JULY 1960 ECONOMIC REPORT No. 63

REPORT ON GRAIN DRYING

1959 HARVEST

by

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DEPARTMENT OF ECONOMICS

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Piece-Work Potato Gathering
Hill Farming During the Post-War Period
Some Notes on Reseeding Old Grassland on Hill and Upland Farms, 1955-57
Diesel Tractor Costs and Performance in the East of Scotland, 1956-57
Some Notes on Grain Drying - 1957 Harvest
Report on Grain Drying - 1958 Harvest
Organisation of Hill and Upland Farming in Selkirkshire
Economic Aspects of Tractor Work, 1957-58

Copies of these publications may be obtained on request to the Secretary of the College or the Advisory Economist.

FOREWORD

This report continues the study of the economics of drying and storing grain on the farm. Under the variable weather conditions usually associated with the harvest period in the east of Scotland and the continued expansion in the use of the combine harvester to handle the grain in the field, more and more importance must be attached to the complementary process of drying the grain. This must be done; the question is who should do it. From the farmer's point of view the answer involves the alternatives of investing in a type of dryer which will best fit in with his requirements or the immediate sale of his combined grain. The farm requirements he needs to consider are the quantity of grain he is likely to have needing drying, whether he needs to store for any length of time and to what extent his existing buildings would need adapting to incorporate a dryer and, possibly, storage facilities. There is also the problem as to where the financial gain is likely to lie - home drying and storage as compared with sale off the combine.

The drying situation was complicated in 1959 when the records summarised in this report were collected. Harvest conditions were exceptionally good and the need for drying was reduced to a minimum. Such conditions do not, however, really affect the situation unless they can be regarded as normal, which is highly unlikely. One of the farmer's biggest investment problems is that he must be equipped to meet peak requirements and this must apply with particular force to having adequate drying and storage facilities.

Although it is not possible to come to any final conclusions on this subject, the information in this report should be of use to those operating drying and storage plant and, in particular, to those who may be contemplating investing in such equipment.

J. D. NUTT.

Advisory Economist.

C O N T E N T S

REPORT ON GRAIN DRYING - 1959 HARVEST

I. INTRODUCTION

This report deals with the third year of an investigation into the economics of grain drying and storage on the farm. The subjects of this study were 14 plants in the East of Scotland area, from which full records were obtained of the quantities of grains dried, the amount of moisture extracted, the fuel consumed and the hours spent on supervision. Due to the small number of varied plants in the sample the results are mainly dealt with on an individual basis.

The four main drying systems used on the farms were as follows :-

a) Ventilated Bin Driers (4 cases)
b) Batch Driers (5 cases)
c) Continuous Driers (4 cases)
d) Platform or In-sack Drier (1 case)

The purpose of this investigation is to determine the general run of costs incurred with the different systems and to examine the conditions under which these are likely to pay. It is relevant also as a study of some of the main points which farmers should bear in mind when considering what type of plant, if any, they should install.

II. DESCRIPTION OF THE PLANTS

A general description of the distinctive features of the four main drying systems is given below :

a) Ventilated Bin Driers : This method consists of ventilated bins for the drying and storing of grain in bulk with either porous floors or with radial flow ducts for circulating the air throughout the grain. It is therefore most suitable on farms where grain has to be stored for fairly lengthy periods and there is no alternative accommodation. It requires a minimum of attention and fits in particularly well where grain from the harvest field, or for consumption on the farm, is to be handled in bulk. While the drying process tends to be slow, this seldom interferes with harvesting operations since there is normally sufficient ventilated storage space for most of the crop. Where there is a danger of deterioration of the grain, it is possible to speed up the rate of drying by using one or two of the bins - especially of the radial flow type - to dry the grain in smaller batches. As a general rule these plants are not suitable for contract work since it is not easy to deal with the grain in small separate lots.

b) Batch Driers : This group consists of bins or trays in which the grain is dried loose, but in relatively small quantities. Some types of batch driers are modifications of the ventilated bin system, the main differences being in the operation of the plant and in the faster drying rates. The drying bins provide only limited storage space once drying is completed so that the grain has to be removed to separate storage accommodation.

Other batch driers take the form of a specialised drying unit, the operation of which is more similar to that of a continuous drier. With this type it is essential to ensure that the daily output capacity is adequate to match the rate at which grain is received from the harvest field. Temporary storage facilities for the wet grain either in sacks or in bulk in the receiving pit are normally used to permit overnight drying so that a smaller capacity drier will suffice. With fully automatic conveying and self emptying drying bins, only infrequent attention is generally required to test and change the grain in the driers. This makes them reasonably convenient for overnight drying since /

since it is usually quite safe to leave the driers running unattended for fairly long periods.

Batch drying fits in particularly well where grain is to be sold immediately after drying, or where existing facilities are available for the storage of grain in bulk. Since the grain is dried in relatively small lots this system is also suitable for the farmer who wishes to carry out a limited amount of contract drying.

c) Continuous Driers : This process consists of a specialised drying plant for blowing air through a continuous flow of grain. Fairly high temperatures may be used which makes them capable of dealing with large quantities of grain during the season. This makes them most suitable for the larger grower, or for the farmer wishing to undertake contract drying on an extensive scale. In most respects they are very similar in operation to the batch driers except that constant attention is generally required while drying is in progress which makes them less convenient for overnight drying.

d) Platform Drier : This simple type of drier consists of a platform with holes through which heated air is blown, the grain being dried in sacks laid over the holes. It is primarily intended for the smaller grower using a bagger type combine. The operation of the plant tends to be slow and laborious because of the time required to load and unload the sacks on the platform. This would be a considerable drawback for the larger grower. Constant attention is not normally required while drying, however, which is an advantage on the smaller farm with only a few workers. This also makes it reasonably convenient for overnight drying.

III. CAPITAL COSTS OF DRYING AND STORAGE

Details of the capital costs of the 14 plants are shown in Table I. The figures in this table bring out clearly the high capital cost of equipment for drying and storing grain on the farm. Comparing the different systems, the platform drier (No. 7) is seen to have by far the lowest capital cost. This plant was housed in a shed of relatively cheap materials which was made as an extension to an existing building - the drier itself being simple in construction was inexpensive. Furthermore there was no capital charge for storage since existing facilities were available for storing the grain in bulk or in sacks. Since the loading of the sacks onto the drier was by hand there was no need for an intake hopper, elevator and conveyor. For moving the grain to bulk storage an elevator and portable auger conveyor only were used so that this item of capital expenditure was very small. This type of drier is obviously an attractive one for the smaller or tenant farmer who may wish to avoid heavy capital investment in fixed equipment.

Turning to the capital costs of the other three systems Table I shows the wide variations in building costs from plant to plant. Examination of these, however, does not bring out any clear differences between the three systems. This was because in every case use was made of an existing building for which no charge was made. The variations in building costs, in fact, resulted mainly from differences in the extent to which structural alterations were required. Two of the plants (3 and 17) required to make extensions onto existing buildings. In the case of plant No. 3 this was in the shape of an open sided barn constructed of corrugated iron sheeting. The other was made of concrete blocks with asbestos roofing. In both cases costs were comparatively moderate due to the relatively cheap materials used and to the fact that they were of a type which were fairly easily handled by the farm staff who undertook most of the construction work. Where substantial alterations were made to the original buildings, costs were often heavier than for the new extensions. On some other plants, however, virtually the same accommodation was provided at little or no expense.

TABLE I. /

TABLE I. CAPITAL COSTS OF DRYING AND STORING

	Ventilated Bin Driers				Batch Driers					Continuous Driers				Platform Drier
Plant Code No.	4	11	13	18	1	2	3	5	6	10	12	15	17	
Capital Costs	£ £	£ £	£ £	£ £	£ £	£ £	£ £	£ £	£ £	£ £	£ £	£ £	£ £	£ £
Building –														
New Building	–	–	–	–	–	–	546	–	–	–	–	–	–	
Structural Alteration	500	341	272	173	1700	1604	260	170	1200	200	–	1000	990	40
TOTAL BUILDING	500	341	272	173	1700	1604	806	170	1200	200	–	1000	990	40
Plant –														
Drier or Vent. Bins	1500*	1423	4682	1536*	845	2185*	639	1340*	676	1072	996*	2300*	1800*	227*
Conveyors, Cleaners etc.	2000*				1955*		480		1180	1443	1536*	2500*	1850*	475*
Storage Bins	–	646	197	–			505	–	–	836	589*	550*	860*	–
Installation etc.	–	78	493	–	–	–	740	–	431	385	–	–	–	–
TOTAL PLANT	3500	2147	5372	1536	2800	2185	2364	1340	2287	3736	3121	5350	4510	702
TOTAL CAPITAL COSTS	4000	2488	5644	1709	4500	3789	3170	1510	3487	3936	3121	6350	5500	742
Total Quantity of Grain Dried (Tons) 1959	470	130½	283½	236	235	201	187	165	178	256	173½	796	343	38½
Capital Cost per Ton 1959 (Excl. Buildings)	£7.4	£16.5	£18.9	£6.5	£11.9	£10.9	£12.6	£8.1	£12.8	£14.6	£18.0	£6.7	£13.1	£18.2
Total Quantity of Grain Dried (Tons) 1958	400	140.5	295	N/A	264.5	14.9	204.5	170	343	408	352	1651	N/A	114.5
Capital Cost per Ton 1958 (Excl. Buildings)	£8.8	£15.3	£18.2	N/A	£10.6	£14.7	£11.6	£7.9	£6.7	£9.7	£8.9	£3.2	N/A	6.5

* Including Installation.
N/A = Not Available.

As it would appear that no specialised type of building was required to house the grain drying and storage plants other than that they should be of sufficient size to provide a reasonably compact layout, it may not be unreasonable to suppose that building costs are likely to be much the same on any particular farm, no matter which of these three systems was installed.

The cost of the actual plants and subsidiaries was generally much higher than the building cost, variations within each group arising mainly from differences in the drying and storage capacity required. Again, however, some of the plants were provided more cheaply than others by skilful use of existing facilities. For instance, plants Nos. 5 and 6 showed considerable economy for re-flooring lofts to provide bulk storage for the grain, and so dispensing with the need for bin storage.

Several of the batch and continuous driers also scored by putting through more than their storage capacity- especially plants Nos. 15 . 17 and to a lesser extent number 3 where substantial quantities of grain were dried on contract. Two of the plants (13 and 15) also increased their throughputs by buying in cheap grain at harvest time. This practice has much to commend it particularly where cheap grains are required for consumption on the farm and it is thereby possible to increase the production of more profitable crops (e.g. malting barley).

The importance of throughput as a factor affecting the economy of all of these plants is apparent from the figures at the foot of the table. In the dry weather of last year's harvest, throughputs were in many cases very much reduced so that capital costs per ton were much higher than for the 1958 crop - an exceptionally wet harvest. In view of the high capital costs involved it is of the utmost importance that the plants should be kept as fully employed as possible, and in a dry year the farmer might be well advised to consider any opportunity which presents itself of extending the working period of his plant.

Because of these and other variations such as in the materials used and in the extent to which use was made of farm as opposed to contract labour, it is difficult to assess the relative economies of the different systems.

More detailed analysis of the available data has shown that ventilated storage, together with the drying equipment, entailed a capital outlay of somewhere about £6 per ton capacity in most cases. The cost of providing storage in ordinary bins worked out at about £2:17:6d. per ton stored, individual costs ranged from £2 to £3:14s. per ton.

This information makes it possible to estimate whether the ventilated bin-cum-storage method is likely to require more or less capital outlay for drying and storing a given quantity of grain as compared with other methods where storage facilities are distinct from the drying equipment. So long as the separate cost of storage (at say £2:17:6d. per ton for bin storage) plus the capital required for drying per ton is less than the inclusive cost of £6 per ton in the case of the ventilated bin method, then it would be less costly to install the type with the drier and separate storage. The process of estimation then becomes as follows :-

$$\frac{C}{Q} = C.p.t.$$

where C = Capital cost of drying equipment

Q = Probable quantity of grain to be dried and stored

C.p.t. = Cost of drying equipment per ton handled.

If c.p.t. + £2:17:6d. is greater than £6 the ventilated bin method would be cheaper to install in the given circumstances and vice versa. This /

This method of estimation could be based on any known cost of providing storage facilities and could thus be applied to the circumstances of particular farms. For instance where storage in bulk was provided more cheaply at a cost of about £1 per ton as in the case of plant No. 6 the cost of the drying equipment alone would only have to be something less than £5 per ton. Since the capital cost of the drier was in fact £676 this drier with bulk storage would be more economical for drying and storing more than $\frac{676}{5}$ = 135 tons of grain compared with the ventilated bin method. If on the other hand, bin storage had had to be provided at £2:17:6d. per ton the plant would then only be justified for drying and storing more than $\frac{676}{3.125}$ = 217 tons.

The assumption made in this comparison is that the output capacity of the drier in question would be sufficient - though not more than necessary - to cope with the minimum quantities mentioned above. In view of the fact that this drier put through over 340 tons of grain in 1958 the assumption for the larger amount would appear to be justified. For the smaller throughput of 135 tons it is possible that a lower capacity drier might have been sufficient and would, therefore, further reduce the costs of drying and storing by this method under the prescribed circumstances.

One suggestion emerging from this analysis is that the ventilated bin method is likely to be an expensive way of drying grain which is not to be stored or could be stored more cheaply by the use of existing facilities or by the provision of cheaper separate storage. Under such circumstances a batch or continuous drier without bin storage would entail much less capital expenditure. Where more expensive bin storage (costing upwards of £2:17:6d. per ton) has to be provided, the ventilated bin method, as in the example given, might prove cheaper for the small or medium grower drying and storing up to about 200 tons in the season. There remains the possibility, however, that the availability of a cheaper low capacity drier might once again swing the balance in favour of this method with separate bin storage.

Particular cases obviously require individual assessment so that no general conclusion is possible from these figures. They may, however, serve as a basis on which decisions might be taken as to the relative merits of the different systems on particular farms. Thus the comparison of capital costs as between any types of drying and storage facilities must take into account the expected quantity of grain to be dried in a season, and the capacity and cost of drier which would be required; the disposal of the grain would also come into the picture in order to determine the extent to which storage facilities would be required. The choice might then be made by applying the standard capital costs of the equipment and installation required for both drying and storage by the different methods. The costs of other ancillary equipment - cleaners, intake hoppers, conveyors - would in many cases, be more or less equal no matter what system is used, though in some cases the cost of conveyors associated with separate storage should be added to the cost of providing the storage.

The high total cost of the continuous driers generally precludes their use on the smaller farm. A batch drier would not only be cheaper but would also be more convenient for the smaller farm with limited staff since constant attention is not required while drying.

Other Equipment

Apart from the drying and storage equipment most of the plants included a grain cleaner, an intake hopper as well as conveyors, elevators and electrical power units for moving the grain. With the exception of the platform drier (No. 7) an intake hopper, a conveyor and/or elevator was required to carry the grain to the drying plants as well as conveyors to take the grain to the storage accommodation where provided separately. In several cases extensive conveying equipment was also necessary to take the grain to other processing plant so that this item of cost often represented /

represented the bulk of the capital outlay. The convenience and value of fully automatic conveying to ensure the smooth operation of large and small plants alike is indisputed but care should be taken not to be over-elaborate. The cost of this equipment may also be seriously affected by the layout and particularly by the relative positions of the various places to which the grain has to be taken. the planning of individual layouts requires the greatest possible consideration in order to avoid bottlenecks and at the same time to keep the cost of this expensive equipment to a minimum.

IV. ANNUAL OPERATING COSTS

The annual operating costs of the 14 plants are shown in Table II.

Fixed Costs

The high cost of capital equipment necessary to set up drying and storage facilities has been noted in the foregoing section. As a result the depreciation charges for the plant and buildings, written off over periods of 10 and 15 years respectively were by far the largest items of cost; together they represented from 58 to 91 per cent of the total annual cost. As far as the economics of grain drying is concerned the over-riding consideration must be to ensure that the capital invested is not out of proportion to the quantity of grain which has to be dried or stored in a normal year. The fact that this element of cost varied from 14s. to 39s.2d. per ton dried suggests that not all of the plants could have been operated at the optimum throughput. The ways in which some farmers were more successful than others in achieving low costs even with the same type of plant have already been discussed in the previous section.

Running Costs

Fuel was the most important item of running cost accounting in all for 6 to 25 per cent of the total expenditure, the costs varying mainly with the extent of drying required. Electricity was used on all of the plants for cleaning, conveying and ventilating the grain. Four of the plants also used electricity for drying, the others using diesel oil. The figures at the foot of the table show the fuel economy of the plants as represented by the drying cost per ton of water extracted. No general conclusion can be drawn from these figures due to the variation in costs between similar plants using the same type of fuel. Variations such as in the condition of the grain, the temperatures employed, the humidity of the air as well as in the general management of the plant seem to affect the fuel economy as much as differences in the method of drying or type of fuel used. Since electricity was only used for drying in the ventilated bins and one of the larger capacity batch driers this would suggest that it is only economical for drying grain in bulk at low temperatures.

Labour was generally a small item of cost, especially for drying grain in the ventilated bins and in the larger capacity batch driers (Nos. 1 and 2), since only infrequent attention was necessary to test and change the grain in the drying bins. The cost was somewhat higher for the continuous driers since these required constant attention while in operation. The platform drier incurred a still higher cost because of the time taken to load and unload the sacks on the platform.

Few, if any, repairs were required on most of the plants although slightly heavier charges were incurred by the continuous driers.

Sack /

TABLE II. INDIVIDUAL COSTS

	Ventilated Bin Driers					
Plant Code No.	4	11	13	18	1	2
	Cost per Ton %	Cost per Ton %	Cost per Ton %	Cost per Ton %	Cost per Ton %	Cost per Ton %
Fixed Costs (Depreciation) -	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Building (15 years)	1: 5 7	3: 6 9	1: 3 2½	1: - 5	9: 7 25	10: 9 27
Plant (10 years)	14:11 76	33: - 82	37:11 82	13: - 64	23:10 63	21: 6 54
TOTAL FIXED COST	16: 4 83	36: 6 91	39: 2 84½	14: - 69	33: 5 88	32: 3 81
Running Costs -						
Electricity	2: 8 14	2: 4½ 6	2: 5 5	5: 5 27	3:11 10	2: 6 6
Diesel	-: - -	-: - -	1: 1 2½	-: - -	-: - -	3: 9 10
Labour	-: 7 3	1: 2 3	3: 8 8	-: 8 3	-: 6½ 2	1: 2½ 3
Repairs	-: - -	-: - -	-: - -	-: 2 1	-: - -	-: - -
Sack Hire	-: - -	-: - -	-: - -	-: - -	-: - -	-: - -
TOTAL RUNNING COST	3: 3 17	3: 6½ 9	7: 2 15½	6: 3 31	4: 5½ 12	7: 5½ 19
T O T A L C O S T	19: 7 100	40: -½ 100	46: 4 100	20: 3 100	37:10½ 100	39: 8½ 100
Fuel used for drying	Elect.	Elect.	Diesel	Elect.	Elect.	Diesel
Fuel cost (drying only) per ton of water extracted	N/A	£3:2s.	£1:6s.	£4:12s.	£3:12s.	£2: 4s.

N/A = NOT AVAILABLE since heater

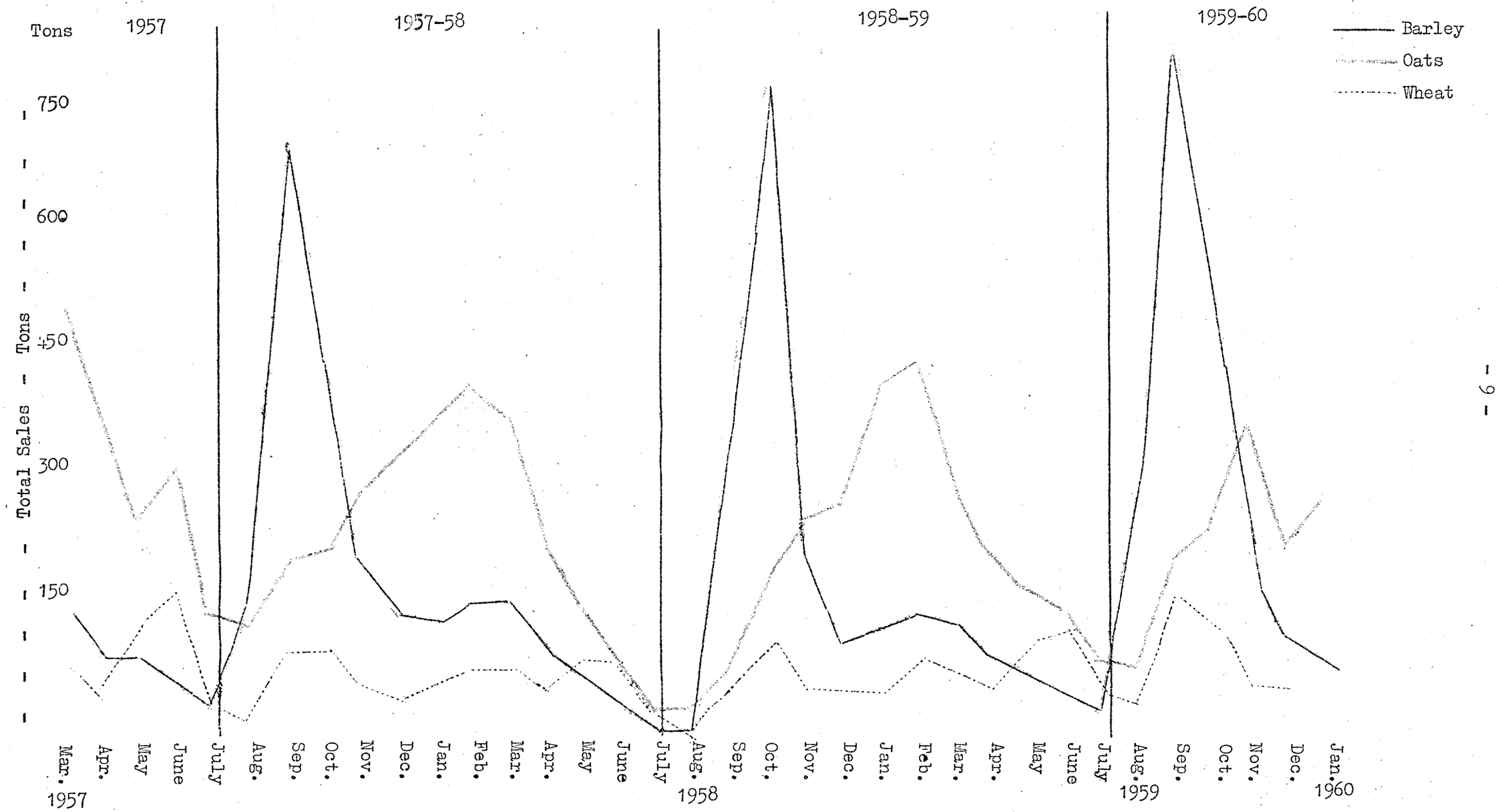
OF DRYING AND STORING

Batch Driers			Continuous Driers				Platform Drier
3	5	6	10	12	15	17	7
Cost per Ton %	Cost per Ton %	Cost per Ton %	Cost per Ton %	Cost per Ton %	Cost per Ton %	Cost per Ton %	Cost per Ton %
s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
8:10½ 21	1: 4 5	9: - 21	1: - 3	-: - -	1: 8 6	3:10 10	1: 7 3
25: 2½ 60	16: 4 61	24: 6 58	29: 3 75	35:11½ 86	13: 5 52	26: 4 71	36: 4 65
34: 1 81	17: 8 66	33: 6 79	30: 3 78	35:11½ 86	15: 1 58	30: 2 81	37:11 68
-:10 2	1:10 7	2: 2 5	-: 6 1	-: 3½ 1	1: 2 4	1: 1 3	2: 1 4
3: 6 8	4: 9 18	4: 4 10	1:10 5	3: - 7	3:10 15	2: 4 6	6: 9 12
3: 6 8	2: 4 9	2: 7 6	4: 3 11	1: 9 4½	4: 2 16	3: 9 10	5: 2 9
-: 3 1	-: - -	-: - -	1:11 5	-: 7 1½	1: 9 7	-: - -	-: - -
-: - -	-: - -	-: - -	-: - -	-: - -	-: - -	-: - -	3:11 7
8: 1 19	8:11 34	9: 1 21	8: 6 22	5: 7½ 14	10:11 42	7: 2 19	17:11 32
42: 2 100	26: 7 100	42: 7 100	38: 9 100	41: 7 100	26: - 100	37: 4 100	55:10 100
Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
£2:16s.	£4:18s.	£4:6s.	£3:18s.	£3:4s.	£2:14s.	£1:14s.	£3:8s.

was on for only a very short time.

CHART I. SEASONAL GRAIN SUPPLIES - Ex. FARM SALES AT 23 TOWNS IN SCOTLAND

(Weekly Market Returns - D.A.F.S.)



Sack hire charges were fairly high for the platform drier (No. 7) where some of the grain had to be stored in sacks. The cost of storing grain in hired sacks at 1d. per week per 2 cwt. sack over varying periods is as follows :-

TABLE III. SACK HIRE CHARGES PER TON OVER VARYING PERIODS

	Per Ton
	s. d.
1 week	-:10
6 weeks	5: -
13 weeks	10:10
26 weeks	21: 8

By comparison bin storage at an average capital cost of £2:17:7d. per ton - or 5s.9d. per ton per annum spreading the cost over 10 years - was much less except for relatively short periods of under 7 weeks.

V. RETURNS FROM DRYING AND STORING GRAIN

The object of this section is to show, as far as possible, the real gains from drying and storing grain on the farm and to establish whether these are sufficient to cover the costs incurred, and give a satisfactory return on capital invested. With the increase in the use of combine harvesters, supplies of grain at harvest time have tended to flood the market and depress prices. The extent of these short term fluctuations in the supply of grains sold in Scotland since March 1957 is shown in Chart I.

This chart shows that most of the barley and a fair proportion of the wheat on farms in Scotland was sold within the harvest period September to November. Oat supplies, on the other hand, were not concentrated at harvest time presumably because most of the oat crop is still harvested by binder. It might be expected, therefore, that only barley, and to a lesser extent wheat prices, would be depressed at harvest time.

Chart II shows the variations in the market prices of grain sold in Scotland since August 1956. The prices are net after making appropriate moisture and drying deductions. The extent of the seasonal fluctuations, therefore, is a measure of the incentive to the farmer both to dry his own grain and to hold it till later in the season.

The chart shows the seasonal increase in the prices of grains sold later in the season. The extent of this increase is, however, also influenced by other factors which affect the general trend of grain prices. For instance in 1956-57 there was a tendency for grain prices to decline, presumably as a result of external pressure on the market, so that the margin between harvest and peak prices was reduced and later in the season prices fell below the harvest level. In the following year, however, there was a general improvement in grain prices which tended to further enhance the margins between harvest and peak prices.

In order to show the extent of the real incentive to hold grain it is necessary to allow for the deficiency payments on wheat sold but not for the acreage deficiency payments on barley and oats. For wheat, the basic standard price fixed for the country as a whole is converted to a rising scale of prices giving an incentive to store till later in the season. This /

CHART II. GRAIN MARKET PRICES - MONTHLY AVERAGE - Ex. FARM PRICES AT 23 TOWNS IN SCOTLAND

(Weekly Market Returns - D.A.F.S.)

This arrangement, in force for the three years under review provided a standard differential amounting to 5s. per cwt. For Scotland, however, the overall realisation prices, i.e. market prices plus appropriate deficiency payments did not result in the full differential of 5s. per cwt. There was nevertheless some incentive to hold wheat and the extent of this is shown in the chart and in the following table covering the last three years. In the case of both barley and oats the deficiency payment is not related to any seasonal pattern and the market prices will, therefore, indicate the extent of the inducement to dry and store these grains until later in the season. These prices are also shown in Table IV.

TABLE IV. DIFFERENCE BETWEEN AVERAGE HARVEST AND PEAK PRICES

Year	WHEAT	BARLEY	OATS
	Per Cwt.	Per Cwt.	Per Cwt.
	s. d.	s. d.	s. d.
1956-57	3:10	3: 9	1: 3
1957-58	3: 6	4: 3	5: -
1958-59	2: 6	3:11	2: -
Three-Year Average	3: 3	4: -	2: 9

Harvest Prices relate to the average for the 3 months September-November.

Peak Prices relate to the average for the 3 consecutive months which gave the highest prices.

The figures in this table give a rough indication of the increases in the prices of grains which might reasonably be expected from drying and storing grain on the farm. The lower margin for oats (except in 1957-58 when there was the general recovery in prices) was probably due to the fact that supplies did not flood the market at harvest time as with the other grains. The average margin of 2s.9d. per cwt. is, therefore, likely to be a measure of the premium on dried grain as opposed to that which is sold straight from the combine at harvest time. For wheat and barley, however, there is an additional advantage in holding the grain till later in the season so that storage facilities are essential if the full differentials shown in the table are to be obtained.

For the farmer who requires grain for consumption on the farm, the alternative to drying and storing would be to sell his grain at harvest time and buy in later in the year. The figures in Table IV would, to some extent, represent the difference between the price received for the grain sold at harvest time and the price of grain bought in later in the year. The differential would tend to be somewhat greater, however, since the buying price would in all probability be higher than the ex-farm prices shown in Chart II.

The following table shows the probable increase in revenue from drying and storing based on the throughputs of home-grown grain for each individual plant. The average increase in returns is based on the three-yearly figures considered in Table IV.

On all the farms the returns from drying and storing their grain were sufficiently high to cover costs and in most cases give an adequate return on the capital invested. The returns were considerably enhanced by the fact that barley and wheat accounted for the bulk of the grain, and it is evident that the returns would have been much less for drying and storing oats alone.

TABLE V. /

TABLE V. ESTIMATED RETURNS FROM DRYING AND STORING GRAIN ON THE FARM

Plant Code No.	Grain Throughputs				Possible Increase in Returns from Drying and Storing	Total Cost* of Drying and Storing	Net Returns	Net Return as Per Cent of Capital Invested
	Barley	Oats	Wheat	Bought In				
Ventilated Bins	Tons	Tons	Tons	Tons	£	£	£	%
4	400	70	-	-	1792	460	1332	33.3
11	98.7	-	31.7	-	498	261	237	9.5
13	95	27	85	76.5	1039	657	382	6.8
18	183	28	25	-	890	239	651	38.1
Batch Driers								
1	150	40	35	-	824	443	381	8.5
2	81	85	35	-	662	399	263	6.9
3	129.7	15.5	18.3	-	621	384	237	7.5
5	134	30	-	-	619	218	401	26.6
6	148	30	-	-	675	379	296	8.5
Platform Drier								
7	14.7	7.5	16.25	-	132	107	25	3.4
Continuous Driers								
10	87	-	169	-	897	496	401	10.2
12	133.5	40	-	-	644	361	283	9.0
15	242	-	120	22	1446	498+	948	14.9

* Total Costs = Running costs per ton plus total overheads charged against home grown grain, i.e. the spread of overheads by taking contract drying is excluded.

\+ Includes a deduction in the capital cost for contract drying.

Where the output capacity of a plant is greater than the quantity of grain produced on the farm additional revenue may be obtained by drying grain on contract. The results for four plants which dried grain on contract are shown in the following table.

TABLE VI. RETURNS FROM CONTRACT DRYING

Plant Code No.	Throughput (Tons)	Revenue from Contract Drying	Cost of Contract Drying	Net Margin Over Costs
Batch Driers		£	£	£
1	10	20	2	18
3	23.7	38	10	28
Continuous Driers				
15	412	621	534*	87
17	343	733	640+	93

* Includes a proportion of the capital cost.

\+ Includes total capital costs.

Since /

Since the two batch driers were set up primarily to dry and store the farmers' own grain, no capital charge has been made for contract drying - the net margin being the difference between the revenue received and the running cost of the contract drying. Appropriate capital charges were made, however, in the case of the continuous driers since their capacity was clearly greater than would be required for the grain produced on the farm. In fact, since none of the home-grown grain was dried by plant No. 17 last year, the total cost was set against the contract grain.

Compared with the potential increase in returns from drying and storing the farmer's own grain, contract drying charged at about £1:10s. to £2 per ton gives only a small return. Thus for plant No. 17 the net return as a percentage of capital invested at 1.7 per cent was considerably less than for all of the other plants drying their own grain. Contract drying can, however, add considerably to the value of a plant by providing additional revenue when otherwise the plant would be lying idle.

VI. NUMBER OF YEARS TO COVER THE CAPITAL INVESTED

For many farmers who may be short of capital for investment in other ways the real cost of tying up the large sums of capital required to set up drying and storage plants may be unduly high. The following table shows the number of years the farmers will have to wait in order to recover their initial capital investment.

TABLE VII. NUMBER OF YEARS REQUIRED TO COVER THE CAPITAL INVESTED

Plant Code No.	(1)* Total Returns	(2) Running Cost of Drying	(3) Margin to Cover Capital Costs Col.(1)-Col.(2)	(4) Total Capital Invested	(5) Number of Years to Cover Capital Invested Col.(4)÷Col.(3)
Ventilated Bins	£	£	£	£	Years
4	1792	77	1715	4000	2.3
11	498	23	475	2488	5.2
13	1039	102	937	5644	6.0
18	890	74	816	1709	2.1
Batch Driers					
1	844	52	792	4500	5.7
2	662	75	587	3789	6.5
3	659	75	584	3170	5.4
5	619	73	546	1510	2.8
6	675	81	594	3487	5.9
Platform Drier					
7	132	34	98	742	7.6
Continuous Driers					
10	897	109	788	3936	5.0
12	644	49	595	3121	5.2
15	2067	430	1637	6350	3.9
17	733	123	610	5500	9.0

* Estimated increase accruing from higher prices plus income from contract drying.

The figures in this table suggest that the possible increase in returns from drying and storing, together with the additional revenue from contract /

contract drying, would provide a margin large enough to meet the whole of the capital outlay within a reasonable number of years. The year 1959 was a dry one with, in most cases, lower net returns than in the previous year so that the expectation of the recovery of capital in two to nine years at the most would seem to be quite satisfactory. In view of the fact that there is no evidence of any easing of the pressure on the market at harvest time - especially for barley - there is every likelihood that the present differentials between harvest and peak prices will remain. In that case the prospective margins over costs would seem an adequate incentive to farmers to install their own grain drying and storage plants.

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