



Groundwater games in Ethiopia: Lessons from the field

Hagar ELDidi and Fekadu Gelaw

On behalf of the team: Wei Zhang, Natnael Teka, Caterina De Petris, Dawit Mekonnen, Seid Yimam, Claudia Ringler, Ruth Meinzen-Dick

Motivation

- Experiential learning is useful for identifying behavioral patterns and shaping mental models; learning by doing
- In Ethiopia, small-scale irrigation rapidly expanding; opportunity to improve awareness of groundwater resources and active engagement to avoid resource depletion before reaching critical phases

Research focus

- Study area: four Woredas of Central Ethiopia Regional State around Butajira: South Sodo, Eastern Meskan, Mareko & Meskan – 15 treatment & 15 control kebeles
- Test immediate learning effect of a group irrigation game on farmers; comparing before and after perceptions
- Test medium-term effect of the intervention on the communities (6 mo - FGDs)

Groundwater game

(Adapted from Meinzen-Dick et al. 2018)

- The game played by the 15 treatment kebeles
- In each treatment kebele, the game is played separately by female and male groups
 - 15 Kebeles * 2 groups * 5 members = 150 players
- Each player individually interviewed twice – before & after the game
 - To capture socioeconomic characteristics and mental model on the choice of crop



Groundwater game ...

- Each group plays three types of games: treatments

- No communications
- With communications
- Setting rules

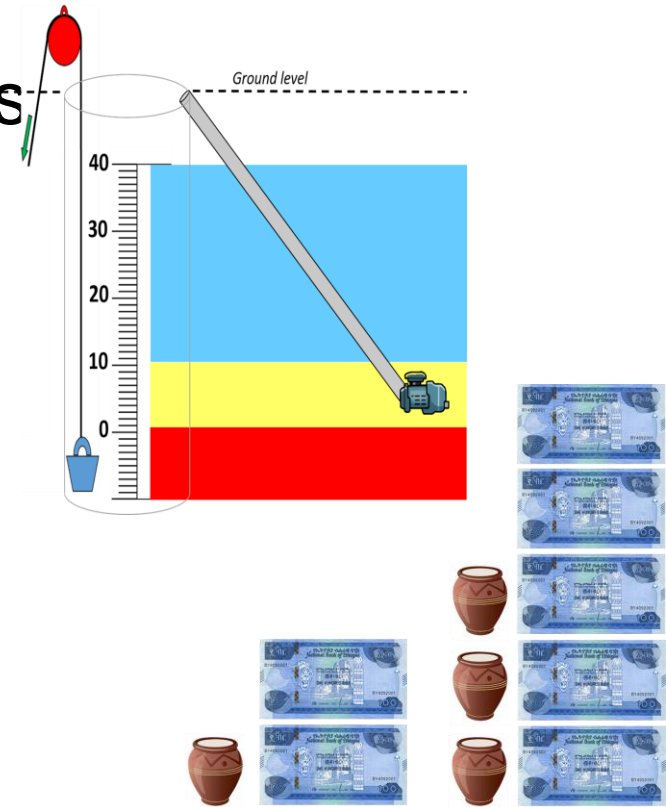
- Each of these games type up to 7 rounds, depending on the availability of water

- Max. of $7 \times 3 = 21$ rounds

- Water saving crops



- Water consuming crops

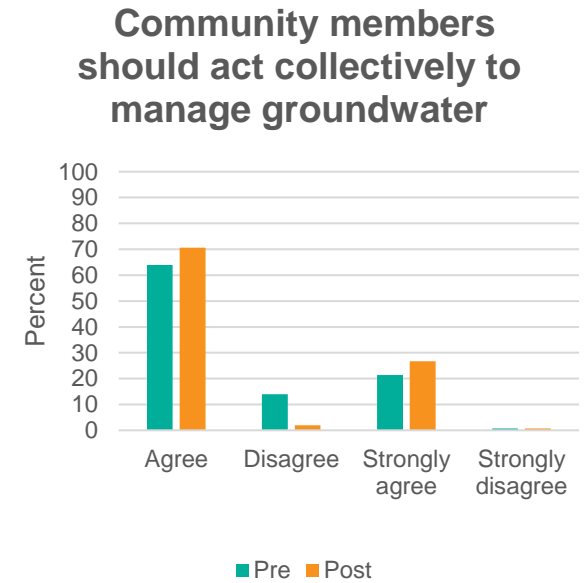
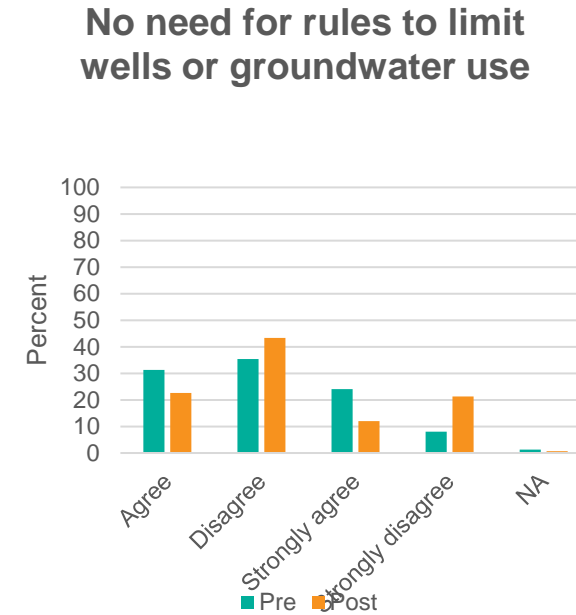
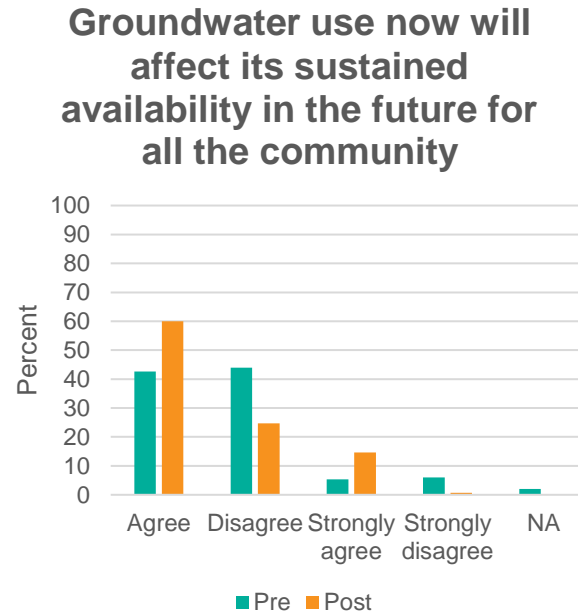
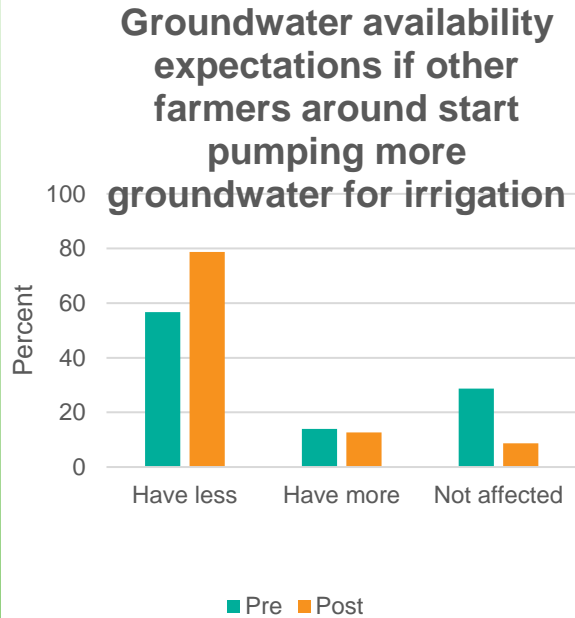


Supplementary tools

- Community debriefing
 - Lessons and insights from the game for local irrigation experiences
 - Brainstorming solutions
- Focus Group Discussions with selected community representative
 - 15 treatment & 15 control Kebeles
 - To understand the context of GW use and their perception



Immediate learning effects (Before-After mental models)

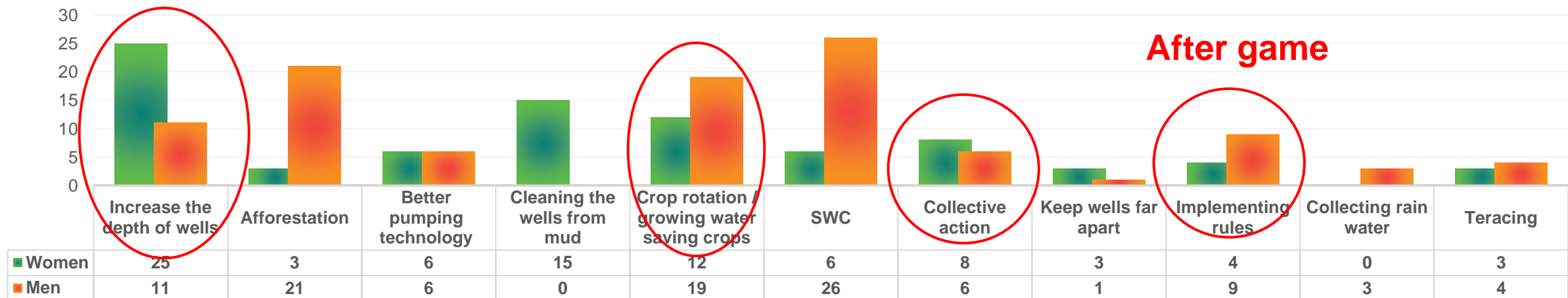


“The majority of us discussed the game at various social settings, and others learned from us”

“After playing this game, we realized that one farmer’s water consumption pattern has an effect on the entire system, and that we must make a collective decision and work together.”

Immediate learning effects (Before-After mental models)

What do you think should be done to improve groundwater availability?



Medium-term effects (endline FGDs)

- Recollected lessons from the game 6 months later
- Many reported necessity of establishing groundwater rules
- Few community-level institutions (adopted rules; water schedules)
 - No significant scarcity/urgency
 - Not yet the dry season
 - Need expert support
 - Simultaneous goals of expanding access to GW irrigation
- Group discussions, awareness raising among peers
 - Individual/ micro group behavior change reported

Share of group making water saving crop choices in the round

(Generalized Linear Model regression)

	<u>Pooled</u>	<u>Female</u>	<u>Male</u>
Game round	0.134*** (0.0504)	0.162* (0.0918)	0.0310 (0.0630)
Communication game	0.379** (0.148)	0.660*** (0.256)	0.0835 (0.189)
Communication game w/rules	0.743*** (0.162)	1.037*** (0.281)	0.515** (0.208)
Gender (Female)	-0.537*** (0.272)		
Total amount of water consumed for irrigation in the previous round	0.0550** (0.0266)	0.0929*** (0.0315)	0.0187 (0.0420)
Constant	-0.413 (0.714)	-1.716** (0.817)	12.43*** (1.387)
Observations	611	304	307
R-squared	0.302	0.309	0.345

Lessons and implications

- Post-game community debriefing discussion key for community-wide learning, spillover effects, and shed light on local governance concerns (e.g., equitable access)
- Games provide an initial, rapid, and scalable experiential learning opportunity about groundwater collective action challenges
 - Key first step to raise awareness and prime mindsets
 - Effective for cognitive, normative, and relational learning
- Deeper, longer-term, and targeted engagement with communities as an important next step
 - Embed in larger technical assistance intervention packages, partnering with local extension/practitioners on the ground
 - Equip communities with accurate local crop water requirements and up to date local aquifer mapping
 - Scaling up example: FES experience in India
- Implementation of rules/ community collective action is a longer-term process

