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Suckler beef systems – assessing steps to improve profitability

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Summary

- The 3 main variables to increase profitability of suckler beef systems are:
  - Increase grass utilisation. This requires good soil fertility, perennial ryegrass dominant swards and the appropriate use of grass budgeting tools.
  - Maximise animal performance. Good fertility and reproductive performance are fundamental to a profitable system with the objective being to produce one calf per cow per year. The breeding and management policy must also aim to maximise live weight gain.
  - Optimise stocking rates. Economic analysis of suckler calf to beef systems in Grange has shown that, where individual animal performance is high; stocking rate is a key driver of profitability.
- Production efficiency improvements are possible for 'average' suckler farming systems in Ireland and can lead to substantial increases in profitability.

Introduction

Ireland is the fifth largest net exporter of beef in the world, exporting 90% of the total 520,000 tonnes of carcass weight produced in 2014, valued at just under €2.1 billion. A further 210,000 cattle, worth €162 m, were exported live. Beef production is the most ubiquitous farm enterprise activity in Ireland with the beef sector one of the main contributors to the Irish agri-food industry, accounting for 34% of total gross output value in 2014. Of the 139,000 farms nationally, beef production activities occur on almost 80% with this output largely generated from the progeny of the suckler beef cow herd. Despite the significance of the beef sector to the national economy, family farm incomes are low, with many beef enterprises operating at a loss when EU and national farm support payments are excluded. Improving profitability on suckler beef farms nationally is a challenge for all stakeholders associated with the industry. The purpose of this article is to outline the key factors that influence the profitability of suckler beef systems and in this context to present analysis highlighting the importance of suckler farms operating to very high levels of management and production efficiency.

Factors affecting profitability of suckler beef systems

The three main variables influencing the profitability of suckler beef enterprises are; 1) grass utilisation, 2) animal performance and, 3) stocking rates.

Grass utilisation

The level of grass (grazed and conserved) utilised on beef farms is firstly determined by the yield of grass grown, which in turn depends on soil fertility. The results of soil analysis from Irish grassland farms have shown that 90% of samples have sub-optimal soil fertility. More specifically, it has been shown that 70% of drystock farms have a large requirement for lime and over half of the soils tested have very low to low Phosphorous (P, 54%) and Potassium (K, 50%) status. Thus, soil testing, to establish current levels of soil fertility, is the initial step to increasing the level of grass utilisation on beef farms.

Where soil fertility is corrected, beef farms can grow up to 15 t DM/ha of grass. This has to be utilised efficiently to maximise live weight gain; paddock-based grazing systems, facilitating rotational grazing management, is a key component of good grassland management. Good rotational grazing

infrastructure, including a network of farm roadways and paddocks, gives flexibility to manage grassland and identify deficits and surpluses as they arise. Practices such as removing excess herbage as bales and restricted grazing in difficult weather conditions are more feasible where there is good grazing infrastructure.

New grass measuring and budgeting tools such as PastureBase Ireland also facilitates better decision-making by farmers. The confidence to make decisions, such as the removal of paddocks from the grazing rotation is critical. Such decisions become based on quality information such as the number of grazing days ahead and the 'grass wedge' on the farm. The use of an easily accessible computer programme thus, becomes a useful aid to grassland management.

Reseeding also has an important role to play in maximising growth and in turn utilisation. Perennial rye-grass swards have shown to be up to 25% more responsive to available nutrients such as nitrogen when compared to old permanent pasture. Reseeding increases the overall productivity of the farm by increasing stock carrying capacity and the proportion of the overall feed budget that is comprised of grazed grass.

Animal performance

The main objective on suckler beef farms is to maximise the value of the animals sold as either beef carcase weight or live weight per suckler cow on the farm. The amount of beef produced on suckler beef farms depends on a myriad of animal performance factors such as live weight gain, mortality and fertility. Data from the Irish Cattle Breeding Federation (ICBF) shows that only 83 out of every 100 cows produce a calf every year and that calf mortality in 2015 was 6% at 28 days.

Good cow fertility and reproductive performance is key to profitability with the objective being to produce one calf per cow per year. There is huge potential to increase the fertility and performance of our national suckler cow base, which in turn will increase productivity and profitability at farm-gate. The introduction of genomic selection will allow farmers to identify the most productive and fertile heifers for breeding at a very young age on the farm. With this information at farm level suckler beef farmers can select bulls on either the Replacement Index (breeding replacement heifers) or the Terminal Index (finishing systems/weanling systems) depending on the production system. Genomic selection will help to give farmers the knowledge and confidence to make informed breeding decisions.

The breeding policy on all suckler beef farms should be to maximise live weight gain through exploiting breed differences and hybrid vigour. Research has clearly shown that using a crossbred cow as opposed to a purebred cow results in an increase of 13% in terms of weaning weight of calf per cow. Herd health planning is also an important aspect of good animal performance and should focus on preventative strategies as opposed to dealing with an outbreak when it arises. Health plans are specific to each farm and should be drawn up between the farmer and their local veterinary practitioner. Particularly where an outbreak on a farm has occurred recently an important first step is to sit down with your local veterinary practitioner and discuss prevention strategies.

Utilising best husbandry practices is a key to maximising animal performance. In terms of animal health, disbudding, castration, dosing and parasite control are all important to have a healthy, stress free animal. When housed, animals must have fresh feed and water, shelter and adequate space to maximise live weight gain.

Stocking rates

Economic analysis of suckler calf to beef systems in Grange has shown that, where individual animal performance is high, stocking rate is the main driver of profitability. It is essential that increases in stocking rate are supported by higher levels of grass grown on the farm. In addition to the aforementioned grazing principles (infrastructure, reseeding, grass budgeting, etc.) soil type and location also has an impact on stock carrying capacity.

Other factors which influence the optimal stocking rate for beef farms include facilities and labour availability. If animal housing and handling facilities are not in place when increasing stocking rates, then extra stress and pressure at key points in the production cycle e.g. calving, will impact on performance metrics such as live weight gain and reproduction. It is important to note that there is a close relationship between facilities and labour; improving farm facilities and handling units as well as the farm business system will all improve the efficiency of labour use on farms.

System comparisons

The implications of production efficiency and level of output were evaluated by comparing five alternative production systems which differed in respect of: animal productive and reproductive performance, grass utilisation, calving pattern and date and finishing systems (Table 1). The analysis excluded land and labour charges and therefore reflects a family farm situation on owned land. To maintain the focus of the analysis on factors affecting the beef enterprise, all direct support payments, such as the Basic Payment Scheme, were excluded from the analysis. The first production system (*Option 1)* represented national average levels of performance and beef output. Thus, this system consisted of finishing steers and heifers at 30 and 26 months of age, respectively. Calving was in February (20%), March (25%), April (30%) and May (25%) and thus, mean calving date was 2 April. Weaning weight was 250 kg with 0.83 calves per cow produced annually. Age at first calving was 36 months. The relatively low level of efficiency was reflected in high production costs and low levels of profitability.

Broadly speaking, farmers have two options to increase profitability; however, the next two scenarios set out to evaluate the implications of both options independently.

It is imperative that increases in output are coupled, and indeed preceded by, high levels of production efficiency (i.e. reproductive and productive performance). To highlight the risk of increasing output without concomitant increases in efficiency, the second scenario (*Option 2*) evaluated a system whereby, efficiency levels were similar to Option 1 but stocking rate was increased to 2 LU/ha. The increase in stocking rate was facilitated by higher levels of both fertiliser nitrogen application and meal feeding. Weaning and carcass weights were greater than Option 1 as a result of greater levels of meal feeding and accordingly, beef output was increased by 74%. However, production costs were similar to Option 1 and net margin also remained negative, albeit with a modest improvement relative to Option 1. A further potential issue is the higher carcass weight for steers in this scenario (435 kg) which is greater than the current Meat Industry Ireland specification and thus, may limit sale options and price. Overall it is clear that increasing output in this manner is not an economically viable proposition, particularly when one considers that cow numbers were 60% greater than Option 1.

Table1. A comparison of suckler beef production systems differing in production efficiency and output.

	Option 1	Option 2	Option 3	Option 4	Option 5
Level of output	**National average**	**High**	**National average**	**High**	**High**
Level of efficiency	**National average**	**National average**	**High**	**High**	**High (bulls)**
Suckler cows on 40ha	23	37	31	**53**	**61**
Stocking rate (LU/ha)	1.27	**2.00**	1.32	**2.22**	2.24
Male finishing system	30 mo steer	30 mo steer	**24 mo steer**	24 mo steer	**16 mo bull**
Heifer finishing system	26 mo	26 mo	**20 mo**	20 mo	20 mo
Fertiliser nitrogen use (kg/ha)	55	**175**	55	**105**	**87**
Meal consumers (t/LU)	0.25	**0.54**	0.38	0.42	**0.74**
Grass consumed (t/DM/ha)	4.6	7.2	5.2	8.7	8.2
Mean calving date	02-Apr	02-Apr	**06-Mar**	06-Mar	06-Mar
Average weaning weight (kg)[1]	250	**257**	**293**	293	293
Average carcase weight (kg)[1]	374	404	370	370	355
Calving rate (calves/cow/year)	0.83	0.83	**0.95**	0.95	0.95
Age at first calving	36 mo	36 mo	**24 mo**	24 mo	24 mo
Beef output (kg live)	11,873	20,670	18,578	31,265	34,508
Variable & fixed costs (€/kg/live)[2]	2.51	2.37	1.81	1.59	1.64
Gross margin (€/farm)[2]	12,898	15,961	25,884	**42,992**	**44,331**
Net margin (€/farm)[2]	-3,512	-3,026	8,439	**21,026**	**22,595**
Conc price sensitivity[3]	16	54	25	46	83
Beef price sensitivity[4]	82	139	129	217	244

[1]Average of male (steers or bulls) and heifer progeny. [2]Excludes land and labour charges. These costs are provided in the text. [3]Impact on net margin (€/ha) per €50/t change in concentrate price. [4]Impact on net margin (€/ha) per 50 c/kg change in beef carcass price.

Option 3 involves a production system where the emphasis is placed in achieving high levels of efficiency rather than output. Hence, fertiliser N application (the key driver of beef output in pastoral systems) is the same as Option 1. Reflecting higher levels of animal live weight performance, steers and heifers are finished six months earlier than Option 1 at similar carcass weights. The higher live weight performance is also indicated by the greater weaning weights in this scenario. Reproductive performance is also much improved with 0.95 calves per cow produced annually and first calving occurring at 24 months of age. Due to the higher rate of grass utilisation (80% vs 70% in Option 1), the earlier slaughter age and the earlier age at first calving, cow numbers, and thus, beef output, is much greater than Option 1. Overall, production costs are almost 30% lower than Option 1 and gross and net margin are also much higher.

To assess the impact of increasing both production efficiency and output on suckler beef farms a fourth scenario *(Option 4*; high efficiency and high output) was considered. In this scenario the production system was similar to Option 2 and stocking rate was increased to the maximum permissible by the Nitrates Directive (170 kg organic N per hectare). In this scenario, production costs are substantially reduced being 37% lower than Option 1, and accordingly, profitability is much higher. This thus, highlights the requirement to couple both relatively high stocking rates, which drives beef output, and good production (grazing and animal) efficiency to maximise profitability of suckler beef systems. Research from Teagasc Grange has shown that increases in stocking rates above those included in the present analysis can further increase profitability. In such circumstances, production costs per kg beef are likely to increase but profitability increases arising from higher level of beef output.

The opportunity to take advantage of the inherent efficiency of bulls was explored in the final scenario (*Option 5*). In this case all other aspects of production were similar to Option 4; however, males were finished as bulls at 16 months of age. Earlier slaughter and lower forage demand of these animals relative to steers in Option 4 led to an increase in the number of cows in this scenario. Carcase weight was lower but total live weight output was greater than Option 4. Although production costs were slightly greater than Option 4, profitability was greater and indeed was the greatest of all scenarios.

Factors affecting profitability

The importance of reproductive and productive efficiency on the economic performance of suckler beef systems is clear from the data presented in Table 1. To further highlight this, the key individual factors which affect profitability were evaluated independently for Option 4. The analysis shows that grass consumption, calving rate, age at first calving and live weight gain all have very important effects on profitability (Table 2). It is important to note that these effects are in the context of an already efficient production system and thus, the effect of unit changes in each of these efficiency factors will be different for the other options presented in Table 1.

The objective of the above analysis was to highlight the importance of both production efficiency and output for profitable suckler beef systems. For many farmers, the level of output evaluated in Options 4 and 5 in Table 1 will not be possible due to factors such as facility constraints, labour availability and soil-type limitations. However, there will be many farmers who can (and do) operate at a higher stocking rate (availing of a derogation from the Nitrates Directive) and indeed, the Teagasc research demonstration farms typically operate at stocking rates in excess of 200 kg organic N per hectare. Regardless, the intention is not to suggest that this level of output is required; rather the principle is that farmers should operate at the highest level of output permissible according to their own set of circumstances. In any event, a prerequisite is that production efficiency should be as high as possible and certainly much higher than that which prevails for 'average' suckler farming systems in Ireland. This can be viewed in terms of relative production costs; Options 4 and 5 produce beef at approximately 64% of the cost of Option 1. In terms of national comparisons, the production costs for Options 4 and 5 can be compared to the average of €1.84 per kg live weight for the farms participating in the Teagasc/Farmers Journal BETTER Farm beef programme.

Table 2. Factors affecting the profitability of suckler calf to beef production systems. Baseline system against which data is calculated is based in Option 4 presented in Table 1.	
	Effect on net margin (€/ha)
Grass (grazed and conserved) consumed (+/- 1 t DM/ha)	105
Calving rate (+/- 5%)	54
Age at first calving (24 vs. 36 months)	112
Lifetime daily live weight gain (+/- 0.1 kg)	78

Undoubtedly the question of land and labour charges arises when one considers the economics of these alternative systems. If one assumes a land charge of €400/ha (€160/acre) then the additional production costs per kg live weight for each system is €1.35, €0.86, €0.77, €0.51 and €0.46 for Options 1, 2, 3, 4, 5, respectively; i.e. where land charge is a consideration (rented/leased land) then the importance of maximising output is amplified. In the case of labour charges, if one assumes that one labour unit can manage a 100-cow suckler unit and that each labour unit earns the average industrial wage (€36,000) then the addition cost to the above scenarios per kg live weight is €0.70, €0.61, €0.64, €0.61 and €0.64 for Options 1, 2, 3, 4 and 5, respectively. In this case, the effect of increasing output is not as pronounced as it was for land charges since outputs and labour charges are coupled to a much greater degree.

Environmental sustainability

The environment sustainability of production systems, particularly greenhouse gas emissions (more commonly known as the carbon footprint) is of increasing interest to consumers. The carbon footprint of suckler beef is influenced by the reproductive efficiency of the suckler cow herd (e.g. age at first calving and calving rate) and the daily live weight gain of progeny to weaning or slaughter. The pasture-based nature of Irish suckler beef systems also has an important role in respect of the management of the enormous reserves of carbon stores in permanent pasture soils and the capacity to further enhance these carbon reserves (i.e. sequestration). Research at Teagasc, Grange has shown that the carbon footprint of suckler systems operating at 'national average' levels of efficiency is much higher than that found for research farm systems. Typically, the scale of difference is in the order of 20%. Together with the aforementioned economic impact, this highlights the dual benefits of improving the efficiency of suckler beef production.

The above article was adapted and reproduced courtesy of Teagasc.

Footnote comment from Simon Marsh, Principal Lecturer – Beef Cattle Specialist, Harper Adams University.

You will note in the above article that the 'Option 5' system involves finishing male calves as bulls at 16 months. This system in Ireland will be based on feeding high quality silage and minimal quantities of concentrates. With a finishing age of 16 months half of the bulls will be over 16 months old and not accepted by many market outlets in the UK. Hence the majority of suckler bulls in the UK are intensively finished with high (1.5+t) levels of concentrates. With some markets in the UK moving away from young bulls the alternative approach would be to finish the male calves as steers at 14-15 months old and an article on 'Intensive finishing of weaned suckler bred steers' is on the NBA website (go to Resources>Technical Information> Beef Systems).