

Agri. technology adoption: some selected issues

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Adoption studies

- The level and rate of technology adoption is a recurrent policy concern
- The early adoption literature (reviewed by Feder *et.al*, 1985 and Feder and Umali, 1993) presents a variety of social, economic, natural, and institutional factors

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Adoption studies



Various factors identified:

- ⇒ Risk preferences;
- ⇒ HH features (age, education level, resource endowment etc.)
- ⇒ Relative factor prices;
- ⇒ Institutional constraints (markets, finance, information *etc.*),
- ⇒ Poverty status *etc*

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Agri. technology adoption - constraints



- A. **Policy & institutional issues:** access to markets, agric. extention, technologies
- The poverty of the 3 Is
- Market constraints: farmers receive less than 30 % of the final price of their own produce

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Agri. technology adoption - constraints



B. Natural and environmental factors - drought, desertification, climate change etc.

C. Cultural factors - local taboos, religion etc.

D. Farm household endowment & contextual factors

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Agri. technology adoption - constraints



Household resource allocation decisions, subject to A to D, result in

⇒ Agri. Technology adoption levels

Two set of impacts, often trade-offs:

⇒ Agri. production and productivity outcomes

⇒ Natural resources and environmental outcomes

⇒ How to balance these policy concerns?

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Adoption studies



The literature since early 1990's analyses the impact of **technology characteristics** on adoption (eg. Adesina and Zinnah, 1993; Adesina and Seidi, 1997; Pingali *et. al*, 2001; Negatu and Parikh, 1999)

⇒ Accordingly, technologies are as good as their attributes (characteristics)

⇒ **Desirable** and **undesirable** features

Adoption studies



⇒ DD for technologies – *derived dd for technology attributes*

⇒ *Lack of harmony* between farmers' concerns / preferences and the technology characteristics

LESSON:

⇒ Integrating farmers' preferences, values and concerns into the technology devt and transfer process

Eg. A study on genetic technology



Farmers are questioning the meaning (to their lives) of what we do
Interview fatigue

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Adoption studies



If agri. technologies do not consider farmers' contextual concerns & potential impacts (Haugerup & Collinson, 1990):

- ⇒ Released but not used
- ⇒ Technologies farmers might find valuable rejected
- ⇒ Used but not resulting the envisaged impacts

Challenge: The relevance of technology attributes varies across enterprises, countries and farmers

Adoption studies



- More recently, agricultural technology adoption has been linked with social networks:
 - ▶ Bandiera and Rasul (2006)
 - ▶ Conley and Udry (2001)
 - ▶ Munshi (2004)
 - ⇒ Social networks
 - ⇒ Individual interactions
 - ⇒ Learning by doing
 - ⇒ Learning curve

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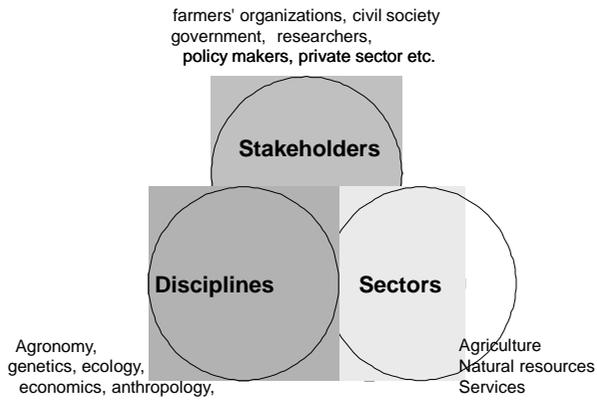
What needs to change?



- Research, technology devt and transfer system is often not participatory, in-flexible and top-down nature (Befekadu and Berhanu, 1999)
- It fails to take into account farmers' heterogeneity
- It fails to ask 'Which farm HHs prefer what kind of technologies? Why?'

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A more holistic and participatory approach to technology devt & transfer: systems thinking?



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What needs to change?



Targeted, choice-based, and context-specific technology devt & transfer strategies

Farmers' involvement with the technology devt remains critical

There is a need to understand 'what do farmers expect from an improved technology?'

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What needs to change?



- ❑ 'One size fits all' recommendation overlooks farmers' heterogeneity
- ❑ Eg. The same transgenic variety for all farmers across the board hardly works

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What needs to change?



- ❑ The research priority setting - **'technology devt for whom?'**
- ❑ Relevant stakeholders involved in technology devt & transfer
- ❑ Build a portfolio of technologies with diverse set of attributes broadly compatible with farmers' preferences based on 'farmer types'

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What needs to change



- ☞ A demand-driven technology development & transfer policy:
 - ☞ Enhances adoption
 - ☞ Reduces transaction costs
 - ☞ Enhances impact

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CONCLUDING REMARKS



- Undertake *ex ante* IA:
 - Productivity, competitiveness, incomes, prices, equity
- Undertake ex post IA: feedback to **policy makers and researchers**
- **Consider average and heterogeneous impacts**
 - Users of agri. technology do not benefit equally
 - Non-use of an improved technology does not necessarily involve opportunity costs

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CONCLUDING REMARKS



- ☞ Dynamics - rural development interventions change farmers' concerns and preferences for technology attributes
- ☞ For instance, irrigation – no more demand for drought resistance and environmental adaptability
- ☞ Dynamics – make some technologies attributes obsolete & results in newly demanded technology traits

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Some questions for further thinking



- How can agri. research evidence favourably influence agricultural technology development and transfer?
- **Breeders / farmers / traders / consumers do not necessarily have similar preferences**
 - The challenge – how do we address the heterogeneous demands of all actors in the market value chain, especially when the technology influences the final product?
 - Balancing the demand conflicts

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