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Climate change effects on the sub-Saharan agriculture- a case study in Kenya on maize growth and adaptation options

Nowadays, the word climate change often appears. This phenomenon is progressively advancing, and is affecting the entire globe. However, some areas are more vulnerable than others. Among them, the sub-Saharan Africa. The concern for this region arises from many reasons. Just to mention a few, it has a very low adaptive capacity, poverty and famine levels are quite spread, and the overall political, economic and social settings are weak. Another important factor is related to agriculture. As a matter of fact, the sub-Saharan Africa mainly relies on this economic sector which is, however, an extreme climate-dependent activity. Therefore, facing future climate changes, this feature makes it at elevated risk. In this frame, the practice of modelling takes place. Among its various applications, one is to find ways to tackle adversities induced by climate change. It is therefore useful for the development of the so-called adaptation strategies, whose prime purpose is to adapt to an altered condition.

Many crops are cultivated in the sub-Saharan Africa. However, maize is the highest in terms of production, and it partly guarantees food security. The concern arises since climate change is projected to lower maize yields, negatively affecting some parts of the region which already suffer high levels of famine.

In this study, two varieties of maize, early and late, based on their sowing date, were modelled in three sites in Kenya using the crop model AquaCrop, developed by FAO. In a future climate change scenario, they were modelled under the RCP8.5. In parallel, important temperature-dependent maize development thresholds was specifically analyzed. The results indicated lower early maize biomass and yields in a future climate change scenario. Late maize biomass and yields resulted relatively high. Therefore, the late variety appeared to be the most suitable adaptation strategy in the three sites in Kenya. In addition, the specific feature of the employed AquaCrop version to simulate only year-by-year was also discussed.

Keywords: physical geography, sub-saharan africa, agriculture, maize, climate change

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