Economic Impacts of Farmer Field Schools: Evidence from Latin America

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Goal

- Measure economic impacts of the delivery of Integrated Pest Management (IPM) through Farmer Field School (FFS) extension approach among bean growers in Nicaragua

What are Farmer Field Schools?

- Farmer Field Schools (FFS) Intensive IPM training that:
  - A) Incorporates farmers priorities
  - B) Uses learning by doing approach
- Aims to increase IPM adoption
  - Improving on Training & Visit extension
  - But... more expensive

Literature gaps & research questions (1)

- Extension impacts traditionally measured by IPM knowledge & pesticide use.
  - **Profitability & health outcomes are more relevant, but less measured**
  - **Extension participants often not randomly selected**
    - **Self-selection of more motivated farmers**
    - **Invitations to known extension collaborators**

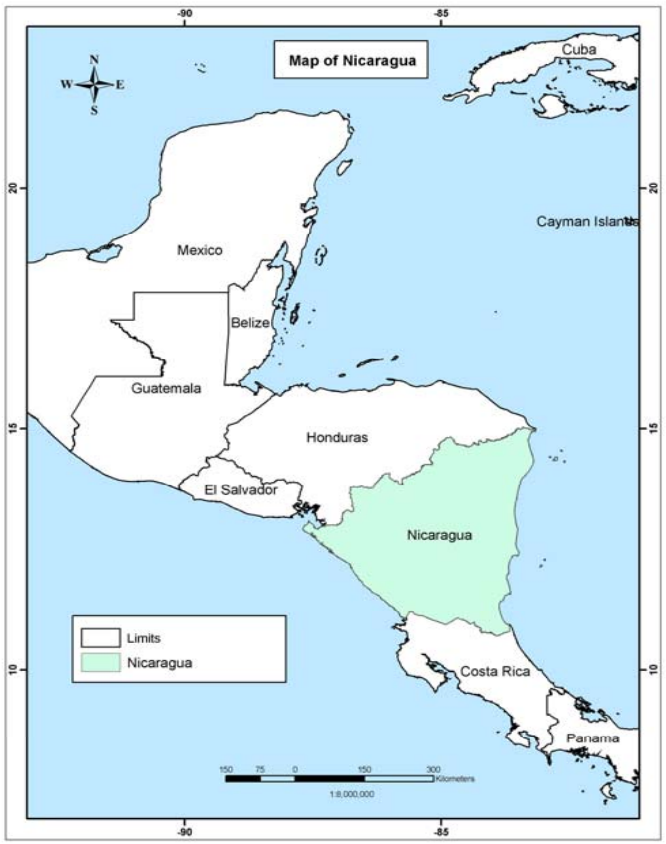
- After controlling for selection bias, do FFS improve graduates' profitability & health outcomes ?

Literature gaps & research questions (2)

- NGO extension providers have replaced public institutions in delivering agricultural technologies.
  - **But NGOs are diverse and impact assessments have failed to explore what NGO characteristics can enhance extension outcomes.**

- Do the characteristics of NGOs that implement FFS influence FFS impacts ? If so, how ?

The Data



- Cross sectional survey 436 bean growers in 74 communities (2004)
- Double stratification, based on exposure to IPM training
  - 22 FFS communities
  - 26 IPM communities no FFS
  - 26 communities without IPM/FFS
- Random selection of participants and non-participants in IPM training

Econometric Estimation

- Clustered & stratified sample design:
  - Survey regressions and population weighting scheme
- Control for selection bias (endogeneity) of participation in FFS & other IPM training
  - 2SLS regressions, using predicted probability of participation as instrumental variables (IV)
  - Predicted probability through probit

Regression models

- **Pesticide demand**: quantity of toxicity weighted pesticides
  IPM adoption: whether they adopted IPM practices
  Labor for spraying: man-days used in spraying chemicals
  Net revenues: US$ per hectare from bean production

- **Explanatory variables**
  Input & output prices
  FFS & other IPM training
  E & H variables
  Socioeconomic characteristics
  Community variables

FFS impacts on farm level, environmental and health outcomes

- IPM training variables:
  - 1) FFS participation
  - 2) Other IPM training participation (T&V)
  - 3) Both FFS **and** Other IPM (35)
  - 4) Neighbor of FFS participant
  - 5) No IPM training (control group)

- Health & environmental outcomes:
  - Acute illness symptoms reported
  - Beneficial insect population – observed level

Key results: FFS impact

- When no control for selection bias, FFS ➔
  - More IPM adoption
  - Less pesticide toxicity risk
- When selection bias controlled, FFS ➔
  - No adoption effect
  - No change in toxicity risk
  - More reports of respiratory & eye irritation
- “Other IPM training” (T&V) does succeed

If FFS training unsuccessful, then why? Can it be implementing organizations?

- NGOs implementing FFS differ in:
  - 1) Number of extensionists
  - 2) Number of extensionists with IPM & FFS training
  - 3) Number of extensionists per project/district
  - 4) Years of experience
  - 5) FFS emphasis (soil conservation, credit)
  - 6) FFS comparative experiments (IPM plot vs traditional)
  - 7) Results of IPM experimentation

Key NGO traits for FFS success

- More IPM adoption where
  - Focus on agriculture, soil conservation (not credit)
  - Experiments where IPM gave higher bean yields
- Less pesticide toxicity where
  - More extensionists, more experienced
  - Expertise in IPM (not FFS method, per se)
- Higher bean revenues where
  - Expertise in IPM (not FFS method, per se)

Conclusions

- Failing to correct for endogeneity of FFS can exaggerate their impacts.
- FFS for bean IPM in Nicaragua performed worse than T&V in profitability, health.
- If continued, future FFS should choose NGO providers with care.

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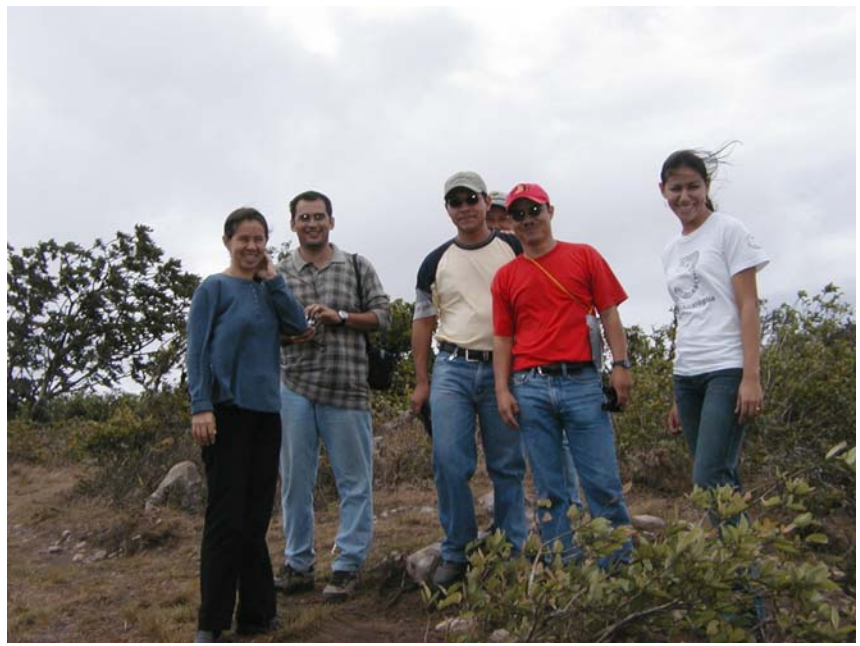

Dissemination of results

- Professional pres. in Nicaragua, El Salvador, Colombia, Panama, USA
- Journal manuscripts
  - Agric. Economics (submitted 1/06)
  - Econ Devt & Cultural Change (in prep)
  - Agronomia Mesoamericana (in prep)

FFS impacts on farm level, environmental and health outcomes: Results

	Number IPM practices (OLS)	IV results	Tox. Weighted insecticide (OLS)	IV results
FFS	(+)***	N.S.	(-)**	N.S.
Other IPM	(+)***	(+)***	N.S.	N.S.
FFS & IPM	(+)***	(+)***	(-)**	(-)*
Influenced	(-)*	N.S.	N.S.	N.S.

	Resp. difficulty	Eye irritation	Level beneficials
FFS	(+)**	(+)*	N.S.
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The influence of NGO characteristics on the overall FFS treatment effect: Results

Variables	N. Of IPM practices	Tox. weighted herbicide	Bean net revenues
FFS	N.S.	N.S.	N.S.
Interactions of FFS			
N. Extensionists per project	N.S	(-)**	N.S
Years of experience	N.S.	(-)*	N.S.
Extens. with IPM training	N.S	(-)**	(+)**
Extens. With FFS training	N.S.	N.S.	N.S
Emphasis on credit	(-)*	N.S.	N.S.
Experiments			
More yields	(+)*	N.S.	N.S

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