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*Cattle, Cost of production*

UNIVERSITY OF  
MANCHESTER



FACULTY OF ECONOMIC  
AND SOCIAL STUDIES

DEPARTMENT OF AGRICULTURAL ECONOMICS

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**BEEF PRODUCTION  
SYSTEMS**

D. O. JONES

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AGRICULTURAL ECONOMICS DEPARTMENT

BEEF PRODUCTION SYSTEMS

D. O. JONES

December 1967

BEEF PRODUCTION SYSTEMS  
SOME CASE STUDIES

INTRODUCTION

Over the past twelve months beef producers have been reminded once again that the market for their product is governed by influences totally outside their control. During the Autumn of 1966 a combination of circumstances, such as the closing of the Common Market Countries to our own as well as to Irish cattle coinciding with an increased level of supplies from Ireland, led to a drastic fall in the market price for beef. This latter factor is also held responsible for the earlier than normal fall in prices during the summer of this year. Except for abatements (now modified in favour of the producer) fatteners are nonetheless largely cushioned against the excesses of the market and despite the ups and downs of market prices over the past few years total returns to producers have steadily improved. Over the past two years these improvements have been incorporated as part of the National Plan to improve domestic beef supplies. Fluctuations in market prices however no doubt shake the confidence of many farmers and since beef is a flexible enterprise on many farms, store cattle rearers are often the worst sufferers.

Beef on the Farm

As a partial measure to implement the National Plan for Beef production the Government gave an assurance in the 1966 Annual Review that in the absence of a significant change in circumstances, there would be no reduction in the guaranteed price of beef cattle, or in the rate of the beef cow subsidy during the period of the plan. In fact, in the 1967 Review both the Beef cow and calf subsidies, as well as the guaranteed price of Beef were increased.

These measures and assurances would appear to be a firm basis for beef producers to plan the consolidation and expansion of their beef enterprises.

In response to calls for more efficient production, more and more farmers are becoming sensitive to costs and profits from beef. Economic surveys in the past have shown that, despite clear exceptions to the contrary, beef in general has not been particularly profitable and usually yielded lower margins per acre than other land using enterprises. It is true that conventional costing procedures by "lifting" the beef enterprise out of its farm setting tend to ignore its relationship to particular farm situations and thus often underrate its real contribution to total farm income.

Although important on a national scale, accounting as it does for 15 per cent of the total value of sales off British farms, on many farms beef more often than not takes a secondary role. Beef production is dependent to a large extent on another industry, dairying, for its raw material, calves, and is often fed on the by-products of other enterprises. On arable farms beef cattle consume arable by-products and are often kept as a means of maintaining fertility, whilst on dairying and mixed farms beef is often fed on seasonal surpluses of grass. Many farmers consider these foods as having no real cost and the difference between sale and purchase price is often equated with profit.

In many areas on the other hand, geographical conditions limit the choice of enterprises and on farms in these areas beef often forms the major enterprise. Other farms in high potential grass and arable areas often find it profitable to produce beef as a planned enterprise. On these farms beef remains a stable element in the farm economy but on those where beef takes a secondary role, a greater flexibility is possible and it is not uncommon to find these farms either getting into, or going out of, or changing the emphasis on beef in

response to conditions within or outside the farm.

Beef production therefore presents a picture of a great diversity of systems, production methods and policies not only within the whole country, but also within particular regions. This diversity considerably complicates the economic assessment of different beef systems by reference to sample studies. More recent studies recognising the difficulty of attempting to define "most profitable" systems from such samples, devote themselves to a study of individual beef enterprises representative of different systems of production.

In this report information which was available about the inputs and output of seven beef enterprises has been valued at current prices and presented as seven different case studies. A separate section is devoted to a discussion of the current prospects for barley beef, and finally a short comment is made about the likely effect on different beef systems of entry into the Common Market. The financial results are discussed not only according to the system or method of beef production followed but also by reference to the place of beef within the farm setting. Except for one which is in South Staffordshire, all the farms are situated in South and Central Shropshire and are representative of some of the more common beef systems found in those areas.

Because of the lack of uniformity in end product, and of the differences in quality of land between farms, comparative results are given in terms of £100 livestock output. That is, cost items and margins are related to the value of cattle (liveweight) actually produced on the farms. For farms with breeding herds this is the value of feeding cattle sold (herd depreciation is treated as a cost), and on other farms it is the difference between the cost of purchased animals and the value of cattle sold, adjusted in both cases for



valuation changes. Where applicable other measures of profitability are used for individual enterprises. In all cases home grown cereals fed to cattle are valued at market prices and all other home grown feed crops at estimated cost of production. Grazing was costed separately on all farms. The results of the seven farms (per £100 livestock output) are shown together in Appendix Table 1.

### THE CASE STUDIES

#### a) Beef on Upland Farms

A system of farming based on sheep and cattle fattening is predominant in the upland areas of South Shropshire. These farms are usually large in size (from 200 to 800 acres) and are located on the less exposed and lower fringes of the hill areas. Unlike the rearing farms of the true hill area these farms usually sell all their cattle fat, and also do not qualify for the hill cow and sheep subsidies. Within the broad pattern of farming in the area, characteristics of topography and other features peculiar to individual farms have given rise to differences in practices and methods. Thus on the better placed farms more of the land is ploughable and yields of cereal crops often compare favourably with lowland arable farms and considerable quantities of wheat and barley may be sold. These farms are therefore more intensive and usually concentrate on the fattening of purchased forward stores. The less favourably placed farms, on the other hand although again having some good cereal growing land, normally have a higher proportion of permanent grass and rough grazing. They are therefore less intensive and their beef enterprises are usually based on a single suckling beef herd. In this way these farms are assured of a supply of weaned calves produced at a reasonable cost and are therefore insulated against the vagaries of the store cattle market. Outwintering is occasionally practised (usually where there is

a shortage of buildings) and thus the cost of keeping the cow is reduced and, if losses can be avoided, the cost of producing the calf. A few farms also practice a modest degree of double suckling. Certain features, both physical and economic, common to all these upland farms, have considerable implications for their beef enterprises. These can be summarised as follows.

1) Cattle and sheep are integrated enterprises on these farms and are often of equal importance. Beef therefore forms a stable element in the farm economy

2) Except for relatively small quantities of purchased concentrates these farms are self sufficient in feed for their stock.

3) Fixed costs such as rent, regular labour and machinery maintenance form a high proportion of total farm costs. Short of a complete farm reorganisation, such as keeping all sheep and no cattle or vice versa, or completely new building layouts to economise in labour sufficiently to dispense with a full time man, there are few opportunities for reducing costs.

4) Improving the profit levels therefore depends on ability to increase output economically without increasing the level of fixed costs.

Case 1

Farm A is a large farm having nearly half the acreage arable, the rest being in permanent grass which progressively becomes rougher towards the hilltops.

The cropping pattern is shown below.

<u>Crop</u>	<u>Per Cent</u>	
Wheat	2.3	
Barley	8.3	
Oats	7.2	
Fodder Roots	4.8	Acreage to cattle (Per cent) = 47.0
Temporary Grass	25.5	
Permanent Grass (adj.)	51.9	
Total	100.0	

The summary of financial results indicates that final margin per £100 output is reasonable but that when related to acreage both output and margin are low. Even so, subsidies (calf and rearing cows) provide most of the final margin.

Financial Results

	Per £100 Output £	Per forage Acre (cattle) £
Output	100.0	23.63
Herd depreciation	4.9	1.16
Foods	75.2	17.78
Labour	9.8	2.32
Miscellaneous	4.1	0.96
Total Costs	94.0	22.22
Margin	6.0	1.41
Subsidies	18.0	4.27
Final Margin	24.0	5.68

On the lower slopes good cereal crops are grown and all the wheat and most of the barley are sold. Good supplies of straw for feeding and bedding are therefore available. The breeding cattle, mainly Herefords, are single suckled but a few Shorthorns are also kept and double suckled. The cows occupy the rougher areas and because of a shortage of buildings the single sucklers are outwintered. They calve down in February and March and the calves, weaned in the Autumn are kept in store condition until their third year and are then fattened either off grass or in yards, depending on their condition. The farm is self sufficient in feed and only two tons of concentrates for the

feeders are purchased annually. The cows receive no concentrates but are wintered entirely on hay, straw and roots. Calf losses tend to be heavy (17 per cent of live births in this year) and replacements have to be purchased.

On such farms low output per acre is partially a function of the quality of land but may also be due to a low intensity of operation. Better profits depend on the ability to expand output without increasing the level of fixed costs. Keeping better cows and thus obtaining better calves might in the long run improve output and in the short run, on farms similar to farm A, reducing the incidence of calf losses would most certainly boost output. Supplying a different market for beef might be another policy worthy of consideration. In recent years the heavy beef animal has become less popular and the prices obtained for it are lower than for younger lighter animals. Fattening at two years old instead of at two and a half to three years old as on Farm A might well be more profitable. Shortening the store period would increase turnover and land would be released on which more breeding cows could be kept. Another, and probably more effective method of intensifying production relates to an improved standard of crop husbandry and in particular to the level of grassland management. Any policy which will lead to an increased production of grass will lead to an improved livestock carrying capacity and therefore a higher output per acre. Where the current level of fertilizer application for example is low, the stocking capacity can usually be dramatically improved by a judicious use of artificial fertilizers. On farm A much of the grass area has been improved but that the potential of this improvement is not being fully exploited is indicated by the level of manuring. During the period of this survey and in the subsequent year, no artificials were applied on the grassland, the only expenditure being on lime and a small amount on slag. Another factor relating to crop husbandry concerns the growing and

feeding of root crops. These crops normally yield more food per acre than grass but are more expensive to grow and harvest both per acre and per unit of food. Much of the expense of growing and harvesting such crops however on these farms is fixed (e.g. rent, labour and machinery costs), and unless profitable alternative use for these resources is available, substituting grass for roots might well decrease total supplies of fodder without a corresponding saving in costs.

One final comment relating to intensifying the beef enterprise is necessary. On these farms cattle and sheep are integrated enterprises and intensifying beef would almost certainly involve intensifying the sheep enterprise and the farmer could find himself involved on a new plane of management with its attendant risks and managerial pressure. The farmers on larger farms may already be earning a satisfactory total income at a lower level of intensity and may have little incentive to improve. The farmers on smaller farms, on the other hand, must make up in intensity for what they lack in acreage if they are to improve their level of income.

Case 2

Farm B is located on better land than Farm A. Most of the farm is on level ground and a greater proportion of the land is ploughable and less under permanent and rough grass. This factor together with other characteristics of the farm have

Cropping

	<u>Per Cent</u>	
Wheat	3.8	
Barley	12.2	
Oats	3.9	
Potatoes	2.4	
Fodder Roots	3.1	Acreage to cattle (percent) = 40.0
Temporary Grass	35.0	
Permanent Grass (adj)	<u>39.0</u>	
Total	<u>100.0</u>	

given Farm B a greater flexibility in methods and practices in beef production and, as the financial results indicate, have resulted in a much higher level of output and profit than those achieved on Farm A.

Financial Results

	Per £100 Output £	Per forage acre (cattle) £
Output	100.0	34.74
Herd Depreciation	6.0	2.09
Foods	52.9	18.39
Labour	9.0	3.12
Miscellaneous	4.1	1.42
Total Costs	72.0	25.02
Margin	28.0	9.72
Subsidies	19.1	6.65
Final Margin	47.1	16.37

The beef enterprise is based on a single suckled but inwintered herd of Hereford Cows. Thus the cows are inside by the beginning of December, calve down in February/March and go out to grass with their calves in early May. Whilst cows are fed entirely on hay a few of the calves have their hay supplemented with rearing nuts. The calves, weaned in the Autumn, are kept growing over the winter and after another summer on grass are finally sold fat out of yards between January and April at two years old. Slightly better cereal yields combined with a higher level of grassland management (more young grass and more fertilizer usage) enables a higher stocking density to be maintained.

Ample buildings available for inwintering the cows enable a closer supervision at calving time and a more selective treatment of calves. This leads to a low incidence of calf losses (two per cent of live births) and a better and more even sized bunch of calves, averaging at weaning a half hundred weight more than similar calves on Farm A. The cattle therefore grow at a more even rate and are sold out fat within a narrow time span, between January and April, when prices are also higher. Beef sold off Farm B averaged 7/- per cwt. more than that from Farm A. The pattern of feeding is broadly similar for both farms but, since the cattle are kept growing and fattened at a younger age, the level of feeding is higher on Farm B.

Case 3.

Farm C is again typical of the many sheep and cattle fattening farms found on the better areas on the fringes of the hills of South Shropshire. Most of the land is of high fertility and good cereal yields comparable to many lowland cash crop farms are obtained. Most of the land is ploughable, there being little rough pasture, and is therefore capable of a higher level of output than Farms A and B. Except for the acreage in wheat and barley for sale the whole farm, in about equal proportions, is devoted to cattle and sheep

Cropping

	<u>Per Cent</u>	
Wheat and Barley	10.0	
Oats and Mixed Corn	10.0	
Potatoes	1.5	
Fodder roots	6.0	Acreage to cattle (percent) = 42.0
Grass	72.5	
Total	100.0	

The beef enterprise is based on fattening purchased forward stores on grass during the summer and in yearlds during the winter. Stores are purchased in batches in the Autumn and early Spring and are sold out as they are finished at regular intervals over the year. The management of this system is considerably less complex than breeding and fattening; there are fewer risks, since the cattle are on the farm for only a relatively short period, turnover is more rapid and the numbers purchased can be matched to availability of feed. On the other hand the system often suffers from fluctuations in store cattle prices and since beef is a major enterprise there is less flexibility in purchasing policy than might appear at first. Like other farms with integrated cattle and sheep enterprises, the greater proportion of total farm costs is fixed and is unlikely to vary with changes in output. Limiting purchases of stores in the Spring because of high prices is unlikely to lead to any significant cost saving and, unless an alternative profitable outlet for the grazing was available, total farm income might well be lower than if the normal number of cattle had been purchased.

The most important profit criterion is the relationship between the purchase price of the store and the selling price of the fat animal. This represents the feeders' margin out of which all costs have to be met and any profit made. Improving profitability therefore depends largely on skill in buying and marketing and on cheaper feeding. Cheaper feeding on these farms is possible through better crop husbandry yielding more food per acre and thus reducing unit costs and increasing stocking capacity.



Financial Results

	Per £100 Output £	Per Forage Acre (cattle) £
Output	100.0	49.73
Foods	51.1	25.42
Labour	9.3	4.62
Miscellaneous	5.3	2.60
Total Costs	65.7	32.64
Margin	34.3	17.09
Subsidies	2.1	1.05
Final Margin	36.4	18.14

A comparison of the above table with that of Case 2 shows that Farm B has achieved a higher margin per unit of output but only because of a higher level of subsidies, Farm C has achieved a much higher output and a slightly better margin per acre.

b) Beef on Lowland Farms

Beef production can take a number of forms on lowland farms and it is on these farms that the newer systems or adaptations of traditional systems have been developed. Lowland farms have a much wider choice of enterprises and range from predominantly cash cropping to predominantly grass farms. In between those extremes, farms practice mixed systems often combining cash cropping and dairying with sheep and/or beef. Some farms have been geared to beef but others have developed beef enterprises as an alternative to dairying. Beef therefore is a more flexible enterprise on lowland farms and its real contribution to farm income often depends on its place in the farm economy. Beef may be kept on some farms to

use up by-products of other enterprises and is therefore a complementary enterprise. On other farms however the introduction or expansion of beef may involve diverting resources from other enterprises and the beef becomes a competitive enterprise. In these cases comparative costs and profits from different enterprises need to be carefully assessed. Finally, beef may be kept on some farms more or less completely independent of other enterprises. Such a beef unit, an example of which is barley beef, is classed as a supplementary enterprise.

In this section four case studies, depicting four different systems of beef production commonly found on lowland farms, are discussed within the framework of the role of the enterprise on the farm.

#### Case 4 Intensive fattening of single suckled calves

Farm D is located on land of good cash crop and grass potential. The beef unit is based on the intensive fattening of single suckled weanling calves on a high barley concentrate and self-feed silage. The weanlings, both purchased and home bred, are yarded in November at about 5 cwts. and sold fat at an average age of 16 months between April and June at a weight of about  $8\frac{1}{2}$  cwts. Since the system was developed as an alternative to traditional store fattening it is perhaps surprising to note that the final margin per £100 output is lower than that achieved on Farm C. One of the reasons for this is the higher level and therefore costlier feeding; more concentrates and no grazing. Another factor is that good quality weanlings are usually in keen demand and consequently fetch good prices.

#### Financial Results

	Per £100 Output £	Per Forage Acre (Cattle) £
Output	100.0	80.09
Foods	58.5	47.33
Labour	7.2	5.84
Miscellaneous	6.4	5.20
Total Costs	72.1	58.37
Subsidies	-	-
Final Margin	27.9	21.72

Good yields of high quality silage combined with the high level of concentrate feeding has however resulted in a high output per acre. The margin per acre compares favourably with barley grown for sale and it is unlikely therefore that more barley at the expense of silage will be grown, especially since well over half the arable acreage is already under cereal and root crops. Improved profitability of this system therefore depends on improving the feed conversion ratio and on the state of the weanling market. Expansion of output depends on achieving higher yields of grass for silage or on the possibilities of diverting land from other enterprises which may currently be less profitable than beef.

#### Case 5 Multiple suckling and fattening purchased calves

Farm E is also a farm of good cash crop and grass potential and over the past few years has developed an intensive beef fattening enterprise based on the multiple suckling of purchased Friesian steer calves. The calves are suckled four at a time and weaned at eight to twelve weeks when a further batch of calves is purchased, the cows suckling in all about ten to twelve calves per lactation. In addition, a considerable number of weaned steer calves of various ages and mixed origin are also purchased. The young stock are in yards over the winter and all but the older ones, which have a period on grass, are also inside during the summer, the cows being brought in to the sucklers. The weaned calves are fed on pellets and nuts until they go on to a high barley concentrate mix. Hay is also fed to appetite. The cattle are sold out at about 15 months at an average weight of  $8\frac{1}{4}$  cwt. This system is a less intensive variant of barley beef and the key factors governing profitability are similar; 1) Feed conversion ratio, 2) feed prices, and 3) calf prices. Conversion ratio on this farm at  $6\frac{1}{2}$  cwt. barley equivalent per cwt. liveweight gain is considerably higher than the ratio usually regarded as a condition of profitability in barley beef. All the concentrates fed are purchased and the savings usually associated with home mixing are lost. The price of calves is governed by the market, but purchasing calves of

mixed origin at various ages clearly requires better judgement than purchasing week old calves of one breed. The system uses very little land and in this sense the beef is a supplementary enterprise and its profitability therefore need not be compared with land using enterprises.

Financial Results

	Per £100
	Output
	£
Output	100.0
Herd Depreciation	0.3
Foods	90.3
Labour	6.8
Miscellaneous	0.5
Total Costs	97.9
Margin	2.1
Subsidies	13.5
Final Margin	15.6

The table of financial results clearly illustrates the high cost of food and when other costs are added, the margin per £100 output is low. Most of the final margin (about £11 per calf fattened) is derived from calf subsidies. This might appear to provide an acceptable additional income and, since the enterprise is extremely flexible and subject only to the availability of buildings and labour, it can be quickly expanded or contrasted as conditions require. If this margin can be maintained or even improved, an expanding beef enterprise of this type can provide an increasing contribution to total farm income.

Case 6 Bucket rearing purchased calves and fattening

Farm F also like farm E has land of good cash crop and grass potential but being

larger has more grassland available. Week old calves of varied beef types but mainly Friesian crosses are purchased at regular intervals between November and July. The calves are bucket fed on milk substitute, early weaned onto pellets and nuts and then kept in store condition until they are finally fattened in yards or off grass between 2 and 2½ years old, by which time they achieve a weight of 9¼ cwt. The store cattle are wintered mostly on hay and the feeders on hay and concentrates. This is a low output system and, despite the relatively cheap feeding (mostly hay and grazing), food costs per unit of output are high but, with calf subsidies, a reasonable margin has been achieved. The cattle have the use of most of the grassland on the farm (being shared only with a herd of breeding sows) but, as the output and margin per forage acre indicate, its full potential is clearly under-utilised.

Financial Results

	Per £100 Output £	Per Forage Acre (Cattle) £
Output	100.0	26.04
Foods	75.1	19.57
Labour	9.3	2.42
Miscellaneous	3.9	1.00
Total Costs	88.3	22.99
Margin	11.7	3.05
Subsidies	21.4	5.58
Final Margin	33.1	8.63

Comparison with other case studies clearly indicates that profits per acre from beef could be more than doubled on this farm without necessarily adopting the newer practices as on Farm D. The less complex and traditional fattening of purchased stores

as on Farm C could be profitably substituted for the present system. A relevant point concerning the intensity with which beef is produced on farms is the size of the total farm income. The high cash crop acreage on this farm must clearly produce a good income but may be a powerful disincentive to intensifying the beef enterprise.

Case 7 Fattening purchased stores on a cash crop farm

Farm G is a medium sized cash cropping farm with a high percentage of high value cash crops such as potatoes and sugar beet. Maximising profit on such farms dictates a maximum area under cash crops, but rotational requirements leaves the farm with 22 per cent of the acreage fallowed or in grass. Nearly half of this is cashed through seeds and hay, a few acres were fed to beef cattle as hay and the remainder was either unutilised grass or fallow. Enterprises such as beef which make use of land and other by-products of an arable rotation are complementary to the main cash cropping enterprises. Beef cattle can not only utilise the grass and tread straw but also help to spread fixed costs over a greater total farm output. In the winter they make use of labour which might otherwise be partially underemployed as well as utilising housing which might otherwise be empty. These considerations however do not always all apply in practice since on many farms particular conditions or attitudes lead to varying responses. Beef fattening for example on Farm G is limited to the winter period since summer fattening would involve extensive permanent fencing, and the size of the unit is limited by the available housing. Sugar beet tops are an arable by-product and therefore assumed to have no cost, but on this farm they are ploughed in rather than carted to the cattle. Despite the complementary nature of the enterprise relatively large quantities of purchased and home grown concentrates are fed and the final margin per £100 output is therefore disappointing

Financial Results

Per £100

Output

£

Output	100.0
Foods	63.7
Labour	10.3
Miscellaneous	5.8
Total Costs	79.8
Margin	20.2
Subsidies	-
Final Margin	20.2

The cattle, purchased heavy Irish stores, leave a feeders margin of £33 per head but when costs are deducted the final margin is reduced to £7 per head. If variable costs only are taken into account the gross margin becomes £10 per head. If the beef enterprise on cash crop farms can make full use of the land available from the arable rotation, it can make a substantial and significant contribution to total farm income. Where the beef enterprise is small, such as on farm G, and the income from it is insignificant compared to that from the main enterprise, it must have a considerable nuisance value on a farm geared to cash crop production and may not receive the managerial attention necessary for complete success.

C) BARLEY BEEF

Barley beef appeared on the farming scene in early 1961 and with the attendant publicity spread fairly rapidly until it reached its peak in 1963. Since then, largely because of high calf prices it has been declining in popularity, but it is still estimated that between 6 and 10 per cent of all clean cattle slaughtered for beef are

finished in this way. The profitable potential of the system in its early days led, on the one hand, to the development of a number of large scale enterprises and, on the other hand, to a large number of farmers experimenting with one or two batches of calves or even older cattle. As profit margins tightened most of the latter abandoned barley beef but many of the former, often because of heavy investment in housing and feeding arrangements, were forced to stay in and it is likely that the bulk of the current output comes from this type of enterprise.

For many farmers and especially barley growers, the system offered the possibility of establishing a profitable beef enterprise which, unlike most traditional beef systems, could be operated independently of the rest of the farming system. For some farms it also offered the possibilities of operating on a large scale and of developing calf supply and marketing channels. For the larger farms it also offered a scope for the introduction of a factory type of production through specialised housing and ~~and~~ mechanical feeding. For the many farms which introduced it on a small scale it offered an alternative to traditional beef, which had often proved unprofitable, and when operated on this scale only required minor and inexpensive adaptations to buildings. Another advantage of the system is that the bulk of the costs consist of the calf and concentrates which, unlike mixed feeding systems, are capable of precise measurement. Costs and margins are therefore relatively easy to assess. The cattle are normally finished at about twelve months; turnover is therefore fairly rapid and, once fully developed, it can yield a regular income over the year. One disadvantage, more particularly applicable to cropping farms, is that the by-products of an arable rotation cannot be utilised and cashed through barley beef.

In Appendix Table 2 the financial results of six batches of Friesian steer calves fattened on three different farms are shown. The physical inputs and output have been valued at current prices. Since the late summer of 1966 the prices of first quality Friesian steer calves have dropped to an average of £16 per head,



representing a reduction of £8 per head from the peak reached in 1965. This factor together with the increase in average returns for beef indicates that calves now being fattened should yield a margin over food and calf cost of about £9 per head greater than for comparable calves fattened in 1965. The table shows this clearly since at current costs and returns an average margin of £19 per head can be achieved. The current prospects for those still in barley beef would therefore appear to be good and it remains to be seen whether other farmers are being tempted once again to try their hand at the system.

The individual batch results indicate that the range in costs and margins is considerably narrower than is usual for traditionally fed beef. This is, in fact, to be expected because of the simplicity and rigidity of the system. What differences there are arise mainly as a result of inherent differences between calves and between levels of management expressing themselves in variations in calf losses and feed conversion rates. Except for one animal, all the calf losses occurred during the rearing stage and, again except for one batch, feed conversion ratios on these farms were somewhat inferior to the original results achieved by Dr. Preston's cattle at the Rowett Institute.

#### Returns to Barley Growing

Since barley forms the bulk of the diet of barley beef, from the age of about twelve weeks to slaughter, a useful comparison for barley growers is between selling the barley direct and cashing it through barley beef. In the table below the results of the six batches have been amalgamated to form one enterprise.

Total Returns

	£
Total gross margin of barley beef	2999
Value of Barley fed (4017 cwts.)	<u>4418</u>
Total returns to barley growing	7417
Variable costs of barley growing (122 acres at 33 c.p.a.)	—
Total gross margin of barley growing	6392

Returns per acre

Barley yield (cwts per acre)	30	33	36
Acres of barley (4017 cwts)	134	122	111
Gross Margin per acre fed to barley beef	£ 47.0	52.4	58.4
Gross Margin per acre Barley sold direct	£ 23.1	26.3	29.4

In the first part of the table the total barley beef gross margin represents the difference between total value of sales (including calf subsidies) and total variable costs (calf purchases, foods and veterinary). When the value of barley fed is added to this figure the total returns to barley growing is obtained. Gross Margin of barley acreage is obtained by deducting the variable costs of growing 122 acres of barley (4017 cwts at 33 cwts per acre) from total returns. The second part of the table shows the comparative gross margin per acre of barley cashed through barley beef and sold direct for three yield levels.

The results indicate that for each yield margins per acre from barley beef are twice those of barley sold direct. The barley acreage payment has been omitted since this is common to both. Barley beef however involves a considerable investment in livestock and also possibly in building adaptations. On most farms however some

housing is available which may be suitable for barley beef without modification, or with only minor expense. An enterprise however as large as the above six batches combined would require an investment in livestock of about £4500. Labour requirements are usually modest but are heaviest during the first four weeks of the rearing period. From the information collected on these farms it would seem that an enterprise of this size could be operated with four man hours per day or even less depending on the method of rearing. The combined charges for interest on investment in livestock and labour costs therefore would amount to no more than about £6 per acre of barley fed but, as the table illustrates, this figure amounts to only a small part of the difference in gross margins between the two methods of utilising barley.

#### BEEF AND THE COMMON MARKET

Despite the current uncertainty about the prospect of Britain's entry into the Common Market, interest in the subject still persists. It seems therefore worthwhile to attempt an assessment of the possible effect on the profitability of certain types of beef production of the adoption by the U.K. of the Common Agricultural Policy of the European Economic Community.

The financial results of the seven beef enterprises, as well as the average of the six batches of barley beef, discussed in this report have been calculated at estimated Common Market prices based on the following assumptions:-

- 1) Thirty per cent increase in beef prices over the current U.K. returns for beef (including deficiency payments). A similar percentage increase has been assumed in prices for store cattle and calves.
- 2) Purchased and home grown cereals have been valued at £30-10-0 per ton, but prices of other concentrates (mostly protein supplements and sugar beet pulp) are assumed not to change.
- 3) No change in the prices of other inputs.
- 4) That subsidies (calf and rearing cow) will be abolished.

The financial results at U.K. current prices have been rewritten to include the calf and rearing cow subsidies in the output instead of as an addition to the margin. This has the effect of reducing the level of individual cost items per £100 of output. The comparative results (Tables 3 and 4) indicate that profits from beef would increase on all the farms except one (Farm E). The extent of the increase however is closely related to the system of beef production. If Farm E is excluded, those enterprises concentrating on fattening purchased store cattle (Farms C, D and G) would derive a much greater benefit from Common Market entry than those combining rearing with fattening, Farms A, B and F. In the latter case the benefit of higher beef prices are more or less cancelled by the combined effect of loss of subsidies and higher feed costs. Higher cereal prices also influence the level of profits according to method of beef production. In general the benefit to fatteners would increase as the proportion of concentrates in the feed declined. Thus the highest benefit would be derived from grass fattening purchased stores, and the least by all-concentrate systems such as barley beef. Even so, at the average level of efficiency of barley beef shown in appendix Table 2, the increase in beef prices is more than enough to compensate for the increase in calf and cereal prices and margins would rise by more than £2 per finished beast. The discontinuance of calf subsidies however would drastically reduce margins. Other intensive cereal based feeding systems, such as ~~that~~ on Farm E would also suffer a considerable decline in profits.

In the long run, membership of the Common Market would very likely lead to a change in the structure and pattern of output of British Agriculture. Adjustments however often take time and the likelihood is that in the short run at least, certain sections of the industry would benefit more than others. In so far as beef is concerned this study suggests that in the short run, fatteners of purchased stores would benefit the most. Intensive fatteners faced with reduced margins might consider other alternatives to beef or, where feasible, might be tempted to switch to the more

extensive system of fattening purchased stores. Similarly farms such as B and F, now combining rearing with fattening and faced with only a relatively insignificant improvement in their profits might also where feasible abandon rearing in favour of purchased stores. Farms such as A, being less flexible might well have to continue with the present system. Store cattle would therefore be in greater demand and prices might rise by a greater proportion than fat cattle. This would lead to a general reduction in profits from fattening but would be of considerable benefit to store cattle rearers on hill farms. These farms, with their fewer available alternatives, would suffer the most from the possible discontinuance of subsidies.

#### Note on the effect of Devaluation

##### a) Current U.K. Production

The effect of the recent devaluation of the pound on the costs and returns of beef producers is difficult to predict. Certain inputs, such as machinery spares and fuel oil, imported from countries which have not devalued their currencies are likely to increase in price, but the overall effect of these on costs is likely to be small. An increase in the value of home grown barley in line with the increased sterling price of imported feed grains could however have a considerable effect on the costs of beef fattening especially on those farms feeding high concentrate rations.

On the returns side, the market price of home produced beef may also rise in line with prices of imported supplies, but since the market price of beef is governed by a number of factors, the extent of the increase is unpredictable. At current levels of support however, and in the absence of an adjustment to the guaranteed price, the benefit of any increase in the market price of beef is likely to accrue to the exchequer through lower rates of deficiency payments, rather than to fatteners.

##### b) Current U.K. Production at E.E.C. Prices

Since the effect of devaluation is to increase the sterling value of current

E.E.C. intervention prices by a sixth, the benefit of Common Market entry to beef producers would be greater than that already estimated under pre-devaluation conditions. This increase would apply to both beef and cereal feed prices but since under any profitable system the value of beef produced is greater than the cost of the cereal fed, the result would be a net gain. The extent of the additional gain would again depend on the proportion of concentrates in the feed.

Summary of Farm Types and beef system

- Case 1. Farm A. Upland farm - mostly grass - poorer land  
single suckling outwintered herd - fattening  
at  $2\frac{1}{2}$  to 3 years old.
- Case 2. Farm B. Upland Farm - mostly grass - better land  
Single suckling inwintered herd - fattening  
at 2 years old.
- Case 3. Farm C. Upland Farm - mostly grass - better land  
Fattening purchased forward stores - in yards  
and on grass.
- Case 4. Farm D. Lowland Farm - Grass with arable - good land  
Intensive fattening of weanling calves on a high  
concentrate and silage diet. Finished at 16 months.
- Case 5. Farm E. Lowland Farm - Grass with arable - good land  
Multiple suckling and intensive fattening of  
purchased calves. Finished at 15 months.
- Case 6. Farm F. Lowland Farm - Grass with arable - good land  
Bucket feeding and early weaning of purchased  
calves. Long store period and fattening at  $2\frac{1}{2}$  years
- Case 7. Farm G. Lowland Farm - mainly cash cropping - good land  
Winter Fattening heavy Irish stores in yards.

Appendix Table 1

Financial results for seven different beef enterprises (at 1966/67 prices)

Case No. Farm	<u>Results per £100 output</u>						
	1	2	3	4	5	6	7
	A	B	C	D	E	F	G
	£	£	£	£	£	£	£
Output	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Herd Depreciation	4.9	6.0	-	-	0.3	-	-
Foods	75.2	52.9	51.1	58.5	90.3	75.1	63.7
Labour	9.8	9.0	9.3	7.2	6.8	9.3	10.3
Miscellaneous	4.1	4.1	5.3	6.4	0.5	3.9	5.8
Total Costs	94.0	72.0	65.7	72.1	97.9	88.3	79.8
Margin	6.0	28.0	34.3	27.9	2.1	11.7	20.2
Subsidies	18.0	19.1	2.1	-	13.5	21.4	-
Final Margin	24.0	47.1	36.4	27.9	15.6	33.1	20.2



Appendix Table 2

Barley Beef

Financial Results for six batches of calves (at 1966/67 prices)

Batch	<u>Per finished beast</u>						Average £	Average at EEC Prices £
	1 £	2 £	3 £	4 £	5 £	6 £		
Calf Cost	17.6	16.0	16.0	16.0	18.9	19.6	17.3	22.5
Foods and Vet. to 12 weeks	6.2	6.7	6.7	7.8	9.3	7.3	7.3	7.3
Total Cost to 12 weeks	23.8	22.7	22.7	23.8	28.2	26.9	24.6	29.8
Foods (12 weeks to slaughter)	36.2	36.3	41.9	37.5	41.5	38.2	38.6	51.0
Total Food and Calf Cost	60.0	59.0	64.6	61.3	69.7	65.1	63.2	80.8
Returns (net of charges) Including calf subsidy and Sale of culls	84.1	75.6	83.5	83.1	83.4	83.9	82.3	91.0
Margin	24.1	16.6	18.9	21.8	13.7	18.8	19.1	10.2
Calves purchased	33	8	16	20	45	44	28	-
Number finished	30	8	16	20	38	40	25	-
Culls and Deaths Per cent	9	-	-	-	15.5	9.0	10.7	-
Food conversion ratio (12 weeks to slaughter)	5.08	5.19	5.36	4.72	5.52	5.08	5.16	-
Weight at slaughter lbs.	882	828	912	907	907	914	892	-
Foods (12 weeks to slaughter) cwts	27.7	28.5	32.9	27.8	32.6	29.6	29.9	-

Appendix Table 3

Financial Results for seven different beef enterprises

at 1966/67 Prices

(Output inclusive of calf and rearing cow subsidies)

Case No. Farm	<u>Results per £100 output</u>						
	1 A	2 B	3 C	4 D	5 E	6 F	7 G
	£	£	£	£	£	£	£
Output	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Herd Depreciation	4.2	5.1	-	-	0.3	-	-
Foods	63.7	44.4	50.1	58.5	79.6	61.9	63.7
Labour	8.3	7.5	9.1	7.2	5.9	7.6	10.3
Miscellaneous	3.5	3.4	5.1	6.4	0.5	3.2	5.8
Total Costs	79.7	60.4	64.3	72.1	86.3	72.7	79.8
Margin	20.3	39.6	35.7	27.9	13.7	27.3	20.2

Appendix Table 4

Financial results for seven different beef enterprises (Table 3)

At estimated Common Market Prices

Results per £100 output

Case No. Farm	1 A	2 B	3 C	4 D	5 E	6 F	7 G
	£	£	£	£	£	£	£
Output	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Herd Depreciation	3.8	4.6	-	-	0.2	-	-
Foods	63.7	45.0	43.8	53.2	84.3	59.4	55.4
Labour	7.5	6.9	7.1	5.6	5.2	7.1	7.9
Miscellaneous	3.1	3.2	4.0	4.9	0.4	3.0	4.5
Total Costs	78.1	59.7	54.9	63.7	90.1	69.5	67.8
Margin	21.9	40.3	45.1	36.3	9.9	30.5	32.2



