

Using PARCHED–THIRST Software to Determine Appropriate Water Management Practices for Maize Production

A Case Study of Fulwe Village in Morogoro District

The Problem

- Farmers at Fulwe village have been experiencing variable maize yields (low to high) for many years.
- Reasons for the mixed results were not exactly known to both farmers and agricultural extension officers.
- Some of the cited reasons included inadequate crop husbandry but most cited is improper planting dates.
- Therefore, the issue was to find means to identify appropriate planting dates. This necessitated the use of the PARCHED–THIRST (PT) software.
- Before embarking on the analyses, the following questions were asked: Is the issue really appropriate planting dates? Will the software be able to identify other problems besides planting dates?



Figure 1: Farmer at Fulwe village explaining a problem of low maize yield during a village meeting with investigators.

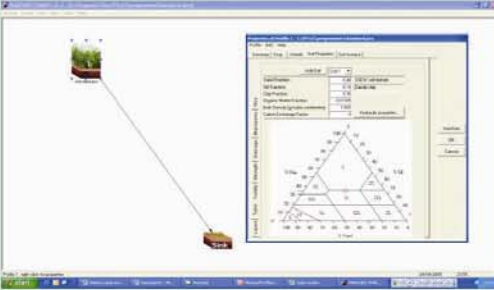


Figure 2: Modelling rainfed maize in PT model – catchment area on top, sink at the bottom and profile dialogue box.

Study Approach

- Collect weather data (1999 – 2003) from Kingolwira weather station (a nearby station to the village) and soil profile data.
- Model the rainfed maize (the main farming system) in PT software (Figure 2).
- Simulation of the rainfed system by varying planting dates between January 1 and 12 March.
- Investigation of dry matter accumulation and grain weight accumulation.

Results

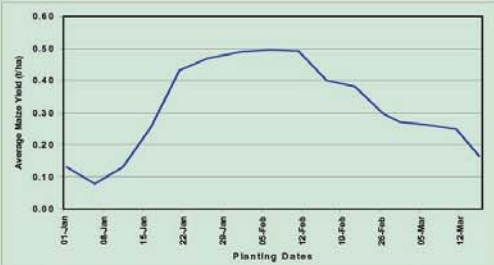


Figure 3: Yield response to planting dates. The 21-Jan to 11-Feb being appropriate but the window is also too wide.

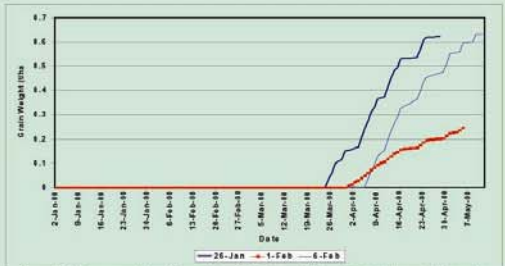


Figure 5: Grain accumulation. Those planted 26-Jan and 6-Feb obtained higher yield than who planted 1-Feb.

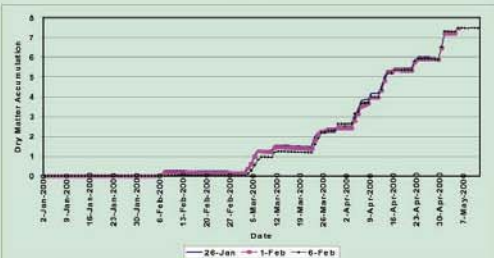


Figure 4: Dry matter accumulation of 2000 "masika" season. Almost all years showed the same pattern. Indicating planting dates have little effect on the final yield.



The Morogoro rural district extension staff, during the training of PT software at Sokoine University of Agriculture, Morogoro

Discussions and Conclusions

- Figure 3 and 4 show that the difference in yield that farmers' experience a likely caused by short dry spells that coincides with some critical stages of tasselling and grain filling.
- Farmers should harvest water and store it so that they can use it for supplementary irrigation during tasselling and grain filling stages. Proper water management during these two stages is critical to realizing good yield.
- PT software has therefore been able to show that the reason for low yield is likely due to dry spells during tasselling and grain filling stages and not due to wrong planting dates.



This publication is an output from a project R8080a funded by the United Kingdom Department for International Development (DFID). The views expressed are not necessarily of DFID.