

Gaming the System:

Stimulating Rules and Behavior Change for
Governance of Groundwater and
Conjunctive Use in India

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The Groundwater Commons

Water as commons:

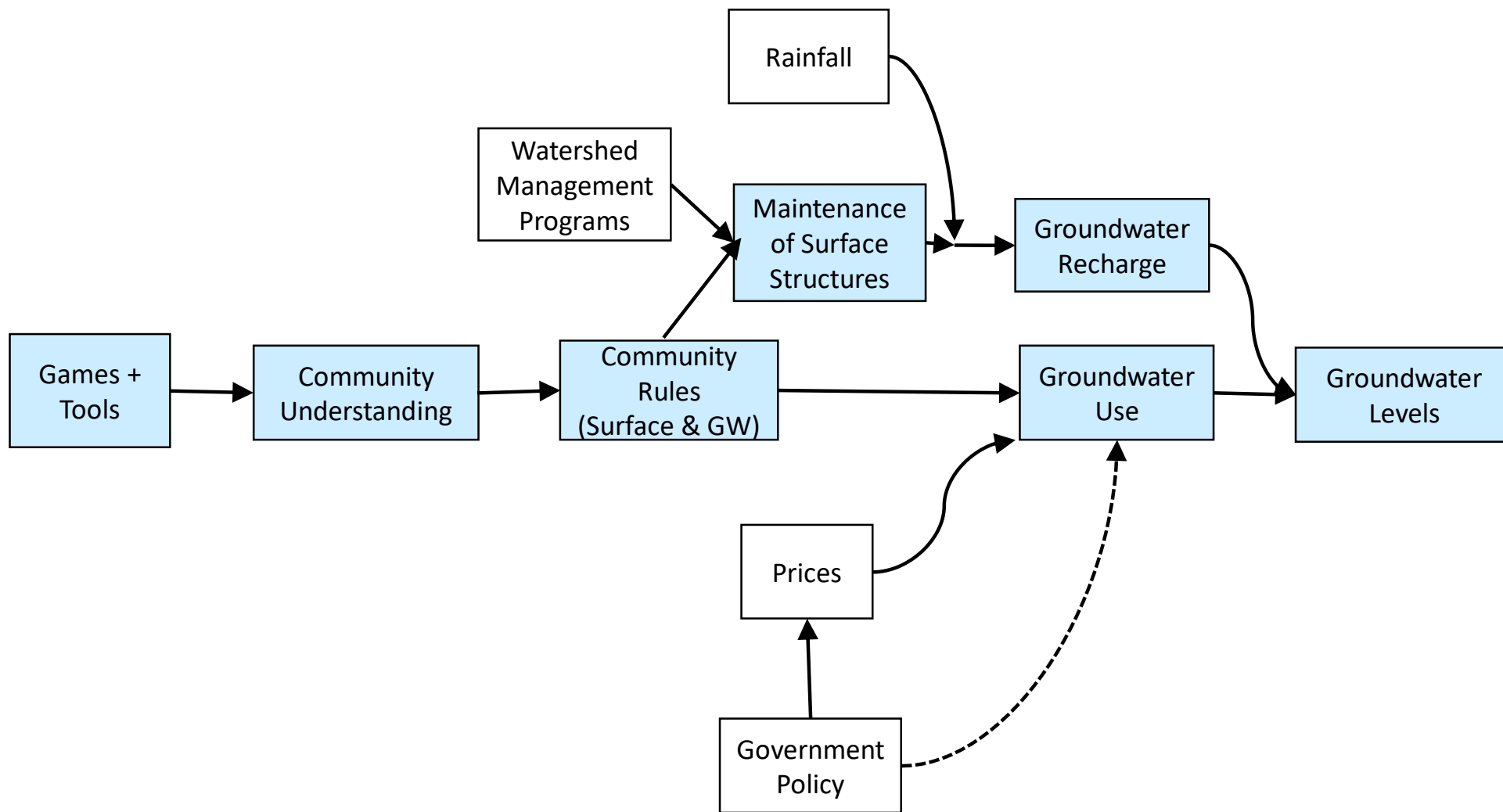
- High subtractability (one person's use reduces GW for others)
- Low excludability (boundaries difficult to establish)
- Fugitive resource
- **Further challenges of groundwater:**
 - Low visibility
 - Lack of understanding of resource dynamics
 - Difficult to identify aquifer boundaries, esp. in hard rock
 - "Traditional knowledge" insufficient with rapidly developing pumping technology
 - State regulation largely ineffective in India



Experimental Games for Experiential Learning

- Usually used to measure propensity to collective action
- Can games be used to strengthen collective action?
 - Shape “mental models” and understanding of relationships
 - Simulate several seasons in short time
 - Try different institutional arrangements
(Rules)





Groundwater game

Games

- Groups of 5 men or women
- Choose crop A or B with different water use & returns
- See effect on water table
- Multiple years, with and without communication
- Individual or community payments randomized

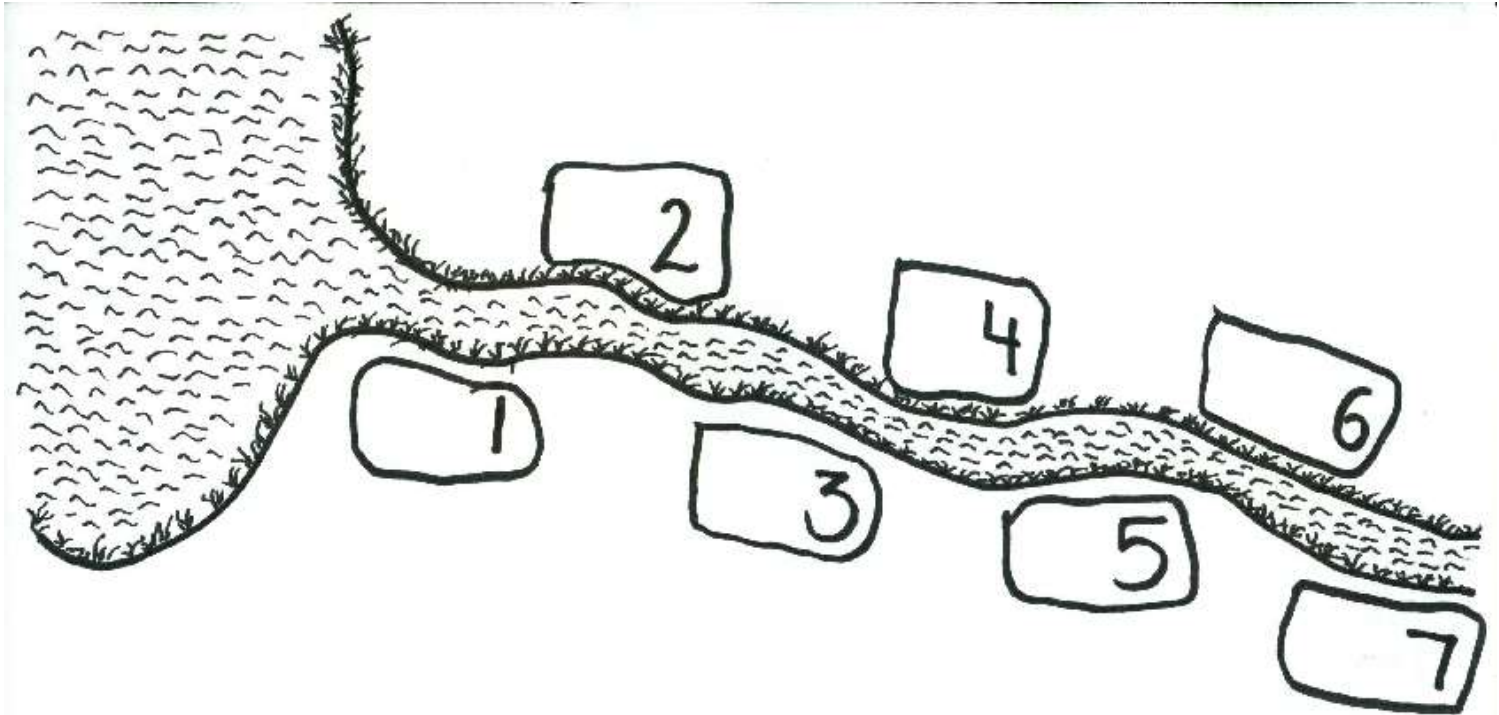
Community debriefing

- How this relates to own experiences and challenges farming
- Lessons and insights the participants gained from the experience
- Possible solutions



Surface Water Game

- Players individually decide on contributions to dam maintenance;
- Benefits from dam depend on total investment of all group members;
- Dam benefit equally distributed amongst all players; OR in sequential order
- Community debriefing.



Net return per ha in INR **Water requirement per ha in cum**

Wheat

15000

5500

Gram

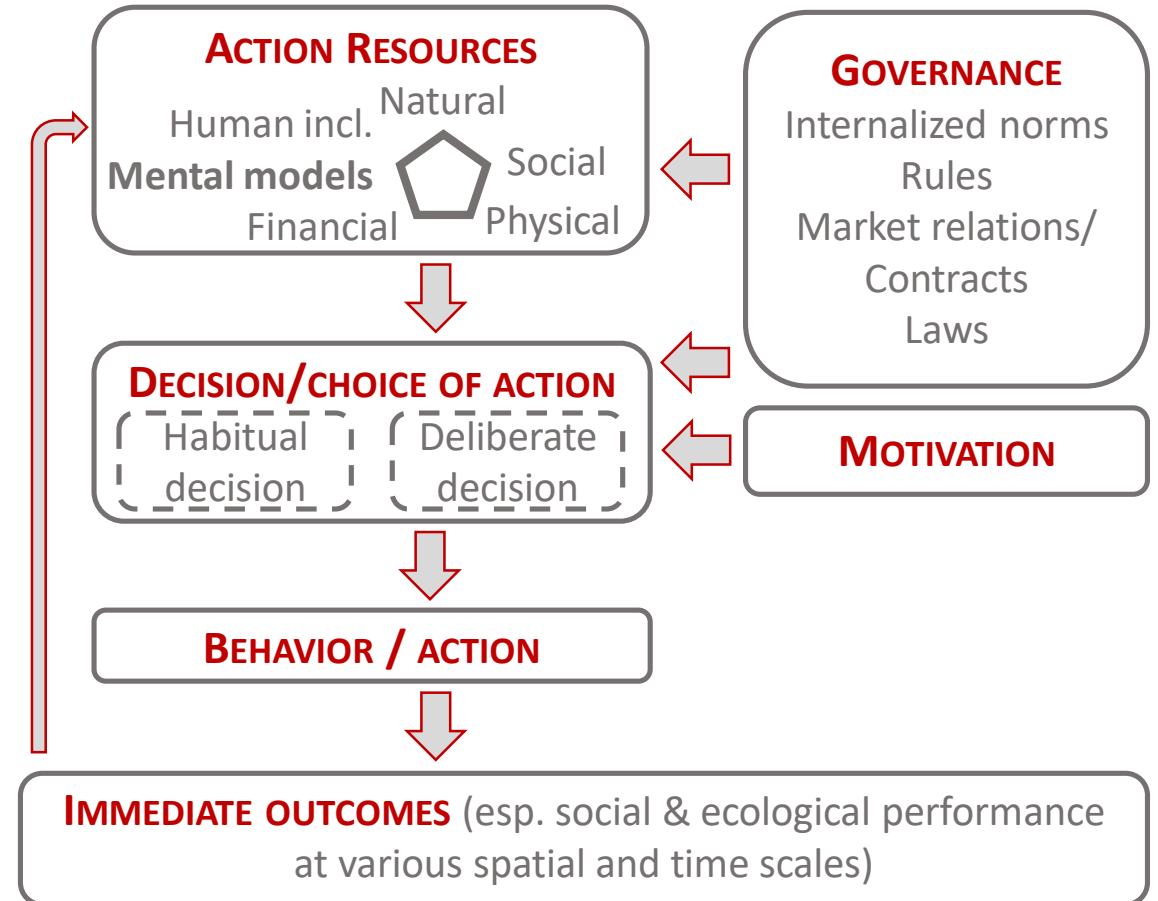
13000

3000

	15000	5500
	13000	3000

Intervention logic

- Learning by experiencing rather than formal teaching or learning by doing
- Rethinking habits
- Influencing internalized norms
- Experimenting with own rules
- Shift from “teaching” solutions to offering social learning space to find own solutions
- Demonstrating costs of poor action
- Highlighting interactions between actors



Outcomes of Games

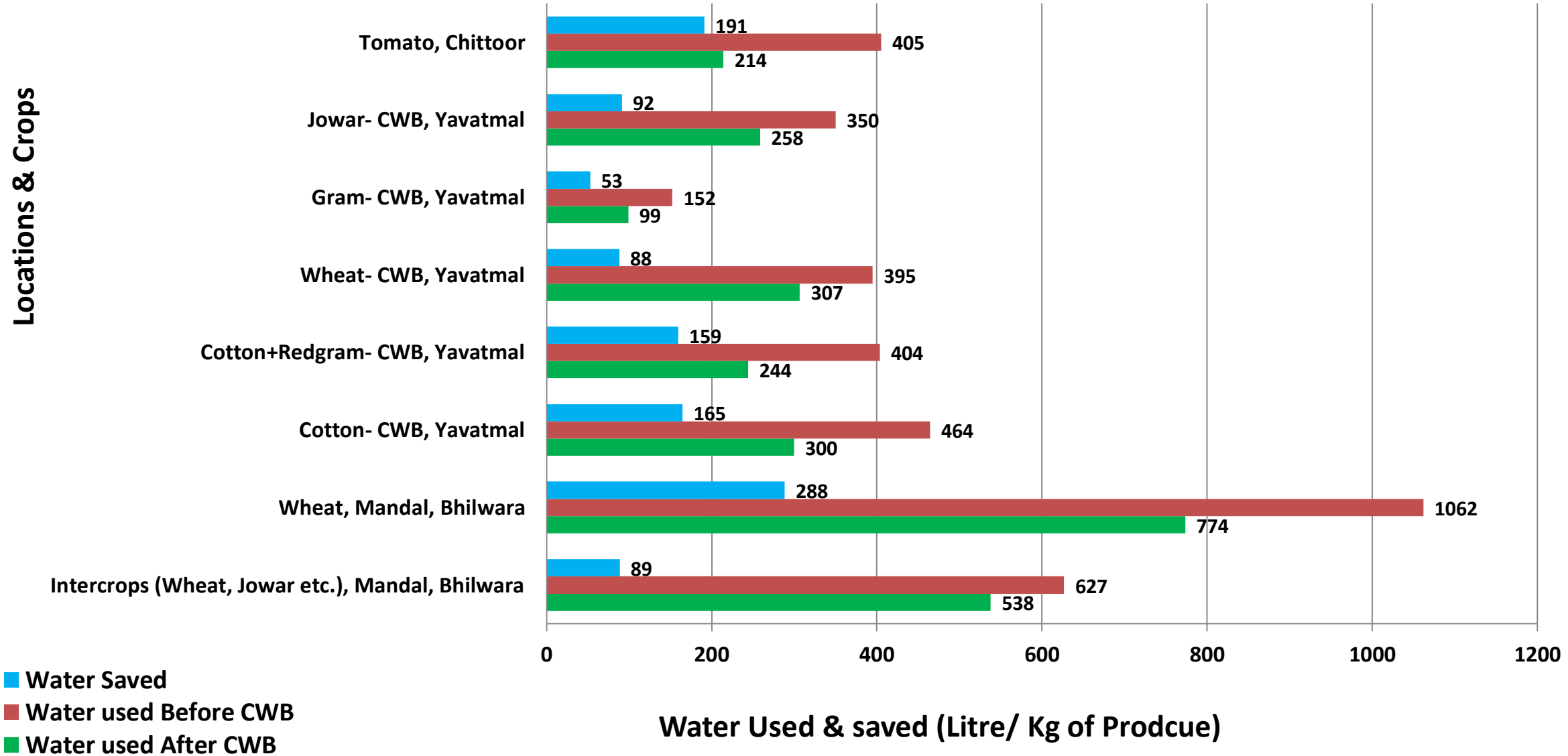
Game	States	Year	# habitations	Outcomes
Groundwater pilot	Andhra Pradesh	2013, 2014	17	Some effect on attitudes Communities more likely to adopt water registers & rules for groundwater *
Surface water	Rajasthan Madhya Pradesh	2016 2017	30 60	Communities more likely brought swelling water conflicts to the table and engaged in dam maintenance activities *
Groundwater expansion	Rajasthan, Madhya Pradesh, Andhra Pradesh	2014- 2019	214	Total 3747 farmers adopted less water consumptive crops or varieties and irrigation scheduling to save water**

*Compared to randomly selected control communities where game has no been played

**Compared to farmers' reported behavior, prior to the games

Water Used Before and After Crop Water Budgeting

Rabi - 2019-20



Resources

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