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EFFICIENCY IN FARM MANAGEMENT

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Imputations are often made about the efficiency of farmers without indicating what is meant by the term "efficiency". It is true that the sense in which the word is used sometimes needs no explanation but, as Lady Margaret Hall and C. B. Winsten have recently shown,¹ there are several different concepts of efficiency and the meaning may not always be self-evident. There is sometimes also a tendency to attribute the results achieved on a particular farm to efficiency or inefficiency when other causal factors may be present. Even among secondary industries there is sufficient variation in the conditions under which firms operate to make it difficult to isolate and measure the effect of efficiency. The problem becomes much more complicated in agriculture where soil, climate, topography and the incidence of pests and diseases are variable.

The meaning of efficiency in farming can perhaps best be clarified by following the analysis of Hall and Winsten. They begin by assuming a comparison between two mines, each with a similar labour force and producing the same sort of coal with the same type and quantity of equipment.

"Then, if we were wondering where to produce coal, at mine A or mine B, we could perhaps take a simple view of efficiency and decide on the mine producing more coal. In such a straightforward decision no allowance would be made for the difficulties with which those working the different mines have to cope, e.g., depth of coal, seam thickness, etc.

"If, on the other hand, we were considering not whether or not to use a mine but how well its management was doing its job, we might look at the question differently. One mine may have simple conditions. Another may have tricky conditions. Thus, although one manager may have less output, both may cope with their different problems equally well."²

There are thus two different ways of looking at efficiency, each of which could clearly be applied in farm comparisons. Hall and Winsten suggest the first type be called *efficiency in use* to emphasize that it is the production unit itself that is being judged on its output. On the other hand, comparisons involving the performance of managers are called comparisons of *managerial efficiency*.

In farming, as in coal mining, managers are confronted with different conditions which affect the range of alternatives open to them. We need to consider, therefore, whether some allowance should be made for difficulties such as the small size of farms, awkward layout, outcrops of rock or other factors. The answer to this question depends partly upon whether we are thinking of short or long-term performance. Probably nothing could be done about such limiting factors in the short run but it could perhaps be claimed that fundamental problems which restrict the scale of production should be considered in long-term plans. It is conceivable, therefore, for a farm manager to be efficient in the short-run but not in the long-run; one who is achieving a relatively high output from a small, hilly property may

¹ Lady Margaret Hall and C. B. Winsten, "The Ambiguous Notion of Efficiency", *The Economic Journal*, Vol. LXIX, No. 273 (March, 1959) pp. 71-86.

² *Ibid.*, p. 71.

be regarded as efficient when compared with others on similar properties but, in the long-run, some doubts would be cast on his managerial efficiency unless he tackled the limiting effects of the size and nature of his property.

The fact that farmers all face somewhat different environments makes it difficult to compare their efficiencies as managers. If environments were all the same an attempt could perhaps be made to measure efficiency but, even then, we would often be interested to know how they would fare in different circumstances. Comparison is even more difficult if managerial efficiencies are compared for tasks of different degrees of complexity.

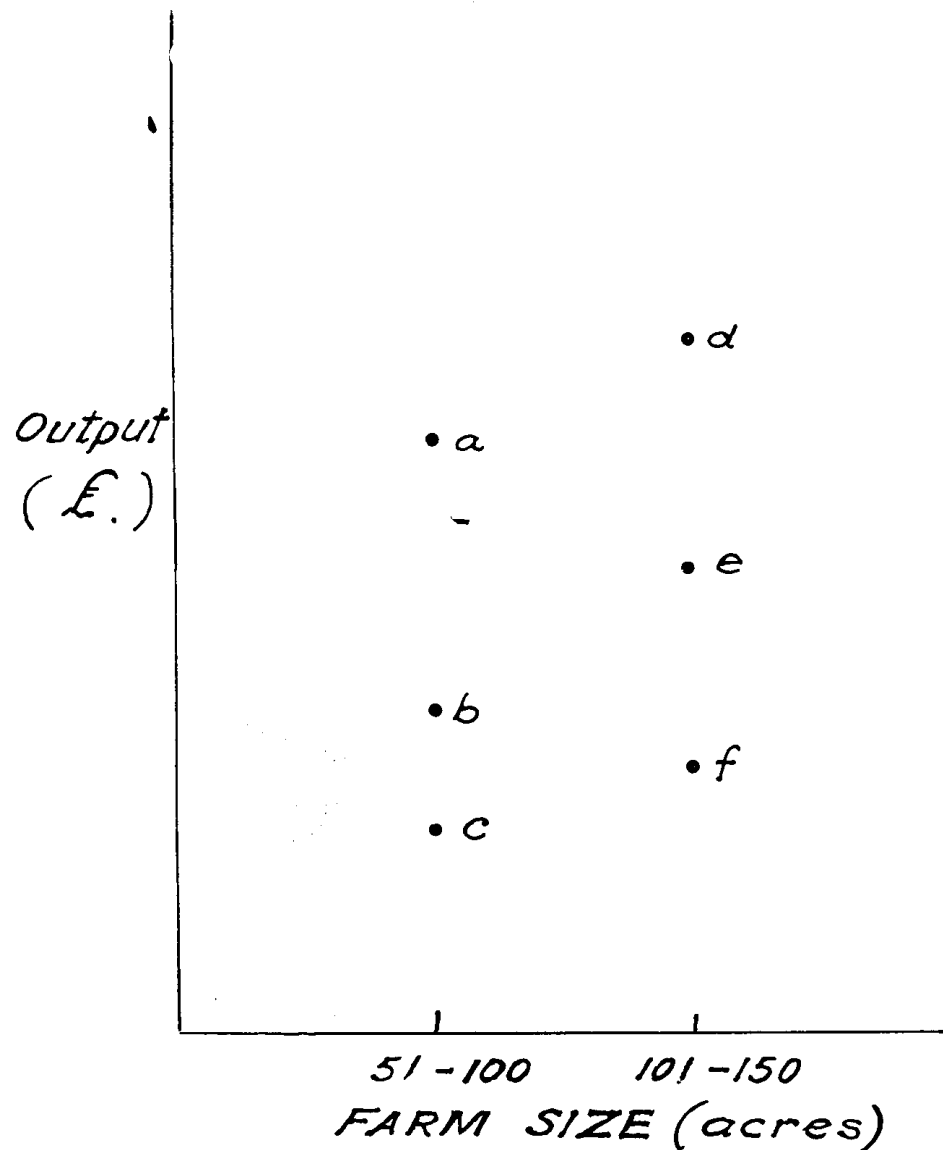


Fig. 1. Hypothetical Output Scales for Farms in Different Size Groups

Difficulties of measurement should not, however, be allowed to completely forestall attempts to appraise managerial efficiency. Considerable progress is possible by using the method of "merging of scales"³ to rank the performances of farmers in different environments. Suppose, for example, we have three farms in the size-group 51-100 acres and three in the size-group 101-150 acres, with outputs as shown in Figure 1. We can see that

$d > c$ and $d > e > f$. We may be tempted to merge the two scales and compare each of the six farms but it could be objected that this would be unfair as the farms are in two different environments (in this case, different size groups) and each should only be compared with farms in the same environment as itself. If, however, we are able to say that farm size is a factor which the manager should be able to control, we could then rank the six farms together and merge the scales to give $d > a > e > b > f > c$.

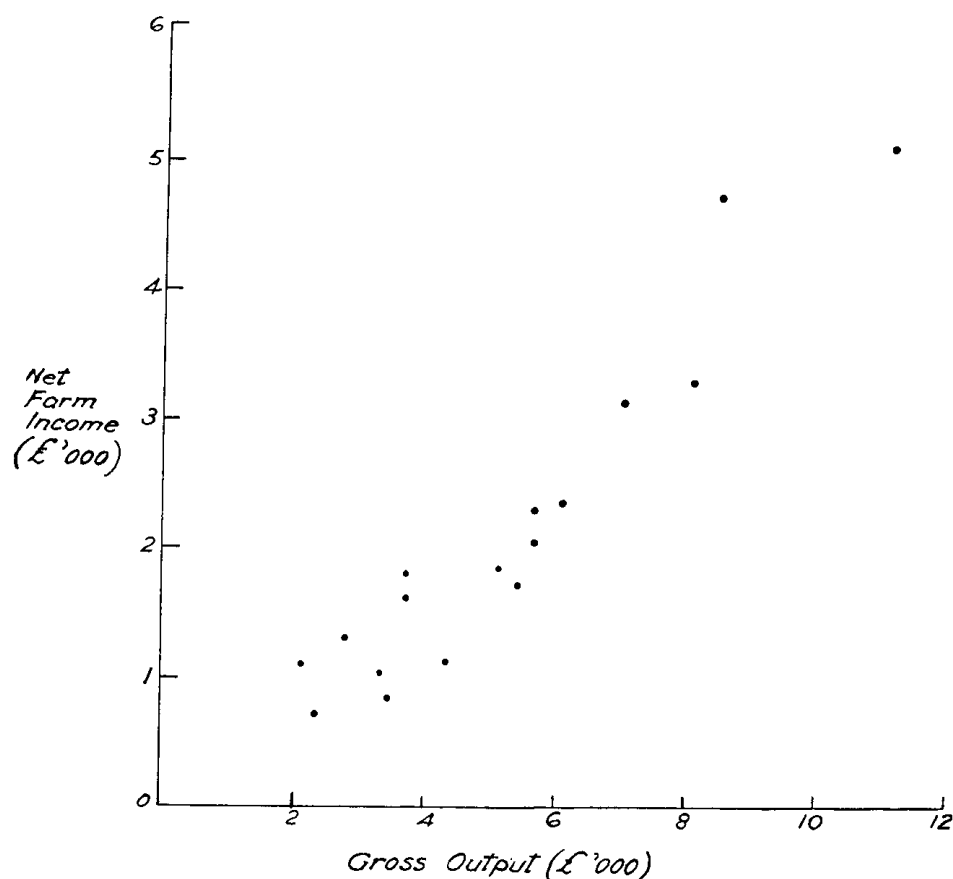


Fig. 2. Gross Output and Net Farm Income for a Group of Dairy Farms in the Nowra District, 1958-59

³ Hall and Winsten, *op. cit.*, p. 76.

The usefulness of this approach to the problem of assessing managerial efficiency can be seen by reference to the accompanying graphs which refer to the results obtained on a group of dairy farms in the Nowra district, New South Wales, in 1958-59.⁴

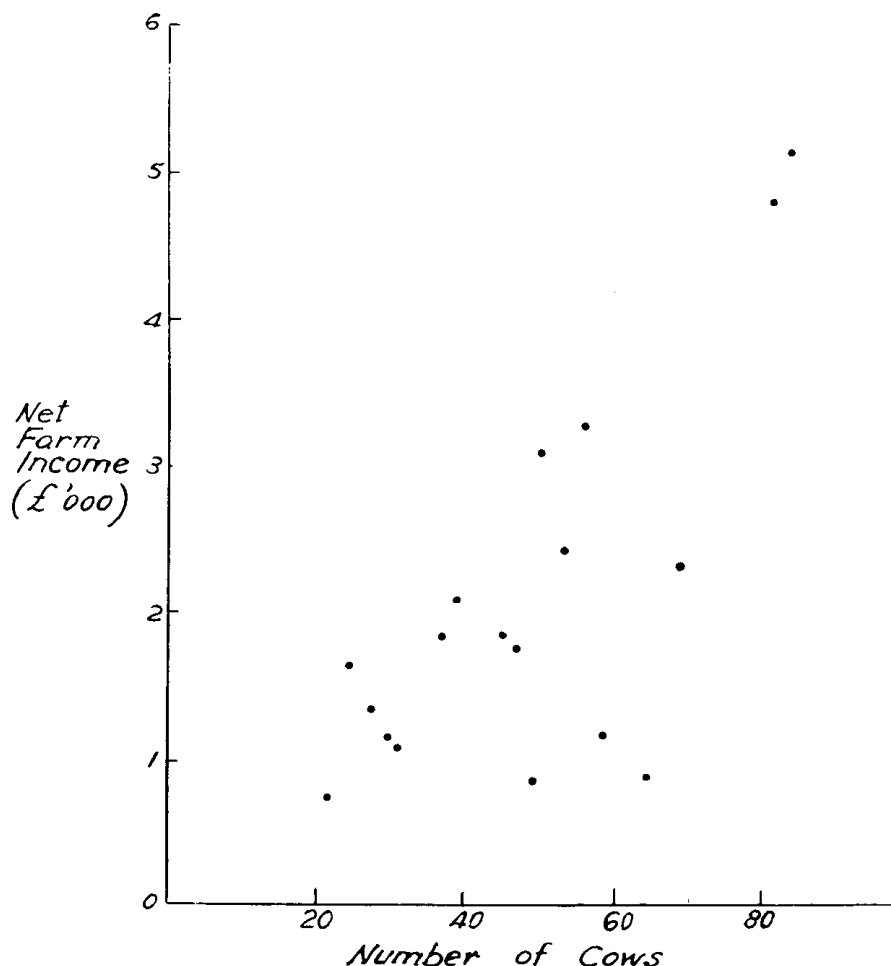


Fig. 3. Number of Cows and Net Farm Income on a Group of Dairy Farms in the Nowra District, 1958-59

Figures 2, 3 and 4 show fairly clearly the relation between net farm income and output, stocking rate and yield per cow. The importance of achieving a high level of output is immediately apparent; without this it is impossible to achieve a high income, irrespective of the level of costs. Of the two key factors in achieving a high milk output (number of cows and milk yield per cow) the results suggest that stock numbers are more important than yield per cow. Attention should, of course, be given to both factors and it will be noted that the three farms with highest incomes had relatively large herds of high-yielding cows.

⁴Detailed results are available in a mimeographed report entitled *Dairy Farm Management Study, Nowra District, 1958-59*, Division of Marketing and Agricultural Economics, Department of Agriculture, Sydney, October, 1959.

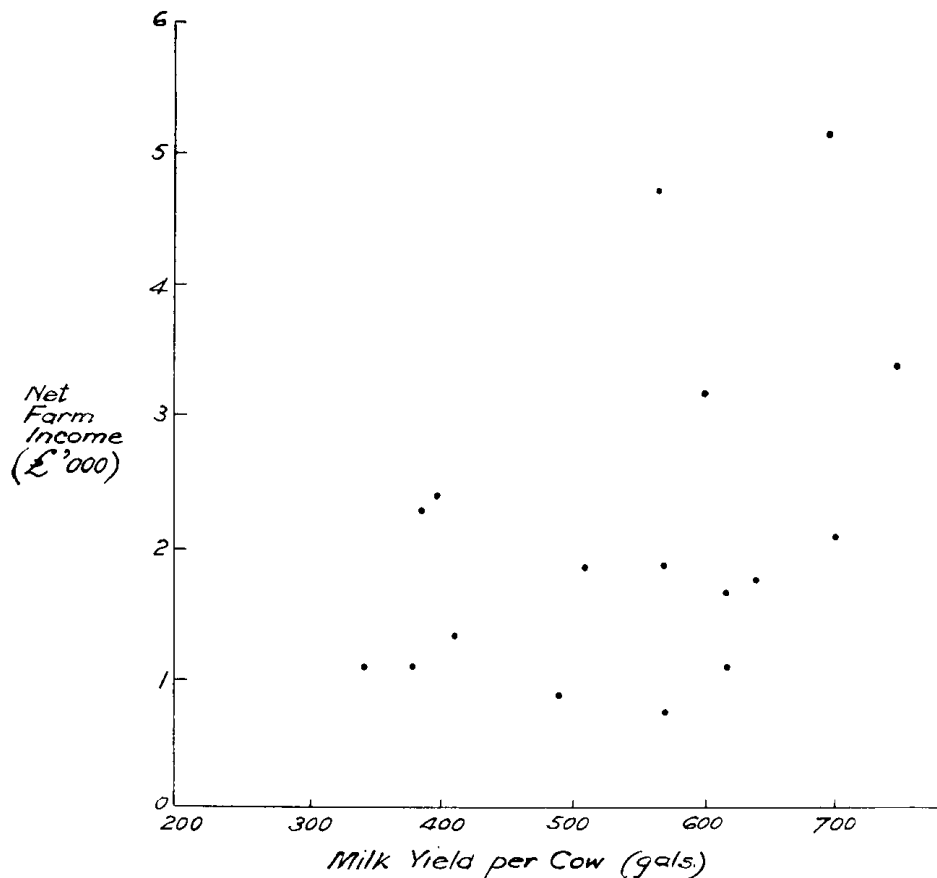


Fig. 4. Yield per Cow and Net Farm Income on a Group of Dairy Farms, Nowra District, 1958-59

Close inspection of Figures 5 to 8 provides an insight into managerial efficiency of each of the farms studied. If Farm H is considered, for example, we note that:

- (i) it had the highest gross output in its size group and a higher output than seven of the thirteen larger farms;
- (ii) the farm's gross output was much higher than that of other properties with a similar number of cows and higher than four properties with larger herds;
- (iii) it was one of three farms with an average yield of over 700 gallons of milk per cow; and
- (iv) costs incurred were about average, despite the fact that a relatively high output was obtained from a small property.

Although we are unable to measure the managerial efficiency of the operator of Farm H, the above facts suggest that he could be given a relatively high efficiency ranking for his performance in 1958-59. It could probably be assumed also that output and net farm income would rise if the limitations imposed by the small size of the farm were overcome. If,

for example, we assume the farmer is able to add 40 acres to the property, enabling him to increase his herd from 40 to 55 cows, we could expect an upward revision of his results. Provided the larger scale of operations involved no loss of efficiency a movement from H to H_1 on each graph (Figures 5 to 8) could be anticipated. However, should the farmer fail to recognise the means whereby he could improve his income in future years he could not be ranked as highly by long-term standards as might be expected on the basis of his current performance.

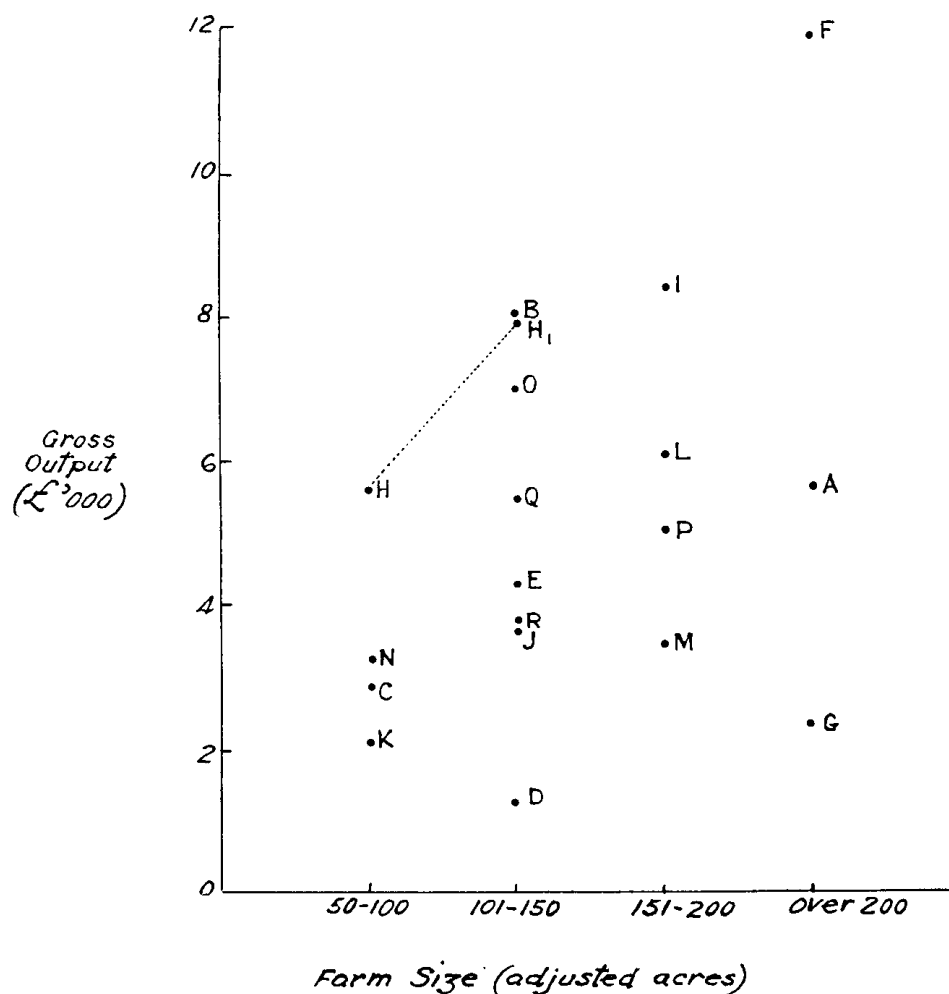


Fig. 5. Gross Output on Dairy Farms in Different Size Groups, Nowra District, 1958-59

The assessment of managerial efficiency in the case of Farm K is somewhat different. In 1958-59, this property had a low income, low output, small herd and low yield per cow and it would seem that the farmer should receive a relatively low ranking for managerial efficiency, at least in the short-run. If, however, he is aware of his fundamental problems and is able to surmount them, this assessment could be incorrect in the long-run.

He may decide, for example, to move to another property or purchase some good land to add to his present holding which, apart from being small, is mainly too steep to cultivate or topdress.

On the other hand, failure to recognize the severe limitations imposed by a small, difficult farm would tend to confirm the accuracy of a low ranking for managerial efficiency. This may seem a harsh judgment and it may be objected that lack of capital, rather than lack of knowledge, is preventing the farmer from improving his position. There could be some substance in this claim in reference to the farmer's current situation but it would be reasonable to expect an effort to be made, in the long-run, to reduce the limiting effect of capital shortage.

As the operator of Farm K clearly has little chance of accumulating capital by saving, a radical change such as moving to another property (perhaps on a rental basis) or changing from dairying to another enterprise may be necessary to overcome the restriction that inadequate capital may be exerting on his managerial ability. In the absence of a feasible solution to the problem, consideration may have to be given to relinquishing the property and obtaining alternative employment; to remain on the farm would

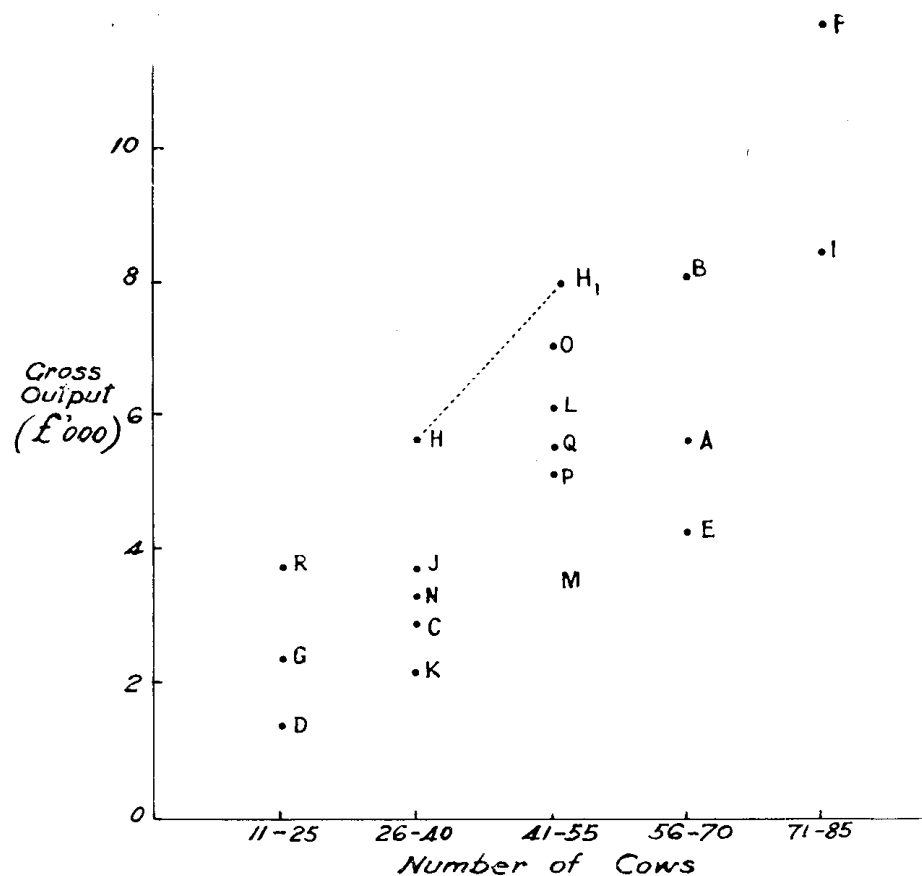


Fig. 6. Gross Output on Dairy Farms with Herds in Different Size Groups, Nowra District, 1958-59

amount to acceptance of a chronic low-income position. We can see, therefore, that shortage of capital could perhaps be regarded as an extenuating circumstance in the short-run but is a factor which an efficient manager would endeavour to take into account in his long-term plans.

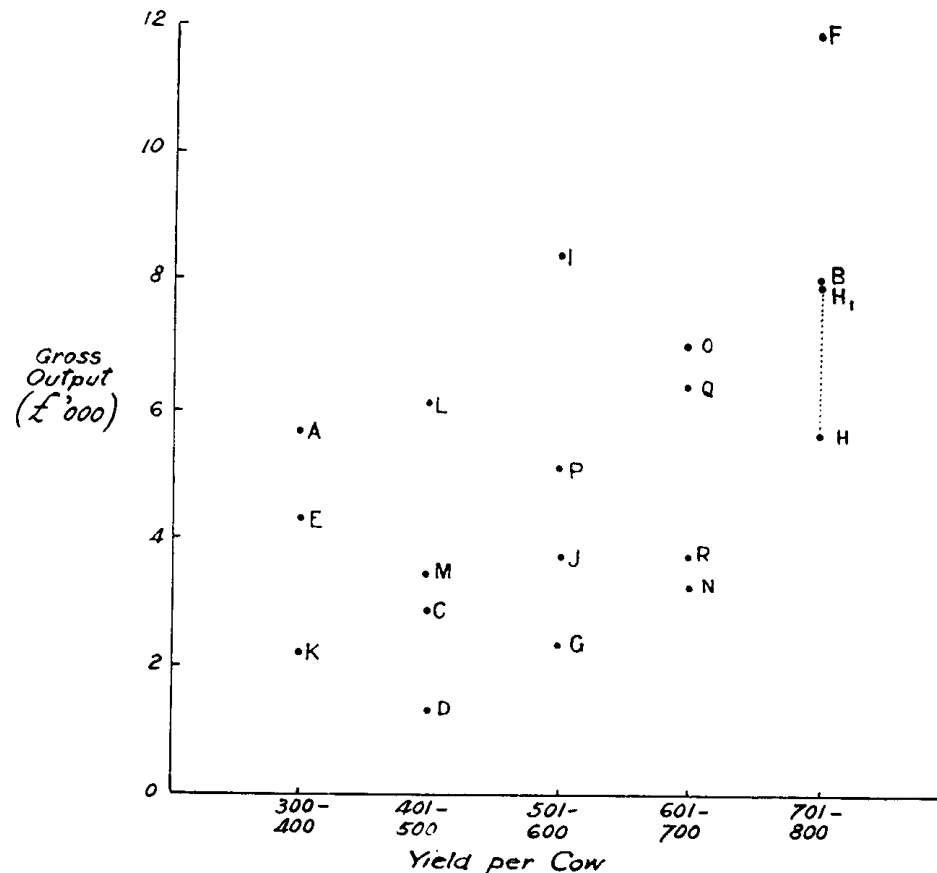


Fig. 7. Cross Output on Dairy Farms Grouped According to Milk Yield per Cow, Nowra District, 1958-59

Discussion of the problems faced by the operators of Farms H and K draws attention to the key role of *knowledge* in managerial efficiency, especially knowledge of the relative importance of the various factors which influence farm income. Technical knowledge and skill, though important, are not sufficient to ensure a high farm income; it is essential also to consider the alternative ways of combining the available resources of land, labour and capital. The most appropriate system of farming to follow on any farm could be deduced broadly, even by an outside observer, from a knowledge of the type-of-farming area in which the property is located but more detailed knowledge would be necessary in order to maximize income. Success in the latter objective would depend, firstly, upon knowledge of the factors likely to have the most important influence on income and, secondly, on the care with which the alternative uses of resources were considered.

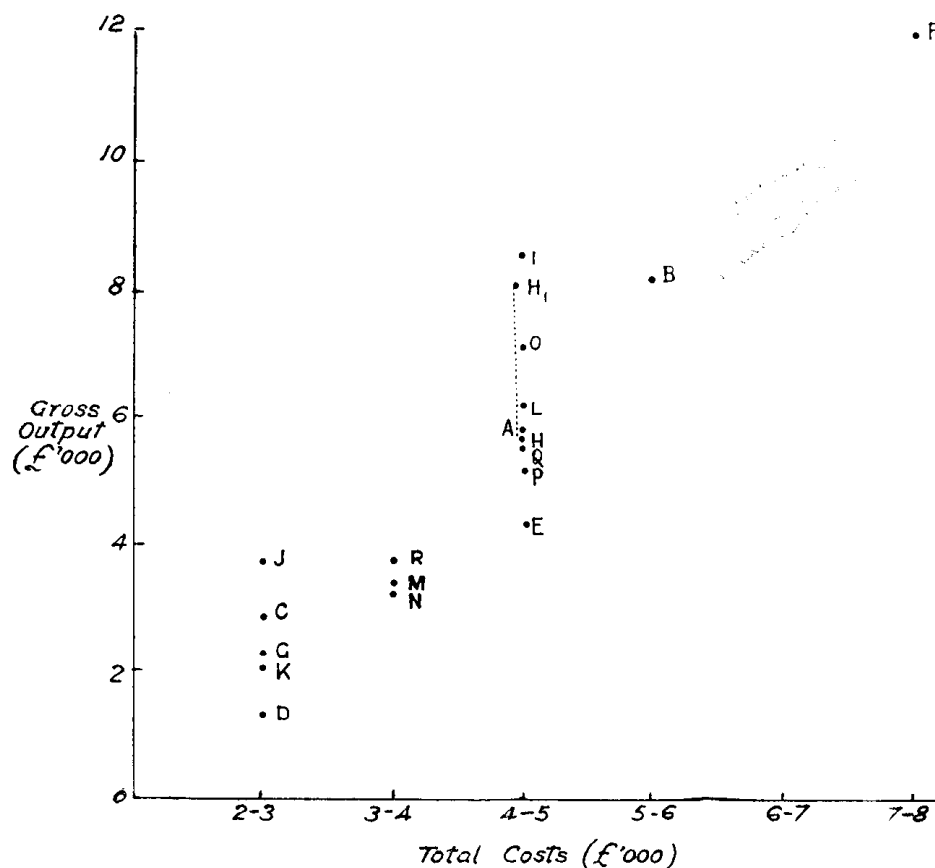


Fig. 8. Gross Output on Dairy Farms Grouped According to Total Costs, Nowra District, 1958-59

We have already noted the relation between density of stocking and farm income on a group of dairy farms in the Nowra district. This study also revealed a closer relation between cattle numbers and net farm income than between yield per cow and net farm income. These points may seem fairly obvious but there is some evidence that dairymen in the district are not very clear about the priorities that should be given to different aspects of management. During 1959, suppliers to the Nowra Co-operative Dairy Company Limited were asked to rank, in order of importance, a list of factors commonly mentioned as contributing to profitable milk production. The rankings of 30 respondents are given in Table 1. A rather surprising result was that the point "maintaining maximum number of cows" was listed second last. On the other hand, the group gave "efficient feeding" and "good breeding" first and second priority respectively, apparently overlooking the fact that neither of these factors could be very influential unless attention was first given to the size of the herd.

TABLE 1
Points in Profitable Milk Production
 Distribution of Rankings by Thirty Dairy Farmers,
 Nowra District, 1959

Points in Order of Group Ranking	Distribution of Rankings by 30 Farmers		
	High	Medium	Low
1 Efficient Feeding	25	5	0
2 Good Breeding	19	10	1
3 Intensive Use of Grassland	18	10	2
4 Efficient Milking Machines	11	16	3
5 Comfort of Cows	9	15	6
6 High Yield per Cow	10	12	8
7 Herd Recording	7	17	6
8 Efficient Rearing	8	17	5
9 Attention to Calving Dates	4	20	6
10 Dehorning	2	15	13
11 Efficient Use of Dairy Labour	5	10	15
12 Observant Stockmanship	0	21	9
13 Maintaining Maximum Number of Cows	2	12	16
14 Milking Three Times Daily	0	0	30

High = Ranking of 1 to 4, inclusive.

Medium = Ranking of 5 to 10, inclusive.

Low = Ranking of 11 to 14, inclusive.

Consideration of problems similar to those experienced on Farm K draws attention to a further aspect of efficiency, namely the efficiency with which the communities resources are used. From the viewpoint of society as a whole, it is clearly a disadvantage to have labour and capital tied up on farms which, for physical reasons, display low productivity. It follows that it is in the interests of the economy as a whole to assist such farmers to make the adjustments necessary to achieve higher income, even if this involves advice on non-farm employment opportunities.

Two other concepts of efficiency distinguished by Hall and Winsten are relevant to this discussion: *target* and *technical* efficiency.

"A target efficiency is concerned with a situation where a number of different units (firms say) are operating in a number of different environments. We are interested in how much a particular firm has to increase its output to reach the best in its particular environment. This is a measured efficiency, on a scale, and not merely a ranking. We are interested in how far the firm has to go to reach the best, and not, as in the more general case of managerial efficiency, how difficult it is to get there. Target efficiencies answer the type of question: if only we could change the management of this firm for the best of its kind, how much output could we obtain? The calculation of technical efficiency, on the other hand, is concerned to answer such questions as, if only we replaced this technique by the one producing most in its particular environment how much more could we obtain? Again the question of how difficult such a task is to achieve is not raised."⁵

⁵ *Ibid.*, p. 74.

The individual results shown on Figures 5 to 8 could perhaps be considered in terms of target efficiency. If it is assumed that farms in, say, the same herd-size group are in the same environment, then each manager would be able to assess the improvement required to reach the target output for his environment. Similarly, if it is considered that *all* of the farms studied are in the same environment, the standard for comparison could be the performance of the farm with the highest output. To take an example, suppose, in Table 2, we compare the figures relating to Farm X with the average results achieved on the three properties with highest output. This assumes that Farm X and the top three farms have equal opportunities for efficient dairy production. As indicated earlier, this need not be the case. It is conceivable that the manager of Farm X would claim that his results could not be fairly compared with the most successful farms, at least in the short-run; he would, perhaps, argue that he was operating under different conditions and that, for him, the relevant comparison was with farms facing similar conditions.

TABLE 2

Results Achieved on Farm "X" Compared with Results for the Three most Successful Farms in a Group of Eighteen Dairy Farms, Nowra District, 1958-59

Item	Farm X *	Average 3 Farms with Highest Net Farm Income
Farm Size adj. ac.	166	186
Net Farm Income £	2,004	4,409
Management and Investment Income £	1,004	3,409
Return on Investment per cent	5.8	12.8
Gross Value of Output £	5,039	9,475
Costs per £100 Output £	80.08	64.02
Output per Adjusted Acre £	30.38	51.03
Total Milk Production gals.	26,012	50,189
Average Number of Cows on Farm no.	46.2	75.2
Milk Yield per Cow gals.	563.1	667.7
Milk Production per Adjusted Acre gals.	156.8	270.3
Average Test per cent	3.74	3.74
Butterfat Yield per Cow lb.	211.9	260.7
Proportion of Milk Supplied to Board per cent	70.0	68.7
Value of Milk Sold per Cow £	97.4	113.8
Average Return for Milk Sold pence	42.1	41.8
Average Cost of Milk Production pence	44.8	35.9

* The figures shown under Farm "X" are the average results for the group as a whole.

Once again, therefore, we can see that the validity of individual farm comparisons depends very heavily on the assumption that the farms compared have similar environments. In addition, it must be recognized that the assessment of managerial efficiency in a particular environment depends on the standards set by the person making the appraisal. In the case of

the Nowra group, for example, one person may conclude that there is efficient management on the three most successful farms whereas another may ask "how do these farms compare with those elsewhere in New South Wales or, say, in Victoria"? An equally pertinent question would be "how does the output of these farms compare with the output known to be feasible on the basis of experimental data?"

We may conclude, therefore, that there is some danger of confused thinking, and perhaps false assessment of the managerial efficiency of farmers, unless the various concepts of efficiency discussed above are kept in mind. Precise measurement of managerial efficiency is extremely difficult but ranking of performances can be helpful. In the short-run, only a person with an intimate knowledge of a particular farmer's problems (or environment), could confidently assess his managerial efficiency. Over a longer period, however, the assessment would be easier for an independent observer as more factors could be assumed to be under the control of the manager and claims of extenuating circumstances due to particular problems would have less validity.

