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**Climate Change, Agriculture, and Economy: Evidence from a CGE Analysis for Sri Lanka****Nanayakkara, G.L.\*, Wimalaweera, G.N.I., Edirisinghe, J.C.***Department of Agribusiness Management, Faculty of Agriculture and Plantation Management, Wayamba University of Sri Lanka, Gonawila (NWP), Sri Lanka**\*[gayani827@gmail.com](mailto:gayani827@gmail.com)***Abstract**

Agriculture has a significant influence on the Sri Lankan economy through its substantial contributions to Gross Domestic Product (GDP), foreign exchange earnings, and government revenue. However, rising climate change conditions such as high temperatures, erratic rainfall, and extreme weather events are increasing the vulnerability of the sector, thereby threatening the productivity and economic stability of the country. The broader macroeconomic and sectoral impacts of climate change have been assessed globally, especially in agriculture-dependent economies. In Sri Lanka the economy-wide impacts of climate induced agricultural productivity decline have been evaluated in only a limited number of studies. Hence, this study aims to address that gap by applying a static multi-sector Computable General Equilibrium (CGE) model. A Social Accounting Matrix (SAM) for 2021 was used to calibrate the CGE model. Prices, exports, household income and consumption, welfare, factor prices, and GDP composition were captured endogenously within the model through a set of behavioral and market clearing equations. Two distinct climate shock scenarios were simulated in the study as 5%, 10% and 20% productivity shocks across the agriculture sector in the first case and paddy-specific shocks of 5%, 18%, and 31% in the second case. Results indicate that agricultural productivity shocks generate sharp declines in exports and sectoral GDP contributions. Under the high shock scenario, vegetable exports declined by 47.2%, while GDP contributions from paddy, coconut and livestock also dropped significantly. Non-agricultural sectors showed negligible reductions indicating their weaker ties to agriculture. Factor price analysis indicated that labor prices drop more than capital prices. This highlights the labor intensity of the agriculture sector in Sri Lanka. At the macroeconomic level, welfare, household income and GDP at factor cost declined, with welfare falling by 1.08% at the high shock (20%) scenario. Similarly, targeted shocks on paddy showed considerable declines in welfare, income, and GDP. These findings highlight the urgent need for proactive and climate-resilient strategies to safeguard the long-term economic stability of the country.

**Keywords:** *Climate change, GAMS, General equilibrium, SAM, Static CGE*