

### Introduction

Within the United States, classical education and popular culture point to a few key methods to promote a sustainable future, notably:

- Waste Reduction
- Water Preservation
- Recycling
- Avoiding Single Use Plastics

- Sustainable Energy
- Alternative Energy Sources (Solar etc.)
- Energy Conservation
- Public or Electric Transport

However, there is a third, overlooked, avenue for promoting environmental sustainability; diet. What we choose to consume, and therefore grow, has a significant impact on the land. The biggest indicator of environmental impact, research suggests, is whether our diets rely on animal-based or plant-based agriculture.

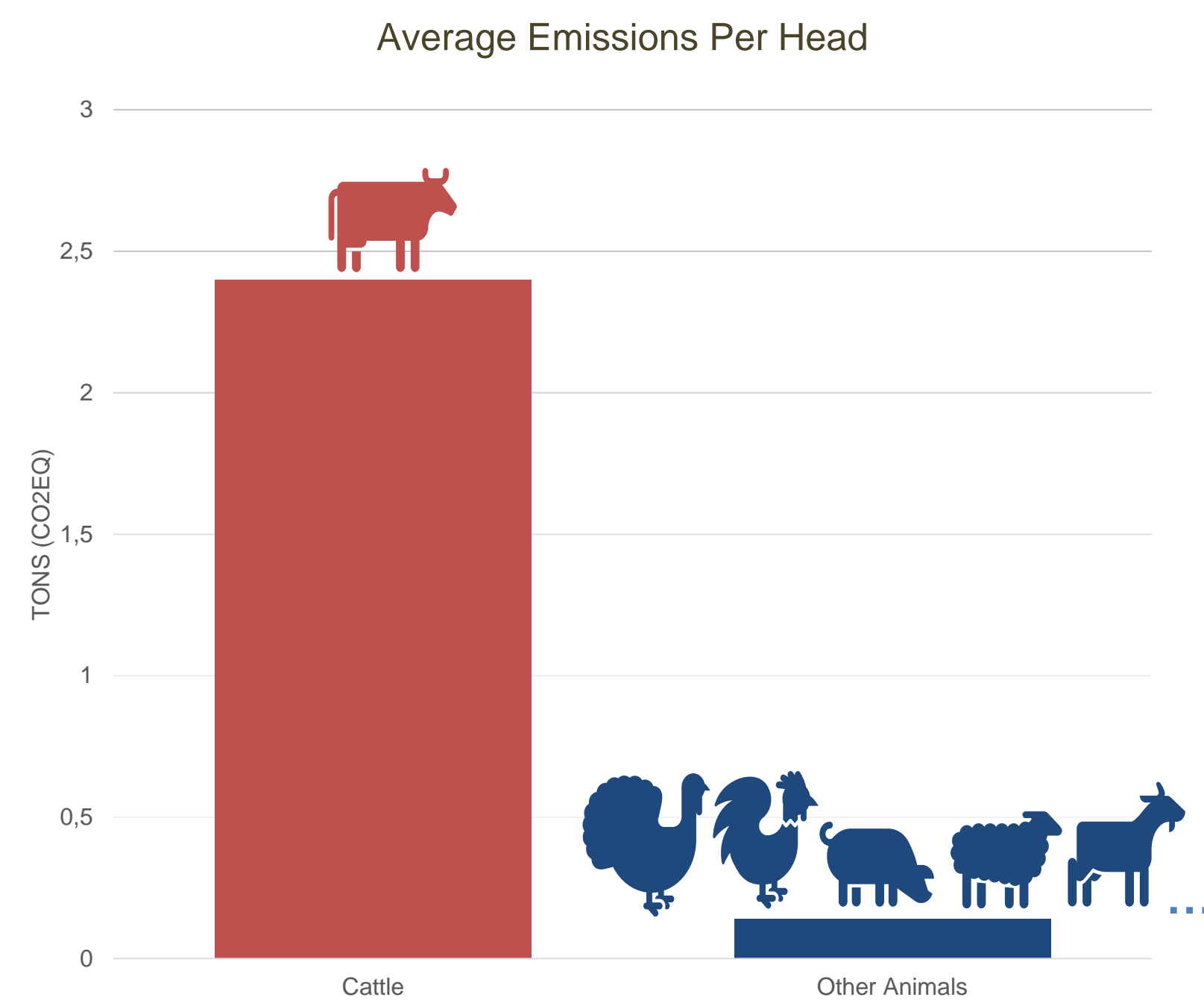


Figure 1: Relative Carbon Impact of Cattle Compared to All Other Livestock (FAOSTAT 2014)

### Acknowledgments

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### Greenhouse Gas Emissions

There are three major sources of emissions from animal agriculture: enteric fermentation within the guts of ruminant livestock (primarily cattle), feed production and land use changes. Defining animal agriculture as a single sector, the following global emission distribution emerges:

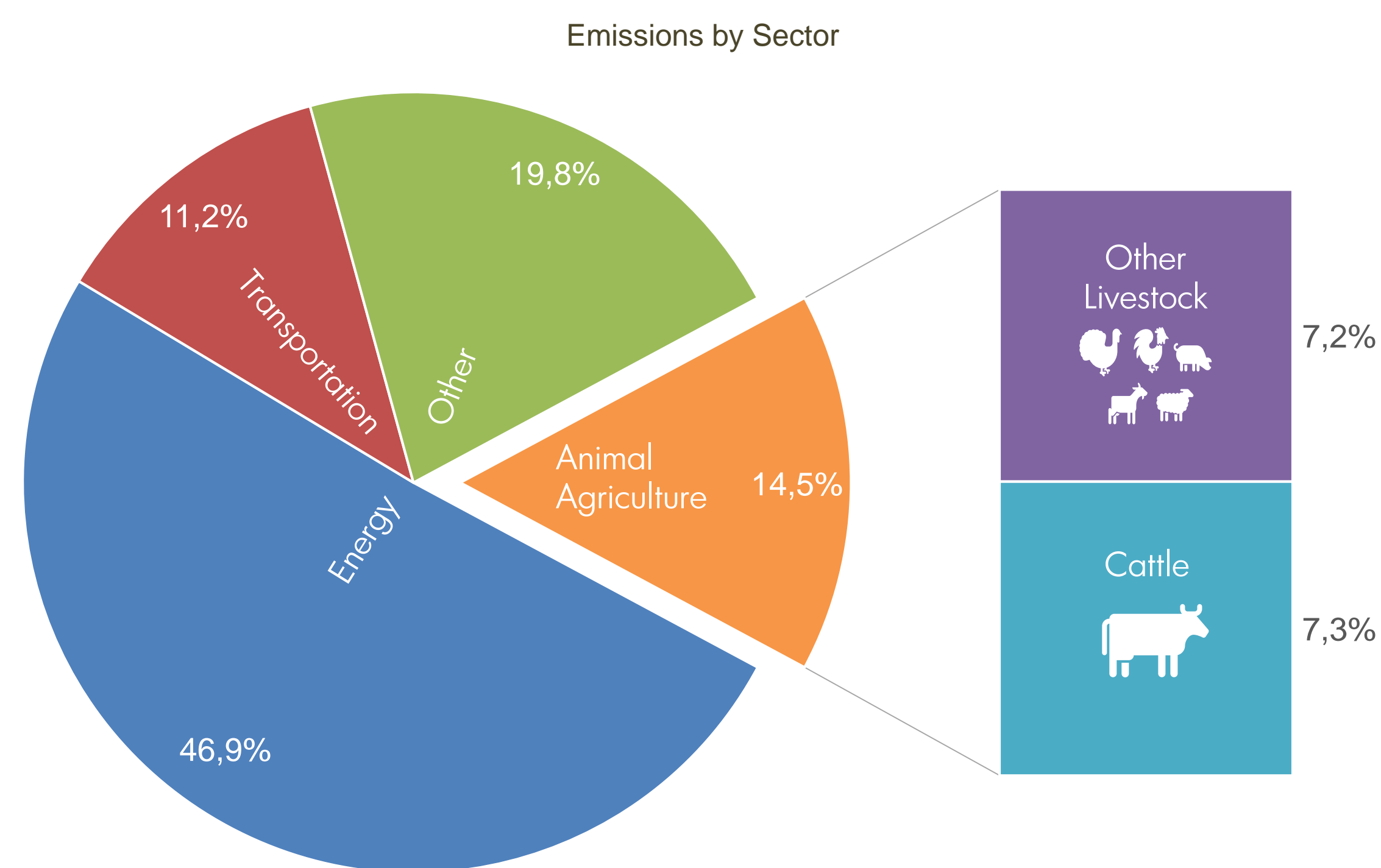


Figure 2: Global Greenhouse Gas Emissions by Sector (2010)

At the consumer level, life-cycle analyses data for standard grocery items produces a carbon cost for many traditional food items. When next at the grocery store, considering the hidden cost of each item can help promote sustainability.

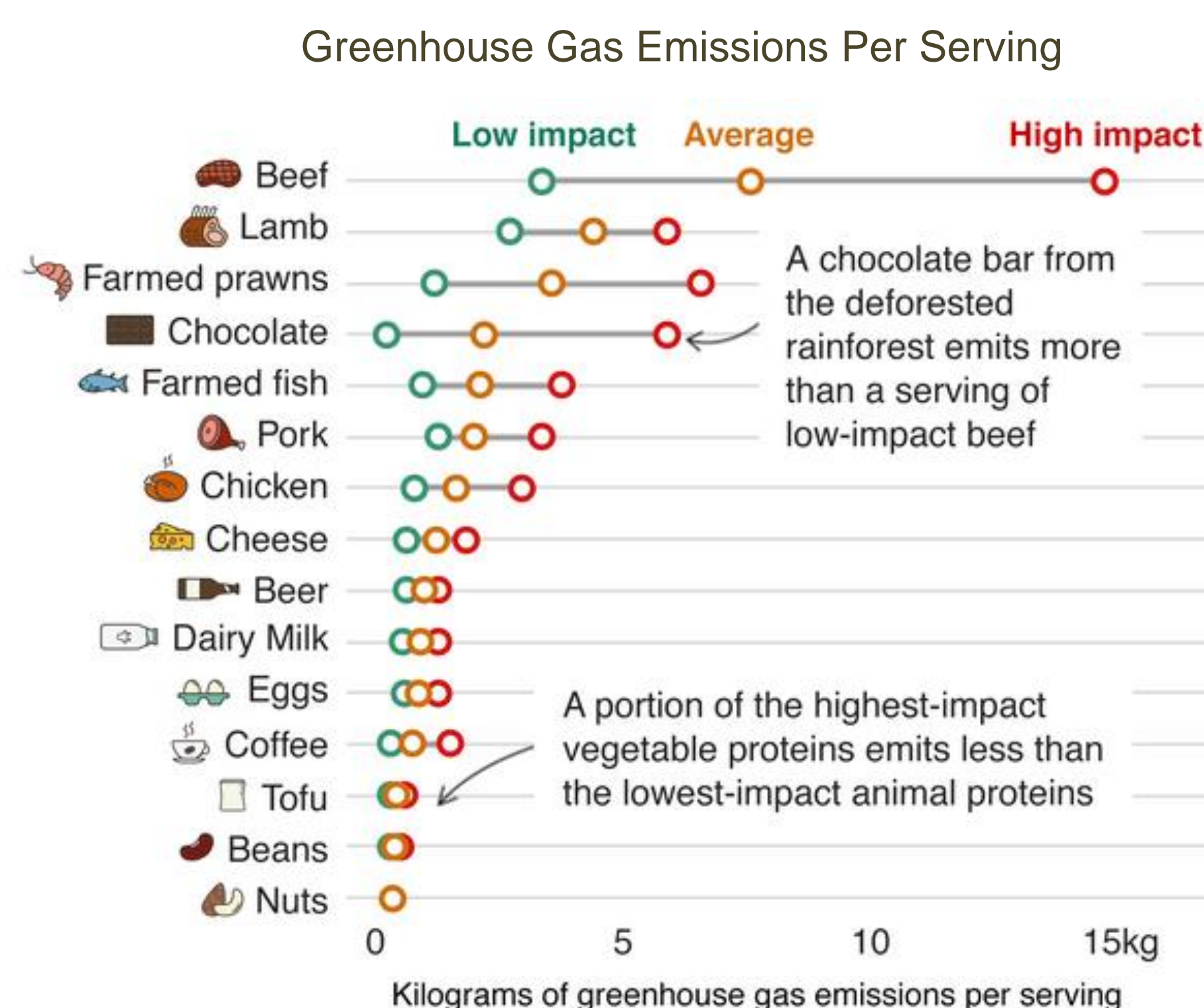


Figure 3: Emissions for Standard Pantry Items [1,2]

### Agricultural Efficiency

Through both land use and water consumption, animal agriculture is disproportionately burdening global supplies.

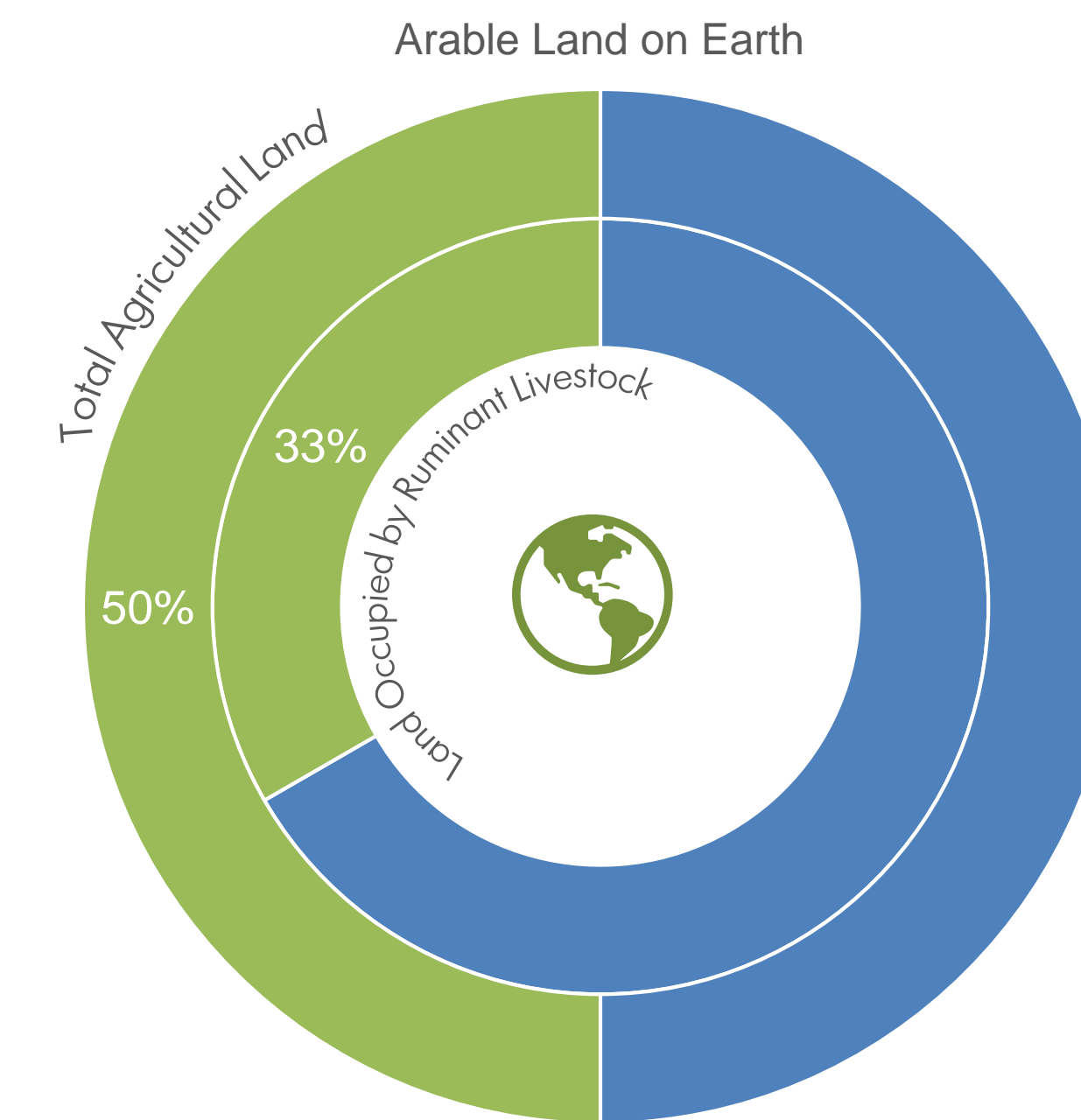


Figure 4: Ruminant Livestock Global Land Share

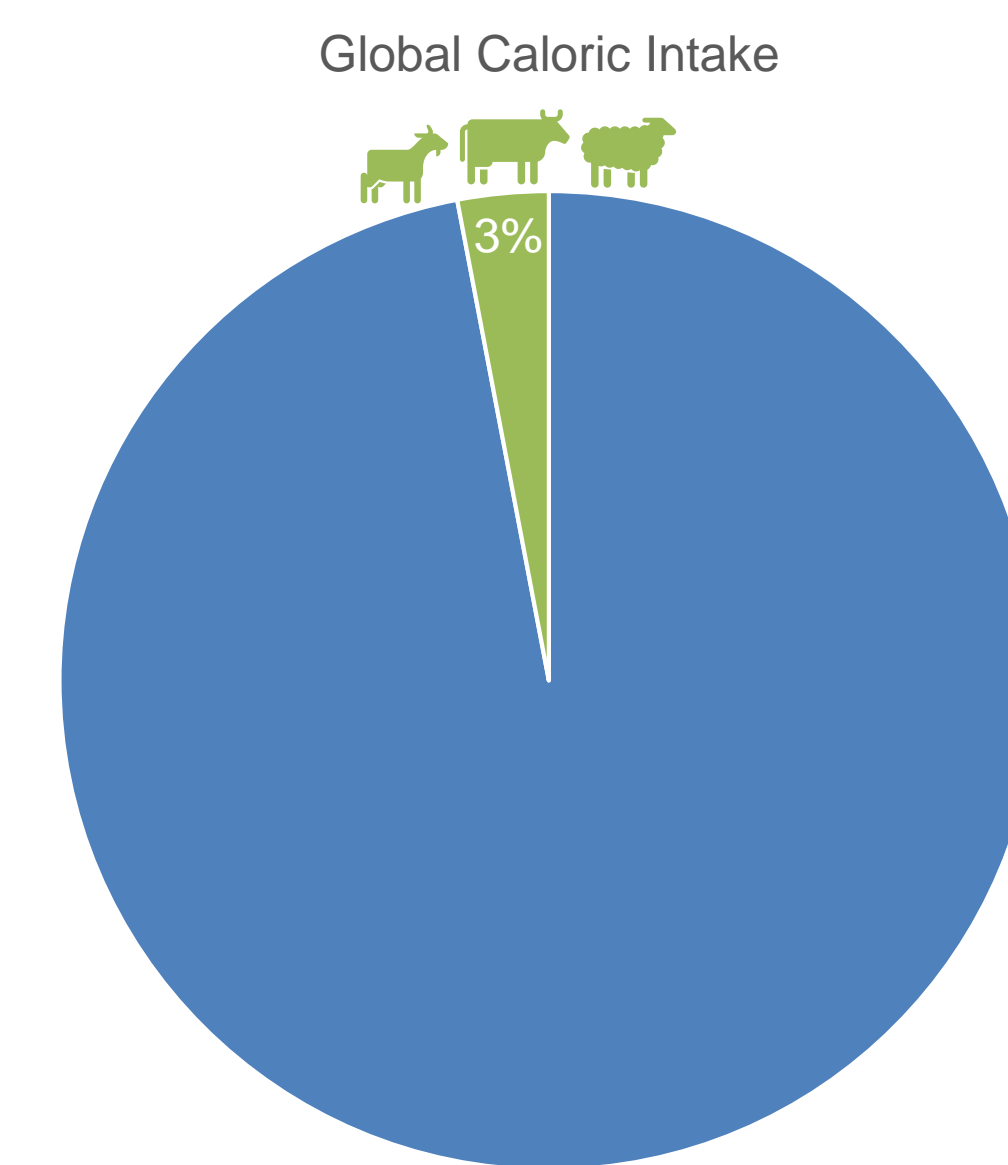


Figure 5: Ruminant Livestock Global Caloric Share

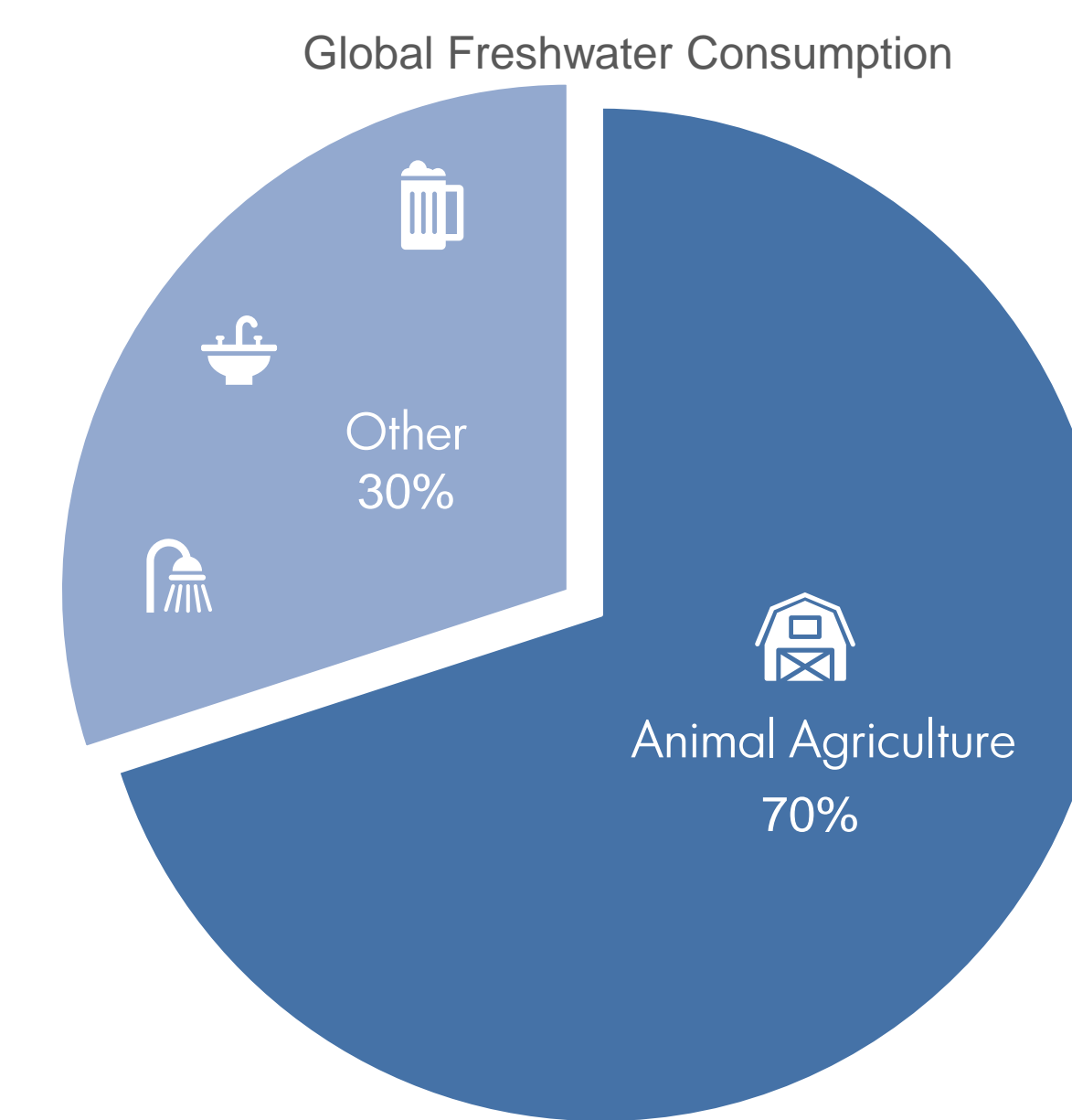


Figure 6: Global Freshwater Consumption

To accommodate Earth's finite resources and humanity's population growth, agricultural concentration must shift away from resource-intensive livestock. Less land use will prevent habitat loss as well as prevent land use changes and preserve global carbon sinks.

### Environmental Degradation

The UN Food and Agriculture Organization (UNFAO) determined that livestock was in the top two or three most significant contributors to the most serious environmental problems we face today. The increase in demand for meat, and the efforts to meet that demand, have forced farm owners to either extend into land unable to support livestock, or overtax their current resources. This overextension is a large contributor to the pervasive environmental degradation associated with animal agriculture.



Leading Cause: Habitat Destruction



Leading Cause: Species Extinction



Largest Single Source: Water Pollution



World Fisheries that are overexploited, fully exploited, or significantly depleted



Amount of the Amazon's Previously Forested Land used for Beef Pastures

### Conclusion

As the global population increases and worldwide diets shift towards higher levels of meat consumption, animal agriculture will gain an even more influential role in environmental protection. By reducing the consumption of high impact foods, such as beef, and shifting diets away from meat consumption, resulting improvements in agricultural efficiency will combat the need for land use change while simultaneously reducing emissions from the industry's largest carbon contributors.

### References

[1] Poore, J., & Nemecek, T. (2018). Reducing food's environmental impacts through producers and consumers. *Science*, 360(6392), 987-992.  
 [2] Stylianou, N., Guibourg, C., & Briggs, H. (2019, August 9). Climate change food calculator: What's your diet's carbon footprint?