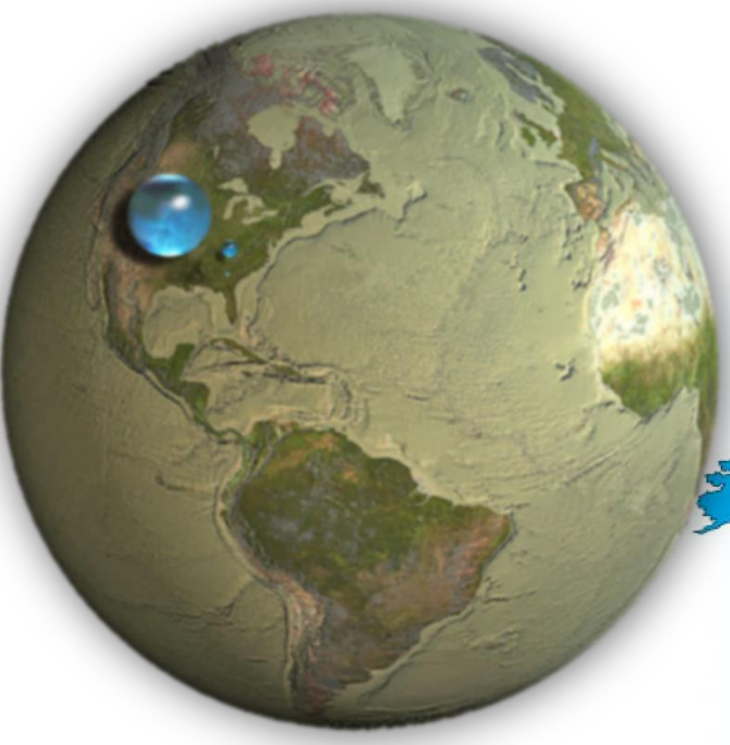
IWMI- India Portfolio

Sustainable Water Management & Technologies

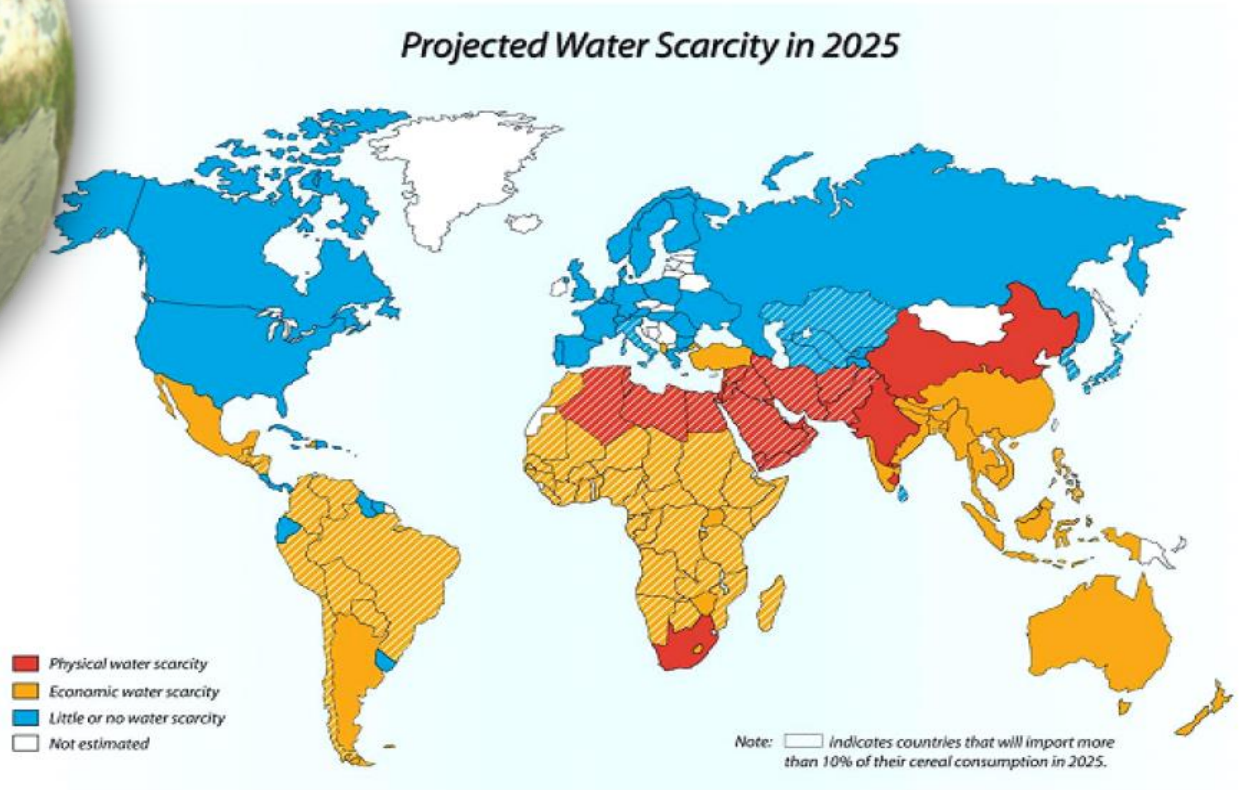
Krishna Reddy Kakumanu

International Workshop on Science, Technology, Innovation and Management for Water Sustainability
CSIR-NISTADS, New Delhi
April 19, 2017

Why Water?

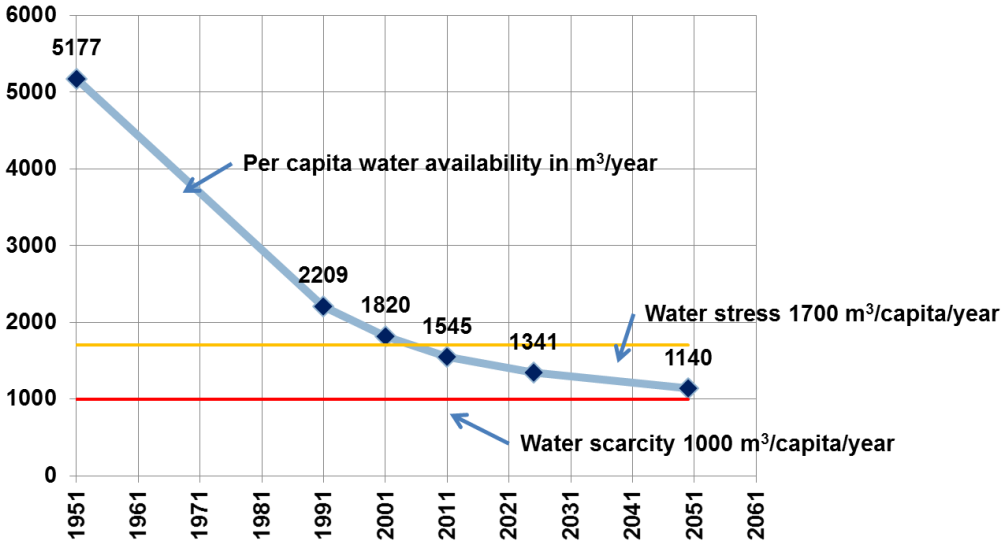


All the Earth's water as a single bubble, to scale. Freshwater is the smaller bubble. Water in lakes and rivers is the tiny bubble. (Source: USGS)



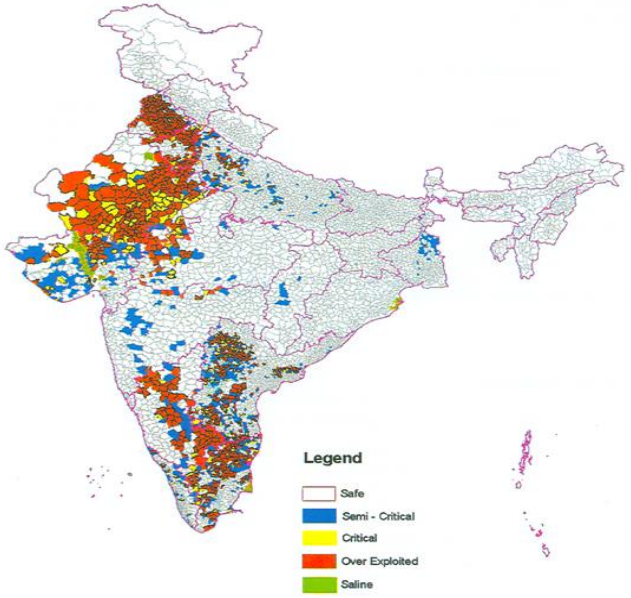
India Water Scenario

- **Climate variability and change** impacting water availability
- Vulnerability is high as **58% NSA is rainfed**



- Diversion of water for irrigation likely to reduce from 83% to 72% by 2025
- Low Irrigation Efficiency
- Groundwater contributes 61% to irrigation

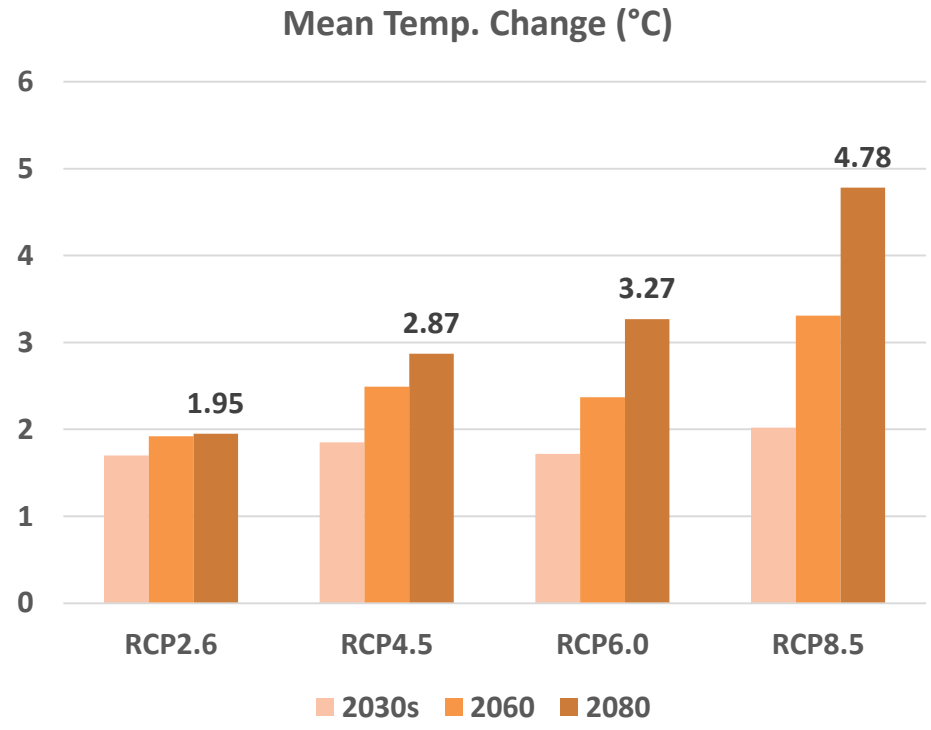
Distribution of Ground Water Exploited Units

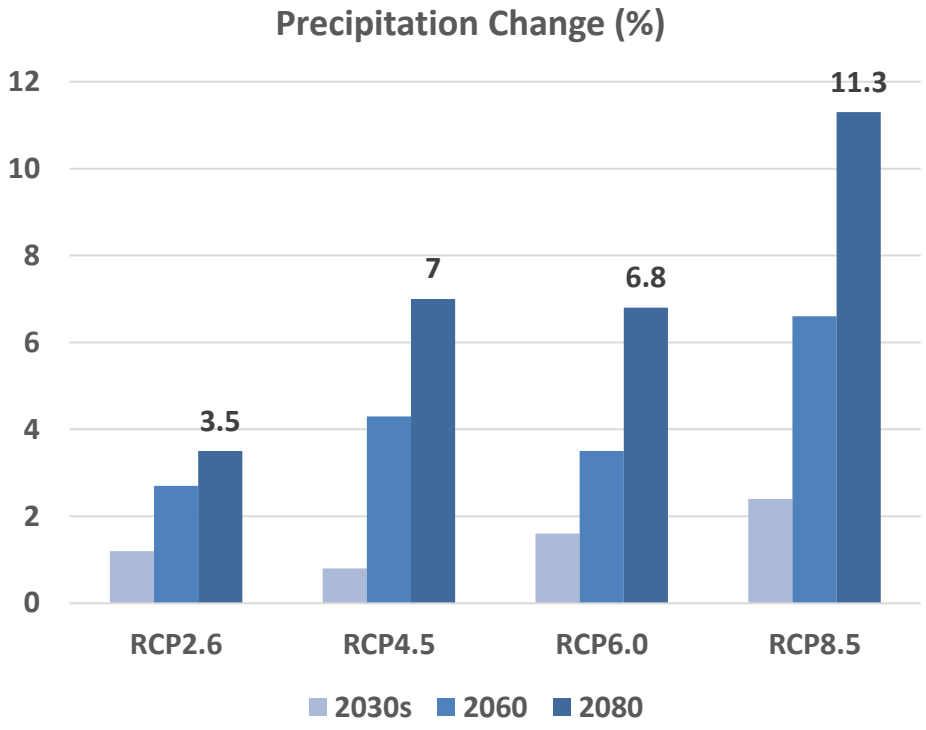


Building **climate resilience** through water and land management is **a major challenge**

Climate Change and Water Resources

- Climate change impacts hydrology, water resources availability and irrigation
- Likely Shift in the timing or seasonality of stream flow with regional imbalances
- Warming increases the evaporative demand and crop water requirement



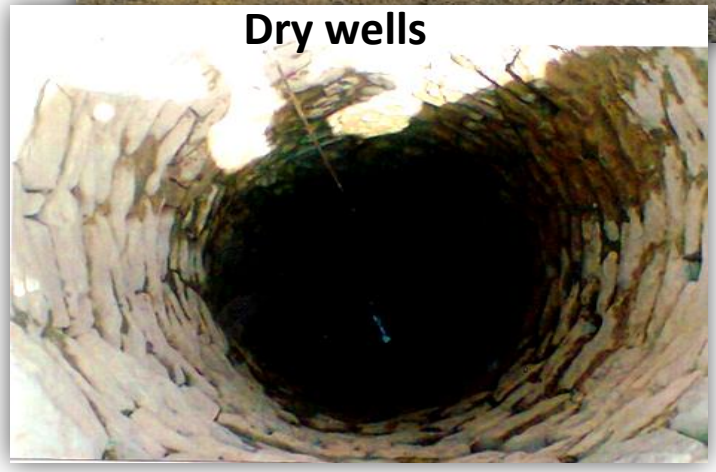


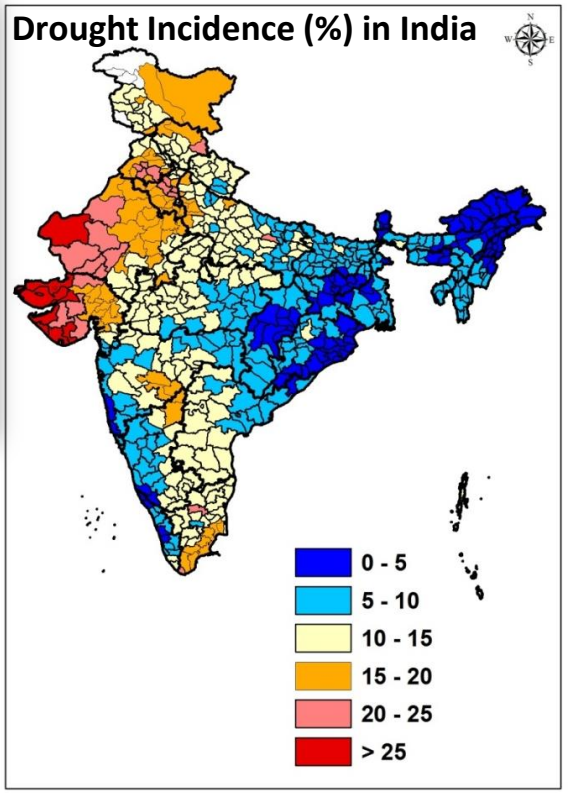
Projected Temperature and Precipitation Change in India - RCP Scenarios

Increased Incidence & Severity of Droughts: India

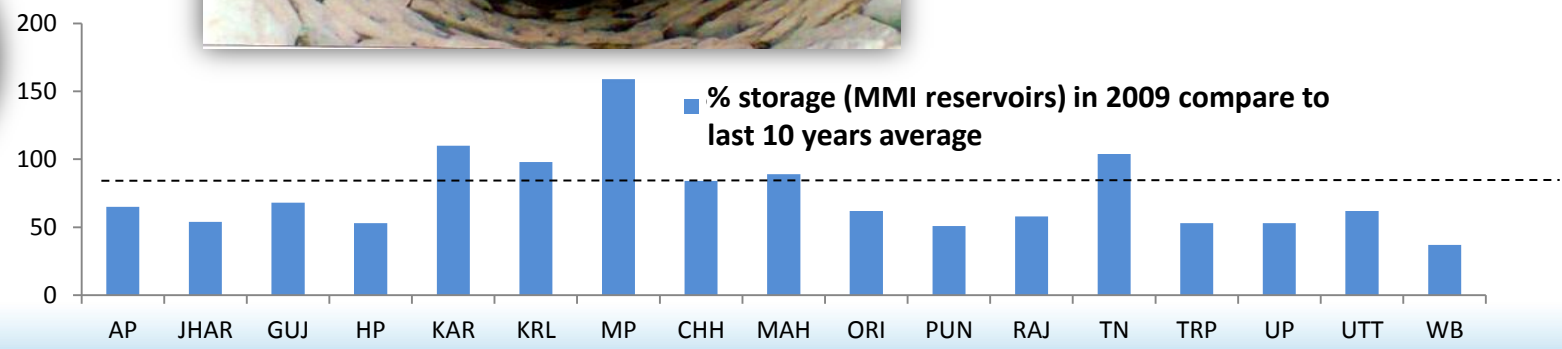
Rainfall departure from normal in India

Year	RF Deficit (Production loss) (%)
2002	-19 (**-15.40**)
2009	-23 (**-4.12**)
2014	-12 (**-3.25**)
2015	-14 (**-2.35**)



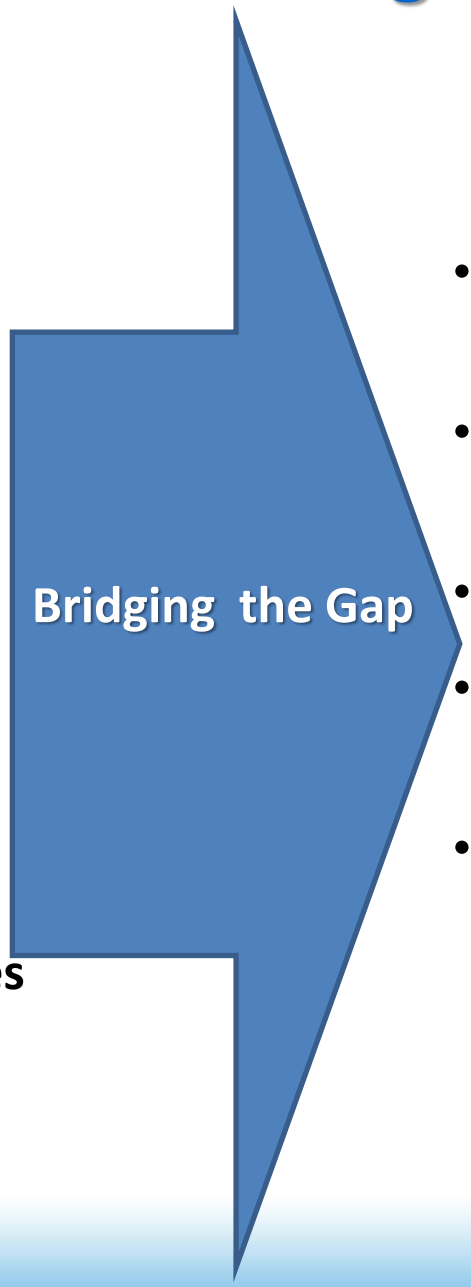


Increased frequency in last decade



Our Water Governance Challenges…

- Acute water scarcity
- Pollution and contamination
- Floods and droughts
- Groundwater depletion
- Urban water management
- Water and ecosystem services



- Fresh look at the way we manage water
- Innovative and smart water solutions
- Building resilience
- Evidence based research in water governance
- CSR emerging a key player in water space, complementing government efforts and SDGs

IWMI's mission

To provide evidence-based solutions to sustainably manage water and land resources for food security, people's livelihoods and the environment

IWMI's vision

A water-secure world

Our Staff

- **300 employees and more than 100 researchers based in Africa, Asia and the Middle East**
- **Multi-disciplinary and cross regional teams working on irrigation, small scale agricultural water management, waste water, water governance and gender, water, climate change and ecosystems**

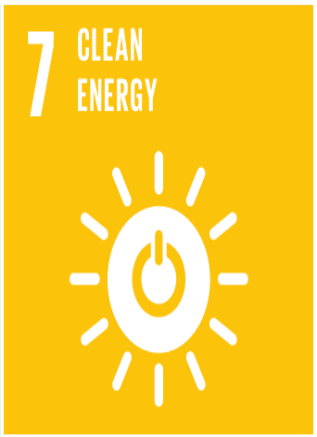
SDGs

- Enhancing efficient use of water (WUE by 20%)
- Ensure water access
- Water harvesting & GW recharge
- Wastewater reuse (also source of nutrients)
- Increased forest/tree cover (C sink of 2.5-3 bil. t of CO2 equivalent)
- Solar pumps (100K)

2.3 Doubling Agri Production
2.4 Resilient Agri products

13.1 Adaptive capacity to CC
13.2 Integrating CC measures
3.3 Capacity development on CC

15.1 Sustainable Eco-sys
15.3 Combat degradation



7.1 Access to renewable energy

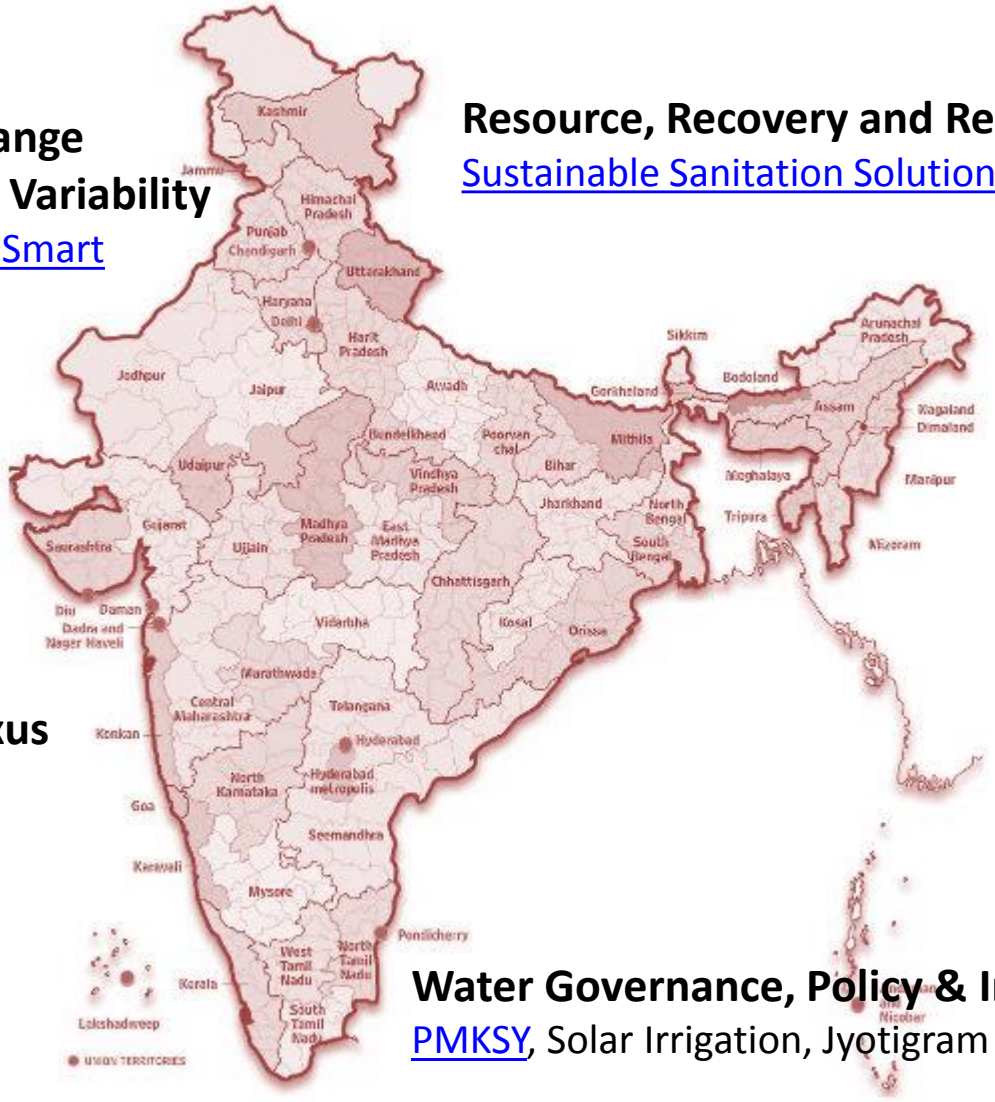
1.5 Reducing vulnerability

IWMI India - Current Focus

Adapting to Climate Change related Water Resource Variability
UTFI, IBFI, SADMS, Climate Smart Interventions

Water Productivity
Smart ICT
Economic W P

Water-Energy-Food Nexus
SPaRC, SPICE –
Gujarat Solar Policy



Resource, Recovery and Reuse
Sustainable Sanitation Solutions, Healthy Ganga

Bringing Green Revolution to Eastern India
Dry season irrigation, SRFSI, Wetlands & ESS

Water Governance, Policy & Institutions
PMKSY, Solar Irrigation, Jyotigram

Water Related Risks & Community Based Resilience

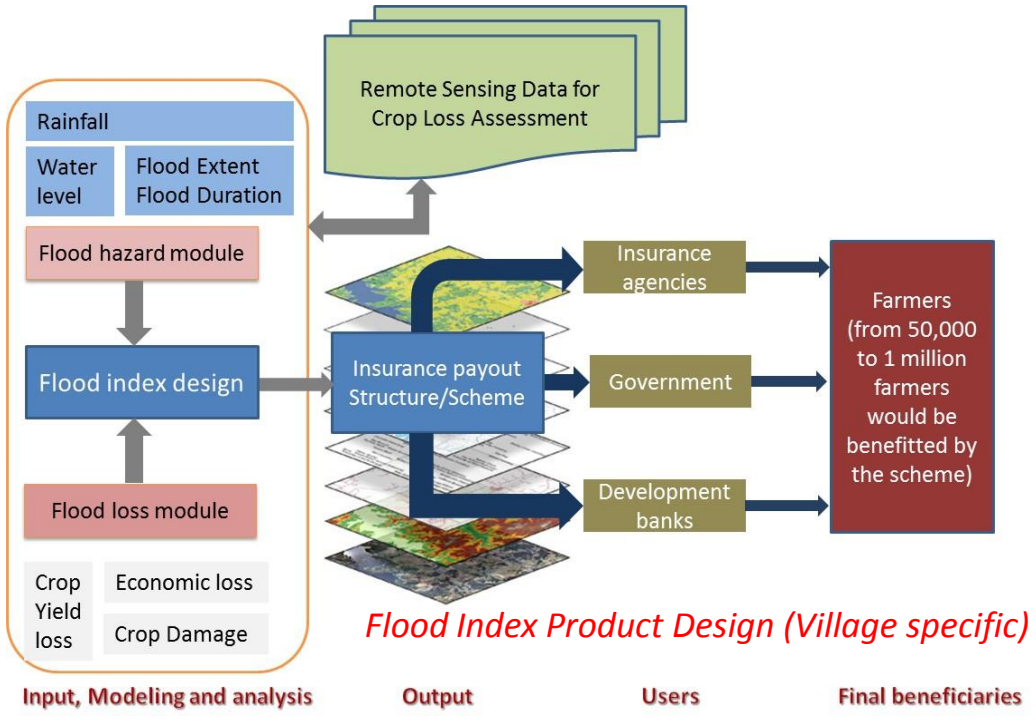
http://utfi.iwmi.org

For a 100 days of monsoon with an uninterrupted water flow, this system can generate 5.5 lakh m^3 water, sufficient to irrigate 137 ha @ 40 cm depth in dry season.

- **Underground Taming of Flood for Irrigation (UTFI)** has demonstrated that community-owned assets can be converted into recharge structures that are effective in achieving both **flood mitigation and enhanced groundwater availability**
- **Resilient community**
- **Community participation** for site maintenance under **MGNREGA**

Index-based Flood Insurance to Enhance Agriculture Resilience and Flood Proofing Livelihoods

- Developed **Flood hazard model** and **flood mapping tool using satellite data** for Bihar;
- High-level discussion with MoA to experiment in 2017 monsoon season and implement within the PMFBY in Bihar
- IBFI Business model and Economic Analysis draft completed

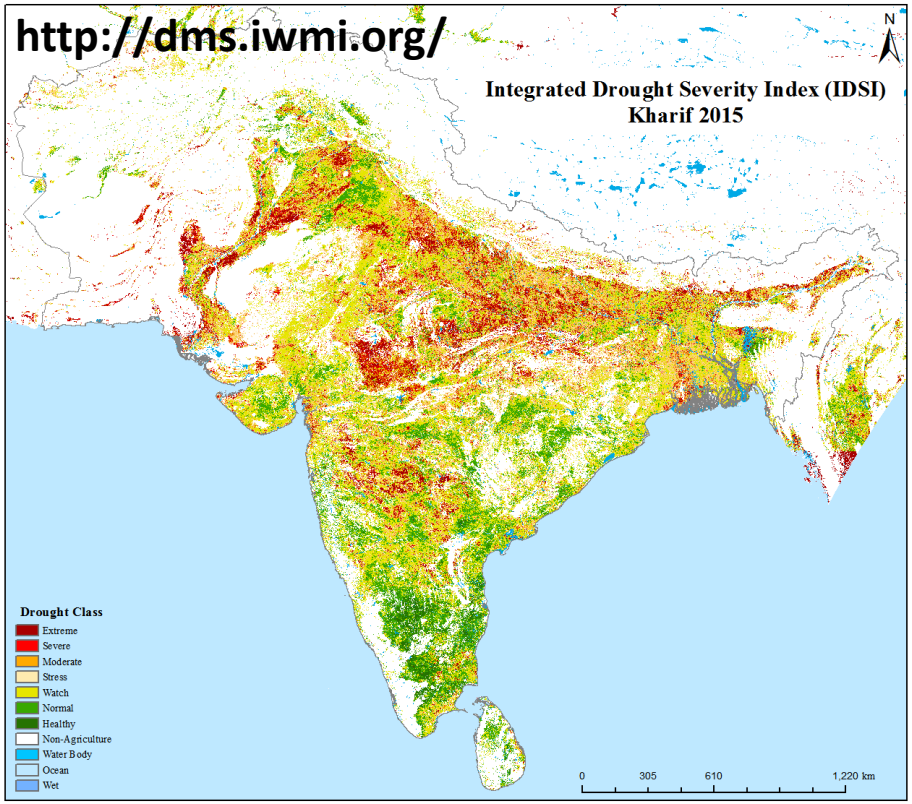


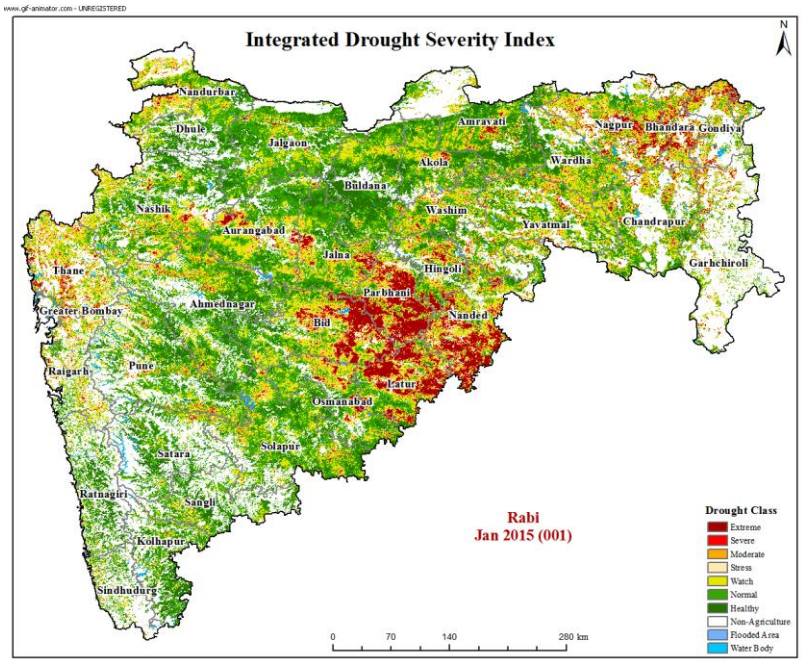
Flood Index Product Design (Village specific)

http://ibfi.iwmi.org

Partners: ICAR-IIWM, ICAR-RCER; Bihar State Disaster Management Authority (BSDMA), Agriculture Insurance Corporation of India, Bajaj Allianz and SwissRe

Water Related Risks & Cutting Edge Technology





- First of its kind for historical drought risk mapping covering SA countries using multisource RS data;
- Allows better understanding on drought frequency, duration over the 15years;
- Helps in efficient drought planning, preparedness, contingency planning and decision-making

Jalna, Maharashtra, 2015

Climate-Smart Land and Water Management

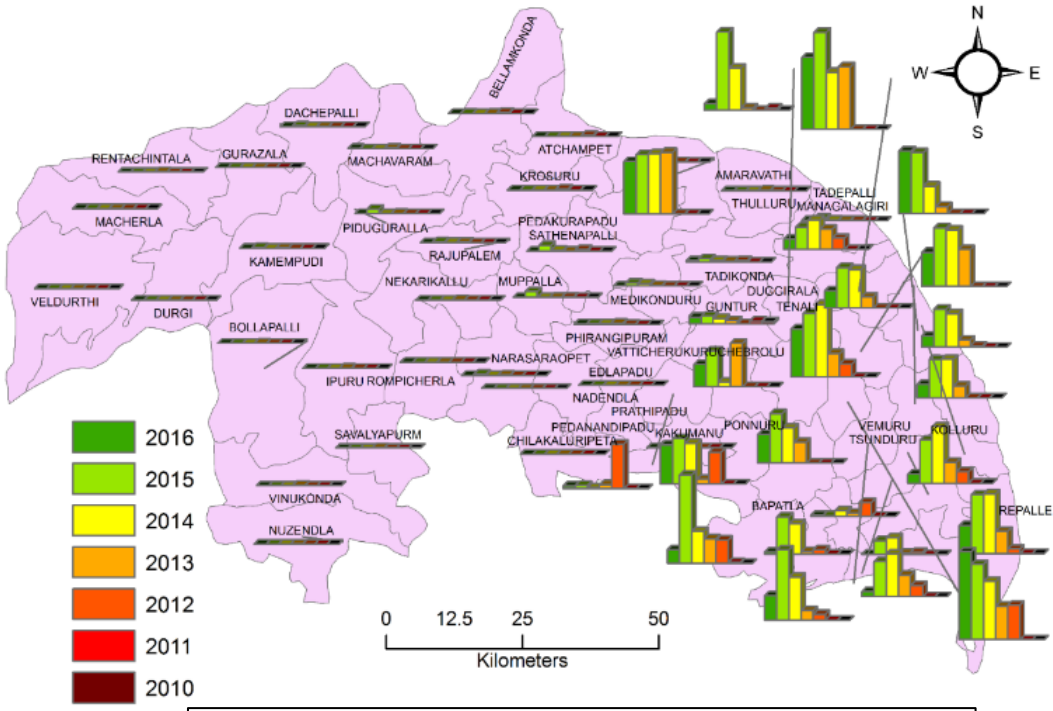
CSA sustainability

- Increase in Productivity
- Increases in Resilience (income)
- Reduces/removes GHGs

Improving Farmers' Adaptation Capability : Adaptation Toolkit

- Direct seeded rice
- Modified SRI
- Alternate Wetting and Drying
- Weather index insurance

Scaling up of DSR in Guntur (% share of DSR to actual area sown increased to 64%)



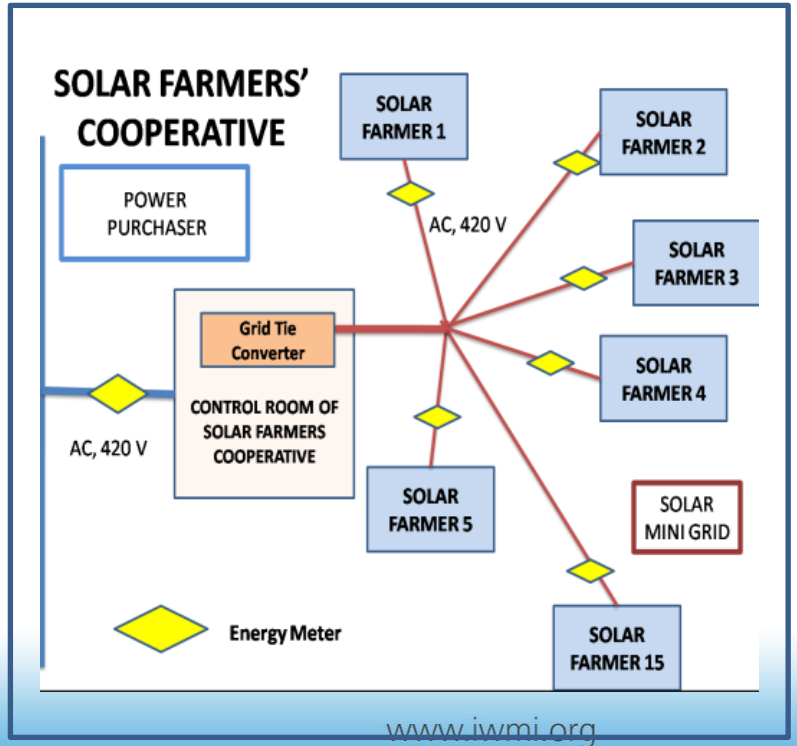
Additional Revenue: 1663 million INR
CH_4 Reduction: 7600 tons

Innovative energy nexus-sparking rural development

Jyotigram Yojana **implemented by Government of Gujarat reduced farm power subsidy, capped groundwater overdraft and improved the quality of rural life. Won the Water for Life Award 2014**

SPaRC – Solar Power as a Remunerative Crop
An innovative concept which links farmer's solar irrigation pump to the electricity grid presenting farmer with the choice to sell the surplus power

SPICE – Solar Pump Irrigators' Cooperative Enterprise
Institutionalizing the idea of SPaRC through a cooperative model



Collective Models for Farm System Intensification

New models to engage with marginal and tenant farmers, particularly women led households in Bihar.

Institutional innovation:

- Establishment of tenant collectives, whereby landless farmers take a joint lease.
- Voluntary consolidation of land through farmer groups.
- Both models involve group management of irrigation infrastructure

Technical innovation:

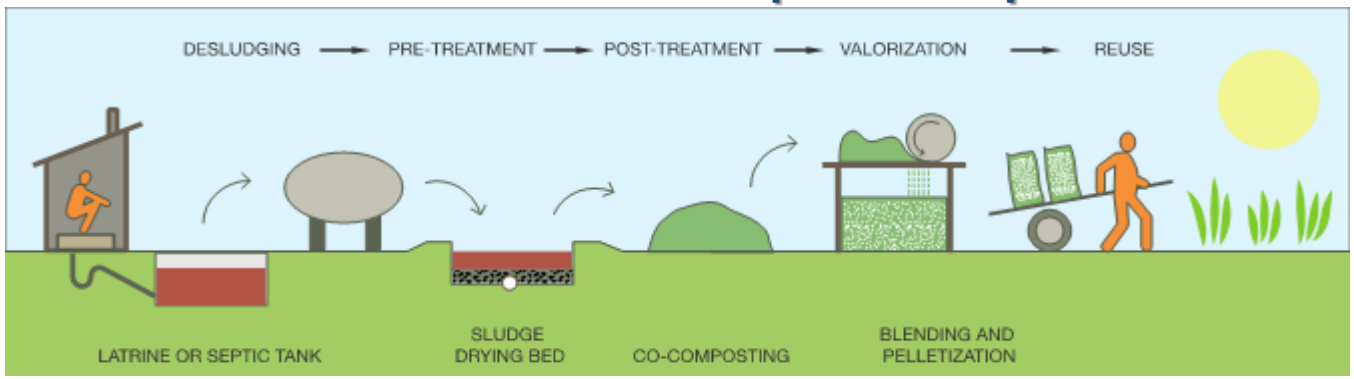
- Solar pumps
- Conjunctive use of pond and groundwater Micro-irrigation (drip and sprinkler)

- **Cropping intensity increased to 300% in model site**
- **New model of agricultural extension from below**

Clean Water & Sanitation

- **Reduce the negative urban footprint on ecosystems and human health through market driven incentives that promote investments**
- **Business models have the potential to close the nutrient loop, reduce use of chemical fertilizers, pollution and GHG emissions.**
- **Turning waste into a business opportunity**

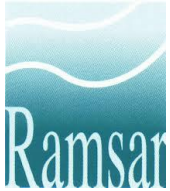
Business models and innovative partnerships



Sustainable Sanitation Solutions - Gates Foundation & IWMI Initiative

- **Improve fecal sludge management** in a low-income resettlement colony, Savda Ghevra – Treatment plant design to serve Population 50,000
- Project done in collaboration with Water-Aid and CURE
- IWMI is designing the **technical, institutional and financial model for implementation** of FSM as demonstration site for Delhi
- Improvement in sanitation facilities for 4000HH, resulting in improved quality of life and hygiene
- Generation of employment opportunities from the location (15-20)establishing a sustainable model.

Partners and Engagement



**Working Agreements with ICAR and NMCG

and many more …

Thank you!

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