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Uncertainty in modelled groundnut yield derived from satellite based rainfall estimates

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In continents such as Africa, availability of real time satellite estimates offers the possibility of mitigation of disasters associated with rainfall excesses and deficits. One application is in the field of crop yield forecasting. Much of Africa depends on rainfed crops in areas where rainfall is marginal. Accurate prediction of crop yield could greatly ameliorate potential famine and allow advance planning of potential intervention operations. Crop yield forecasting can be carried out by using satellite based rainfall estimates as the input to a suitable crop model. An area of importance is the assessment of errors in the rainfall field and their propagation in the forecast yield. In this paper we investigate uncertainty in groundnut yields using the Gambia as a case study. Yield data were available from 1974 to 2002. Rainfall estimates for the same period were calculated from Meteosat TIR imagery. A large area crop yield model (GLAM) was calibrated using the yield data. Uncertainties the satellite rainfall estimates were computed by careful comparison with raingauge data. The way in which these uncertainties propagate through to crop yield was found to depend strongly with rainfall amount and temporal distribution throughout the growing season.