Yield Gains - What’s Possible and How?

Net Zero Emissions Food Systems
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Global yield trends

(Data source: FAOstat)
Global and regional yield trends

(Data source: FAOstat)
Base case

- Reasonable to project continuation of recent trends, as FAO/OECD does

[Graph showing growth in land use, multi-cropped land, yields, and area harvested in 2032.]
What are some potential surprises?
Potential surprises

• Negatives
  • Accelerated rates of global warming
How bad could it get?
Global warming has greatly increased the chance of climate trends large enough to halve yield trends over a 10 year period, with a roughly 1 in 4 chance for maize and 1 in 6 chance for wheat.
Potential surprises

• Negatives
  • Accelerated rates of global warming
  • Reversal of US warming hole
Potential surprise: An end to the U.S. warming hole

Difference in Summer Max Temperatures between the Last Decade and the 1930s

https://www.theclimatebrink.com/p/which-was-warmer-the-1930s-or-the
Potential surprises

• Negatives
  • Accelerated rates of global warming
  • Reversal of US warming hole
  • Policies to promote low-yielding ‘climate-smart’ practices

• Positives
  • Rapid gains in air quality from electrification
  • Rapid increase in double cropping in US and elsewhere
  • Rapid progress with gene editing
What are the biggest levers that might be pulled?

• Doubling ag research budgets. We spend WAY more than 75% of total mitigation effort on non-ag sectors.

• Use policies to facilitate some “positive surprises”
  • improve air quality
  • encourage double cropping where viable
  • streamline crispr regulation