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UTFI: Global through to field scale assessments

Paul Pavelic

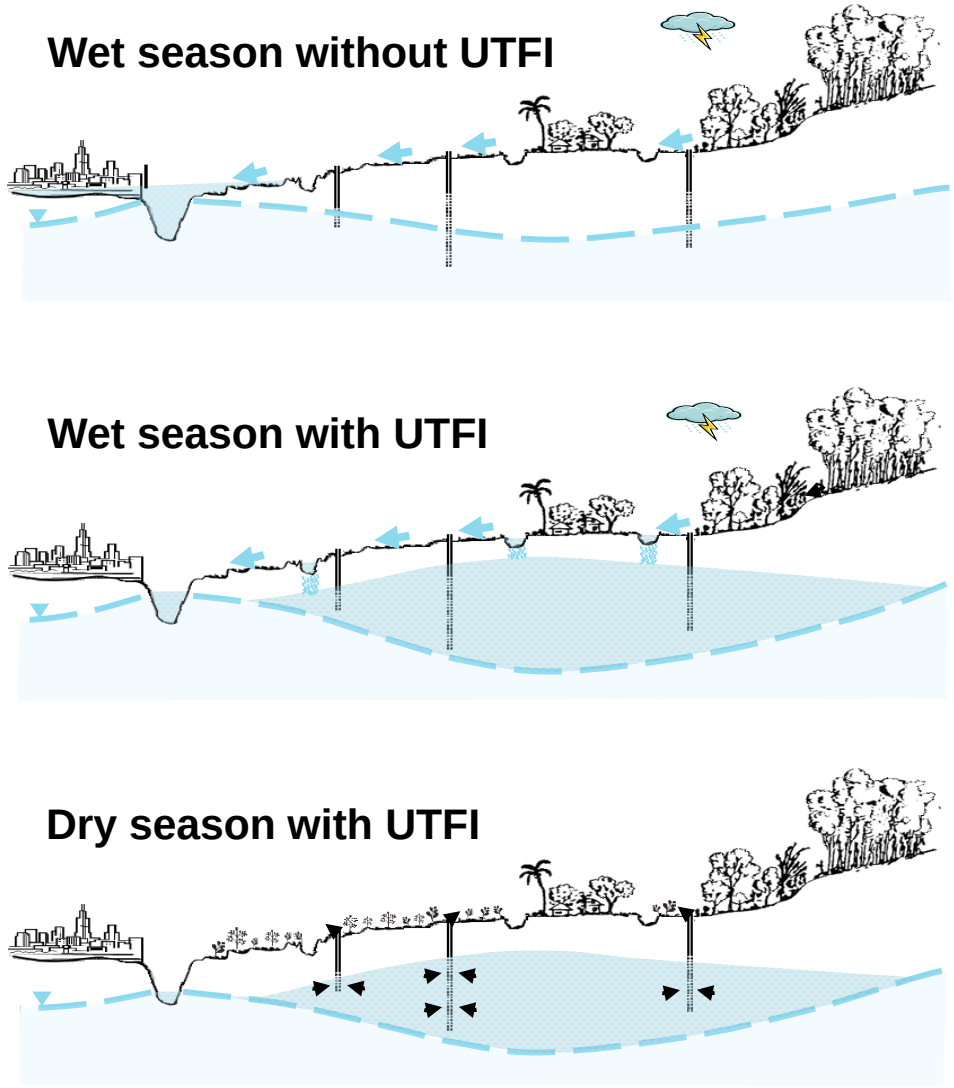
International Water Management Institute, Lao PDR

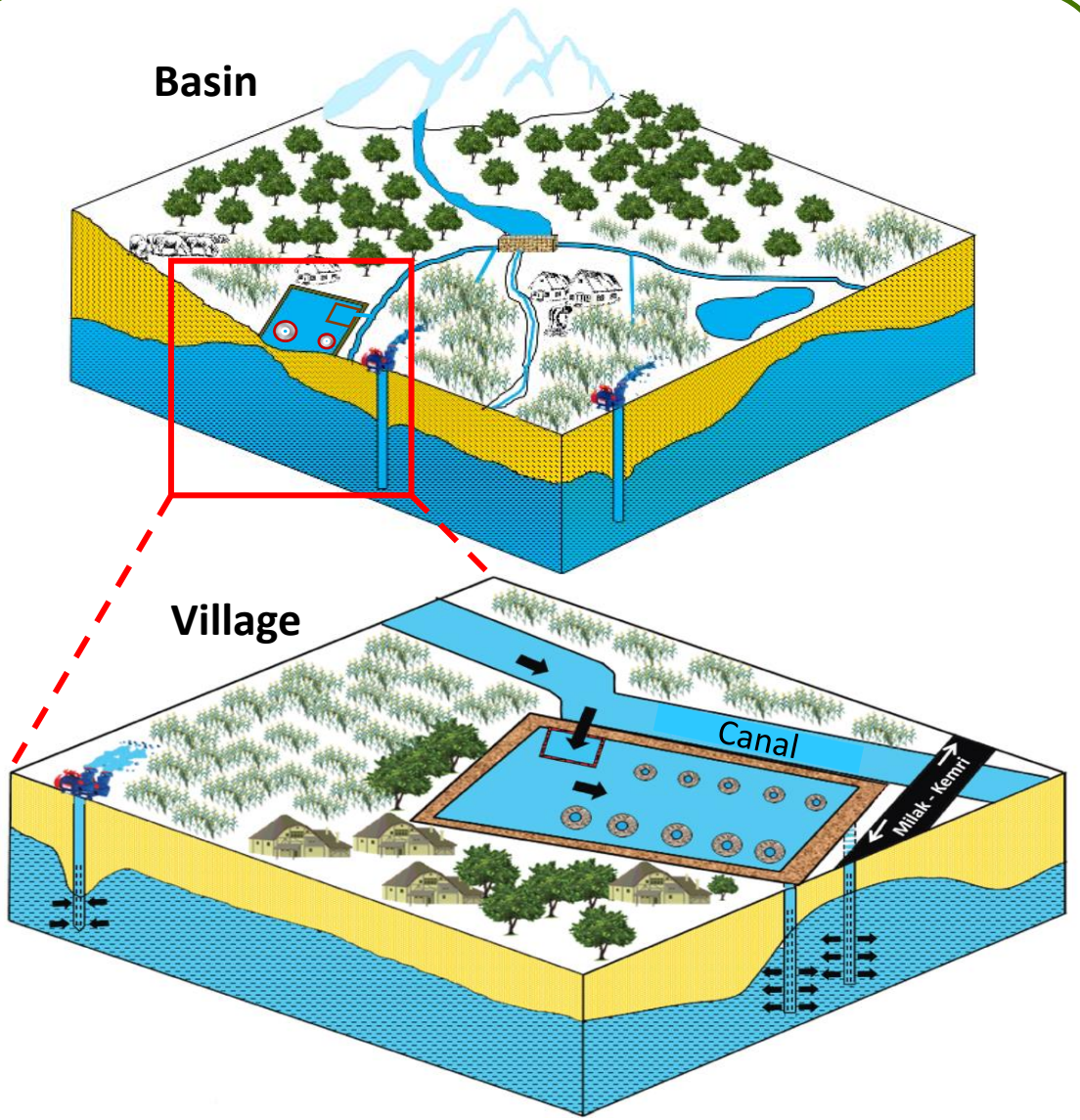
IWMI International Water Management Institute

Consequences of Growing Water Variability

- Trends in water security have been generally been worsening in recent decades
- Socioeconomic impacts of floods and droughts are huge
- Enhancing water storage through interventions at the community level hold great promise
- This work is centered on developing and mainstreaming pragmatic yet effective solutions

UTFI Concept



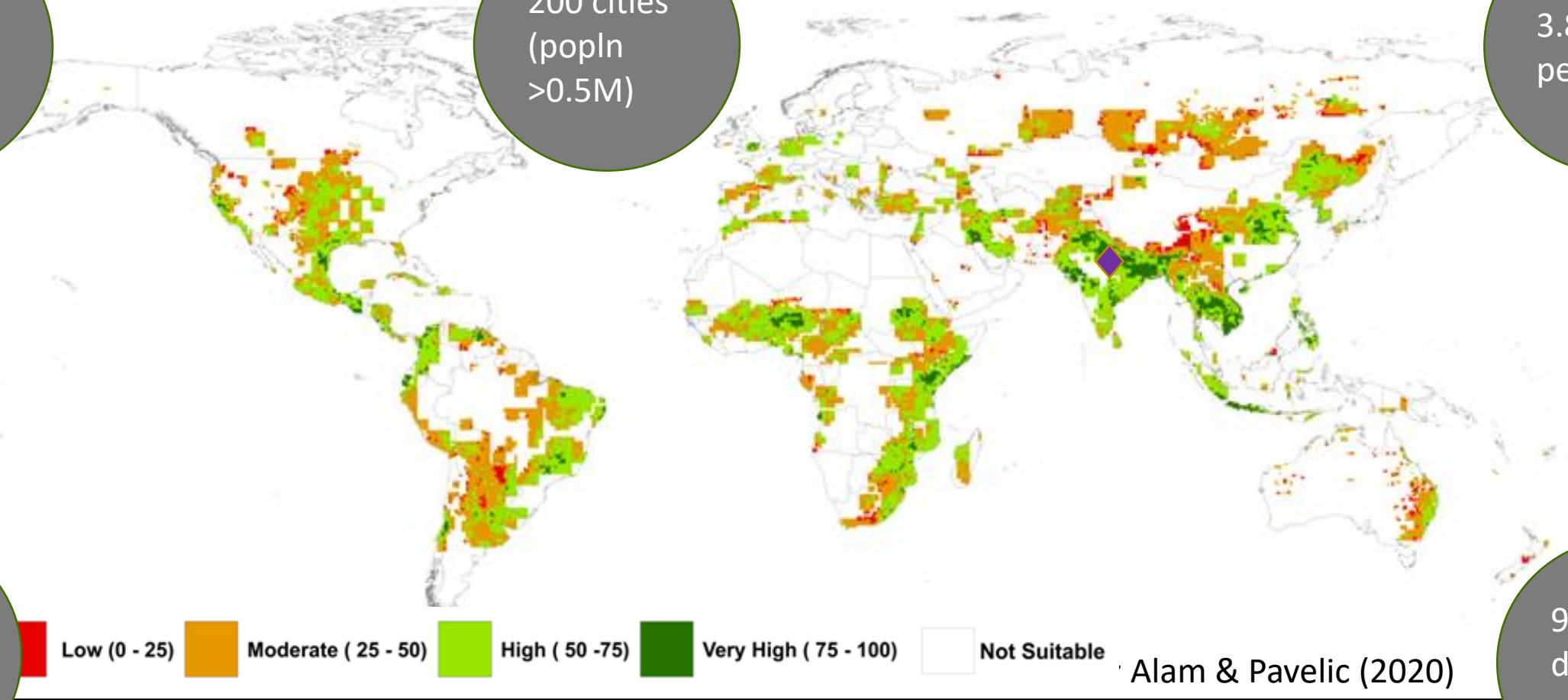


Global Opportunities for UTFI

1,580 Mha (11% of global land area)

200 cities (popln >0.5M)

3.8 billion people



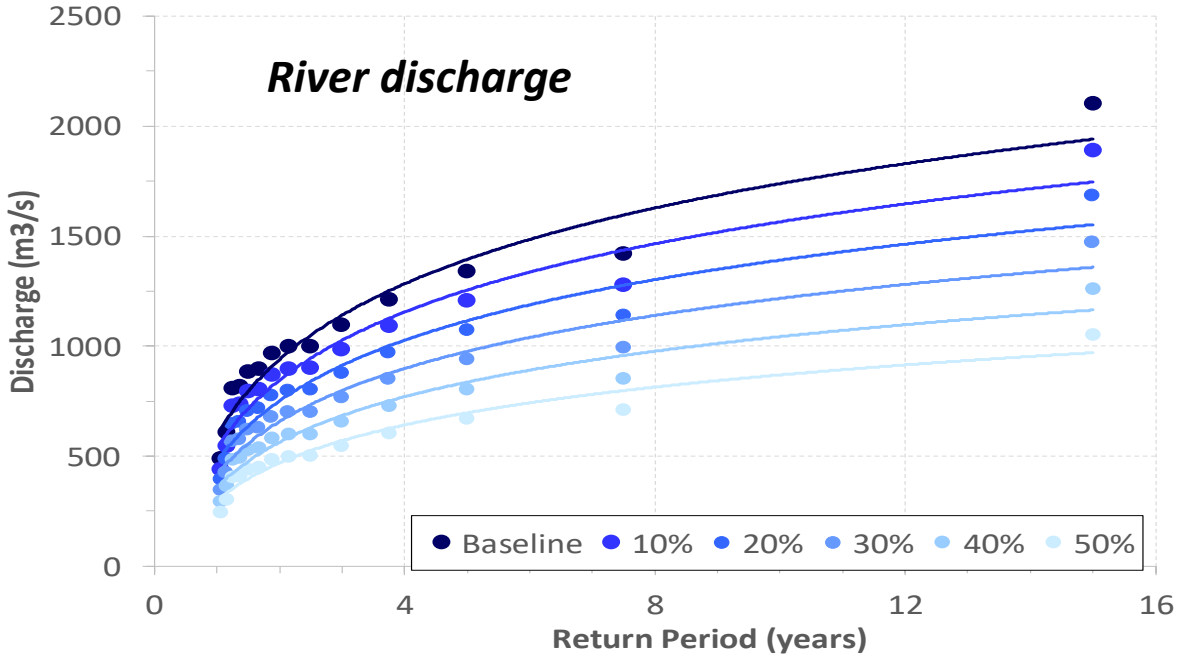
Alam & Pavelic (2020)

622 Mha (40 % crop area)

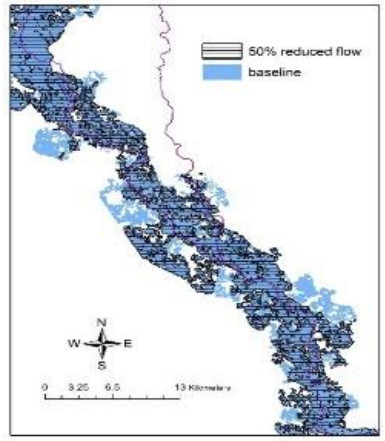
90 % GW depleted areas

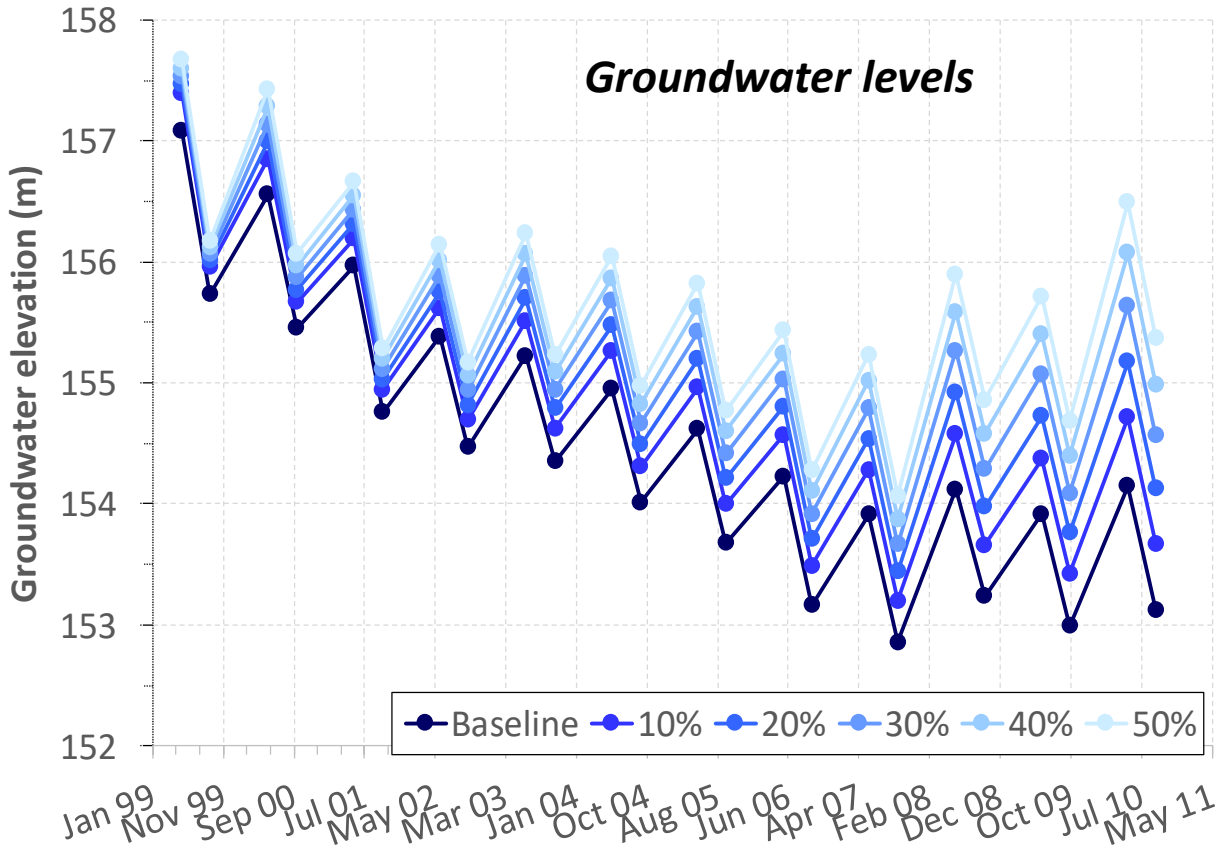
Green shaded areas highlight where the scope for UTFI is promising. These areas account for 50% of the global population and 40% of the crop area.

Hydrologic impacts of basin-scale adoption



Flood inundation





- SWAT-MODFLOW modelling at basin scale for alternative scenarios of UTFI implementation
- GW depletion can be reversed and flood risk reduced

Economics of basin-scale adoption

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Internal Rate of Return (IRR) for the Ramganga basin

	Scenario 1 [a*]	Scenario 2 [b*]	Scenario 3 [c*]
Surface recharge	39%	15%	50%
Well recharge	29%	10%	39%

[a] Scenario 1: growing an extra rice crop plus flood damage protection

[b] Scenario 2: growing an extra maize crop plus flood damage protection

[c] Scenario 3: yield increase for sugarcane plus an extra rice crop plus flood damage reduction plus fuel saving

[*] Recharge volume taken as 3.25 km^3 (50 percent of annual average basin outflow)

Source: Alam & Pavelic, (2020)

Piloting UTFI in Uttar Pradesh

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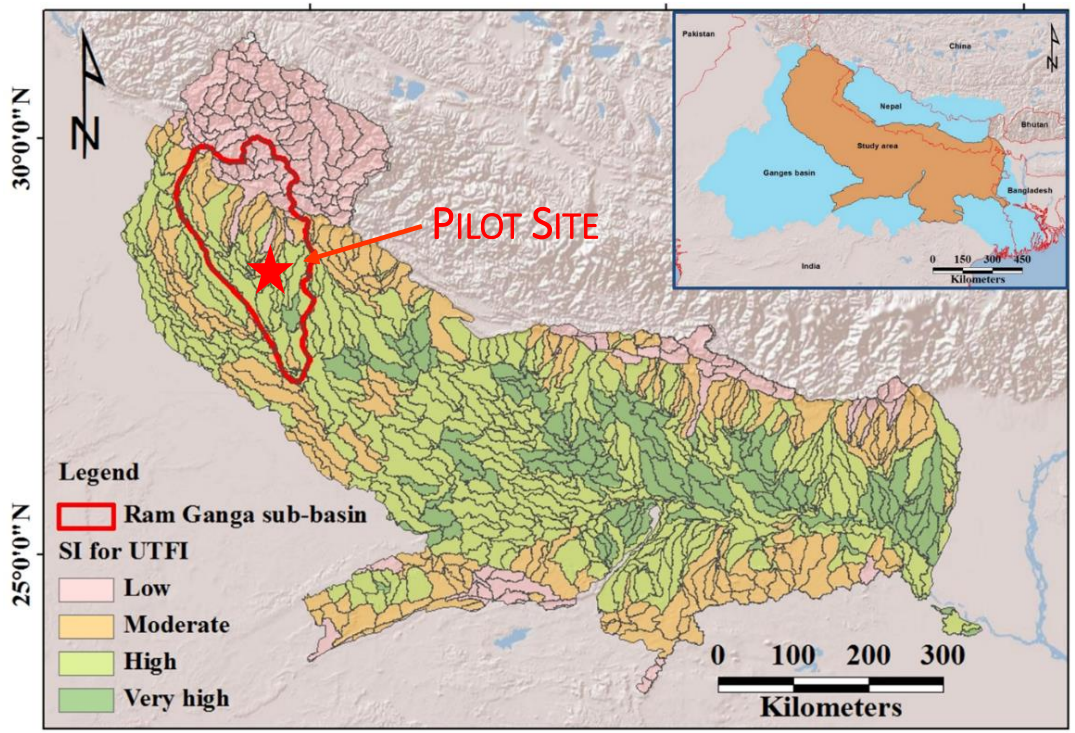
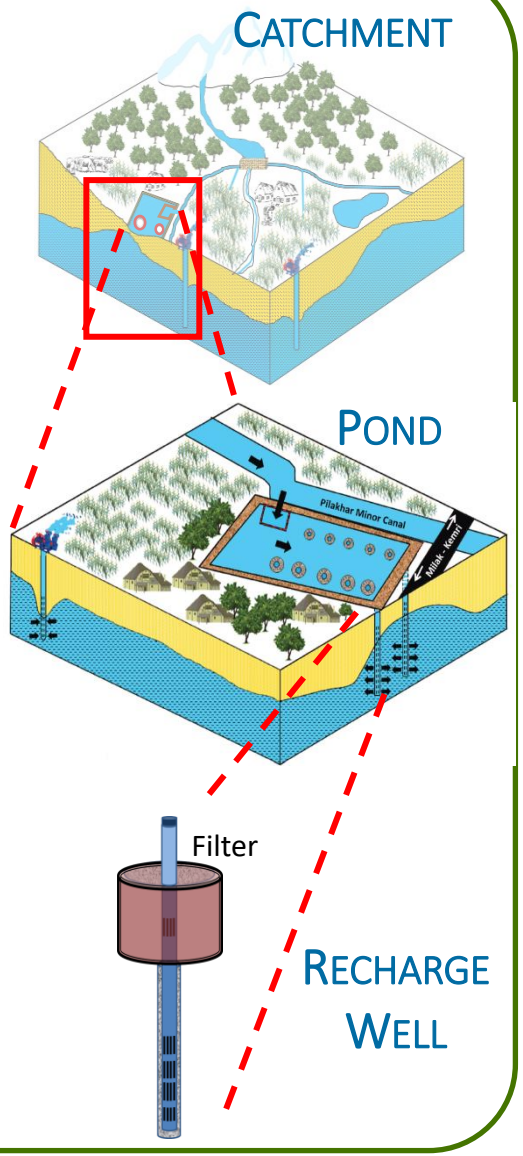
Aims

- Develop a sound, evidence-based case for UTFI
- Facilitate scaling-up of the pilot

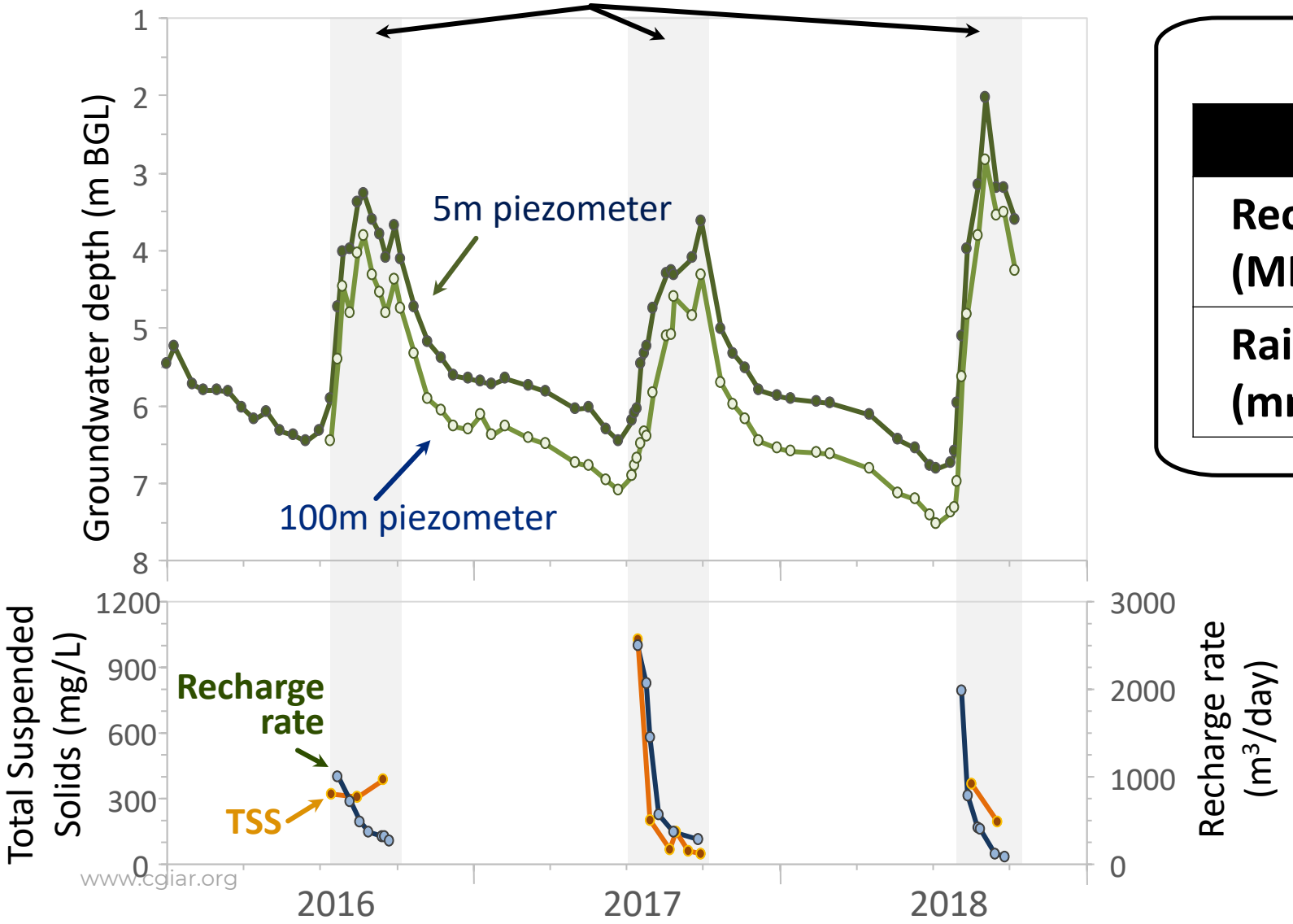
Technical Approach

- Mapping, hydrologic/ hydraulic modelling, pilot testing (technical, social/gender, economic, institutional, environmental analysis)





Pilot Results – Water Quantity



SUMMARY

	2016	2017	2018
Recharge (ML)	45	62	26
Rainfall (mm)	857	905	1812

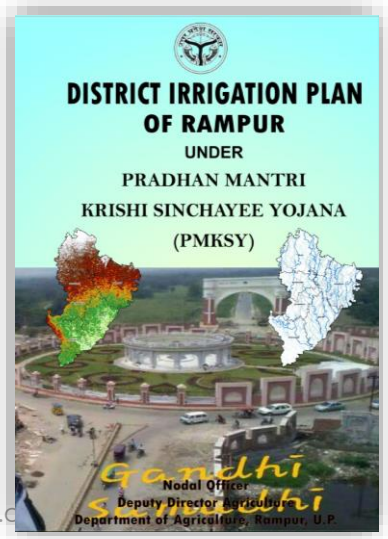
Volumes recharged equate to:

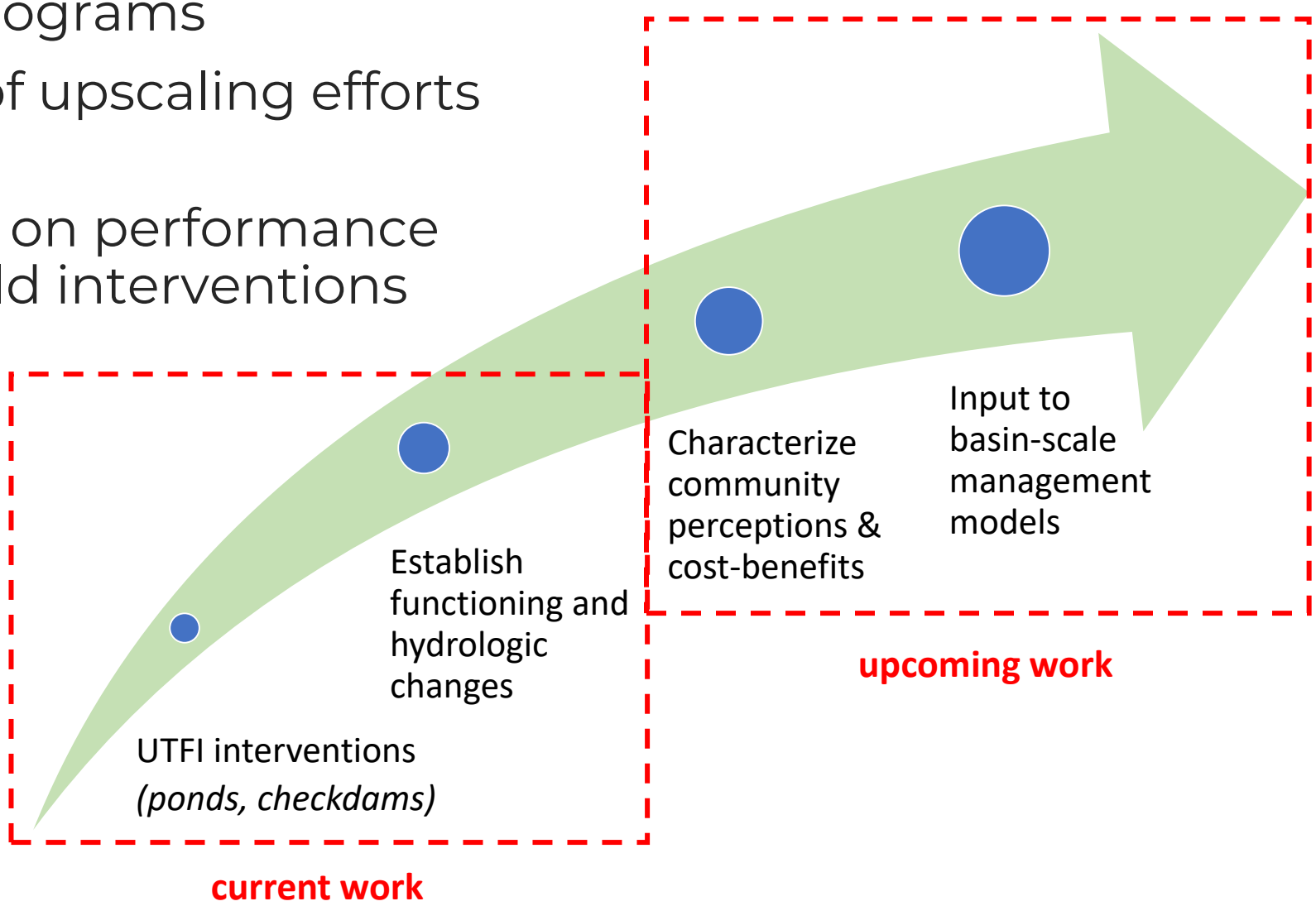
8-12 ha of irrigated land

2-4% of natural recharge

Evaluation of UTFI Upscaling

- GoI has been scaling up MAR/UTFI in Uttar Pradesh under various programs
- Performance & impacts of upscaling efforts are unknown
- Current NG work focuses on performance assessment of diverse field interventions





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Thank You

Contact: p.pavelic@cgiar.org