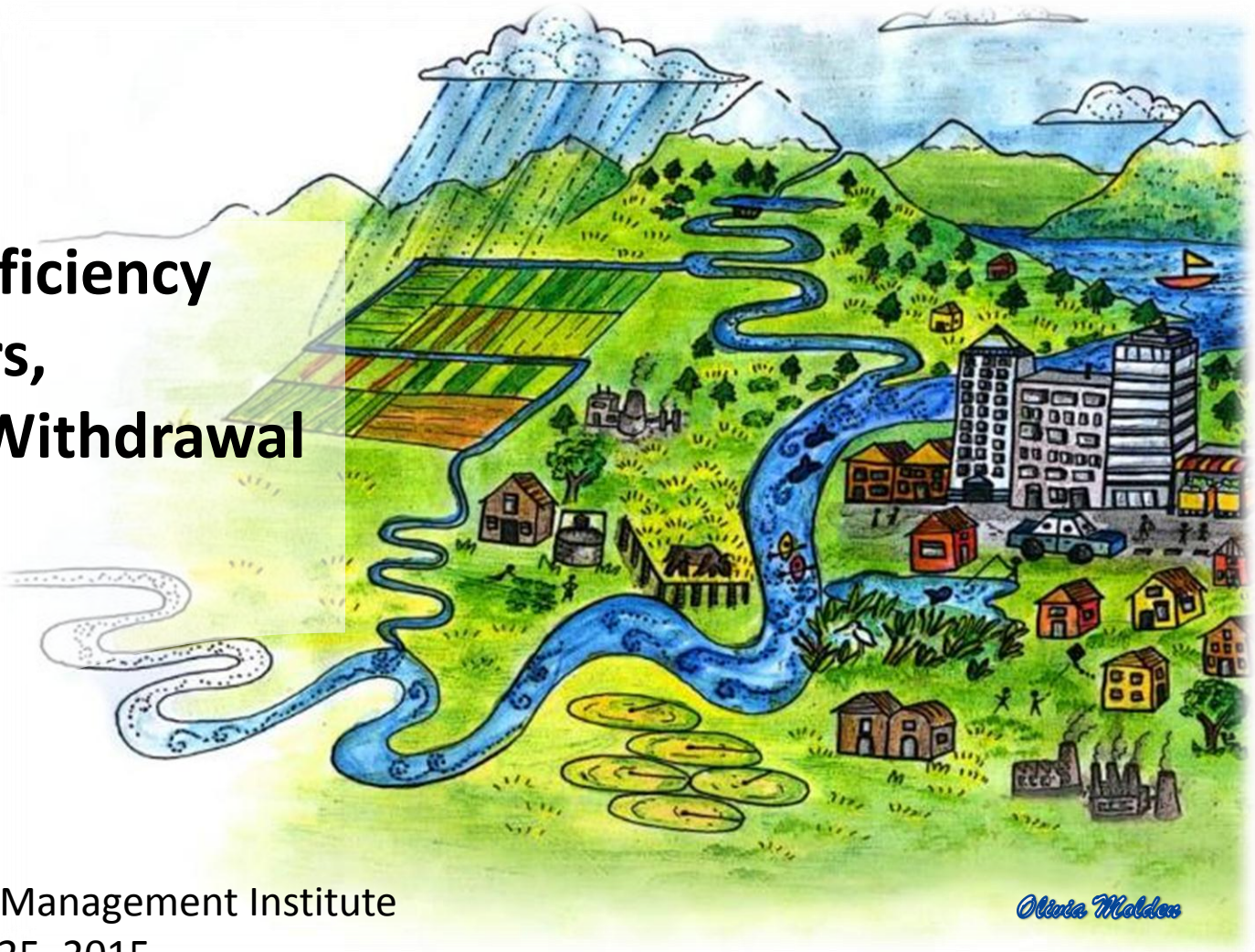
Water Use Efficiency across Sectors, Sustainable Withdrawal and Scarcity



Meredith Giordano
International Water Management Institute
New York, February 25, 2015

Presentation Overview

- Setting the scene: Water goals, targets and definitions
- Proposed indicators to support water use efficiency and sustainable withdrawals
- Considerations for implementation
- Supporting data and tools
- Concluding remarks

Water and the SDGs

- **MDGs**: water security for direct human needs received prominence
- **SDGs**: broader context of water security to address the **water needs of all sectors**, cross-sectoral challenges, and risks

Target 6: Ensure availability and sustainable management of water and sanitation for all

6.1 Drinking water
6.2 Sanitation
6.3 Water quality
6.4 Water use efficiency
6.5 IWRM
6.6 Protection/restoration of water-related ecosystems.

Target 6.4: Defined

By 2030,

- substantially increase **water-use efficiency** across all sectors
- ensure **sustainable withdrawals** and supply of freshwater to address **water scarcity**, and
- substantially reduce the number of people suffering from water scarcity.

Target 6.4: Key Terms

- **Water (use) efficiency:** "doing more and better with less" (*aka* water productivity)
- **Water withdrawal:** water removed (permanently or temporarily) for final consumption or production (*cf* water consumption)
- **Water scarcity**:
  - Physical: available resources insufficient to meet all demands, including minimal environmental flow requirements
  - Economic: lack of investments in water or lack of human capacity to keep up with water demand

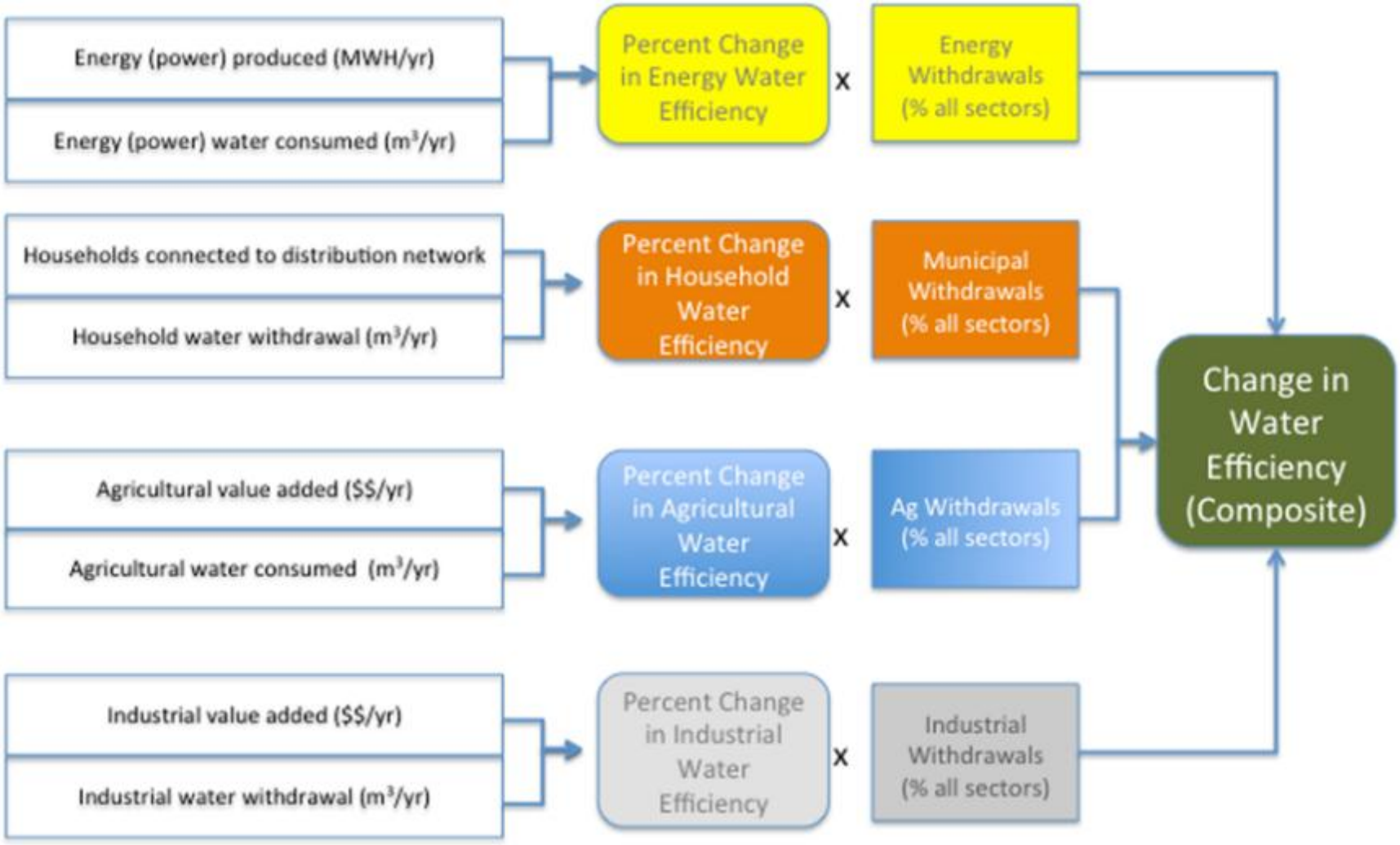
Proposed Indicators

- **Water Use Efficiency:** Weighted measure of value/energy per unit of water consumed/withdrawn across different sectors

- **Sustainable Water Withdrawal Index/Natural Water Capital Index:** Measure water withdrawals in relation to available water (taking into account environmental water requirements)

- **Water Scarcity Index** *(in development):* Combination of human impact values associated with water scarcity (e.g., crop yields, power supply, and drinking water availability)

Proposed Indicators: Water Efficiency Index



Task Team on water withdrawals and productivity

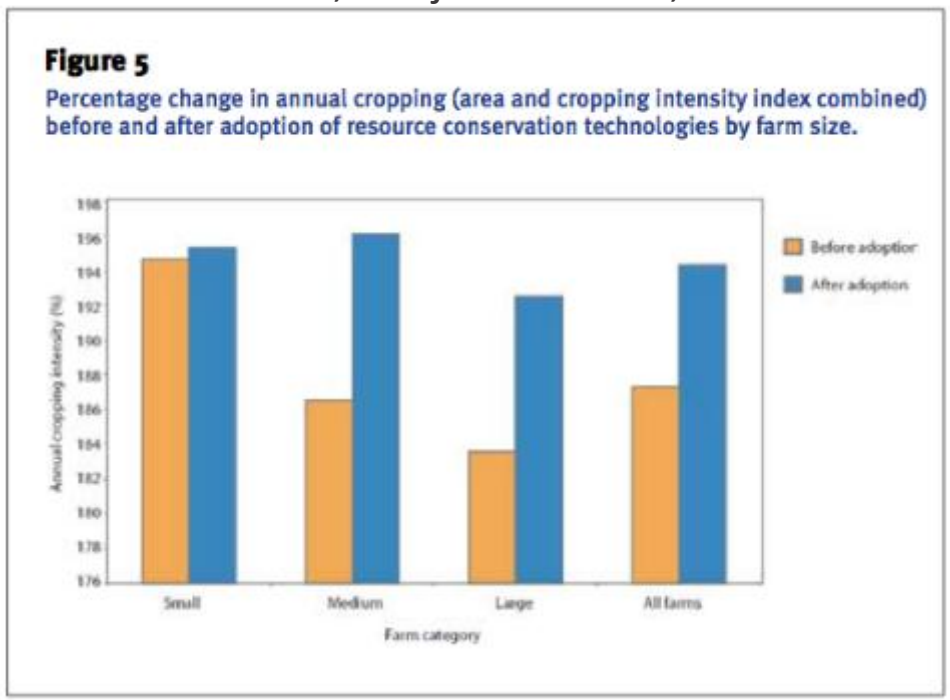
How to improve water use efficiency (WUE)?

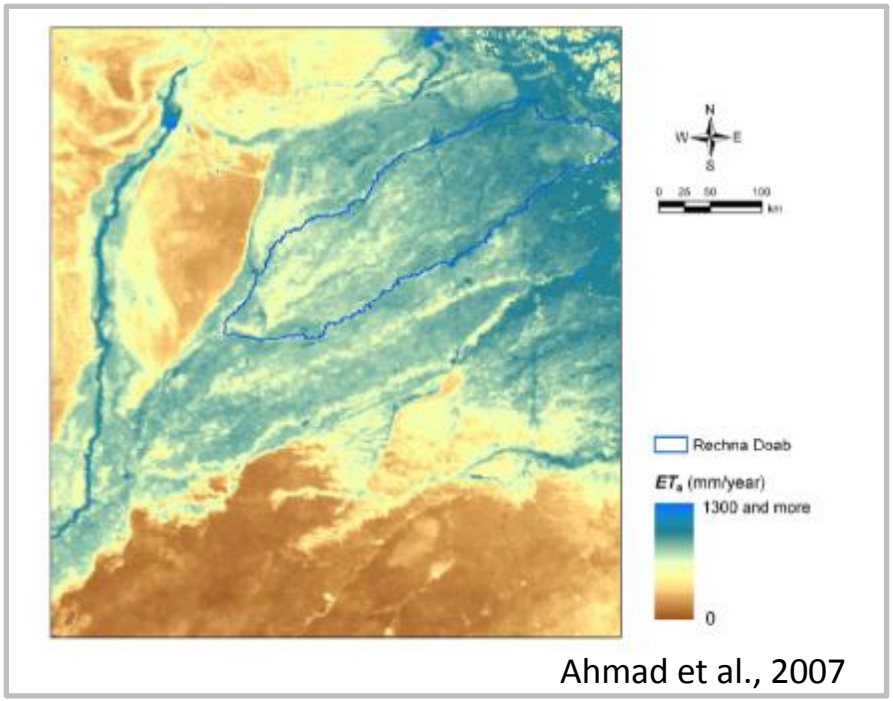
- **Increase the productivity per unit of water consumed** (e.g., change crop varieties, improved timing/application of water, non-water inputs)
- **Reduce non-beneficial depletion** (e.g., non-beneficial evaporation, flows to sinks)
- **Reallocate water among users** (e.g., from lower to higher value uses)
- **Tap uncommitted flows** (e.g., storage, water reuse)

Range of technical, managerial and policy interventions

Do improvements in WUE always lead to reduced water use?

Rice-Wheat Zone, Punjab Province, Pakistan

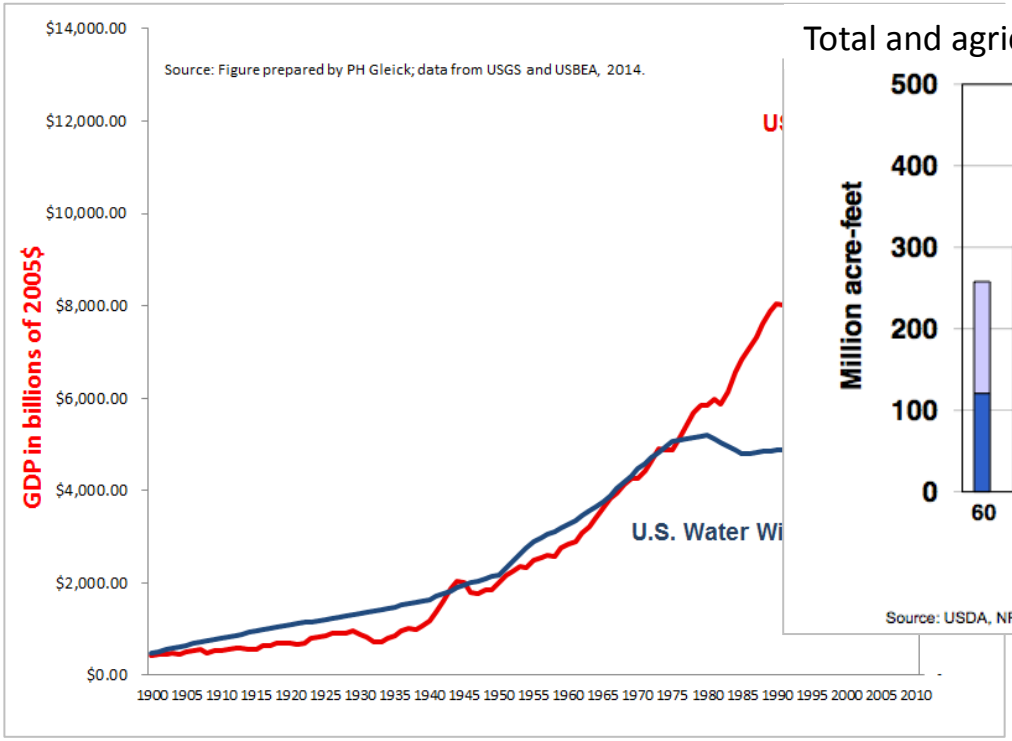




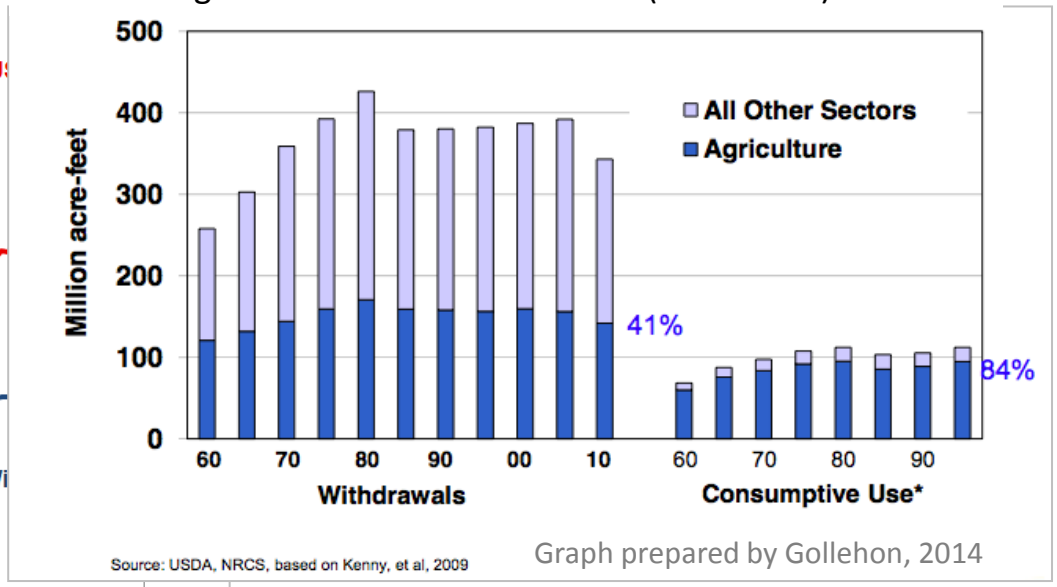
Ahmad et al., 2007

Do improvements in WUE always lead to reduced water use?

US GDP in $2005; Water withdrawals in km^3/year.



Total and agricultural water withdrawals (1960-2010)



Graph prepared by Gollehon, 2014

Not necessarily. Need to consider overall benefits, trade-offs (economic, environmental and social) and capacity to manage.

Composite indicators

Task Team on water withdrawals and productivity

Composite solutions

Alternative Solution

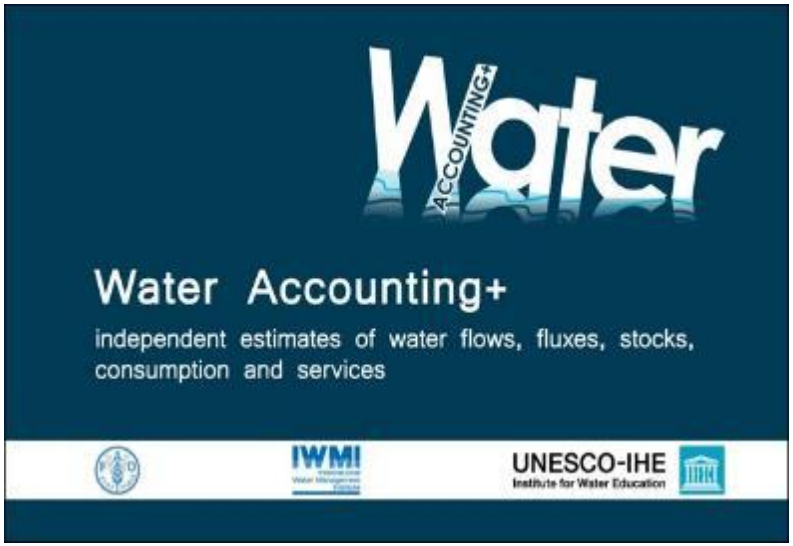
- Solar power as cash crop with a guaranteed market at attractive price.
- Reduce financial cost of subsidies
- Incentives to sell back solar power rather than pump groundwater
- Reduce the carbon footprint

Prashanth Vishwanathan /IWMI

Sukhdev Vishwakarma and his daughter Meenu both farm workers, use water pumped from a solar water pump at the farms of Gurinder Singh, a farmer with a land holding of 80 acres in Jagadhri.

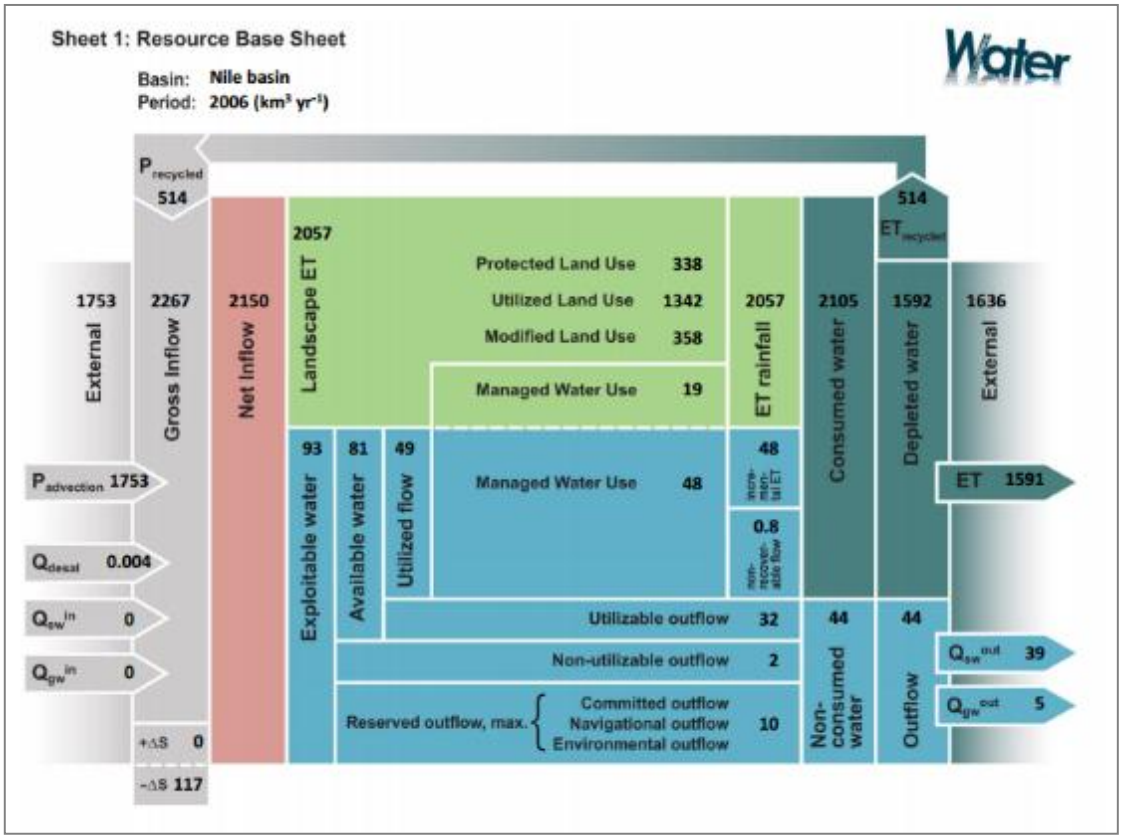
Tools to support implementation: Water Accounting +

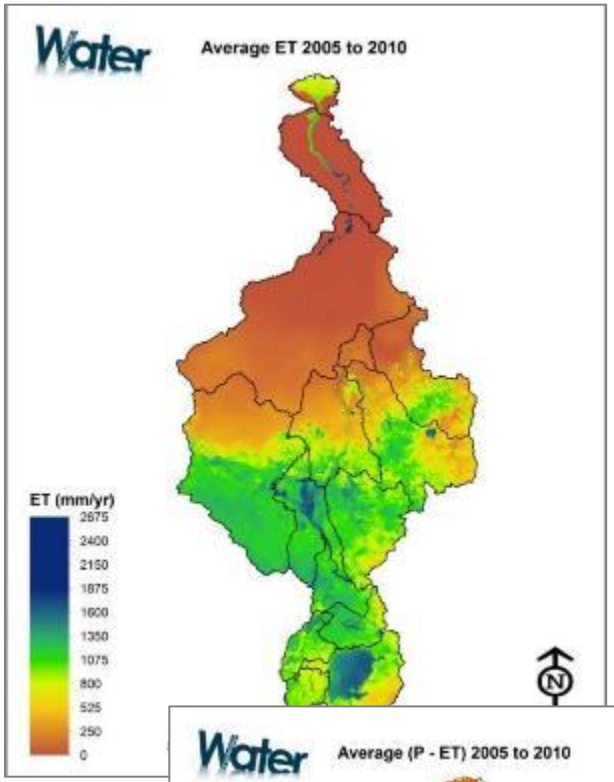
- Water accounting quantifies available water resources and their use by constructing water balances, over time and space, of varying complexity and detail.
- Water Accounting Plus:
  - open access platform to calculate water productivity
  - data and hydrological models to assess potential cross-sectoral impacts of various management and investment decisions

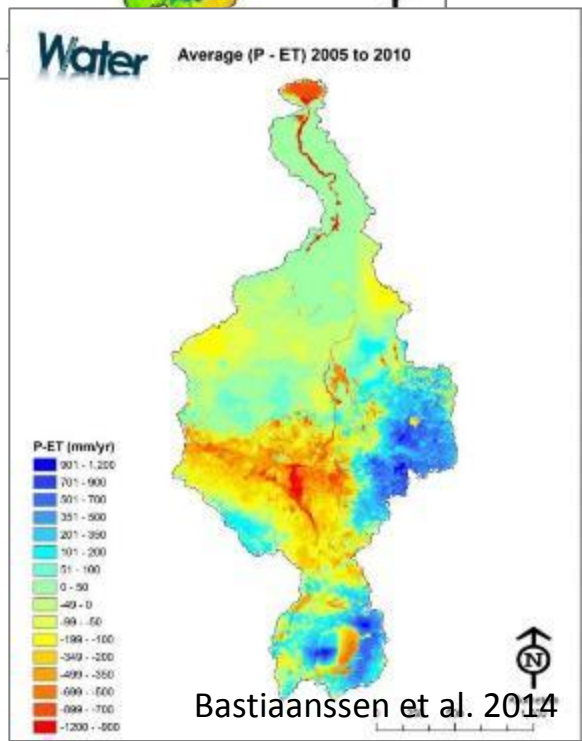


Water Accounting +

Water Sheets	Purpose
Resource Basin	Hydrological, manageable, utilizable flows, water security, sustainability
Evapotranspiration	Beneficial & non-beneficial flows
Productivity	Biomass returns, carbon sequestration, food security
Withdrawal	Management, regulations, allocations



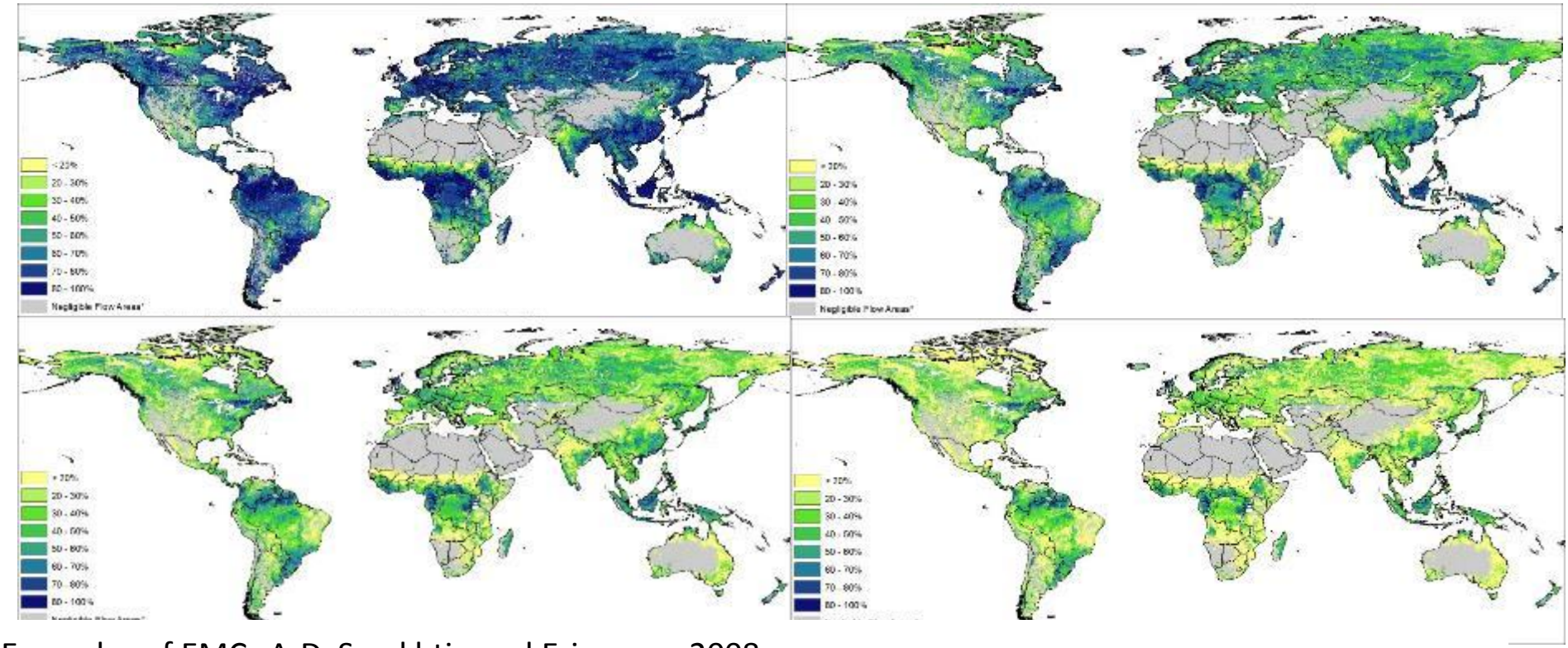




Bastiaanssen et al. 2014

Tools to Support Implementation: Environmental Flows

- Environmental Flow Calculators (desktop rapid assessments)
- Maps of Global Environmental Water Requirements by different environmental management classes (EMC)

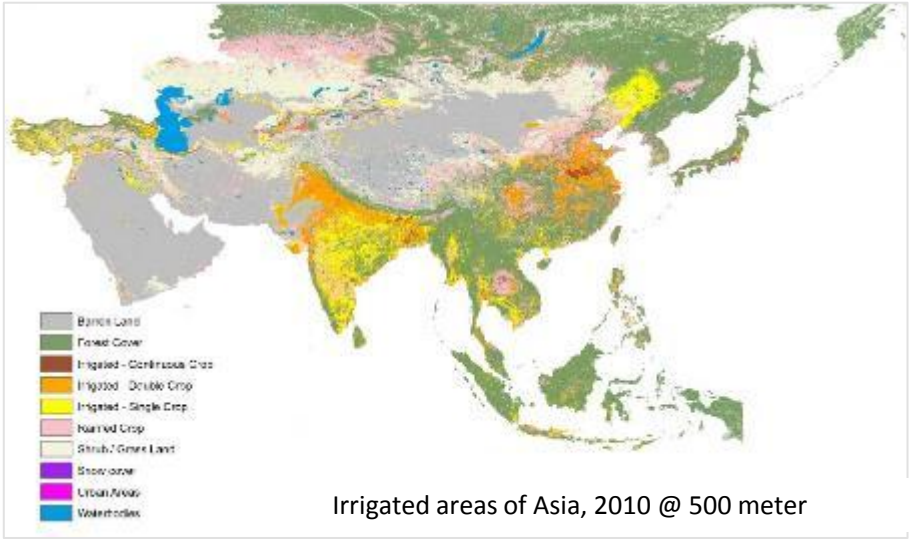


Examples of EMCs A-D, Smakhtin and Eriyagam, 2008

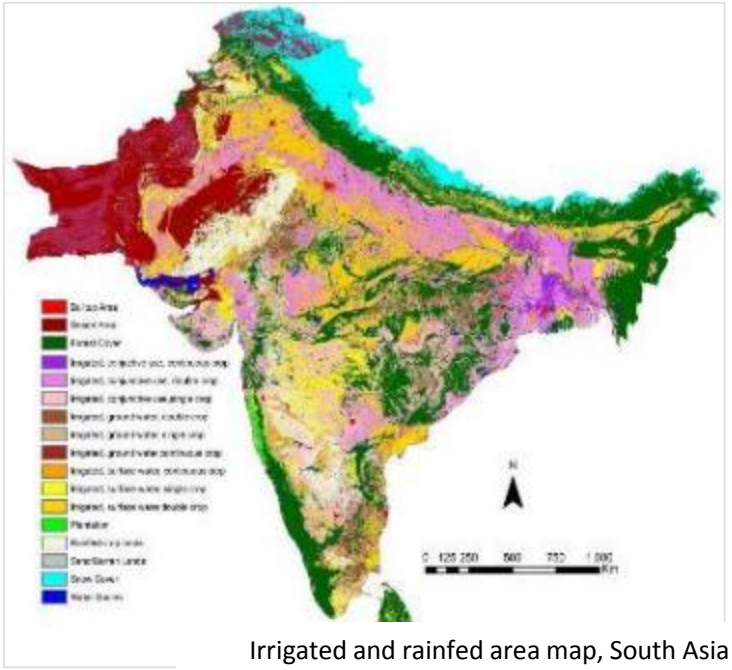
Tools to support implementation: Other Data Sets

- **Aquastat:** FAO's water information system: water resources, water uses, and agricultural water management: http://www.fao.org/nr/water/aquastat/main/index.stm

- **Irrigated/Rainfed area maps**



Irrigated areas of Asia, 2010 @ 500 meter


Irrigated and rainfed area map, South Asia

- Global, national water data sets on water availability, water withdrawals, environmental water requirements

Going Forward: Bridging Policy and Research for Strengthened Capacity

- Setting national targets that align with the SDGs *and* suit the national context
- Establishing realistic indicators that can be supported by national/ international data sets
- Identifying investment choices that consider efficiency, equity and sustainability needs and trade-offs
- Supporting implementation through data collection and monitoring

Thank you

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