Adoption of Fertilizer Best Management Practices: The Need for a Sociological Approach

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Introduction

- Impact can only be seen if adoption happens
- ***Adoption*** – decision of an end user to continue full use of an innovation
- Adoption of agricultural technologies is problematic
  - poor rates of adoption especially in developing countries

Fertilizer Best Management Practices (FBMP): Greater Challenge for Adoption

- FBMPs are knowledge intensive technologies (KITs) – aimed at fine-tuning farmer nutrient management
  - enabling farmers to make decisions that translate into sound agronomic practices
- Adoption of KITs (FBMP) is even more problematic
  - in the form of knowledge and information, and not physical products such as seed or machinery

Why Poor Rates of Adoption?

- **Economics as key driver for adoption**
  - Many factors affecting farmers' decisions
  - Risks and uncertainty, small farmers in Asia
  - Farming, not only way of life but it is LIFE
- **Lack of engagement of end users**
  - target users (farmers) are not involved in technology development, validation and extension
  - Less consideration of farmers' knowledge and needs
- **Extension hurdles**
  - scale and complexity
  - dependence of extension on the wider policy environment and other agency functions
  - commitment and political support
  - Less interaction with knowledge generation

Need for a Sociological Approach in Adoption of FBMPs

- **Farming – social and cultural activity**, not only an economic activity
- **Technology adoption**
  - **social and cultural process**
  - goes beyond economics
  - A deliberate decision made after considering a wide range of issues, done within a social context where different individuals may interact influencing the decision
- **A sociological approach highly necessary** - looking at individuals and groups, relationships, perspectives and worldviews

Objectives

- To present a sociological understanding of the process of adoption of FBMPs
  - based on experience in research and extension of KIT's (integrated pest management (IPM) and site specific nutrient management (SSNM)
  - in the context of rice research at IRRI (SSNM is FBMP)
- To discuss concepts that are essential in facilitating adoption
- To explore possible ways to address the challenges in the adoption of FBMPs (SSNM)

Key Sociological Concepts for Facilitating Adoption of FBMPs

- Farmer knowledge
- Experiential learning
- Social capital

To Facilitate Adoption: Build on Farmer Knowledge

Farmers

- have a deep and complex understanding of the natural environment on their farms
- well informed about their own resources, what works and does not work
- active problem solvers developed through accumulated experience, gained from parents, and farmer-to-farmer communication

I. To Facilitate Adoption: Build on Farmer Knowledge

- Farmer knowledge (nutrient management) -- stored in their minds, unwritten, but reflected in their perceptions and beliefs about fertilizers, and embedded in their nutrient management practices in the whole rice production process.
- Farmer knowledge has much to contribute to how FBMPs will be useful for and used by them

Example: Farmers' Beliefs on the Analogy of Plant and Human Care

- Local knowledge is evident in beliefs on the analogy regarding plant care as caring for a human being.
  - A baby or child requires more care than adults, so does the plant at the early stage of the crop requires more care
  - Emphasize aspects of vulnerability and growth.

  "If the plants are still young, they have to be taken care of"
- This worldview of Filipino farmers on plant and human care affect their fertilizer practices
  - Bulk of the nutrients are applied at the early stage of the crop, As a baby is given vitamins to ensure that the child is well fed.
  - Caring is equated with the amount of fertilizer applied
- Useful in the development and extension of FBMPs

Farmer Knowledge in Fertilizer Practices

Fertilizer application	n	%	Average DAT	Human-plant analogy	Average Kg/Ha		
					N	P	K
1	36	25	14	Baby	44.56	3.36	4.76
2	91	62	38	Adolescent - Pregnancy	33.13	1.90	2.65
3	19	13	53	Adult	16.06	0.18	0.79

- recognize that plants require different amounts of nutrients at different growth stages.

- normally apply fertilizer in a scheduled manner, 2-3 times/season, by growth stage

Implications and Challenge

- Farmer Knowledge - implications for the refinement of FBMP's (SSNM)
  - Scheduled fertilizer application
  - Mindset of the analogy regarding plant and human care (SSNM, a plant based approach, nutrients applied when needed)
  - Local classification of soil, reflecting indigenous nutrient supply
  - Farmers' experiences on how their crop responds to fertilizer use and climatic conditions among other risk factors within the locality
- Understanding farmer knowledge
- How to operationalize the building on farmer knowledge

Implications and Challenge: Participative Research and Extension (PR&E)

PR&E - an avenue in the fusion of farmer local knowledge (emic – insider's point of view) and scientific knowledge (etic – outsider's point of view) for farmer adaptations;

- a process which engages farmers as well as government and scientific organizations and other stakeholders both in research and extension;

  - activities could include participatory experiments for technology validation, demonstration farms, training of trainors, and farmer-to-farmer training

II. To Facilitate Adoption: Consider Experiential Learning

- Adoption of an innovation is intertwined with the way that farmers accumulate knowledge
- Research, development and extension of technologies (KITs, FBMP, SSNM)

  -- should consider how knowledge is most efficiently passed through different people
  -- how it can be effectively learned by end users
  -- greater likelihood of success on adoption

What is Experiential Learning

- *Experiential learning* - Process of creating knowledge through the transformation of experience (Kolb and Fry 1975)
- Elements of experiential learning cycle

  (1) concrete experience

  (2) observation and reflection

  (3) the formation of abstract concepts, and

  (4) testing in new situations

  Experiential learning used and effective in adult education in IPM- Farmer Field School (FFS)

Experiential Learning and Adoption: IPM Example

- The experiential learning in the FFS, resulted to the adoption of IPM in the Philippines
- Farmer participants used their concrete experiences to test ideas, consequently change their pest management practices through group experimentation
  - interpret observations, facts, and experiences both individually and collectively
  - generated a consensus that was also culturally enforced

Experiential Learning (FFS): Generated Courage

- Overcoming fears (individual and collective):
  - Fear that insects will always harm their rice plants
  - Fear that insects will transfer from a sprayed farm to an unsprayed farm
  - Fear of losing a crop or having a lower harvest
- *Pakikisama* and *hiya* – two strong group-oriented norms, aspects of Filipino culture that regulate social relationships.
  Pakikisama - getting along with others
  hiya - sense of shame
  - Social Fear; cultural mechanisms that enable cooperative behavior resulting to adoption of IPM

Implications and Challenge

- Dissemination:
  - farmer field school- high investment cost
  - simple messages- lower cost, does not facilitate farmer learning
  - Combination, with a modified FFS (less meetings)
- FBMPs like SSNM can be incorporated in existing FFS program in the country

III. To Facilitate Adoption: Capitalize on Social Capital

- *Social capital:*

  Features of social life such as networks, norms and trust that facilitate collective action
  (Putnam 1996)

- Addresses gaps in adoption/diffusion studies -

  Focus more on individual attributes as success factors BUT

  Less consideration that human behavior is constituted by interactions and interrelations among people, and which goes beyond the individual

How does social capital facilitate adoption?

- In the process of building social capital, the process is also towards technology adoption through sharing and learning of technologies.
- In the Philippines, the build up of social capital is through *HUNTAHAN* (informal conversation)

Building-up of Social Capital: Directly Affected by Culture

House neighborhood Farm

Places of *Huntahan*

Sources of Social Capital: Case of Filipino Farmers

- Sources of social capital:
  - kinship, house neighborhood, farm neighborhood, and membership in farmer's association
- Interactions among members of the network established trust, allowing sharing and learning (especially among farm neighbors), resulting to the fast adoption (IPM)
- Reduces transaction cost and enable efficient farmer-to-farmer learning

Implications and Challenge

- Social capital is directly affected by culture
- Culture varies by society, social capital also varies by society; though there maybe some commonalities in Asian cultures
- Identify existing social capital in the country
- Incorporate these sources of social capital in strategies for farmer participation, and institutional partnerships

Irrigated Rice Research Consortium (IRRC): An avenue for participatory R&E

- Provides an international platform and effective mechanism supporting the research - extension partnership between national agricultural research and extension systems (NARES) and IRRI

to promote sustainable, benefit enhancing technologies in irrigated rice-based systems including SSNM

Core Technologies

- Site-specific Nutrient Management
- Water savings
- Super bag
- Drying systems
- Weed management in direct seeded rice
- Ecological pest management

Scaling Out of SSNM: Two Cases

- IRRC through the Coordination Unit and Productivity workgroup is facilitating the dissemination of SSNM across multiple scales.
- Examples are two cases where we work with partners in the Philippines, both public and private sectors, for the dissemination of SSNM

Case I – Public Sector

Background

- Agricultural extension in the Philippines is decentralized - responsibility of local government.
- Work with Western Visayas State University (WVSU) and University of the Philippines at Los Baños (UPLB) in developing a locally adapted SSNM practice in Iloilo, the rice bowl of central Philippines
- Work with farmers in SSNM trials, and this year, with local government extension for the dissemination of the developed recommendations.
- It all started with a thesis proposal to IRRI by a PhD student majoring in soil science at the UPLB, same time a professor at WVSU in Iloilo.
- She saw the potential of increasing the provincial rice production; Iloilo rice farmers were applying either too much or too little fertilizer.

Case 1 Preliminary Results

- An SSNM recommendation for Iloilo was developed
- Initial adoption results show that farmers involved in the participatory experiment changed their timing of application
- April 2007 - a meeting with SSNM proponents, local government (municipal agricultural officers), fertilizer company representatives, farmers and other stakeholders for scaling out SSNM

Case 2 – Private Sector

Background

- Private sector - play an increasing role as a provider of technical information (decentralization)
- Fertilizer manufacturers need more efficient fertilizer recommendations, especially farmers' sources of information regarding fertilizer use is varied and unreliable.
- Sectors of the fertilizer industry visited IRRI in 2004 to gain familiarly with SSNM that could be incorporated into their recommendation, research and marketing, and disseminated through field staff.
- Fixed time N management was validated through the industry conducting participatory on-farm experiments with farmers.
- The partnership continues with updates on SSNM provided through the IRRC for refinements of recommendations

Case 2 Preliminary Results

- A modified recommendation on the timing for fertilizer application was developed
- A switch from a soil test approach to plant based approach
- Recommendations soon to be given to their Marketing section for promotion
- Yield target as a basis for SSNM recommendation makes sense to farmers because nutrient management is highly dependent on their financial capacity

Conclusion

- Farming is a social and cultural activity
- Ensuring technology adoption should not only consider profitability but social and cultural aspects as well
- Farmer knowledge, farmer experiential learning and the existing social capital are necessary for ensuring adoption of FBMPs and accelerating its spread for small scale farmers in Asia

THANK YOU

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