

95. Impact of climate change on crop production in southern Mali and the potential of adaptation strategies

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Climate variability and change are affecting rural livelihoods in Mali today and present a growing challenge in the region, as in many other parts of the African continent. We used a database of long-term (from 1965 to 2005) weather records and crop yields of a field experiment conducted from 1965 to 1993 at the N'Tarla in southern Mali to quantify possible historical changes of climate and their impact on yields of cotton, sorghum, and groundnut. Series of future climate data coupled with the calibrated crop growth model APSIM were then used to simulate impacts of climate change on crop production and evaluate adaptation options of crop management, such as planting date, fertilization and choice of variety. We found that temperature and the total number of dry days within the growing season had significantly increased over the 1965-2005 period. These climate changes reduced cotton yields, but no significant relationship was found for sorghum or groundnut. Predicted future changes in climate are in line with the historical changes. By mid-century, predicted maize grain yield losses under current farmer's practice are between 51% and 57%. For millet average yield losses are between 7% and 12%. A major challenge of adaptation strategies to climate variability and change is to match the crop growth cycle to the length of the rainy season. If crop management is improved – to avoid delays in planting date, to increase rates of fertilizer use and to use the best performing crop varieties – the loss in crop yield due to climate change can be compensated and even turned into a yield increase compared with current yields.