



Livestock solutions for a better environment

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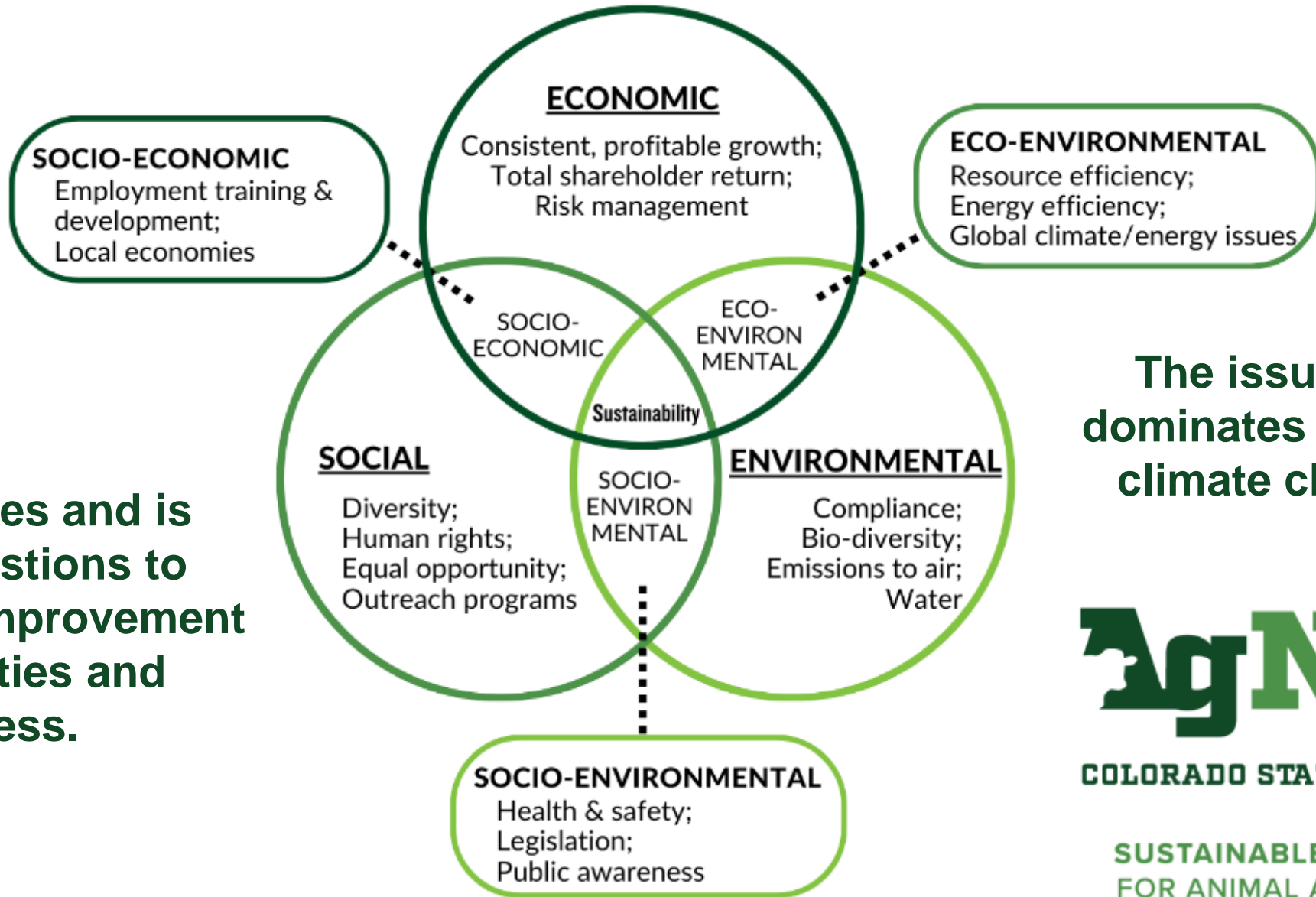
November 5, 2024

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Sustainability is Complex, Multi-Faceted and Often Emotionally Driven



Society cares and is asking questions to understand improvement opportunities and progress.

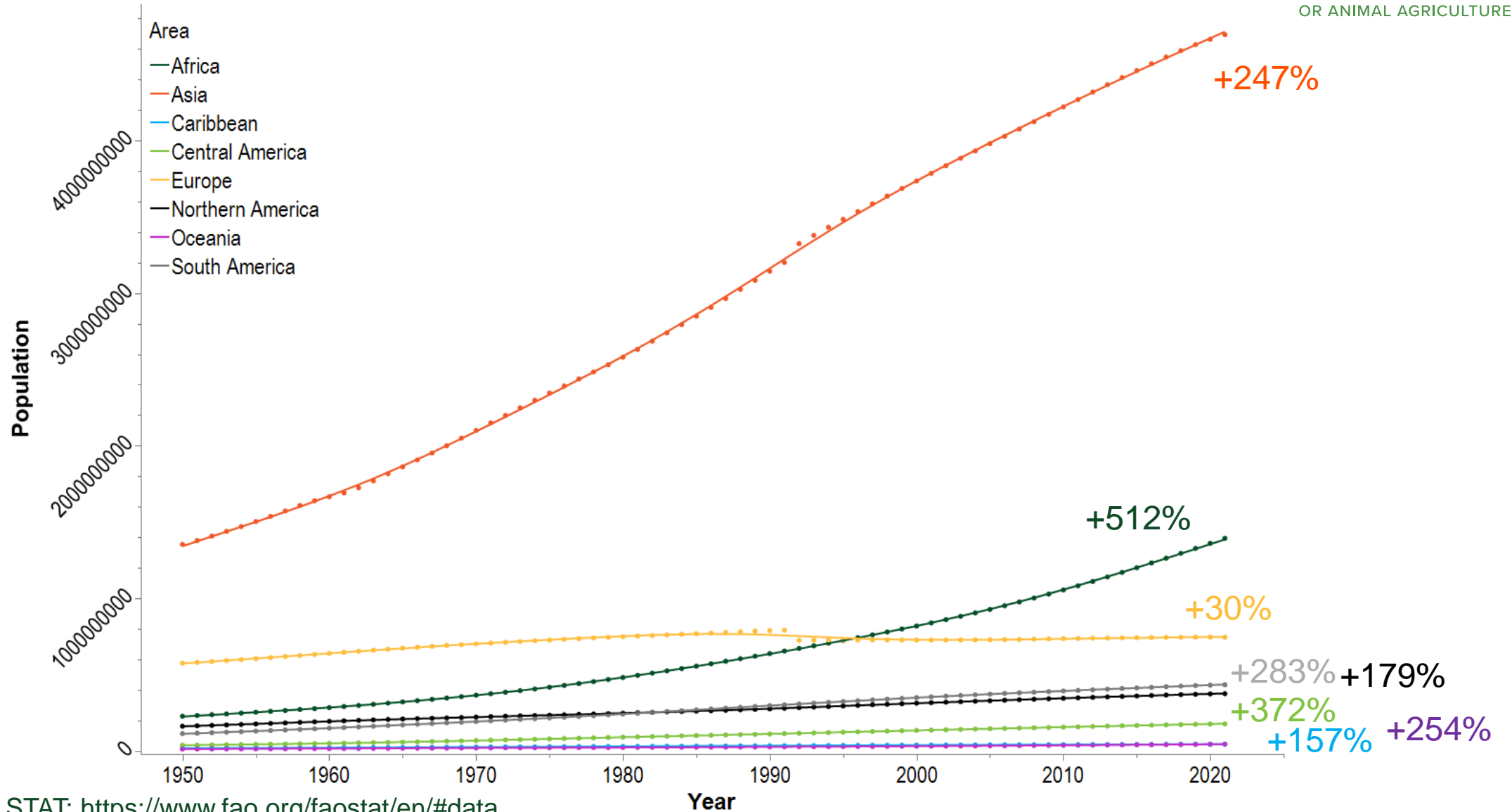
The issue that dominates today is climate change.



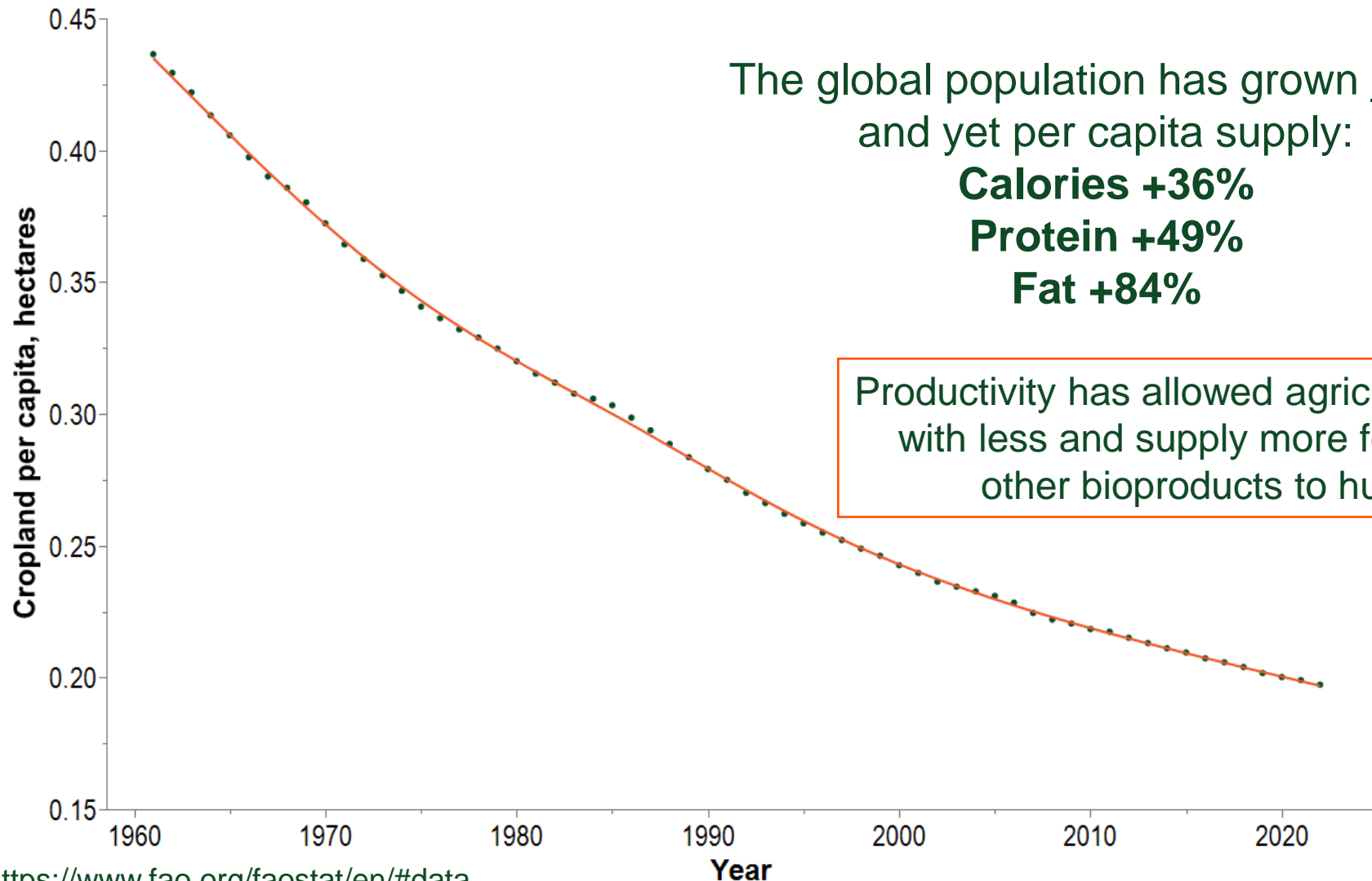
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Population trends, 1950 - 2021



Cropland per capita has declined 54% since 1961



The global population has grown 158%
and yet per capita supply:

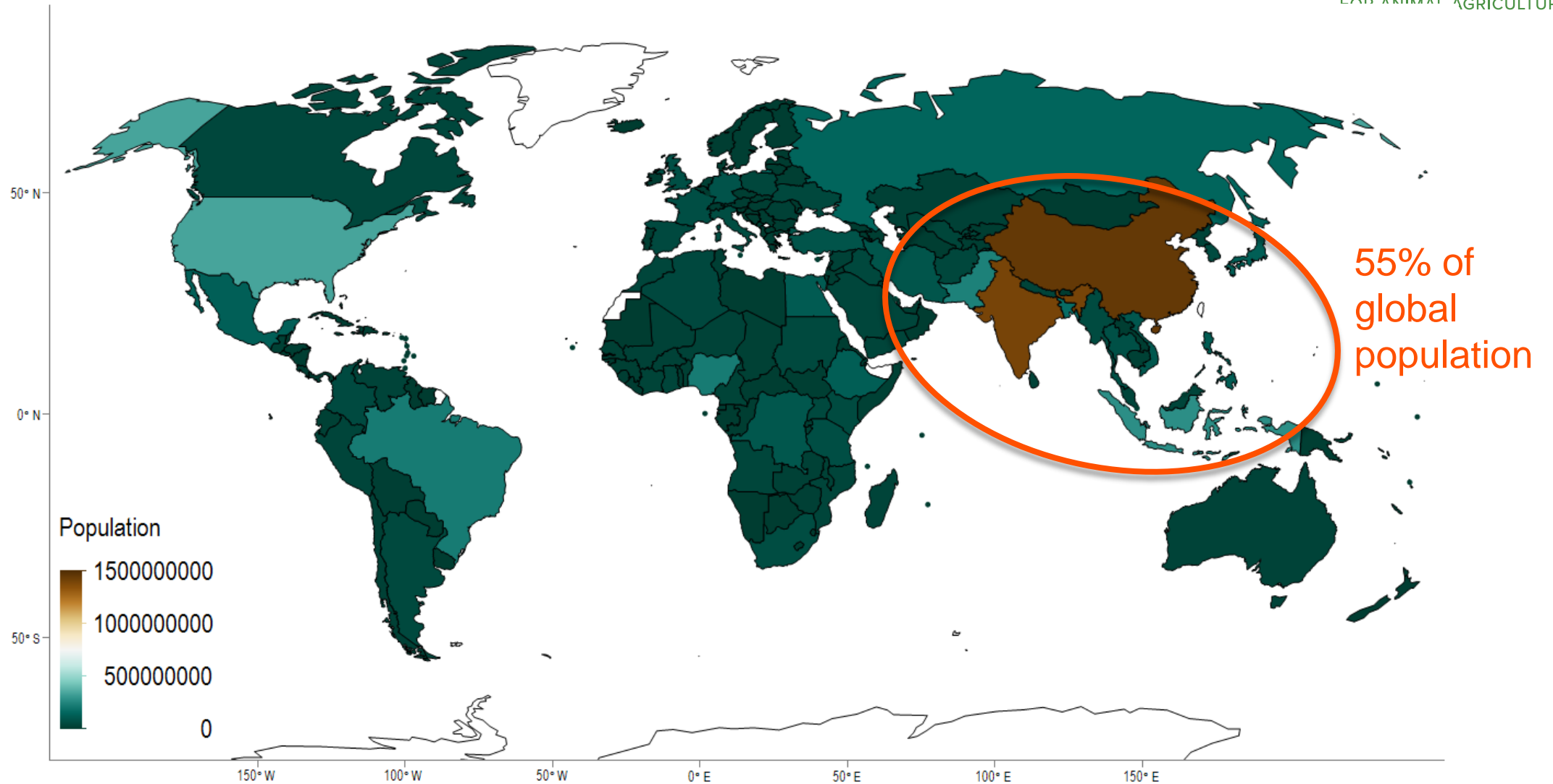
Calories +36%

Protein +49%

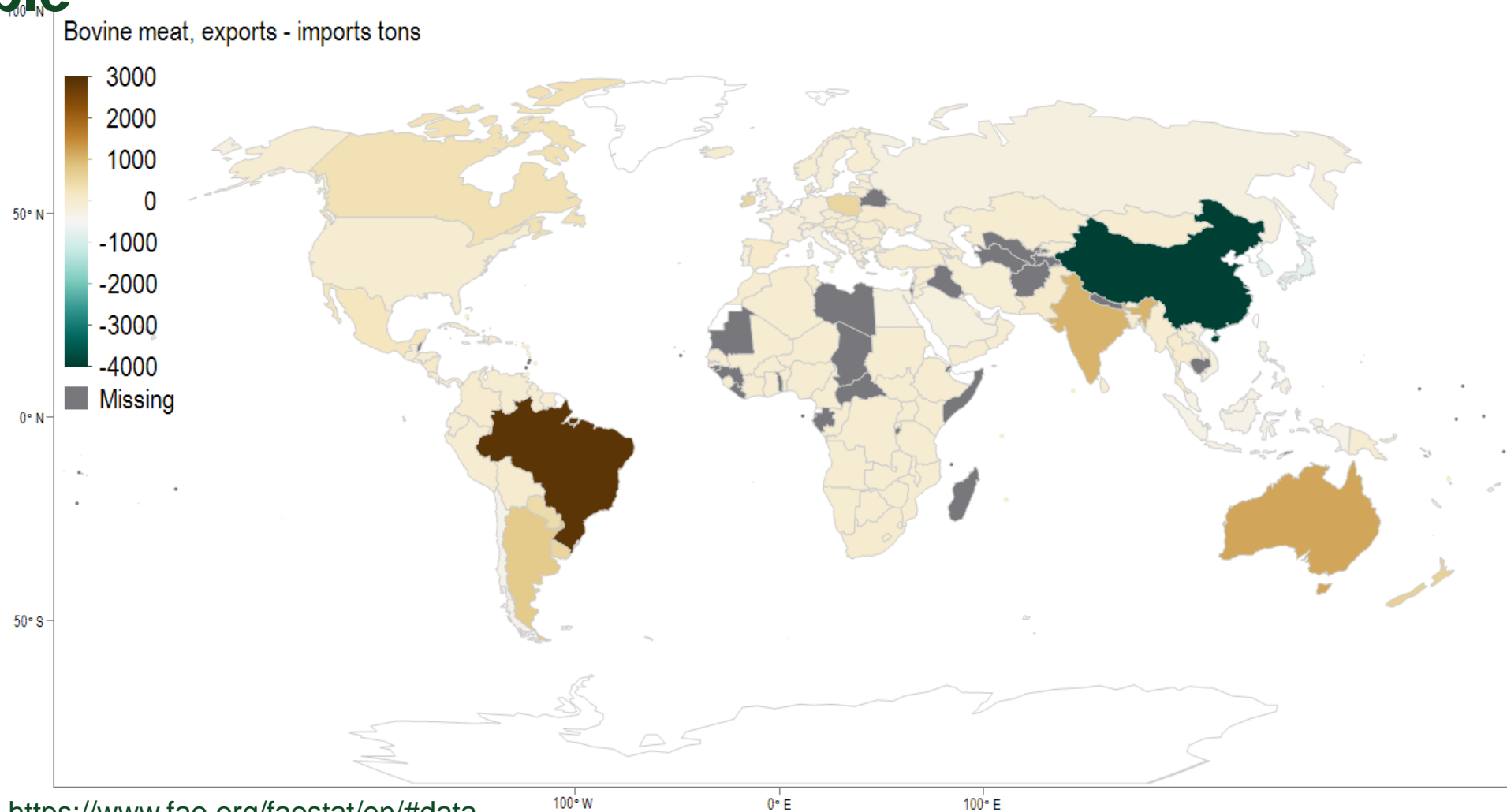
Fat +84%

Productivity has allowed agriculture do more
with less and supply more food, fiber, &
other bioproducts to humanity

Global population, 2021

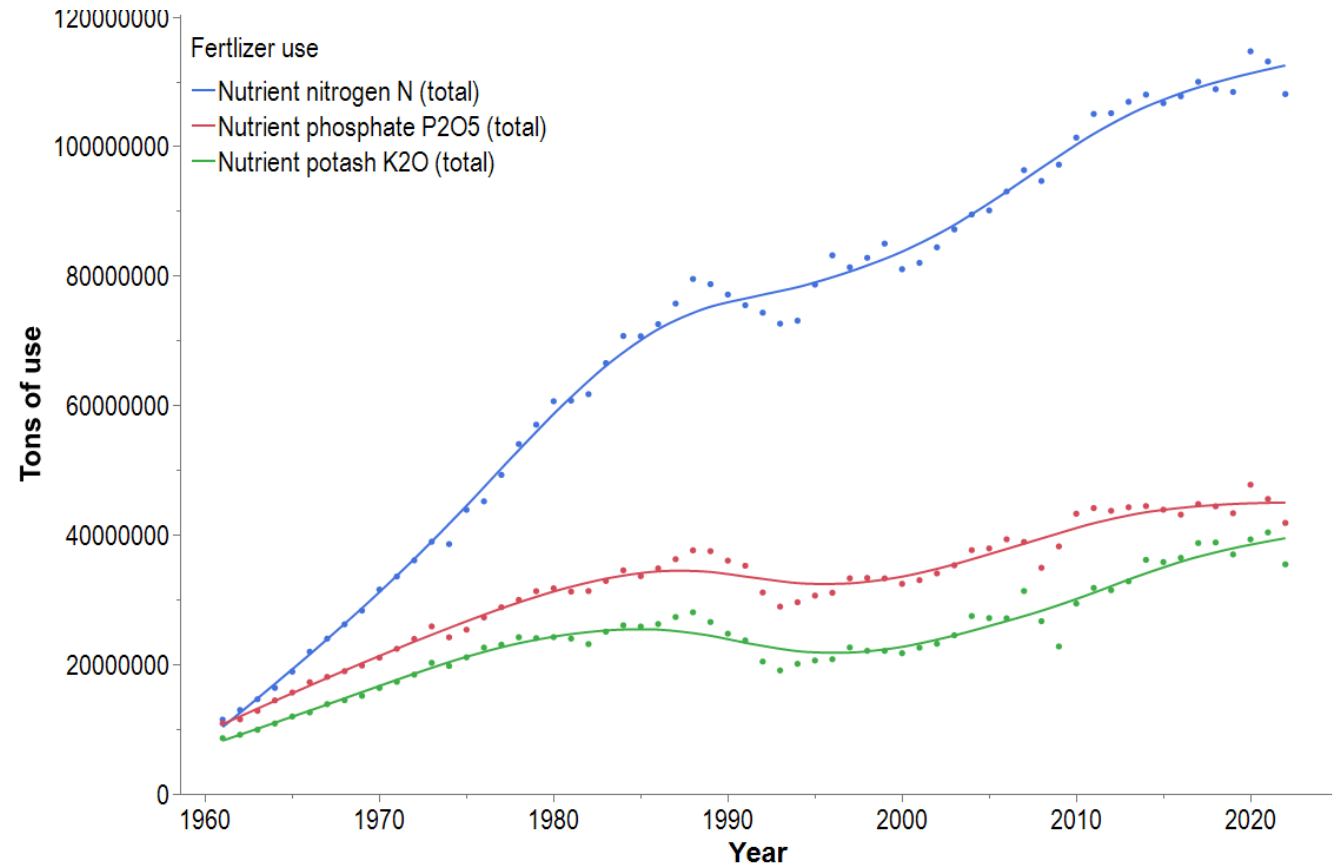


Many nations in Latin America & the Caribbean are net exporters – creating economic development domestically & nutritional security globally – beef example



Total production gains have had environmental consequences

- Increased total inputs use
 - N, P, K
- Challenges with expansion and land use change from native ecosystems
- Increases in livestock numbers to meet growing demand for meat, milk, and eggs
- All have implications to increase absolute GHG emissions





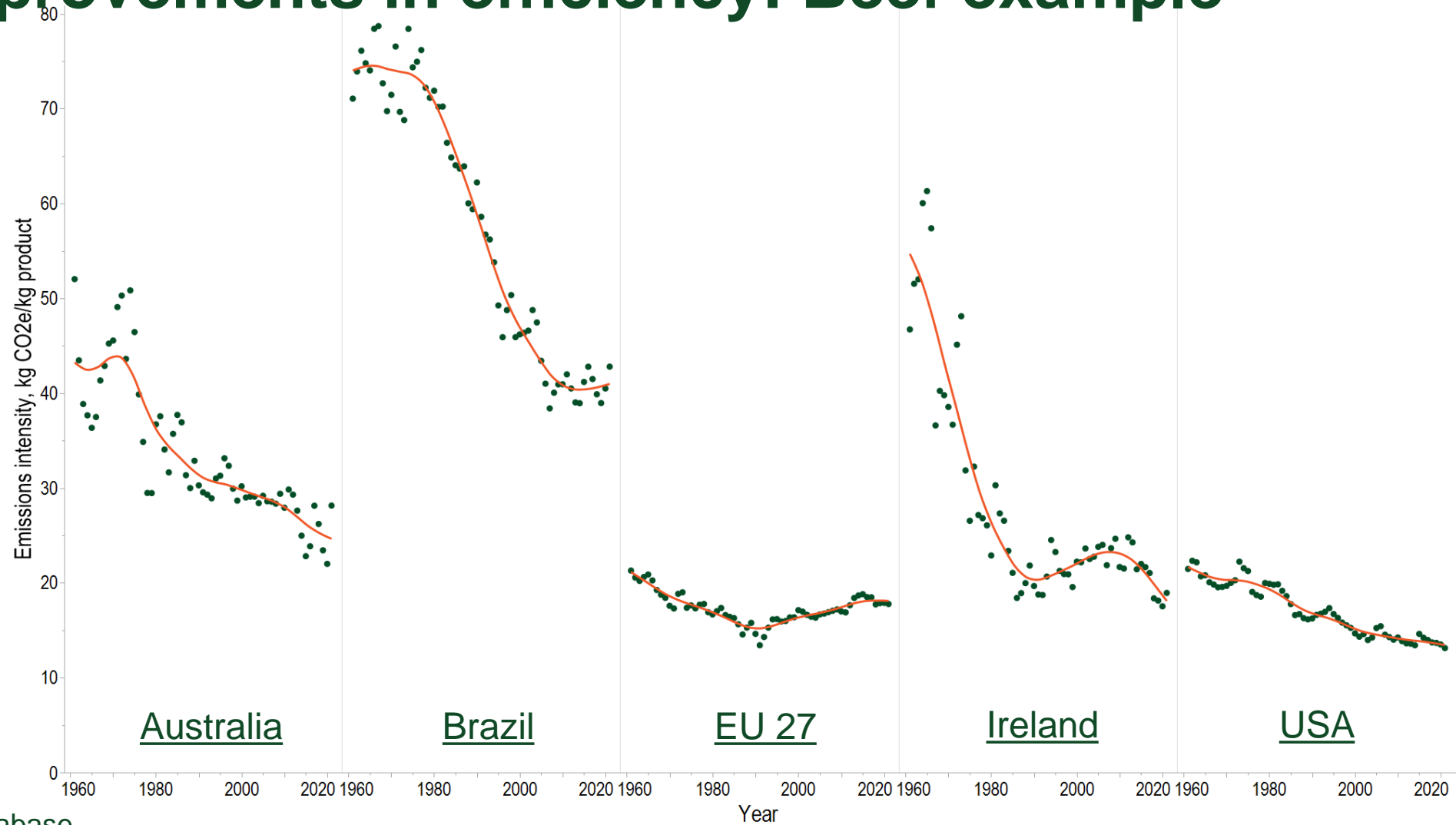
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**Intensity improvements
vs. absolute impacts**

Emissions intensities are not static – animal agriculture has been making significant improvements in efficiency: Beef example

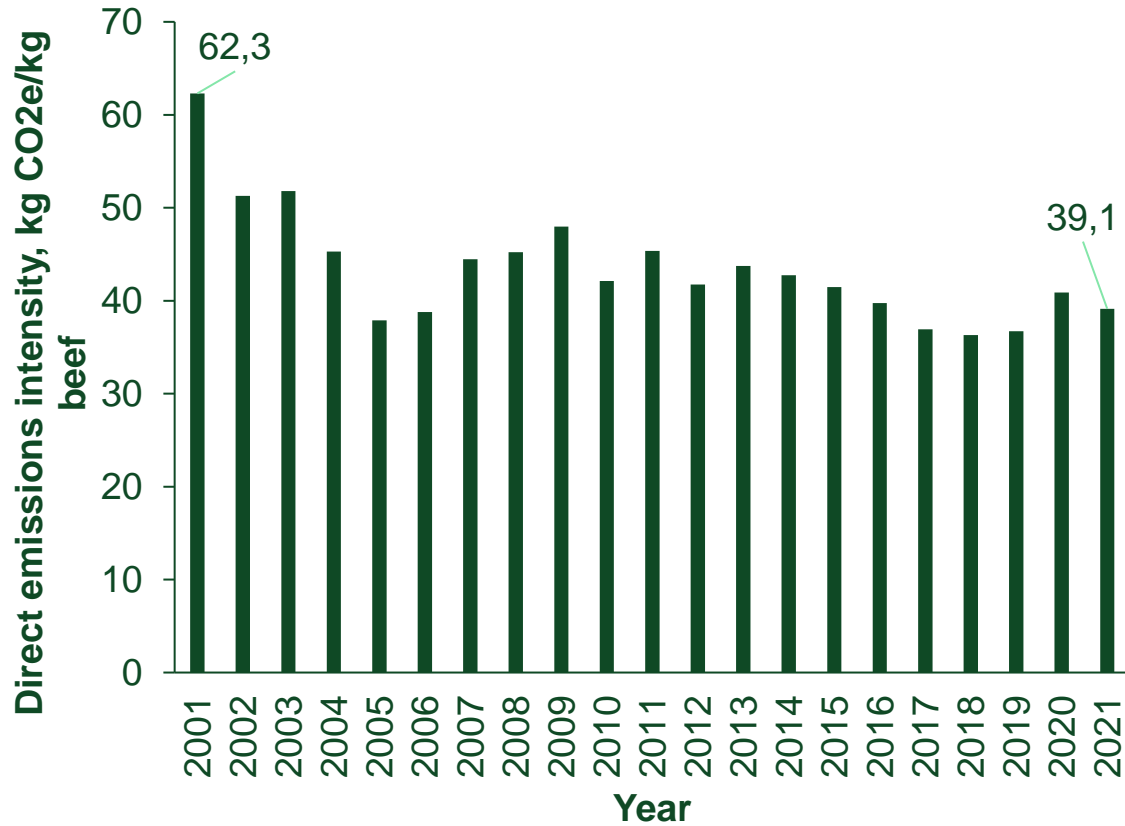


Reductions in emissions intensity do not always translate into decreases in absolute emissions

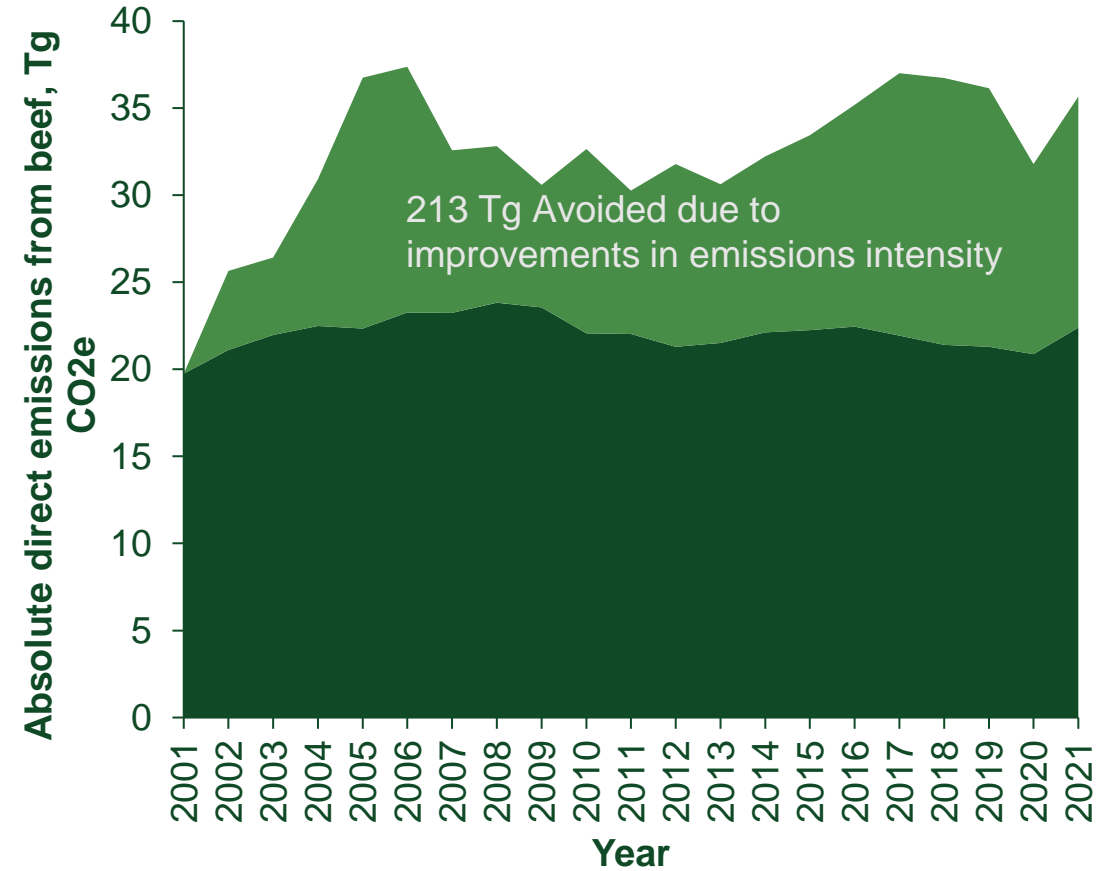
Rates of improvement need to *match or exceed* production growth to freeze or reduce emissions



Case example: Uruguay beef production

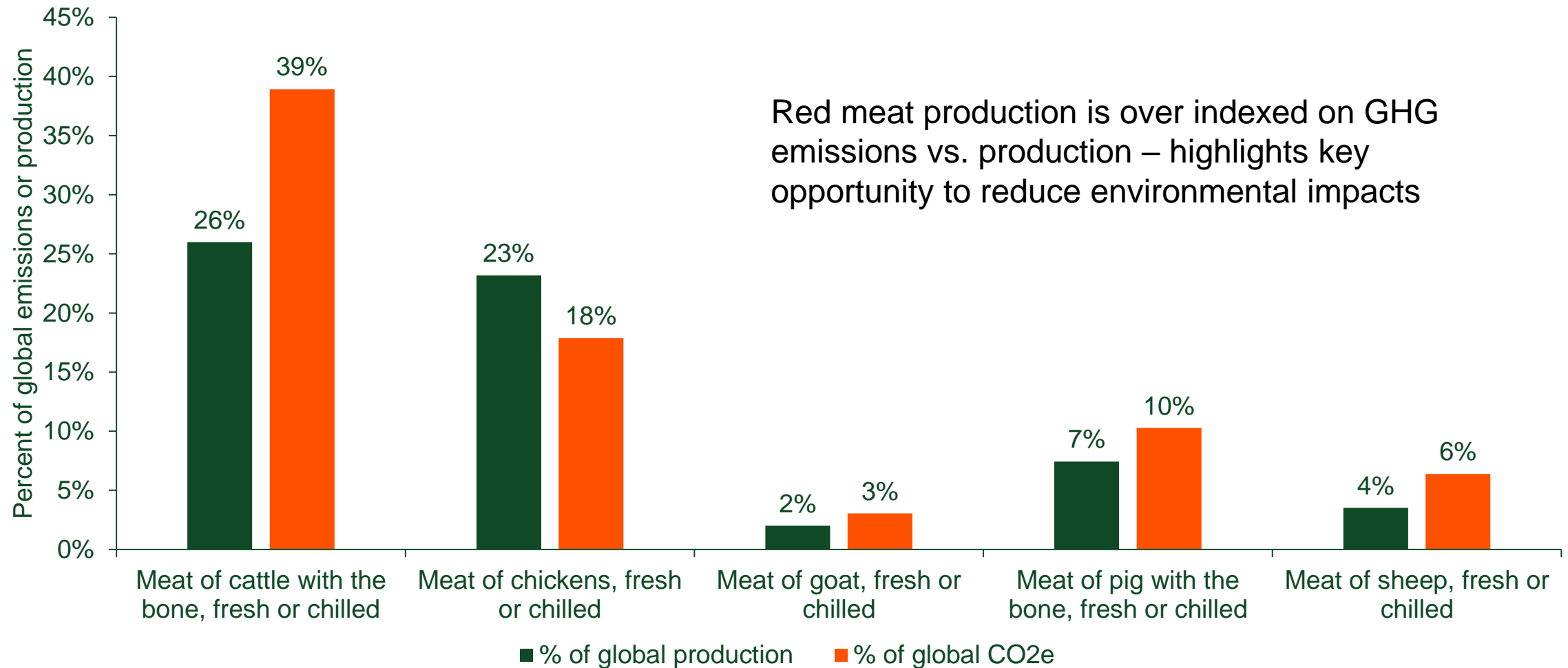


■ Beef emissions intensity



■ Emissions, Tg CO₂e ■ Emissions avoided

Latin America and Caribbean meat and poultry production & direct CO₂e emissions



Opportunities to lower GHG emissions intensity

GHG emissions

Kg of production

Emissions reductions examples:

- Reducing emissions from feed production/pastures
- Improving C removals
- Reducing enteric methane emissions directly
- Reducing emissions from manure

Productivity improvements examples:

- Improve reproductive performance
- Improve rates of gain to decrease days to slaughter (beef)
- Improve milk production, lower age-at-first calving, optimize productive life (dairy)
- Improve animal health
- Improved genetic merit
- Improved animal nutrition

Improvements can have win-wins (improved productivity => \$\$, nutritional security) & tradeoffs (increased grain use => feed-food competition)

Tradeoffs in extensive & intensive production

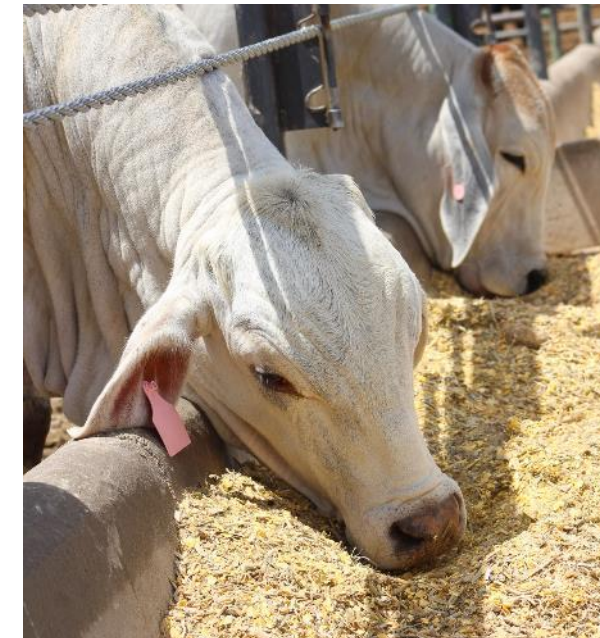


Cow-calf/stocker production

- ~80% of GHG emissions
- Minimal feed-food competition
- Multiple ecosystem services potential

Feedlot production

- ~20% of GHG emissions
- More feed-food competition
- Potential for nutrient management challenges



Complexity of land use & multiple ecosystem services from livestock systems



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Sharing, sparing, suitability, “best use”

Bottom line

- With growing population & incomes, animal source food demand will continue to grow
- Livestock in Latin America & Caribbean have multiple potential benefits: economic development, nutritional security, ecosystem services
- GHG emissions from global livestock have increased in absolute terms; however, reductions in emissions intensity have allowed for significant avoided emissions
- Investment in livestock productivity & technology innovations have substantial upsides for improved:
 - ✓ Environment
 - ✓ Economic & nutritional security

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