Climate Change, Water and Food Security

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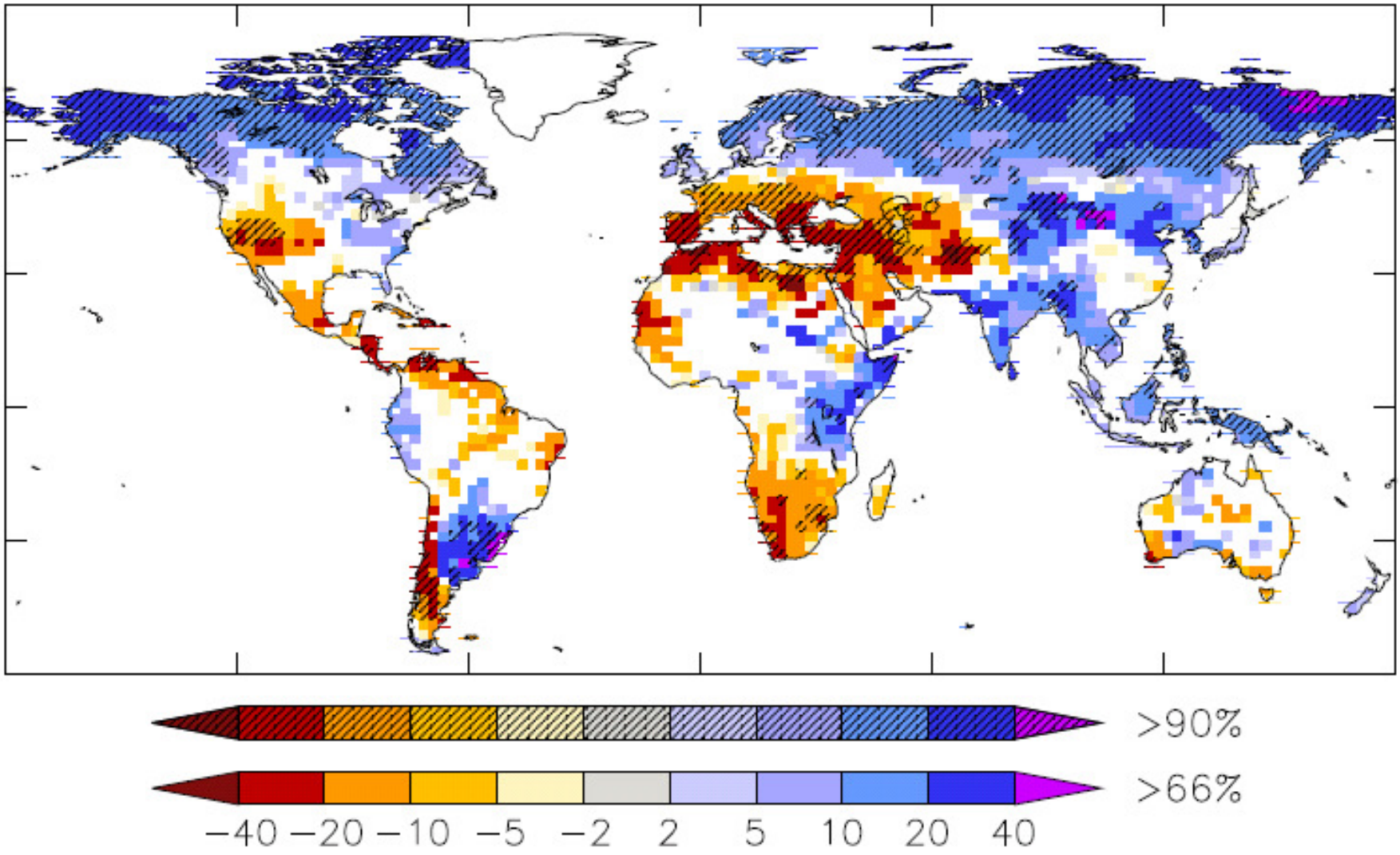
Scope

Agricultural water management:

- Irrigated agriculture
  - Precipitation, Evapotranspiration, Runoff, Recharge
- Rainfed agriculture
  - Precipitation, Evapotranspiration
- Other agricultural systems
  - fisheries, aquaculture, forests, rangeland

Expected change in annual runoff - 2060



Multimodel mean changes in annual runoff by 2060, in percent, indicating also degree of agreement between the 12 models used Scenario A1B, i.e. very rapid economic growth, convergence among regions and technological change in energy systems. Illustration from Milly et al 2005.

Findings and recommendations (I)

- Intensive food systems are at risk from climate change impacts:
  - A combination of reduced base flows, flooding and sea-level rise will hit irrigated areas, and in particular productive lowland deltas (Indus, Nile, Ganges).
  - In key food-insecure areas (Sub-Saharan Africa, Peninsular India), anticipated reductions in current rainfed production may have multiple impacts including loss of livelihoods and displacement. This will put further pressure on irrigated production. Adaptation strategies should include enhancing resilience of rainfed systems through investments in soil moisture management (water harvesting, water conservation, etc.)
- Globally, agricultural production will have to negotiate more variability in water inputs and more competition for bulk water:
  - Hence more progressive management of surface and groundwater storage will be key in reconciling competing demands, increase water productivity and maintain environmental services.

Findings and recommendations (II)

- The knowledge base is sufficiently precise to warrant mainstreaming now:
  - Notwithstanding gaps in data and research, progressive adaptation across land and water systems are justified on a no-regrets basis.
- Specific national capacity skills in climate change assessment, downscaling, forecasting and economic planning will be required:
  - National capacities will need to be supported by regional applied research centres that can produce scaleable solutions to food production under amplified hydrological variability and temperature changes.
- Financing adaptive water management initiatives will need innovation:
  - This will require a shift away from supply driven investment styles toward approaches that allow farmers and water managers to re-tune their existing operations to cope with anticipated impacts.