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ECONOMIC REPORT. NO. I

THE STRUCTURE OF OVERHEAD COSTS

by

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THE STRUCTURE OF OVERHEAD COSTS

Introduction.

It is the object of cost accounting to spread as far as possible, all items of expenditure over the farm enterprises in the proportion in which they are used by each individual enterprise. This is done by means of records of the use of man, horse, and tractor labour and by feeding stuffs, manures, and seeds records. Despite these elaborate records, there still remain sundry expenses which cannot be charged direct to any enterprise, and it is this residuum which comprises the group of expenses known as overhead costs. These may be defined as those items of expenditure which cannot, in practice, be allocated direct to any particular enterprise on the farm. It is the purpose of this article to describe the items entering into overhead costs, the method by which they are distributed over all the enterprise on the farm, and to produce a figure which may be regarded as a reasonably accurate measure of the magnitude of overhead costs on farms in the North-East of Scotland.

The sources from which the necessary data have been obtained are threefold. Use has been made of the farm accounts examined by the Economics Department of the North of Scotland College of Agriculture. These accounts give an indication of the total amount of money spent on the items entering into overhead costs. Reference has also been made to a number of full cost accounts prepared by the Economics Department in order to determine the proportion of certain items which should be regarded as comprising overhead costs. The third source of information is the enterprise costs being undertaken, and relating to oats, potatoes, turnips, grass and milk.

Items/

Items entering into the Overhead Costs Structure.

The following paragraphs discuss the items entering into the overhead costs structure, and show the proportion which is taken of each item. One of the problems considered when determining the percentage of each item to take has been the necessity of avoiding double counting. The object has been to produce an overhead cost figure capable of application to all departments of the farm. In costing these enterprises separately, however, certain items of the nature of overhead costs will appear. The general overhead cost figure has to be such that allowance is made for these items, otherwise double counting will occur.

1. Man Labour.

On a farm for which full labour records are available, it is possible to allocate to all enterprises on the farm the bulk of the hours of man labour. There remains, however, a residuum which cannot be charged to any particular enterprise. This remainder includes all labour spent on maintaining the structure of the farm in good condition, e.g. building repairs, fencing, ditching, and the numerous odd jobs undertaken by the farm staff. This residuum can only be allocated in a general way and forms part of the overhead costs.

All the cost account records available within the Department since 1936-37 have been examined, and as a result it has been found that about 10% of the total man labour may be considered as being an overhead charge. In practice this means that 10% of the labour bill cannot be charged to any specific farm enterprise, and must therefore enter into the overhead costs calculation.

2./

2. Implement Repairs.

An examination of the implement repairs account shows that this item includes expenditure chargeable direct to tractor and horse costs, and also some which will appear directly in milk production costs. It is necessary, therefore, to eliminate these items from this portion of overhead costs. An examination of the available farm accounts shows that 22% of the implement repairs account is in relation to tractor maintenance, while a further 10% is chargeable direct to milk costs. Hence the proportion of the implement repairs appearing in the overhead costs structure appears to be 68% of the total.

3. Depreciation of Equipment.

Similar considerations apply to the depreciation of equipment. As charges for depreciation will appear in tractor costs and also in milk production costs, it is necessary, in order to avoid double counting, to omit these from the overhead costs. An examination of the farm accounts indicates that 43% of the depreciation is chargeable to the tractor account, while dairy equipment accounts for a further 5%. This means, therefore, that the depreciation on all other equipment amounts to 52% of the total, and this proportion should enter into the overhead costs structure.

4. Fuel, Light and Power.

In a full cost account, it is possible to distribute practically all the fuel costs, including in this item tractor fuel, coal, coke, wood, electricity, either to the tractor account, to the dairy or to man labour as an allowance. There remains, however, an undistributed residuum of approximately 2.5%. This small proportion is practically negligible, but should nevertheless enter into the overhead costs structure.

5. Repairs to Buildings, etc.

This item of the accounts comprises all those expenses concerned with the maintenance of the structure of the farm, whether it be buildings, fences, drains, cottar houses, and so forth. It does not include the cash value of any work of the regular farm staff, whose wages already appear in the labour account. It is not possible to allocate to the appropriate enterprises the items comprising this account. Hence 100% of this charge has to appear in the overhead costs.

6. Rates and Insurance.

Both these items are similarly incapable of being charged direct to any enterprise, and must be included in their entirety in the overhead costs. Rates, of course, refers solely to the occupier's portion, while insurances do not include any for specific purposes, such as workmen's compensations.

7. Car Expenses.

Included in this item of expenditure are the charges for tax, insurance, fuel and repairs. The cost here has to be the total charge minus any allowance for the private use of the car. Normally this reduction would arise, but in the year upon which this investigation is based - 1943-44, conditions of petrol supply were such that no allowance for private running was made. As it is not possible to allocate car expenses to the appropriate departments of the farm, 100% of the charge has to be included in any calculation of overhead costs.

8. Interest and Bank Charges.

This item includes any bank commission, cheques, interest on overdraft, etc., incurred in the running of the farm. It does not include interest on money borrowed for the/

the purchase of the farm, nor for executing landlord's improvements. Again it is not possible to allocate this charge directly over all departments of the farm, so that 100% of the cost has to appear in the overhead costs structure.

9. Miscellaneous.

The final items of overhead costs cover all the numerous small purchases which it is not possible to group under any of the previous headings. This charge includes such items as paper, stamps (but not National Health and Unemployment Insurance stamps which appear in the labour bill), telephone, market expenses, and so forth. A slight element of double counting may exist here, as an examination of the farm accounts shows that about 5% of the total will appear as a direct charge in milk production costs. Thus the proportion chargeable to overhead costs becomes 95%.

It is now possible to tabulate the items entering into the overhead costs structure, and to indicate the percentage of the total cost of each item which should be taken.

<u>Item.</u>	<u>Percentage to be charged.</u>
Man Labour	10.0
Implement Repairs	68.0
Depreciation of Equipment	52.0
Fuel, Light and Power	2.5
Repairs to Buildings, etc.	100.0
Rates and Insurances	100.0
Car Expenses	100.0
Interest and Bank Charges	100.0
Miscellaneous	95.0

Allocation/

Allocation of Overhead Costs.

Numerous methods of allocation have been considered, but have been discarded in favour of the method adopted for full cost accounting. The major problem of allocation lies with the items "implement repairs" and "depreciation of equipment". Only two alternatives have been seriously considered, one relatively complicated applicable to full cost accounting, and to which reference is made in detail below. The other is to allocate the whole overhead cost as the basis of man labour. This latter method leads to the unrealistic distribution of repairs and depreciation, much of it going to crops, such as grass, which make little use of equipment. It seems only logical to distribute these items according to the use of equipment. The matter is of some importance in that repairs and depreciation account for 38% of the total overhead costs.

For purposes of full cost accounting the items entering into the overhead costs structure are split into three groups, each group being allocated in a different manner. The following paragraphs show the items entering into each group, discuss the logic of the proposed method of allocation and give a figure based on the 1943-44 accounts.

<u>Group 1.</u>	<u>Total</u>	<u>Overheads</u>	<u>Overheads</u>
<u>Item.</u>	<u>Cost.</u>	<u>Percentage</u>	<u>Cost.</u>
Man Labour	£196,294	10.0	£19,629
Fuel, Light and Power	28,901	2.5	723
Insurances	3,367	100.0	3,367
Car Expenses	4,870	100.0	4,870
Interest & Bank Charges	2,776	100.0	2,776
Miscellaneous	8,638	95.0	8,206
	<u>£244,846</u>		<u>£39,571</u>

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This group of expenses must be spread over all the departments of the farm in accordance with their importance. This importance may be measured either by the amount of money spent, exclusive of overhead costs, or by the amount of man labour involved. If the amount of money spent is used as the measure of importance, factors external to the farm are introduced. This must be avoided as far as possible, which suggests that the man labour basis is to be preferred. A difficulty arises here, however. The man labour basis may be either in terms of hours or money. In the former case, sufficient information is lacking to enable an estimate to be made for all farms, while reliable figures are available for the latter. It seems preferable, therefore, to use, as the basis of allocation, the value of the man labour involved. Hence the overhead costs of £39,571 has to be allocated over the farms involved in accordance with the spread of the man labour. It is possible to calculate a figure per £1 man labour which may be used in this connection. As 10% of the labour bill has already been accounted, the basis of calculation must be 90% of the labour bill on the 171 farms involved. Employing this figure, a charge of 4/6d per £1 man labour is arrived at.

Group 2.

<u>Item.</u>	<u>Total Cost.</u>	<u>Overheads Percentage.</u>	<u>Overheads Cost.</u>
Implement Repairs	£31,483	68.0	£21,408
Depreciation	23,051	52.0	11,987
	<u>£54,534</u>		<u>£33,395</u>

The allocation of this portion of the overhead costs presents some difficulty. It cannot be allocated on any basis other than the number of hours the implements are used. No record of this is available, but it is believed that the number/

number of hours of horse and tractor work undertaken will be some measure of the hours during which equipment is employed. This again gives rise to a further difficulty. A tractor, working at a higher pace than horses, will give rise to a greater degree of wear and tear than will horses. Hence, the number of hours of work involved will have to be adjusted for the use of the tractor. An examination of the available cost accounts suggests that, averaging all farm work, a tractor works three times as fast as horses. In view of the universality of the horse, it seems desirable to convert tractor hours into horse hours by multiplying the former by three.

The total charge of £33,395 has to be allocated to all crops on the basis of the number of hours of horse and tractor labour involved. The following figures for hours has been obtained from enterprise cost records.

	<u>Hours per acre.</u>		
	<u>Horse.</u>	<u>Tractor.</u>	<u>Composite.</u>
Grass	1	$\frac{1}{2}$	$2\frac{1}{2}$
Cereals	$7\frac{1}{2}$	$6\frac{1}{2}$	27
Roots	51	$11\frac{1}{2}$	$85\frac{1}{2}$
Potatoes	$25\frac{1}{2}$	$15\frac{1}{2}$	72

Employing these hour requirements, and by reference to the total cost - £33,395 - and total cropping, a charge of $7\frac{1}{2}$ pence per composite hour is arrived at.

Group 3.

<u>Item.</u>	<u>Total Cost.</u>	<u>Overheads Percentage.</u>	<u>Overheads Cost.</u>
Repairs to Buildings	£12,658	100.0	£12,658
Rates	1,298	100.0	1,298
	<u>£13,956</u>		<u>£13,956</u>

This/

This charge of £13,956 may be allocated over the farm on an acreage basis or by reference to the rent. If an acreage basis be used, then a flat rate per acre is obtained which does not take into account the varying conditions of land and buildings. A rental basis will go some way towards correcting this error, since rent does in some measure reflect the condition and adequacy of the buildings on the farm. For this reason a rental basis is to be preferred. By dividing the above cost by the corresponding rent, a figure of 7/6d per £1 rent is obtained.

Summary.

Summarising the foregoing, the following charges for overhead costs have to be made.

1. Per £1 man labour = 4/6d.
2. Per hour horse/tractor labour = 7½ pence.
3. Per £1 rent = 7/6d.

The first group, allocated on a man labour basis, is applicable to all enterprise costs, whether crops, livestock, or livestock products. The second and third are applicable to crops only.

A Sub-Committee appointed by the Conference of Scottish Agricultural Economists, and of which the author of this Report is a member, has, between October 1945 and April 1946, considered the problem of overhead costs. In order to obtain a figure applicable to all Scotland, certain adjustments of the above charges were agreed to on behalf of the North of Scotland College Economics Department. The adjustments agreed to are as follows:-

1. 65% of implement repairs instead of 68%
2. 55% depreciation of equipment instead of 52%
3. 5% of fuel, light and power instead of 2.5%
4. The Sub-Committee when calculating the horse/tractor hours, reduced the horse hours by 3, leaving the tractor hours unchanged. In the North-East the practice is to increase/

increase the tractor hours by 3, leaving the horse hours unchanged. The final result is the same by both methods but in the North-East the horse/tractor hours will be three times as great, and the charges per hour one third of the agreed figure.

5. The charges are calculated on figures for all Scottish farmers whose accounts are examined by the three Colleges.

6. The third group of overhead costs has been calculated on an acreage basis, and not on a rental basis as employed in the North-East.

As a result of these compromises, the agreed rates for Scotland as a whole become:-

1. 4/11d per £1 of man labour.
2. 1/11d per hour of tractor/horse labour
3. 6/8d per acre.