Are new farming systems based on perennial pastures in south west Australia more profitable?

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Introduction Traditional farming systems in south west Australia based on annual plants have been shown to use insufficient water leading to excess leakage below the root zone, groundwater rise and eventually salinisation of the landscape. Introduction of deep-rooted summer active perennial plants can significantly increase water-use thus reducing the risk of salinisation. However the adoption of perennials by farmers is also dependent on their effect on economic factors. This paper reports an analysis of the impact of perennials on whole farm profit.

Materials and methods A model of the farming system known as MIDAS was used to undertake this analysis (Morrison *et al.,* 1986). The model was paramatised with a representative 2000 ha farm in the Albany Eastern Hinterland catchment receiving 600 mm annual rainfall and comprising of three soil types, deep sand, shallow sand over clay and deep sand over clay. Livestock enterprise was a self replacing Merino flock utilising surplus ewes for crossbred lamb production. Three different systems where analysed. 1. Traditional farming system - 30% crop, 70% annual pasture subterranean clover (*Trifolium subterraneum*) based, stocked at 8.5 dse/ha. 2. Current best practice - 30% crop, 23% annual pasture subterranean clover based, 47% perennial pasture either lucerne (*Medicago sativa*) alone or kikuyu (*Pennisetum clandestinum*)-subterranean clover, stocked at 10 dse/ha. 3. Future farming system - 30% crop, 70% perennial pasture either lucerne alone or kikuyu-subterranean clover or tall fescue (*Festuca arundinacea*)-subterranean clover, stocked at 12 dse (dry sheep equivalents)/ha. Leakage values were estimated using a farm scale hydrologic model (Beverly *et al.* 2003).

Results Farm profit and leakage results are presented in Table 1. As expected there is a substantial decrease in the leakage of water below the root zone (69 to 23 mm) as the area of the farm under perennials increased from 0 to 70%. Encouragingly farm profit increased ($32 to $104 per ha per yr) as leakage decreased. Increased profit was driven by higher pasture yield, superior feed quality in summer and autumn, reduced supplementary feed and higher stocking rates. The optimum area of the farm under varying perennial options is presented in Figure 1. With only one perennial option in this case, lucerne, the optimum proportion of the farm is around 25% in terms of profit. If another perennial option with a different growth pattern, such as kikuyu, is added the optimum increases to about 50% and with a third the optimum reaches to 75%. This result is quite promising as large areas of the landscape need to be planted to perennials to minimise the impact of salinisation.

Table 1 Estimated farm profit ($/ha per yr) and leakage (mm) beneath contrasting farm systems

	Traditional farming system	Current best practice	Future farming system
Farm profit ($/ha/yr)	$32	$69	$104
Leakage below root zone (mm)	69 mm	46 mm	23 mm

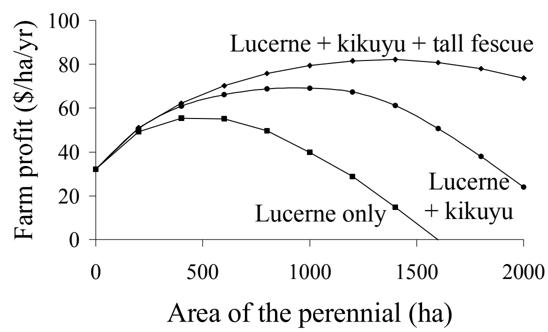

Figure 1 The effect of varying the area of perennials on farm profit

Conclusions This analysis suggests that it is possible for farmers to substantially increase farm profit while reducing the risk of salinisation through planting a high proportion of their farm to perennial pastures.

References

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