Farmers' Adaptation and Coping of Climate Variability-induced Shocks in Ethiopia: Disentangling Household-specific Determinants of ex-ante and ex-post Strategy Choices

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Abstract

Climate variability-induced shocks and their profound impact in reducing agricultural production, inflating agricultural input and output prices, and deteriorating smallholder farm households' welfare have been posing formidable policy challenges in Ethiopia for several decades. Smallholders' welfare, on the other hand, depends on their choice of strategies to deal with these shocks before and after their occurrence, which are in turn highly farmer- specific. This paper examines household-specific determinants of farmers' choice of ex-ante and ex-post adaptation strategies to climate-induced shocks in Ethiopia. Baseline data collected by CIMMYT from 898 households in the major maize growing hotspots in Ethiopia is used for analysis. Logistic principal component analysis (LPCA) is applied to identify dominant strategies while multivariate probit analysis (MVP) is applied to model farmers interdependent adaptation decisions.

Findings show that farmers choice of adaptation and coping strategies are highly idiosyncratic and heterogeneous. Gender, education, market information, farming knowledge and experience, participation in rural institutions, social networks, resource endowments and farmers' expectation are the major drivers of farmers choices of ex-ante adaptation as well as ex-post coping strategies. Results from both LPCA and MVP show that most of the strategies farmers choose are complementary strategies. This implies that there is no single best strategy that works for all farmers, instead farmers use multiple adaptation and coping strategies tailored for their socio-economic settings. Findings also show complementarity of strategies is stronger in ex-ante strategies than ex-post strategies.

Based on this we suggest that analysis of robust climate adaptation interventions should focus on the household level. In addition, knowledge creation on innovative adaptation options such as application of shock resistant varieties is a key area of intervention to improve farmers resilience to climate variability-induced shocks. Moreover, strong aftershock household asset restoration and development schemes should help farmers get back in track by preserving their productive farm assets.

Furthermore, this paper identifies farmers dominant strategies by applying dimensionality reduction of binary data using LPCA. Results of LPCA were compared with classical linear PCA and exponential family PCA and LPCA was found to be more appropriate in dimensionality reduction of binary data.

Keywords: Adaptation, coping, Ethiopia, logistic PCA, multivariate probit

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