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Moisture Stress Risk Management to Cope with Food Insecurity in Ethiopia

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Abstract

The risk farmers' face due to the variability in the quantity and distribution of rainfall in agriculture is paramount in the drought prone areas of Ethiopia. However, it is not known how farmers perceive and manage the risk due to this variability. Therefore, this research aimed at analysing farmers' strategies to cope with the production risks due to the unreliable rainfall in Kalu district of South Welo zone in North Eastern Ethiopia. For methodological reasons livestock enterprises were not considered.

The area was stratified into less (LMS) and highly (HMS) moisture stress. Data on states of moisture availability and the associated subjective probabilities of farmers, crop yield, resource use, and prices of products were collected. The quantitative data were analysed using stochastic dominance (SD) and parametric linear programming (PLP) models.

Farmers' moisture risk coping strategies are mainly explained by the allocation of farm land among the different crops produced. In the LMS of Kalu, farmers increase land allocated to tef, chickpea, lentil, field pea, and emmer wheat when they expect moisture stress, while farmers in HMS increase land for tef, chickpea, maize, and haricot bean instead of sorghum.

The results of the SD analysis for LMS identified faba bean, field pea, and sorghum; where as tef, sorghum and chickpea were identified as dominant for the HMS with first or second degree stochastic dominance criteria. The mean-variance risk efficiency analysis with PLP for LMS included wheat as a substitute of faba bean to reduce the variability of expected gross margin as wheat has low variability and covaries inversely with sorghum, lentil, chickpea, emmer wheat, maize, and faba bean. For HMS areas, the model introduced haricot bean and maize to reduce the variability in expected gross margin in the risk neutral plan dominated by tef.

The results justify farmers' moisture stress risk coping strategies. And yet, consideration of the model results would improve the efficient mix of crops to cope with moisture stress risk even better. A higher emphasis on land allocation to pulses and cereals achieving attractive market prices is, therefore, recommended to improve the returns of the farming community.

Keywords: Moisture stress, parametric linear programming, stochastic dominance criteria

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