ADOPTION OF IMPROVED MAIZE PRODUCTION TECHNOLOGIES AMONG SMALLHOLDER FARMERS IN THE SEMI-ARID ZONES OF KENYA; THE CASE OF IMPROVED SEEDS AND INORGANIC FERTILIZERS IN MACHAKOS DISTRICT.

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ABSTRACT.

In most smallholder cropping systems in Africa, crop improvement and resource management are essential for increasing crop productivity. These issues are more acute in the semi-arid areas where farmers practice subsistence farming with little use of improved technologies that translate to sub-optimal yields and hence food insecurity. Consequently, factors determining technology utilization in these areas should be identified to guide policy interventions. This study analyzed the factors influencing the intensity of adoption of improved maize seeds and inorganic fertilizers in the dry mid altitude zones of Kenya.

Multi-stage sampling was used to select 121 farmers from Machakos district who were interviewed using pre-tested semi-structured questionnaires. Descriptive statistics were analysed and a Simultaneous Equation Tobit Model estimated. McFadden’s R-Squares for the models were 0.075 and 0.133 for seed and fertilizer adoption, respectively. These levels of explanatory power and study findings were consistent with other cross-section studies using censored data to explain technology adoption.

The rates of adoption of improved maize seeds and inorganic fertilizers were 65 and 36 percent respectively. Men outnumbered women and were better adopters of improved technologies. Major adoption limitations included recycling of seeds and high input costs. Tobit regression results indicated that age, formal education, fertilizer amounts, off-farm income and early maturity perceptions significantly influenced the intensity of adoption of improved maize seeds. Formal education, experience, hired labour, fertilized area, farm size and attendance to field days significantly influenced the intensity of adoption of inorganic fertilizers.
A major conclusion drawn from the study was that the use of improved maize seeds and inorganic fertilizers was low and declining as indicated by the level of use of these inputs. The recommended seed rate for this area was 25 kg of seed per hectare while recommended fertilizer rates were 50 kgN/ha. However, farmers on average applied 8.6 kgN/ha while adopting a seed rate of 10 kg of seed per hectare. Adopters of both technologies achieved 34 percent while non-adopters achieved only 15 percent of the returns possible from the maize enterprise in this area (as a ratio of farmers returns to optimal research returns). These low and declining levels of use and unpredictable weather conditions have translated to sub-optimal yields, persistent food insecurity and rising poverty levels. Appropriate policy interventions that can increase the use of these inputs can greatly improve the food security situation in the area.

The study underscored the importance of extension, credit and distance to the market in influencing adoption. The results confirm the importance of producer education and arguably, educating farmers is likely to increase the use of these technologies. Therefore, there is need for the government and other development agencies to invest more in village schools and other educational efforts such as adult education. The government should ensure that all individuals acquire some basic level of education by making primary level of education compulsory.