B-19

Determinants of soybean adoption and performance in Northern Ghana

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Soybean has capacity as a development crop to generate new sources of income for smallholder farmers. Yet as an unfamiliar commercial crop, soybean requires farmers to move beyond traditional production practices and market engagements in order to succeed. In this context soybean represents a long-jump agricultural technology, requiring significant, non-incremental changes for smallholder farmers. This research addresses the adoption process for long-jump agricultural technologies like soybean to understand the drivers that enable or hinder farmer participation in this dynamic agricultural market.

Specifically, I explore the role experience, space, economies of scale, demographics, market access, and land rights play in understanding adoption and performance in soybean production among smallholder women farmers. I consider three estimation strategies using a primary dataset on smallholder soybean producers in the Upper West region of Ghana. I first employ probit and ordinary least squares (OLS) regression models to understand adoption and performance. I then employ a combined spatial-autoregressive with spatial-autoregressive disturbances (SARAR) model using a generalized spatial two-stage least squares to understand cross-unit interactions in a spatial dimension.

I demonstrate that there exists positive, large, and significant spatial autoregressive dependence and knowledge spillover in soybean yields among smallholder female farmers within spatial networks. This finding provides guidance for agricultural development programs about the importance of social interaction and information provision through farmer networks in improving farmer performance in soybean production. Further, I show that larger farms and producers who allocate more land to soybean cultivation are associated with higher yields and sustained soybean adoption, which may indicate economies of scale. Finally, I demonstrate that experience and extension access are important drivers of success in soybean cultivation. These findings ultimately contribute to the understanding of whether soybean as a development crop can directly benefit smallholder farmer livelihoods.