Mitigation in Agriculture+ (AFOLU): Lessons from the Energy Sector and Perspectives Looking Forward

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Outline

- Some stock taking of what has happened in terms of mitigation, notably in energy
- A long way to go in agriculture, forestry, and other land use (AFOLU)
- Some broad policy conclusions

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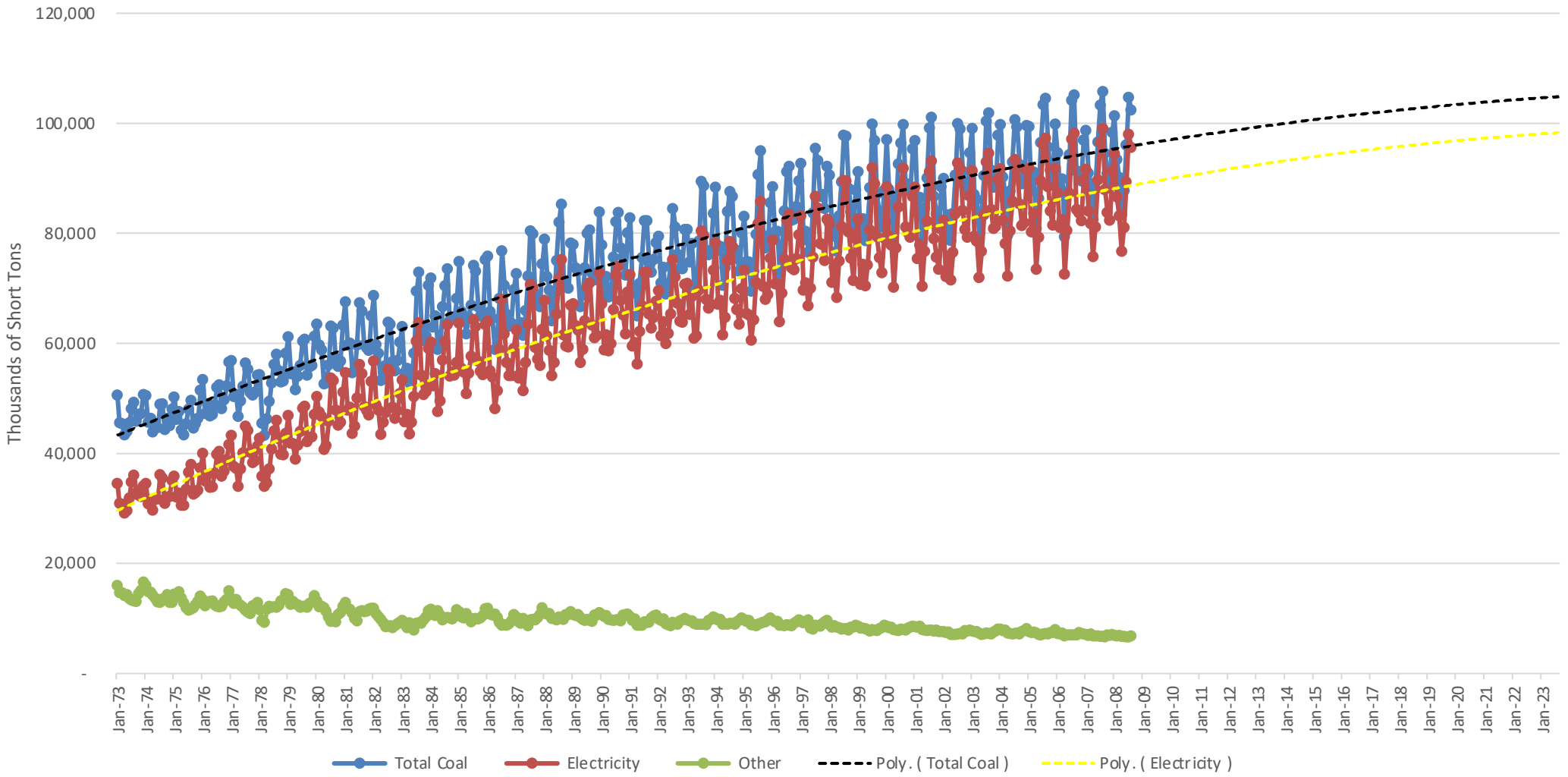
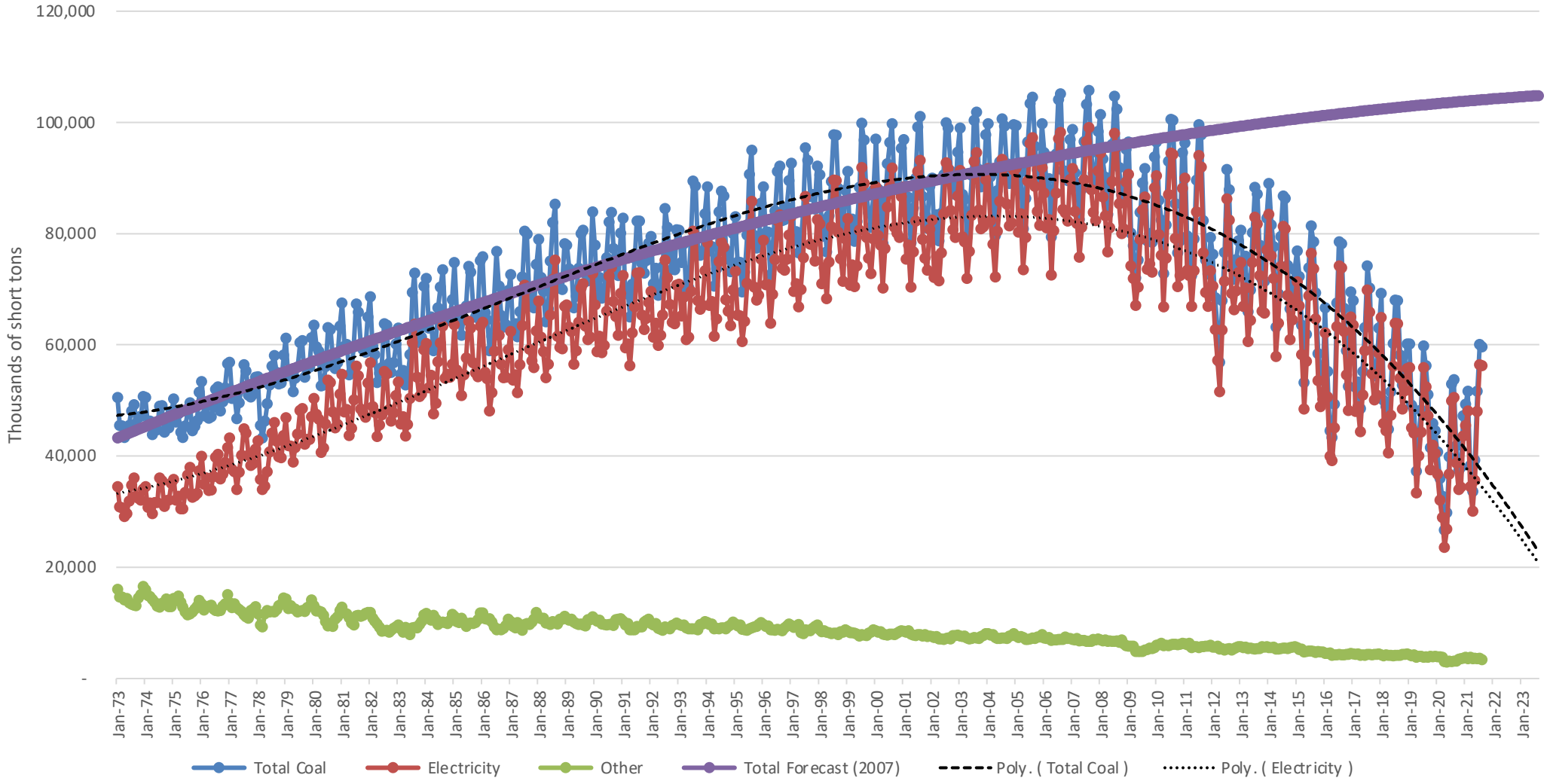
Coal Consumption in the USA



Source: U.S. Energy Information Administration, Monthly Energy Review

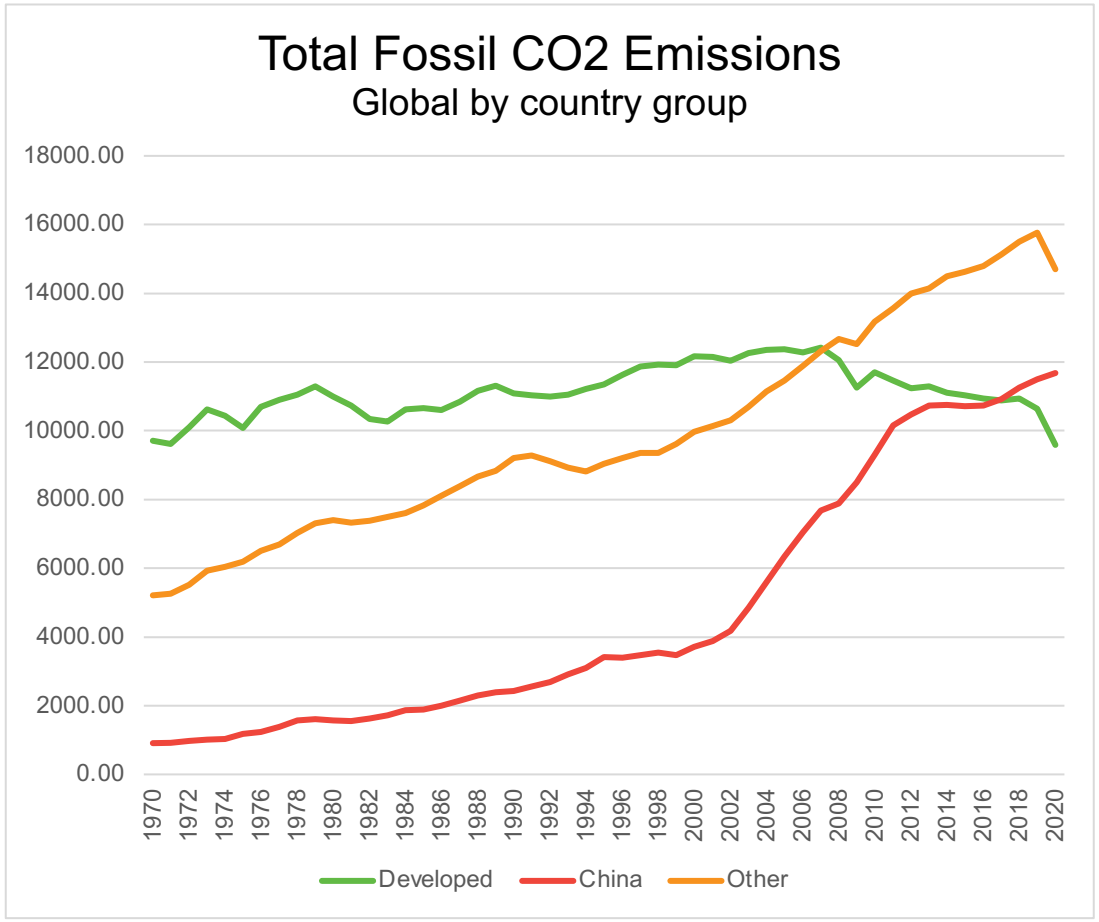
2009: Pulling for cleaner energy

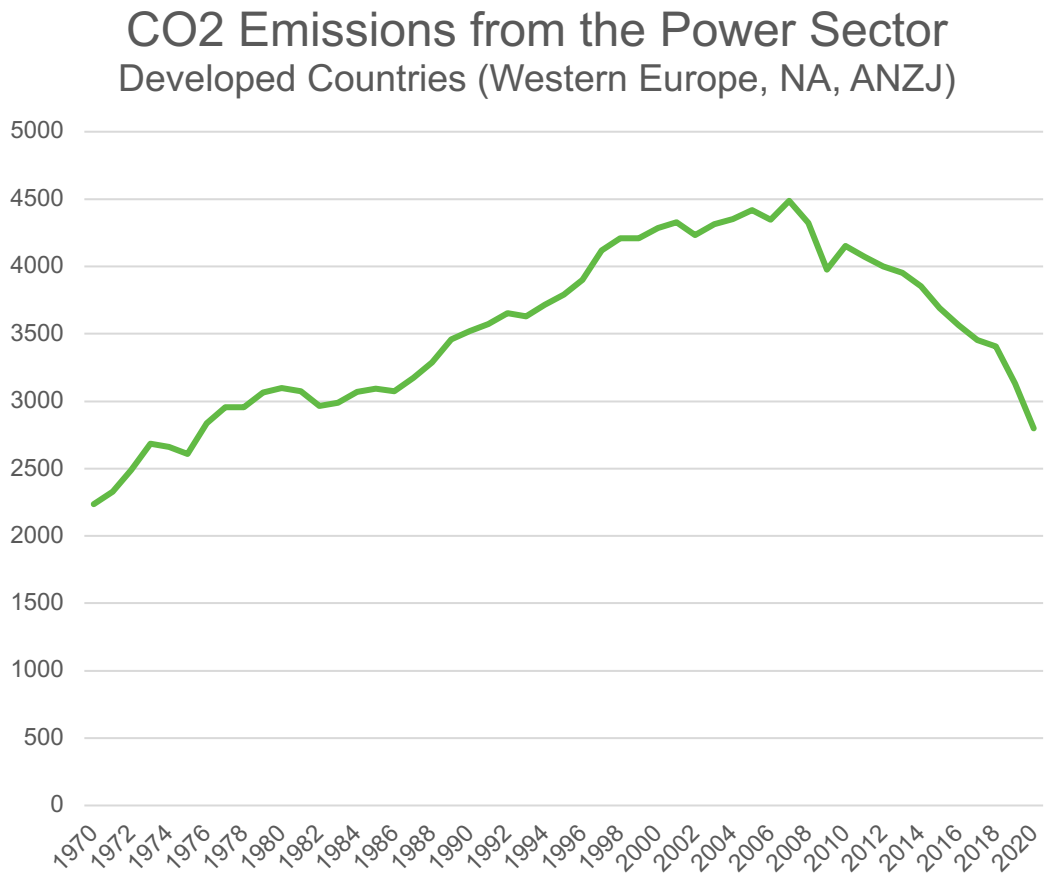
Coal Consumption in the USA



Source: U.S. Energy Information Administration, Monthly Energy Review

Fossil CO2 Emissions



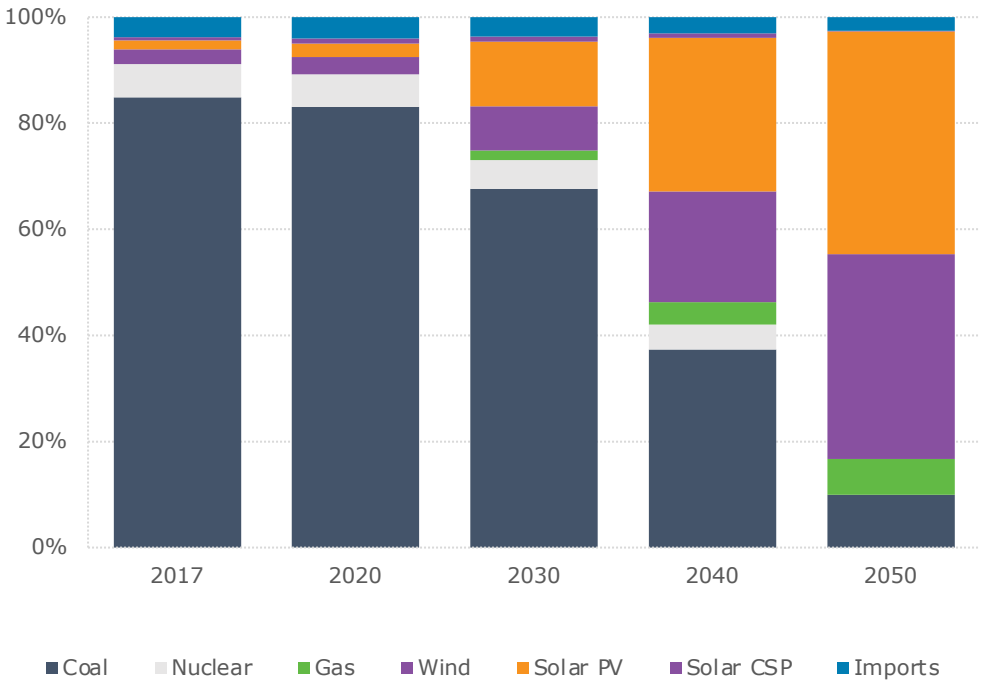


Source: Crippa et al 2021

What About Developing Countries?
Many Developing Countries Set to Follow a Similar Trend

South Africa:

Least Cost Power Generation Mix



- A transition to clean power has positive long run development benefits (greater growth, employment, welfare, …)
- Significant transition issues in shutting down some industries and growing new ones
- Substantial institutional issues; 20th century institutions not well placed for managing 21st century power systems.

Source: Merven et al 2021

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Results in the power sector and beyond

- International Energy Agency on global power sector investment in 2021: "*Renewables dominate investment in new power generation*."
- Other sectors electrifying:
  - Transport
  - Industry
  - Buildings

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What Happened in Energy?

A. Technical advance

B. Simulation modeling (rigorous futures)

C. Policy support

D. Institutional innovation

- Can't have a 21st century power system with 20th century institutions.

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NEED A SIMILAR PACKAGE IN AFOLU TO BRING ABOUT THE NECESSARY LEVEL OF INNOVATION AND INVESTMENT.

AFOLU is about a dozen years behind

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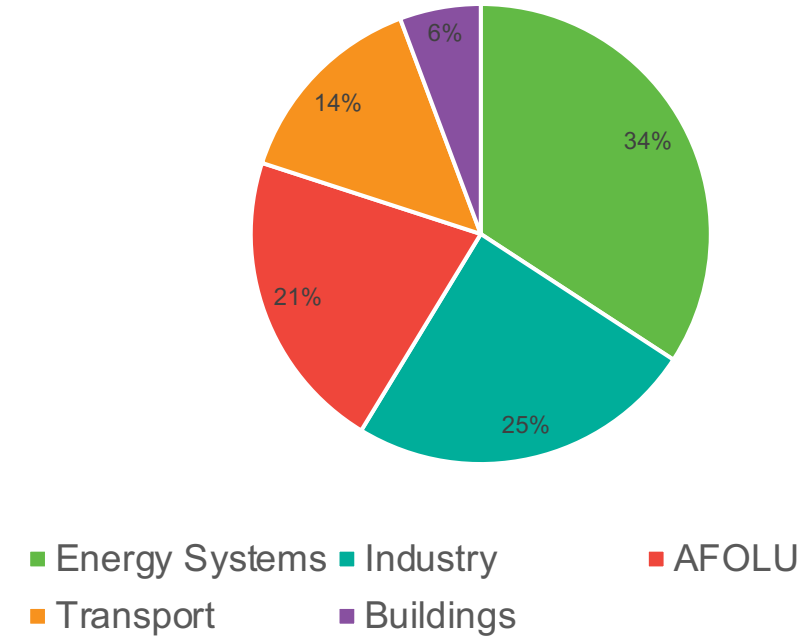
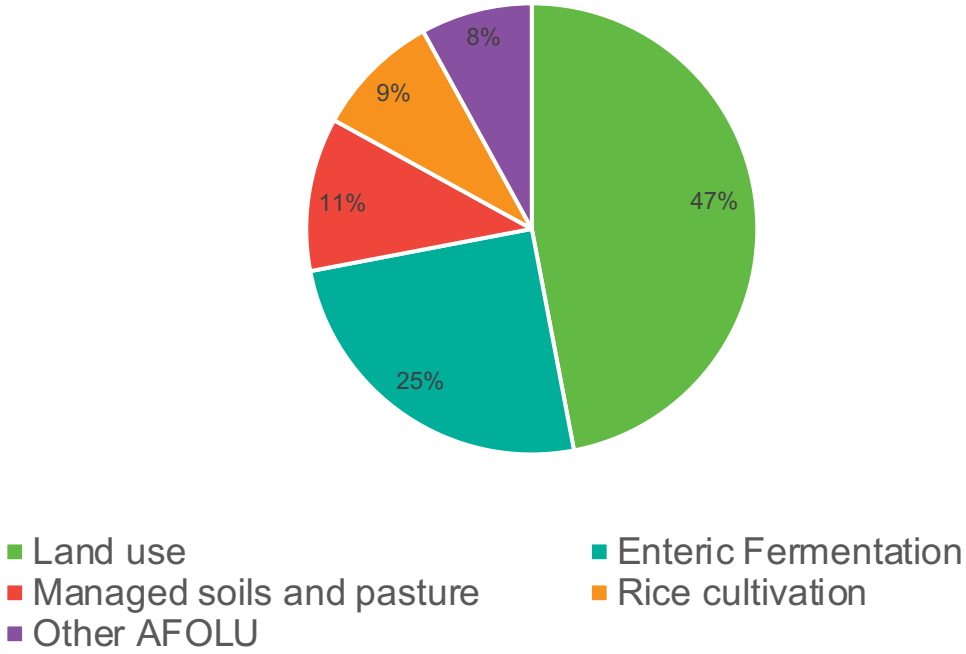
Emissions Shares in 2018

- Total emission shares



- AFOLU emissions shares



Source: Lamb et al 2021

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Reasons for much more Focus on AFOLU Emissions

A. Approximately 21% of global emissions are from AFOLU

   (Too large to ignore)

B. AFOLU is a major source of methane emissions, which is a very powerful but short-lived GHG

   (A major focus of CoP26)

C. AFOLU is currently the only sector with significant potential to deliver net negative emissions

   (CoP26 topline goal: Secure global net zero by mid-century)

Source: Lamb et al 2021

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Some Math

- Suppose that, by 2050, all emitting sectors other than AFOLU reduce emissions by 90% compared with 2018 levels.
- Q: How negative must AFOLU go, relative to 2018 levels, to attain net zero globally?
- A: About -8%.[1]
- Interpretation: AFOLU runs from about 21% of current emissions to -8%, meaning a total change of about 29% of current emissions.

[1]Assumes direct air capture and enhanced weathering technologies remain uneconomic and defines AFOLU broadly to include anything involving photosynthesis.

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High Expectations of AFOLU/Food Systems

- Convert from a net emissions source to a net sink
- Generate improved livelihoods for billions of people (as the world's largest 'employer')
- Produce approximately 30% more food by 2050
- Enable a shift to healthier diets (currently about 3 billion people cannot afford a healthy diet)
- Become substantially more nature positive (e.g., agriculture is currently the principal driver of biodiversity loss)
- Accomplish all of this in the context of a rapidly warming climate

Low and middle income countries (LMICs) are crucial in all of this.

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Simplified Agenda

A. Invest in R&D to support ongoing technical advance
   - Agricultural productivity growth that results in sustainable intensification is good mitigation policy
   - LMICs particularly important

B. Develop rigorous futures using simulation modeling

C. Policy support for transition

D. Institutional reform and innovation to meet 21st century needs

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Thank you!

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