The impact of concentrate price on the utilization of grazed and conserved grass

P. Crosson[1,2], P. O'Kiely[1], F.P. O'Mara[2], M.J. Drennan[1] and M. Wallace[2]
[1]Teagasc, Grange Research Centre, Dunsany, Co. Meath, Ireland, Email: pcrosson@grange.teagasc.ie, [2]Faculty of Agri-Food and the Environment, University College Dublin, Belfield, Dublin 4, Ireland

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Introduction A linear programming model was designed and constructed to facilitate the identification of optimal beef production systems under varying technical and policy scenarios. The model operates at a systems level and most activities that could occur in Irish spring-calving, suckler beef production systems are included. In this paper, the components of the model are described together with a simple application of the model involving changing concentrate prices.

Model description The model was developed using a mathematical programming methodology which encompasses the following characteristics: 1) a range of possible activities, 2) various constraints to prevent free selection from the range of activities, and 3) an objective which can be quantified (Dent *et al*., 1986). It is a single year steady-state design. The fundamental unit on which the model is based is the cow unit. Due to the predominance of pasture-based systems in Ireland a detailed set of grazing options that are typical of those available to Irish cattle farmers is specified. Model details are specified on a monthly basis. This enables it to respond to monthly fluctuations in feed supply and animal requirements. Financial budgets (Teagasc, 2003) assign a cost or revenue to each activity and thus the program identifies the optimal net farm margin. Nutritional specifications are described in terms of net energy (NE) requirements subject to a maximum intake capacity.

Model application A scenario investigating the impact of a change in concentrate price on optimal systems is presented. Concentrates generally are the most costly feedstuffs and the cost of concentrates influences farm margin and system operated to a large extent. The influence of concentrate price on the optimal system is presented below (Table 1) together with the resulting impact on net margin (Figure 1). Above €140/tDM it was found that there was no response to further increases in concentrate price. Therefore, results are presented for the range €100/tDM to €140/tDM.

Table 1 Production results for concentrate price change scenario

Concentrate price (€/tDM)	100	105	110	115	120	125	130	135	140
Area for grazing (ha)	60.0	60.0	60.0	50.0	50.0	49.0	45.3	35.7	35.7
Area for grass silage (ha)	0.0	0.0	0.0	0.0	0.0	1.0	4.7	14.3	14.3
Land rented (ha)	10.0	10.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0
Total N applied (kg/ha)	199.4	196.3	196.3	196.3	196.3	202.4	217.7	243.4	243.4
Concentrates fed (t)	94.5	84.5	84.5	70.4	70.4	58.8	39.1	6.0	6.0
Suckler cow numbers	61.3	61.2	61.2	51.0	51.0	53.7	56.4	56.2	56.2

Up to around €120/tDM all animals are finished on concentrate based diets but above this steer progeny are finished off grass and from about €130/tDM all progeny are finished off grass. Stock numbers initially decrease with an increase in concentrate price but recover somewhat after the change to grass-based finishing.

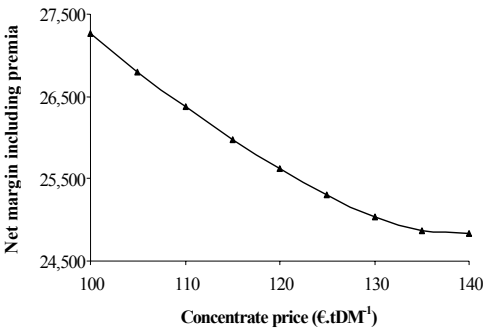

Figure 1 Change in net margin with increasing concentrate price

Conclusions Concentrate price impacts crucially on optimal systems driving both the operated finishing system and grass silage requirements. The model can be used also to analyse current or prospective scenarios. Future changes in agricultural policy can be investigated routinely. Whilst the production data are based mainly on performances obtained at Grange, the parameters can be modified to reflect other situations.

References

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