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Impact of climate change adaptation strategies on net farm income of smallholder maize farmers in South Africa

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Abstract

The consequence of climate change on agricultural productivity relies on several interacting factors such as the timing of extreme weather events and rainfall which are predicted to become more recurring in the future. The study examined the determinants of climate change adaptation strategies (CCAS) and their intensity of adoption on the net farm income of smallholder maize farmers in South Africa. A multi-stage sampling technique was used to select smallholder maize farmers across thirty (30) villages in North West province, South Africa. The data were analysed through descriptive and inferential statistics - endogenous switching regression model, multivariate probit regression (MVP) and negative binomial regression model (NBRM). The results of the descriptive statistics revealed that the majority (78.0%) of the household-head were married, while their mean household size, farm size, and age were 6 persons, 4.2 hectares, and 47.2 years, respectively. The parameter estimates of the MVP model revealed that the coefficient of age of the respondents, household size, years of farming experience, off-farm income, and access to credit significantly influence the choice of CCAS adopted. Additionally, gender of the household, main occupation, farm size and access to climate information were the significant factors influencing the adoption intensity of CCAS among the smallholder farmers in South Africa. This research concluded that mixed cropping, crop rotation, mulching and agroforestry were the major CCAS adopted by the smallholder maize farmers in South Africa while the educational status of the household head, access to credit, farm size and off-farm income are significant in explaining the variations in the net farm income of both adopter and non-adopter of CCAS. Therefore, the research recommends that government should strengthen public agricultural credit services, enhance extension services, provide on-farm demonstration training, and disseminate information about CCAS as this will facilitate the adoption of climate-smart farming practices by farmers particularly for smallholder farmers in South Africa in their effort to deal with climate change.

Keywords: Climate adaptation, climate-smart farming, multivariate probit regression, negative binomial regression