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Food Security and Farm Revenues among Smallscale Farmers in Malawi under Changing Climate, Population Growth and Landuse Options

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Abstract

In Malawi, like in many other sub-Saharan African countries, smallscale farmers comprise up to 80 % of the population and agriculture is often the sole source of livelihood. Due to financial and resource limitations, smallscale farmers are faced with fewer opportunities in choosing or accessing adaptation options, hence being more vulnerable.

In this study we consider welfare as an aggregate measure of food security and farm revenues. Through an integrated climate biophysical and economic modelling process, welfare of smallscale farmers' is analysed over a period of 50 years (2010–2060), under different novel crop management practices against probable scenarios of landuse, population growth and farm input subsidies.

The analysed crop management practices include subsistence system, representing the no adaptation option, conservation agriculture, use of fertiliser trees (agroforestry), optimal fertilisation and intensive farming systems. The study includes all major crops, which represent over 95 % of cultivated land in Malawi. The climate biophysical modelling utilises the Environmental Policy Integrated Climate (EPIC) model to simulate crop productivity under different crop management practices while the partial agriculture sector economic model is developed through the Generalised Algebraic Mathematical Systems (GAMS).

Welfare sensitivity to climate impact is discussed under different management options and scenarios alongside the role played by reproductive health services. We conclude by highlighting a number of probable policy recommendations regarding investments levels on crop management practices, landuse change and reproductive health services that optimise welfare of smallscale farmers in Malawi.

Keywords: Food security, integrated modelling, landuse investments, smallscale farmers, sustainable crop management practices, welfare