



Tropentag, September 11-13, 2024, hybrid conference

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Impact of climate-smart agricultural technology and gender-differentials on smallholder sunflower farmer’s food-nutrition and water security

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Abstract

Climate change poses a significant challenge to the agricultural system worldwide, particularly in a nation like South Africa, where water scarcity and food insecurity are prevalent. This study examines the impact of Climate-Smart Agricultural Technology (CSAT) adoption on gender-differential food-nutrition and water security outcomes in South Africa. Drawing on a combination of quantitative analysis and qualitative insights from gender-differentiated smallholder sunflower (*Helianthus annuus L.*) farming communities, a multistage sampling procedure was employed in selecting smallholder sunflower farmers across some selected villages in South Africa. To understand the linkages between CSAT, household’s food-nutrition and water security outcomes (FNWS); endogenous switching regression (ESR) model was employed to achieve the objective. Herewith, water poverty index was used to measure the water security status, while dietary diversity index (Simpson Index) and calorie intake per adult equivalent were used to determine the food-nutrition security (FNS) of the households. The results show that female-headed smallholder sunflower farmers’ FNS - dietary diversity and calorie intake increased by 28 % and 30 % respectively while the water poverty index reduced by 18 %. On the other hand, that of their male counterpart increased by 21 % and 35 % respectively while the water poverty index reduced by 23 %, indicating that the farmers’ decisions to adopt CSAT influenced their FNWS outcomes. Additionally, CSAT adoption is influenced by access to extension services, climate change information, and off-farm income. Therefore, the study concludes that CSAT adoption enhances water availability, crop yield and FNWS. Therefore, policy on investment in capacity-building initiatives to enhance farmers’ knowledge and skills in CSAT adoption, and water resource management, particularly targeting the marginalised communities and women farmers would contribute to the increased implementation of CSAT adoption, thus, resulting in the overall FNWS in South Africa.

Keywords: Dietary diversity, food policy, rural development, water poverty