# the Relationship Between Climate Indicators and Food Security

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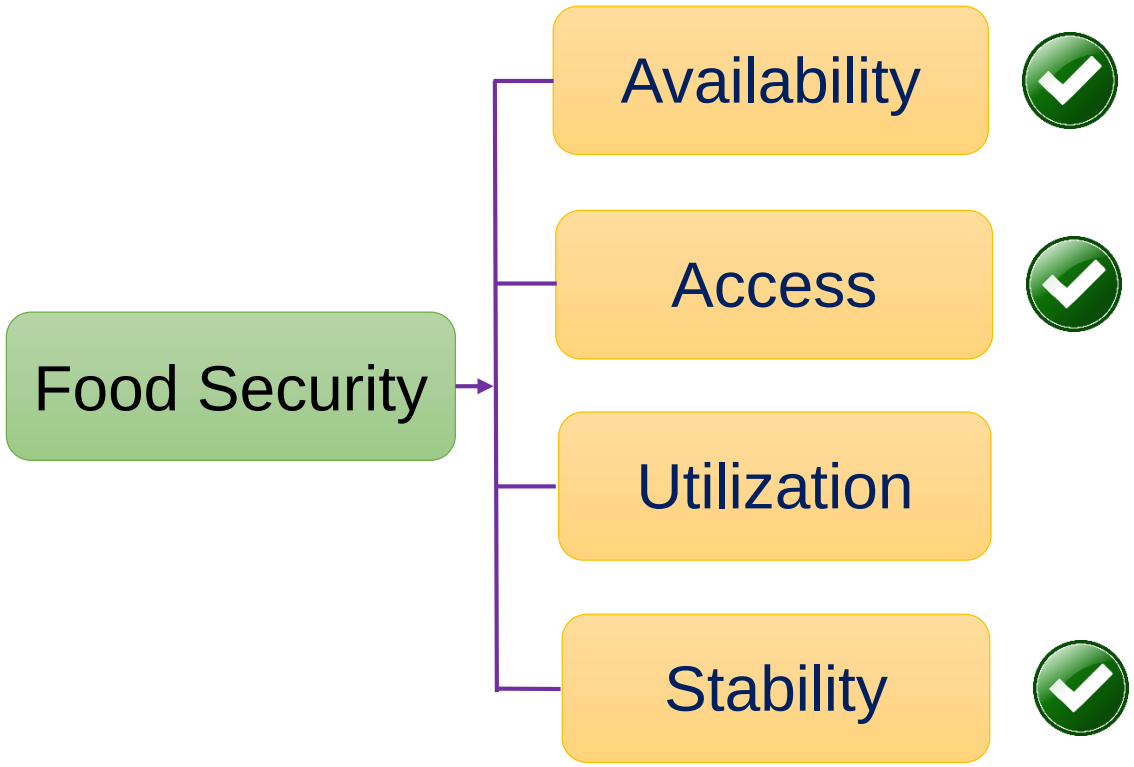
# *The importance of studying food security:*


**Based on FAO definition Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food, but:**

- **Population increase from 7 billion in 2011 to 9.2 billion in 2050**
- **Approximately a billion people are chronically malnourished**
- **Agricultural systems are degrading land, water, biodiversity and climate on a global scale.**
- **Droughts and climate change have caused shortfalls in the world grain production.**


The Economist

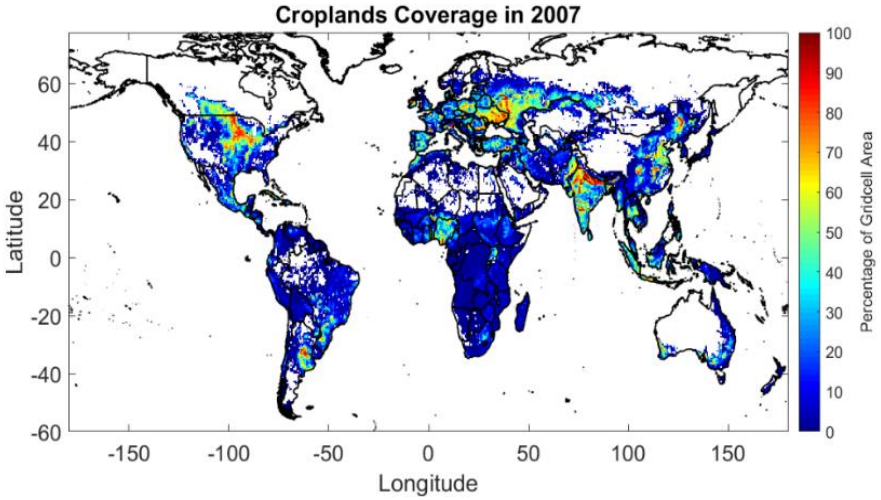
**"Few things matter to human happiness more than the yields of staple crops." (The Economist, 2011 )**

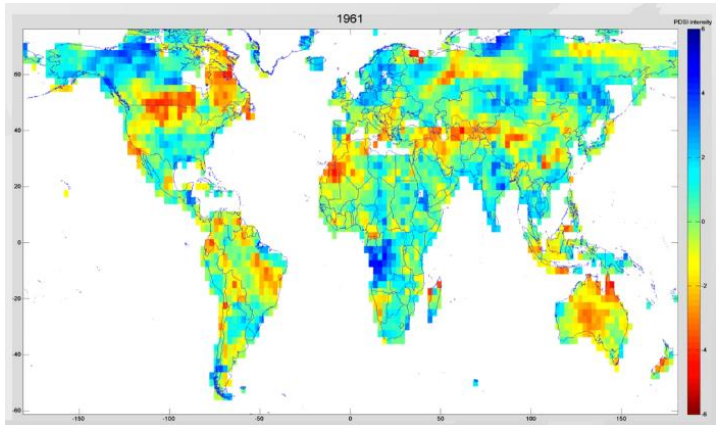



# Food Security, an interdisciplinary topic

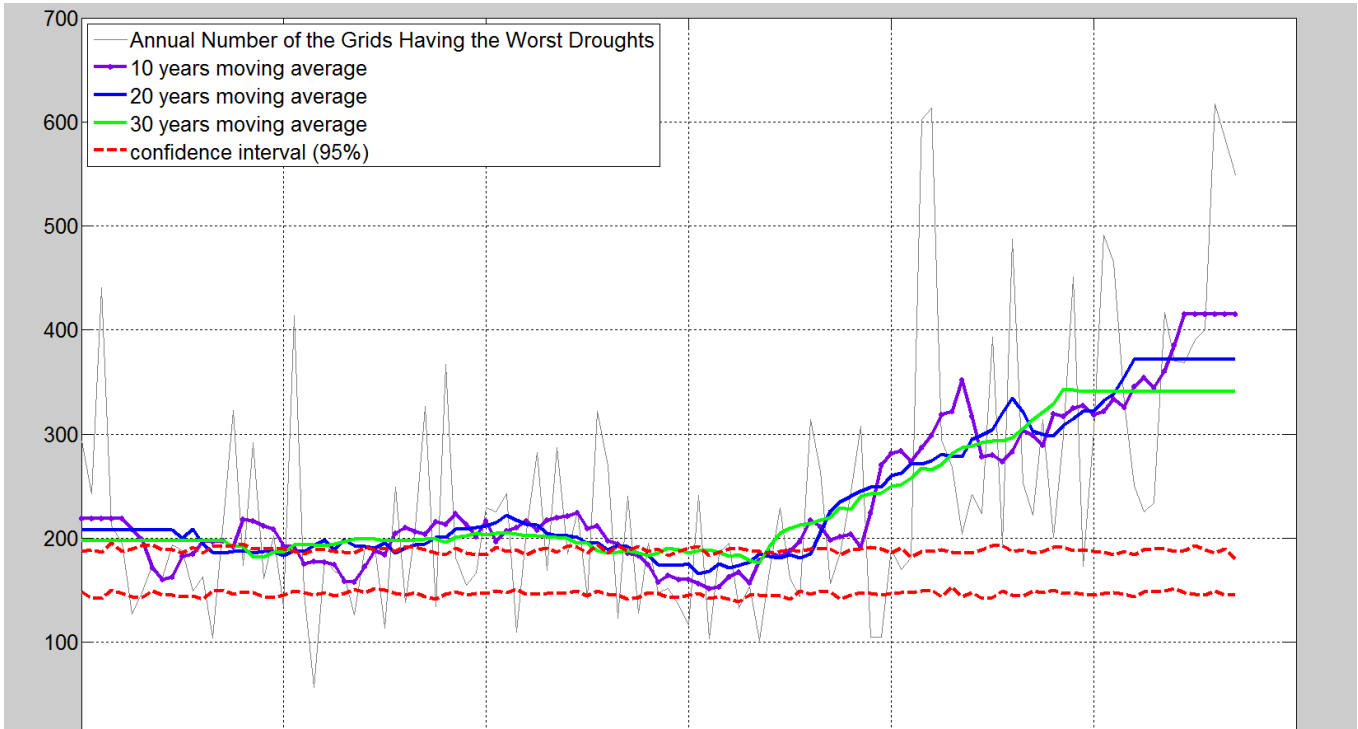
# In order to study food security we should know about climate variables like drought. Why?

- Drought **frequency** and **extent** is increasing globally.
- Droughts have direct and indirect unfavorable impacts on food security.
- Weather and weather extremes have a great impact on crops.



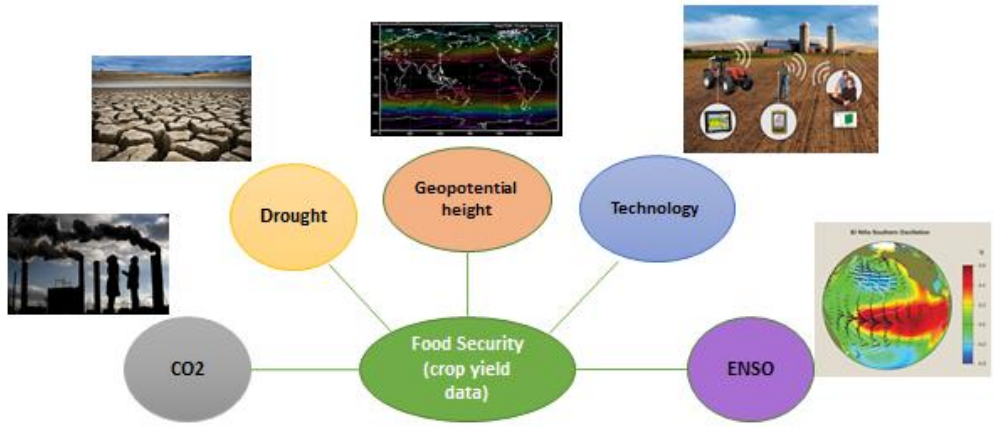




- **We consider crop yield as a good measure for food security.**

- **What indicators will we use in this project?**

✓ CO2 enrichment (Climate change)
✓ Drought
✓ technology
✓ ENSO
✓ Geopotential Height




- **Case study:**

✓ Important crop producer countries, like US, China and India

- **How can we understand the impacts of these indicators on food security?**
  **Statistics, algebra, programming**
- **We will use MATLAB, and ARCMAP.**

$$Yield = \beta_1 + \beta_2.Year + \beta_3.ENSO + \beta_4.PDSI + \beta_5.GPH + \beta_6.CO_2$$