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Impacts of Agricultural Research on Poverty: Findings of an Integrated Economic and Social Analysis

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The extent to which agricultural research has reduced poverty is of increasing interest to policymakers, donors, and researchers. Until recently, poverty reduction was a secondary goal of agricultural research: the primary focus was on increasing food supplies and reducing food prices. This strategy was successful in substantially increasing the yields of important food staples. When impacts from productivity are combined with increased agricultural employment, lower food prices, and increased off-farm employment, agricultural research has led to significant reductions in rural poverty, particularly in Asia and Latin America. However, the benefits of such technologies do not always materialize for poor people, and some impacts can be negative. Despite achievement of food security for many countries, poverty remains widespread.

Strengthening the ability to assess the contribution of agricultural research to poverty reduction requires combining strong evaluation designs that generate good data with integrated research methods and willingness to learn from and use the results of such assessments to influence future strategic choices.

This paper synthesizes the results of seven studies of the impact of agricultural research on poverty that aimed to enhance the impact of agricultural research on poverty reduction through an improved understanding within CGIAR centers and national partners of the relationship between agricultural research and poverty reduction. The seven studies are listed in the table.

Purpose and Scope of the Seven Case Studies

Seven case studies were selected to develop new approaches for assessing poverty impacts at different scales.

Five of the seven case studies use household- and community-level quantitative and qualitative data within an integrated social and economic analysis. Two employ econometric analysis of secondary data at district or provincial levels. The former provide more detail on the mechanisms by which agricultural research affects the poor, particularly in terms of the direct impacts; the latter better quantify the magnitude of impacts, particularly indirect impacts, on poverty.

Conceptual Framework and Research Methods

The sustainable livelihoods (SL) framework provided a conceptual framework to take into account the multiple dimensions of poverty and the diverse causal pathways among agricultural research, dissemination, production, and poverty. Livelihood approaches recognize that for poor people, survival and prosperity depend on the pursuit of multiple activities simultaneously. The SL framework is concerned with both external and locally perceived assessments of vulnerability, the role of natural, physical, financial, human, social, and political assets, and the importance of formal and informal institutions.

The five micro-oriented SPIA studies were designed as integrated economic and social analyses, and drew on the perspectives and methodologies of economists, sociologists, and

Country	Technology	Lead CGIAR center
Bangladesh	Modern rice varieties	IRRI
Bangladesh	Polyculture fishponds	IFPRI
	Improved vegetables	IFPRI
	Modern rice varieties	IFPRI
Kenya	Soil fertility management	ICRAF
Zimbabwe	Modern maize varieties	IFPRI
Mexico	Creolized maize varieties	CIMMYT
China	Agricultural research investments	IFPRI
India	Agricultural research investments	IFPRI

anthropologists from CGIAR centers, universities, and case study countries. Data were collected from household and community surveys, secondary data, focus groups, household-level case studies, and key informant interviews.

Results, Lessons, and Discussion

Adoption. While asset holdings are clearly important to the decision to adopt new technologies, other factors also play a crucial role, including farmers' perceptions of whether the technologies would increase or decrease farmer vulnerability, the nature of the disseminating institutions, and cultural factors such as gender roles and taste preferences.

Dissemination. Dissemination processes have a significant impact on who is reached with the technology and how well they are able to take advantage of it. Dissemination methods are increasingly diversified. While direct extension still exists, dissemination involves a wide array of other methods including training through community-based organizations and farmer-to-farmer dissemination. There is no one best method for all regions, or even to reach all farmers within one region. Each depends on local history and social dynamics. It is thus important to conduct sufficient re-search on local cultural and power relationships before determining the most appropriate means of dissemination.

Impacts on poverty. A wide variety of direct impacts on adopting households were clearly identified by the case studies, including positive effects (e.g., increased production, knowledge, empowerment of women), as well as negative effects (e.g., increased vulnerability,

decreased soil fertility, debt from fertilizer purchase). The poor are often beneficiaries, especially if the technologies or their delivery are de-signed to build on assets that they do have. The direct impacts of agricultural research on productivity and income for the poor were sometimes limited for technologies that were more oriented to better-off farmers, especially those requiring high levels of assets.

Declining real food prices limited the direct income gains to poor producers from agricultural technologies. Even the sub-

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stantial yield gains for rice did not lead to very large income gains because of falling output prices and small landholdings. Other technologies had even lower impacts on farm incomes. Despite limitations on the direct income effects, the technologies were still important for poverty reduction. The increased stability and even marginal improvements in agricultural production was valued by poor households for providing food security and a launching pad into other activities. Increased agricultural employment was also a major benefit, improving incomes and stability of employment. Perhaps the largest impact of agricultural research on poverty was the indirect impact of productivity growth on reducing real food prices, which benefited both urban and rural poor.

Lessons About Poverty Impact Assessment

The studies identified factors that need to be known in the very early stages of research, such as the priority poor people put on managing risk, and their weak capacity to do so; the types of social differentiation (gender; class; ethnicity, etc.) that affect the uptake and impacts of different technologies; the variety of traits that farmers value; and the role of agriculture in livelihood strategies.

Using both quantitative and qualitative methods, the case studies pay much attention to their ability to make causal statements. Ultimately, the ability to draw inferences about causation boils down to controlling for unobservable factors between groups that have adopted and those that have not, having large enough sample sizes to detect a statistically significant difference, and controlling for endogenous variables.

These studies brought out the need to pay attention to direct and indirect impacts and not to restrict the analysis to looking for impacts that can be easily quantified. The studies confirmed that mixing disciplines from the social sciences and using mixed methods are essential to conducting impact assessments.

The SL framework provided a useful method for thinking about interrelated influences on livelihoods that are normally excluded in conventional impact assessment, and helped ensure that important explanatory factors were not overlooked. However, the framework still does not include some important concepts that explain people's behavior and position in relation to technology (e.g., culture, power and experience), and could not accommodate the nuances of particular situations.

Lessons for Future Research

Some information about the priorities of poor people and of impacts of research needs to be known beforehand, or during very early stages of the evolution of research, e.g., the priority the poor place on managing risk, the types of social differentiation that will affect the uptake of different technologies, and the variety of traits that farmers value beyond yield.

More thought needs to be given to dissemination strategies at an early stage, and an understanding developed of how local social relationships mediate different forms of dissemination, from conventional extension to more participatory and group-based methods. In this way, technology is more likely to be adopted and unintended effects can be diminished.

The formation of new partnerships is essential if agricultural research organizations are to be informed by and have an impact on the livelihoods of poor people. While the CGIAR cannot tailor technologies for the enormous range of livelihood strategies found throughout the world, it should facilitate such a tailoring by creating meaningful partnerships with a range of institutions that better understand local livelihood strategies.

To increase the impact of this work, researchers must be willing to conduct research and impact assessment within the context of an "institutional learning and change" (ILAC) perspective. Research should be structured to involve multiple stakeholders in a process that is participatory, iterative, interactive, reflective, and adaptive. This is consistent with the changing CGIAR mandate to be increasingly poverty-focused.

Keywords: poverty, agricultural research, sustainable livelihoods, vulnerability, agricultural extension, Bangladesh, China, India, Kenya, Mexico, Zimbabwe

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