Crop choice and planting time for upland crops in Northwest Cambodia

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Background

Crop yields are declining in Northwest Cambodia and crop failure in the pre-monsoon season is commonplace, with 95% of farmers sowing during the hottest period of the year (Feb-April) with unpredictable rainfall (Fig. 1). Farmers lack knowledge to adopt more sustainable farming practices.

Methods

A small plot replicated trial was conducted over 4 seasons (2 years) in Samlout District, Battambang Province, Northwest Cambodia to evaluate yields in response to time of sowing and crop sequence under no till farming conditions (Fig. 2). The pre-monsoon crop was sown in late May each year and the monsoon crop in early October.

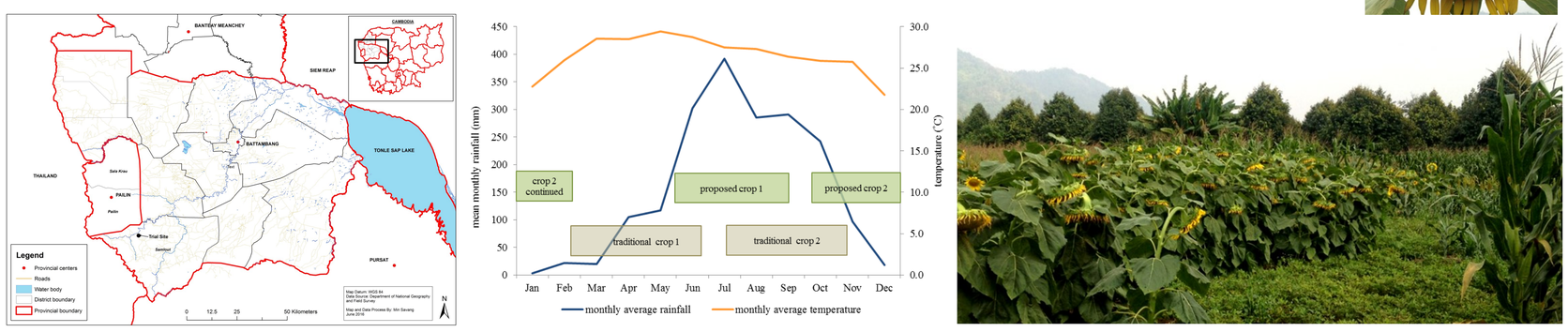

Figure 1. Map of Northwest Cambodia showing location of the research site (left); traditional and proposed crop production seasons at Samlout as related to climatic conditions (middle); the trial site (right).

Aim

- To increase reliability and sustainability of the farming system
- To compare yield and profit of sequences consisting of continuous maize, and maize in rotation with peanut, sunflower, sorghum, cowpea or mungbean

Hypothesis

- A shift in sowing time to two months later than traditional practice will increase crop yield and reduce crop failure due to heat and drought stress
- Inclusion of rotation crops in the crop sequence will be more profitable and sustainable than continuous maize

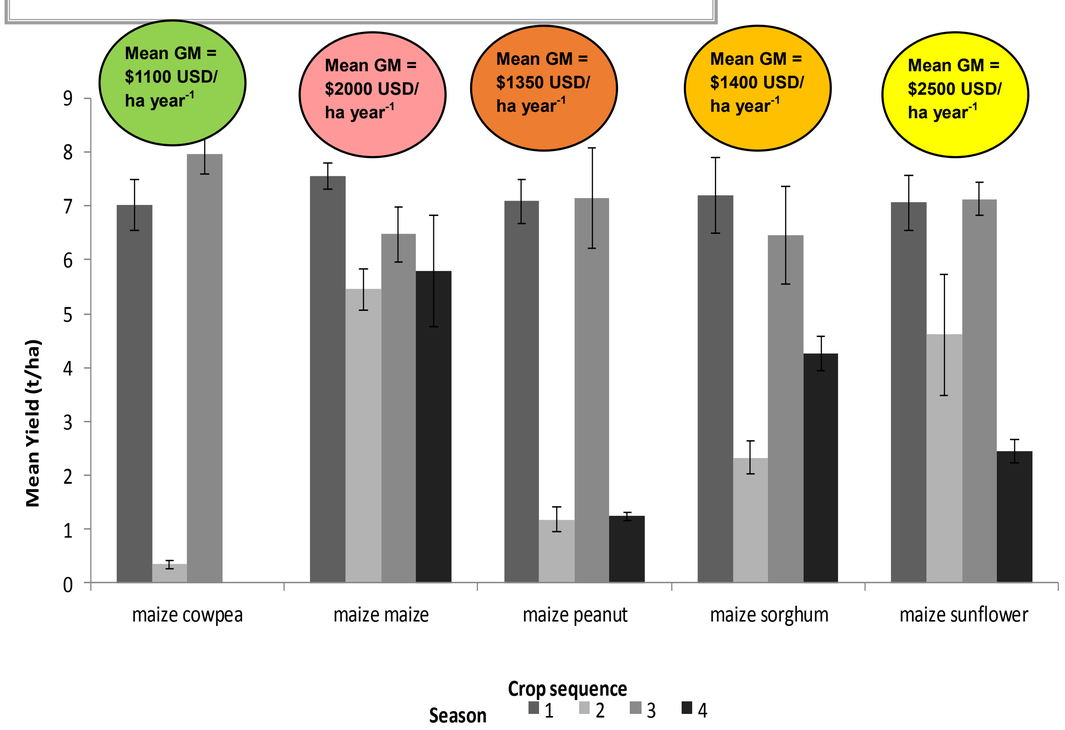

Figure 2. Mean yields for individual crops and whole rotations across 4 seasons at Samlout (graph); Mean gross margin returns (GM) for crop sequences (top).

Results

- Maize-sunflower was the most profitable crop sequence (Fig. 2).
- Continuous maize produced the most stable yields across the 4 seasons
- On-farm trials demonstrated high crop yields and a low probability of crop failure when sowing time was delayed by 2 months. Separate APSIM crop simulation analysis confirmed these results
- Maize, sunflower and sorghum planted in early October produced good yields largely through access to stored soil moisture
- Data from this on-farm research (yields, plant growth, surface soil moisture, rainfall) was used to predict soil profile moisture down to 1.4 m in the APSIM model, and demonstrated crops were able to access deep stored moisture for their moisture requirements (Fig. 3.)

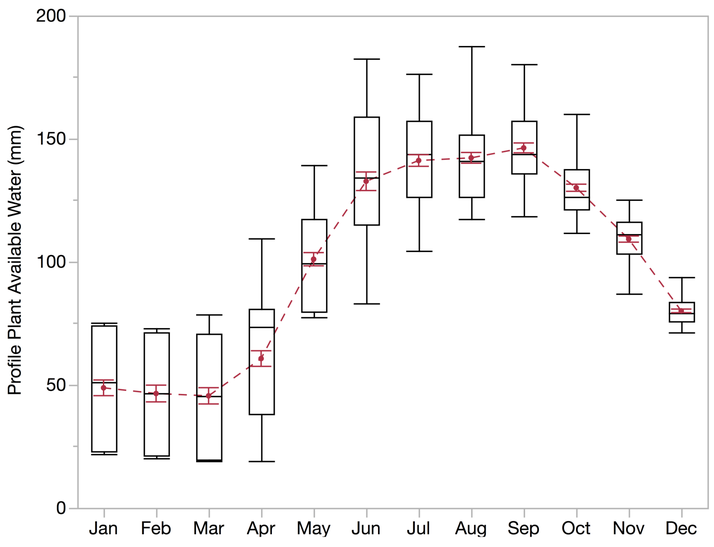

Figure 3. Predicted PAW by month down the soil profile to 1.4 m, for a clay soil at Samlout

Conclusions

- This research recommends a delay in the traditional time of sowing by two months, which results in better alignment of crop growth to rainfall, residual soil moisture and cooler conditions for plant growth to optimise yield
- Sunflower is a viable new crop choice for the region
- Adoption of conservation agriculture (no tillage, crop rotations) would assist to alleviate current system problems of yield decline, soil and nutrient degradation, and with positive flow on effects for the health of the wider catchment
- The extension of the APSIM model to predict subsoil profile moisture is an important development for practitioners working in land mine affected soils

Acknowledgements

This research is jointly funded by the Australian Centre for International Agricultural Research (ACIAR) and the University of New England (UNE) Armidale, Australia. Special thanks to the ACIAR project team for all their hard work, and Savang Min for creating the map.