Potential Role of Formal Insurance in Sustainable Food Production and Natural Resources Management

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Abstract

In the semi-arid tropics, the variability of annual amount and temporal distribution of rainfall is quite high and as a result rain-fed food production fluctuates significantly. In particular, frequent drought and flood damage food production and incur food insecurity among rural people. Although they have developed various informal mechanisms to mitigate weather-induced shocks, such mechanisms are usually imperfect and/or costly. Among the costly informal mechanisms, we focus on the following two: the first is low-risk and low-return agricultural technologies including crop diversification ex ante, and the second is dependence on natural resources including livestock that are grown by grazing. Then, we investigate the impact of formal insurance on the farmers’ reliance on such mechanisms. For this purpose, we have experimentally introduced a formal insurance scheme in a rural area of Zambia, where people depend on rain-fed agricultural and natural resources, but there are no formal financial institutions.

The formal insurance we have introduced is a so-called rainfall index insurance, whose insurance payouts are based on an officially observable amount of rainfall that is highly correlated with crop yield. Since rainfall index insurance has advantage over ordinary crop insurance in terms of transaction costs and moral hazards, it has been expected a promising way to insulate vulnerable smallholders against rainfall shocks. However, neither government nor private insurance companies have ever introduced such insurance in Zambia so far. We developed a simple rainfall index insurance for our study site in Southern Province of Zambia and sold it to about 200 households at the beginning of the 2011/12 and 2012/13 crop seasons. The insurance uses rainfall observed at a weather station in Choma about 35 to 55 km away from our study site, and the both years were judged as a normal year with no insurance payout carried out after the seasons.

Based on the insurance sales, we find from regression analyses that impediments to insurance purchases are farmers’ risk aversion, liquidity constraints, and poor understanding of the insurance contract, all of which are consistent with previous literature. As for the impact of formal insurance, it is found that farmers with more insurance increased maize field and planted maize earlier. Although such farmers increased plot size of other crops such as sweet potato and cotton, they reduced crop diversification. Early planting of maize is recommended to have higher yield, but is avoided by risk-averse farmers who tend to wait for enough amount of rainfall. Therefore, the formal insurance has encouraged farmers to adopt higher

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risk and higher return technologies for staple food production. With regard to livestock holding, empirical results do not show robust evidence about the impact of formal insurance on the number of livestock (either small livestock like goat or large livestock like cattle). Thus, although we find also from regression analyses that the rainfall index insurance is a substitute for small livestock, the impact of insurance provision on natural resources through the change of grazing animals is not so clear in the short run.

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