



WORLD GEOSPATIAL CONFERENCE 2025

# Using Data and Technology for Landscape Governance

Foundation for Ecological Security

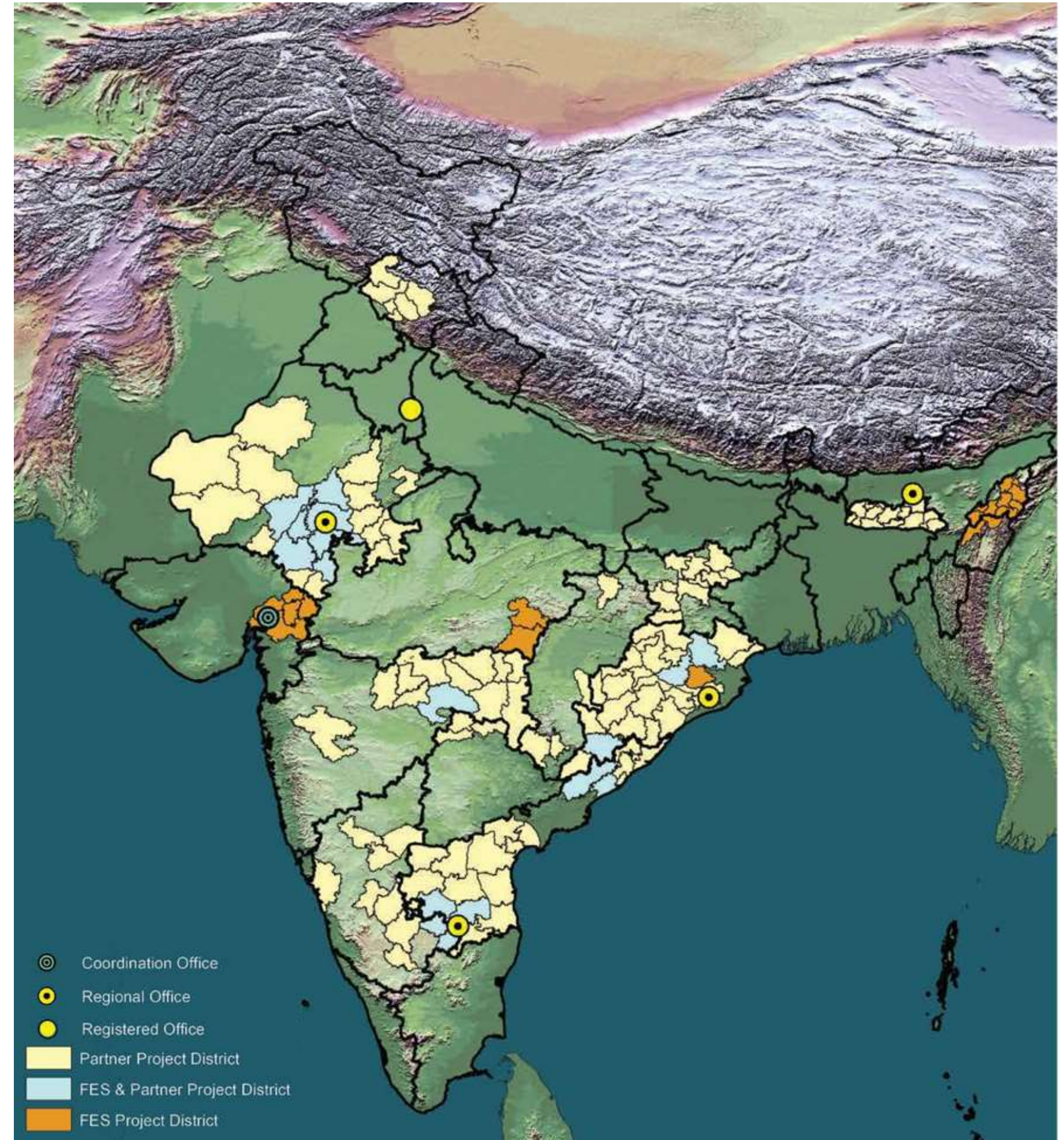


# FES

FOUNDATION FOR ECOLOGICAL SECURITY

- Established in 2001
- Currently working in ten eco-regions
- 119 districts of 14 states
- 8,309 villages through direct interventions, and 33,571 villages through partnerships with 92 NGOs and state government departments

Through	Village Institutions Strengthened	Million People Impacted	Million Acres of Commons under Community Governance
FES Teams	8,309	5.38	2.33
Government and NGO Partners	33,571	19.42	10.19
<b>Total</b>	<b>41,880</b>	<b>24.80</b>	<b>12.52</b>



# The Core Model

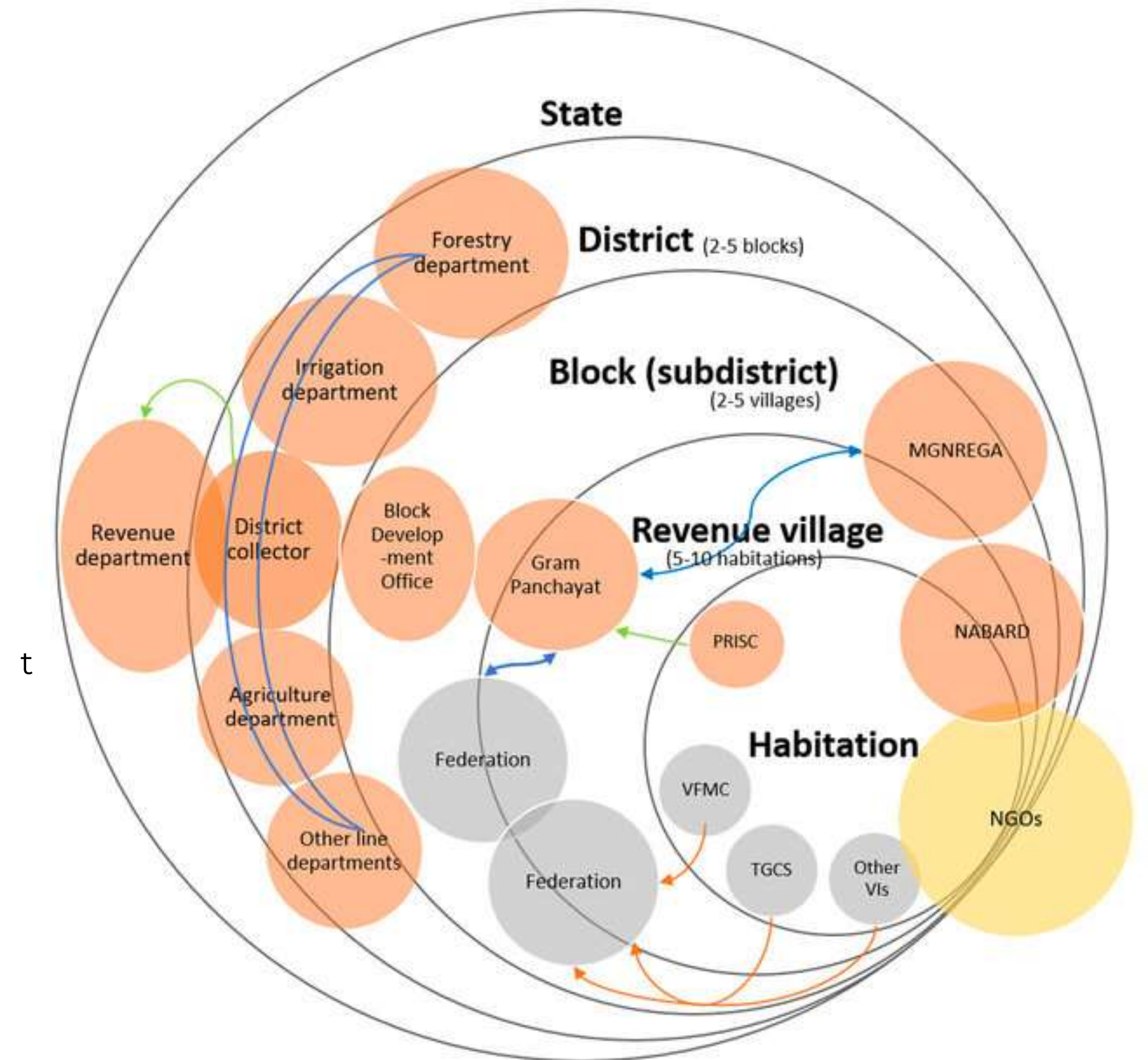


# Complex Problems

- We live in an increasingly interconnected, global society challenged by **cooperation problems across multiple scales**.
- Sustainability issues are governed by **complex, polycentric institutional arrangements** where multiple institutions and actors engage in **different forms of self-organization** to manage such cooperation problems.
- Increasingly **complex knowledge systems** seriously challenge our ability to deliver salient, credible and legitimate scientific information to decision-makers.
- Sustainable Management of Land and Water Resources poses similar challenges

# Polycentric Governance Challenge of Local Climate Action

- Multiple centers of decision-making with multiple kinds of datasets.
- Diverse actors need to change practices, actions, the way they do their businesses for sustainability
- Who needs to do what differently ?



Complex actor-institutional dynamics shaping the governance of Commons

Source: Meinzen-Dick et al. (2021). Securing the Commons in India: Mapping Polycentric Governance. *International Journal of the Commons*, 15(1), 218-235.

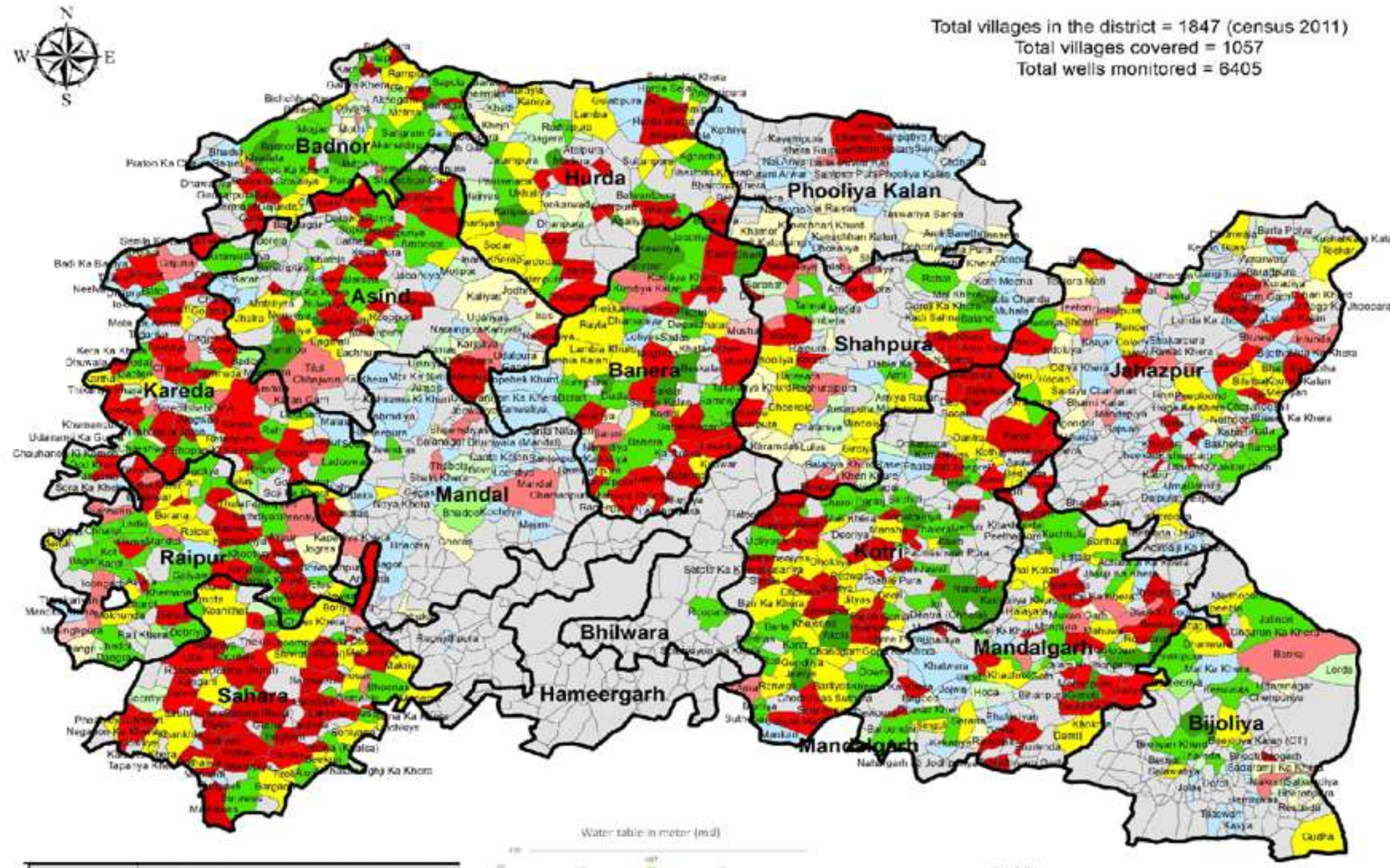
# Combining and Crafting Tools and approaches

FES has developed participatory data and GIS tools such as

Tool	Purpose
Groundwater Monitoring	Community GW Monitoring; Geotagging wells
Common Land Mapping	Community Mapping of Land and Water Bodies
Crop Water Budgeting	Shared understanding of Water Balance; Collective Agriculture Decisions
Composite Landscape Assessment and Restoration Tool (CLART)	Scientific Planning of NRM Assets using ge

# Informing Landscape Action

Village level categorization of Ground water situation in Bhilwara district based on WMT data (2020-2023)



Category	Village Category (based on times of monitoring and water table rise/fall)
Very good	Water table raised more than 50% time
Good	Water table raised 0-50% time
Poor	Water table declined 0-50% time
Very poor	Water table declined more than 50% time
Moderate	Stable water table

# Planning for conservation of land & Water (Composite Approach)

## Drainage Line

**VERY GOOD RECHARGE STRUCTURE**

Percolation Tanks,  
Water Harvesting Structure  
For Recharge,  
Contour Trench

**MODERATE RECHARGE STRUCTURE**

Water Arresting Trench,  
Gully Plug, Loose Boulder  
Check Dam

**SURFACE STORAGE AREA**

Farm Pond,  
Surface storage Structure

**CATCHMENT CONSERVATION**

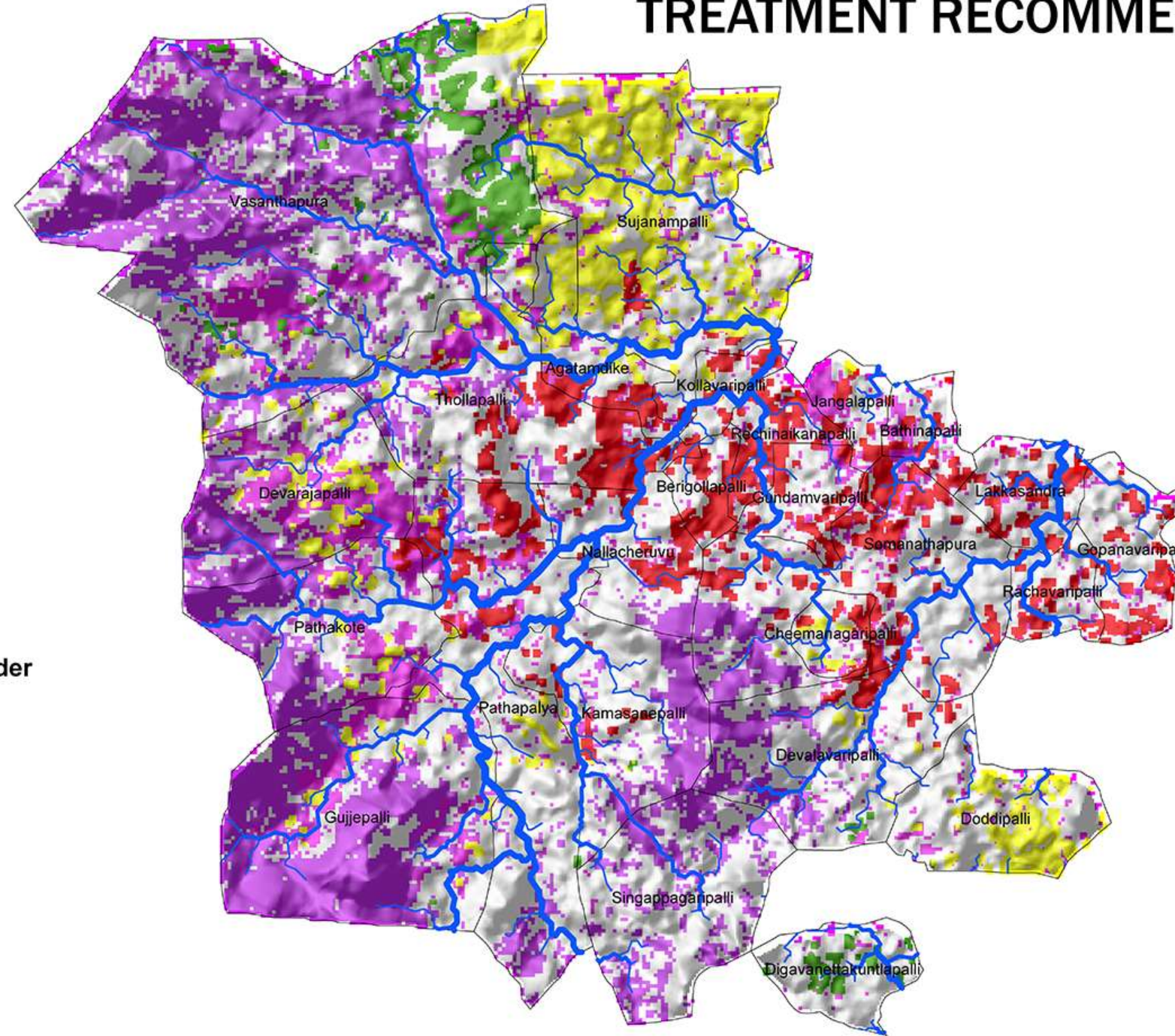
Grass seeding,  
Stone Bunding  
Bench terracing  
Regeneration



## TREATMENT RECOMMENDATION

**Stream Order**

- 1
- 2
- 3
- 4
- 5



# Knowledge, Motivation, Agency approach

- System Change as a set of Behavioral Changes
- Instead of starting with the tools, start with identifying the key actors
- Consider what they need : Knowledge of conditions/problems  
Motivation to address problems Agency/mechanisms to act
- What combination of tools can help equip them?

# Knowledge

Knowledge: “the ability to use information strategically to achieve one's objectives” (Logan 2012)

Shapes how people understand their situation (mental models)

Data (raw facts)+ organization, contextualization → Information  
Information + analysis, interpretation, models + sharing with key actors → Knowledge

# Motivation

Motivation: desire to act in service of a goal

Types of motivation

- Extrinsic
  - Regulation (fear of punishment)
  - Economic incentives
- Intrinsic
  - Care
  - Other norms

Most policies and “incentives” focus on extrinsic motivations

- Concerns with crowding out intrinsic motivations

How to appeal to/strengthen intrinsic motivations (moral incentives)?

Applies to communities, government, other actors

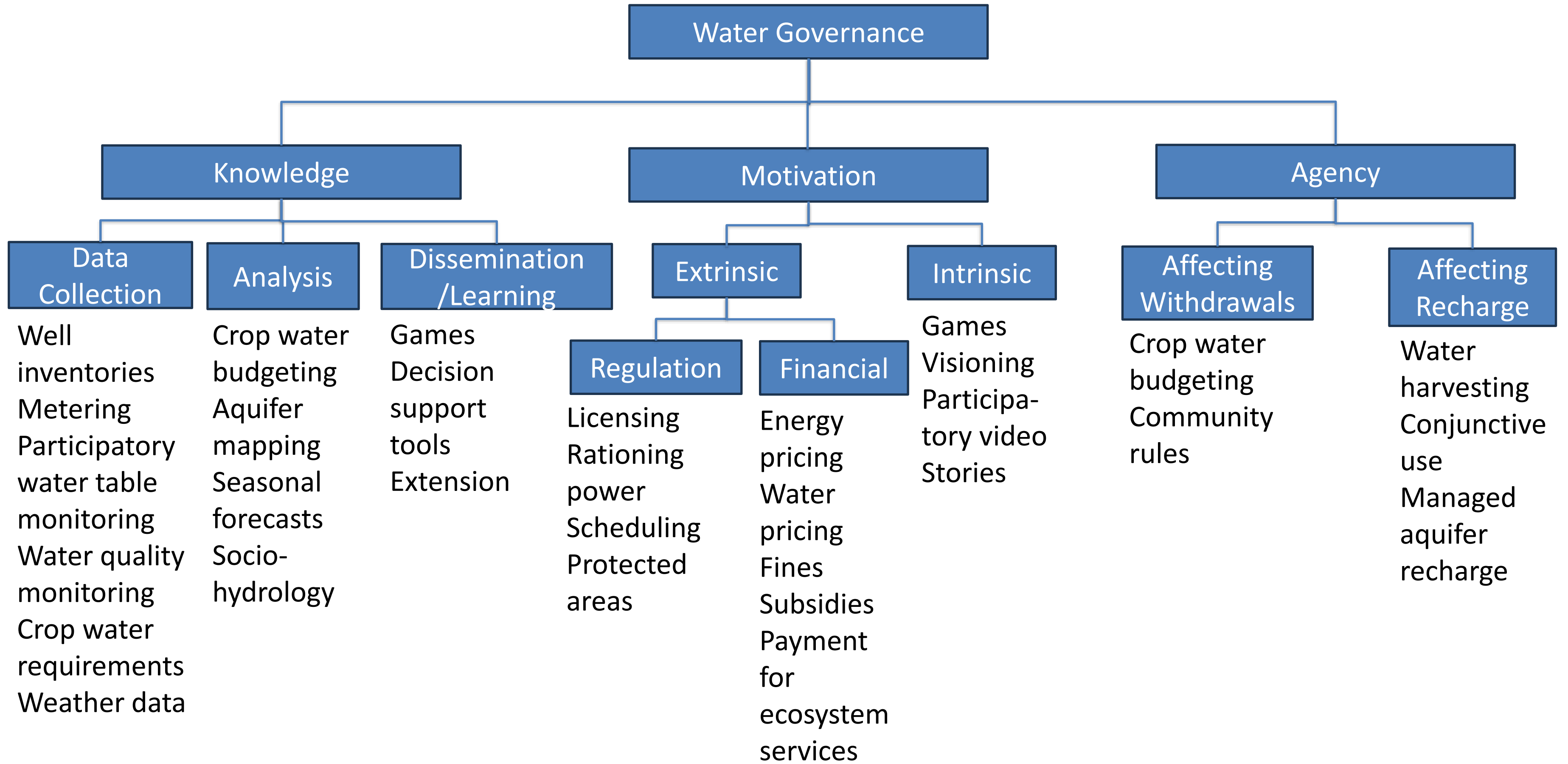
# Agency

Agency: being able to act to produce desired outcomes;  
action to shape biophysical and social conditions, including influencing the  
conduct of others

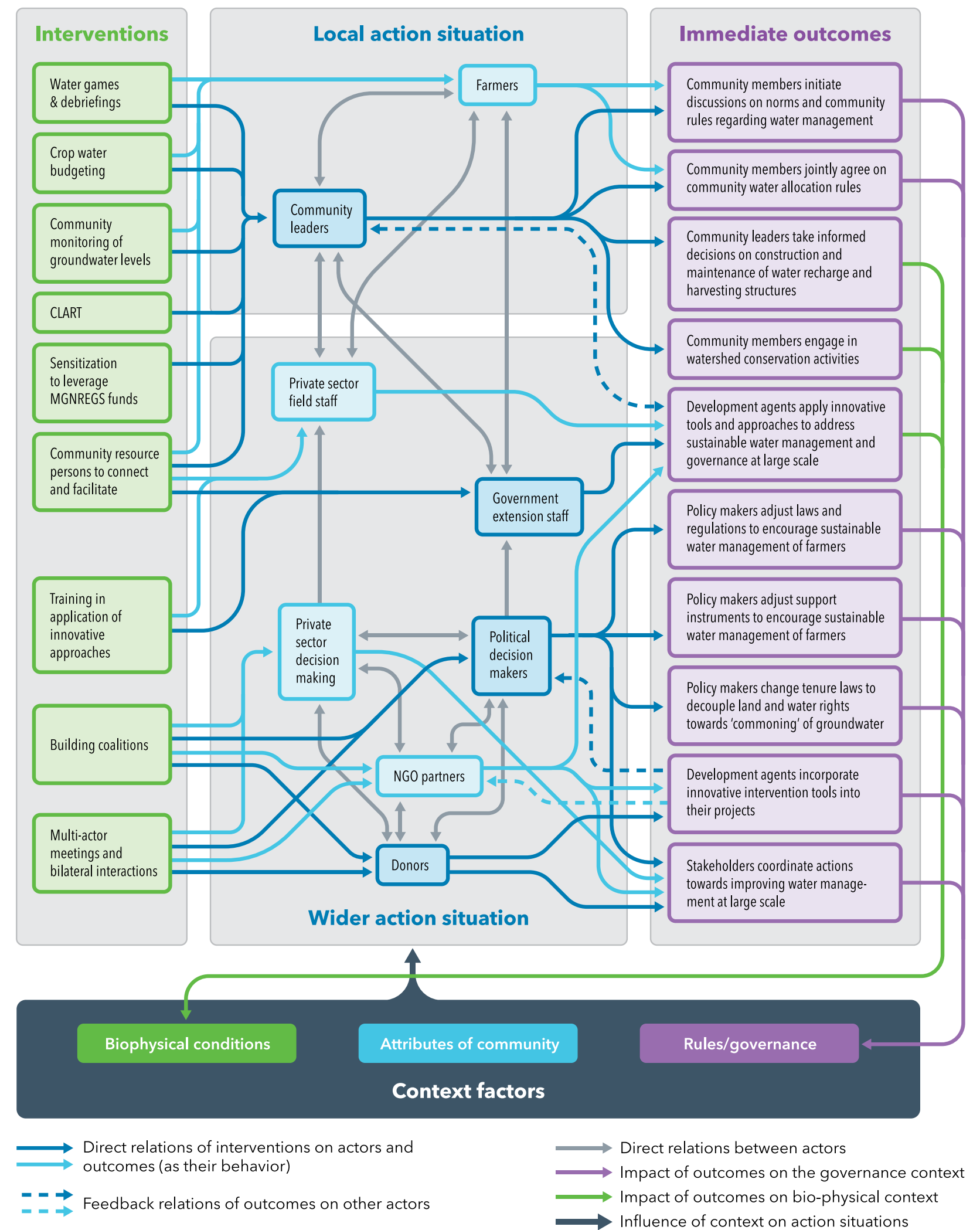
If people want to do something about groundwater problems, what can they  
do?

Coordinated action required; hence agency is relational

Power relations and structures can constrain agency



# Combination of tools aimed at behavior change



## References

- Meinzen-Dick, R., & Bruns, B. (2024). Crafting combinations to govern groundwater. *International Journal of the Commons*, 18(1), 585-600.
- Sanil, R., Falk, T., Meinzen-Dick, R., & Priyadarshini, P. (2024). Combining approaches for systemic behaviour change in groundwater governance. *International Journal of the Commons*, 18(1), 411-424.

Thank you.

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