

## **'Wheatman' - a computer-based decision aid for wheat growers in Queensland**

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Farming decisions are made under risk due to the variance in environmental factors during the long time period between the decision and the economic outcome thereof. It is these risks and their variance due to alternative farming decisions that 'Wheatman' seeks to quantify.

The data base used by 'Wheatman' consists of the probability of gaining given grain yield levels for given combinations of location, soil type, starting available soil water, planting time and crop phenology. This data was produced by running a large wheat model (Hammer et al., 1987) through 96 years of daily meteorological data for each combination of starting conditions.

The input requirements to access this data base take the form of decision pyramids. Thus to determine starting soil nitrate level the best input is the measured NO<sub>3</sub>-N/60 cm at planting; failing such data information on past yields, protein level, rain in crop and fertiliser application is required; failing this nitrate level is determined on soil type, age and history of cultivation.

The major outputs from 'Wheatman' are future planting opportunities, and for a given planting time the flowering times and associated frost risk for all current genotypes, grain yield and protein probability; and fertiliser requirement and the likely yield loss from wild oat infestations. At each output recycling options are available so that 'what if?' type queries can be made.

A previous attempt to present such data to farmers (Woodruff, 1975) was based upon yield probabilities gained from accumulated trial data and was 'paper' not computer based. The similarities in 'optimal' decision making between these two packages suggests that the future environmental variance and economic considerations now dominate decision making rather than agronomic knowledge. Future improvements will come from consideration of farmer 'utility' and the consequences of decisions made on long term farm income and stability. The acceptance of such decision packages and their utility depends very heavily on the co-operation and improvement to these packages brought about by having extension agronomists and farmers involved in the programme from its outset.

Substantial modification of both the input and output interface has been undertaken as a result of three years field testing of this package by extension agronomists. The most used section and that causing most changes to farmers decisions, was that presenting details on the relative yield effect of flowering data (planting date x variety phenology) via frost risk and water stress likelihood.

1. Hammer G L. Woodruff D H and Robinson J B (1987): Agr. and Forest Met. 41. 123-142.
2. Woodruff D R (1975): 'Decision Making for Wheat Growers', DPI Tech. Rep. 16.