Why Investing in Irrigation Wells? Analysis for 6 Indian Villages

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Presentation outline

Context

Objective

Methodology

Results

Conclusions

Context

- Since 1970 boom in borewells in India
  > From 20% irrigated by wells to 60%
  > Private initiatives
  > Policy support (credit, subsidies...)
- By end of the 1990s problem of water scarcity
  > Falling water tables
  > Borewell failures
  > Increasing investment costs

Context

- Return on investments has decreased and becomes much more uncertain
- Nevertheless farmers keep investing
- Possible reasons

  > Insufficient knowledge of groundwater system
  - Invisible nature of the resource
  - Difficulty to perceive impact of own use

Context

- Possible reasons

  > Sunk cost fallacy / escalation of commitment

  - Costs from the past determine current decisions
  - Vicious circle of indebtedness

- Behaviour aggravates water scarcity

Objective

- Understand investment decisions of farmers
- Support policy formulation for sustainable groundwater extraction

Methodology

- ICRISAT Village level Studies dataset is used
- Representative panel dataset (2001-2009) of 447 farmers in 6 villages in 3 districts from two states (Andhra Pradesh and Maharashtra)
- Yearly interview on a variety of topics (socio-economic; farming; resource use...)

Methodology

- Questionnaire contains module on well investments
  - Size of investment, depth of the well, number of attempts
- Analysis of investment decision using a Double Hurdle model :
  - Whether to invest (logit)
  - How much to invest (truncated)

Results: Descriptives

- On average 2.2 ha cultivated, irrigated area 1 ha
- Irrigation of paddy, cotton, sugar cane, vegetables
- 70 % indebted (average 400 euro)
- Signs of increasing water scarcity ?
  - Over years slight decrease in irrigated area
  - Deeper wells
  - Increasing investments

Results: Investment model

- Two decision have different determinants
  - Double hurdle outperforms tobit
- Decision whether to invest depends on
  - Past investments (+)
  - Land ownership (+)
  - Rainfall (-)
  - District

Results: Investment model

- Decision how much to invest depends on
  - Irrigated area (+)
  - Non-agricultural income (+)
  - District

Conclusions

- Confirmation of problem of escalation of commitment
- Adequate legal and institutional arrangements are necessary to regulate users
  - Credit and subsidy system
  - Licensing of wells, a reform of the property rights
  - Making people aware of the non-viability of their investments

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