

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 and Hennessey, 2003) projects that milk price will reduce 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. 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 that had different land use requirements were compared High Grass (HG), High Concentrate (HC) and High Maize Silage (HM) in this analysis. The HG and HC systems were managed similarly with concentrate inputs of 350kg and 1500kg, respectively. Results from a three-year study carried out at Moorepark with high durability cows (Horan et al., 2004) were used as the basis for the simulation. The HM system consisted of the addition of maize silage to the diet in early Spring and the Autumn thereby enabling a higher stocking rate to be carried on the farm. It was assumed that each kg of maize silage DM yielded an additional 0.35 kg of milk based on studies carried out at Moorepark. The modeled farm had 29.5 ha, 50 cow housing places and 323,327 l of milk quota, which was representative of Teagasc monitor farms (Ramsbottom G., per. comm.). All milk, male calf and cull cow prices and opportunity costs of land were based on adaptations of projections from FAPRI-Ireland (Binfield et al., 2003). The Moorepark Dairy Systems Model (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 could be increased per cow but cow numbers were restricted (CR) at 49.4 cows with quota purchasing possible. In scenario 3 land available for expansion was limited (LL) to 19.6 ha while

in scenario 4 there was an unlimited availability of land for expansion (LU) with the same amount of quota purchased as S3. Extra milk quota was purchased at €0.153/l and was financed by a loan over five-years at 4% interest with the capital and the interest considered an expense. It was assumed there was no cost for labour on the farm in a static scenario but when milk production was increased the increased requirement for labour was based on data from the Moorepark labour study. When numbers increased over 50 cow housing places, conventional housing facilities were included at a cost of €1,600 /cow which was financed over a 15 year period.

Results and Discussion

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

Conclusion

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.

References

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

	Quota Restricted			Cows Restricted		Land Limited		Land Unlimited
	High Grass	High Conc.	High Maize	High Conc.	High Maize	High Conc.	High Maize	High Grass
Area 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
Milk Sales (kg)	301,055	297,815	299,755	351,376	319,012	380,539	381,006	382,362
Total Sales (€)	85,964	84,470	85,255	99,662	90,732	107,934	108,364	109,181
Total Costs (€)	55,382	56,506	55,992	70,159	60,697	78,121	77,700	77,755
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