

Why does technology fail to benefit the poorest farmers? A sociotechnical approach to the study of innovation and poverty

Harvard University, 2018

My dissertation '[Why does technology fail to benefit the poorest farmers? A sociotechnical approach to the study of innovation and poverty](#)' studies the barriers preventing the poorest farmers from realizing greater benefits from agricultural technology. The empirical evidence I bring to bear on this question comes from extensive fieldwork in India. The dissertation is reported in four chapters. In the first chapter, I develop my theoretical approach, situate my research in the literature, and preview the main findings of the empirical chapters as well as the overarching conclusions of the dissertation. My empirical work is covered in chapters two, three and four.

Chapter two, 'What keeps the poorest farmers from benefiting from technology? A study of agricultural technology and poverty in Bihar, India' evaluates the barriers preventing the poorest farmers from realizing greater benefits from technology in a single region. In the chapter, I identify a set of 11 potential barriers from the literature. I then evaluate these barriers against six purposively selected case studies to understand the extent to which each of the 11 potential barriers prevents the poorest farmers from benefiting from technology in Bihar, India. I conclude that *missing infrastructure* and *misaligned incentives* are the two biggest barriers preventing the poorest farmers from realizing greater benefits from technology in the Bihari context.

Chapter three, 'The System of Rice Intensification: The Challenges of Technology Selection for Meeting the Needs of the Poorest Farmers' focuses on a single technology, the System of Rice Intensification (SRI), that emerged onto the global stage in the early 2000s, and whose proponents hoped would benefit poorest farmers in particular. I find that even when the physical dimensions of technology are "pro-poor," realizing these benefits still requires reorienting the larger sociotechnical regime towards the needs of the poorest. My findings also shed light on challenges in the *selection* stage of agricultural innovation systems for meeting the needs of the poorest farmers, including 1) propensity for silver bullet thinking; 2) failure to take into account variance and uncertainty in local conditions; 3) selection of technology based on institutional incentives not aligned with the needs of the poorest farmers (e.g. political and professional incentives).

Chapter four, 'Subsidies for Whom? Comparative Evaluation of India's Drip Irrigation Subsidy Program' studies programs that promote widespread use of a single technology, drip irrigation, across four states in India. These programs, together represent a modern and sustained effort by a wide range of actors to bring a new technology into widespread use. I ground the paper in emerging innovation systems literature on the role of government in market-creation. I argue that India's drip irrigation subsidy program can be analyzed as a large-scale effort to support the emergence of a new market and industry. The Indian government used its financial power to create a market for drip irrigation, which in turn led to considerable growth for the private drip irrigation industry. The subsidy program was successful (in some states) at achieving widespread use of the technology because it created a set of incentives that shifted responsibility for 'last mile' technology delivery from government extension programs to the private sector. While the incentive structure embedded in the subsidy program was a success in achieving widespread use of the technology, it failed to ensure that the poorest farmers also benefited from drip irrigation. From a policy perspective, given the large publicly funded investment in market-creation, I argue that the government should demand more from the private sector in return for its investment. In particular, the subsidy program should be re-written so that the incentive structures created by the program ensure that the poorest farmers realize greater benefits from the technology. The government can do this by offering specific financial incentives to the private sector equipment dealers for working with the poorest farmers, and by limiting the availability of the subsidy for medium and larger farmers.