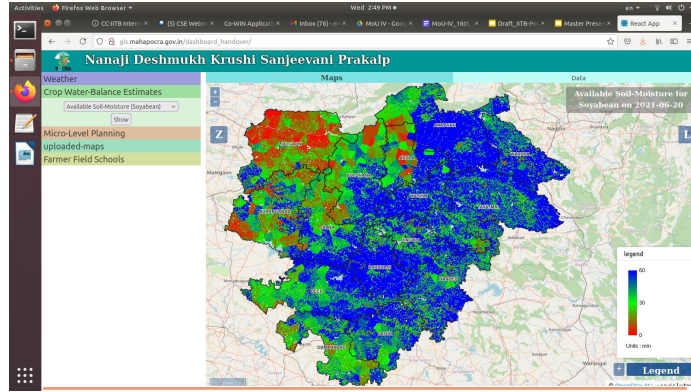


Climate Resilience and the CIC

IIT Bombay
1st Dec 2022

Today's agenda

- **PoCRA - IITB achievements**
- **Climate Resilience - what does it mean and what is to be done**
- **CIC - IITB structure and activities**



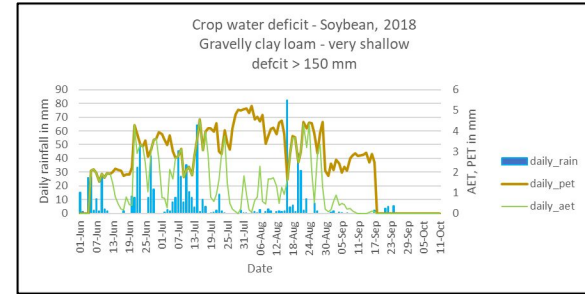
PoCRA IITB key achievements

- **On-demand real-time hourly** computation of water budget for **3.2 million points (200mx200m)** in PoCRA region
- Can be **aggregated** to any region of interest - zone, village, cluster, catchment and so on
- Can give **soil moisture**, **crop stress**, **runoff**, **GW recharge** at any point during ongoing monsoon

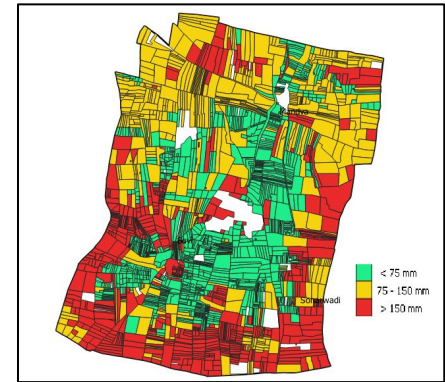
Enables

- **vulnerability** mapping and **targeting** of beneficiaries
- analysis and **advisories** for **dry spells**, **wet spells**
- **rabi crop-plans** and **GW-use-plans** as required by the **GW Act 2013**

Can be easily scaled up



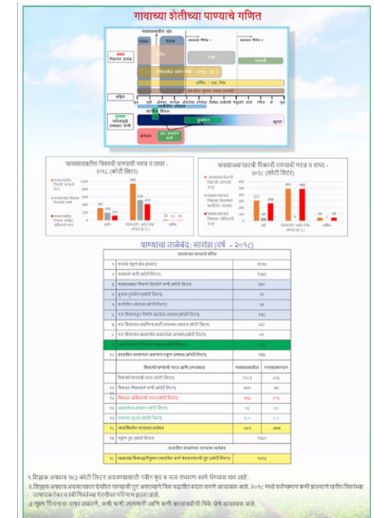
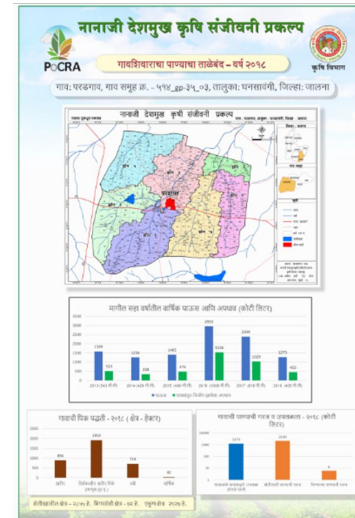
Waychal Pimpri
Hingoli 2018



Bavi, Mandwa cluster
Osmanabad 2019

MLP- Village Level Planning

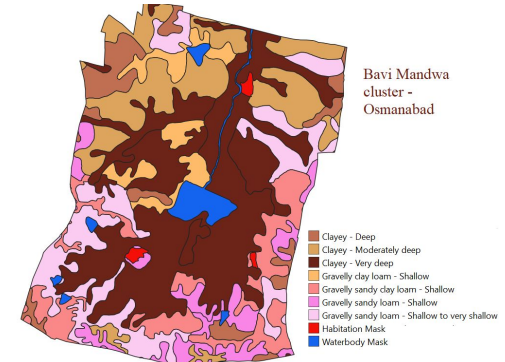
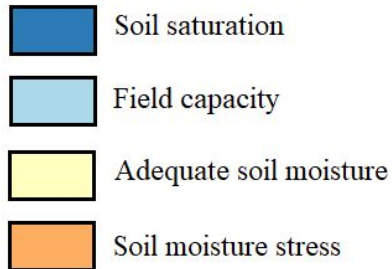
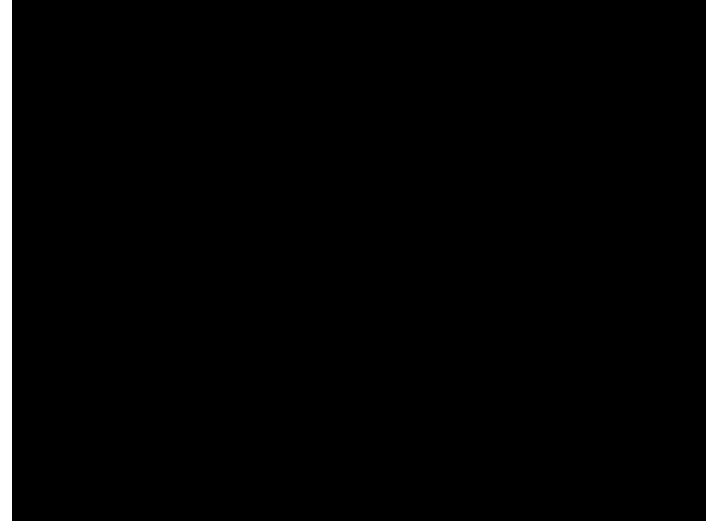
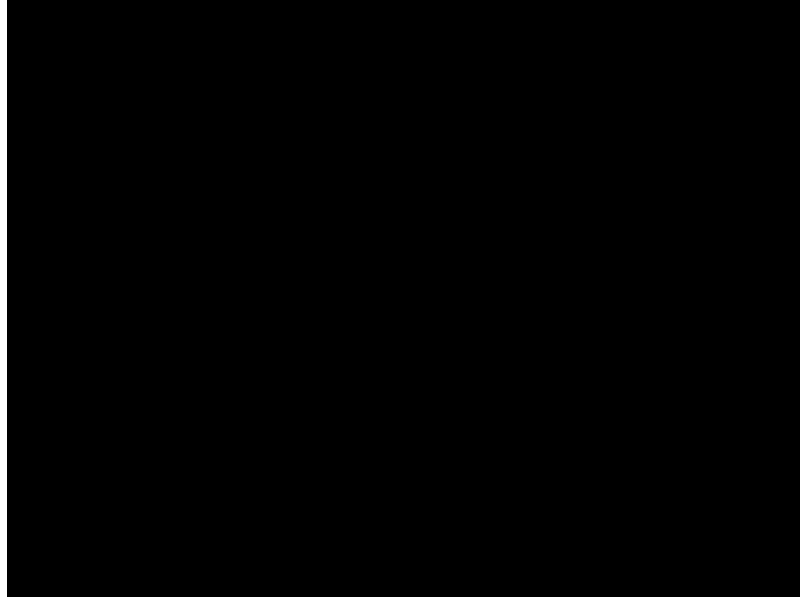
- **Linked water balance with community** and farm-level activities and infrastructure
- Explicit linkage of **supply, demand and interventions**
- Innovative extension strategies for resilience with **focus on median farmer**
- Led to creation of **formal platform for village-level community discussion** - precursor to Hivare Bazar
- Agenda setting for **hangam baithaks**



Dry Spells - Example

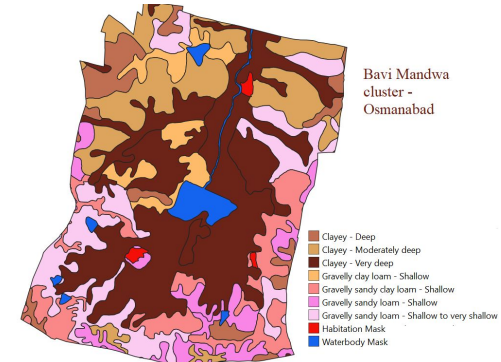
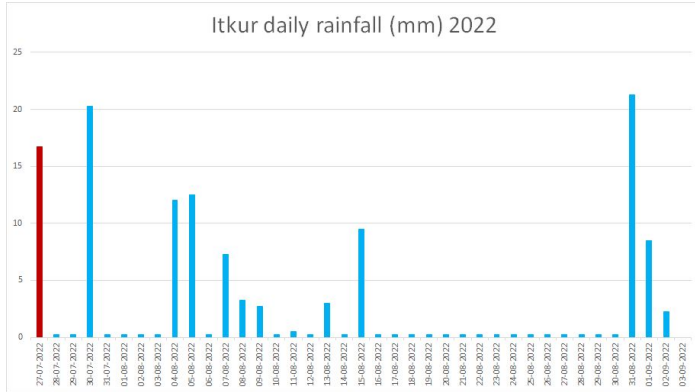
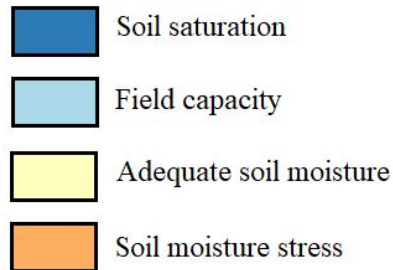
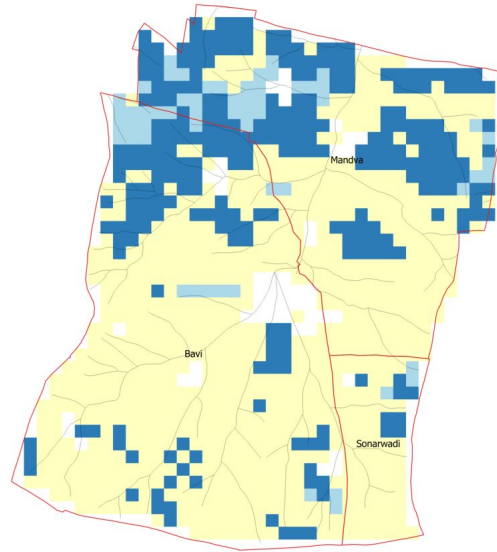
Daily change in soil moisture during a dry spell
(Bavi Mandwa cluster Osmanabad 2022)

Dry Spells - Soil moisture during a dry spell (Bavi Mandwa cluster Osmanabad 2022)

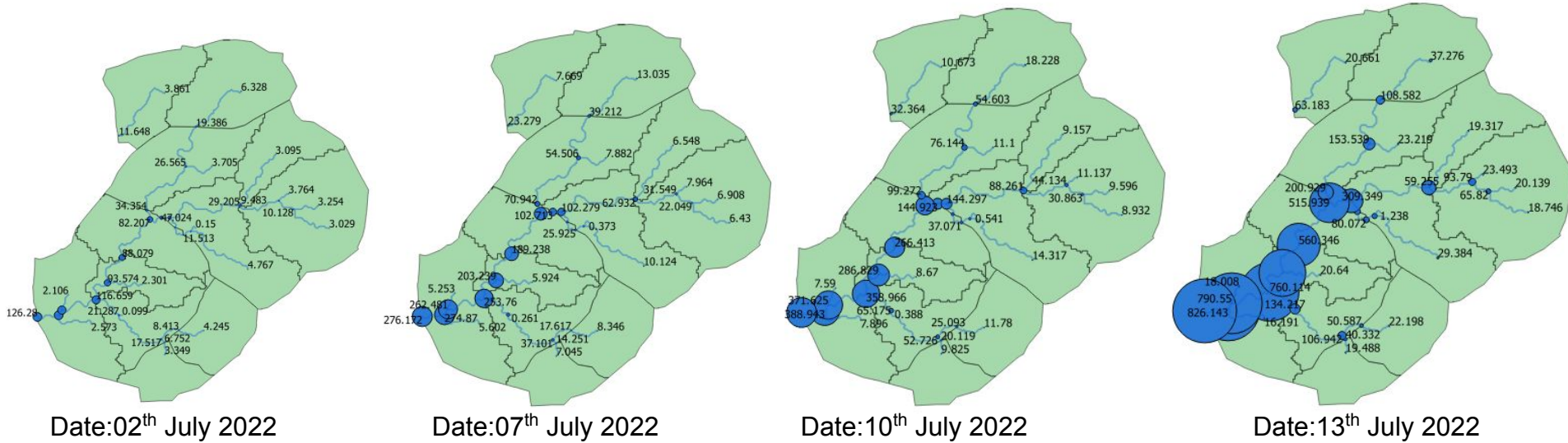


Dry Spells - Soil moisture during a dry spell (Bavi Mandwa cluster Osmanabad 2022)

27-Jul-2022



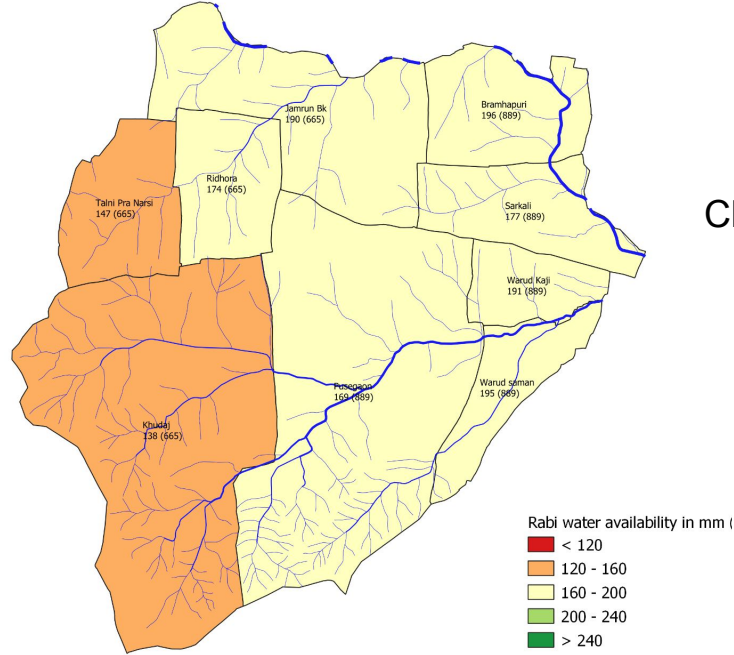
Wet Spells - Sample Stream Flow Maps for a cluster



Stream levels - next step!

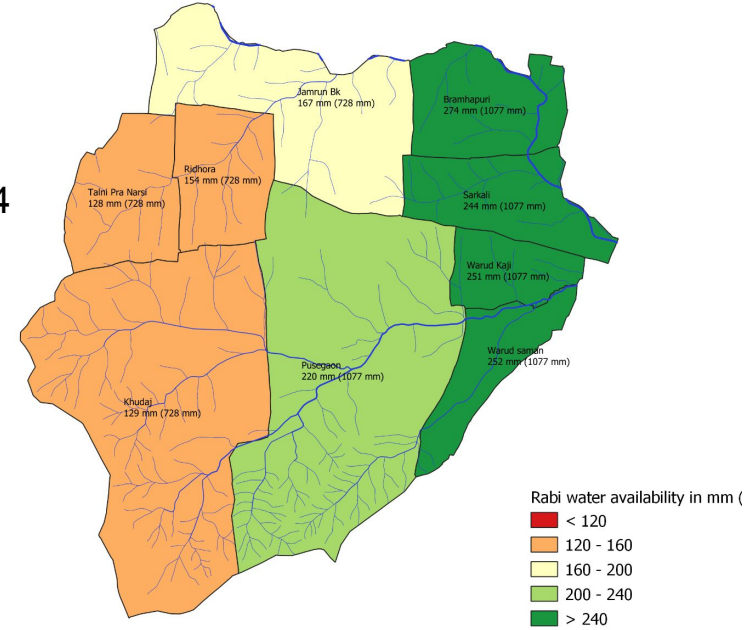
What do peak events look like and how to be prepared.

Yearly Variation in Water Availability for Rabi



Year 2018

Cluster: 512_ppg-1_04
Taluka: Hingoli
District: Hingoli

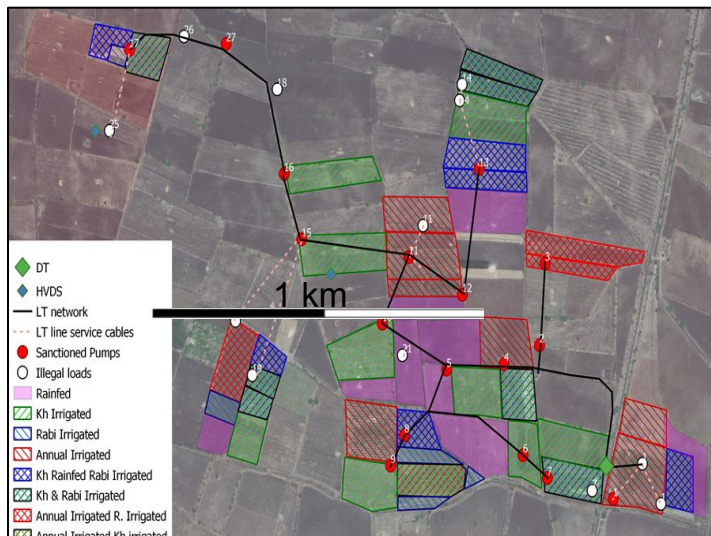


Year 2022

- Water availability for rabi is dependent on the rainfall and may change considerably (about 80 mm) for good vs bad year

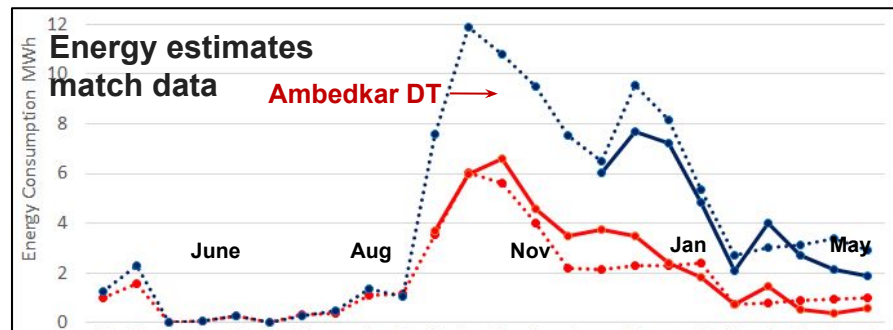
Energy Infrastructure, QoS and irrigation requirements, Load Management

DT loading $\longleftrightarrow$ Irrigation requirement



Crop	Area (Ha.)	Dug well	Bore well	Irrgs / Wk	Irrig. Dpth (mm)	Volume (m3)	Elec. Units Req'd.
Wheat	10.2	90%	10%	0.6	67	4,100	1,230
Harbhara (Sprinkler)	0.5	100%	0%	0.5	67	168	60
Cotton (Furrow)	12	90%	10%	0.3	45	1,620	486
Cotton (Drip)	4.2	90%	10%	0.3	35	441	132

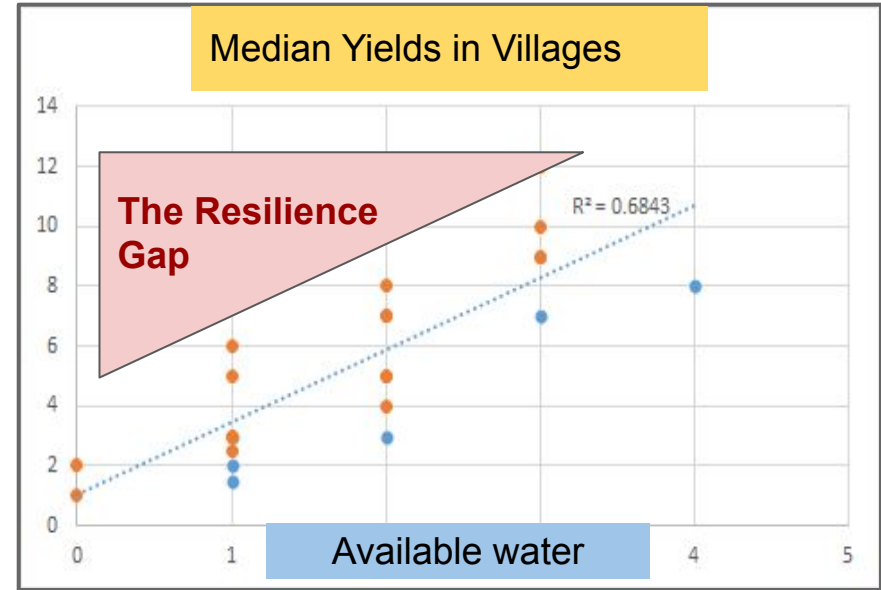
Estimates based on indices developed through measurements and observations



PoCRA Conclusions: Making Villages Resilient

Stabilizing Kharif and Rabi yields village-level analysis

- Rabi- Demand-side planning
- Kharif- Improving Access
- **Aggregate indices** - median yields, mean deficits, storage in village, energy infrastructure
- Better allocation of resources - better analysis - **One taluka at a time!**
- Better Knowledge support. New workflows.
- Progressive Krishi Sahayaks, Progressive Junior Engineers!



**Already available: Post-Monsoon Index,
Kharif Index**

Climate Resilience - Agenda for Research and Actions

Dry Spells - Measurements, Quantification, Ensuring coverage and access, guiding investments at farm and community level

Wet Spells - Tracking intensity and drawing up plans, ensuring drainage, estimation of losses

Rabi Yields and Crop Diversification -reducing competition, linking cropping patterns to available resource and market demand, ensuring diversification

Mapping Energy stress - bringing energy infrastructure in line with cropping patterns, ensuring compliance, load management

Innovative Extension - outcome-based extension, focus on key village narratives - median yields, storage in village

IT stack for Agriculture - advisories and contingencies, bringing in vendors for IT services at district and department level, **extending Water Budgets throughout the state - in steps.**

Climate Resilience - Agenda for Research and Actions

Dry Spells - Measurements, Quantification, Ensuring coverage and access, guiding investments at farm and community level

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Rabi Yields and Crop resource and market de s to available

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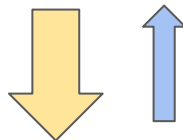
IT stack for Agriculture - advisories and contingencies, bringing in vendors for IT services at district and department level, **extending Water Budgets throughout the state - in steps.**

Some achieved, *some achievable by current PoCRA-IITB processes*, some need more work.

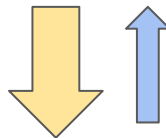
Way Ahead - Climate Change and Resilience



Dept. of Agri.



District SAO/
ATMA



Village/Comm
unity/Farmer

Business as Usual

- Little data gathering at the local level
- Little analysis at the district level
- Makes Policy-making largely uniform and thin
- Limits Preparedness and handling of extreme events
- Inability to take differential steps and justify them

Limited Liaison with MSEDCL, WRD, Forest, GSDA and other agencies

Way Ahead - The Climate Innovation Center - Knowledge



Dept. of Agri.



District SAO/
ATMA



Village/Comm
unity/Farmer

Provide knowledge support at department, district and community+farm through products and services

- **Department Level** - Dashboard, IT Stack, Contingencies and Policy Analysis
- **District-Level** : Collate data and analyse, **Cropping patterns, yields and prices, means and spreads**. Drive extension strategy, response to extreme events
- **Farm and Community Level** - Agenda setting at *hangam* level, guiding and targeting, safety net functions
- **Seed and coordinate research**

Way Ahead - The IITB-CIC Engagements

CIC-IITB Plan

Multi-year project.

Core Team: 1 CEO, 2 Water, 2 Contingency and IT Stack, 1 Energy, 1 Post-Harvest and Market-side Linkages.

Other staff as per projects.

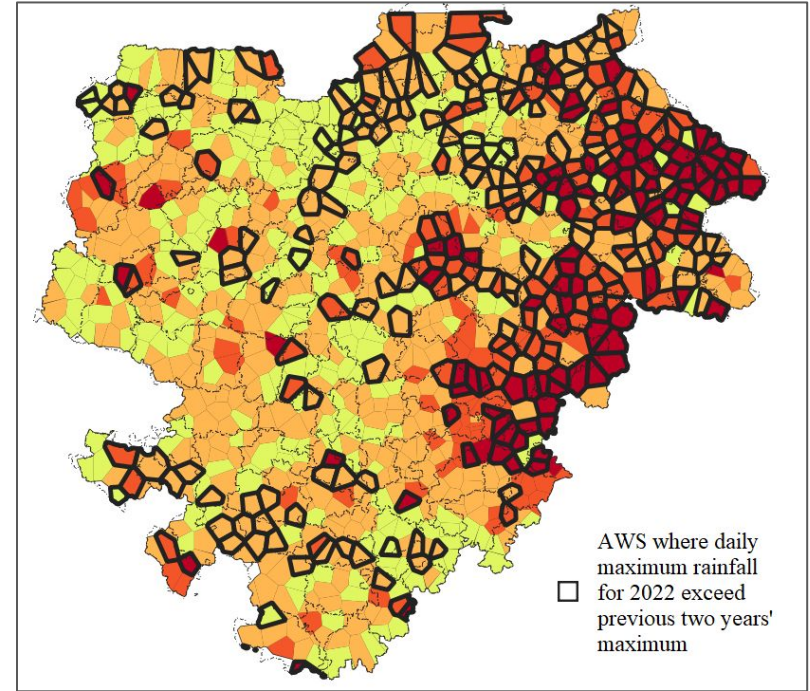
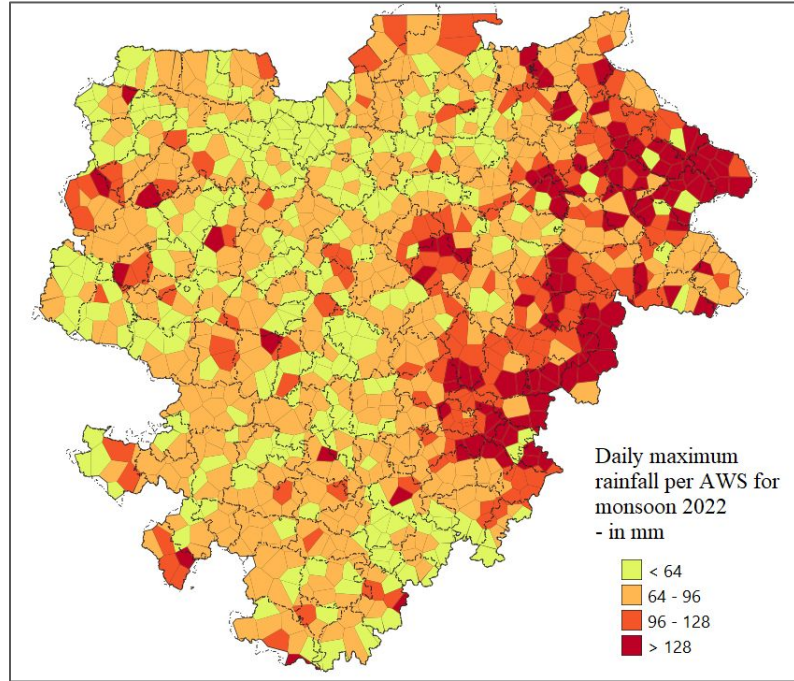
Possible Projects for Year 1.

- Expanding Water Budgets to whole state
- New SoPs for district-level data analysis, advisories and extension
- Extending basic model - GW and SW flows

CIC-IITB to operate as sequence of projects of 3-12 month duration, provide key reports, analyses, IT design, vendor and contracting support.

- Design projects based on department priority areas
- Work with pilot districts to extend SoPs.
- Devise innovative community and farm level activities and extension
- Develop and/or support IT infrastructure
- Drive agenda with allied agencies like MSEDCL, WRD, Forest, GSDA
- Coordinate with SAUs, KVKs and local agencies in all of the above.
- Provide guidance for vendable products and contracts

The most recent climate risk - wet spells



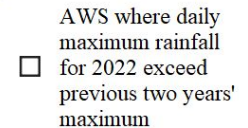
Can we tackle in a better way?

Compensation: Roughly Rs. 1200 crores, at Rs. 13,000 per hectare. Much of it is likely to be poorly targeted.

- Tools exist to identify wet-spell vulnerability at the zone and farm level. Methods exist to improve preparedness.

More Broadly - For Climate Resilience

- Spend Rs. 20/Ha per year on measurements and Rs. 10/Ha per year on R&D and analysis.





Thanks

