Community Irrigation Sharing Arrangement and Smallholders' Market Led Agriculture - A Case of Odisha State, India

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Background and objective

- Community Irrigation Sharing Arrangement is a well-known irrigation sharing model adopted in many agrarian economies.
- In India, this model was adopted in groundwater irrigation since the 1960s in which government invests in physical structure development.
- For operationalization, a Water User Association (WUA) is formed by the beneficiary farmers that is a governance arrangement amongst farmers within a community to share irrigation water.
- During the past half a century, WUA's impact on cropping pattern has been diverse when markets are accessible, irrespective of its place of formation & scale of operation.
- **Research question-** How does a WUA in groundwater impact on smallholders' cropping pattern when markets are accessible?

Material and methods

Study area	➢ Cuttack and Jagatsinghpur districts from Odisha state in eastern India are chosen due to the high number of functional WUAs in groundwater that started establishing since the 1970s.
Research design	➢ Focus Group Discussion (FGD) in 6-10 farmers' group organized in 20 WUA from 12 villages. ➢ 3-4 representative farmers were personally interviewed using a structured questionnaire to triangulate the data collected in the FGD at the farm level.
Data collected	➢ Quantitative information on cropping pattern, irrigation provision and market accessibility before (farmer's recall data & published secondary data) and after (survey) a WUA formation.
Survey period	➢ November 2018 - March 2019.
Analytical method	➢ K-medoids clustering method is utilized to group the WUAs reflecting the impact of low-cost irrigation provision and market access on cropping pattern change.

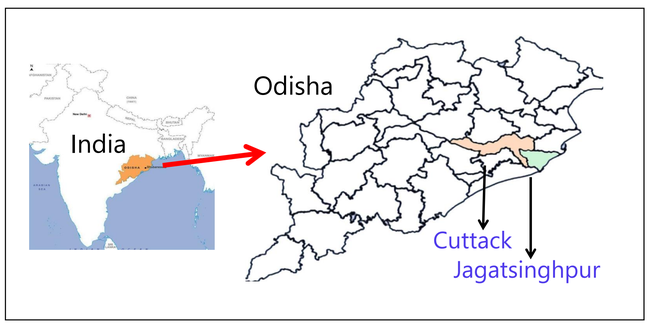

Figure 1. Map of the study area


Figure 2. FGD with farmers in a crop field in Cuttack

Results

- Farmers representing HD and MD shifted the previous rice-based cropping pattern, i.e. Rice (Rainy season: June-Sept)- Green Gram (Winter season: Oct-Jan)- Fallow (Summer season: Feb-May) to the vegetable-based cropping pattern, i.e. Rice – Vegetables –Vegetables.


Figure 4. Crop diversity in HD

- HD farmers mostly cultivated the off-season vegetables and marketed by self to the city market.
- MD farmers grew seasonal vegetables and sold through village traders.


Figure 5. Crop diversity in MD

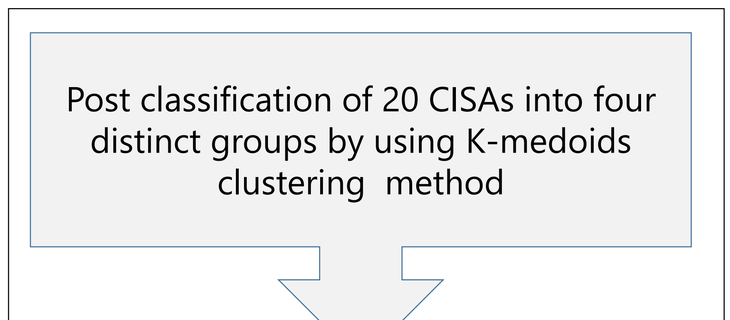

Figure 3. Post classification of CISAs into distinct groups


Figure 6. Contract sale of sugarcane in ML & LD

- 51 % of cultivated land in ML and 72 % in **LD** were shifted from the previously followed Rice- Green Gram – Fallow to the Sugarcane based cropping pattern and availed the contract sale agreement with a sugar mill.
- 20 % of the ML farms' shift to Rice-Vegetables- Oil seed was also observed, who sold their vegetables to the village traders.


Figure 7. Crop specialization in LD

Conclusion

- Vegetable-based crop diversification took place in the WUAs when markets are accessed directly by self or a village trader.
- Low-cost WUA water and limited direct market accessibility triggered sugarcane specialization for its contracted sale.

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