Training Briefs

AHI brief

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Training Course on Tracking Technology "Spillover"

Tracking spontaneous farmer-to-farmer sharing of technologies provides important insights for enhancing technology adoption and the positive impacts of technological innovation.

This training course gives practical instruction on the use of a methodology for tracking the spontaneous "spillover," or farmer-to-farmer sharing, of introduced technologies. Conventional adoption studies emphasize identification of factors influencing adoption and evaluation of impact in terms of the numbers of adopters and the area over which the technology is applied. The proposed methodology operates under an expanded set of objectives and research questions. The identification of pros, cons and adoption barriers for different technologies can assist to target improvements on the technology or its mode of delivery. Identification of the characteristics of adopting households and farming systems enables our understanding of who benefits from introduced technologies and can improve technology targeting for diverse social groups. Characterization of social networks through which technology flows in the absence of outside intervention can enable us to tap into existing social networks or to target strategies to overcome social biases inherent in these (i.e., gender bias within patrilineal societies). Identification of social and biophysical innovations made by farmers can help in our understanding of how technologies may be modified to better fit the farming system, and integrated into scaling out efforts. Finally, identification of positive and negative social and agroecological impacts can shed light on how to maximize positive while minimizing negative spin-offs of technological innovation.

The course also proposes methodological improvements to standard adoption studies, which follow four basic steps: 1) researcher identification of variables likely to influence adoption; 2) structured household questionnaires focusing on key variables; 3) statistical analysis to correlate key variables

Gender-disaggregated focus group discussions help to identify basic patterns of technology sharing and adoption, as well as to interpret the findings of spillover studies.

with technology adoption; and 4) researcher interpretation of observed patterns. The modified methodology includes these same steps, but systematically builds local perceptions into the approach. Focus group discussions with different social groups (adopting and non-adopting farmers, or by gender and wealth) during Step 1 of the methodology aid in identifying basic patterns of adoption and technology sharing as observed by farmers. Newly identified variables are integrated into the standard household surveys. Focus group discussions are also utilized during Step 4 of the methodology to integrate farmers' interpretation of observed patterns into the analysis. Each of these steps ensures that the methodology is sensitive to patterns of adoption and social interaction specific to the local context. Household survey methods used in Step 2 also differ in two important respects. Sampling of interviewees can be done through the standard random sampling approach or through a form of "snowball sampling" in which social networks are traced from the original "project farmers" to "level one adopters" (farmers adopting from project farmers) to "level two adopters,"

TYPE OF IMPACT	BANANA GERMPLASM AND MANAGEMENT	SOIL AND WATER CONSERVATION	TOMATO GERMPLASM AND MANAGEMENT
Impact on other system components	Favorable effects on other crops when intercropped	Positive effect on banana (soil fertility and moisture) and livestock (fodder production)	Increased fallowing of hillside plots as more time is allocated to cash crop cultivation in valley bottoms
Input requirements	Increased demand on inputs (fertilizer) at farm level given high organic matter inputs during establishment	No outside inputs identified	More pesticide and inorganic fertilizer use given crop demands and extended periods of cultivation
Land, labor and nutrient allocations	Recommended spacing takes up land; increased labor investments during planting and mulching	Organic nutrients and labor diverted from other activities during terrace establishment	Substantial diversions of land, labor and nutrients from coffee and maize
Pests and disease	None observed	Reduction in maize stem borer	Increase in pests and wilting disease due to decreased crop rotation
Soil	Mulching increases soil fertility and water holding capacity; reduces erosion	Positive or negative, depending on levels of organic amendments	Increased water holding capacity and fertility from manure usage
Weeds	Sharply reduced through mulching	Increase in weeds near Napier grass	Increased along with soil fertility

Table 1. Agroecological impacts of technologies introduced to Lushoto, Tanzania. This table illustrates the substantial spin-offs, both positive (green font) and negative (red font), that characterize technological innovation. These impacts are generally obscured under conventional adoption studies, but have a profound impact on the technology's success and system sustainability.

and so on. While the former is better for rigorous econometric analysis of adoption variables, the latter is best for understanding social networks through which technologies spread in the absence of outside interventions and how adoption levels and technologies themselves change through successive levels of "spillover." The household survey methods employed here also differ by the integration of more in-depth qualitative interviews in a select number of households. This aids in understanding social and biophysical innovations, livelihood and environmental impact, and the steps associated with technology adoption—information requiring qualitative inquiry.

As a whole, this methodology helps us to move from a view of technological innovation as a one-off step (introducing new technologies) to a process that proceeds from problem definition to technology targeting, testing, monitoring, troubleshooting, and dissemination or discontinuation. This is of fundamental importance in ensuring that patterns and lessons are not lost, and to minimize the risks introduced into the system—for example, negative agroecological impacts or socio-economic gap-widening that results from biases toward wealthier farmers.

Mode of Application

In addition to the method's application as a retrospective impact study, the methodology can be applied within an iterative process of technology targeting, dissemination and monitoring. In this case, adoption barriers or negative effects of new technologies are periodically captured and addressed through further technological or methodological innovations. The steps in the methodology would therefore be modified, as follows:

✔ Problem identification, technology targeting and dissemination;

✔ Monitoring of technology spillover and impacts (using a condensed version of the above methodology, but guided by the same questions);

✔ Targeting of new technologies and dissemination approaches to address identified barriers and negative impacts; and

✔ Monitoring of technology spillover and impacts (of new approaches implemented in Step 3).

Application Domain

This methodology can be applied within any technology dissemination program, independent of the agroecological or institutional context. It is a research method, but its main objective is to inform development—namely, to enhance the positive impacts of technological innovation.

Course Details

Teaching Methods: Formal instruction (using case studies and sample research protocols and findings); practicums (using sample databases); field work (for select stages in the methodology).

Duration: 6 to 10 days.

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TRANSFORMING LIVES AND LANDSCAPES

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