

## THE WESTERN AUSTRALIAN DAIRY FARM MODEL

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The Western Australian Dairy Farm Model (WADFM) is a mathematical programming model which determines whole farm management strategies (number of cows, calving pattern, milk production, level of concentrate feeding, area watered, area and type of fodder conservation, size and type of beef sideline activity) that will maximize profit on a dairy farm.

The model includes about 400 activities and 300 constraints. All model assumptions are contained in a series of spreadsheets which simplifies revision of model parameters and allows users to examine all of the assumptions. Full description of the model is given by Olney and Falconer (1985).

The WADFM has three main areas of application: assisting farmers and advisers to determine practical management strategies that will maximize profit, evaluation of research priorities and evaluation of industry policy decisions. The following example relates to both an extension and research use.

The model was used to determine the potential profit from improvements in pasture growth on a non irrigated dairy farm in Western Australia. Pasture growth throughout the growing season was increased by up to 30% at two levels of digestibility, with and without adjustments to the whole farm plan, i.e. cow numbers, calving pattern, feeding strategies, fodder conservation and stock trading.

Results in Table 1 provide an estimate of the potential value of increased pasture growth. Benefits of a 10% increase in growth may be lost by a 5% reduction in pasture digestibility.

Table 1. Increase in profit with changes in pasture growth and digestibility (IVD) when management strategies were optimized for each level of pasture production (optimum plan) and when management strategies were not adjusted to take advantage of additional pasture growth (unadjusted plan)

Pasture growth	Increase in profit (\$/yr)			Increase in profit for unadjusted plan (% optimum plan)
	Optimum plan		Unadjusted plan	
	Standard IVD	IVD 5% below standard	Standard IVD	
Standard	0	-3,272	0	0
Standard + 10%	3,156	-239	930	29
Standard + 20%	6,484	2,710	2,631	40
Standard + 30%	9,781	5,910	3,073	31

Predictions from the model can be used by researchers to assess the on farm value of their research results and to target those areas with the greatest potential benefit. For extension workers, the model predictions provide an indication of the changes that would be required to a whole farm plan to maximize profit from any innovations. In the above example up to 70% of the potential increase in profit from improved pasture would be lost if changes were not made to the farm plan.

OLNEY, G.R. and FALCONER, D.A. (1985). Mathematical programming model of Western Australian dairy farms. Western Australian Department of Agriculture.

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