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# Assessing the Needs for Different Climate Change Adaptation Strategies in Ghana's Cacao Sector

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**Abstract**

Assessing the needs for climate adaptation in West African cacao production over the next decades requires spatially detailed analysis of climate impacts. We use the impact assessment of Bunn et al.(unpublished) on how climate change will affect the suitability of cacao in Ghana over the next decades. They outline specific adaptation strategies for different climate impact zones. Here we estimate the current share of households dependent on cacao as well as the share of production that are located in these zones.

Using a Random Forest machine learning approach to model occurrences of cacao depending on several relevant bio-climatic and soil-related variables, Bunn et al. find four different suitability zones for cacao in Ghana. Moreover, they employ downscaled RCP6.0 climate projections to estimate the change in suitability up to the 2050s. Depending on the changes in suitability, they propose five different types of adaptation strategies: Opportunity refers to zones that are currently unsuitable for cacao but will probably become suitable in the future. Transformation is required in suitable areas which are projected to become unsuitable. In areas transforming from one suitability type to another, cacao production will be possible but under different conditions and systemic adaptation is recommended. If the suitability type remains the same, incremental adaptation is proposed. Finally, in regions where there is low model agreement on the future climatic suitability of cacao, a strategy of systemic resilience is suggested.

We assign current data from the 2010 Population and Housing Census of the Ghana Statistical Service and cacao production statistics from the Ghana Cacao Board to the climate impact zones specified by Bunn et al. We find that about 40 % of the households and 35 % of the current production in Ghana are located in areas that require systemic adaptation. Only about 10 % of the households and 4 % of the production are located in areas which will become unsuitable for cacao (transformation). Hence, although only a minor share of activities is located in regions that are projected to become fully unsuitable, there is a considerable share of areas that still require different strategies of adaptation to actually maintain cacao production.

**Keywords:** Cacao, climate adaptation, Ghana

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