

Animal health and Sustainability

A Global Data Analysis - Summary



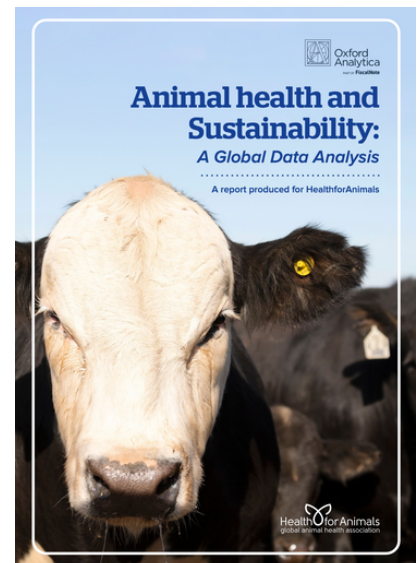
A report produced for HealthforAnimals

This report analyses the relationship between animal health and the economy, environment and society. A summary is below and a full copy can be found at HealthforAnimals.org/AHSustainability

The review was carried out by Oxford Analytica, a leading research and analysis firm, which developed a unique regression model to measure different animal health indicators.

The model found livestock diseases are associated with significant reductions in global livestock productivity, producing key associations such as:

- A 60% global vaccination rate for beef cattle correlates to a productivity rise of more than 50%.
- A fall in disease levels of 10 percentage points is associated with an 800 million tonne decrease in greenhouse gas (GHG) emissions.
- Poultry disease was associated with a 5% rise in hunger in 2019 – equal to an additional 34 million people going hungry.



The report also builds upon existing research in the field with case studies that demonstrate how livestock disease control can meet global needs and targets, such as:

- Showing through UNFAO data that scaling up existing practices in animal health and husbandry means livestock could potentially serve more than 9 billion people in 2050 without increasing emissions.
- Calculating that livestock disease losses represent \$358.4 billion in lost production per year.
- Estimating that every percentage point reduction in global beef cattle losses due to disease could provide enough additional production to meet the consumption needs of 317 million people.



Methodology

The model is built on data covering 180 countries from 2005 to 2022 sourced from the World Organisation for Animal Health (WOAH) and UN Food and Agriculture Organisation (UNFAO). The model used robust multiple regression analysis to identify statistically significant correlations or "associations" between variables such as vaccination, disease levels and productivity in livestock species.

It is important to note that associations can also reflect complementary, external factors as well. For instance, vaccination data may also reflect the effect of an overall increased investment in veterinary care. Final results also provide estimates on the aggregated impacts of disease and vaccination rather than for individual illnesses. Visit the "Interpreting Report Results" section of the full report for further information on how best analyse all results.

Economic sustainability

The modelling found that animal disease significantly reduces global livestock productivity each year, having a measurable impact on revenue for producers.

The report finds that in 2018 alone:

- Global poultry production was likely reduced by 2.8 million tonnes due to disease.
- In low-income countries, poultry production levels were likely reduced by up to 22% due to disease.
- Global egg production was likely reduced by 3 million tonnes by disease, which from a revenue perspective equated to a loss of US\$5.6 billion. That figure is the equivalent of wiping out the United Kingdom's £1.2 billion egg market nearly four times over.


In 2018, diseases caused global poultry production to fall by

2.8 ↓
million tons


When modelling the average effect of vaccination in a year, Oxford Analytica's research found that:

- A 60% global vaccination rate for beef cattle is associated with a 52.6% rise in production. Based on global productivity levels, this rise is equivalent to the beef consumption needs of 3.1 billion people.
- In Brazil, one of the world's largest beef producers, vaccinating 1% of beef cattle correlates with a 0.7% increase in production.
- In Argentina, another major beef producer, an 80% vaccination rate for beef cattle in a given year is associated with a 43.8% rise in production over a 'no vaccination' scenario.

Effects of disease on egg production in 2018 were modelled at

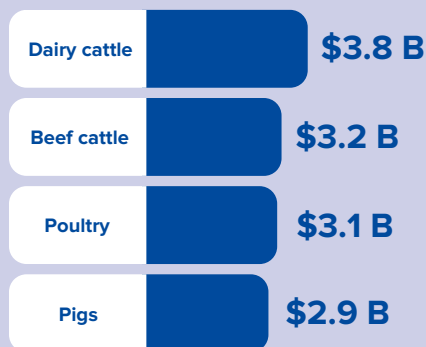
\$5.6 billion in losses 

Equivalent to almost **4 times** the UK's £1.2bn¹ egg market¹



Economics of Reducing Disease

For every one percentage point reduction in global livestock disease levels, the following additional revenue is generated*:



A case study analysis by Oxford Analytica found that livestock disease reduces global production by 80 billion kilos of meat and 179.5 billion kilos of dairy each year, reducing producer revenue by \$358.4 billion.*

Every 1% reduction in beef cattle disease rates would:

- increase production enough to meet the average beef consumption needs of 317 million people
- increase producer revenue by US\$3.2 billion.

Every 1% reduction in dairy cattle disease rates would:

- increase production enough to meet the average dairy needs of 80.5 million people
- increase producer revenue by US\$3.8 billion.

1. <https://www.egginfo.co.uk/egg-facts-and-figures/industry-information/data>

*Based on World Organisation of Animal Health estimate that 20% of production is lost to disease each year.

Environmental sustainability

Animal disease is associated with significant increases in livestock greenhouse gas (GHG) emissions and land use, while vaccination correlates to reductions in both:

- When global disease levels fall by 10 percentage points, Oxford Analytica modelling suggests GHG emissions fall by more than 800 million tonnes overall. This is equal to the average annual emissions of 117 million Europeans, based on the EU's estimate of 6.8 tonnes of CO₂ emitted per person each year.
- The effect of disease on GHG emissions is most pronounced in low-income countries. An outbreak of cattle disease affecting 20% of a herd is associated with an estimated 60% increase in GHG emissions in low-income countries compared to 42% in high-income countries.

A reduction in global livestock disease levels of **10 percentage points**

Leads to a drop of more than

800 ↓
million tons
of GHG emissions

Equivalent to the average annual emissions of **117 million Europeans**
based on EU estimate of 6.8 tonnes of CO₂ per person²



When analysing land use, Oxford Analytica modelling found significant associative relationships with disease levels and vaccination such as:

- When 20% of poultry globally are affected by disease each year, 8.6% more land is estimated to be necessary to maintain expected production levels.
- A 40% global vaccination rate for cattle in a given year is associated with a 5.2% reduction in land required for livestock production.



A 40% vaccination rate for Brazilian cattle is associated with a

12.8%
reduction
in land use for livestock

A case study analysis of UN data found that scaling up existing practices in animal health and husbandry means livestock could serve a world population of more than 9 billion in 2050 while holding emissions to current levels. Oxford Analytica's calculations indicated:

- UNFAO estimates that an increased uptake of existing animal health and husbandry technologies and practices can reduce livestock emissions intensity by 18-30%³.
- This intensity reduction could allow livestock farmers to increase production by an estimated 46.7 billion kg a year, enough to meet the needs of another 1.6 billion people, while holding overall emissions at current levels.
- With the global population at 8 billion, this means that increased adoption of existing tools in animal health and husbandry could enable livestock to serve more than 9 billion people in 2050 without increasing emissions.

2. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Greenhouse_gas_emission_

3. <https://www.fao.org/news/story/en/item/1157729/icode/>

Social sustainability

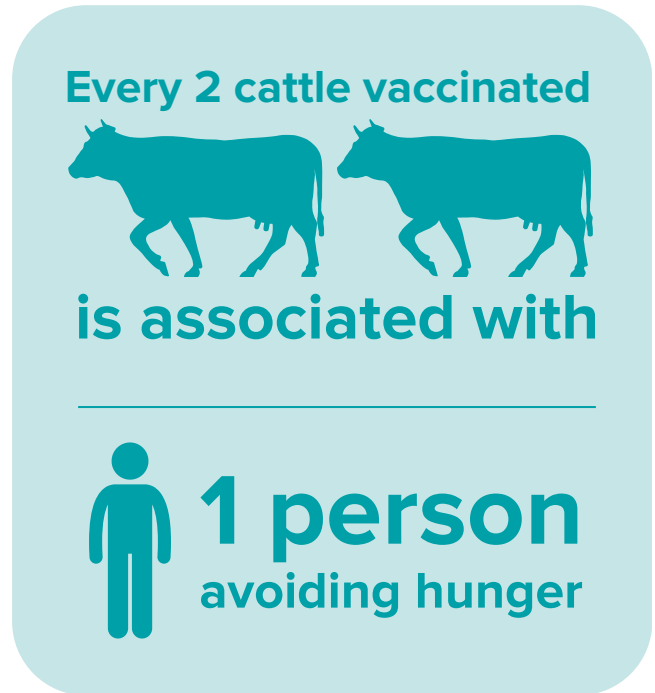
The modelling found that higher rates of disease among livestock are associated with higher levels of undernourishment and food insecurity among the world's population, while vaccination among livestock is associated with lower levels of undernourishment and food insecurity.

Oxford Analytica's modelling found:

- Poultry disease was associated with a 2% increase in global hunger in 2018 and 5% in 2019. This is equivalent to global hunger increasing by 13.6 million people in 2018 and 34.39 million in 2019.
- Each additional cattle vaccinated in a given year is associated with a decline of 0.674 in the number of undernourished people nationally. This suggests that at a global level, on average, every two cattle vaccinated may contribute to one person avoiding hunger.

Using the World Organisation for Animal Health's estimate that 20% of livestock production is lost to disease each year, Oxford Analytica conducted an analysis that found:

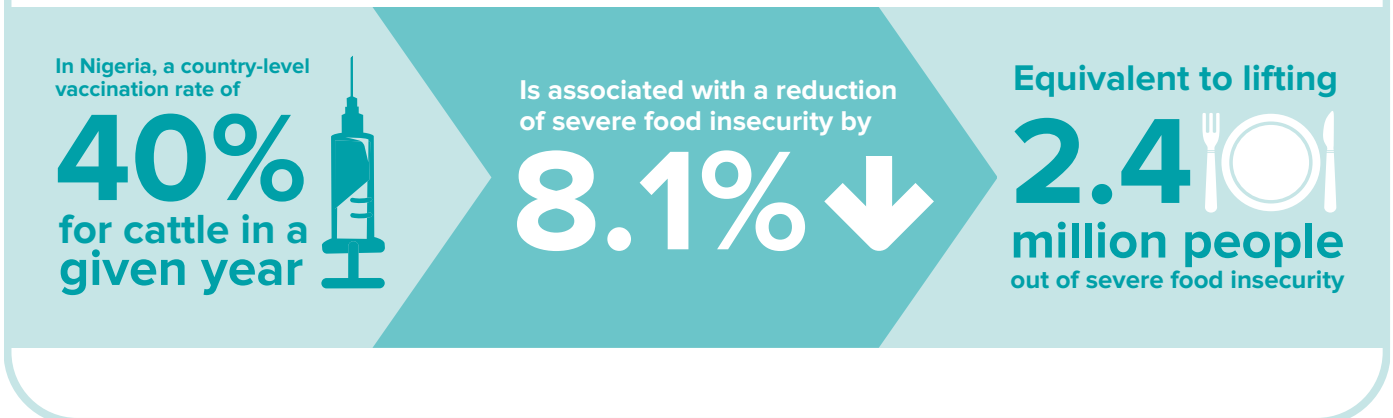
- Current meat production losses due to disease are approximately 80 billion kg, equal to the annual consumption needs of 1.6 billion people
- Current dairy production losses due to disease are approximately 180 billion kg, equal to the annual consumption needs of 2 billion people



Country spotlight: Nigeria

In Nigeria, an estimated 29 million people – out of a population of 206 million – are classified as living in severe food insecurity, which is defined by UNFAO as going a day or more without food to eat.⁴

The analysis modelled the impact of vaccinating cattle to reduce losses from disease and increase food supply, and found:



4. <https://www.fao.org/hunger/en/>

Conclusion

Animal disease rates and prevalence vary widely across the globe, with damaging diseases such as Foot and Mouth effectively eliminated in high-income countries while remaining endemic in developing regions.

Similarly, animal health measures and veterinary infrastructure also vary and can determine the efficacy of husbandry practices and control measures such as vaccination, as well as production levels.

However, the analysis indicates that controlling livestock disease in all contexts has multiplier benefits for economic, environmental and social sustainability. This includes reductions in emissions, hunger, malnutrition and poverty in line with the targets established by the UN's Sustainable Development Goals for 2030.

The modelling by Oxford Analytica provides a useful contribution to global knowledge on animal health and its effects on the environment, economies and society, while recognising that there will be significant opportunities for others to build upon it in the future.

Increasingly robust data from sources such as WAHIS, FAOSTAT and the Global Burden of Animal Disease programme will enable researchers to overcome some of the data gaps and limitations in this project and provide more granular results. The full report strives to explain the methodology and processes behind calculations in full so that others may leverage this approach in their work.



Primary Sources

The following sources were primarily used to compile the "Animal Health and Sustainability" report:

- **The United Nations Food and Agriculture Organization's FAOSTAT:** FAOSTAT provides free access to food and agriculture data for more than 245 countries and territories and covers all FAO regional groupings from 1961 to the most recent year available.
- **The World Organisation for Animal Health's WAHIS platform:** WAHIS is the global animal health reference database of the World Organisation for Animal Health (WOAH). WAHIS data reflects the validated information since 2005 reported by the Veterinary Services from Member and non-Member Countries and Territories on terrestrial and aquatic Listed diseases in domestic animals and wildlife, as well as on emerging diseases and zoonoses.



About



Oxford Analytica, now a part of FiscalNote is an independent global analysis and advisory firm which draws on a worldwide network of experts to advise its clients on their strategy and performance. Our insights and judgements on global issues enable our clients to succeed in complex markets where the nexus of politics and economics, state and business is critical. To learn more about our products and services, visit www.oxan.com.



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