



Presentation from
**2015 World Water
Week in Stockholm**

www.worldwaterweek.org

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Managing water variability: multiple dimensions



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International Water Management Institute

Photo: Fraser Sugden

Consumers: poor affected most by food price fluctuations

Growing Concern | Heat, drought and rain are pushing world food prices higher

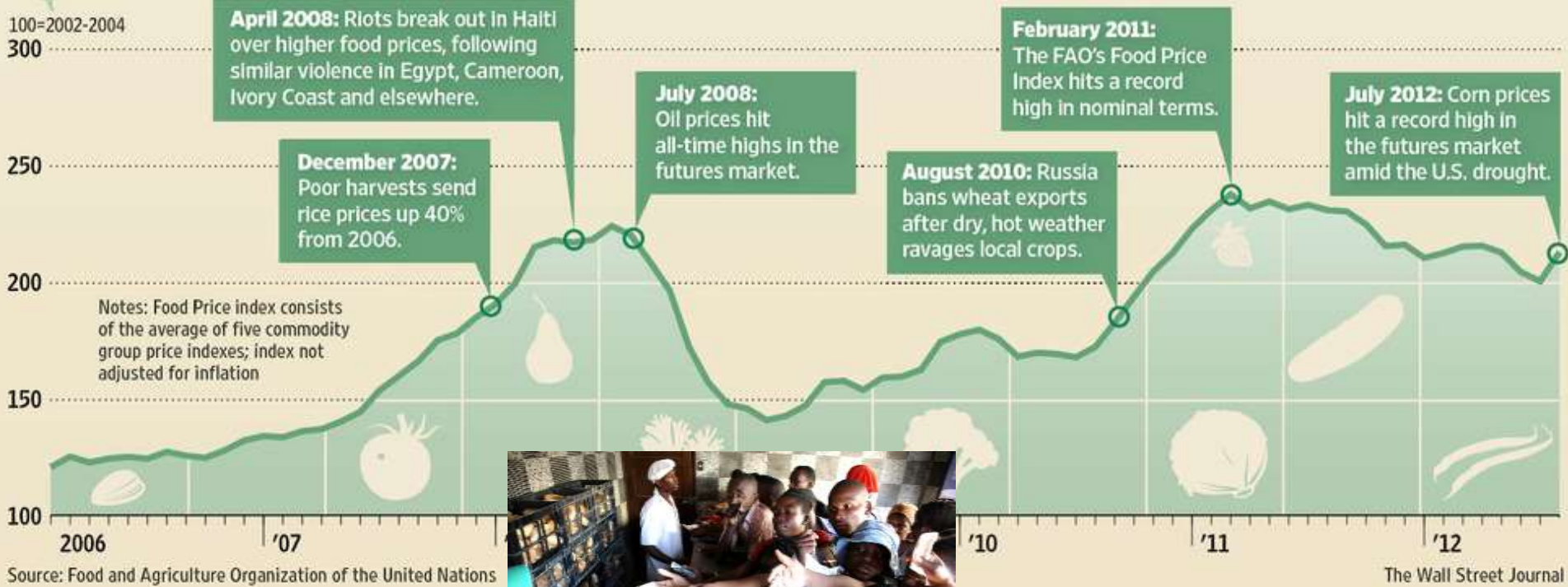
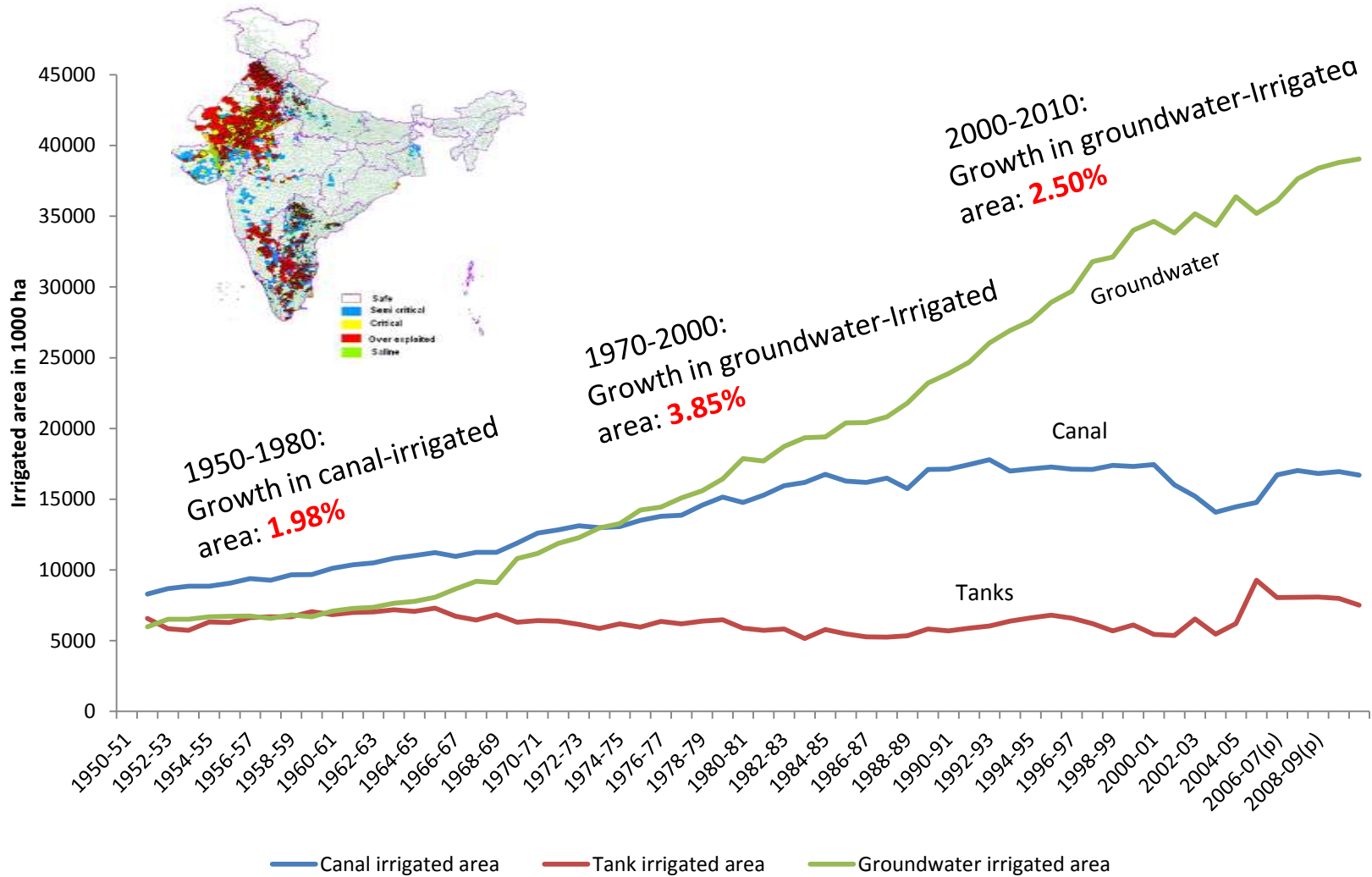


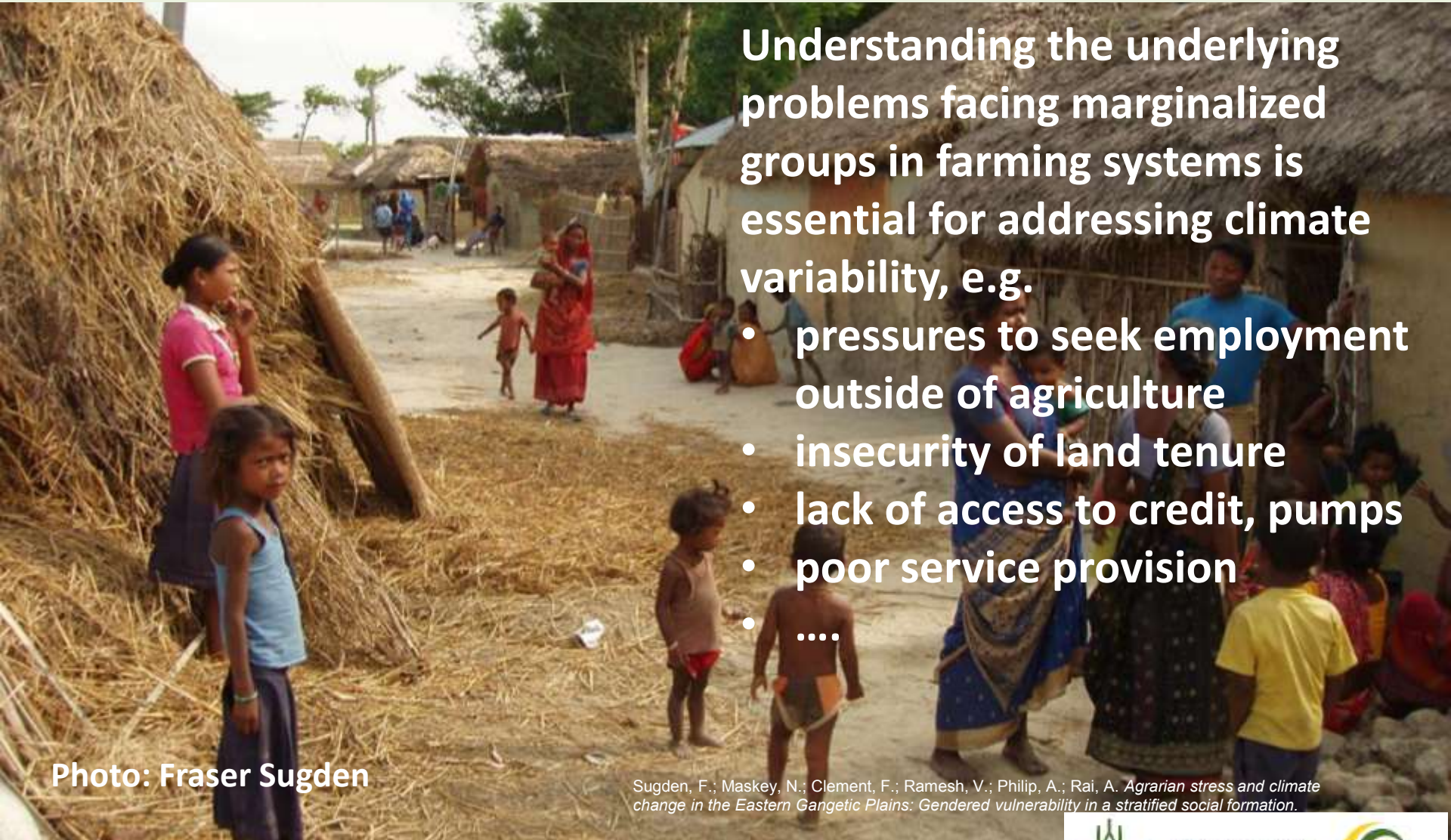
Photo: ILRI

The water resource: pressure on groundwater will continue



Source: Mukherji et al. 2013.

Marginalized groups: concerned about more than climate variability



Understanding the underlying problems facing marginalized groups in farming systems is essential for addressing climate variability, e.g.

- pressures to seek employment outside of agriculture
- insecurity of land tenure
- lack of access to credit, pumps
- poor service provision
-

Photo: Fraser Sugden

Sugden, F.; Maskey, N.; Clement, F.; Ramesh, V.; Philip, A.; Rai, A. *Agrarian stress and climate change in the Eastern Gangetic Plains: Gendered vulnerability in a stratified social formation.*

Farmer adaptation: e.g. flood-tolerant rice



- 4 m tons of rice lost to floods in India and Bangladesh, annually
- ‘Scuba’ rice resilient to complete submergence up to 17 days

Source and Photo: IRRI

Rural development agencies: Linking knowledge to action in climate-smart villages

CLIMATE SMART VILLAGE / FARM

Weather smart

- Seasonal weather forecasts
- ICT based agro-advisories
- Index based insurance
- Climate analogues



Water smart

- Aquifer recharge
- Rainwater harvesting
- Community management of water
- Laser leveling
- On-farm water management



Carbon smart

- Agroforestry
- Conservation tillage
- Land use systems
- Livestock management



Nitrogen smart

- Site specific nutrient management
- Precision fertilizers
- Catch cropping / legumes



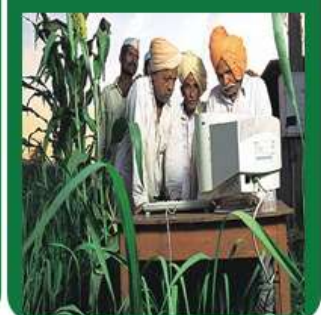
Energy smart

- Biofuels
- Fuel efficient engines
- Residue management
- Minimum tillage

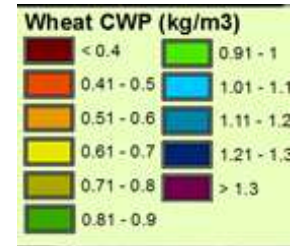


Knowledge smart

- Farmer-farmer learning
- Farmer networks on adaptation technologies
- Seed and fodder banks
- Market info
- Off-farm risk management-kitchen garden



Irrigation system manager: new potential to increase water productivity by identifying high performers



Doukalla Irrigation Scheme, Morocco

Private sector response: Increasingly looking to reduce water footprint



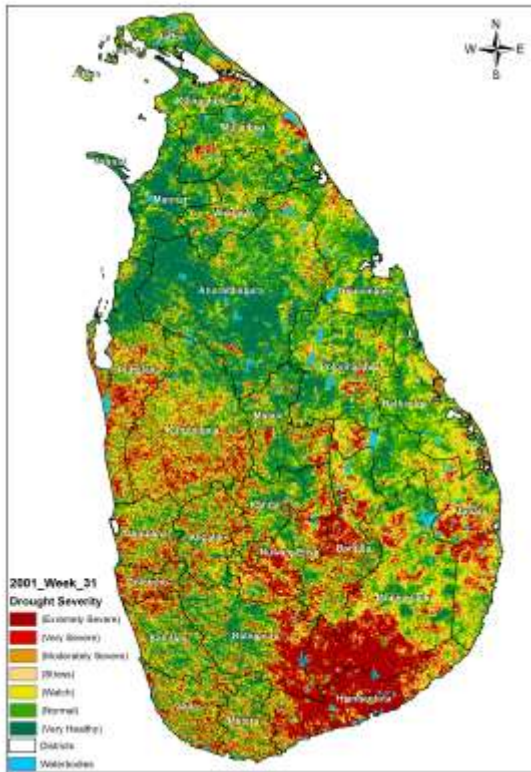
Photo Credit: Creative Commons, Wikimedia

Coffee in Viet Nam - 3% of GDP; employs around 2 million people

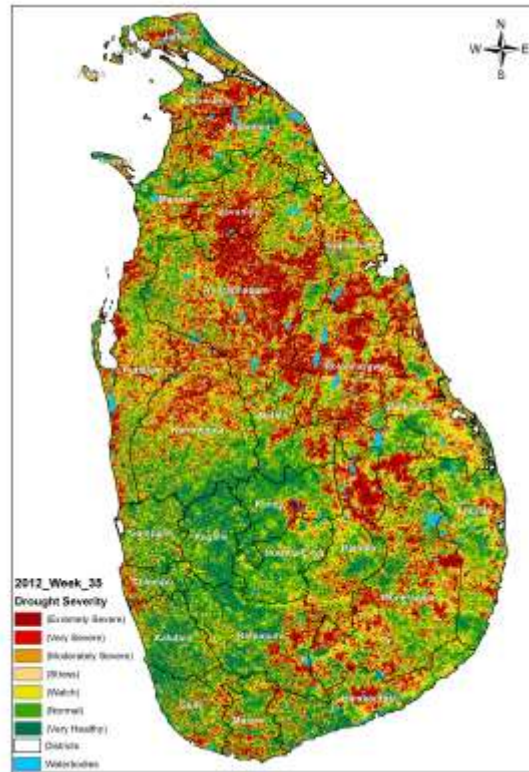
- Water scarcity is a significant threat
- Agronomic research showed benefit of 'water stress' and strategic timing of irrigation to boost yield
- Savings on water and production costs

Insurance industry: looking for an objective indicator

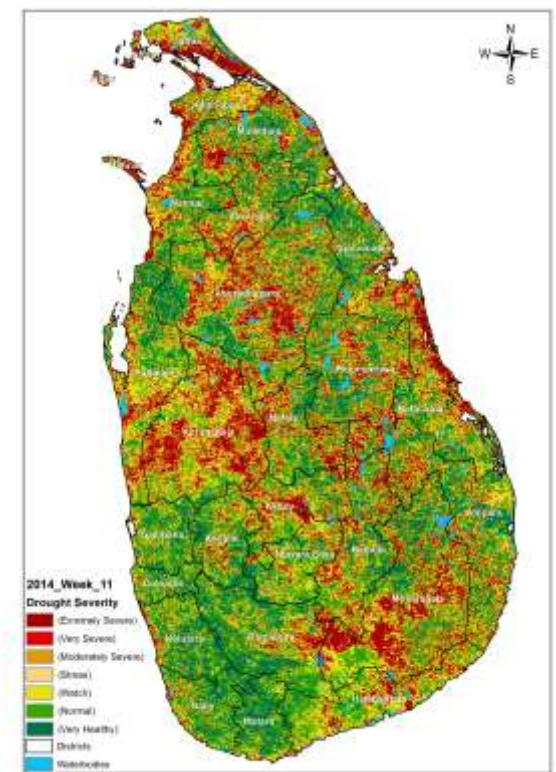
2001



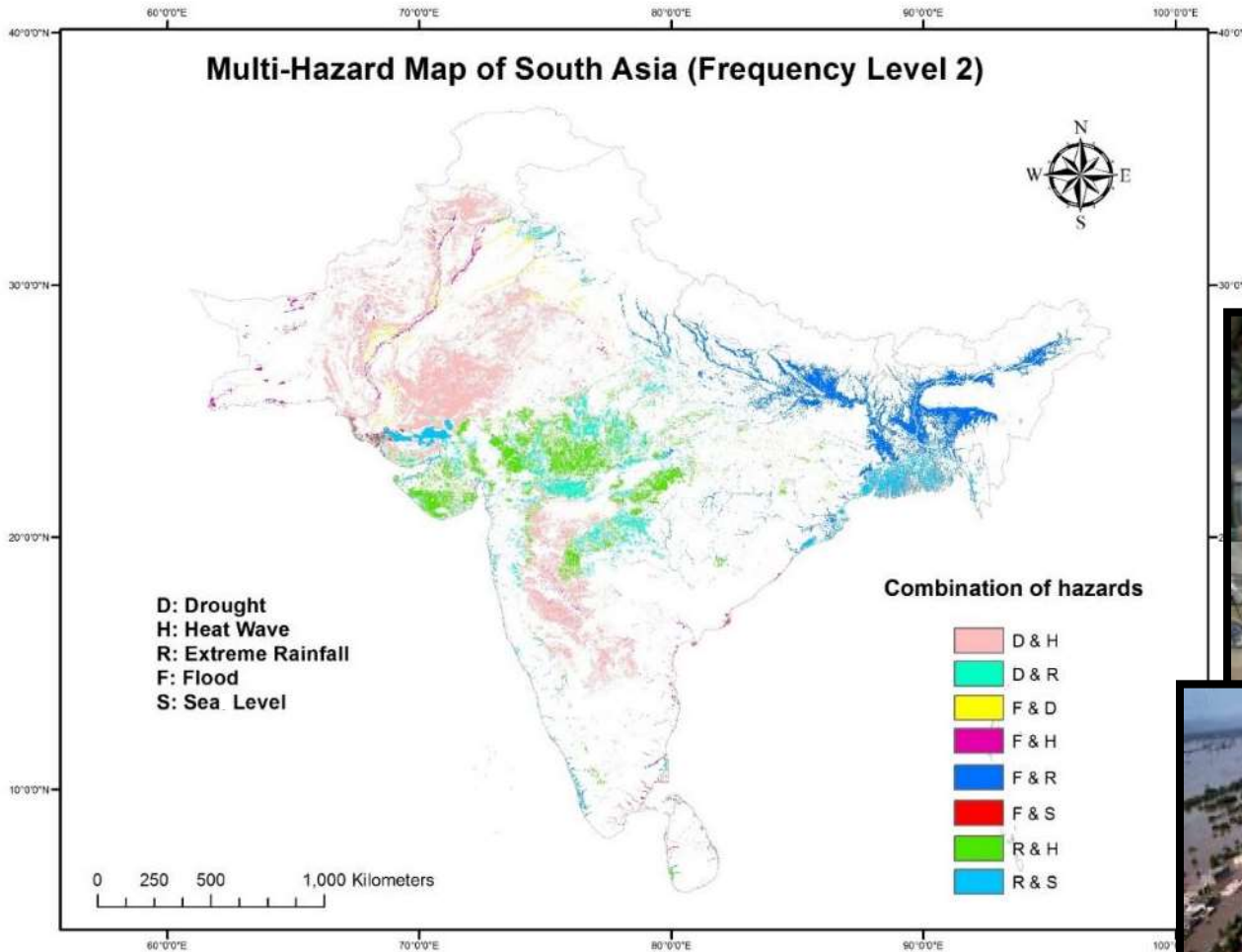
2012



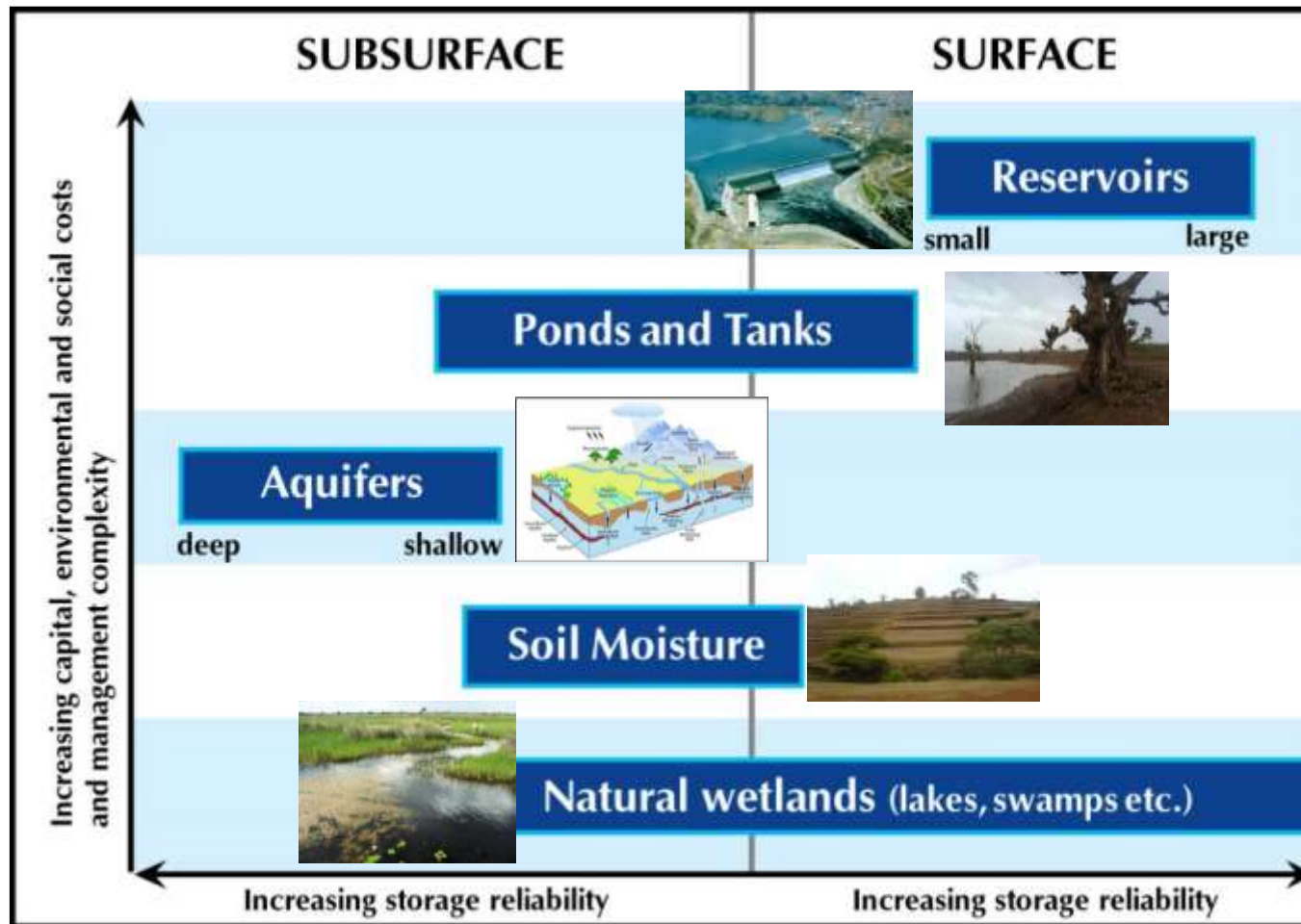
2014



Urban planner / manager: What type and level of protection is appropriate?



Planning agencies: Consider the full range of storage options



Source: McCartney and Smakhtin 2010

Water resources planner: rethinking storage

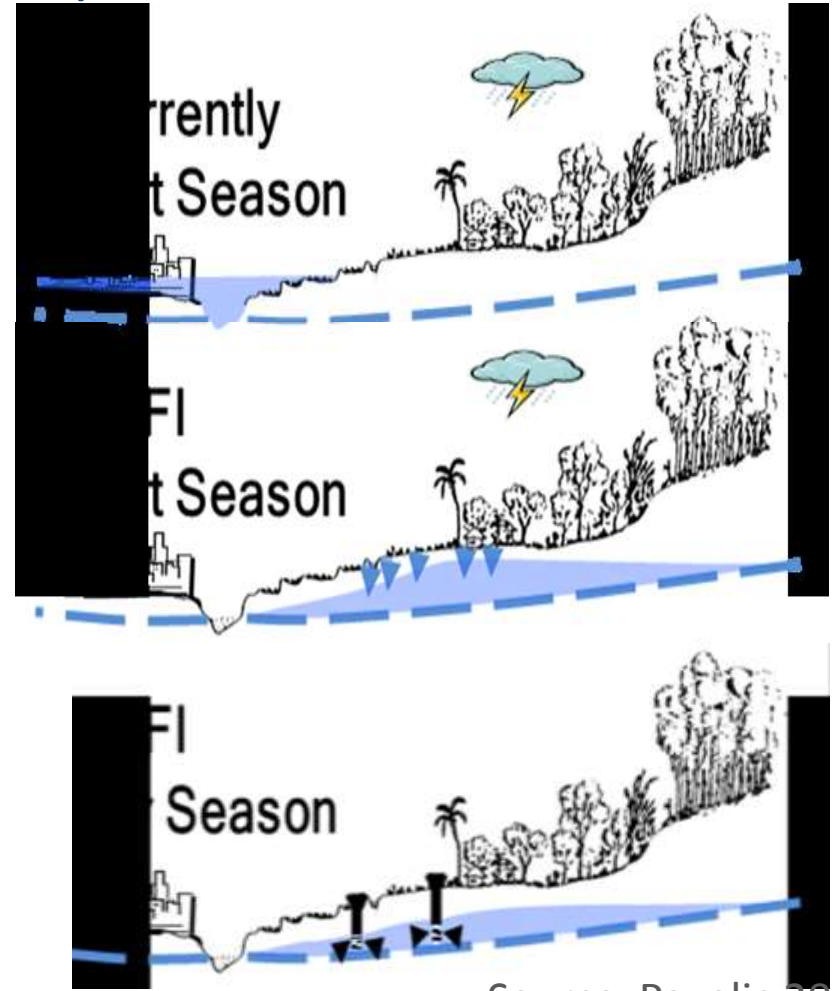
Underground 'taming' of floods for irrigation (UTFI)

Wet Season: Distributed upstream recharge of excess floodwater to groundwater

Dry Season: Groundwater withdrawal for dry season irrigation

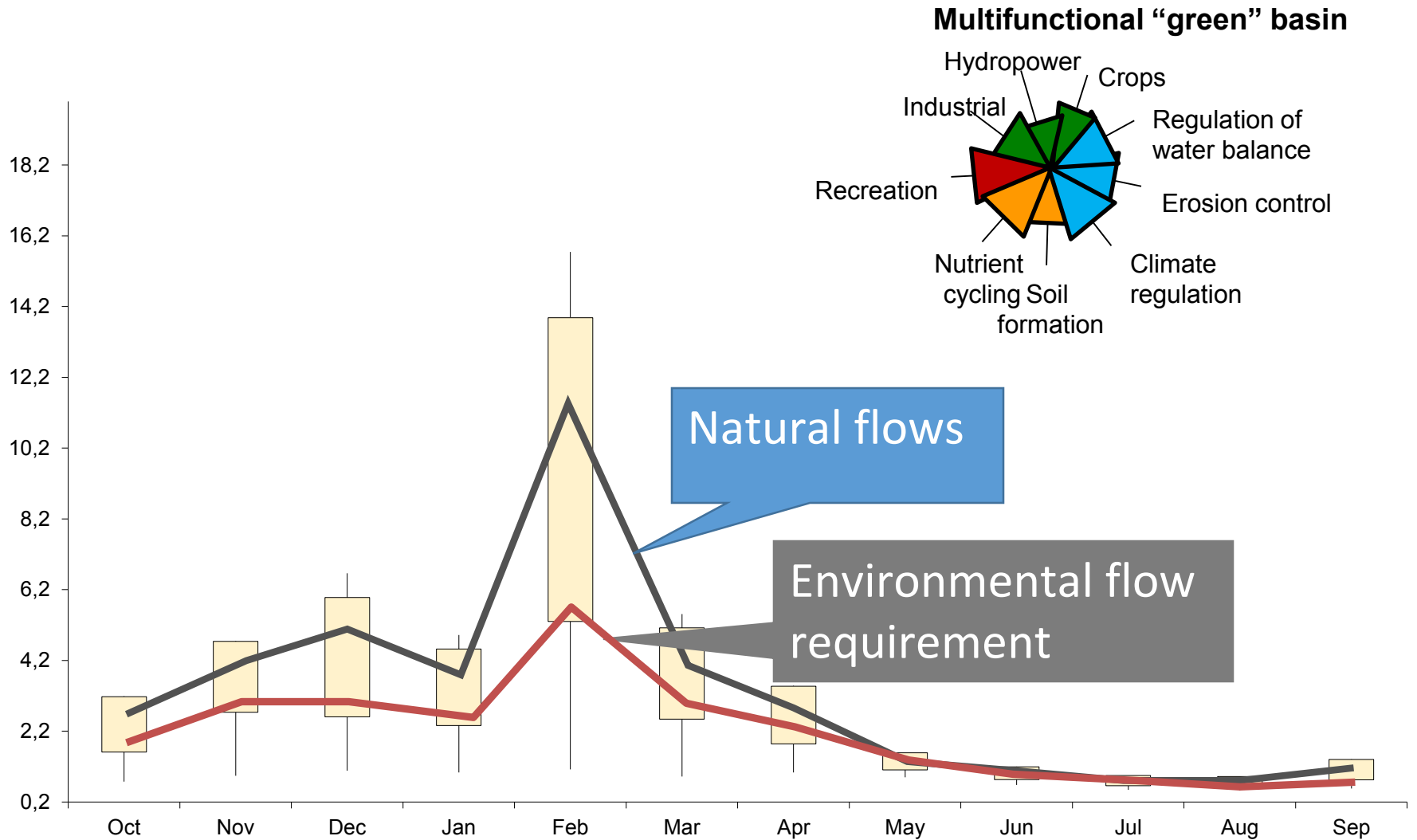
Benefits:

- *Urban:* protection of infrastructure / lives / livelihoods
- *Rural:* greater access to groundwater, increased agricultural production & livelihoods improvement

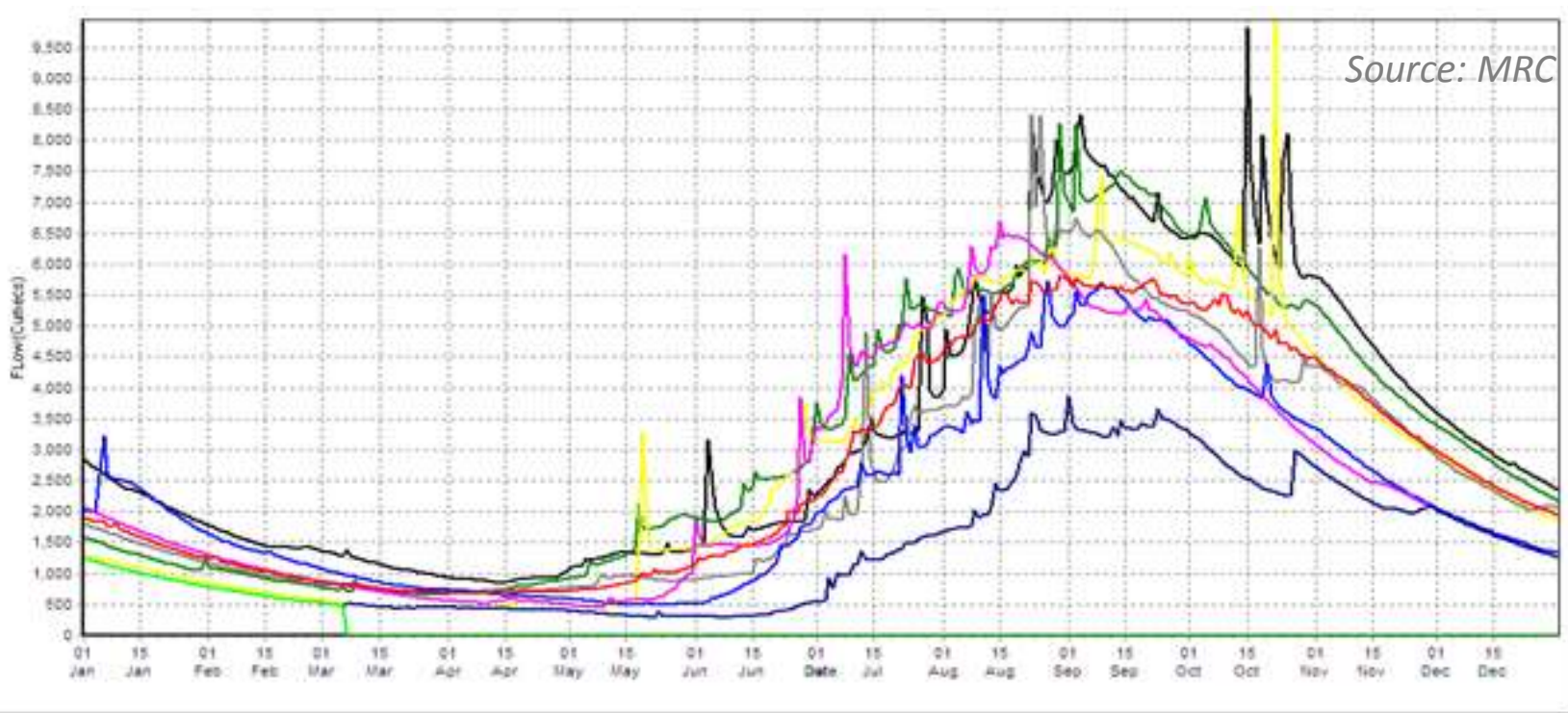


Source: Pavelic 2012

Environmental services: Maintaining natural variability



Transboundary manager: How is variability reflected in agreements?



- Percentage allocation
- Adaptation – ‘buffer’ storage
- Communication and consultation
- Cross-sector trade-offs

www.iwmi.org <https://wle.cgiar.org/>
<https://ccaafs.cgiar.org/>

