



FRESHWATER USE AND FARM ANIMAL WELFARE

THE CHALLENGE

Our blue planet is under strain with many of our key environments showing telling signs of over-use and exploitation. Our water resources are vital for us to live and are home to an abundance of wildlife. Finding ways of supporting food production and using our water resources wisely whilst reducing our impacts on our environment are pressing challenges, but ones that we must get right.

To explore ways to protect water resources whilst producing meats from farms with the potential for higher animal welfare, Compassion in World Farming commissioned a new report. Global expert, Professor Arjen Hoekstra, assessed water use in the production of meat products from industrial, mixed and grazing farm systems¹. This briefing note provides highlights of our new report, from the perspective of animal welfare and broader sustainability issues.

KEY FINDINGS

This new research shows that meat production is a very water intensive part of our diet and highlights a number of significant issues:

- Worldwide, approximately one quarter of global freshwater use relates to producing meat and dairy, which is likely to increase if production continues to rise.
- Grain-based animal feeds use 43 times more irrigation water than pasture-based animal feeds.
- Grass-based farming may be preferable to intensive farming from a water resources point of view.
- A reduction in meat consumption and food waste can reduce the water impact of our diets.



OVERVIEW OF THE STUDY

Our new research calculated the quantity of water used and the amount of water polluted during the production of certain meats. This provides a water footprint (WFP) which was compared across three different meat products from three different farming systems in five geographic regions.

WATER FOOTPRINTS IN DEPTH

The water footprints were calculated by adding up all the water used in each stage of the production process from producing animal feed, on farm water use and through to slaughter. The WFP is expressed in litres of water used per kilo of meat produced. Using the standard methodology developed by the authors², the study measures three different types of water which are used during the production of each meat:

Green: is the volume of rainwater use,
Blue: is surface and ground water use (irrigation),
Grey: is an indicator of freshwater pollution.

In this new study, the rainwater, surface and groundwater, and water pollution footprints were calculated for three different meat types – cattle (beef), poultry (chicken) and pigs (pork). The water footprints of these were calculated for meats produced in three different farming systems – grazing, mixed and industrial agricultural systems. These were studied in five different regions – Brazil, China, Netherlands, USA, and global average.

Industrial farm systems can be considered to have the potential for lower animal welfare, while extensive and grass-based farm systems have the potential for higher welfare farming.

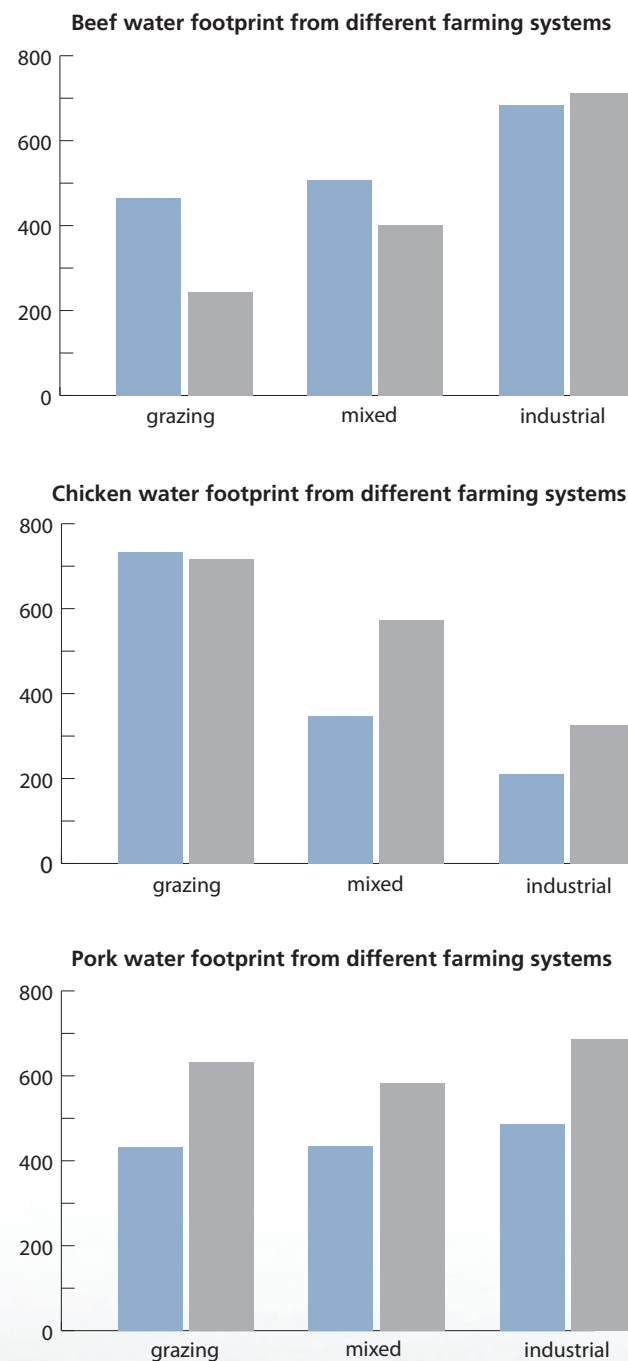
WATER AND WELFARE

Animal feed is the dominant factor in the amount of water used to produce meat, and relates to both the amount of feed and the type of feed consumed by the animals over their lifespan. The balance between these two factors determines the overall WFP and varies between different farm systems and management practices. Grazing animals rely on forage and roughage but eat a greater volume of feed. Industrially-farmed animals rely more on grain-based, concentrated feeds but require smaller quantities. WFP is also affected by regional differences in climate, soil, rainfall and vegetation.

Green (rainwater) water dominates the WFP of animal agriculture but is of less concern for water resource management than *blue* (irrigation) and *grey* (pollution) water. Grain-based animal feeds use 43 times more *blue* water and 61 times more *grey* water per kg of feed than is needed for roughage-based animal feeds. The global averages of the *blue* and *grey* WFPs indicate that pork industrial systems have slightly higher blue and grey WFPs than grazing systems. Globally, industrial beef farming has far higher *blue* and *grey* WFPs than grass-based beef, whilst the reverse is the case for chicken.

Meat products have greater WFPs than plant-based foods, therefore reducing meat production will reduce water use.

Figure 1. Litres of irrigation water (blue) and pollution levels (grey) in the production of three meat products, as a global average (litres/kg).



OUR ANALYSIS

FINDING BEST PRACTICE

Our new study can be used to identify specific examples of lower water footprints. Ranking the *blue* water and *grey* water footprints of the three meats and four nations studied shows that grazing systems can be favourable for water resource management:

- The lowest *grey* WFPs are found in grazed beef cattle in China and then Brazil.
- The lowest combined *blue* and *grey* WFP is found in beef from grazing systems in Brazil and then China.
- The lowest *blue* WFPs are found in poultry systems in Brazil, where all chicken meat production systems show very low and very similar *blue* WFPs.



THE EFFICIENCY TRAP

In a resource-constrained world, there are strong drivers for efficiency through intensification, however, this could be counter-productive. For example, it may be more effective for water management to accept a higher WFP which is predominately rainwater than a lower WFP which is primarily *blue* and *grey* water. Equally, high WFPs in areas of high rainfall may be of little impact locally, whereas a lower WFP may have a higher impact in water scarce areas.

There is also a risk of prioritising efficiency on one indicator alone, such as water use, at the expense of other factors. For example, deforestation in water rich areas to produce animal feeds can cause biodiversity loss or climate change. Additionally, scale can be more important than efficiency. Industrial and mixed farming together provide 91% of global meat and thus dominate livestock water use globally. Efficiency gains in these sectors could be outweighed if these farming systems continue to grow.

Given that meat has a higher WFP than plant-based foods, reducing meat production is an effective and efficient way to reduce water use. Reducing meat consumption can also deliver additional health³ and environment benefits.

A LIFE WORTH LIVING

While the amount of water use in agriculture is of great importance for people and the planet, our methods of farming are also of vital importance to the animals we choose to farm. The trend towards intensive industrial meat production has moved animals away from conditions that can meet their needs and into systems that often cause suffering, distress and disease. The welfare of animals includes their physical and mental state and good animal welfare should be considered in terms of the Five Freedoms⁴.

- **Freedom from hunger and thirst**
- **Freedom from discomfort**
- **Freedom from pain, injury or disease**
- **Freedom to express normal behaviour**
- **Freedom from fear and distress**

BEYOND FACTORY FARMING

Compassion in World Farming encourages policy makers, farmers, food businesses and consumers to move beyond factory farming and seek new ways to achieve humane sustainable and healthy diets for all. A new approach to food and farming must strike an optimal ethical balance across many environmental, social and economic needs.



POLICY RECOMMENDATIONS

- ✓ Expansion of industrial or grain-fed animal production systems should be reversed.
- ✓ Financial mechanisms and policies must be switched from supporting intensive farming to driving humane sustainable food security.
- ✓ Measures to reduce food waste and over consumption of meat are needed.
- ✓ Laws, policies and practices must be enhanced to ensure animal welfare is at the heart of farming.
- ✓ Research should be developed to design farming and food systems which deliver humane sustainable food security and optimise multiple environmental, economic and social objectives.

REFERENCES

- ¹ Gerbens-Leenes, P.W., Mekonnen, M.M., Hoekstra, A.Y. (2012). *A Comparative study on the water footprint of poultry, pork and beef in different countries and production systems*, Value of Water Research Report Series No. 55, UNESCO-IHE, Delft, the Netherlands.
- ² Hoekstra, A.Y., Chapagain, A.K., Aldaya, M.M., Mekonnen, M.M. (2011). *The water footprint assessment manual - Setting the global standard*, Earthscan, London.
- ³ World Cancer Research Fund / American Institute for Cancer Research (2007). *Food, Nutrition, Physical Activity, and the Prevention of Cancer: a Global Perspective*. Washington DC.
- ⁴ Farm Animal Welfare Council (2009). *Farm Animal Welfare in Great Britain: Past, Present and Future*. Pp 1-151.

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“The sheer scale of current intensive farming, regardless of so-called efficiency, contributes to us outstripping our resources unsustainably. I believe that the current drive to industrialise and expand pork and chicken production must be seriously challenged due to the pressures on our water environment and resources.”

Philip LyMBERy, CEO, Compassion in World Farming

This research is part of a series exploring animal welfare and sustainability issues. Funding has been provided by a partnership of three organisations: Compassion in World Farming, The Tubney Charitable Trust and World Society for the Protection of Animals. The full report is available to download from ciwf.org/water

The work of Compassion in World Farming is only possible with the backing of our donors and grants from charitable trusts. To enquire about funding our projects, please email:

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A decorative graphic at the bottom of the page consists of a blue wavy line that curves across the width of the page. Below this line, there are several water droplets of varying sizes, some in sharp focus and others blurred, set against a light blue background.