwater.⁶ This could have disastrous effects as rain becomes less frequent but heavier.

The increased use of chemical-based agricultural inputs, including artificial fertilisers, pesticides, and herbicides, and their impact on soil and water quality will likely exacerbate the effects of climate change by further degrading other ecosystems such as coral reefs⁷ and rivers⁸, decreasing the land's ability to produce food⁹. It is much easier for farmers in developed countries to endure a climatic setback than those in poorer nations such as Malawi, where 80% of the population lives in rural areas¹⁰ and approximately 40% of the economy is supported by rain-fed agriculture¹¹. For example, as grazing areas dry up in sub-Saharan Africa, pastoralists will be forced to travel farther to find food. Cattle, goats, camels, sheep, and wildlife dependant on access to grazing areas for food will suffer¹². This will lead to greater conflict between people and between people and animals.

Resources must be made available to educate and prepare for change if the negative impacts of climate change on animals suffering is to be minimised.

Recommendations

- Require consultation and guidance from welfare scientists and experts when drafting climate change policy, such as how to reduce green house gases emissions, agriculture management, mitigation strategies, and disaster response;

- Include animal welfare policies in development programmes, compare these programmes to different climate change scenarios and include strategies for minimising the risk to animals from climate change; and
- Conduct a thorough review of the impact of climate change on farm animals and their welfare, including increased risk of animal disease and starvation due to drought, taking into account food security and livelihood protection needs, as well as the rights of pastoralists and the indigenous.

Effects of Farm Animal Agriculture on Climate Change

Not only are the effects of climate change on animal welfare important, but also the contributions of animal production to climate change due to the contribution to GHGs and energy consumption. Unfortunately, many studies and recommendations do not take into account multiple causes and effects, thus significantly restricting the potential outcomes.

Current Status and Overall Impact:

Livestock agriculture accounts for 35-40% of methane and nearly 70% of nitrous oxide worldwide, gases that arise mainly from the digestive processes of animals, and animals' waste¹³. Levels will continue to rise as animal numbers grow to meet the increasing demands for meat and milk from developing countries such as China and India. Agricultural emissions of nitrous oxide from manure and the production of artificial fertilisers are projected to increase by 35-60% by 2030¹⁴. Some developing regions will have very large increases, including parts of East Asia with an increase of 135% from enteric fermentation and 86% for manure management¹⁵.

Deforestation for animal production accounts for 89.5% of all CO₂ livestock related emission and 34% of CO₂, CH₄, and N₂O emissions¹⁶. The increased production of beef in South America and soybean production for feed transported to Europe is leading to deforestation of the rain forest, which has a great impact on the emission of GHG.¹⁷ Soybean production for feed also causes losses of biodiversity and chemical pollution.^{18, 19, 20, 21, 22,23} Western Europe is the only region whose emissions are falling and predicted to continue to decrease by 2020,²⁴ but that does not include these areas used for feed production in other parts of the world.

With good management, animals genetically suited to their environments and raised in low-density systems can play important roles in proper land management through consuming biomass unsuitable for human consumption.²⁵ Grazing animals can contribute to a rich biodiversity, fertilising the soil, and improving the land's ability to collect and absorb water. Agricultural and pasture lands can act as "carbon sinks," pulling and storing carbon from the atmosphere.²⁶ Sustainable land management practices, such as agroforestry, silvo-pastures, and growing cover crops, can prevent carbon from being lost.²⁷

By contrast, poorly managed, high-density and intensive practices and systems are typically inhumane and destructive to the environment. Ensuring adequate animal welfare can also help to reduce GHG emissions and ultimately the future sustainability of meat, egg, and milk production.

While animal agriculture emits significant amounts of CO₂ through the production of fertilisers and feed,²⁸ and the energy required to heat and cool industrial operations and run farm machinery,²⁹ the farm animal agriculture sector emits enormous quantities of nitrous oxide and methane emissions from animal manure,³⁰ methane emissions from animals' digestion, and nitrous oxide emissions from the artificial fertiliser used to grow feed crops for animals.³¹

Comparisons of Systems:

There is a great deal of research demonstrating how changes to agricultural practices might help alleviate climate change; however, comparisons between different farming methods and land use change are complex and the findings from different research studies are often contradictory. Farming methods are varied in their effect on climate change, the environment, people, and the animals. Industrial pig and bird production, for example, is a significant source of GHG emissions and is predicted to become even greater with countries such as China and India increasing production. On the other hand the more intense the production the less GHG emission per kg of product.

There is a lack of research comparing organic or pasture-raised versus conventional or industrial animal agriculture and energy use. Most studies to date do not include a complete life cycle analysis of all the "ingredients" that go into animal agriculture, including land use changes (deforestation or the clearing of grasslands or pastures to produce crops for animal feed) and the amount of energy used to produce and transport fertiliser, antibiotics, feed, animals, and animal products.

While it is difficult to compare species, regions, and farming systems some studies indicate that production of cattle, followed by dairy cows, pigs, and birds is the most damaging to the environment when considering such factors as the type of GHG emission, manure and industrial wastes, water use, production system, feed conversion, and land requirements^{32,33}. However, these studies do not consider the effect agriculture production has on the animal or on the surrounding communities. Birds raised for meat and eggs are, just as other farmed animals including fish, sentient individuals recognised as such by various governments^{34,35}. While decreasing beef and increasing poultry production could potentially reduce GHG emissions, the acceptability of such policies are limited by decreased welfare of birds in agricultural systems, increased potential for disease outbreaks as well as point source environmental contamination.

Industrial animal production facilities require significant amounts of feed, antibiotics, and water to operate and produce huge quantities of manure, with dangerous concentrations of heavy metals, antibiotics and other drugs, and pathogens, such as *E. coli*, which can pollute the soil and water.

In contrast, farm animals reared in more extensive systems, which are less water-reliant and provide for reduced disease transmission, typically use local resources and their manure can be efficiently utilised as a source of fertiliser, thus avoiding artificial fertilisers. Organic agriculture³⁶ and small diverse farming³⁷ has the potential to contribute substantially to global food supply while reducing detrimental environmental impacts. Dr. Hans Herren summed up the past and future of agricultural policy when he said, "On a global scale, we have been producing sufficient food for an ever growing population. But this has been done at a cost that has left deep physical, biological and social scars, that now need the full attention of the scientific, moral and political authorities..."³⁸.

Recommendations:

- Conduct a thorough review of the impact of the entire farm animal production sector on climate change and their wider societal impacts, including the impacts of the various types of production systems (e.g., extensive, industrial, indigenous, intensive);
- Investigate the outcomes of shifting to more sustainable animal agriculture systems, such as organic or semi-intensive and the related effects on GHG emissions;
- Include strategies on husbandry (feed, genetic makeup, lifespan), management system (organic, water-intensive extensive, housed), outputs (manure), and reducing the numbers of farm animals reared and killed for food production for cutting emissions on global, national, and regional scales;
- Implement policies to reduce development and expansion of all animal agriculture systems;
- Incorporate education in sustainable land use as a central part of poverty alleviation plans;
- Encourage low-intensity/density farming system policies and strategies; and
- Develop sustainable adaptation techniques and farming strategies in collaboration with farmers, agriculture extension agents, women's groups, farm animal welfare experts and advocates, and political bodies.

Disaster Relief Programmes

Protecting farm animals during and after a disaster is more than just preserving local, regional, and national resources and ways of life. . It is also more than just preserving income. It is also about ensuring livelihoods, and regional economic and political stability. As farm animals are generally uninsured, farmers and pastoralists are especially vulnerable to poverty, disease, and conflict when animals perish in disasters. Current sanitation and safety considerations restrict animals from inclusion in most refugee/disaster camps, and evacuation plans often exclude animals. This can inhibit disaster response and effectiveness as people will often refuse to leave behind their animals. With effective planning, early warning systems and appropriate partners such as governmental and humanitarian organisations, the effects of disasters involving animals can be mitigated.

Recommendations:

- Incorporate humanitarian animal relief bodies to improve response effectiveness and efficiency;
- Incorporate risk reduction plans into poverty reduction policy;
- Include early warning systems (e.g., Hyogo framework based) in the animal relief communities to prepare owners of animal populations;
- Integrate veterinarians and animal protection experts in disaster assessment teams;
- Conduct joint disaster trainings and exercises with humanitarian and animal protection experts;³⁹
- Require animal shelters and veterinary clinics to be wind and earthquake resistant and located at an appropriate distance from storm surge areas where possible.

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