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Guidance and Technology: An Assessment of Project Intervention and Promoted
Technologies

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Abstract

This study used primary data, collected as part of the Cereal Systems Initiative for South Asia (CSISA) project to compare net returns and cost efficiency between farmers who are beneficiaries of the project to farmers who are not beneficiaries. Additionally, non-beneficiary farmers who use the promoted technologies from the project are compared to other non-beneficiary farmers who do not use the promoted technologies. Propensity score matching is used to account for selection bias when comparing the outcomes of beneficiary and control groups. Results indicate higher return for project recipients as well as farmers who use the CSISA promoted resource-conserving technologies (RCTs).

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1. Introduction

Rice and wheat are immensely important crops for India. Rice is a staple crop for 65% of the population and constitutes nearly 55% of the total cereal production in the country. Much of this crop production comes from the study area of this paper, Bihar and eastern Uttar Pradesh (EUP); represent 7.5% and 12.6%,

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respectively as reported by Prasanna [1]. Wheat represents approximately 35% of India's food grain production. Of this, 90% comes from the plain states of northern India, including Bihar and EUP. Uttar Pradesh was the largest producer of wheat in 2009 with a total of 24.3 million tons according to the National Informatics Center of India [2].

These cereal crops are water and labor intensive, two scarce resources in Bihar and EUP. In an effort to alleviate the demands for these resources, as well as decrease hunger and malnutrition while increasing income and food security, the Bill and Melinda Gates Foundation and USAID have funded the Cereal Systems Initiative for South Asia (CSISA) project. This project promotes the use of resource-conserving technologies (RCTs) in rice-wheat cropping systems. These technologies, such as zero-tillage (ZT) and direct-seeded rice (DSR), reduce the amount of water and labor necessary for cereal production. This study evaluated the performance of farmers engaged in the CSISA project in the season of rabi† 2011 for wheat. In addition, to evaluate the economic performance of non-beneficiaries who use RCTs compared to those who do not, this paper evaluated the difference in net returns and cost efficiency for these farmers

CSISA intervention involves outreach and engagement with farmers through attendance in travelling seminars, trainings, field days, field visits, and technology demonstrations. Farmers who are receiving intervention from the CSISA project also gain access to technologies, such as a ZT planter, and in some cases the farmers will also receive subsidies from the project. However, being involved in the project doesn't guarantee subsidies to the farmer. Data for this study is from the cost and return survey for the wheat season of rabi 2011 and is conducted over Bihar and EUP.

2. Objective

There were two main objectives to this study. Firstly, this study aimed to evaluate the differences between farmers who are receiving intervention from the CSISA project to a control group of farmers who are not receiving intervention. This will help to measure the effectiveness of the project itself. Secondly, this study looks only at farmers who are not receiving intervention from the CSISA project. This group is further divided into those who are using the CSISA promoted technologies (without CSISA intervention). In the rabi season, the promoted technology is ZT-wheat compared to conventional tillage. Non-beneficiary farmers will be evaluated in each season to help determine the effectiveness of the technologies. In all situations, the net returns and a stochastic frontier analysis of cost efficiency were used to evaluate the differences in the groups.

Beneficiary farmers in the CSISA project were selected using a random stratified sampling procedure. However, these farmers were selected from a pre-approved list of farmers in the region. To address selection bias, this study uses propensity score matching (PSM).‡ The propensity score of the comparison groups are compared using 1-to-1 nearest neighbor matching outlined in Caliendo and Kopeinig [3]. Samples that lay outside of the supported region (i.e. vary too much between control and beneficiary groups) are removed and their values are not accounted for. Remaining farmers are then paired 1-to-1 between the beneficiary group and control group.

The remainder of this paper is organized as follows: section 3 describes the methodology used for cost and return analysis and stochastic frontier cost efficiency, section 4 provides a description of the data used and results for the wheat season of rabi 2011, and section 5 concludes.

† Rabi/winter season runs from November to March. Wheat is the primary crop grown in this season. Other crops include sugarcane, vegetables, oilseed, and pulses.

‡ For the implementation of the PSM, we consider socio-economic characteristics that are not influenced by the project.

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