A Comparison of Three Systems of Milk Production With Different Land Use Strategies

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Introduction Under the Luxemburg agreement FAPRI-Ireland (Breen & Hennessey 2003) projects that milk price will decrease by 5.0 to 5.5 c/l because of reductions in support for butter and skimmed milk powder. These changes mean that many dairy farmers need to reappraise their systems of milk production and consider necessary adjustments that will ensure viability in the longer term. The objective of this study was to model three different systems of milk production in scenarios where quota, cow numbers or land was restricted.

Materials and methods Three systems of milk production were compared 'High Grass' (HG), 'High Concentrate' (HC) and 'High Maize Silage' (HM) in this analysis. The HG and HC systems were managed similarly (Horan *et al*., 2004) with concentrate inputs of 350kg and 1500kg, respectively. The HM system consisted of the addition of maize silage to the diet in early spring and autumn with a response of 0.35 kg milk/kg of maize silage DM. The modeled farm had 29.5 ha, 50 cow-housing places and 323,327l of milk quota, which was representative of Teagasc monitor farms, while housing and milk quota were included at €1,600/cow and €0.153/l respectively. All milk, male calf and cull cow prices and opportunity cost of land were based on projections from FAPRI-Ireland (Binfield *et al*., 2003). The Moorepark Dairy Systems Model (MDSM-Shalloo *et al.,* 2004) was used to simulate the three milk production systems under four different milk quota scenarios. In scenario 1 milk quota was restricted (QR) and therefore an increase in milk yield per cow resulted in reduced cow numbers. In scenario 2 milk yield was increased per cow but cow numbers were restricted (CR) at 49.4. In scenario 3 land available for expansion was limited (LL) to that of the HG in scenario 1 (19.6 ha). In scenario 4 there was unlimited availability of land for expansion (LU) with the same amount of quota purchased as in scenario 3. Similar amounts of milk quota were purchased in scenario 4 as in scenario 3 with the HC and HM.

Results Table 1 shows the key herd parameters for the three systems of milk production under the four different scenarios. In QR farm profit was €2,617 and €1,279 lower in the HC and HM systems, respectively than in HG. In CR farm profit was €1,079 and €503 higher in the HG than in the HC and HM systems, respectively. In LL farm profit was €770 lower and €137 higher in the HC and HM systems than in the HG system. In LU farm profit was €1,701 and €794 higher in the HG system than in the HC and HM systems when compared to LL.

Table 1 Key herd output parameters for the three systems of milk production under four scenarios

	QR			CR		LL		LU
	HG	HC	HM	HC	HM	HC	HM	HG
Hectares used (Ha)	19.6	15.3	15.4	18.1	16.4	19.6	19.6	24.9
Quota purchase (kg)	-	-	-	53,562	19,257	82,724	81,251	81,308
Cows calving	49.4	41.9	46.4	49.4	49.4	53.5	59.0	62.8
Stocking rate (LU/ha)	2.37	2.57	2.82	2.57	2.82	2.57	2.82	2.37
Labour costs (€)	-	-	-	4,165	1,497	6,432	6,295	6,346
Farm profit (€)	30,582	27,965	29,303	29,503	30,079	29,812	30,719	31,513

Conclusions The results indicate that the most profitable system of milk production is where grazed grass is maximised in the diet. Expansion through increasing output per cow reduces farm profitability. Where land area is limiting there may be an advantage in going to high input systems but it is very much dependent on the supplement to milk price ratio and the ability of the farmer to operate higher input systems effectively.

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