How to harmonize virtual water trade and future water management and policy dialogue

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RE-THINKING PARADIGMS: WATER AND FOOD SECURITY
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Premises

- My background: groundwater research in ma… preferential flow and colloid-facilitated c… and modelling of the same, to groundwa… s in Asia and other developing co… K, and recently integrating many a… ncerns of climate change, water …

- Little origina… ther qualified and diverse inputs/c… ebate

- … scientist effectively feed an …se on ensuring food security into the 21st

- E… tive debate: multifarious, complementary, coherent, timely, and appealing, and preferably also provocative

Food security - Who's food security?

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Alternative food pyramid

Degree of affluence of people/societies

Food as a pleasue

Food as a commodity

Food production as a wealth-generating livelihood

Food production in subsistence agriculture

Food for survival – as in emergency relief

Ref: Villholth, 2008

Background/backdrop

- A world of growing population, but more importantly a world of growing aspiration for higher living standard
- Not possible to 'park' poor people in the outskirts of civil society, leaving them to sustain themselves from mother nature
- Whatever solutions are there – they become increasingly complex (technologically and managerially) with a concomitant risk of bypassing/disregarding the poor
- Not only is it difficult to expand land and water resources to extend/increase food production, but importantly the quality of these media is surely and partially irreversibly degrading
- As problems grow, they tend to get controversial/politicized/ rejected and research offers less hope of solution
- Social and environmental problems today increasingly impact at global scales, imply that solutions need to be global as well

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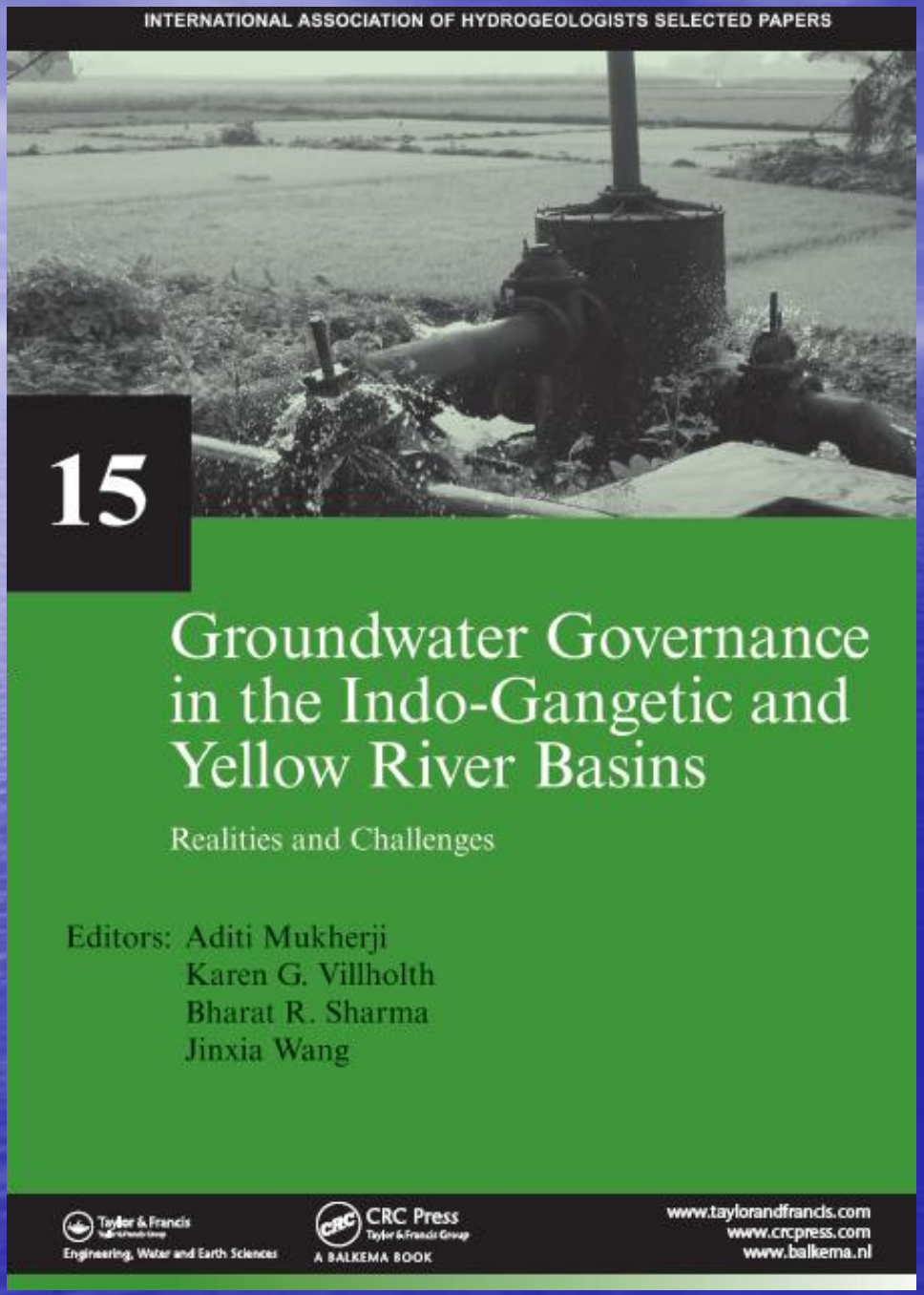
INTERNATIONAL ASSOCIATION OF HYDROGEOLOGISTS SELECTED PAPERS
15
Groundwater Governance in the Indo-Gangetic and Yellow River Basins
Realities and Challenges
Editors: Aditi Mukherji
Karen G. Villholth
Bharat R. Sharma
Jinxia Wang
Taylor & Francis
Engineering, Water and Earth Sciences
CRC Press
Taylor & Francis Group
A BALKEMA BOOK
www.taylorandfrancis.com
www.crcpress.com
www.balkema.nl

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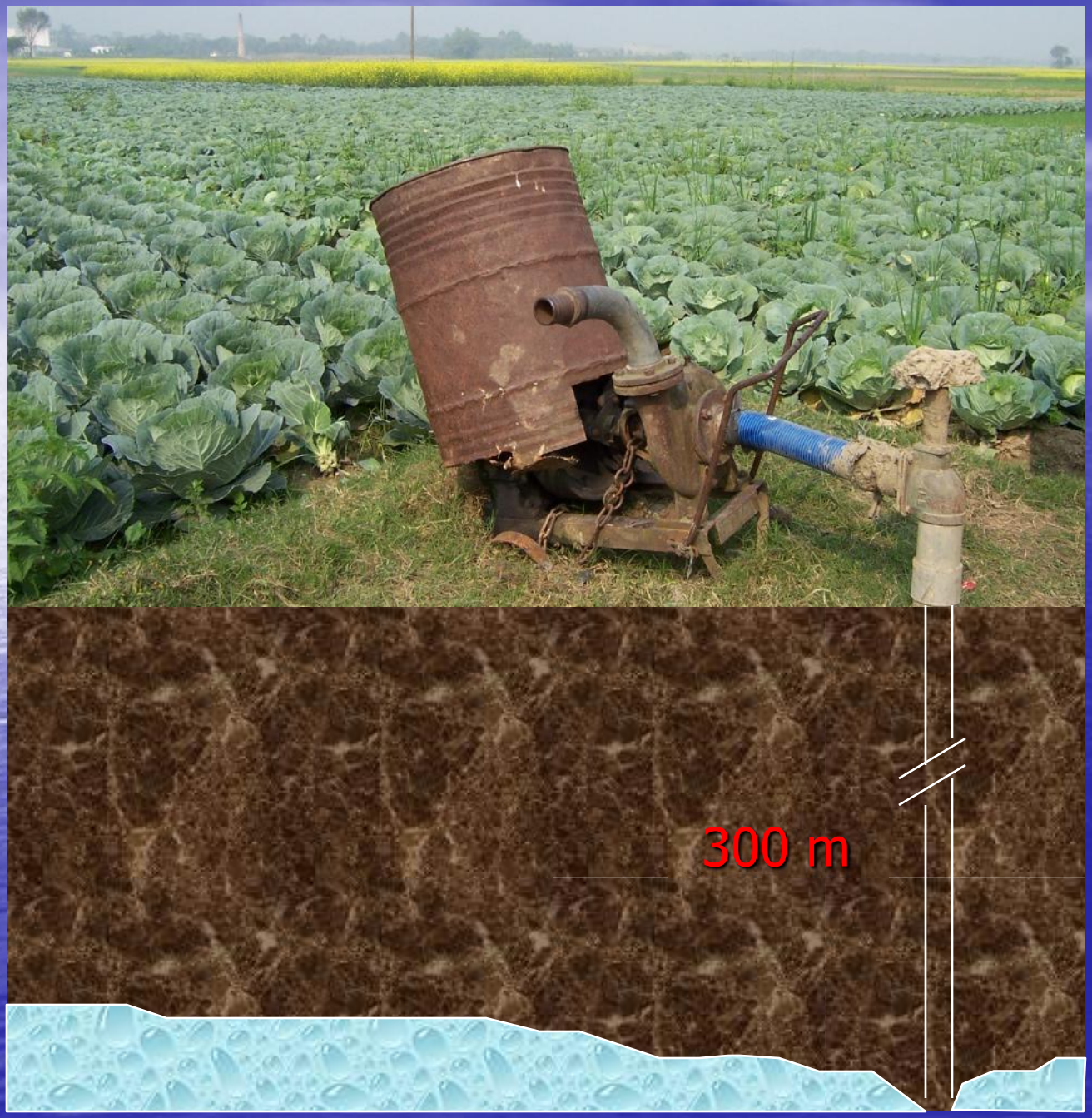
In India, China, Bangladesh and Pakistan one billion people depend on GW for agriculture, mostly small-holders

The hidden drought



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GW has surpassed SW for irrigation in India

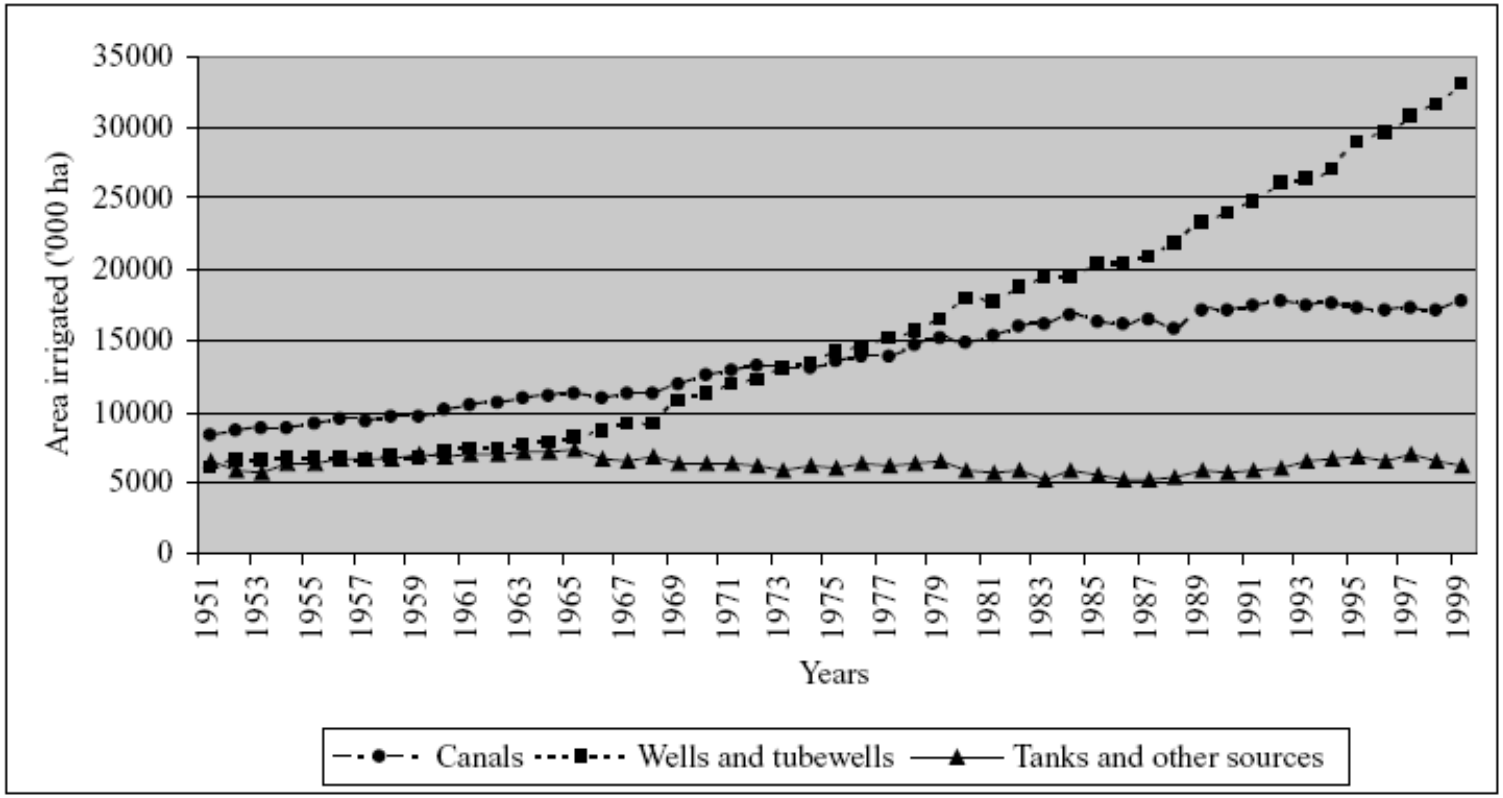

Figure 1. Growth in area under different sources of irrigation, 1951–1999.
Source: Department of Agriculture and Cooperation, Ministry of Agriculture, India (several years) (http://agricoop.nic.in/statistics/sump2.htm) downloaded on 20th January 2007.

Wells

Canals

Tanks

Ref: Rama Mohan, 2009

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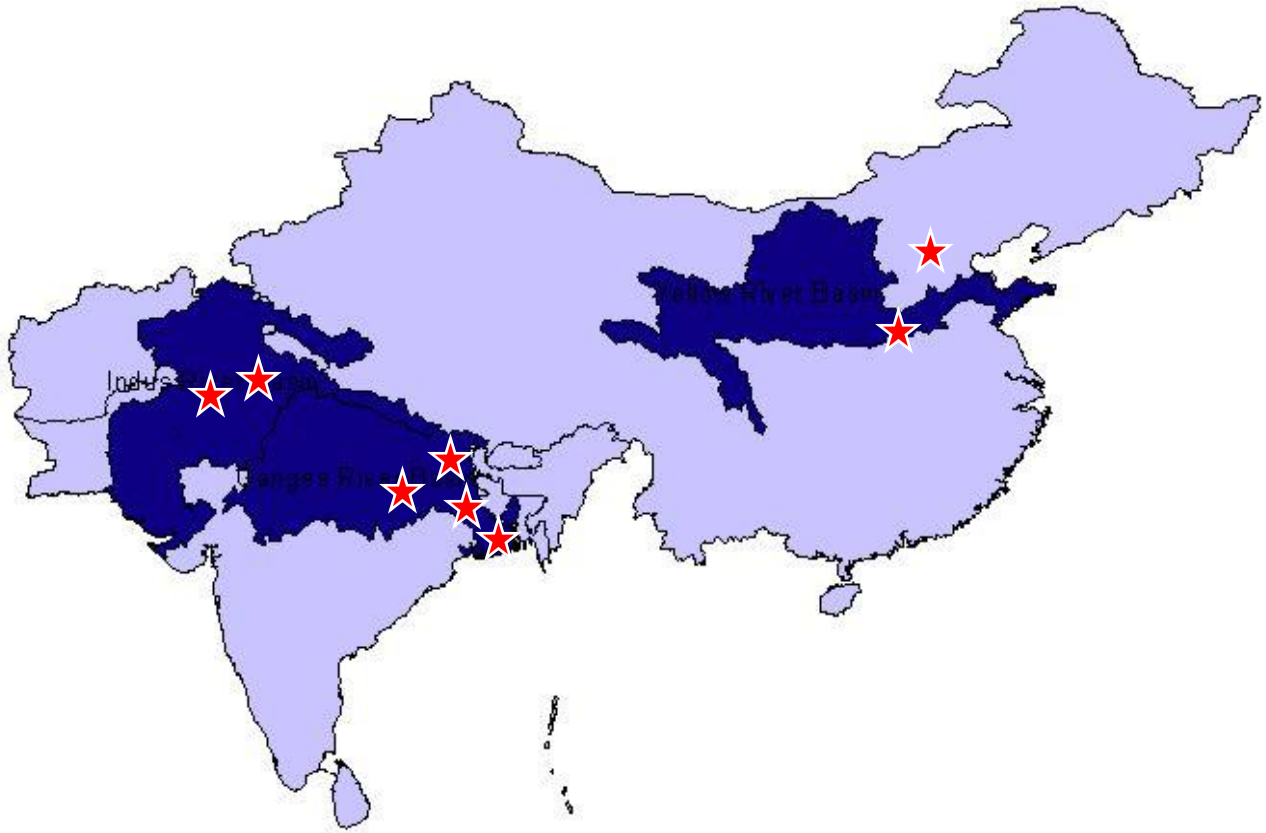
Study sites within Indo-Gangetic and Yellow River Basins

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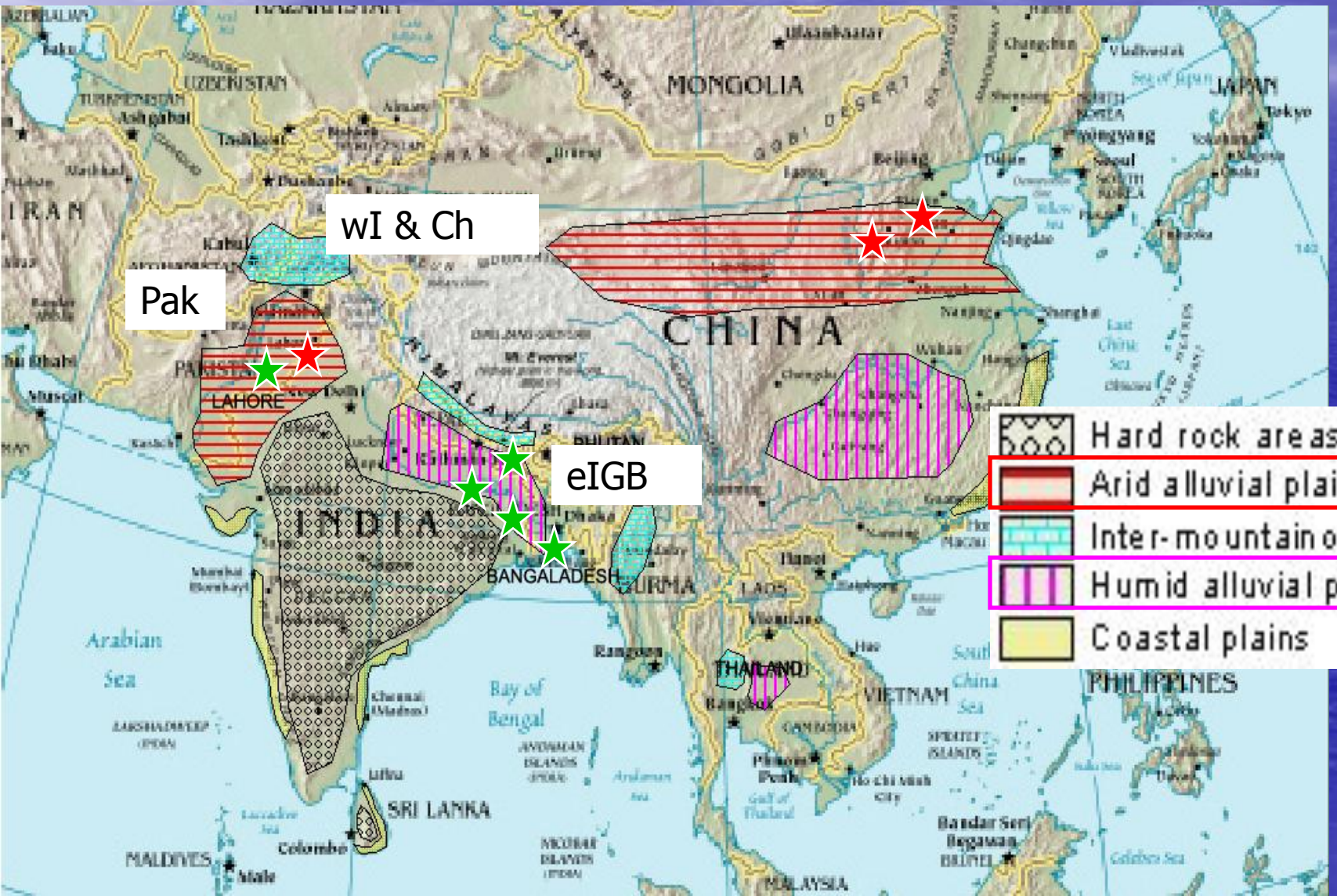
Groundwater zones of IGB & YRB



Agronomic perspective

	wI & Ch	eIGB	Pak
Major crops	Wheat, maize, rice	Rice, wheat, mustard, jute, banana, maize, vegetables	Rice, wheat, sugarcane, cotton
Cropping intensity	156-179	146-250	160
Crop yields kg/ha	Wheat: 6484 Maize: 6427	Wheat: 2028 Rice: 3071	Wheat: 2600 Rice: 2750

Attainable wheat yield: 3600 kg/ha (FAO, 2002)

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Resource perspective

	wI & Ch	eIGB	Pak
Rainfall	550-768 mm/yr	1232-2000 mm/yr	375-650 mm/yr
Fraction of irrigation from GW	68 -100 %	72 - 100 %	74 - 79 %
GWL mbgl	23-300 m	< 10 m	4-15 m
GWL decline	0.9 - 2.0 m/yr	~0 m/yr	0.1 m/yr

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Economic, energy and equity perspective

	wI & Ch	eIGB	Pak
Energy source	Electricity, subsidized	Diesel, not subsidized	Diesel & elec., not subsidized
Share of irrigation cost in total cost	12 %	7-32 %	22-33 %
Capital cost of well, USD	2460-5700 USD	15 - 570 USD	40-100 USD

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Coping strategies

wI & Ch	eIGB	Pak
• Crop diversification • Install deeper wells • Efficient pumps • Simple water saving techniques • Income diversification • Migration	•Rain-fed farming •Leasing out land to tube-well owners •Use of kerosene to replace diesel •Rental market for pumps •Use of fuel-efficient Honda pumps •Use of plastic pipelines for conveyance •Diversify livelihoods and work for larger farmers	•Conjunctive use of GW and surface water •Farmers crop intensively and grow more water saving crops or cash crops

Virtual water

- Increasingly on the global water research agenda, and slowly also on the global water policy agenda
- Inadvertently, virtual water will play a greater role in food trade – simply as a function of increasing water scarcity and the disparity of water availability between countries and regions of the world
- Virtual water trade will not inherently solve the problems
- Mechanisms/barriers will likely persist to hinder loss of priviliges of wealthy nations
- Need for research: to put figures on flows and values, to stress the consequences, and to advocate for more transparent trade practices that take into account the larger scale re-distribution of water and the ethics involved

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MAR - managed aquifer recharge

- A new mantra to recover over-exploited and degraded aquifers
- Advocated strongly at the IAH conference in Hyderabad recently
- Gujarat representatives argued that their GW problems could be solved with MAR
- However, the consequences in terms of technological feasibility, investments, environmental impacts and social tensions were not raised as an issue

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CSR – another option for addressing optimal water use

- Easier to control corporations than consumers
- Linked to virtual water and global value chains
- Delicate balance between self-promotion and 'green-washing'
- What check and control mechanisms are there?

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Let's revive Greenpeace

- Layman or professional watchdogs to check and balance corporate and multi-national companies' behavior

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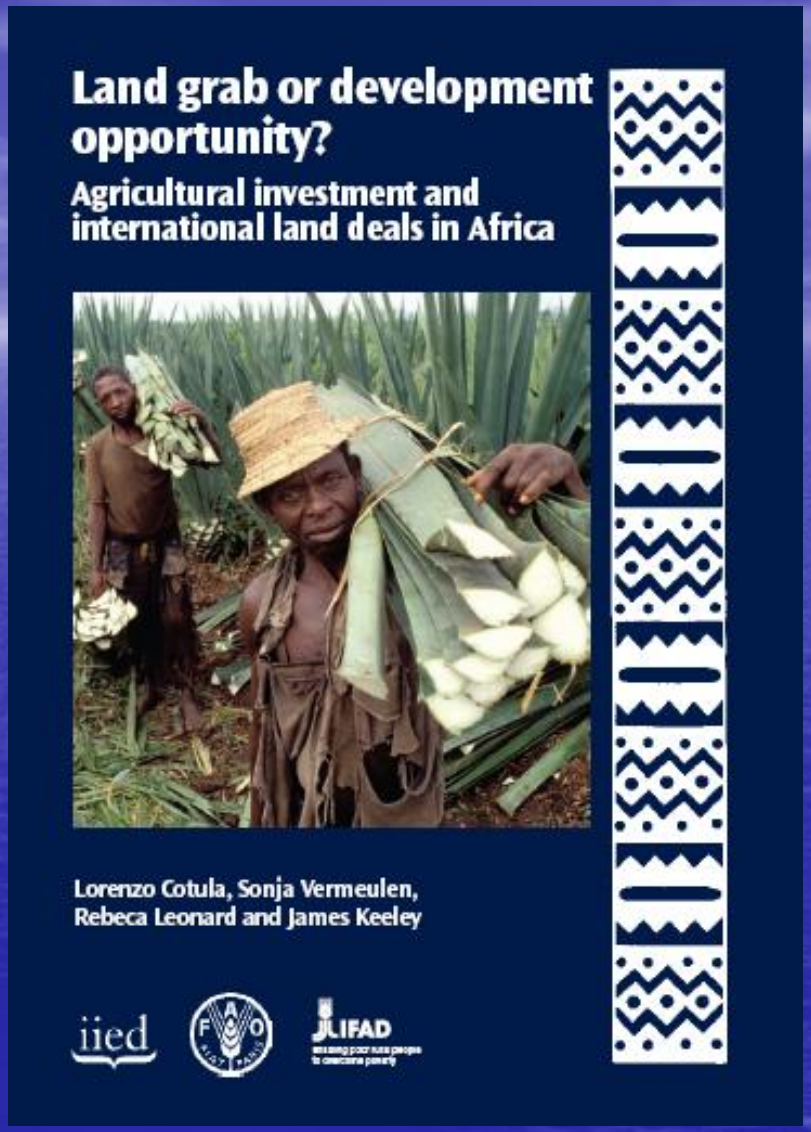
Land grapping

- An example of the complex issues at hand
- Support to productivity gains and local development or neo-colonialism?



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Technology fixes or eco-agriculture?

- A wide spectrum of farming systems:
  - Indigenous methods
  - Small-holder farming with input of technology
  - Large-scale intensive farming
  - Irrigated – rainfed - conjunctive

New challenges

- Food (and water) for disasters
- Migration

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What we need to do as researchers

- Think out of the box
- Understand the wider contexts of the problems and solutions we investigate
- Understand/add to the contemporary jargon and use it to drive agendas that fuel more holistic and sustainable pathways and policies
- Highlight the food-water nexus, but understand that other factors are at play and constraining general and just development
- Get a role in international trade negotiations

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Conclusions

- Poverty is a constraint for global development, not only an impediment in the respective countries. Hence, we need global solutions, built on solidarity
- Crop productivity increases are critical to meet the food gap. However, water scarcity is not always the constraining factor
- Virtual water is a very important concept, tool, and lever for increasing political focus on water and food linkages, trade options and transboundary environmental footprints
- We, as researchers, need to dare to enter into more controversial policy debate, based on our professional backgrounds and trying to drive for more sustainable/transparent solutions.

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Thank you!

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