# COMPARISION OF FLOCK STRUCTURE -USING MIDAS-

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MIDAS (Model of an Integrated Dryland Agricultural System)is a whole-farm mathematical programming for the crop-livestock farming system of the Western Australian with many regional versions. In its standard form, MIDAS has about 400 activities including 20 different rotations on six different soil types with many different seeding,harvesting,sheep management and crop fertilisation options. About 200 constraints in the model represent the limited farm resources,financial constraints,and biological limits to productian.

The major feature distinguishing MIDAS from other mathematical programning models isits emphasis on the interdependencies of croppingandlivestock enterprises. These include nitrogen fixation by leguminous pastures and crqps, stubble,grazing bylivestock, pasture suppression followiing cropping, feeding grain to sheep and the effect of a pasture phase on the costs of weed control.

MIDAS has been applied to a wide range of extensionand research issues (see Kingwell and Pannell 1987). The benefits of using a whole far, optimisation model are evident in the results derived by comparing five different self replacing merino flock structures with main selling activity being lambs, hoggets, shippers 18 to 28 months, shippers 30 to 40 months and wethers 48 to 76 monhs of age. Sensitivity of flock structure to changes in wool price was also examined.

Results for different flockstructuresares~in Tablel. Higher proportions of wethers in the flock are associated with increased profit. With less profitable flockstructures, there is an increase in the area of the farm in crop reflecting the reduced profitability of the sheep enterprise.

Table1 Sheep numbers, net income and percentage of farm in crop for different flock structures (wool price 450c/kg).

| Main selling activity | Lambs | Hoggets | Shippers 18-28 mth | shippers 30-40mth | Wethers 48-76 mth |
|---|---|---|---|---|---|
| Net income ($) | 21268 | 21614 | 30462 | 33499 | 36527 |
| Ewe (head) | 1568 | 1522 | 1533 | 1662 | 1329 |
| Winter DSEs | 2745 | 3172 | 3143 | 3939 | 4324 |
| Crop % | 57 | 57 | 57 | 42 | 42 |

At lower wool prices (300c/kg), selling shippers at 30 to 40 months of age is the most profitable option with the area of farm in crop increasing by 19 percent.

The importance of using a whole-farm approach for dealing with the complexities of the farming system in the wheatbelt is evident from this analyses. Partial analyses rarely allow for changes in enterprise mixes in response to changing prices or enterprise profitability. MIDAS is a useful tool offering a whole-farm insight to both researchers and extension officers.

KINGWELL, R.S. and PANNELL, D.J. (1987). "MIDAS, A Bioeconomic Model of a Dryland Farm System. (PUDOC: Wageningen).

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