ADOPTING IMPROVED FARM TECHNOLOGY pdf

1: Adoption of improved farm technology in northern Nigeria.

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Researchers use time-series data extensively to explain how the rate of technology adoption varies with time, but time-series data does not address the fundamental reasons for adoption. These three empirical methodologies describe the parts of agricultural technology adoption which must be understood if governments and NGOs are to craft their activities for optimum effect: Technology Adoption Technology is assumed to mean a new, scientifically derived, often complex input supplied to farmers by organizations with deep technical expertise. This coincidence should not obstruct the point that a technology is simply the application of scientific knowledge for a certain end. A project or a technique can still be considered a technology even if the science is many steps removed from the eventual implementer. There are many lessons and best practices that can be gleaned from existing studies if technology is looked at in broader terms. The uncertainty diminishes over time through the acquisition of experience and information, and the production function itself may change as adopters become more efficient in the application of the technology. In this paper, technology is any discrete input â€” either as a good or as a method â€” with the purpose of controlling and managing animal, vegetative growth, or both. This more inclusive concept allows us to look at the adoption dynamics and diffusion patterns of an expanded MERET project using criteria established by a wide body of scholarly research and publications. The characteristics associated with higher rates of HYV adoption are the same as the ones associated higher participation rates in terrace construction, save for context-specific exemptions. Just as there are different types of technologies, there are different kinds of adoption. Aggregate adoption, on the other hand, is measured as the aggregate level of use of a particular technology among one specific group of farmers or within one particular area. In some instances, farmers are presented with a single choice: Similarly with MERET, a community site may be recruited to construct dams, bunds, gully controls and terracing. This gives farmers several distinct technological options, and it gives those trying to measure and model that adoption more to consider because farmers may adopt the complete package of innovation, they may adopt nothing, or they may pick subsets of bundles. Doing so produces several simultaneously occurring adoption and diffusion processes, although these processes have been shown to follow specific and predictable patterns. Variable inputs such as HYVs can be adopted in part and planted on a percentage of farmland, and fertilizer can be applied selectively, so modeling their adoption and diffusion involves first measuring if it has been adopted at all, and second assessing the extent to which farmers have adopted it. Technologies such as wells, tractors and other mechanized inputs are not divisible, thus farmers have only a discrete choice: Modeling this adoption behavior at the individual level produces dichotomous outcomes, but an aggregate analysis turns these discrete choices into continuous measures of the percentage of farmers using the non-divisible inputs. Ethiopia and MERET Ethiopia is a country so beset by poverty and vulnerability to natural and man-made shocks that it has become synonymous with famine and starvation. It is both one of the poorest countries in Africa17 and one of the most populous. Agencies influenced by this line of thinking have tended to favor direct transfers of food to meet immediate needs. And when the targeted communities remain food insecure in subsequent years, these aid agencies are left searching for reasons why a one-time in-kind transfer was insufficient for addressing the underlying causes of the original food insecurity. In the past few decades donors and aid professionals have come to learn that food insecurity is the result of insufficient access to food, not insufficient availability. The natural resource base is degraded from unsustainable farming practices and forest removal, these unsustainable practices being the byproducts of growing population pressures. These forces locked the growing population out of school, out of the cities, out of non-agricultural work, and consequently forced them to stay on increasingly smaller and more heavily exploited land parcels. They include soil and stone bunds, gully-control constructions, trenches, bench terracing, water-pond construction, organic fertilizer application, and the planting of strategically chosen tree, shrub and grass varieties. The program has directly benefited over 1. Indicators showing positive impacts on human wellbeing include: Even with these dual incentives for participation, not all targeted communities choose to take part in MERET, and of those that do opt in, not all of them stay in for the entire five-to-seven years of the project cycle. Although MERET has been active for over three decades and receives tens of millions of dollars each year, it is still a relatively small project. Governments, aid agencies, and development NGOs can then tailor their agriculture outreach projects to be attractive to their targeted communities. Factors Influencing Adoption The most often cited factors that have been used to explain the variability seen in agricultural technology adoption and its patterns of diffusion, are those described by Feder, Just and Zilberman. These explanatory indicators vary from study to study based on their contextual applicability, but traditionally include: In delineating these particular factors, they point out that the categories are not discrete or exclusive and that boundaries may blur and overlap due to the interdependent relationship between indicators. Many studies have shown that each of these indicators significantly influences the agricultural technology adoption process; trying to separate each characteristic from the others is difficult and may even be unnecessary. That is not to suggest uniform causation; farm size may act as a proxy for other socio-economic indicators such as access to credit because the larger farm has more collateral value. It very well may be the case that these correlated indicators also influence the adoption decision, and therefore a failure to account for them in the regression models may tend to inflate the reported relationship between farm size and adoption likelihoods. Looking at soil conservation techniques in the Philippines, Shively finds that the decision to adopt depends on farm size, partially because soil conservation on small farms is especially costly due to increases in the short-run risk of consumption shortfall with certainty. Because the primary targets of MERET activities are the poorest and most food-insecure communities, WFP is specifically targeting those farmers whose poverty, and consequently smaller farm sizes, indicate they are the least able to adopt the types of agriculture technologies which aim to address the root cause of that poverty. Risk and Uncertainty All technology adoption decisions carry with them some mixture of subjective risk â€" such as human tendencies to assume more uncertainty in outcomes from unfamiliar techniques â€" and objective risks resulting from variations in rainfall, pests, diseases and other blights, and the timely access to critical inputs. Without some level of assurance that access to future benefits is not at risk, farmers have little incentive to invest their time, labor and capital into technology adoption. The study of SRI adoption in Madagascar shows how institutional deficiencies can exacerbate risk aversion: And if the farmers are from the lowest socio-economic cross-section, their lack of access to agricultural and financial resources will prevent them from being able to bear risks, even if they would otherwise prefer the riskier option. In other words, they are kept from experimenting with new techniques and technologies by the amount of risk they are able to take on, not by the amount of risk they prefer to accept. Human Capital These variables are comprised of individual or community characteristics such as education, human health indicators, age and gender demographics, and their relationship to technology adoption is one of potential. Adesina and Baidu-Forson find that adoption of different sorghum varieties was based more on the applicability to grinding each variety than on output increases. Income generating activities and land rehabilitation schemes hold the promise of creating assets and reducing risk-aversion to the point where more farmers will adopt MERET activities, creating a cycle of growth and adoption. But to overcome the initial resistance to adoption, MERET should address the risk-preferences of the rural poor and break the current cycle of vulnerability, poverty and risk-aversion. The populations in these areas skew young, with 59 percent of the population under the age of 19 and almost one-third below the age of nine. Women-headed households account for a very small percentage, roughly 4. Labor Availability The labor market affects technology adoption differently depending on whether the area targeted with the technology has a net labor shortage or net labor surplus; seasonal availability adds another dimension. Another consideration is whether the proposed technology is labor-saving or labor-intensive. Higher labor supply is associated with higher rates of adoption of labor-intensive technologies;69 the inverse is also true. Although SRI is a low external-input LEI technology, it does in fact require percent more labor than traditional rice-growing methods. The need for added labor inputs means farmers have less time to sell their labor to other farmers. While the added income from output increases would serve to offset the opportunity cost of lost labor wages in the present, farmers can only conceivably do this if they have access to credit to meet their financial obligations until the SRI crop is harvested. But weak rural financial institutions and non-existent credit means that attractive returns to SRI are less impressive to farmers because they are unable to meet immediate needs; therefore they choose not to participate in SRI, but rather to sell their excess labor to other farmers in order to earn immediate wages. Lee notes that increased access to credit sources can help farmers surmount short-run liquidity constraints and increase technology adoption. Rational farmers, comparing present opportunities against future income streams, can therefore be expected to exhibit sensitivity to interest rates and other credit considerations. This makes farmers from areas with high interest rates less likely to participate in any activity in which they forgo immediate cash for any future returns. In areas where this is the case, aid agencies should include cash transfers, or payment for project participation, in order to overcome the distorted discounting caused by high interest rates. Another option is to provide financing to the communities at more reasonable interest rates, although both options risk angering local moneylenders. MERET typically uses food transfers as payment, rather than cash. This approach works for WFP because the targeted communities are significantly food-insecure; food transfers in areas with sufficient food production are not advisable as they can distort food prices, leading to lost revenue for farmers and lower production in the future. Tenure Tenure incorporates issues addressed in the sections on credit constraints and risk and uncertainty. As mentioned above, the uncertainty associated with a change of course is an impediment to technology adoption. The self-reinforcing nature of vulnerability means that those who can least afford to take on risk are the ones who are trapped in a cycle of poverty due to that risk-aversion. Before Ethiopia was an absolute monarchy and followed a traditionally imperial landowning system. The vast majority of land was owned by a few noble and absentee landowners,79 but worked on by peasants. Large tracts were underutilized. Under this order, land was confiscated from the large landowners and transferred to the State. The State then allocated parcels to families and gave them user-rights, although the State remained the ultimate owner of the land. Land could not be sold, transferred or mortgaged. This government maintained the land-tenure structure instituted by the Derg with a few alterations. They find that tenure security reduces the fear of land redistribution, thereby addressing uncertainty over land position. Because sharecropper farmers will, in any given season, receive only a part of their marginal product, they have limited incentive to invest more time, labor or capital than is minimally required. The response of farmers to technology adoption based on their tenure situation is yet another example of people responding to rational incentives. If farmers are not somehow ensured access to the land and its outputs, they have no incentive to invest their time, money, or both, into what they perceive as risky technology, regardless of the output increases that may occur. Commodity Market Access New technologies often require repeated and consistent use of new inputs such as fertilizers and pesticides. Even low external-input sustainable agriculture LEISA activities usually demand significant amounts of construction materials for land preparation activities. If farmers are not secure in their access to these resources and the markets that provide them, adopting the technologies that require such inputs would place them at the mercy of supply streams. Having seen that the ability to bear risk decreases with poverty, the poorest farmers may need the greatest assurances that they will not be left without the inputs needed to sustain their families, and also earn extra income. But access to markets is needed also as an outlet for production, and not just as a means of securing inputs. Farmers need something to do with their increased output. If there are no markets that can bear the extra supply without creating a reactionary price decline, their investment in new agricultural technologies will be for naught. Poor infrastructure in many developing nations results in inefficiencies and expensive cycles in the prices of commodities. Poor storage means a large amount of output rots before it can be sold, leaving very little available for purchase in the months before the next harvest. Access to wider markets offers the possibility of increased food availability due to less spoilage and loss, higher profits for farmers because prices are not deflated due to the post-harvest flooding of local markets, and the minimization of commodity-price fluctuations. Good baseline data will let the project designers know what each farmer is able to bear: Farm Size and Tenure Farm size may be the most important characteristic to measure because it can act as a proxy for many other wealth-related variables. That makes these farmers the most likely to not only adopt these large-scale projects, but to stay in for the life of the project because their extra land, and associated wealth, means they can weather small or medium shocks that may dissuade smaller farmers. Their land resources means they can devote a relatively small percentage of arable land to a new technology, while still having enough buffer land to plant their regular crops and still be assured of those economic returns. As these farmers become more familiar with the new technology, it becomes less risky, and they can assign more land to its use. In this way, farmers become the extension workers for the very projects that can increase incomes and provide food security. But these communities are also often the most marginalized and vulnerable to shock-induced poverty traps. NGOs and international aid agencies can do little to influence the tenure laws in any given country, but these organizations often work in tandem with local government counterparts to implement their projects. The government benefits from the increased production of the now-improved land, and from a community that does not rely on government assistance. Aid professionals and development programs will certainly benefit from knowing the risk preferences of targeted communities.

2: Agriculture in the Classroom

improved farm practices by the farmers. Moreover, logistic regression model portrays that technology adoption is times lower for Sherpur compared to Parbatipur.

3: Agricultural Technology Adoption: Issues for Consideration When Scaling-Up :

Assefa and Gezahegn: Adoption of Improved Technology in Ethiopia_____ 1. Introduction The ultimate goal of any rural or agricultural development strategy or program is to.

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