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The economic dependency of Ghana's cocoa sector on pollination services

Master Thesis

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Abstract

The cocoa economy of Ghana depends on insect pollination. Through a systematic literature review, *Ceratopogonidae* are identified as Ghana's most diverse and important cocoa pollinator family. A challenging taxonomy of cocoa flower visitors, lacking data on population drivers, as well as their linkage to cocoa productivity, are identified as major knowledge gaps. Based on the findings from the literature review and stakeholder interviews, manual pollination is discussed and identified as a promising technology to increase cocoa productivity. Its long-term viability as well as its dependency on additional inputs nevertheless need to be studied further. An economy-wide computable general equilibrium (CGE) model with an explicit representation of the ten regions of Ghana is used to model changes in the cocoa pollinator population. The model scenarios are decreasing cocoa pollinator numbers of 10%, 30% and 50%, as well as an increase of 10%. Substantial effects on the economy of Ghana are only observed if severe declines of 30% and 50% occur. Changes in pollinator populations affect poor and rural households more than urban and rich households. Substantial income losses of households in the Western region, the most important cocoa growing region, are observed. Positive changes in food security are observed at the country level and for most regions of Ghana as pollinators decline. Considerably negative effects on food consumption can nevertheless be observed in the Western region. Declining cocoa pollinator numbers lead to an increased production of all other agricultural commodities, which considerably benefits the food processing sector. At the same time, the cocoa processing sector suffers high losses. Apart from activities related to agriculture, substantial changes are observed in the mining and finance industry with both considerably increasing their output if pollinator numbers are on the decline.