

A decision support system for managing climate impacts and quantification of production risk on the financial feasibility of “cattle” farming.

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Research focus area:	Sustainable natural resource utilization

Aims of the project

- To develop a decision support system to assist “cattle” farmers to plan for climatic changes and to assess the economic impact thereof on their industry in order to promote sustainability and profitability and improve risk management

Executive summary

For farmers to plan effectively for the upcoming season and to alleviate the effect that possible drought conditions might have on their livestock production, reliable information on the interaction between weather and veld conditions is needed. The main objective of this research is to provide information with respect to future climatic conditions and to translate such information into usable information concerning veld production that could be used to manage livestock production. The best way to provide information regarding the interaction between weather and veld conditions is to use a mathematical simulation model that simulates the effect of weather on the dry matter production of natural veld. The PUTU 11 model was used in this research to simulate rangeland productivity for a Themeda triandra veld. Weather, soil and plant physiological data was used to simulate the growth of natural veld, as well as data pertaining to El Niño or La Niña events. The output of the PUTU 11 model was then used to simulate the expected veld production for the coming season.

A regression model was then used to provide an estimate of the known movements in the data. In essence only deviations from these known movements can be attributed to risk and therefore the residuals of the regression model were used to gain insight into the production risk associated with dry matter production.

The regression results demonstrated good predictability of future veld production given good estimates of past production is available. Stochastic sequences of dry matter production were simulated by adding the errors of the time series model to the predicted dry matter production to provide a stochastic forecast of dry matter production. The stochastic forecasts were then used to predict the offtake percentages that will result in enough veldt being available for the remaining animals.