



## **Multi-scales and multi-sites analysis of the role of climate in cotton yields in West Africa**

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Cotton is the main tradable crop of West and Central African countries, representing for some countries the main exported agricultural product. Cotton is then of major concerns since it represents an important source of income accounting for more than a tenth of total exports. Moreover, the subsector as a whole is essential for rural poverty reduction. Since cotton is a rainfed crop in these countries, its yield is closely related to climate. The objective of this study is to point out the role of climate variability in cotton yields. Our approach consists in taking two completely different sites in the analysis of the climate-yields relationships, i.e., an experimental plot in Mali with a long-term historical yield-survey and farmers' yields in 28 administrative units in Cameroon. We found that the same climate indexes (rainy season onset and length) are major drivers for the year-to-year and the spatial distribution of cotton productivity, even if the role of climate is strongly reduced in farmers' exploitations where other non-climatic factors impact crop productivity such as human management, biotic stresses, pests, etc. The link between climate and cotton yields seems to depend on the mean climate since the driest cotton areas in Cameroon are the most sensitive to climate variability. The coherence of the results from the two very different situations gives us some confidence in the generalization of our findings to the whole West and Central Africa. Our study shows also that the aggregation of yield data from the local scale to the national scale tends to smooth the non-climatic variability and to highlight the role of climate in the year-to-year variability of cotton yields.