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Cultivar Selection for Farm Profitability and Risk Management: Case of Rainfed Maize in India

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Abstract

Drought is one of the major abiotic constraints for maize production in India, where about 80% of maize is still grown under rainfed conditions. Lack of irrigation restricts the use of production inputs on farm, further limiting the crop productivity. The present study examines the rainfed maize production systems of India, to identify the impacts of cultivar selection as an adaptive strategy to combat drought stresses. The farm-level maize production details were collected during 2010 and 2011 from three districts of Rajasthan, Bihar and Karnataka states of India, making a total sample of 340 maize cultivating households. The data showed diverse cultivation systems of maize across the selected districts, mainly with respect to the season of cultivation, cropping pattern followed, and input-use. Most of the sampled farmers recognized open pollinated varieties (OPVs, including improved composite and local landraces) as more congenial for growing under such risk-prone, rainfed conditions, compared to the commercial hybrids.

Varietal adoption is an important coping strategy for managing drought risk, and the hybrid and OPVs production systems co-existed only in *Kharif* (rainy season). Therefore, we limited our examination to the sub-group of 308 sample farmers who cultivate maize in this season, largely without irrigation. Production system characterization was undertaken to delineate the impacts of farmer practices, including varietal adoption, and on production risks. The production and profitability risks were estimated employing mean-variance (Just-Pope type) functions, which showed that hybrids perform *at par* or better than the OPVs in reducing abiotic risk, even in the most drought-prone rainfed system of Rajasthan. The paper also identifies the relevance of consumption utility differences across the cultivars in determining their rate of on farm adoption. A low consumption preference was cited as one of the major reasons for the non-adoption of hybrid maize in the traditional production systems. The study shows that the research and development activities on hybrid development should focus on developing not only the drought tolerant maize hybrids, but also on consumption quality traits, which could be helpful in enhancing food and nutritional security of maize producing households living in the rainfed environment.

Keywords: Drought, hybrid seed adoption, mean-variance production function