

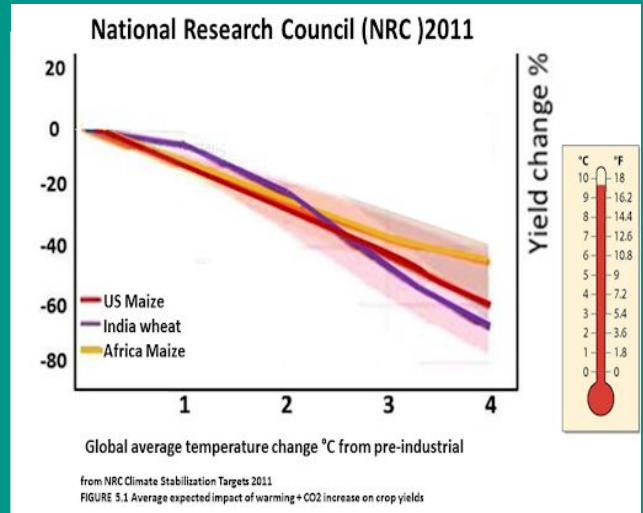


Impacts of Climate Change: Crop Security



Introduction

- Crop Security is the protection of economically significant crops and natural resources from potential threats.
- The security of these crops are essential as they are prone to being damaged and limited by non-ideal temperatures, nutrient-poor soils, pests, weeds, etc.
- With the human population continuously growing, there is a greater emphasis on crop security.
- Improved crop security could include: nutrient-rich soils, controlled, ideal environment, use of effective fertilisers/pesticides, plant breeding and genetic modification to maintain disease resistance, etc.¹



Research from the National Research Council (NRC) in 2011 shows that the yield % of various maizes and wheat is heavily declining as the global average temperatures continue to increase.

Climate change, food and farming: 2010s

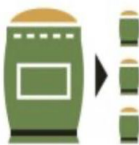
According to the Fifth Assessment Report of the IPCC, climate change is affecting food and farming now

Adaptation is happening, but is not enough

Farmers are:



Changing planting dates



Adjusting marketing arrangements



Using different crop cultivars and species

SOURCE: Vermeulen, 2014



Research from the Fifth Assessment Report of the IPCC shows that are already adapting to change, but that more effort is still needed

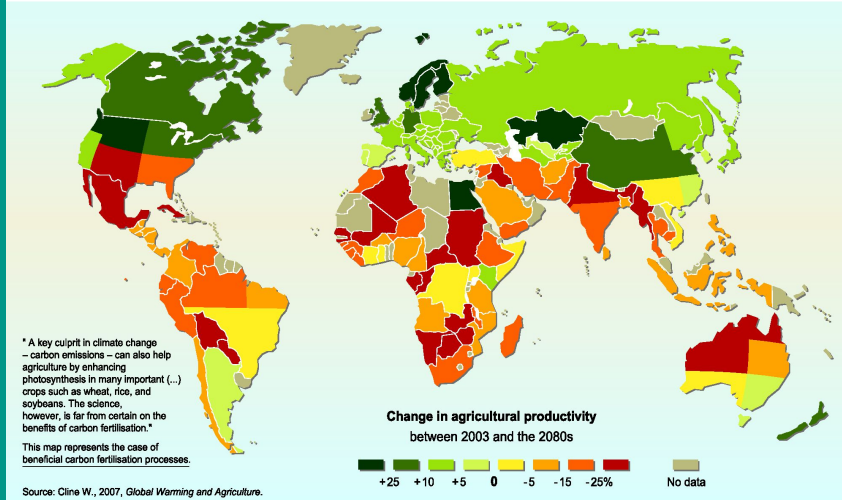
How Current Global Change is Making This Worse

- 1) Water availability affects the amount of crops that can be grown in a seasonal cycle, and changing conditions have reduced crop yields.⁵
- 2) An increase in global temperature could cause an issue with the Svalbard Seed Vault in Norway. The vault is the biggest crop security measure in the world, and it relies on permafrost to keep seeds viable for thousands of species preserved. Increased temperatures will decrease the effectiveness of the permafrost.⁴

The Svalbard Seed Vault



Projected impact of climate change on agricultural yields



Some parts of the world, in more northern latitudes, are expected to see a net gain in agricultural yields, due to increased amounts of CO₂ in the atmosphere along with favorable temperatures

Climate change, food and farming: 2010s

Tropical regions are most vulnerable

Percentage of people undernourished (2011-13):

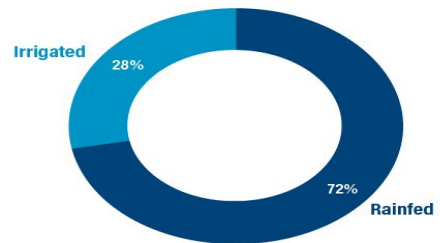


SOURCES: Porter et al. 2014; FAO. 2013.



As time goes on, with more extreme weather and precipitation occurring with a higher frequency, agricultural yields are expected to decrease by up to 25% in tropical areas. This has the potential to severely impact food availability for impoverished communities in these regions

The majority of global crop area is rainfed rather than irrigated

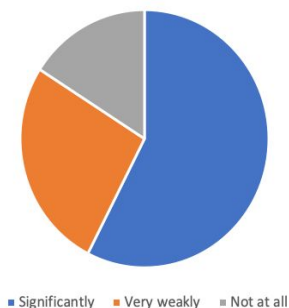


Source: Aqeduct Food 2019.

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Public Perception of Crop Security

Crop Security



References

1. Lastname, F.I. et al. 2020. *Journal Name* Vol.: page numbers
 2. "Webpage Name", date, Institution <https://www.url.org>
 3. Lastname, F.I. "News article title." 29 March 2020. *News Organization* <https://www.url.org>
 4. Fowler, and Cary. "Svalbard Seed Vault and Crop Security." *OUP Academic*, Oxford University Press, 1 Mar. 2008,
 5. Kang, Yinhong, et al. "Climate Change Impacts on Crop Yield, Crop Water Productivity and Food Security – A Review." *Progress in Natural Science*, Elsevier, 31 Oct. 2009,
- ¹ Maccree, M. M.; Baskin, C. R.; Zelicoff, A. P. Ensuring national biosecurity: institutional biosafety committees; Elsevier: Amsterdam, 2016.