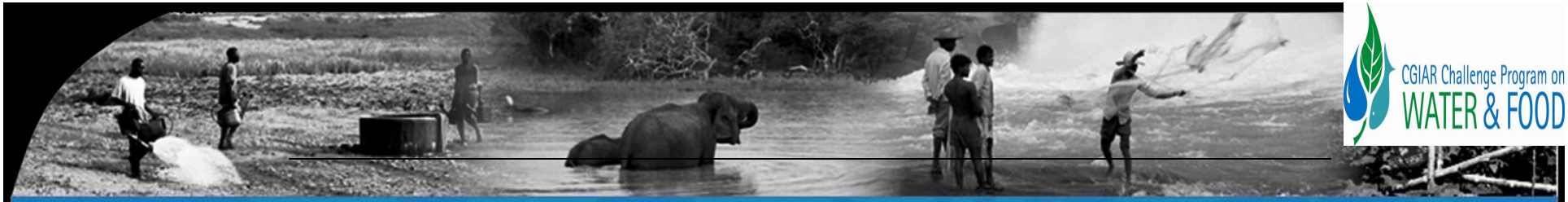


What ails Indian Agriculture?

A Reality Check on Our Irrigation Policy

Tushaar Shah
International Water Management Institute
www.iwmi.org

Highlights of the Analysis

- History of Indian irrigation: Three Phases and a Turning Point.
- Since 1975, Indian agriculture has emerged as the world's largest user of groundwater to grow food and fibre.
- The groundwater boom is fired by population pressure on land and demands of intensive diversification of farming.
- India and Pakistan together lost over 5 million ha of canal irrigated areas; tubewells are canibalizing flow irrigation.
- Investing in flow irrigation under BAU is throwing good money after bad. Yet, 11th FYP has allocated nearly US $ 50 billion to these..
- India's irrigation challenge is one of managing its sub-continental aquifer systems, a vast reservoir we have left unmanaged.

Highlights of the Recommendations

- Ensure at least 15 irrigations of 800-1000 m^3/ha JIT, on-demand; and Indian agriculture will boom; this is possible but not by canals and dams.

- Small-farming in the north and east is facing an energy-squeeze from rising diesel prices. Investing in rural electrification can create more irrigation here than public irrigation.

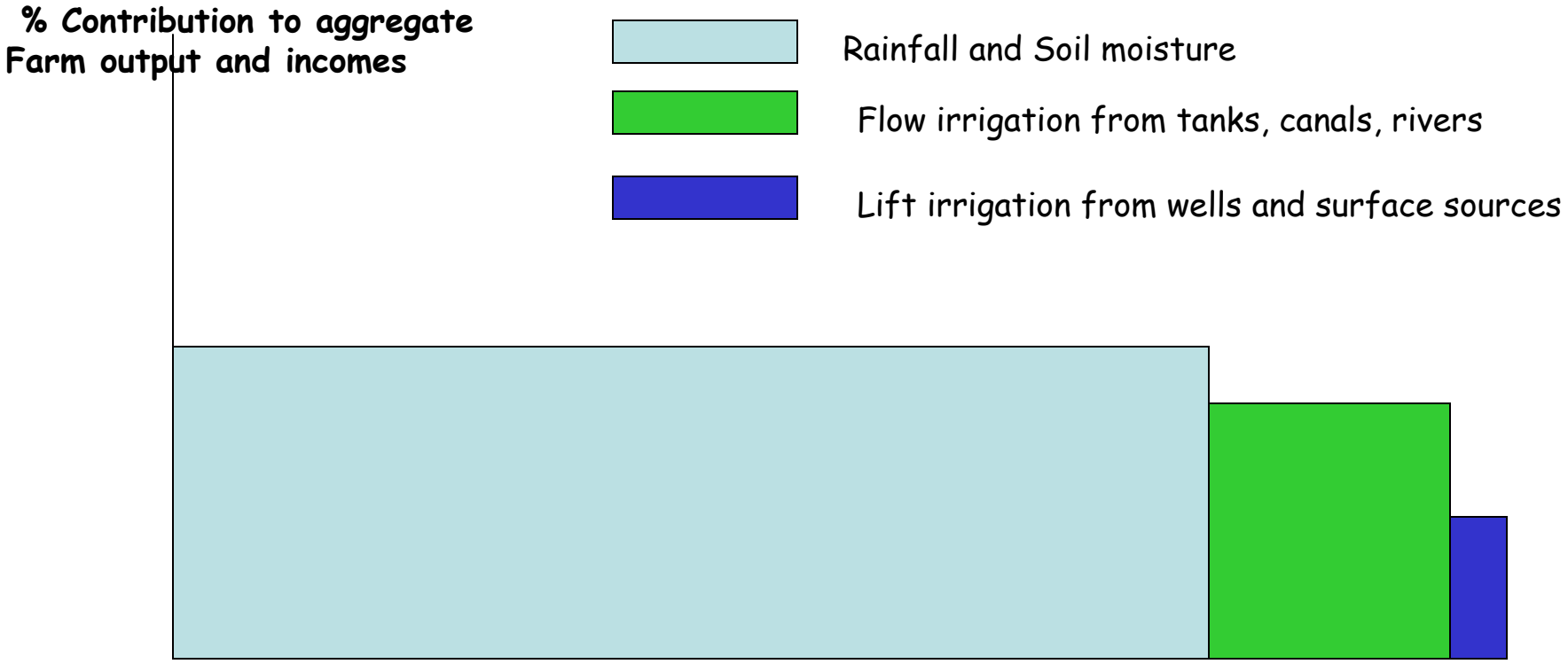
- In west and south, energy-squeeze takes the form of an invidious electricity-groundwater nexus that is imposing a huge cost on entire rural society. Jyotirgram in Gujarat is the answer.

- In hard-rock areas, 65% of India, groundwater recharge has to be the mantra for rejuventating agricultural economy.

- Reservoir-based systems need to be reinvented; consider retrofitting some of them to deliver piped, pressurized irrigation.

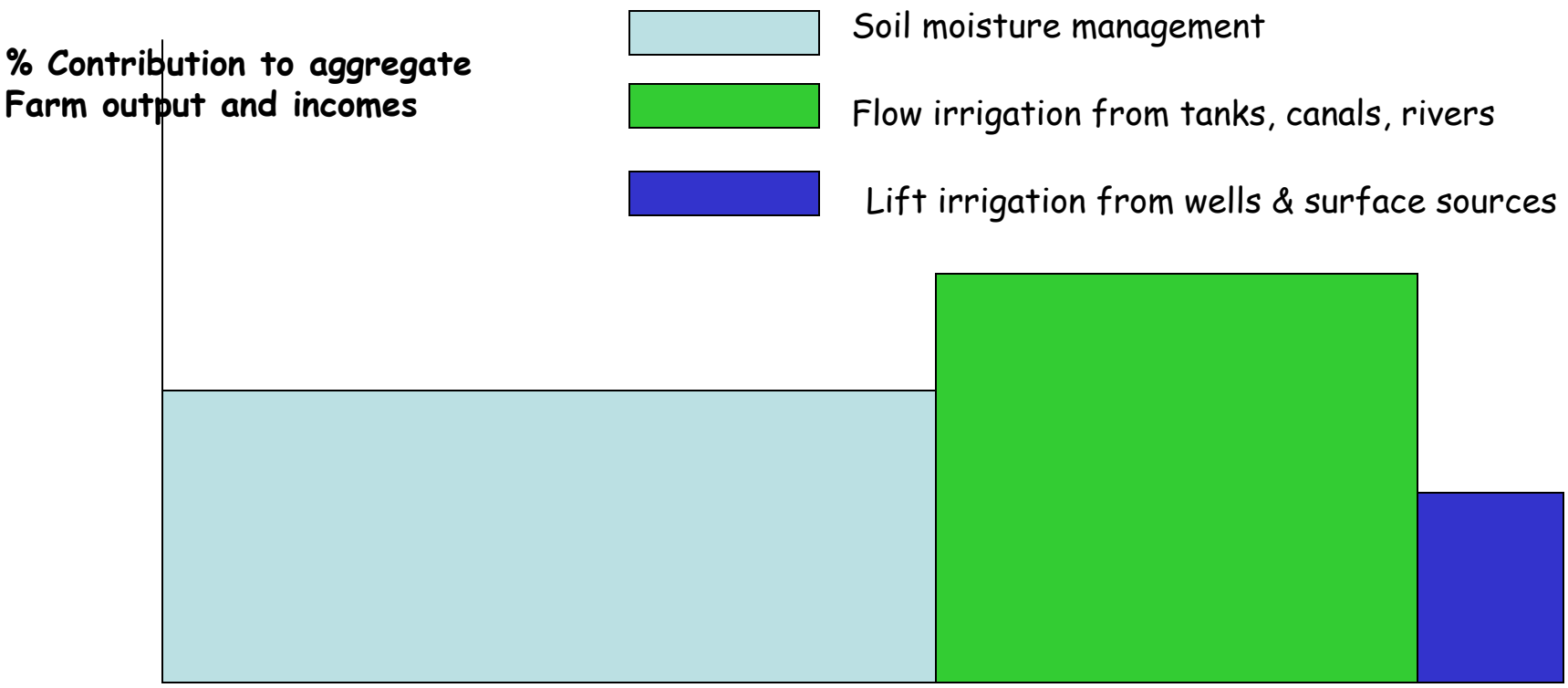
Evolution of Indian Irrigation: Era of adaptive irrigation-upto 1830

- ***Community was the unit of irrigation management***



Evolution of Indian Irrigation: Era of canal construction-1830-1970

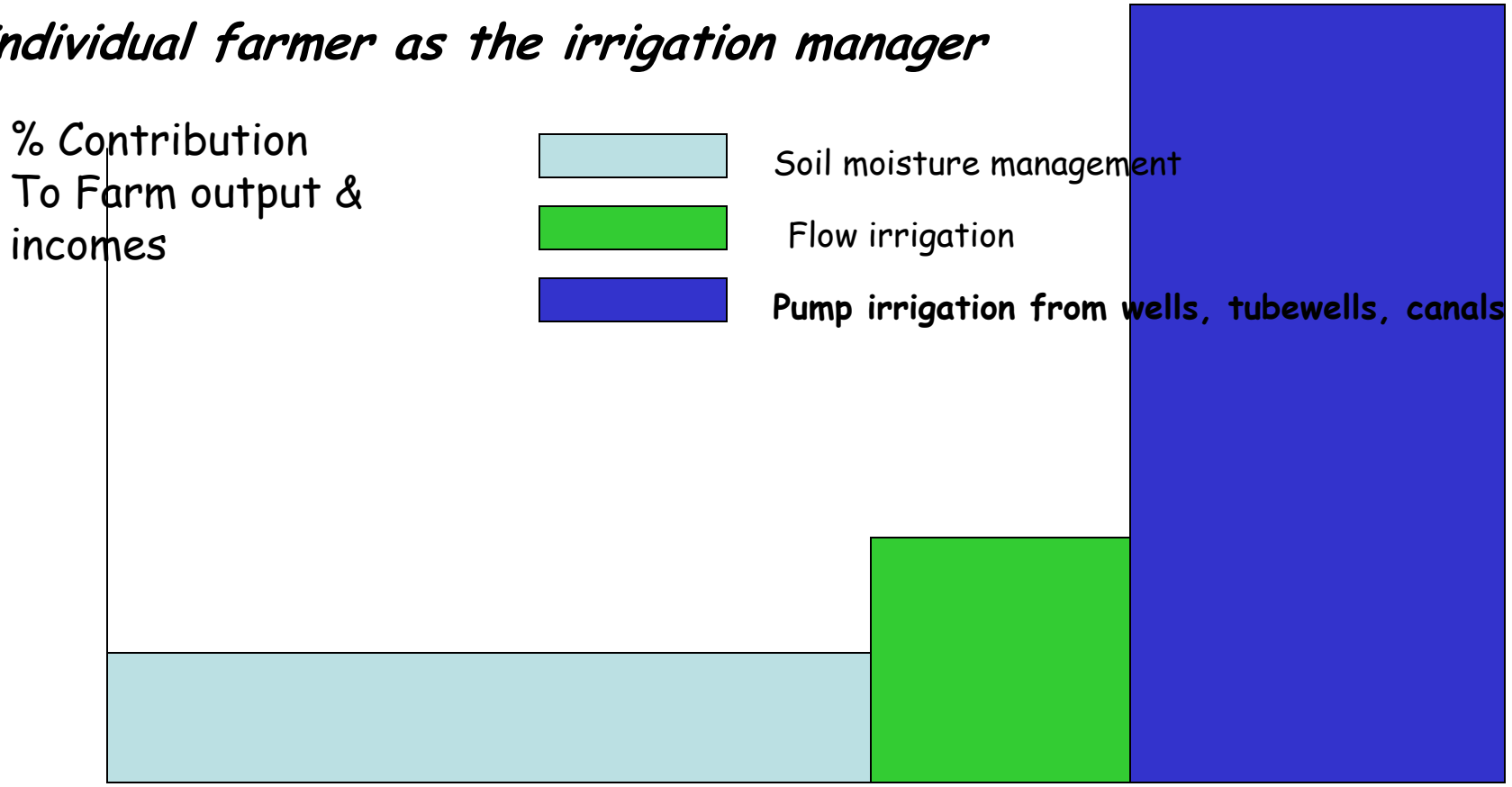
- ***State emerged as the architect, builder, manager of irrigation***



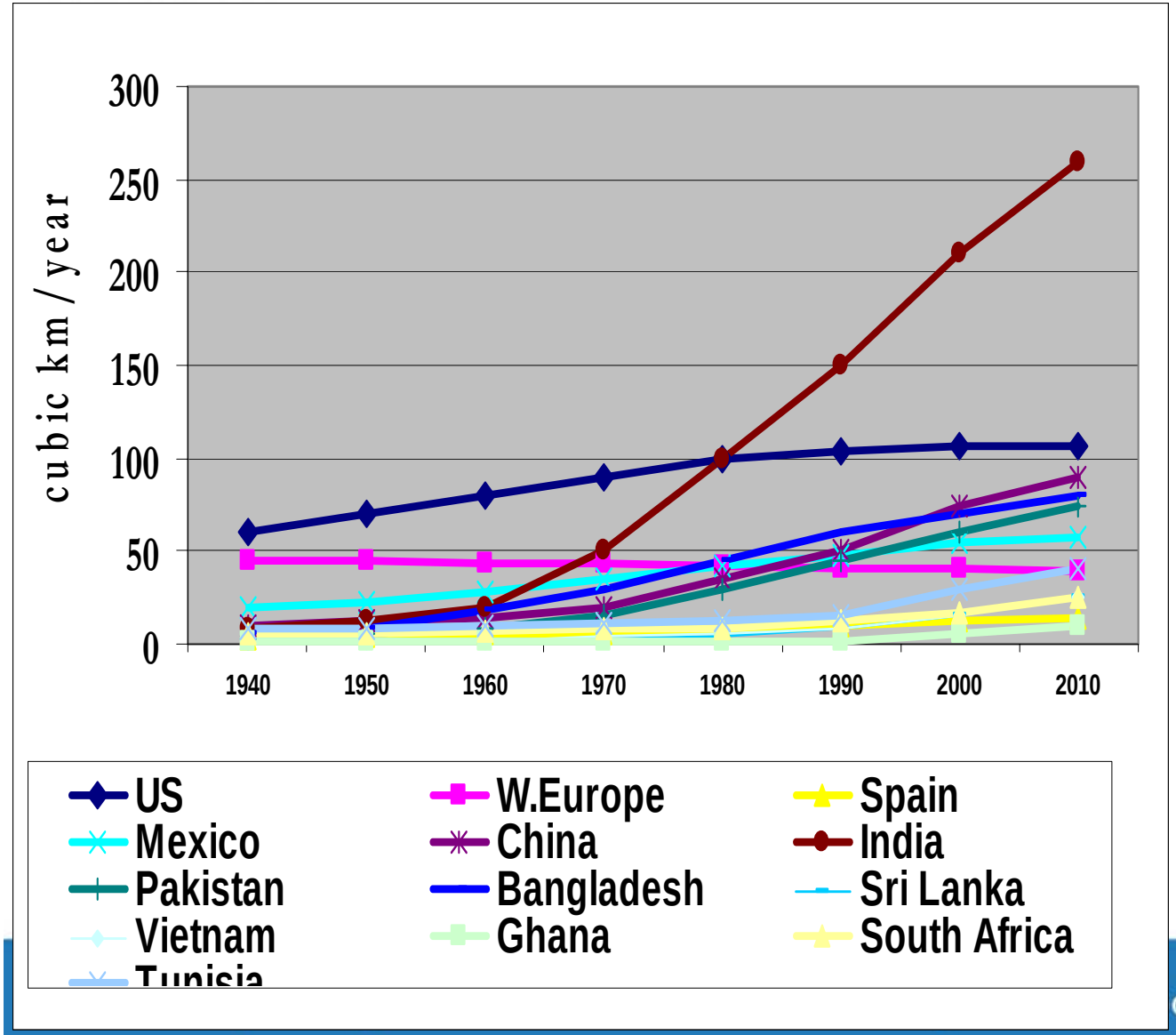
% water consumptively used in agriculture

Evolution of Indian Irrigation:
Era of atomistic pump irrigation-1970-todate

Individual farmer as the irrigation manager



India is the world's largest user of groundwater in agriculture in the world.



India has over 20 million irrigation wells. We add 0.8 million/year.

Every fourth cultivator owns an irrigation well; non-owners depend on groundwater markets.

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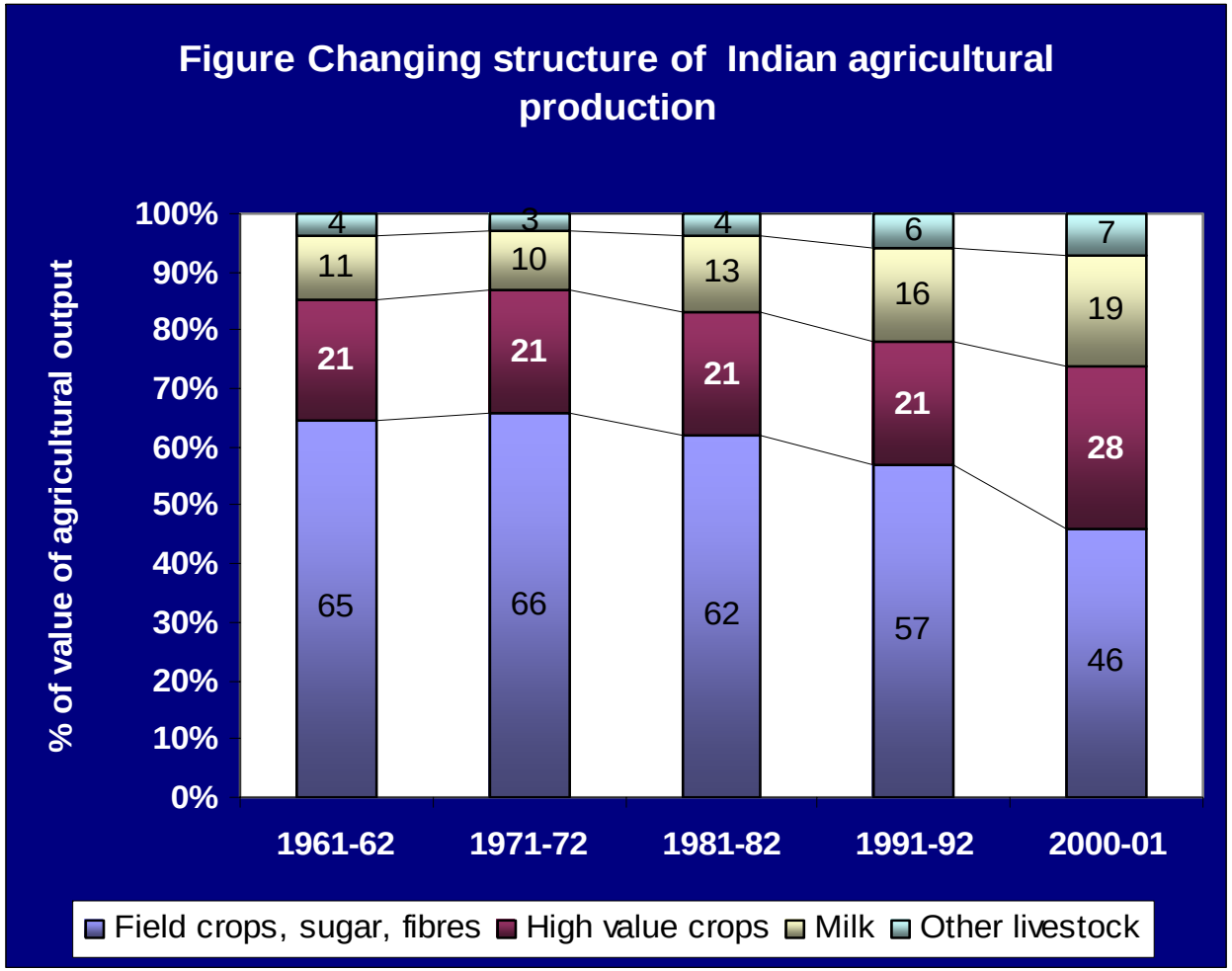
od, livelihoods and nature

Our irrigation planning is preoccupied with food grains; Indian farmer is diversifying in a hurry.



Canal and tank irrigated areas condemned to low-value crops unresponsive to precision irrigation.

Much diversification is Occurring outside Command areas (IFPRI).

Much diversification Requires small dozes of Year-round, on-demand Irrigation.

Value added farming Will expand with Waste-water irrigation and Groundwater.

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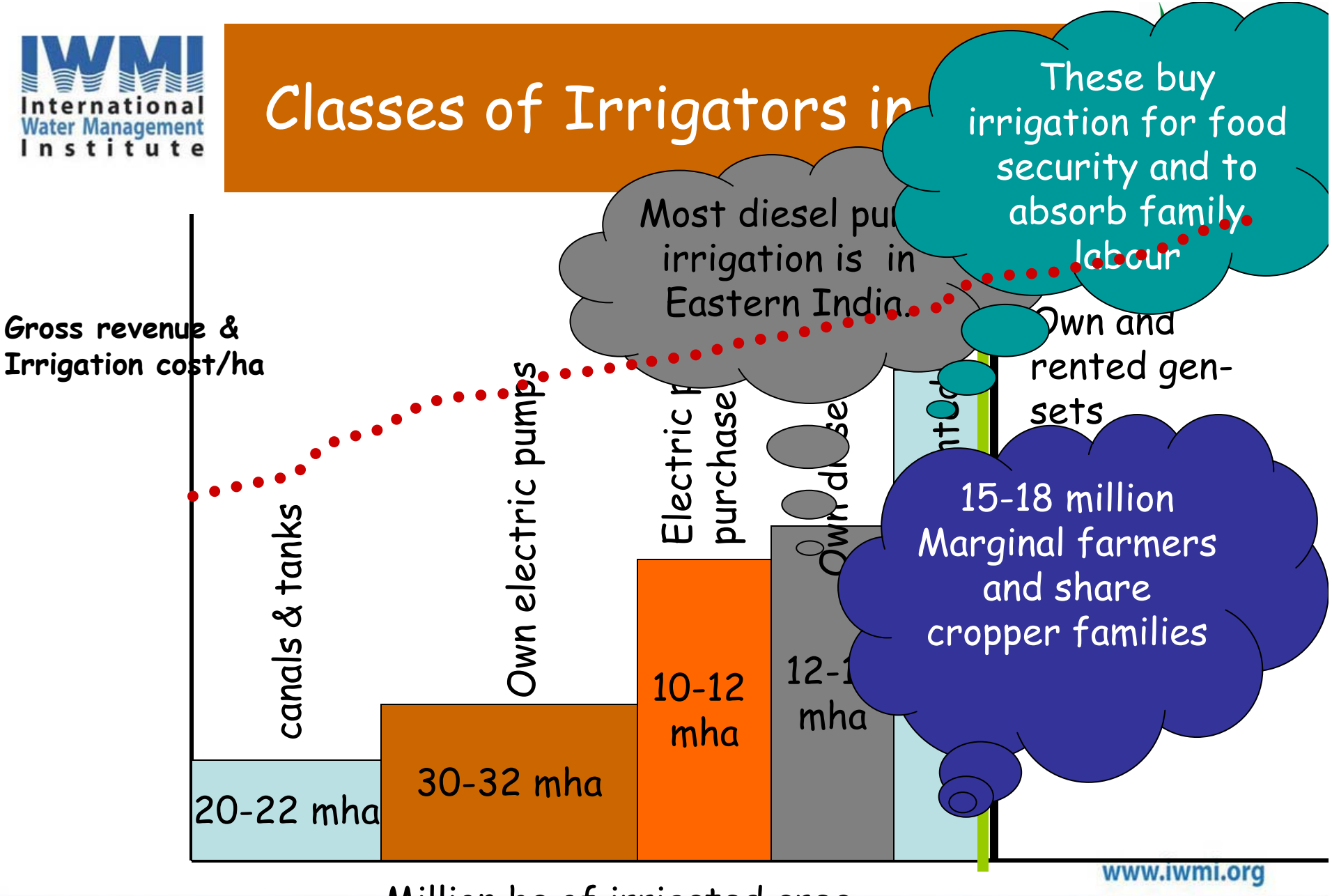
Improving water and land resources management for food, livelihoods and nature

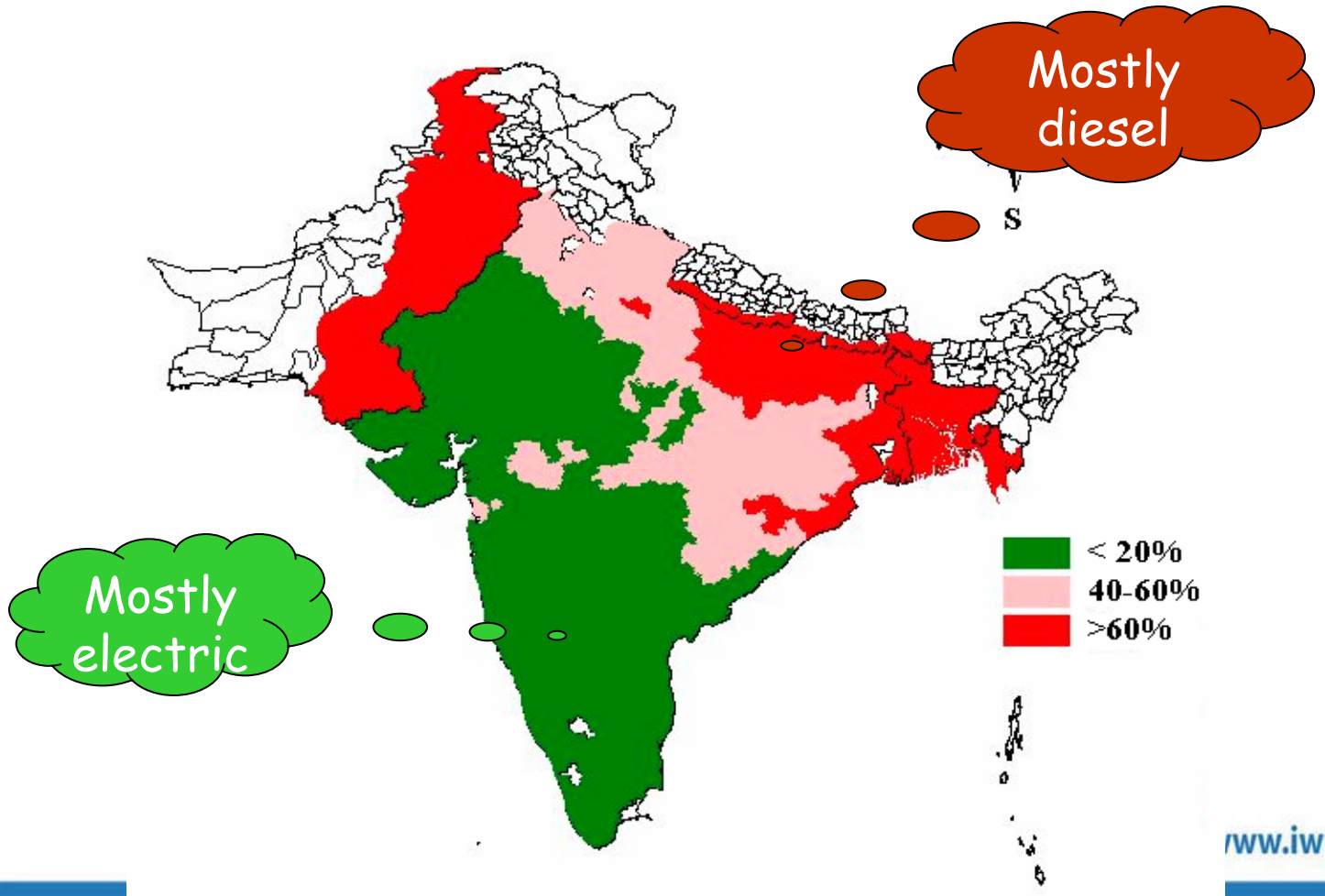
Classes of Irrigators in



Irrigation Challenge 1

In the Ganga-Brahmaputra basin, over 80% of irrigated areas are dependent on diesel pumps; rising diesel prices are hitting small-holder irrigation hard.

Energy Divide in South Asia's groundwater irrigation economy



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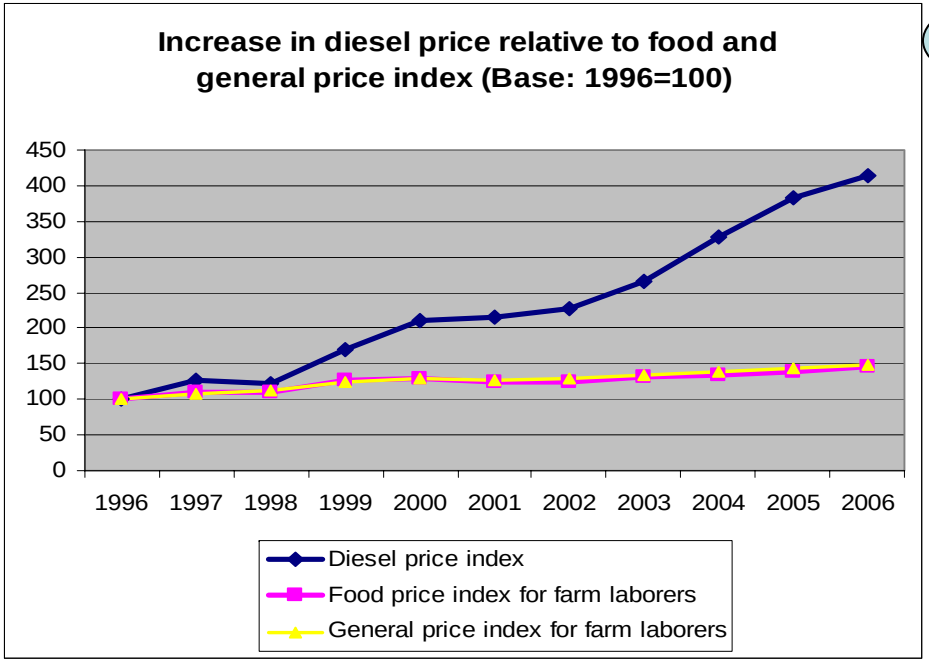
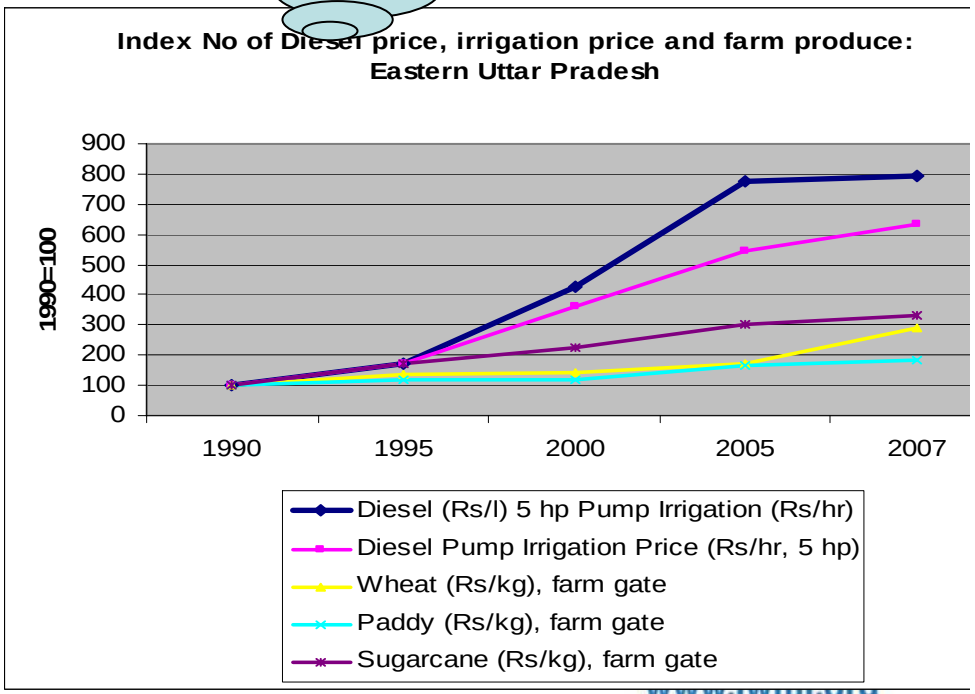
Rising diesel price is driving out small-holder irrigation in Ganga-Brahmaputra basin..

Rural electrification;
Chinese pumps;



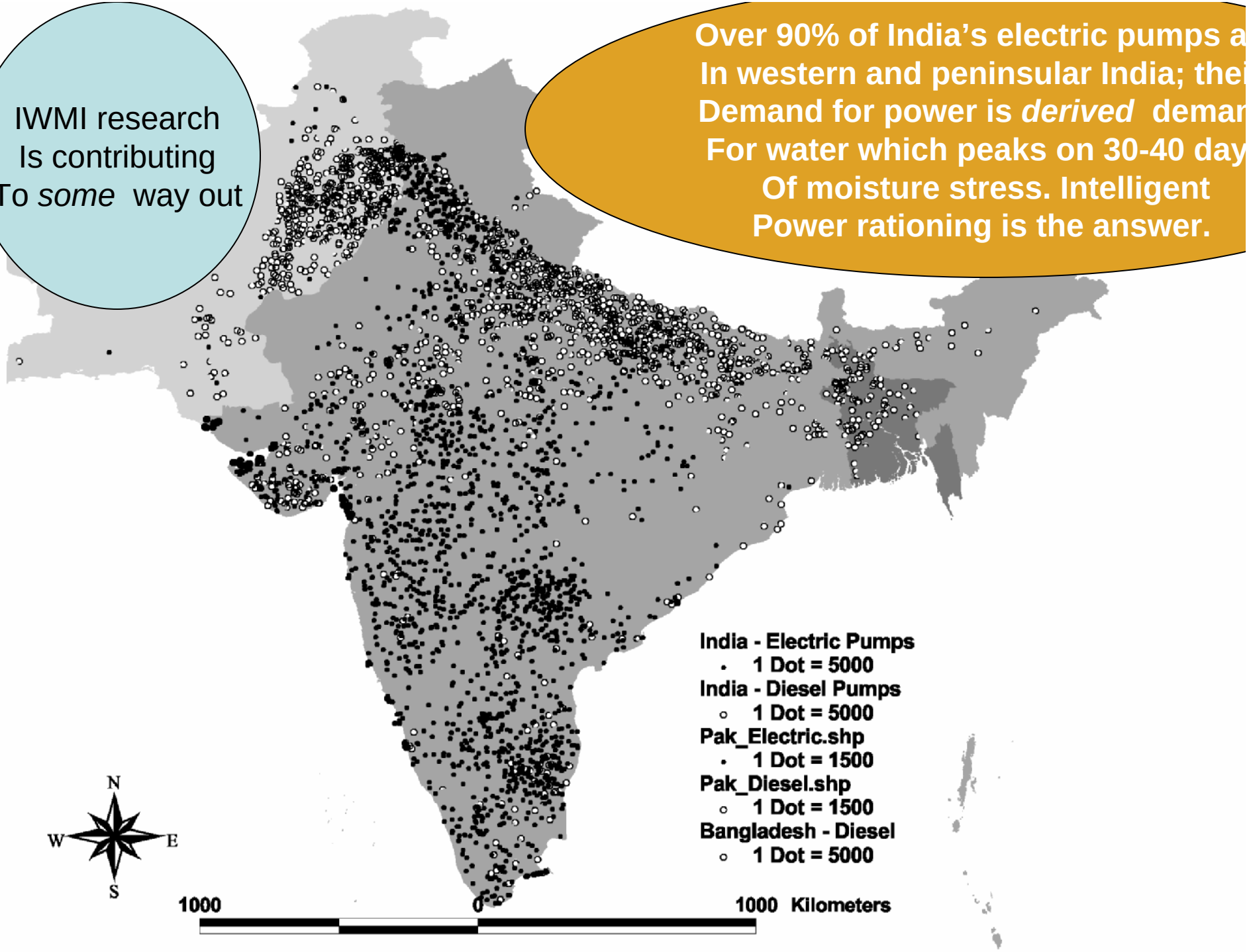


Irrigation Challenge 2

In western and peninsular India, the invidious electricity-groundwater nexus is the big challenge.

IWMI research
Is contributing
To *some* way out

Over 90% of India's electric pumps a
In western and peninsular India; thei
Demand for power is *derived* deman
For water which peaks on 30-40 day
Of moisture stress. Intelligent
Power rationing is the answer.



Rural Gujarat Rewired under Jyotirgram Yojana

Figure 1 a Electricity Network Before

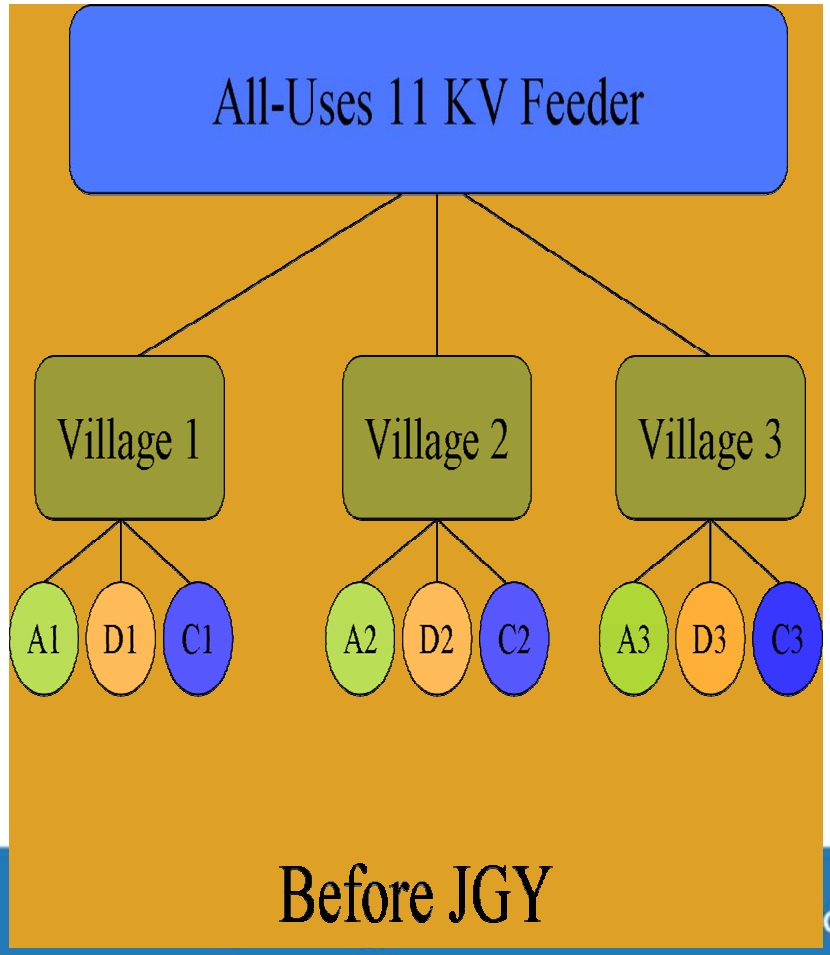
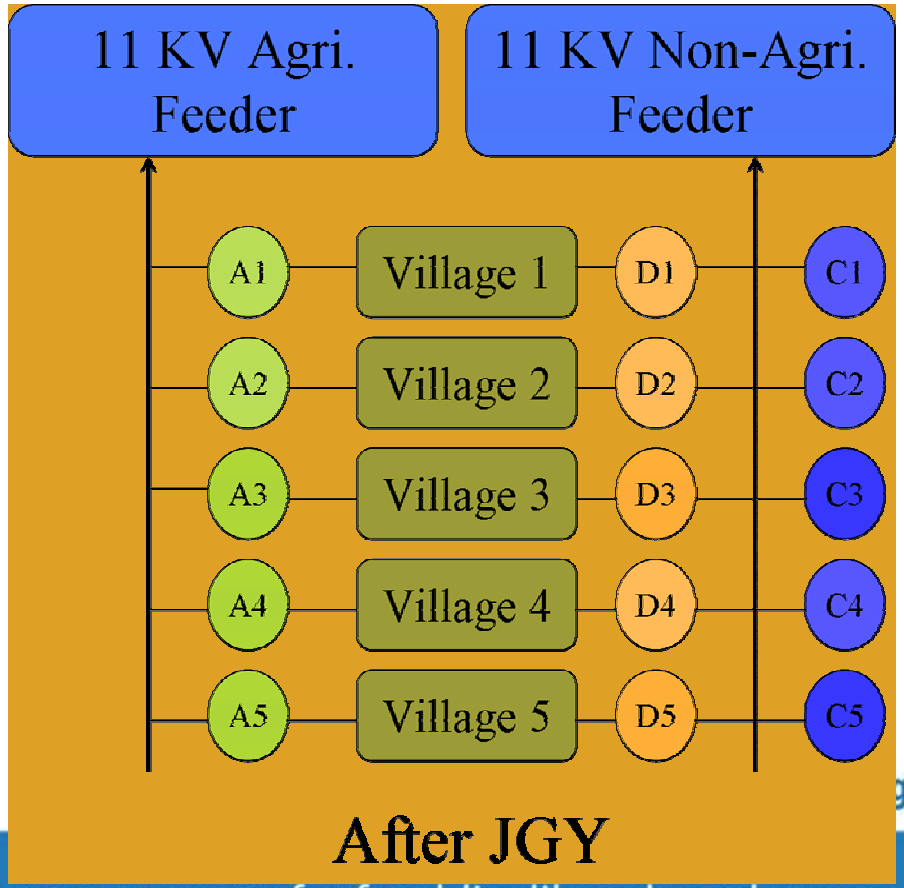


Figure 1 b Electricity Network after



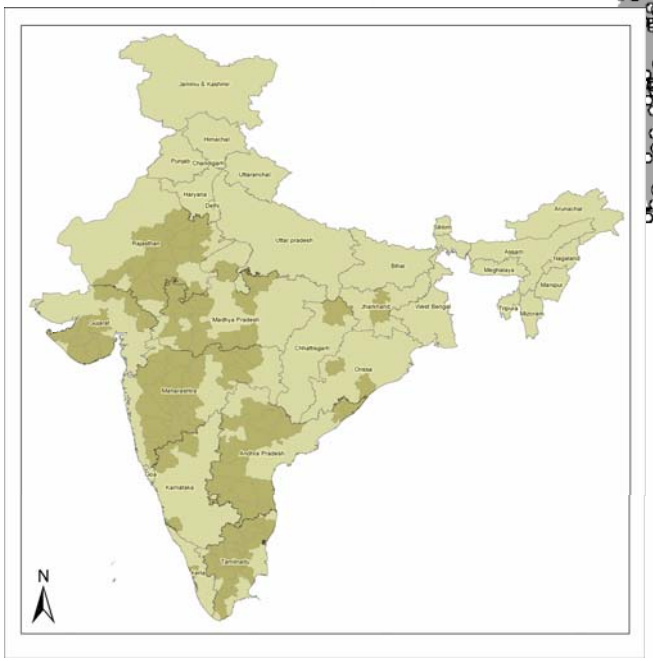
ces management for food, livelihoods and nature

Impact of Jyotirgram Yojana: Perceptions IWMI collaborative Study

Stakeholder group	Positive (+)/Negative (-)
Rural housewives, domestic users	+++++
Students, teachers, patients, doctors	+++++
Non-farm trades, shops, cottage industries, rice mills, dairy co-ops, banks, co-operatives	+++++
Pump repair, motor rewinding, tubewell deepening, etc	-----
Tubewell owners: quality and reliability of power supply	+++
Tubewell owners: No. of hours ofpower supply	---
Water buyers, landless laborers, tenants	-----
Groundwater irrigated area	---

Irrigation Challenge 3

In hard-rock areas of peninsular India, groundwater recharge is the big answer; and some 10 million large dug wells can be a major vehicle for farmer-participatory recharge movement.



Western and Southern India have 10 millio
Dugwells. Many are out of use but are
Excellent recharge structures.

India - Dug Wells
- 1 Dot = 5000

India - Shallow Tu
- 1 Dot = 5000

Bangladesh - Shallo
- 1 Dot = 5000

Pakistan - Shallow Tube We
- 1 Dot = 1500

100 over-exploited
Hardrock districts alre
Have 7-7.5 million open
That can be readily
used.

Irrigation Challenge 4

India has built some 200 billion m^3 of surface storage which is proving a dead-eight. It irrigates only 10-12 m ha while the same amount of groundwater irrigates 5 times more.

We need to stop throwing good money after bad before finding out how to get the most out of these investments.

Retrofitting canal systems as piped systems delivering pressurized irrigation needs to be considered.

Reinvent Reservoir Irrigation Systems

- Reservoir and canal systems

- Canals use up 4-7% of command area
- Can not deliver water JIT, on-demand
- Can not deliver pressurized irrigation
- WUAs, private participation unattractive due to lack of water control
- Canal systems are reduced to recharge role; Bhakra command irrigates 75% by tubewells; in Narmada, farmers refuse to build distribution systems.

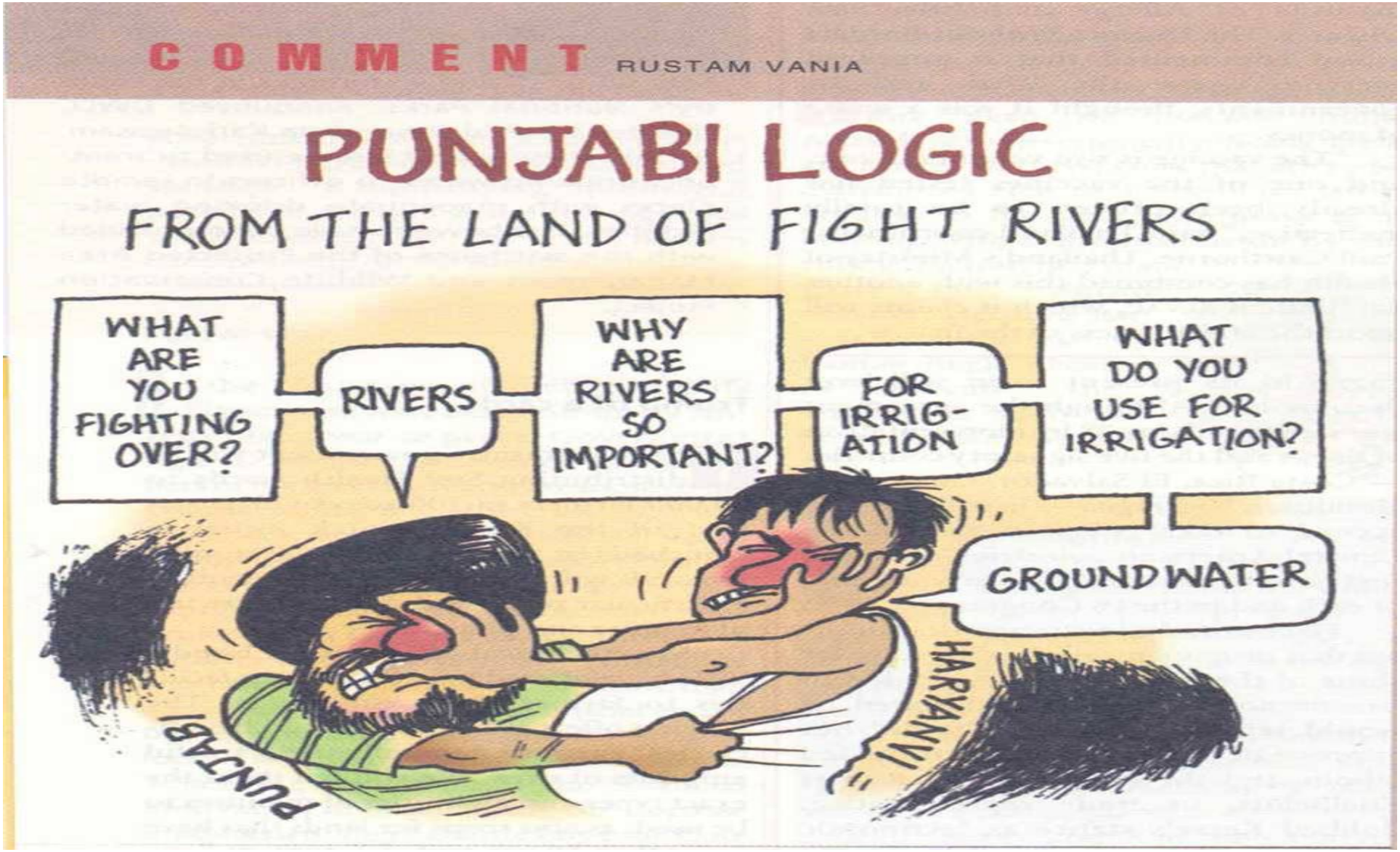
- Piped systems

- Save land; can use the same storage to irrigate 30-50% more; saves water; eases pressure on groundwater and energy used for pumping it;

- Amenable to JIT, on-demand irrigation;
- Public private partnership
- Creates new jobs in water distribution and retailing;
- Carbon credits
- Massive environmental benefits

Implications: Wake up to new realities.

- Recognize and respond to the new reality. Government's role as irrigation provider is no longer the most critical.
- Investing in surface irrigation is throwing good money after bad.. To survive, it needs to be reinvented.
- Irrigation Department's mission statement needs to be rewritten.
- Managing the Energy-irrigation is the central irrigation challenge
- Groundwater recharge needs to be the new mantra of agricultural development in hard-rock India.



Source: "Down to Earth"