



Tropentag, September 11-13, 2024, hybrid conference

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Identification of potential future areas for sustainable cashew production in Togo using the maxent model

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Abstract

Understanding current and future potential habitats is crucial for designing sustainable management policies and cashew-growing practices that are more resilient to climate change. This study assessed the current distribution and predicted the potential effect of climate change on the habitat distribution of *Anacardium occidentale* L. in Togo under two global circulation models (HadGEM3-GC3.1-L and MIROC6) and two shared socio-economic pathways (SSP245 and SSP585) by 2050. The maximum entropy algorithm, 2538 species occurrence records and a combination of seventeen (17) climate and soil variables were used. The results showed that soil, followed respectively by the annual precipitation (bio12), and the temperature seasonality (bio4), are the most significant environmental factors affecting cashew distribution in Togo. Based on the current model, 78.92% of the Togolese landscape is highly favourable to sustainable cashew-growing practices. In 2050, according to the MOROC6 Model, sustainable cashew nut production areas will be reduced to 5.24% under the SSP 245 scenario and completely disappear under the SSP585 scenario. However, for the HadGEM3-GC3.1-L model in 2050, the areas of sustainable cashew nut production in Togo will be reduced to 3.71% and 0.26% respectively for the SSP245 and 585 scenarios. In short, the results of this study, which was carried out for the first time in Togo, point out the need to put in place a strategy for the conservation and sustainable cultivation of cashew trees in Togo. This research will help to produce more cashew nuts and contribute to achieving sustainable development objectives. This study will also help the cashew nut production sector to become climate resilient.

Keywords: *Anacardium occidentale* L., Climate Change, ecological niche modelling, sustainable agriculture