

MODULE 4 PART A : BEEF PRODUCTION COSTS

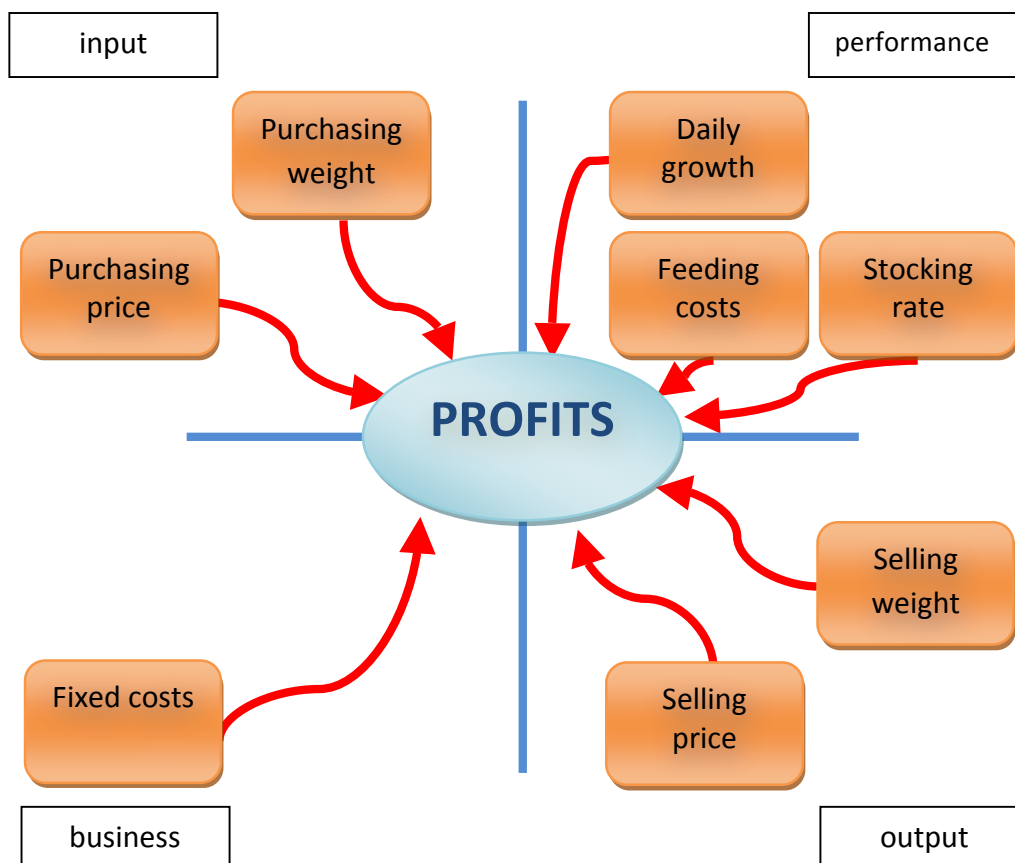
STUDENT FACTSHEET

INTRODUCTION

The beef enterprise objective is to produce high quality meat by using efficient resources. There is different emphasis for each enterprise and also the costs involved in each system. Beef enterprises can be categorized as shown in Table 1 and Table 2.

The main factors that influence the beef enterprise profits are:-

- Weight and purchasing costs (pence per kg)
- Feeding costs
- Stocking rate (foraging systems)
- Daily growth
- Weight and selling costs (pence per kg)
- Fixed costs (use of buildings and machinery)



Enterprise aim	Feed (silage or hay)		Grazed grass	Concentrates			Type of enterprise	Notes
	High	Low		High	Medium	low		
Producing maximum amount of meat				✓			<ul style="list-style-type: none"> • Feeding yard • Barley 	High daily growth required by using feeds that are high in energy and protein, but cheap to buy.
	✓				✓		<ul style="list-style-type: none"> • Silage / Maize • Rosemaund Silage 	High daily growth. Dependent on producing high quality feed. High fixed costs (buildings and machinery).
Production balance between meat weight and quality	✓				✓		<ul style="list-style-type: none"> • Finish on silage/maize silage and concentrates 	Dependent on quality of the animal – suckler pedigree animals are produced for quality and those from dairy pedigree used for maximum amount of meat. Animal purchasing and selling cost is essential.
	✓		✓		✓		<ul style="list-style-type: none"> • 18 months • 20-24 months 	Dependent on quality of the animal – suckler pedigree animals produced for quality and those from dairy pedigree used for maximum amount of meat. Animal purchasing and selling cost is essential.
Producing meat of the highest quality possible		✓	✓				<ul style="list-style-type: none"> • Finishing from grass 	Abundance of grazed grass and stocking rate are essential. Animal purchasing cost and selling price is essential.
			✓				<ul style="list-style-type: none"> • Organic 	Quality can vary. Low body and production costs, higher selling price (p per kg).

TABLE 1 FEATURES OF BEEF ENTERPRISES

Enterprise aim	Feed (silage or hay)		Grazed grass	Concentrates			Type of enterprise	Notes
	High	Low		High	Medium	low		
Store Cattle		✓	✓			✓	• Winter	Balance between lower quality silage and using more concentrates. Animal purchasing cost and selling price is essential.
			✓				• Summer	Abundance of grazed grass and stocking rate are essential. Animal purchasing cost and selling price is essential
Suckler Calves	✓		✓			✓	• Lowlands	Cattle are bigger and therefore need more concentrates.
		✓	✓				• Uplands	Extensive grazing on the uplands. Low productivity, therefore, maintaining low costs is important.

TABLE 2 FEATURES OF BEEF ENTERPRISES

BEEF ENTERPRISE OUTPUT

The two main factors that contribute to beef enterprise output are the marketing value of the animal and the animal's purchasing cost. If the animal is reared on the farm, then there is no purchasing cost. Output can be defined as:-

$$\text{OUTPUT} = \text{MARKET VALUE} - \text{PURCHASING COST}$$

or

$$\text{OUTPUT } \pounds = \left(\text{Selling weight kg} \times \frac{\text{Selling price p per kg}}{100} \right) - \left(\text{Purchasing weight kg} \times \frac{\text{Purchasing price p pe}}{100} \right)$$

For example

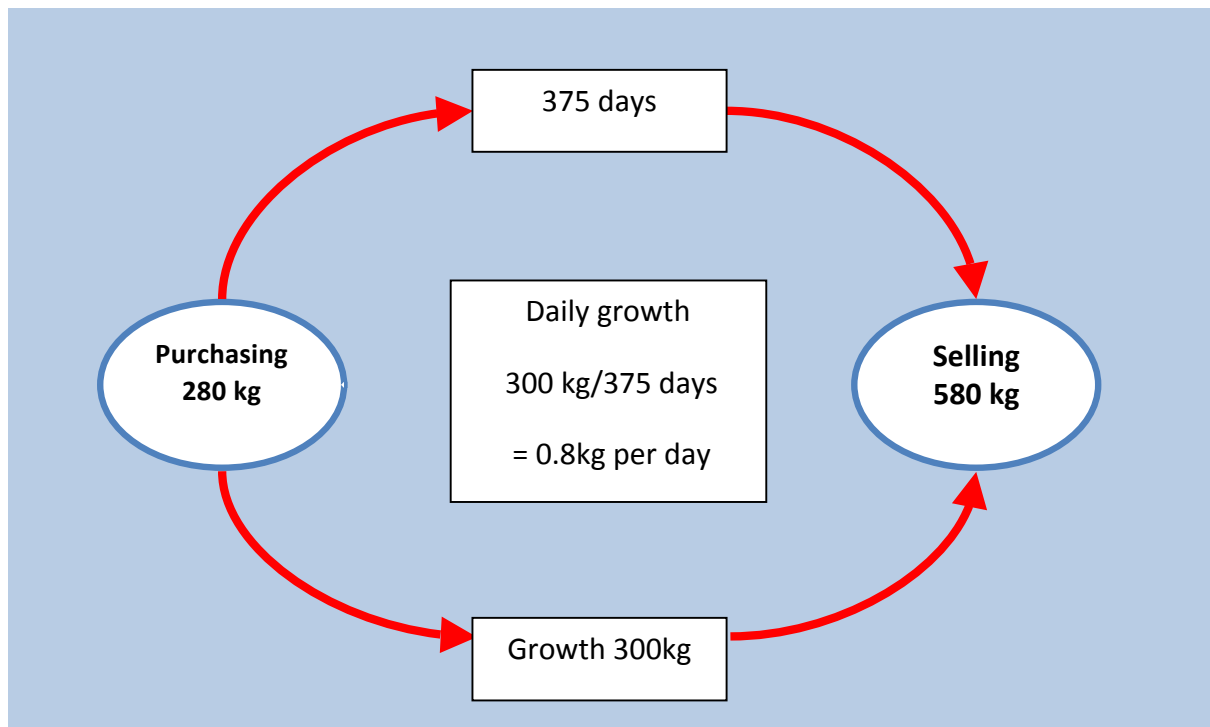
Selling weight	580 kg
Selling price	130 pence per kg live
Purchasing weight	280 kg
Purchasing price	120 pence per kg live

$$\text{OUTPUT } \pounds = \left(580 \times \frac{130}{100} \right) - \left(280 \times \frac{120}{100} \right)$$

$$\text{OUTPUT } \pounds = (754) - (336) = 418$$

The difference between the purchasing and selling price is essential, but also the daily growth and the number of days that the animal is kept between purchasing and selling.

For example



Maintaining a higher daily growth for an extended period means that the animal will either (i) reach its target weight sooner (thus saving feeding costs) or (ii) reach a higher weight and have a higher value when slaughtered.

VARIABLE COSTS

Variable costs are costs that change to reflect the size of the enterprise. If the number of animals kept are higher, then the costs will be higher. The main variable costs in a beef enterprise are:-

- Concentrates
- Feed
- Veterinary
- Marketing
- Straw
- Other

Usually, concentrates is the main cost, followed by feed, but the remainder need to be considered.

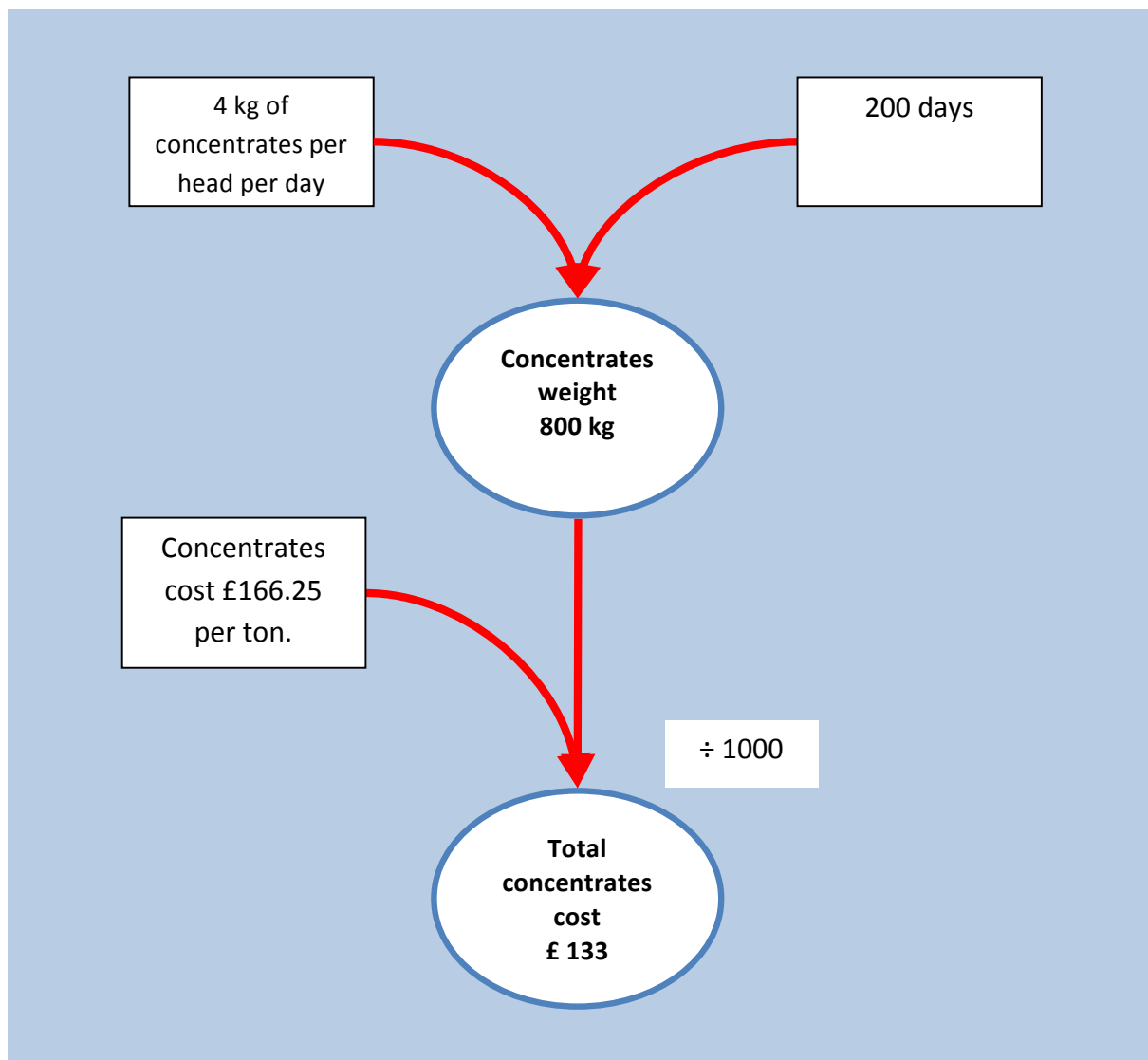
CALCULATING CONCENTRATES COST

We can calculate the concentrates cost by using the following equations:-

$$\text{Total Concentrates Weight (kg)} = \text{Feeding Period (days)} \times \text{Concentrates Weight (kg per day)}$$

$$\text{Total Concentrates Cost (£)} = \text{Total Concentrates Weight (kg)} \times \text{Price (£ per t)} \div 1000$$

For example



CALCULATING THE ENTERPRISE GROSS MARGIN

Gross Margin is used to measure the financial success of an agricultural enterprise. An enterprise is a collection of activities that produce the same goods and show the same features.

Enterprise	Notes
Dairy	A collection of cattle from a dairy breed that produce milk, calves and old cattle.
Beef	A collection of animals that produce meat.
Sheep	A collection of sheep that produce lambs, old sheep and wool.
Barley	Crops enterprise that produce cereals and straw from barley.

Gross Margin is calculated using the following equation:-

$$\text{GROSS MARGIN} = \text{OUTPUT} - \text{VARIABLE COSTS}$$

It is possible to calculate it based either on the 'Total' for the enterprise or based on £ per head of animal in the enterprise. Calculations based on £ per head, makes it possible to benchmark and make a comparison with other enterprises. A template and an example of Gross Margin calculation is shown below.

GROSS MARGIN TEMPLATE FOR BEEF ENTERPRISE

<u>Enterprise</u>	<u>Stock</u> <u>Number</u>	
Input	£ per head	TOTAL
Selling Price (pence per kg)		
Selling Weight (kg)		
Purchasing Price (pence per kg)		
Purchasing Weight (kg)		
Enterprise Output		
Variable Costs		
Concentrates		
Feed		
Veterinary		
Marketing		
Straw		
Other		
Total Variable Costs		
GROSS MARGIN		

NOTES – RELATIVE EQUATIONS

Enterprise Output = Selling – Purchasing Costs

Gross Margin = Output – Variable Costs

EXAMPLE - GROSS MARGIN FOR BEEF ENTERPRISE

<u>Enterprise cattle</u>	<u>Finishing store</u>	<u>Stock Number</u>	
			400
Output		£ per head	TOTAL
Selling Price (pence per kg live)	130		
Selling Weight (kg)	580	754	301 600
Purchasing Price (pence per kg live)	120		
Purchasing Weight (kg)	280	336	134 400
Enterprise Output		418	167 200
Variable Costs			
Concentrates		133	53 200
Feed		30	12 000
Veterinary		26	10 400
Marketing		29	11 600
Straw		13	5 200
Other		5	2 000
Total Variable Costs		236	94 400
GROSS MARGIN		182	72 800

GRAZED GRASS COSTS

Grazed grass costs are types of variable costs that increase or decrease according to the surface area, and not according to stock number. With systems that use grasslands, the costs calculated must be based on those producing grazed grass. The main costs involved with grazed grass:-

- Fertiliser
- Weedkillers
- Lime
- Silage and hay costs – contractors, containers, plastic covers

Sharing the costs between a higher number of animals will reduce the burden on individual animals, therefore, stocking rate is essential for successful enterprises.

CALCULATING GRAZED GRASS COSTS

Grazed Grass Costs	£	<u>Notes</u>
Fertiliser		
Weedkiller		
Lime		
Silage or Hay Costs		
Other		
Total Grazed Grass Costs		
Number of hectares of grazed grasslands		
Grazed Grass costs per hectare		$\frac{\text{Total Costs}}{\text{Number of hectares}}$
Stocking rate (number per hectare)		
Grazed Grass costs per head		$\frac{\text{Grazed grass costs per hectare}}{\text{Stocking rate}}$

EXAMPLE- CALCULATING GRAZED GRASS COSTS

Grazed Grass Costs	
Fertiliser	£6000
Weedkiller	£500
Lime	£2000
Silage or Hay Costs	£4000
Other	£620
Total Grazed Grass Costs	£13120
Number of hectares of Grazed Grasslands	80
Grazed Grass costs per hectare	£164
Stocking rate (number per hectare)	5.0
Grazed Grass costs per head	£32.80

FIXED COSTS

These are costs that are difficult to ear-mark to a specific enterprise, or costs and that do not change according to the amount of the enterprise's fixed costs. The main fixed costs are:-

- Buildings
- Machinery
- Labour
- Power (Oil and Electricity)
- Maintenance
- Interests on Loans
- Overdraft Interests
- Insurance
- Water
- Telephone
- Rents

Although it is difficult to ear-mark fixed costs for an enterprise, it is possible to calculate the cost for each animal.

EXAMPLE- CALCULATING FIXED COSTS

Fixed Costs		<u>Notes</u>
Labour	£20000	
Power	£2400	
Interests	£500	
Insurance	£1000	
Other	£1600	
Total Fixed Costs	£25500	
Number of hectares of grazed grasslands	80	
Fixed Costs per hectare	£318.75	$\frac{\text{Total Costs}}{\text{Number of hectares}}$
Stocking rate (number per hectare)	5.0	
Fixed Costs per head	£63.75	$\frac{\text{Fixed costs per hectare}}{\text{Stocking rate}}$

It is expected that the Gross Margin derived from all the enterprises should be sufficient to pay for the fixed costs of the business.

Example

	£ per head	Total
Gross Margin	<i>£182</i>	<i>£72 800</i>
Less Grazed Grass Costs	<i>£32.80</i>	<i>£13 120</i>
Gross Margin after Grazed Grass Costs	<i>£149.20</i>	<i>£59 680</i>
Less Fixed Costs	<i>£63.75</i>	<i>£25 500</i>
Profit	<i>£85.45</i>	<i>£34 180</i>

ANALYSING THE RELATIONSHIP BETWEEN PROFIT, GROSS MARGIN AND FIXED COSTS

By designing a tree diagram as shown in Figure 1, it is possible to analyse the relationship between all the factors that influence the profit of a beef business. It is possible to compare the individual factors with bench mark data available from Hybu Cig Cymru, *EBLEX* and other agents that collect information on agricultural enterprises.

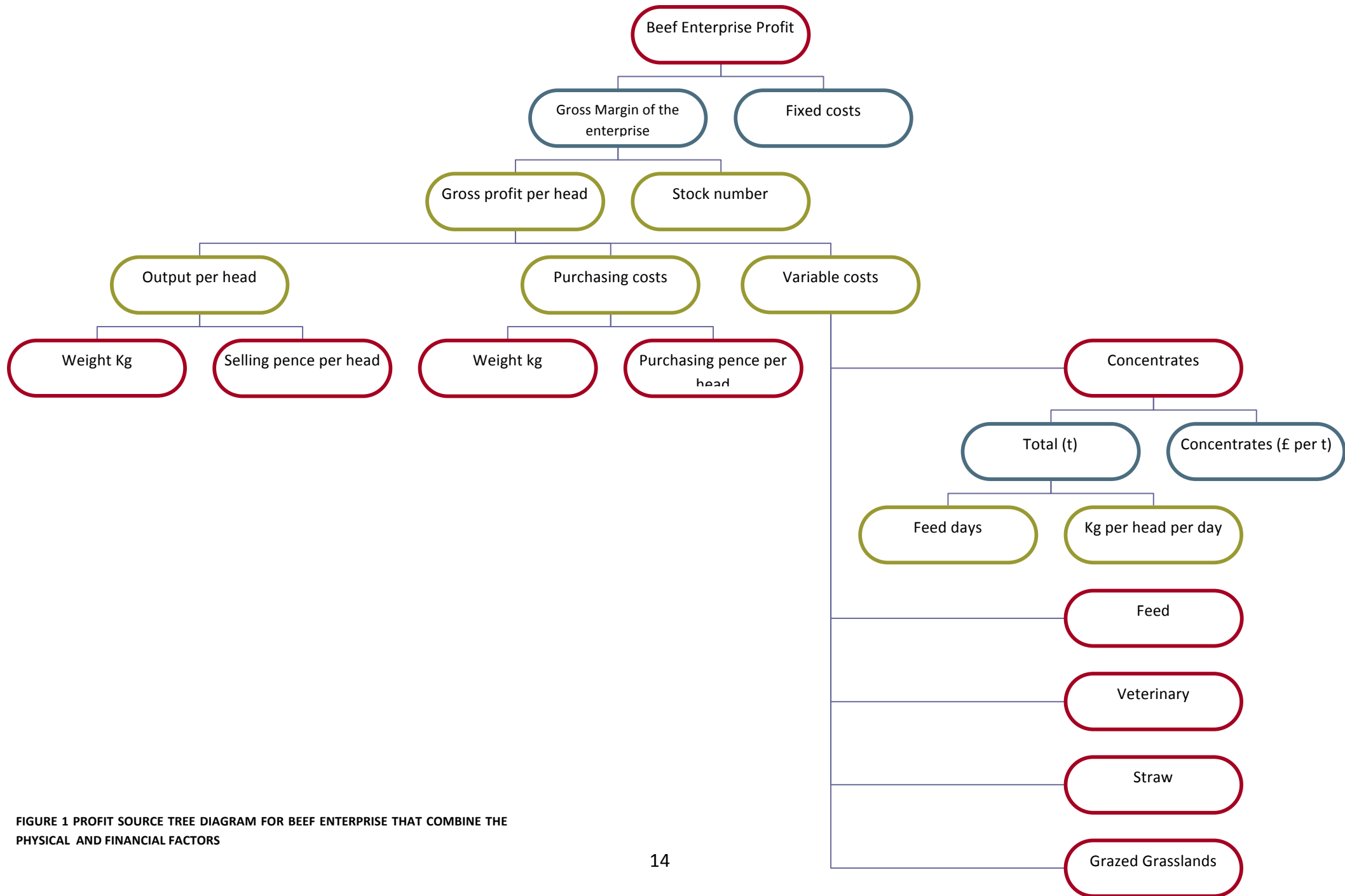


FIGURE 1 PROFIT SOURCE TREE DIAGRAM FOR BEEF ENTERPRISE THAT COMBINE THE PHYSICAL AND FINANCIAL FACTORS

BENCHMARKING PERFORMANCE

The aim of benchmarking is to compare the performance of a farm system business with a standard performance within the industry. By comparing the differences between the two, the farmer can recognize the factors that promotes production and factors that decrease production.

A number of organisations involved in the beef production publish benchmark details e.g. Meat Promotion Wales, *EBLEX* and Farm Business Survey. The information can come from a survey or target figures for specific enterprises.

Benchmarking allows comparison between £ per head or £ per hectare.

BENCHMARK TEMPLATE FOR BEEF ENTERPRISE

	BENCHMARK DATA		Farm performance
	Average performance for the industry	Highest ¼ performance for the industry	
OUTPUT			
Selling Weight (kg per head)			
Selling price (p per kg)			
Selling income (£ per head)			
Purchasing weight (kg per head)			
Purchasing price (p per kg)			
Purchasing cost (£ per head)			
OUTPUT (£ per head)			
VARIABLE COSTS			
Concentrates weight (kg per head)			
Concentrates costs (£ per tonne)			
Total concentrates costs (£ per head)			
Veterinary costs (£ per head)			
Straw costs (£ per head)			
Marketing costs (£ per head)			
Other costs (£ per head)			
TOTAL VARIABLE COSTS			
GROSS MARGIN (£ per head)			
PHYSICAL DETAILS			
Stocking rate (number per hectare)			
Silage weight (kg per head)			
Daily growth (kg per day)			
Feeding period (days)			
Deaths (%)			
% Slaughter (slaught. weight/live weight)			

EXAMPLE - BEEF SYSTEM BENCHMARK

	BENCHMARK DATA		
	Average performance for the industry	Highest 1/3 performance for the industry	Farm performance
OUTPUT			
	SUCCESS		
Selling weight (kg per carcass head)	336	350	313
Selling price (p per kg)	270	280	241
Selling income (£ per head)	907	980	754
Purchasing weight (kg per head)	420	440	280
Purchasing price (p per kg)	145	135	120
Purchasing costs (£ per head)	504	594	336
OUTPUT (£ per head)	403	386	418
VARIABLE COSTS			
	SUCCESS		
Concentrates weight (kg per head)	700	500	800
Concentrates costs (£ per tonne)	180	160	166.25
Total concentrates costs (£ per head)	126	80	133
Veterinary costs (£ per head)	16	16	26
Straw costs (£ per head)	23	25	13
Marketing costs (£ per head)	37	40	29
Other costs (£ per head)	12	12	35
TOTAL VARIABLE COSTS	214	173	236
GROSS MARGIN (£ per head)	189	213	182
PHYSICAL DETAILS			
	SUCCESS		
Stocking rate (number per hectare)	4.0	5.0	5.0
Silage weight (kg per head)	4650	5250	5500
Daily growth (kg per day)	1.0	1.06	0.8
Feeding period (days)	180	170	200
Deaths (%)	1%	1%	2%
% Slaughter (slaugh. weight/live weight)	336/600 = 56%	350/625 = 56%	313/580 = 54%

Purchasing costs less than average

Output more than the average

High concentrates cost because of use and long feeding period

Higher variable costs

Lower Gross Profit

Consumes more silage

Less daily growth and long feeding period

CALCULATION TO CONTROL BEEF SYSTEMS

A key factor for beef farmers is to decide what the animal selling price must be to ensure profit. This price is called breakeven price, and this is the lowest price that the farmer can receive without incurring a loss. This calculation involves

- animal purchasing price
- variable costs
- grazed grassland costs and
- operative capital costs

and this total is then divided by the likely weight of the animal when sold to calculate the breakeven price. The template below demonstrates the calculations that are required followed by an example.

Breakeven Costs for Store Cattle

1. Calculating the purchasing cost, adjusted for deaths

Purchasing costs (£ per head)	Purchasing price (p per kg live)		<input type="text"/>
	×		
	Purchasing weight (kg)		<input type="text"/>
	÷ 100		
	=	1	<input type="text"/>
Adjustment for deaths (£ per head)	Purchasing cost (£ per head)	From 1	<input type="text"/>
	×		
	Death percentage (%)		<input type="text"/>
	=	2	<input type="text"/>
Purchasing cost adjusted (£ per head)	Purchasing cost (£ per head)	From 1	<input type="text"/>
	+		
	Adjustment for deaths (£ per head)	From 2	<input type="text"/>
	=	3	<input type="text"/>

2. Calculating total variable costs

Concentrates costs (£ per head)	Kg concentrates per head	<input type="text"/>
	×	
	Concentrates prices £ per t	<input type="text"/>
	÷ 1000	
	=	<input type="text"/>
Feeding costs (£ per head)	+	<input type="text"/>
Veterinary costs (£ per head)	+	<input type="text"/>
Marketing costs		<input type="text"/>
Straw costs (£ per head)	+	<input type="text"/>
Other (£ per head)	+	<input type="text"/>
Grazed grassland costs (£ per head)	+	<input type="text"/>
Total variable and grazed grassland cost: (£ per head)	=	4 <input type="text"/>

3. Calculating Total Costs

Total Costs (£ per head)	Adjusted purchasing costs (£ per head)	From 3	<input type="text"/>
	+		
	Total variable and grazed grasslands costs (£ per head)	From 4	<input type="text"/>
	=	5	<input type="text"/>

1. Adjustment for interests on operative capital

Interest costs on operative capital (£ per head)	Total costs (£ per head)	From 5	<input type="text"/>
	×		
	Interest rate (%)		<input type="text"/>
	÷ 365		
	×		
	Feeding period (days)		<input type="text"/>
	=	6	<input type="text"/>

5. Calculating breakeven costs

Breakeven costs excluding fixed costs (£ per kg)

Total costs (£ per head)

From 5

+

Interest costs (£ per head)

From 6

=

÷

Selling weight (kg)

× 100

=

Example of breakeven costs for Store Cattle

1. Calculating purchasing costs adjusted for deaths

Purchasing costs (£ per head)	Purchasing price (p per kg live)		120
	×		
	Purchasing weight (kg)		280
	÷ 100		
	=	1	336
Adjustments for deaths (£ per head)	Purchasing costs (£ per head)	From 1	336
	×		
	Percentage deaths (%)		2%
	=	2	6.72
Adjusted purchasing costs (£ per head)	Purchasing cost (£ per head)	From 1	336
	+		
	Adjustments for deaths (£ per head)	From 2	6.72
	=	3	342.72

2. Calculating total variable costs

Cost of concentrates (£ per head)	Kg concentrates per head	800
	×	
	Concentrates price (£ per t)	166.25
	÷ 1000	
	=	133
Feeding costs (£ per head)	+	30
Veterinary costs (£ per head)	+	26
Marketing costs		29
Straw costs (£ per head)	+	13
Other (£ per head)	+	5
Grazes Grassland costs (£ per head)	+	32.80
Total variable and grazed grassland cost: (£ per head)	=	268.80

4

3. Calculating Total Costs

Total Costs (£ per head)	Adjusted purchasing costs (£ per head)	From 3	342.72
	+		
	Total variable and grazed grassland costs (£ per head)	From 4	268.80
	=	5	611.52

4. Adjustments for interest on operative capital

Interest costs on operative capital (£ per head)	Total costs (£ per head)	From 5	611.52
	×		
	Interest rate (%)		5%
	÷ 365		
	×		
	Feeding period (days)		200
	=	6	16.75

5. Calculating breakeven costs

Breakeven costs excluding fixed costs (p per kg live)

Total costs (£ per head) From 5 611.52

+

Interest costs (£ per head) From 6 16.75

=

628.27

÷

Selling weight (kg) 580

× 100

=

108.3

Additional costs that are required to clear the fixed costs can be estimated. If the estimated fixed costs are £63.75 per head and the selling weight is 580kg, then:-

£63.75

÷

Selling weight (kg) 580

× 100

=

Addition to the breakeven costs to pay for fixed costs (p per kg live)

10.99

KEY QUESTIONS TO ASSESS GROSS MARGIN AND BENCHMARKING

1. Is the OUTPUT higher or lower than the average?
 - a. What is the selling price – pence per kg – compared to the market?
 - i. Does the time of year, gender, breed, fat quality and conformation have an influence?
 - b. What is the purchasing price – pence per kg – compared to the market?
 - i. Does the time of year, gender, growth potential have an influence?
 - c. Is there adequate growth – kg per day – between purchasing and selling?
 - i. Does the time of year, gender, breed have an influence?
 - ii. Does feeding and fodder have an influence?
 - d. What is the selling weight - kg – compared to the target?
2. Are the VARIABLE COSTS higher or lower than the average?
 - a. Which one of the variable costs is the most expensive?
 - b. What was the total concentrates (kg) per head that was used?
 - c. What was the price of the concentrates?
3. Are the GRAZED GRASSLAND COSTS higher or lower than the average?
 - a. Which of the grazed grassland costs is the most expensive and why?
 - b. What is the stocking rate, and is it higher or lower than expected?
4. Are the FIXED COSTS higher or lower than the average?
 - a. Is there any unnecessary expenditure?
 - b. Is there any unusual expenditure?

Answering these questions will help to analyse the strengths and weaknesses of the beef system.