Promoting Adoption of New Rice Varieties: Addressing the Costs of Early Adoption in Sierra Leone

Researchers:

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Sector(s): Agriculture

Fieldwork: Innovations for Poverty Action (IPA)

Location: Various communities, Sierra Leone

Sample: 245 Communities

Initiative(s): Agricultural Technology Adoption Initiative (ATAI)

Target group: Farmers

Outcome of interest: Technology adoption

Intervention type: Fertilizer and agricultural inputs Training Subsidies

Partner organization(s): International Rescue Committee (IRC)

Policy issue

Agricultural productivity has stagnated in much of sub-Saharan Africa, while many other regions of the world have seen dramatic productivity improvements in recent decades. New agricultural technologies, such as high-yielding crop varieties, offer the promise of improving productivity and hence the welfare of farmers. But adoption of these technologies has often been low in countries where dissemination programs have been conducted. First adopters of new technologies play an important role in the spread of technology as they take on the burden of experimentation—testing whether and how a new variety works in local conditions. This is particularly important in much of sub-Saharan Africa where a multiplicity of micro climates within a small area means that experimentation is essential for farmers to learn which crop varieties are best for their particular land. There is also concern that early subsidization to increase adoption of new technologies will lead to expectation of continued subsidies, depressing demand at market prices.

Context of the evaluation

Many African countries do not produce enough rice to meet their growing consumption needs. Sierra Leone, a net exporter of rice before the civil war, must now import a third of its total consumption at a high cost. Low rice production is a threat to food security for vulnerable groups, particularly the rural poor who grow rice as their primary staple diet.

A promising solution is the dissemination of high-yielding rice varieties, such as the New Rice of Africa (NERICA) varieties, which have become known as the “miracle crop” for African rice farmers because they combine the genetic qualities of Asian rice (high

yielding) and African rice (high resistance to drought and disease). NERICA also has shorter maturity and so can be harvested in the hungry season with potential food security benefits. However, there are also concerns that NERICA requires more labor and must be dried during the rainy season. Current estimates suggest only 2 percent of farmers in Sierra Leone use NERICAs. Improved varieties cost farmer 40 to 100 percent more than traditional varieties, representing a significant barrier to adoption amongst poor farmers.



Farmer gazing over field in Sierra Leone.

Photo Credit: Tristan Reed

Details of the intervention

Researchers sought to test whether improved seeds are beneficial for the poor in Sierra Leone and how best to promote uptake given the high costs of early adoption. Early adopters generate a positive externality to surrounding farmers and communities by delivering information on the effectiveness of new varieties and how to make the most of them in local conditions.

Two types of incentives will be tested: (1) a price subsidy scheme allowing farmers to purchase new seeds at a price lower than the market price; and (2) targeted agricultural extension work involving community demonstration plots and practical advice on how to use these seeds. Two types of new seed varieties will be used in the intervention. The first is one of the NERICA varieties and the other is a local variety developed by the Rokupr station, ROK-16, which has proven popular in early participatory variety selection tests.

The first stage of the intervention will pilot the agricultural extension training and subsidy incentives. One treatment arm will receive free seeds and training, and take up and yields will be compared to a comparison group. In the second year, researchers plan to test a more complex set of alternatives involving six treatment arms, each with approximately 35 communities, under

three different schemes:

Pricing Scheme

- *T1:* Farming households offered ROK-16 variety at 0 percent subsidy (market price).
- *T2:* Farming households offered ROK-16 variety at 50 percent subsidy.
- *T3:* Farming households offered ROK-16 variety at 100 percent subsidy (free).

Training Scheme

- *T4:* Farmers receive a targeted training program without a formal opportunity to purchase the new seeds.
- *T5:* Farmers receive a targeted training program and are offered the chance to purchase ROK-16 seeds at one of the three subsidized prices.

NERICA Scheme

- *T6:* Farmers are offered one upland variety of NERICA rice (NERICA-6) for free (as is currently the practice of the government's NERICA project) as well as the targeted training program.

The pricing scheme aims to test the hypothesis that a one-time subsidy can reduce the adoption cost for early-adopters and have a long-lasting effect both on the beneficiary and their neighbors. The training scheme aims to reduce the cost of learning by providing information on how well the seed works in the community (through a demonstration plot) and on how to cope with some of new features of the rice. Both ROK-16 and NERICA are included because there is little information on the relative productivity of each variety of seed in upland conditions.

Key outcome variables measured at endline include: (1) the amount of improved rice variety seeds (NERICA and ROK-16) purchased and planted; (2) planting of other rice varieties and other crops; (3) amount of family and hired labor used on the farm; (4) consumption and food security.

Results and policy lessons

Study in implementation, results forthcoming.