

Your Vision
Lives on!





Localizing Water and Food Security

Building resilience in a non-stationary world

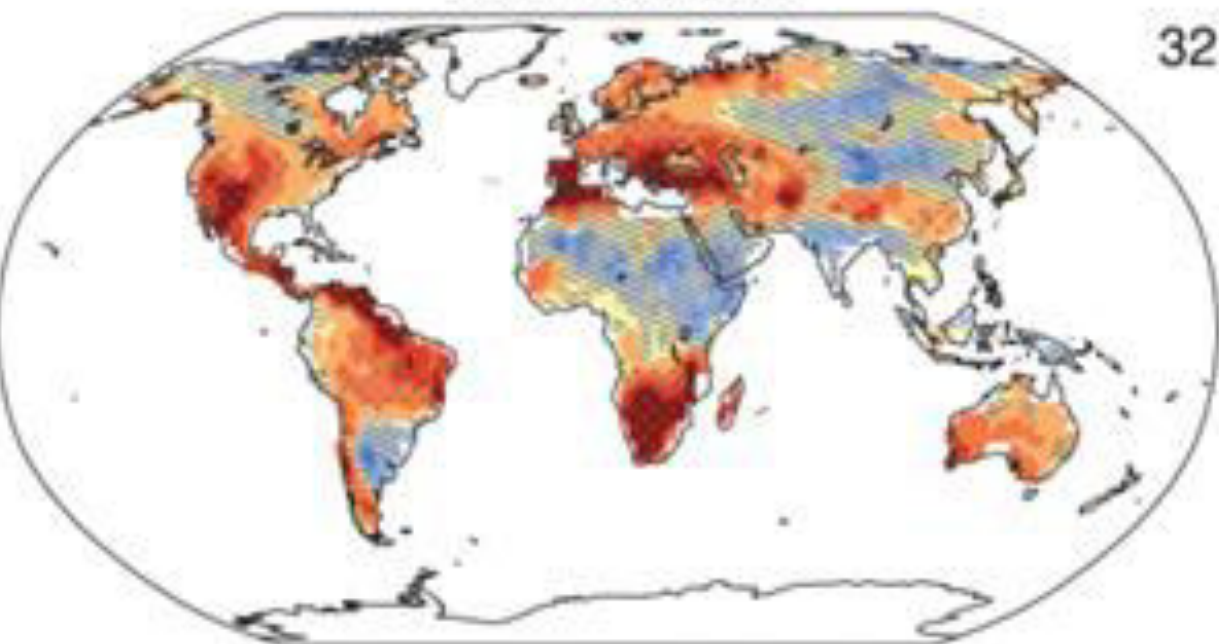
Rabi H. Mohtar





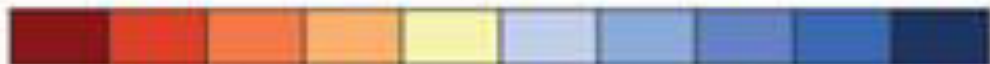


Soil moisture



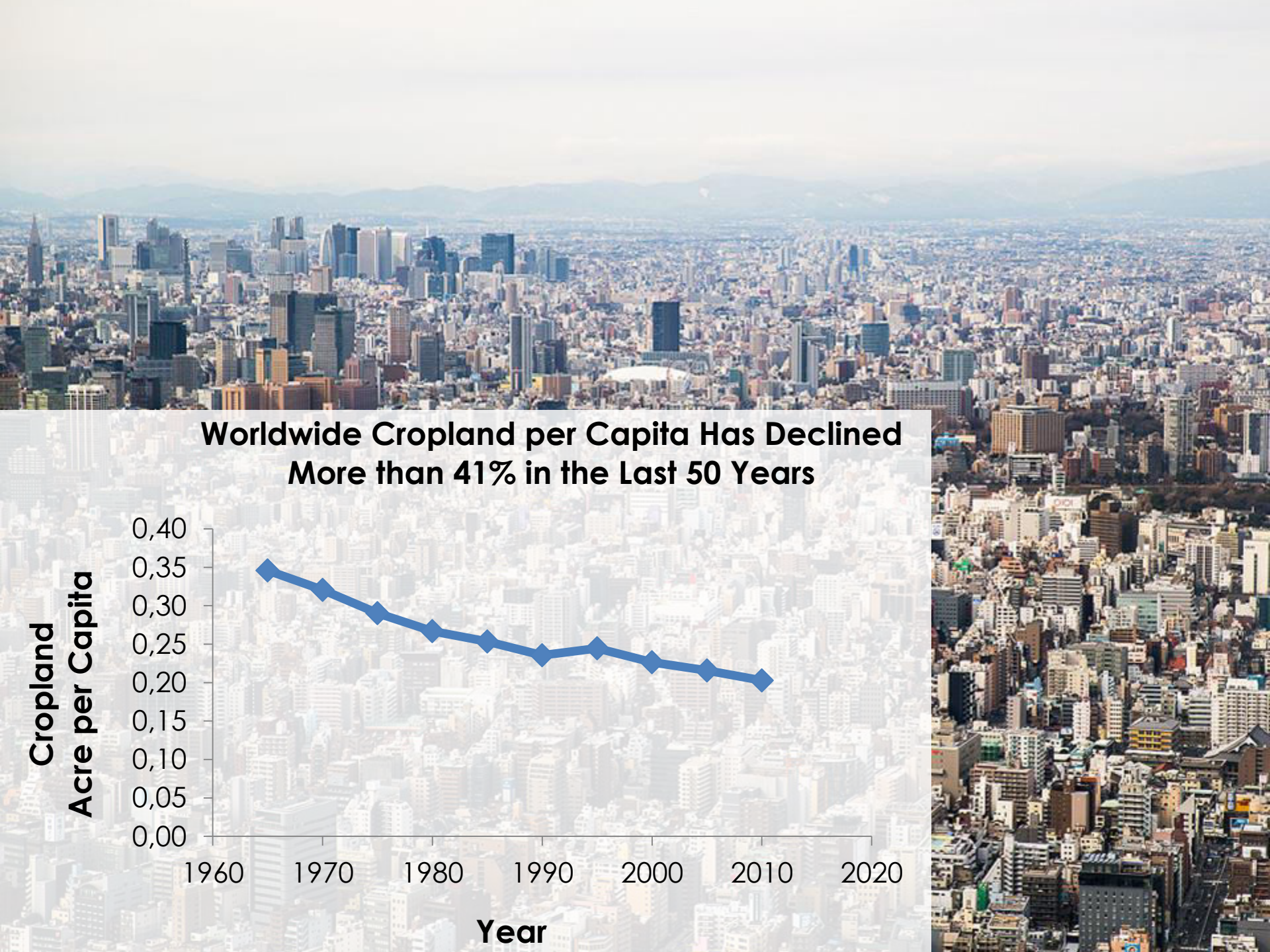
(%)

(IPCC, 2013)

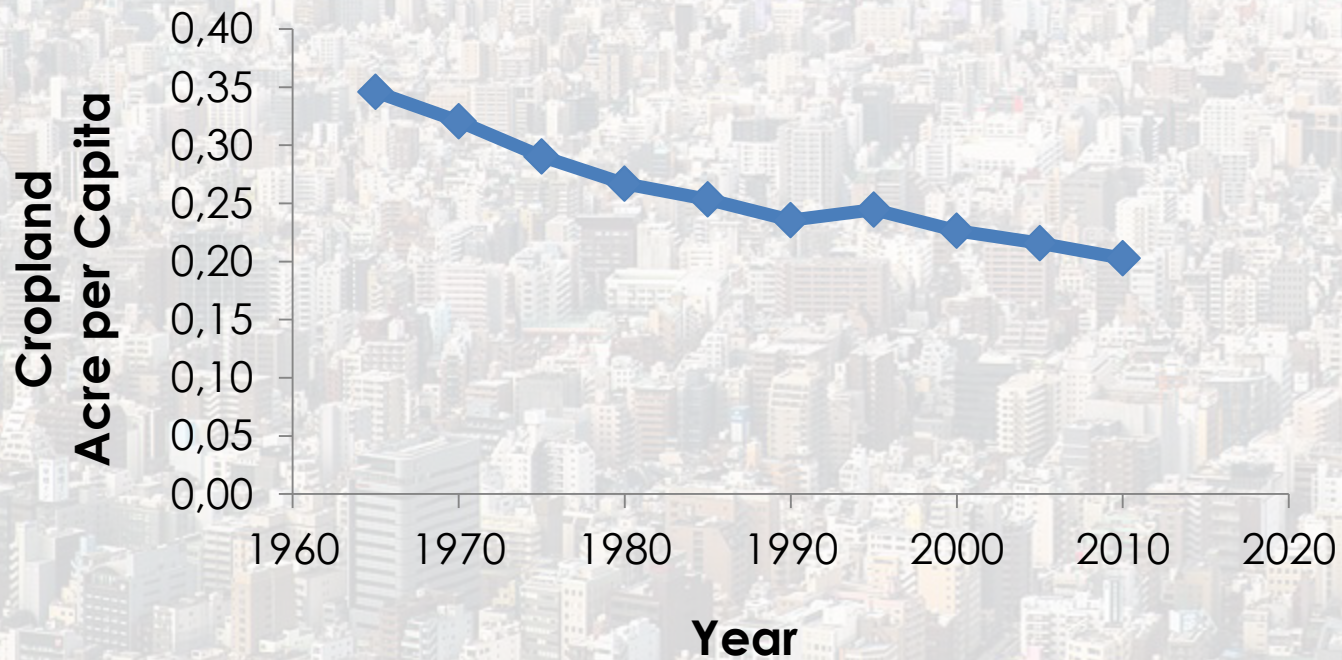


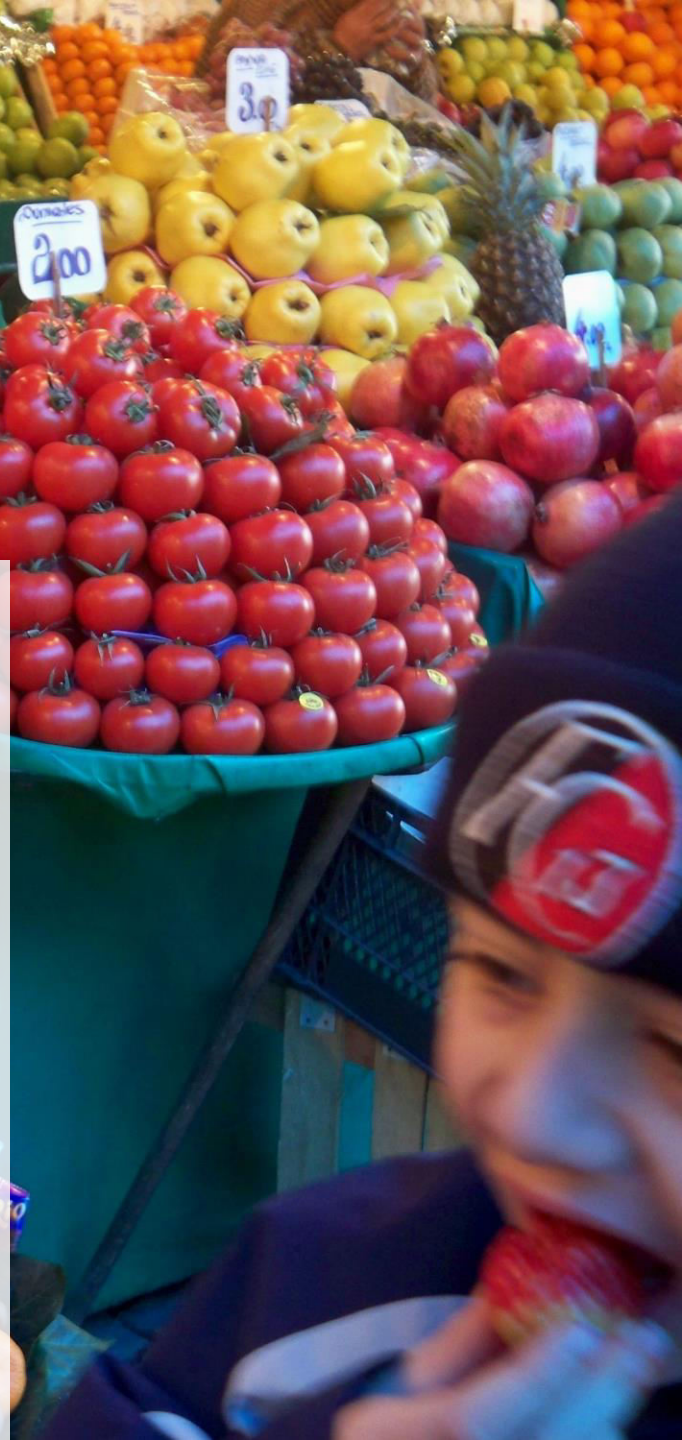
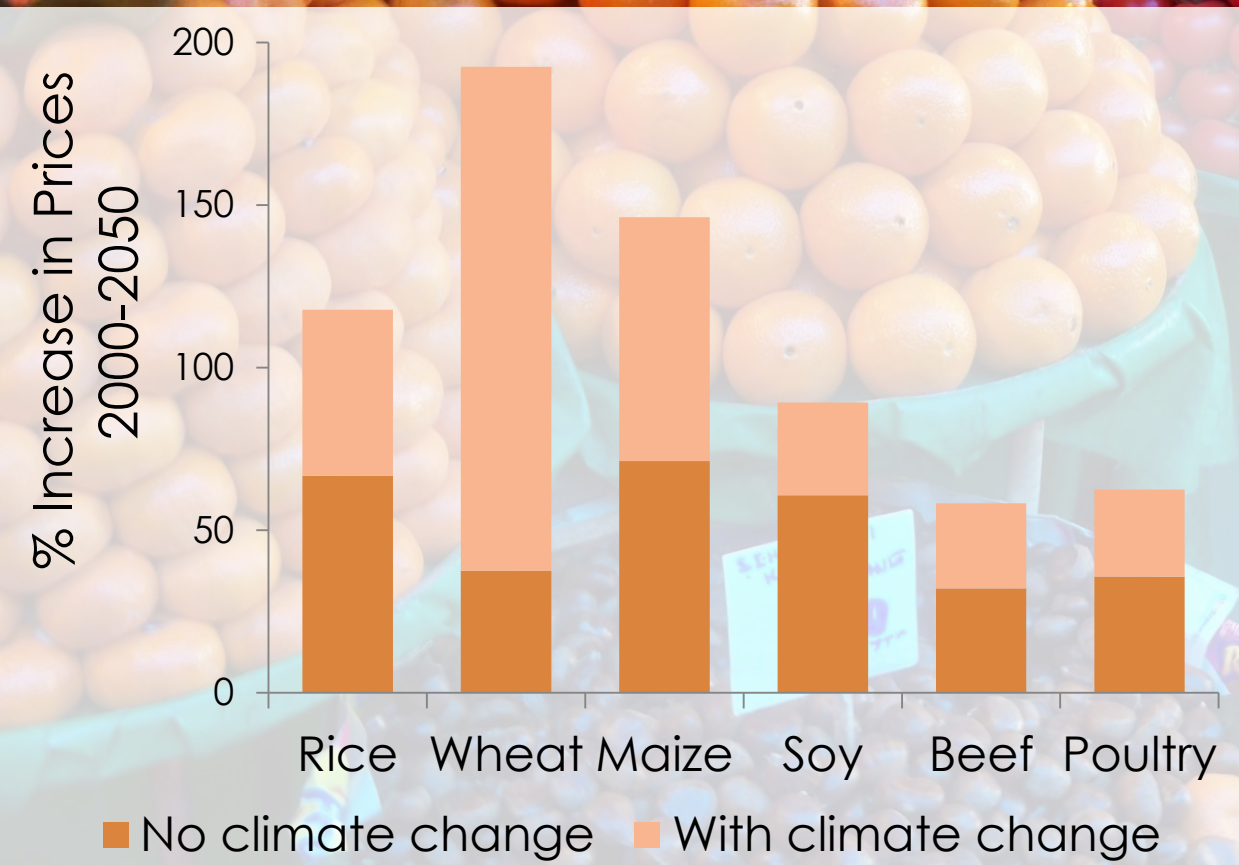
-10 -7.5 -5 -2.5 0 2.5 5 7.5 10

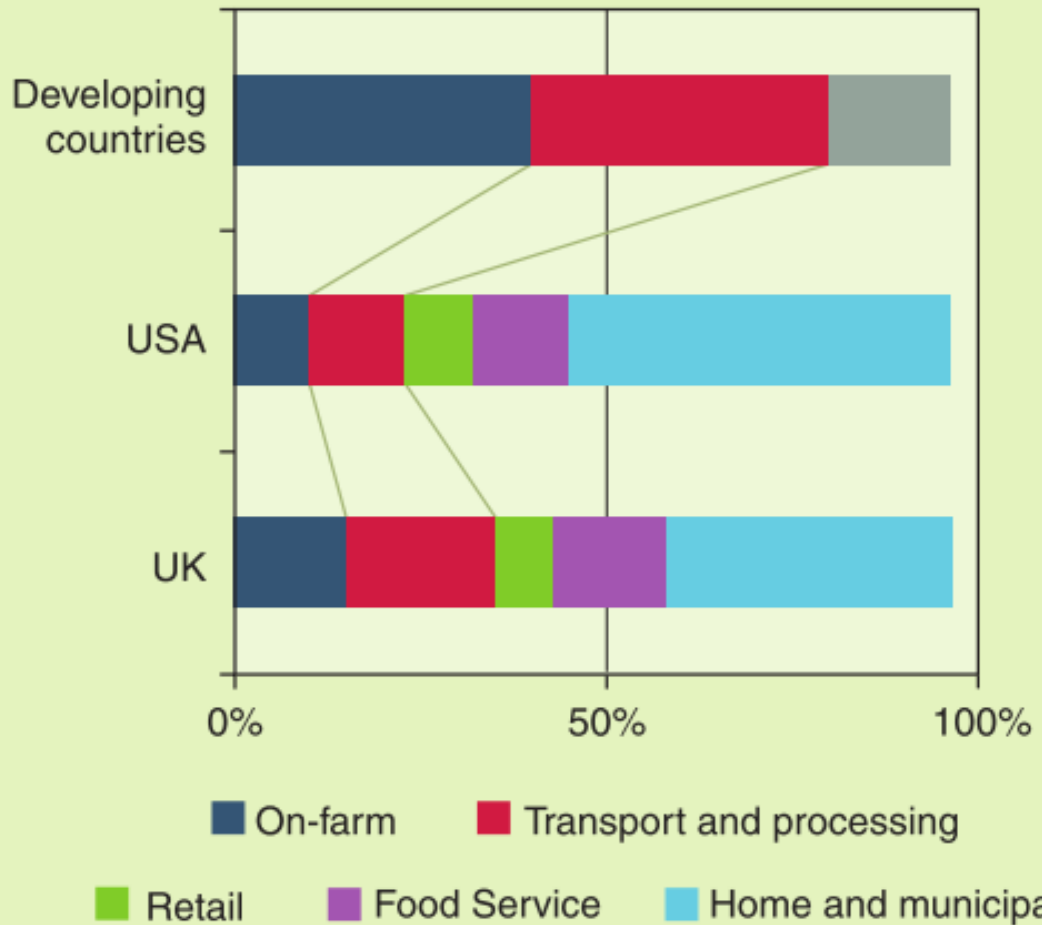




Worldwide Cropland per Capita Has Declined More than 41% in the Last 50 Years



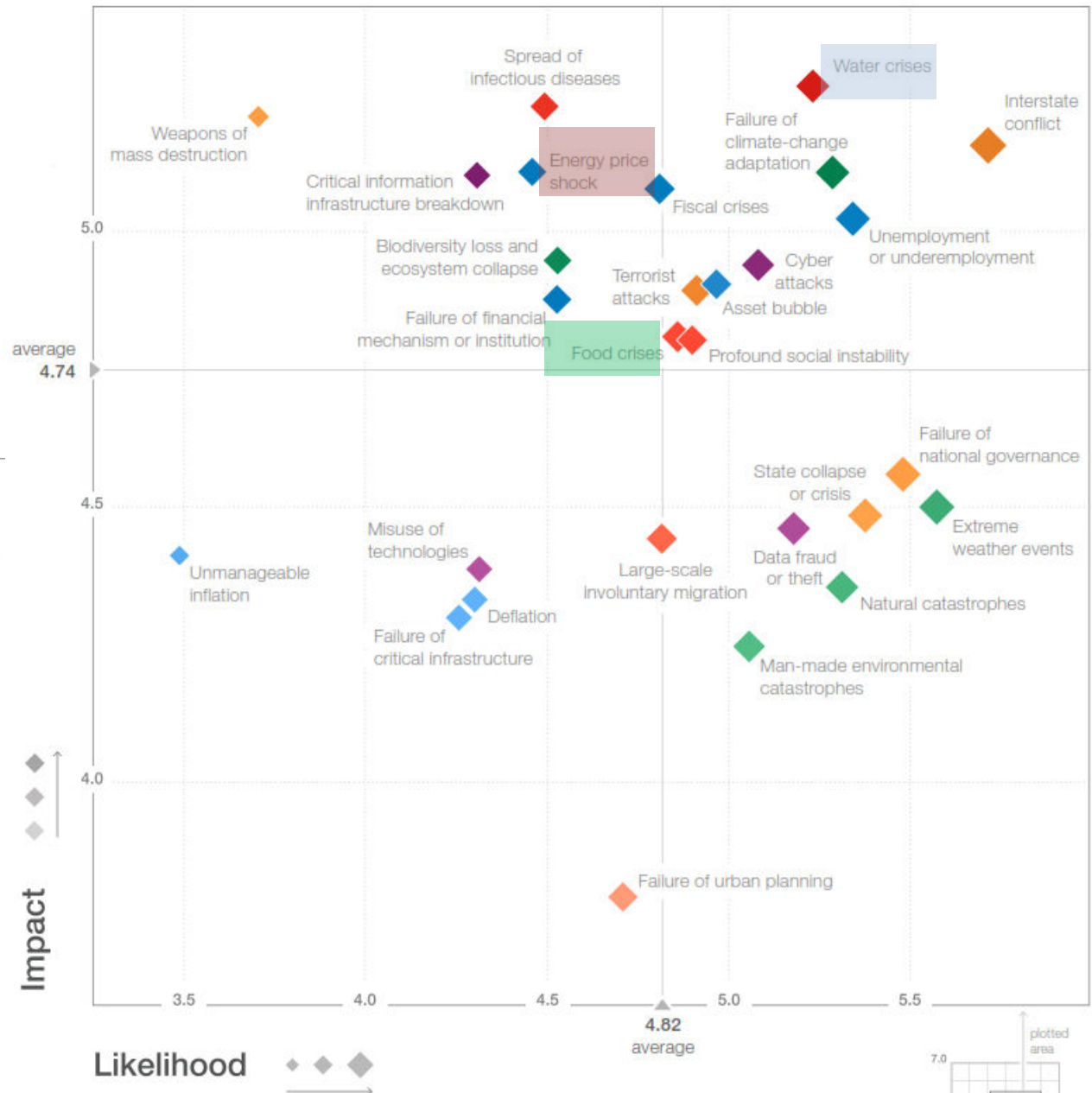




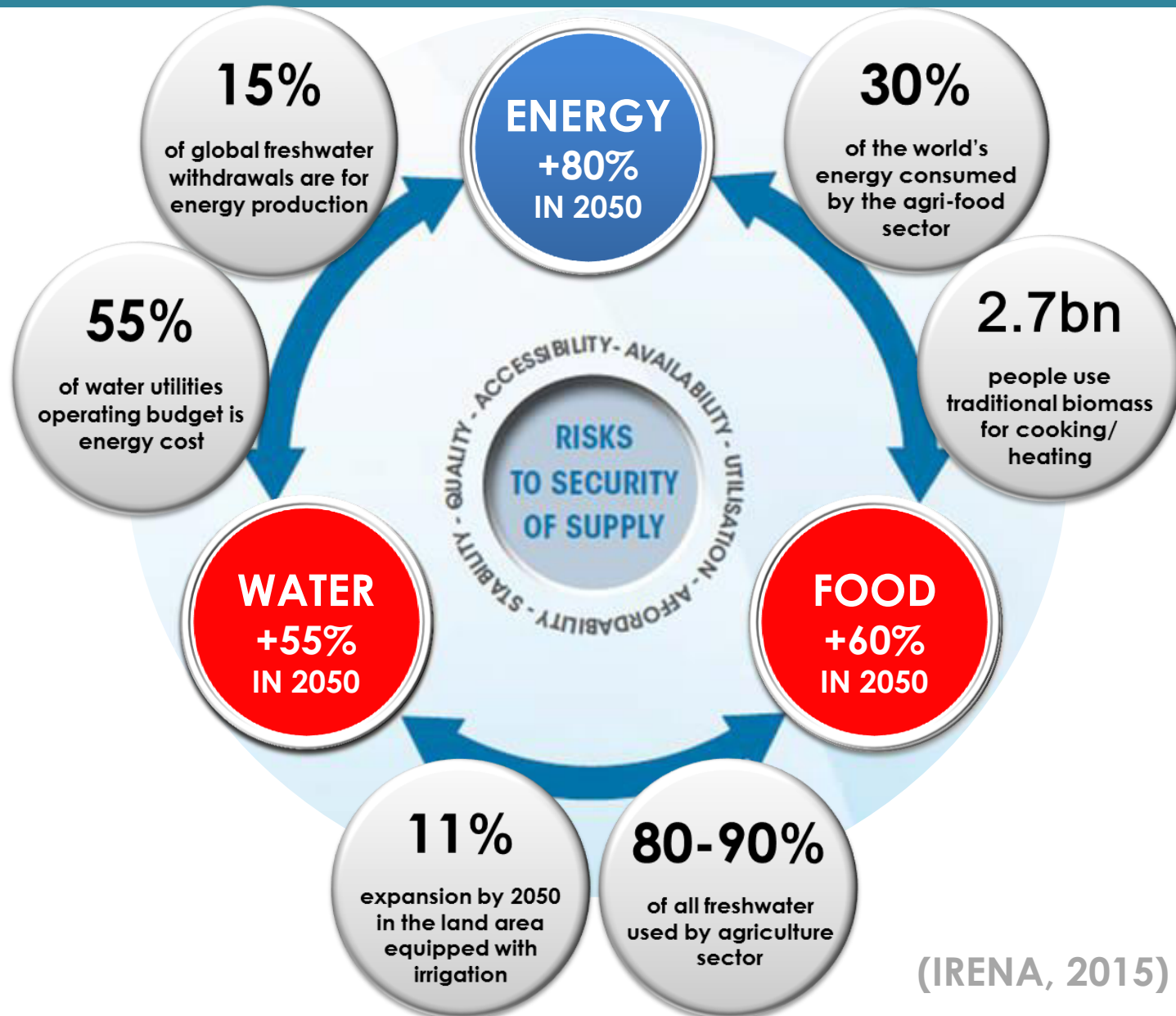
Global Shifts in Risks and Security

WEF Global Risk 2015 Report Top Global Risks of highest concerns

The Big Risks: **Economic**, **environmental** and **societal** risks dominate. Although they were noted as major causes for concern, **geopolitical** and **technological** risks didn't come high on the radar.

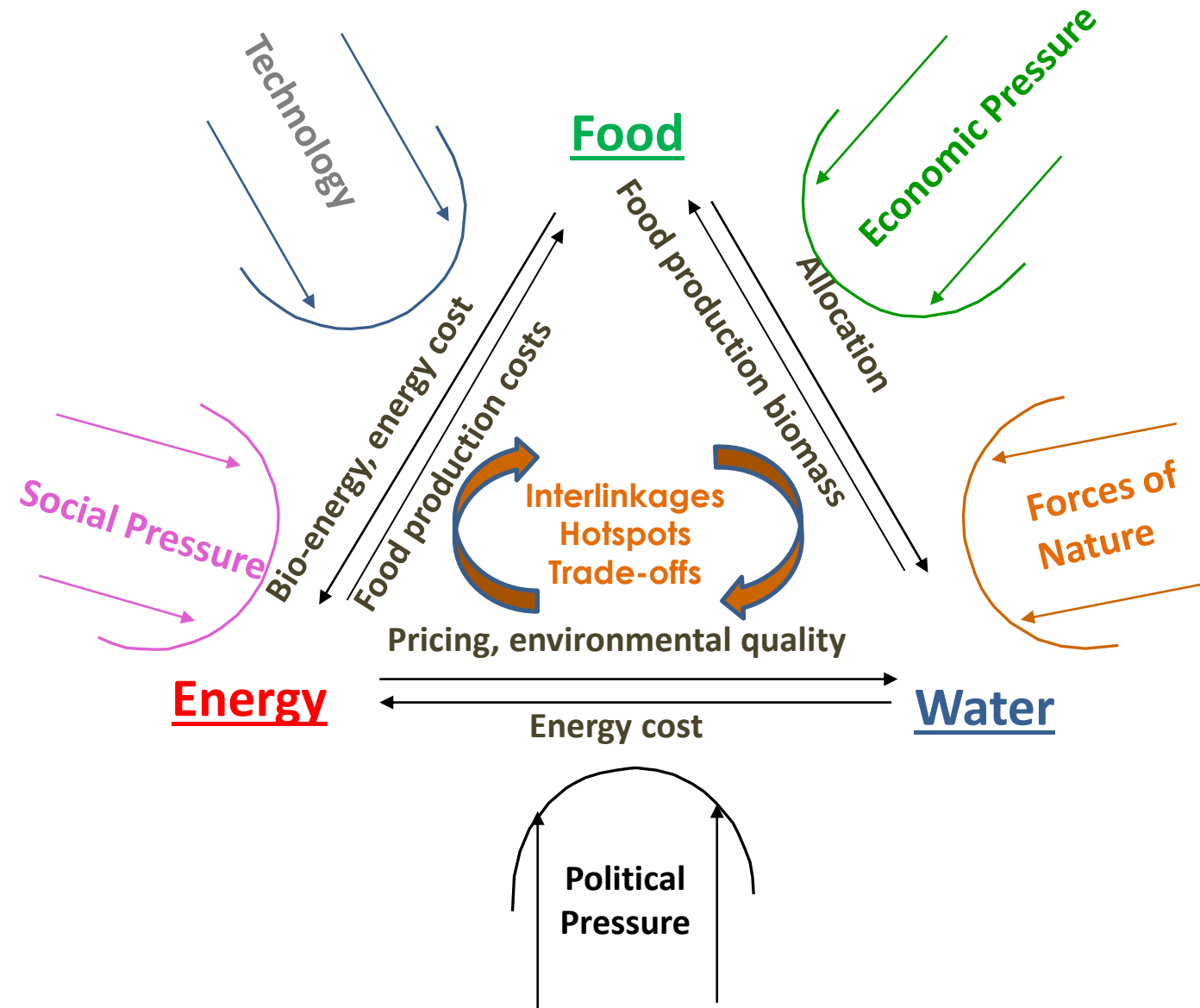


Resource Interconnectedness

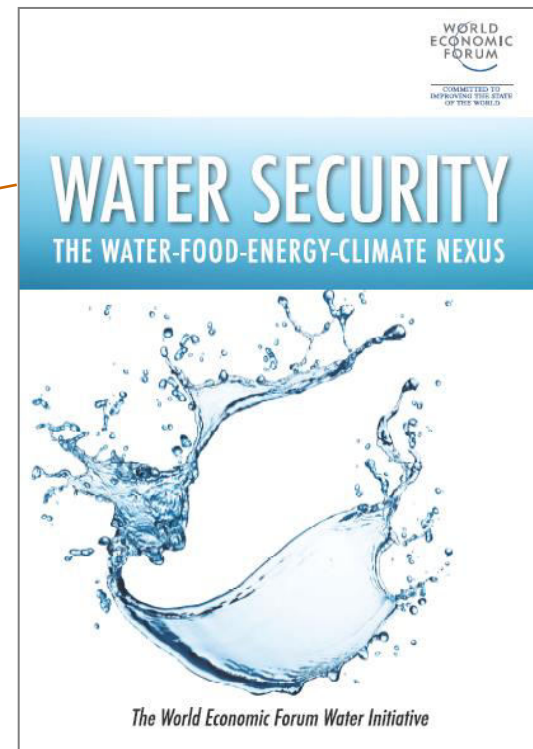


(IRENA, 2015)

Water-Energy-Food Nexus



(Mohtar, 2011)



IWRM and Nexus

IWRM Framework

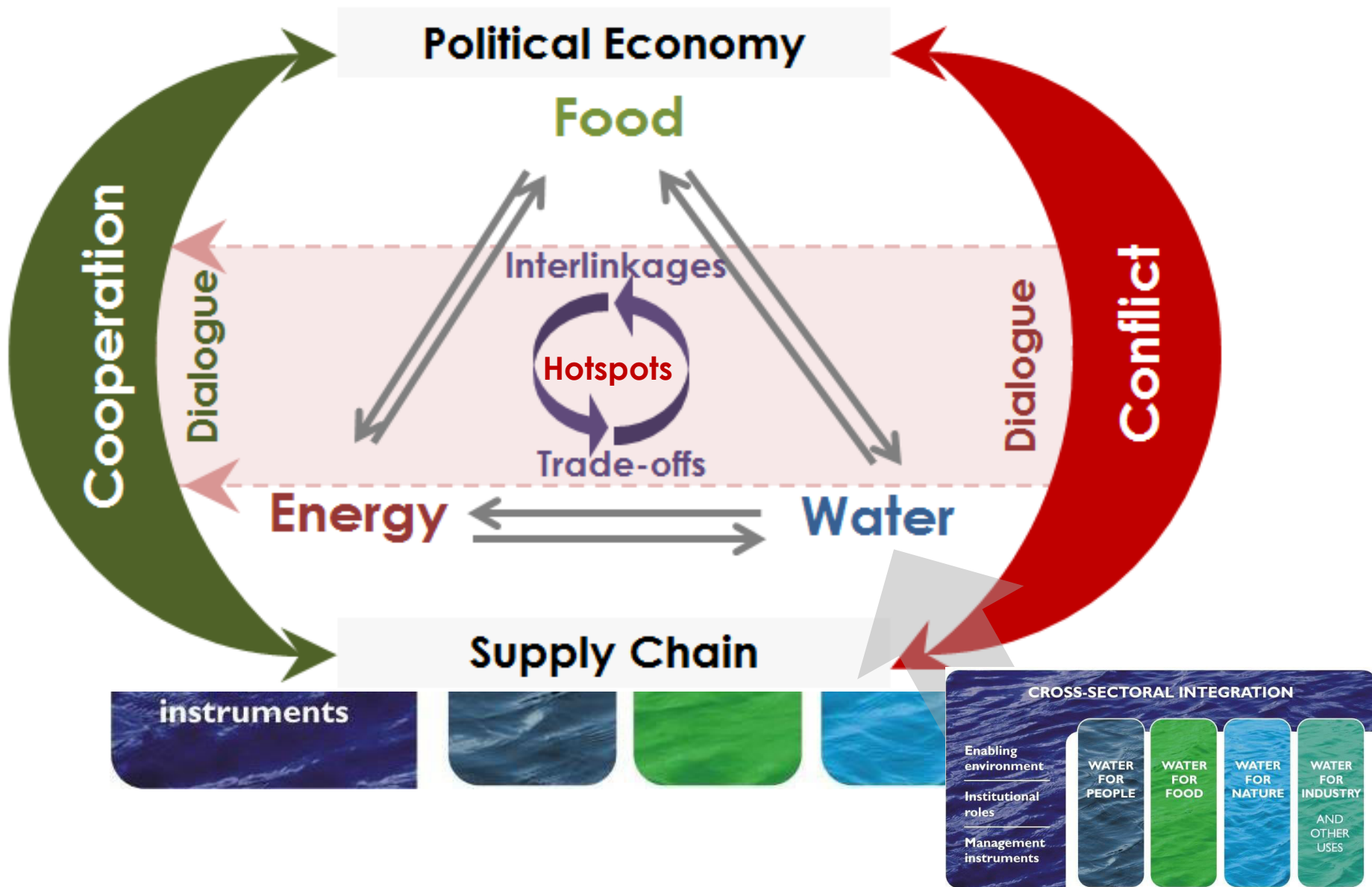
**ECOLOGICAL
SUSTAINABILITY**

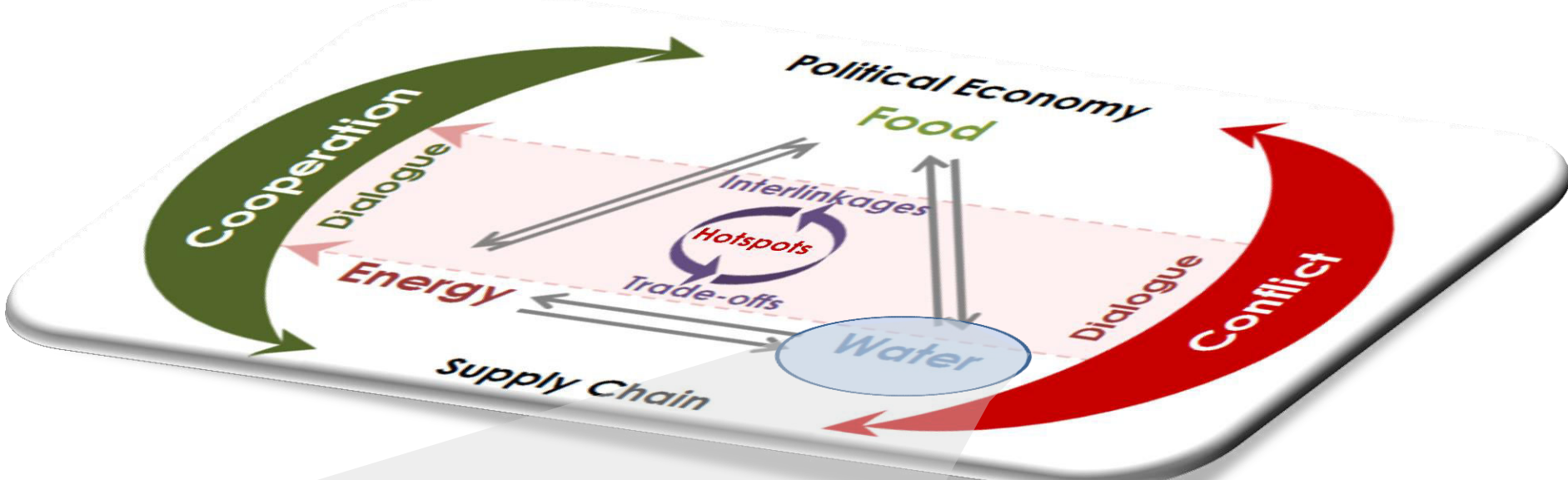


**ECONOMIC
EFFICIENCY**

**SOCIAL
EQUITY**

IWRM and Nexus



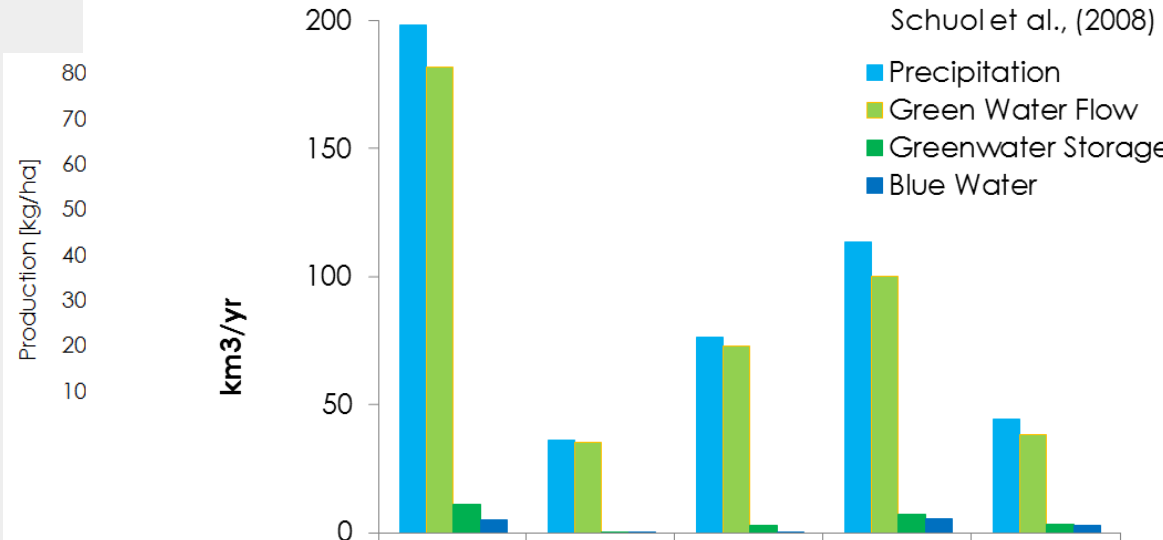


How to Bridge Water Gap by 2050?

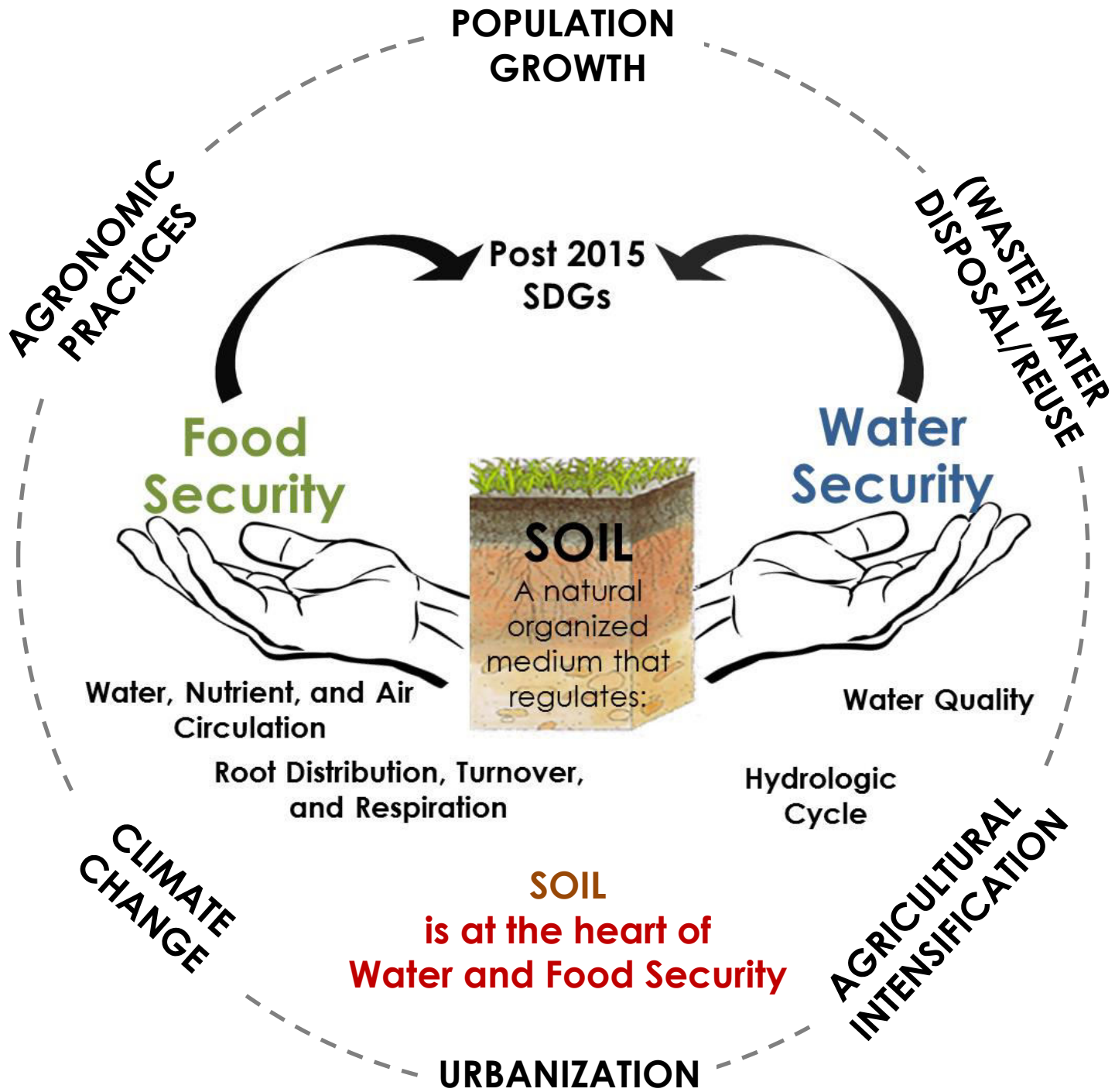


Average Available and Renewable Water for North African Arab Countries (km³/yr)

Schueler et al., (2008)



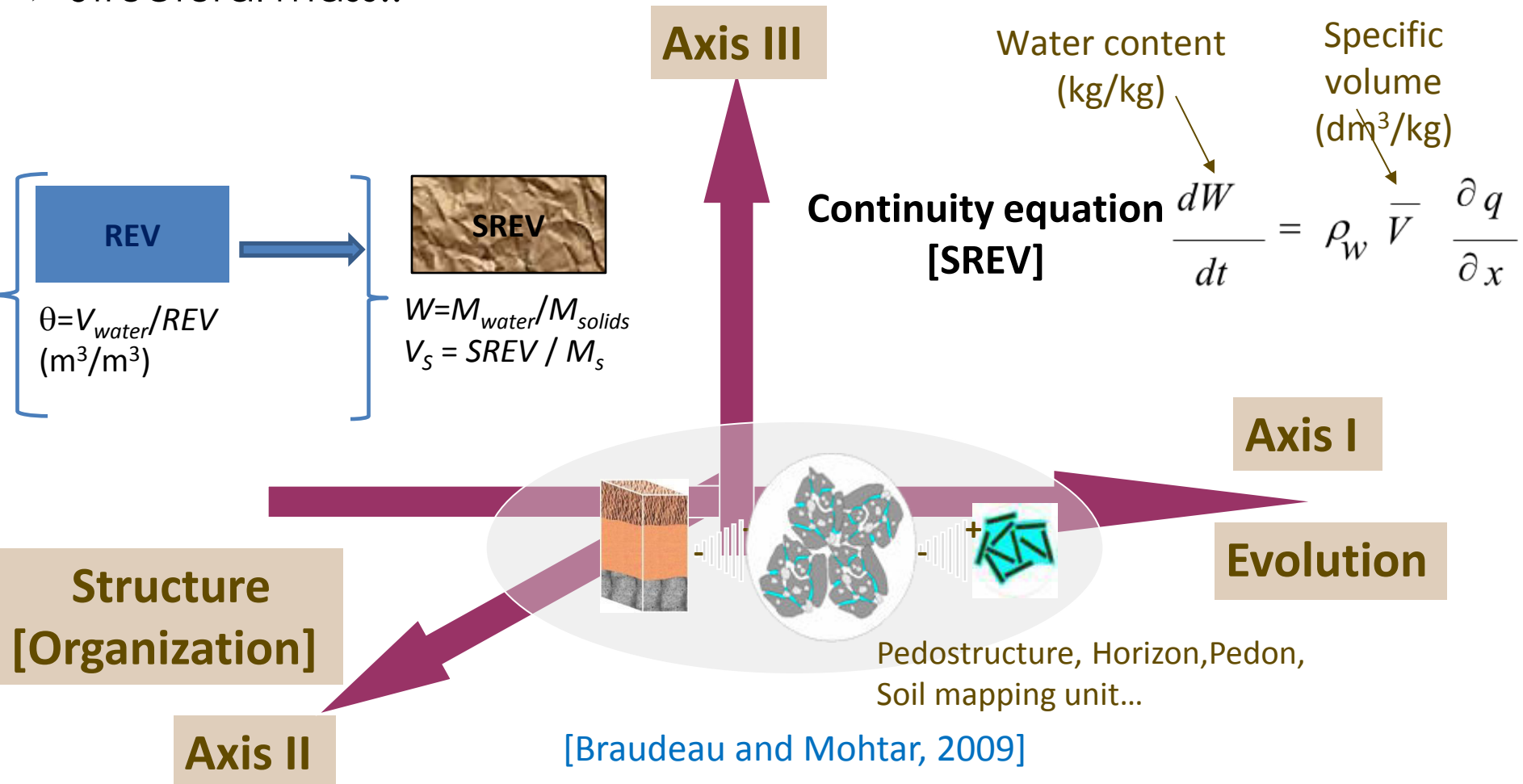
	Algeria	Egypt	Libya	Morocco	Tunisia
Precipitation	198.6	36.3	76.6	113.6	44.7
Green Water Flow	182.1	35.6	73.1	100.3	38.5
Greenwater Storage	11.3	0.6	3.1	7.5	3.3
Blue Water	5.2	0.1	0.4	5.7	2.9



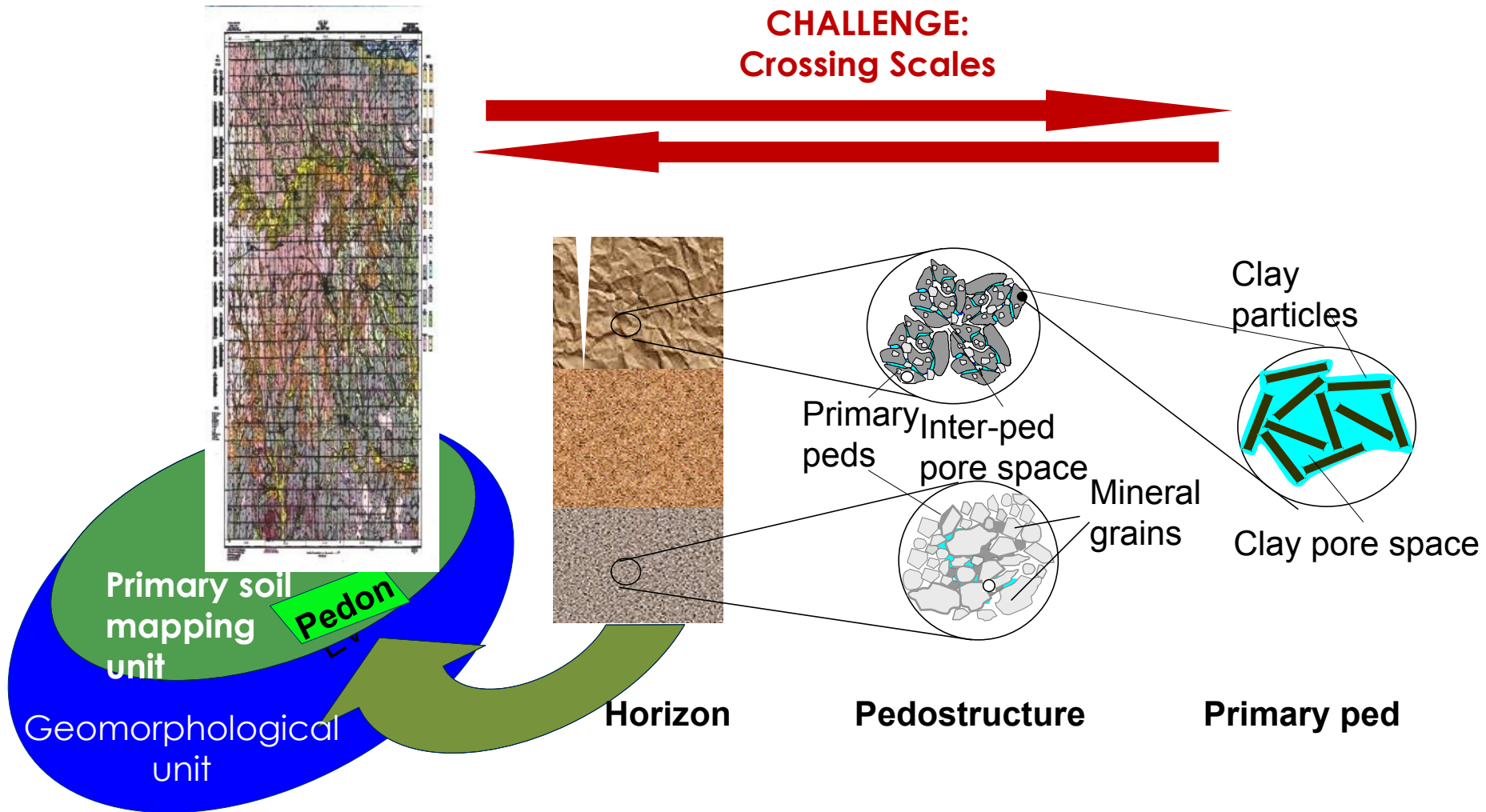
The Structural Representative Elementary Volume (SREV)

- Reference?
- Structural mass..

Hydro-structural Properties

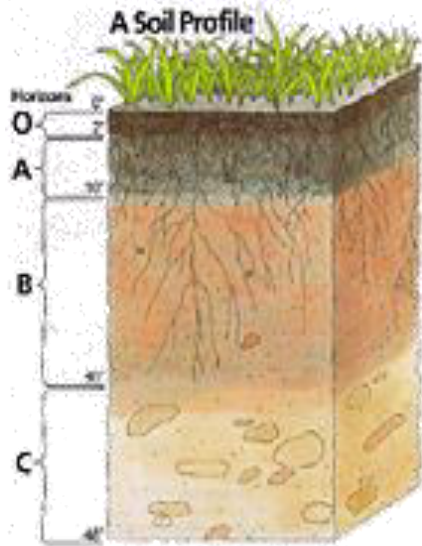


Soil Structure Hierarchical Scaling



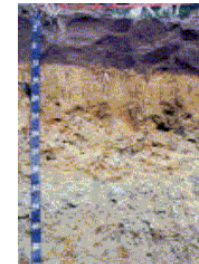
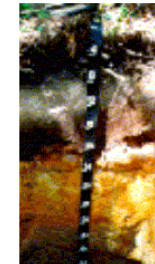
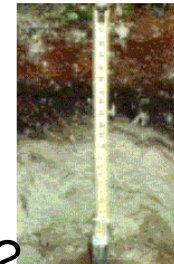
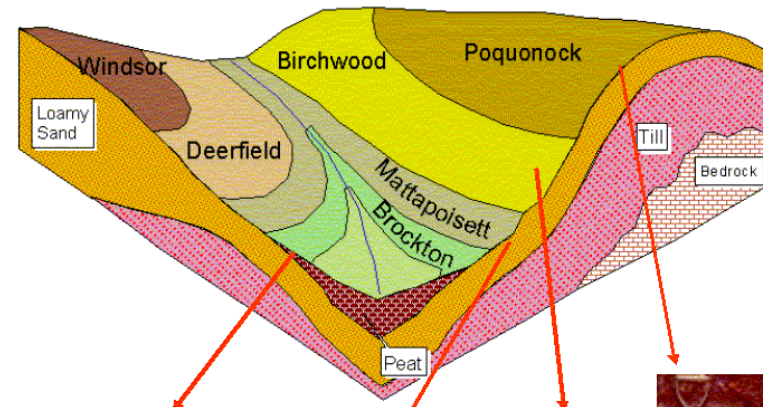
Challenge: Coupling Soil Bio-geo-chemical and Physical Models within the Organized Soil System

Soil Mapping Unit



Spatially Distributed Soil Mapping Unit

Soil/Geology	
	Bedrock
	Birchwood
	Brockton
	Deerfield
	Mattapoisett
	Poquonock
	Solum
	Swansea
	Till
	Windsor
	peat



Three fundamental questions:

1. Typology representing the system?
2. Model used for these couplings?
3. The thermodynamic conditions for this biophysical system?

Concluding Remarks

- 1. The Nexus platform builds on the IWRM and invites other disciplines into water security debate.** It has the potential for achieving integrated water, energy and food security.
- 2. There is a need for Quantitative approaches** to study the long term impact of any agro-environmental practices on soil functioning.
- 3. Valuing Water and energy** resources are vital to the sustainability of food production system.
- 4. Green Water Revolution** is needed for water and food security resilience.

WEF Nexus Research Team



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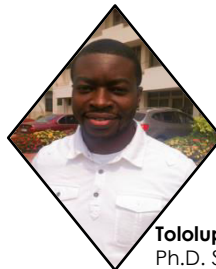
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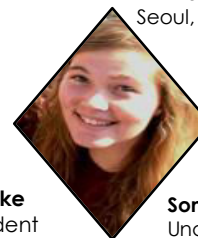
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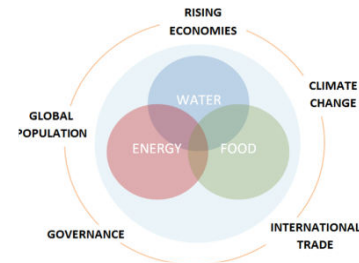
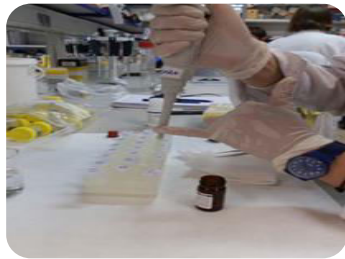
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Undergraduate



Mary Schweitzer
Program
Manager



Thank You



2015
International
Year of Soils

