Measuring the effects of anthropogenic CO$_2$ emissions on global nutrient intakes

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\( \text{CO}_2 \) emissions are growing steadily

Source: IPCC (2013), Boden et al. (2016), Houghton et al. (2012)
Putting more CO$_2$ in the atmosphere

Source: IPCC (2013)
Many crops lose nutrients under 550 ppm CO$_2$

Source: Myers et al. (2014), Medek et al. (2017)
Who is affected, and by how much?

• Problem
  – Globally, our dietary supply of nutrients is dependent on CO$_2$-affected crops:
    
    | Nutrient                  | Percentage |
    |---------------------------|------------|
    | Iron (bioavailable)       | 63%        |
    | Zinc                      | 51%        |
    | Protein (digestible)      | 43%        |
  
  – Poorest countries are most reliant on plants for nutrition
  – Deficiencies for these nutrients are high

• Approach
  – With current diets, remove nutrients lost under higher CO$_2$
  – Identify countries at highest risk for increased deficiency
Risk of lost nutrients in a higher-CO$_2$ world

High risk in South Asia, Middle East and Africa

Source: Myers et al. (2015), Medek et al. (2017), Smith et al. (in review), Smith and Myers (in prep.)
Risk of lost nutrients in a higher-CO$_2$ world

658M children under 5 and women of childbearing age are in moderate-to-high risk countries (27% of global total)

Source: Myers et al. (2015), Medek et al. (2017), Smith et al. (in review), Smith and Myers (in prep.)