Dairy farming in the U.K.

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OVER THE PAST 10 years in the United Kingdom we have seen a steady increase in the size of dairy herds ranging from an additional few cows in some herds to very large expansion in others. But the size of the national herd has remained fairly constant at a little over 2½ million cows. The move towards larger but fewer producers has increased the size of the average herd from 21 cows in 1960 to approximately 35 cows in 1970.

It is during this period that we have seen the advent of large scale dairying, and although the number of such herds continues to rise, they only represent around 4 per cent of producers, yet account for some 20 per cent of the production. (Table 1)[1].

The foregoing has been the accepted solution for increasing output on the dairy farm, in order to maintain income levels comparable with the rest of society. This has normally necessitated higher stocking densities, heavy capital commitment and increased management skills.

In our own case, when the farming policy at The Home Farm was being reviewed in 1964/65, it was obvious that we would have to intensify our production to meet the rising level of fixed costs. The Home Farm then comprised 1,200 acres of agricultural land; included in this were 120 acres of grass at Goodwood Airfield which could not be grazed, and 100 acres of rough downland grazing.

We were carrying a herd of 110 Friesian milking cows, 50 heifers reared to calving, a single suckling beef herd of 45 head and 400 breeding ewes for fat-lamb production. Some 650 acres of cereals were being grown and we were obtaining good yields. There was little scope for improvement here, and I felt any increase in the intensity of the cereal growing, with a smaller grass break, would only have led to lower cereal yields.

We felt that the scope for improvement lay in the intensification of production from the grassland side of the farm, particularly on the Airfield. The level of profit achieved or attainable, from land used by the beef herd and sheep flock, was not regarded as being sufficiently high to merit any expansion of these enterprises.

The dairy herd was clearly the most worthwhile enterprise to expand, as the cow performance was already at a high level, milk sales being over 1,000 gallons per cow in 1965. As the grass from the Airfield could only be used for conservation, it was felt that this could be most economically converted by dairy cows.

Having made the decision to expand the dairy herd, the first problem was to decide how the expansion was to take place. Of course, the decisions we reached in 1965 might not necessarily be the same in 1971, and we had circumstances definitely peculiar to ourselves. We had to consider then what should be the size of the herd or herds, how different systems would involve us in buildings and yet fit in with the topography of the farm. The system had to be one that would show an acceptable return on capital, be competitive for the next 10 to 15 years, and, if possible, be the basis for further expansion and development in the future.

The decision was made to expand to 300 cows, on the traditional system of grazing in the summer and conserved feed in the winter, with an appropriate increase in the dairy followers; to eliminate the beef herd, and to reduce the ewe flock.

The establishment of a new 150 cow unit, together with the extension and modernisation of the then existing 110 cow unit at Mortar Mill Dairy, was explored. However, I had read reports on two large units that had recently been set up in Italy, besides those already in operation in other countries around the world, and we decided that the possibilities of a 300 cow unit at Goodwood, would bear investigation.

Eventually, the single large unit emerged as being the best, both from the point of view of economy, and the position of Mortar Mill Dairy at the Home Farm.

In addition, the following points were in favour of one unit:

1. The existing plant, installed in 1948, was due for modernisation.
2. One unit would permit full use to be made of equipment and avoid duplication.
3. There would be economy in the provision of services.
4. Better staffing arrangements, and from the management point of view it would be much easier to have only one dairy to service.
5. Easier to have all the conserved feed in one place, so that the best quality feeds could be

fed to the freshly calved and high yielding cow and the lowest quality to the stale milker.

6. Grassland management would be simplified with a two sward system.
7. Mortar Mill Dairy was also very well positioned for, within grazing distance, there are 240 acres of arable and 50 acres of permanent grass, sufficient to support a large number of grazing cows.
8. It would lend itself for further development.

We planned to reach the full number of cows immediately and not to build up in stages. This is so vitally important if a satisfactory return on capital is going to be achieved.

Although, I virtually planned the expansion by a critical path analysis, a local outbreak of foot and mouth in 1966 and the prolonged outbreak in 1967, delayed our reaching the full numbers until late in 1968, two years later than anticipated.

In designing the layout for the buildings that would enable us to handle this size of herd, I had to give considerable thought to the following points:—

1. Summer and winter management with the movement of cows in and out of the buildings.
2. Storage system for the conserved feed and feeding arrangements.
3. System of winter housing, with the effect on manure disposal.
4. Milking arrangements, with feeding in or out of the parlour.
5. Provision for isolation areas, handling facilities, etc.
6. Good working conditions for the staff and comfort for the cows.
7. A layout that enabled the cows to be kept apart from the services bringing in the fodder to the unit.

A few herds are practising zero grazing. In few cases is this as economical as direct grazing systems. Unless land is such a scarce commodity and a limiting factor, or other physical factors such as motorways, make it a necessity, the small increase in total utilised fodder does not compensate for the increased costs involved. We have found that paddock grazing has given us a very efficient grazing system, and it is possible to achieve a high stocking density.

However, in most cases it is desirable to house our cows in the winter and save our pasture for the following year's grazing. This leads us to the varying forms of conserving feed for the winter months. The price structure for milk in this country encourages an emphasis on winter milk production.

Most of the fodder is still conserved in the form of hay; in qualities as good as concentrate feed, down to material of lower feeding value than straw. Some very good systems of silage making have developed and self-feed silage from a bunk has eased the burden of many a dairy farmer.

However, self-feed silage and efficient dairy management are not very compatible. If good yields per cow are going to be obtained, a very high quality of conserved feed must be made, and this material requires careful feeding to the cow. Thus, we are seeing the introduction of mechanised handling systems of the silage out of the bunk. The tower silo enables a very high quality feed to be conserved, but as in all cases of fodder conservation, the quality of the material fed can be no better than the quality of the material conserved in the first place. We decided on tower silage for the top two-thirds of the herd and to use the existing bunk silage for the remaining lower yielders.

Again, the decision was made to have loose housing in bedded wards, having ample supplies of bedding straw from our cereal growing, but many of the large dairy herds are using cubicles for their cows. This does lead to the additional problem of slurry disposal and this is being dealt with in varying systems. I have found that by having a system of narrow bedded areas and hard concrete feeding areas we have a manageable slurry problem. The quantity of slurry produced is sufficient for applying to the areas used for conserving grass and not that grazed by dairy stock, and is particularly useful in the Airfield.

We chose a 12/24 herringbone system for milking the cows, with a proportion of their concentrate feed being fed in the parlour during milking. There has been a swing towards out-of-parlour feeding, but with the coming of rotary milking parlours, there seems a likelihood of a return to parlour feeding.

We installed a forced air ventilation system in the parlour and it does make for pleasant working conditions throughout the year, which I consider is so important when operators spend a considerable part of their day there.

At the planning stage our calculations were based on the following factors:

1. 0.5 acre per cow for grazing.
2. 2 tons of DM per cow in the form of high quality conserved forage.
3. 15 to 20 cwt barley, per cow, to be fed rolled, along with the silage.
4. To maintain and if possible to increase the 1,000 gallons of milk sales per cow per annum, with a margin over concentrates of £125.
5. The average number of cows dry per annum not to exceed 16 to 17 per cent.
6. An initial replacement of 25 per cent reducing to 20 per cent, as the herd becomes established.
7. A staff of four, dairy manager, under manager and two junior herdsmen.

Herd Management

The herd is divided into five groups in the winter and was initially in just two groups in the summer, but for the last two years has been divided into three groups.

Cows are sub-divided according to yield, freshly calved cows join the top group giving over five gallons and these are milked three times daily.

The next lower group receives the freshly calved heifers and in the summer contains cows down to three gallons. Once their yield falls below three gallons, they are moved down into the lowest group where they remain until they are dried off. In the winter these last two groups are sub-divided.

This is one of the big advantages of the large dairy herd that it is possible to sub-divide the herd into groups and to manage them according to their yields.

We originally planned for a staff of four, based on twice a day milking. However, with the larger herd we found that there were sufficient cows giving over five gallons a day to warrant milking these three times daily. In this way we were able to handle them as a separate group through the summer, and were able to manage them to their potential production. In the autumn of 1969, when we changed to three times a day milking, the staffing was reorganised as follows:—

Two herdswomen attend to the morning and afternoon milkings. Starting with the top group at 05.30 hours, following through the groups and finishing with the lowest group at around 08.00 hours. The top group, which are milked three times a day, are then milked at 13.15 and finished by 14.00 hours. The lowest group are started at 15.30, finishing with the highest of the twice daily milked cows, at approximately 17.00 hours.

The third milking of the top group takes place at 20.15 hours and is carried out on alternate weeks by the dairy manager or his assistant. The group is limited to 85 cows, in order that it takes them no longer than 1.5 hours.

The herdswomen are responsible, in addition to the milking, for the cleanliness of the parlour and dairy. They have good time off in the mornings, one weekend off in three, milking in the morning only on the second and fully working on the third weekend, but on this weekend, they have the Friday off prior to the weekend.

The dairy manager and his assistant work alternate weekends and, when they are on evening milking, they are responsible for seeing to all the cows during the evening and attend to calvings, starting the following day at 09.00. When not on evening duty they start at 05.30 and finish by 17.30. In practice this has turned out to be a very good arrangement, because there is always a responsible person on duty without them being involved in long working hours, and the milking process is never disrupted.

The fifth member of the dairy staff is a junior herdsman, whose duties consist of bedding yards, scraping the feeding areas and attending to the feeding in the winter. During the summer months, fetching in the groups of cows for milking, moving electric fences and pasture management.

Support to this team comes from two people, a tractor driver who relief milks with the two herdswomen on the weekends, and who spends approximately one day per week on slurry disposal in the winter. The second person is a post-college student, who works alternate weekends with the junior herdsman, and assists with the bedding of the yards in the winter or moving the irrigation pipes in the summer, but in both cases he is free for other farm duties after 09.00 hours.

We have a regular weekly visit by our veterinary surgeon to check infertilities, carry out pregnancy diagnoses and attend to any other veterinary work. Magnesium bullets are used every spring just after turn out, and most winters a vitamin injection is given. We are an accredited herd, and were one of the first to become accredited in West Sussex.

Conserved feeds are analysed each autumn, a typical tower silo analysis being DM 40/45 per cent, DCP 5.0 per cent and SE 24 per cent. On some occasions protein has been sufficient for 7 gallons. Clamp silage is usually in the order of 25 per cent DM, 2.8 per cent DCP and 12 per cent SE.

I prefer grass silage to maize or whole crop cereal silage, because of the higher protein content we can achieve, and thus be able to feed a high proportion of rolled barley or other straight starch feeds. Adequate minerals are fed at all times of the year, and I feel this is one of those essential items, which can be listed under "attention to detail".

All fodder conservation is carried out by the arable staff, both for the dairy herd, and the other livestock on the farm. This works in very well with the cereal cropping, and with the yards to clean out each spring, everyone's time is fully utilised. I am sure this is where two enterprises can be complementary, and have an advantage over the single specialised unit.

The benefit of satisfactory grass breaks in our cereal rotation and the steady build up of fertility, has been shown in increased cereal yields. (Table 2.)

In managing a large herd, the importance of comprehensive physical records cannot be over emphasised. There is no reason why every cow should not be considered as an individual, from her breeding to her feeding. In order to make worthwhile management decisions for the herd, one must be able to look at individual cow performance, through to group performance, and on to total herd performance.

Our breeding policy is intended to be constructive, semen from proven bulls being used for proven cows and natural service for the younger section. Equally so, the dairy enterprise must be budgeted and financially monitored on a continuous basis.

I think this is the time to have a look at some of the results we have achieved with the dairy herd. My brief is to speak on large scale dairying and for this purpose I have tried to segregate the dairy from the rest of the enterprises and look at it as an independent unit.

Firstly, to take the yields per cow through the build up. (Table 3.) You will note that the annual yield has increased to almost 1,200 gallons and this with a high proportion of young animals.

At March 31, 1970 the margin over concentrates was £128. The gross margin per cow was £92.5, we used 1.3 acres per cow resulting in a gross margin of £68 per acre. Labour costs have remained steady at £26 per cow, wage increases being offset by increasing cow numbers.

Table 4 shows the contribution the dairy has made to the farm in the form of trading surplus since the expansion took place. This indicates that, although productivity has been improving, net trading has been diminishing, which is a typical state of affairs in this country.

At the planning stage it was anticipated that we should expect a return of between 20 to 25 per cent. Total capital costs to date have amounted to £78,000 less grants of £24,000, leaving a net cost of £54,000 (£180 per cow). This includes taking over the original buildings, all new buildings and equipment, dairy plant and field machinery required for the dairy enterprise.

From the beginning, we were interested in monitoring the business, and with the help of our NAAS Farm Management Advisers, this has been carried out. If we had wound up the dairy unit on March 31, 1970 it would have given us a discounted yield of 11 per cent. This is with a very low terminal value, both cows and buildings have been heavily written down.

We feel we are through the worst, the herd is built up and we are past the period of low cash flow. However, just to show how vital it is to get a unit into full production in Year 1 of its life, I took the figures we were obtaining per cow in the initial years, and calculating the cash flows on a full unit of 300 cows, it shows that we would have obtained a discounted yield of 16.5 per cent instead of the 11 per cent.

Current problems and future viability

Since last year there has been a complete change in the cost structure of our purchased and home grown feeds. This has had the effect of making our grassland a much greater asset than ever before, and systems based on making high quality conserved feeds will be in a much stronger position.

All fixed costs such as wages, fertiliser, etc. continue to rise, but we can still expand in our existing unit and this we plan to do. Having established the unit, and become familiar with managing a large dairy concern, we are in a strong position to go forward again and meet the challenge the future holds in store.

We have been able to achieve reasonable results with our expansion into large scale dairying, but this has been through maintaining an above average yield, margin over concentrates, and gross margin per cow.

Admittedly, having invested a large capital sum we had to maintain a high output, and Table 5[2] indicates, when certain levels of investment are made, the net margin per cow that has to be achieved, to maintain the same return on the capital invested. Unfortunately there are instances in the UK where investments have been made in expansion, when the performance and the margin per cow were insufficient to meet the higher level of capital investment.

In entering the field of large scale dairying there are numerous risk factors, but the greater proportion can be forestalled by good management and attention to detail. For instance, if the slurry is spread on grazing pastures one must face up to the grave risks that one is taking.

However, brucellosis could ruin any project through circumstances outside our control. Politics can upset the best laid plans and are probably the greatest risk factor.

Finally, will the incentives be towards large scale enterprises? Is our food to come from fewer but larger units; I think so. We have ever increasing demands on the land for leisure and recreation. The efficiency and standards of living obtainable from the larger integrated units must be the future pattern of agricultural production. In the 1970's there will be a change from farming as a way of life, to a highly developed agricultural business, employing the most up-to-date management techniques.

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1. Structural Change in the Dairy Industry in England and Wales, an application of Markov Chain Analysis. D. Colman and D. Leach, Manchester University, Dept. of Agricultural Economics, Bulletin No. 125/M.24.
2. NAAS Farm Management Advisory Service. South East Region.

Table 1

DISTRIBUTION OF MILK PRODUCERS AND MILK OUTPUT IN ENGLAND AND WALES
1966-67 to 1975-76

	1966-67		1970-71		1975-76	
	% of Producers	*Share of Production*	*% of Producers*	*Share of Production*	*% of Producers*	*Share of Production*
Very Small	19.3	3.6	18.6	2.8	16.9	2.0
Small	27.2	13.7	23.1	9.3	20.3	6.6
Average	22.7	19.1	21.3	14.3	19.6	10.6
Sub Total	69.3	36.4	63.0	26.4	56.8	19.2
Substantial	22.6	33.7	23.8	28.3	23.9	23.0
Large	6.9	21.2	9.5	23.5	12.1	23.9
Very Large	1.2	8.8	3.7	21.8	7.2	33.9
Sub Total	30.7	63.6	37.0	73.6	43.2	80.8
Grand Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 2

CEREAL YIELDS (CWT/ACRE)

Cereal crop	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*1969*	*1970*
Wheat	37	32	33	35	38	31	47	43
Barley	25	28	31	32	34	28	37	35

Table 3

YEARLY AVERAGE (JAN-DEC.)

	Year	*Number of Cows*	*Yield per Cow Galls.*	*Milk Sales per Cow £*
	1964	117	970	150
Old Unit	1965	127	1,060	170
	1966	151	1,056	172
Moved into	1967	217	990	169
New Unit	1968	230	1,085	183
Started	1969	280	1,116	188
3x milking	1970	291	1,185	205

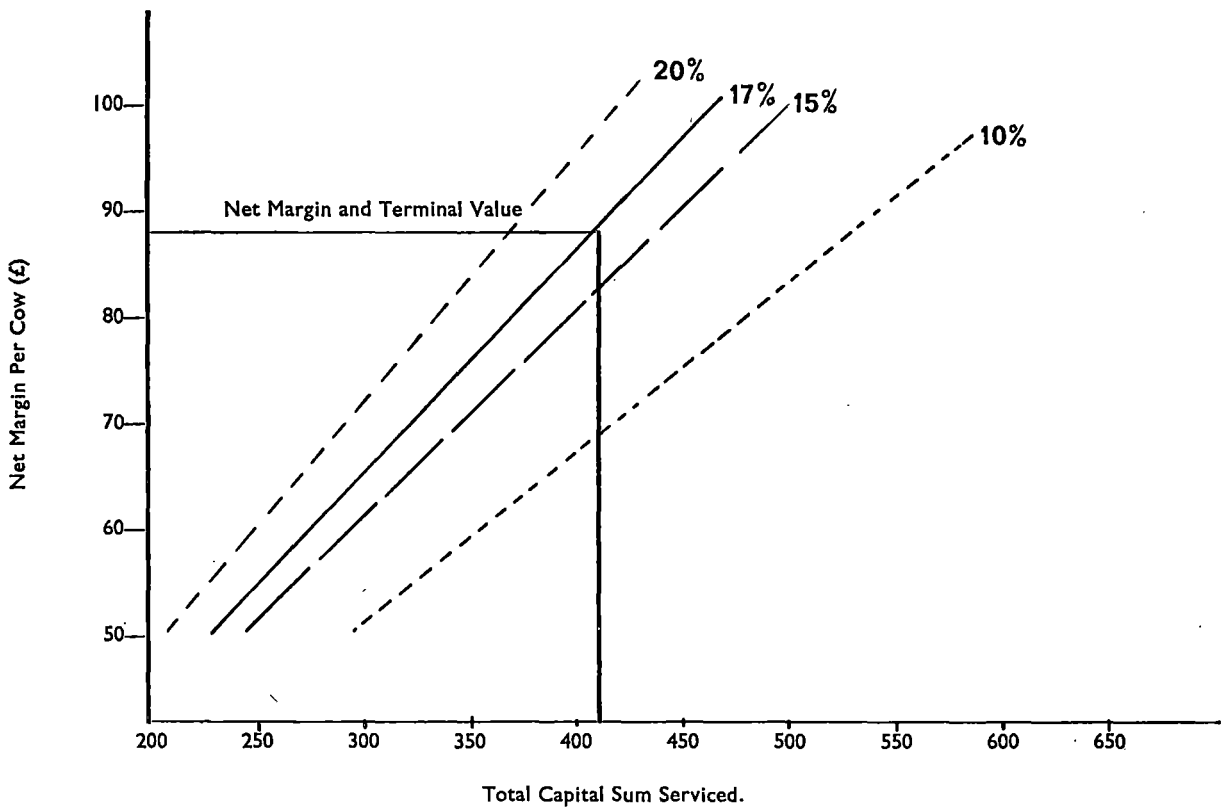
Table 4

TRADING SURPLUS TO MARCH 31

	1968	*1969*	*1970*
Total £	11,533	11,456	11,923
Per Cow	51	47.9	41.3

Table 5

RELATIONSHIP BETWEEN CAPITAL INVESTMENT AND LIVESTOCK PERFORMANCE



DAIRY FARMING IN U.K.

DISCUSSION SUMMARY

The main points made in the discussion, and Mr. Bacon's replies, were:—

1. The herd size was restricted to 300 cows in the first instance by grazing availability within walking distance (800 metres) of the dairy building. As land use became more intensive the herd could be increased to 370 cows.

2. The peak capital investment in the project was £58,000 made in the first year of the expansion. Experience had justified the decision to invest in tower silos because milk yields always fell when the cows moved on to clamp silage. It was possible to feed more dry matter to cows using clamps and wastage was reduced.

3. Because the dairy buildings were situated in the middle of the grazing area there would be little advantage in having two installations. A centralised system also saved labour.

4. Staffing was so arranged that someone was always available for responsible work. This allowed time for the very important attention to detail and routine record keeping. The three times per day milking fitted conveniently into the working hours for the milkers. The women doing the milking were concerned solely with the milking, and other work was carried out simultaneously. The female workers received the same salaries as the males—£1,200 to £1,600 per year. There was no difficulty in recruiting labour of the required standard because of the good salaries and working conditions. People with Farm Institute training were preferred because of the complexities of the installation.

5. The labour cost of £26 per cow quoted in the paper referred to the cows only. It did not include any charge for followers.

6. About 20 per cent. of the herd was replaced annually and the calving index was 380 days. The very good calving index was attributed to the high plane of nutrition.