Understanding Climate Change Impacts on Common-Pool Resources Management: The Case of Collective Irrigation Systems in Argentina

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1 What?

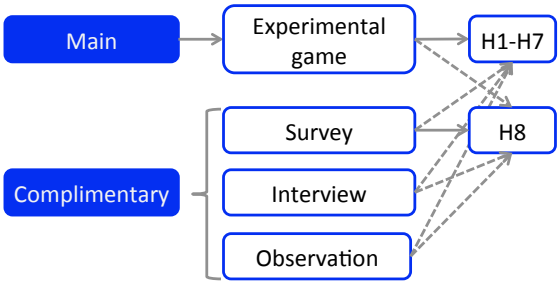
How do small-scale farmers collectively manage their communal irrigation systems under Climate Change (CC)?

2 Why?

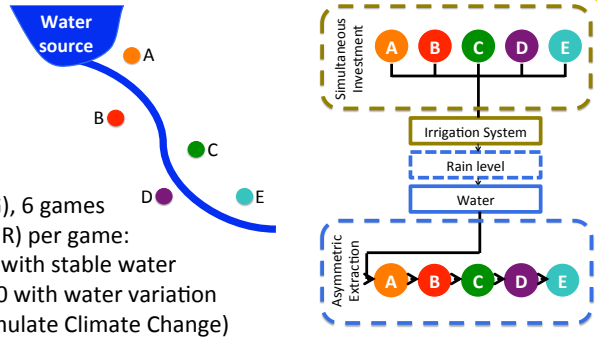
- Farmers are irrigation-water dependent.
- Farmers are increasingly exposed to Climate Change (water variation).
- Climate Change might negatively affect farmers.

3a How?

- Multi-method approach to test 8 Hypotheses (H)
- Field experiment with farmers



3b The game

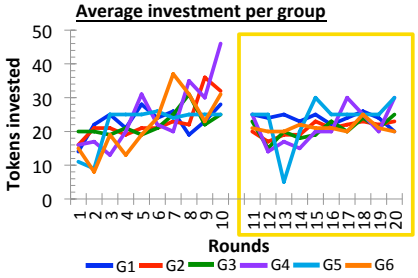


- 6 Groups (G), 6 games
- 20 Rounds (R) per game:
  - R1-10 with stable water
  - R11-20 with water variation (to simulate Climate Change)
- 5 players per game in asymmetric positions: A, B, C, D and E
- Endowment per player: 10 tokens/Round
- Investment in the system: simultaneous and private
- Extraction of water: asymmetric and public
- Final income per player = tokens not invested + value of their crops

4 Findings

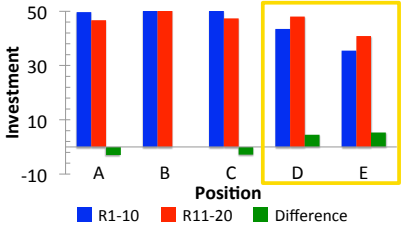
Investment

Average investment per group



- Investment converged under Climate Change (R11-20)

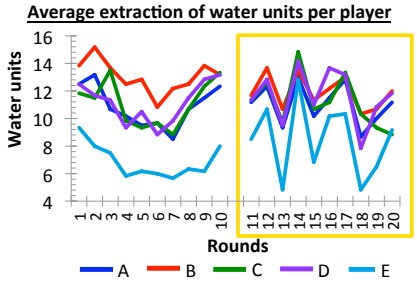
Average investment per set of rounds per player



- During Climate Change (R11-20) some players invested more
- Downstream players (E) invested less

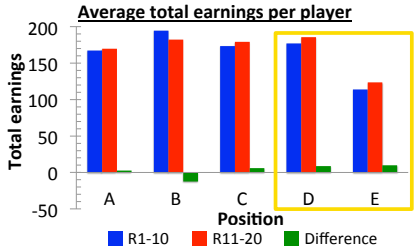
Extraction and earnings

Average extraction of water units per player



- Water extraction fluctuated more during Climate Change (R11-20)
- Player E confronted more variation

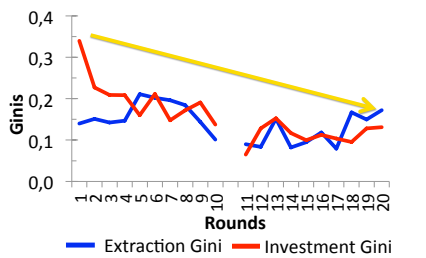
Average total earnings per player



- During Climate Change (R11-20) players earned more
- Downstream players (E) earned less

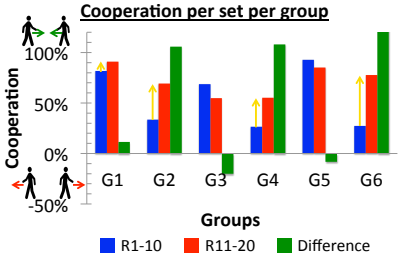
Inequality and Cooperation

Average investment and extraction Gini coefficients



- Investment and water extraction inequality improved during Climate Change (R11-20)

Cooperation per set per group



- Cooperation improved during Climate Change (R11-20)

5 Conclusion

- Some strategies observed in the field were consistent with previous findings (laboratory), others were not.
- Organized groups proved to have more capacity to collectively manage their communal irrigation systems.
- The lack of social capital in non-organized groups inhibited collective actions.
- Further field studies are necessary to build more comprehensive and consistent empirical evidence.

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