Title: Determinants of improved crop varieties adoption and the role of complementary inputs: new insights from rural Uganda

The 2008 food crisis galvanised efforts towards supporting sustainable increase of local agricultural production and productivity especially in Sub Saharan Africa (SSA) through the promotion of adoption of improved crop varieties by smallholder farmers. Studies have shown that improved crop varieties offer great potential for improving food and nutrition security and poverty alleviation of agricultural households. Surprisingly many interventions in promoting agricultural technology adoption have always been followed in quick succession by extensive disadoption of those technologies. A key attribute of the improved crop varieties is that they require complementary inputs such as fertilizers, pesticides and irrigation to give optimal yield benefits. But for example in Uganda in 2015, World Bank estimated that fertilizer use per hectare of arable land was just 2.4kgs, substantially lower than the 14.97kgs average for SSA. In this paper we try to explain the puzzle of disadoption by analysing the effect of complementary inputs on the adoption and retention of the use of improved crop varieties.

We construct a unique individual farmer level panel data from the 2009-2011 waves of the Uganda National Panel Survey data on agriculture for our empirical analysis. The paper models the effect of the use of complementary inputs of fertilizers and pesticides on the adoption and retention of key staple improved food crop varieties using bivariate probit model and to exploit the panel nature of our dataset, we also estimate fixed effects. The hypothesis tested here is that if an individual is constrained in using the complementary inputs of fertilizers and pesticides, they will readily disadopt improved crop varieties. Our preliminary results show that there is a high rate of disadoption among farmers who only adopt improved crop varieties without any of the complementary inputs of fertilizers or pesticides. We find dramatic health and educational outcome differences across these types of farmers and their families. These results mean that the success of the sustainable adoption of improved crop varieties depends on the promotion of other complementary inputs that permit farmers to obtain optimal yields from the improved seeds for sustainable delivery of food and nutrition security and poverty alleviation.