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Swine Cost of production

JULY, 1963

REPORT No. 142

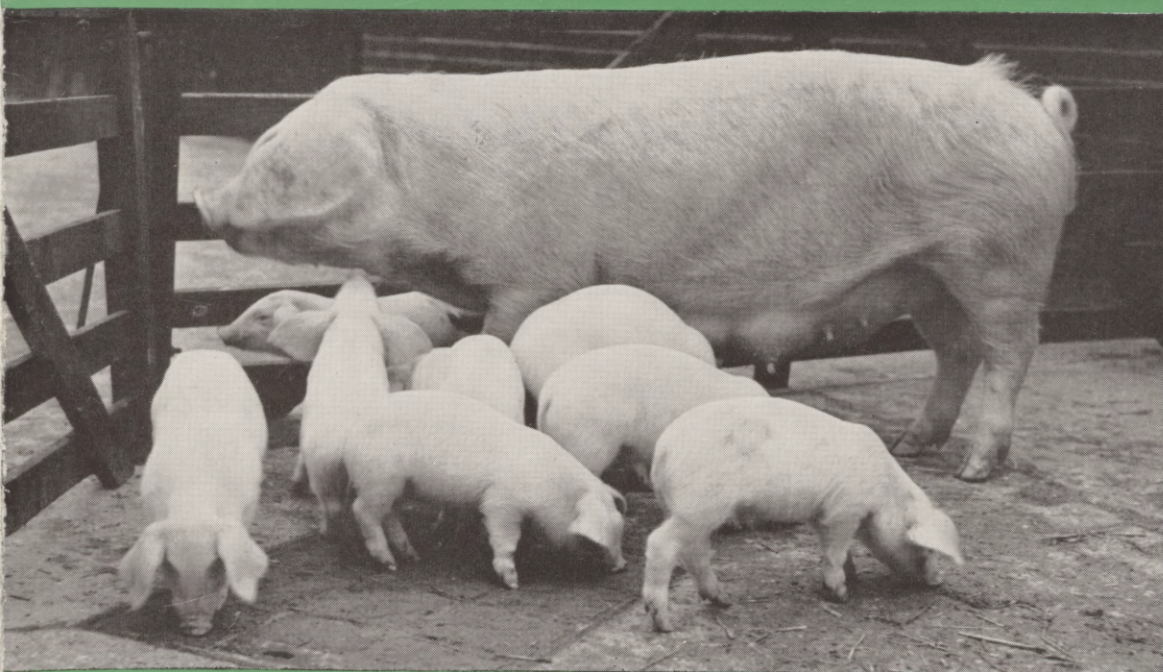
UNIVERSITY OF EXETER

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WEANER PIG PRODUCTION

Systems of Management and Farrowing

by

G. A. LONGBOTTOM

1 COURTENAY PARK
NEWTON ABBOT,
DEVON

PRICE THREE SHILLINGS

WEANER PIG PRODUCTION

The Results of Different Systems
of Management and
Quality of Farrowing Accommodation

by

G. A. LONGBOTTOM.

This report formed part of a thesis presented in fulfilment of the requirements for the degree of Master of Arts in Economics (Agricultural Economics) to the University of Bristol. Those parts of general interest have been extracted and the material re-arranged by Mr. D. Juckes, Exeter University. It is hoped that the sense of the original arguments has not been lost.

Funds for the study were provided by the Pig Industry Development Authority and assistance by officers of the Authority. This help is gratefully acknowledged, as is the help of those University Departments of Agricultural Economics who provided data. Also many farmers who were visited in the course of the work extended help and hospitality.

S. T. Morris.

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INTRODUCTION

There are very many ways of keeping pigs. Highly successful examples of almost every way can be found. On the other hand equally unsuccessful examples of them can also be found. Sometimes a farmer can be seen to be using the most developed techniques and yet be making a very poor return. The only thing that can be said is that if he were not using them his position would be even worse. He has been forced into using them to avoid heavy loss because there is something fundamentally wrong with his enterprise. Often a pig enterprise has been started because it will fit in well with the rest of the farm. For instance it may use some spare labour or spare buildings or the pigs may be fed on some waste produce. This then proves profitable and the pig enterprise is increased until it contributes a major part of the farm income. But the enterprise is still being run in the same way as when it was only a sideline. A careful look at it may suggest ways in which it now can and should be changed to improve efficiency.

Among many variable costs in producing fat pigs that of the weaners is of some importance. If the margin per pig sold is only £1 a variation in the cost of producing the weaner from £4 to £5 means the difference between a margin and no margin. And the variation in costs of weaners is often much greater than this.

This report shows how different methods and different standards may affect these costs. It is in no way a comprehensive account of how to keep pigs. It is hoped, however, that there may be some points in it which will interest pig keepers and particularly those who are wondering which system to follow.

I.
**HOW SHOULD IN-PIG SOWS, FARROWING SOWS, AND
 SOWS WITH LITTERS BE KEPT ? INDOORS, OUTDOORS
 OR BOTH ?**

While in general fattening pigs are kept indoors sows and their litters may be kept either indoors or outdoors. Three phases can be distinguished, in-pig, farrowing and rearing up to weaning. In practice only five combinations are commonly found. These are as follows :—

TABLE 1 **SYSTEMS OF MANAGEMENT FOUND**

	1.	2.	3.	4.	5.
In-pig	Indoor	Indoor winter Outdoor summer	Outdoor	Outdoor	Outdoor
Farrowing	Indoor	Indoor	Indoor	Indoor	Outdoor
Rearing	Indoor	Indoor	Indoor	Outdoor	Outdoor

The purpose of this investigation was to compare these five systems and the standards of comparison were the number of pigs reared per sow per annum, and the quantity of food eaten per sow per annum.

Other factors contributing to the cost of production of weaners are labour, sow longevity and building and fixed equipment costs.

While there are differences in labour costs according to the system used, standard of management and the circumstances of the individual farm are of overriding importance. Widely different results have been obtained by different workers.

It was not possible to compare sow longevity under the different systems but while the disposal value of the rejected sow is so close to its replacement cost this factor is not going to affect the cost of weaners greatly unless it is so bad that the breeding programme is affected. This would of course, show in the number of pigs weaned per sow per annum.

Building costs for the different systems will also vary from farm to farm. Clearly on some farms with no existing buildings suitable for farrowing, and having dry free draining soils there are advantages in farrowing and rearing out of doors. On other farms it would be worthwhile only if there were clear advantages in the number of pigs weaned.

The weight of the weaners and their subsequent conversion rates during fattening also affect the choice of system. However, there is no clear cut evidence to show any advantage to a particular system in regard to these factors. The quality of the pigs and the standard of management are once again of overriding importance.

TABLE 2

DISTRIBUTION OF BREEDS BY SYSTEMS OF MANAGEMENT

<i>Breed</i> \ <i>System</i>	<i>In-Pig Farrowing Rearing</i>	1. <i>Indoor Indoor Indoor</i>	2. <i>Seasonal* Indoor Indoor</i>	3. <i>Outdoor Indoor Indoor</i>	4. <i>Outdoor Indoor Outdoor</i>	5. <i>Outdoor Outdoor Outdoor</i>	<i>% of all sows in each breed</i>
White	% of sows of each breed under each system	7	18	31	20	25	67
Coloured		6	17	26	19	32	20
Cross-bred		10	4	21	34	31	13
Total		7	16	28	21	27	100

*Seasonal=Indoor winter, Outdoor summer.

Results from 195 herds together with the systems used were obtained from University Departments of Agricultural Economics as follows :— Bristol I (1957/58), Cambridge, Nottingham, Aberystwyth (1958/59) and Bristol II (now Exeter) (1959/60).

As breeds of pigs can clearly affect the results and as the coloured breeds are more commonly kept out-of-doors than the white breeds it is necessary to show what breeds were kept under the different systems. This can be seen in Table 2 above.

It can be seen that as expected the coloured and cross-bred pigs are associated with the more outdoor systems. The association is not very marked. The effects of this difference are unfortunately confused with the results due to the differing systems of management.

The following results were obtained :—

TABLE 3 RESULTS IN PIGLETS PER SOW UNDER EACH SYSTEM

<i>System</i>	1.	2.	3.	4.	5.
Litters per sow per annum	1.77	1.77	1.68	1.73	1.63
Pigs born per litter	10.33	10.26	10.22	9.94	9.71
Pigs born per sow/annum	18.35	18.18	17.11	17.21	15.80
Pigs lost per sow/annum	4.59	3.96	3.67	2.77	2.55
Pigs weaned per sow per annum	13.76	14.22	13.44	14.44	13.25

The average number of pigs weaned per sow per annum under the five systems shows no clear advantage to any system. But this is not the end of the story. The system under which the sows are kept out of doors throughout gives the lowest number of pigs born. The system under which the sows are kept indoors throughout gives the highest number of pigs born.

The number of pigs born is the product of the number of litters per sow per annum and the number of pigs born per litter. The most outdoor system is the worst and the most indoor system the best on both counts. On the other hand the more indoor the system the higher the number of pigs lost between birth and weaning. This is in line with general experience. If there are any faults of management or if disease appears in the herd these are always more serious in piglets kept under more artificial conditions.

This leads to the conclusion that as management and disease control improves, which they undoubtedly have already since these results were obtained, so will the advantages of keeping sows indoors instead of outdoors increase.

The quantity of the food consumed by the sows under the different systems is as follows :—

TABLE 4 **FOOD CONSUMPTION UNDER EACH SYSTEM**

<i>System</i>	1.	2.	3.	4.	5.
Cwt. of Meal Equivalent per sow per annum	29.5	30.6	29.4	31.1	30.7

This is based on the results of 95 herds only, it being impossible to obtain them for the rest. Creep food fed to suckling pigs is included. There is no indication of economies in food as a result of the sows being kept out of doors.

To sum up for this sample of 195 herds the five different systems of breeding and rearing showed no differences in the efficiency of weaner production but there was a greater potential for improvement by eliminating pre-weaning losses in the herds where sows were kept indoors, and if this were achieved the more indoor systems would be better than the outdoor systems.

II.

DOES GOOD FARROWING ACCOMMODATION PAY ?

Between 20% and 25% of piglets born alive are lost before weaning. This increases the cost of weaner production and thus of fat pig production markedly. There are many factors contributing to this high loss but clearly the standard of farrowing accommodation contributes.

This investigation was carried out on 52 herds in the South West of England in 1960-61. All were members of Part I or II of the P.I.D.A. Recording Scheme. Their farrowing accommodation was scored and the scores related to the percentage loss of piglets between birth and three weeks of age. The figures refer to winter farrowing only as some herds were farrowed outside in the summer. Also deficiencies in farrowing accommodation should have more effect in winter than summer.

The scoring system, which is shown together with the recording sheets as an appendix, was based upon reports of scoring fattening houses in Denmark (Farm Accounting Bureau—Copenhagen)¹ and in this country (Thornton).² The final system was submitted to Dr. D. W. B. Sainsbury,³ of the Veterinary School, Cambridge, for approval.

Scores were obtained as follows :—

TABLE 5 DISTRIBUTION OF 52 BUILDINGS ACCORDING TO THE SCORES ALLOTTED TO THEM

Score	0-9	10-19	20-29	30-39	40-49	50-59	Full Marks (60)
No. of buildings	0	4	9	13	10	16	0
Percentage of buildings	0	7.7	17.3	25.0	19.2	30.8	0

which can be broken down as follows :—

TABLE 6 SCORES FOR DIFFERENT FACTORS NUMBER SCORING

Factor	6 Points	4 Points	2 Points	Total
Outer walls	15	36	1	52
Ceilings	8	28	16	52
Floors	21	15	16	52
Ventilation	9	13	30	52

1. Pig Houses and Fodder Consumption—Denmark (1954).

2. Thornton, D.S. Personal Communication.

3. Sainsbury, Dr D.W.B. Personal Communication.

TABLE 7 PRESENCE OR ABSENCE OF IMPORTANT FEATURES

	<i>Present</i>		<i>Absent</i>	
	<i>No.</i>	<i>Per cent.</i>	<i>No.</i>	<i>Per cent.</i>
Creep	46	89	6	11
Source of heat in creep	37	71	15	29
Insulated floor in creep	24	46	28	54
Draught exclusion in creep	34	65	18	35
Trough in creep	40	77	12	23
Farrowing rails	29	56	23	44
Farrowing crate	11	21	41	79

Most of the houses were permanent buildings constructed of substantial materials, but a lack of insulation of both walls and ceilings was a feature common to the majority. Floor insulation, however, has commanded attention in a large number of instances.

The system of ventilation was a cause of low marking in 80% of the buildings. Simple open-shut type or sliding windows, half doors or no ventilation at all appeared to be the system in 60% of the cases, making any attempt to control ventilation impossible if heat was to be retained in the house and draughts excluded.

Great importance was attached to the creep area in the total score and in this respect the houses seemed to be rather better equipped. Only 11.5% provided no creep facilities whatsoever and 71% actually provided an external source of heat. Of the features of the creep which were recorded, the insulation of the floor appeared to be that most lacking, being provided in only 46% of the houses.

An overall appraisal of the results indicated that ease of provision was perhaps more important than the need for the various improvements in determining their presence or absence. Thus with regard to the creep, simple items of equipment such as infra red lamps, which could be purchased and added to the building without other changes, were the more common features. The insulation of the creep floor, an operation involving rather more effort, was frequently left untended.

When the score of each herd is related to the average percentage mortality up to 3 weeks of age in the herd, the following results are obtained :—

TABLE 8 RELATIONSHIP BETWEEN PIGLET MORTALITY AND FARROWING ACCOMMODATION

<i>Score of Accommodation</i>	<i>Number of Herds</i>	<i>Size of Herd Litters/Herd</i>	<i>Average Percentage Mortality at 3 Weeks</i>
Under 30 points	13	11.4	18.2%
30-39 ..	13	10.1	19.9%
40-49 ..	10	14.9	20.2%
50-59 ..	16	19.6	19.0%

It can be seen that these results show no relationship between the score of the accommodation and the resulting mortality. There does appear to be an increase in the size of the herd with increasing score. This is confirmed if the herds are grouped according to their size and the average accommodation score taken.

TABLE 9 RELATIONSHIP BETWEEN SIZE OF HERD AND QUALITY OF ACCOMMODATION

<i>Number of Litters Per Herd</i>	<i>Average Accommodation Score</i>
0-10	36.5
11-20	40.8
21-30	42.0
30+	47.6

Therefore the only safe conclusions that can be made are that no relationship can be seen between the percentage mortality and the quality of the accommodation as assessed by the scoring method here used, and that large herds tend to have better farrowing accommodation than small herds.

This does not prove that the quality of farrowing accommodation is unimportant. It shows that there are too many other factors, such as skill of management, involved. It is also possible that large herds tend to have a higher percentage mortality than small herds. As the herds with good accommodation tend to be the larger herds the two effects could cancel one another out.

It might be desirable at a later date to do another investigation into this matter taking in more variables and assessing their relative importance rather than fixing them at the beginning by a scoring method. As a measure of results the size of litter weaned might be more satisfactory than the percentage loss. After all a litter of 20 pigs which loses 50% leaving 10 pigs is in many ways more satisfactory than one of 10 pigs which loses 20% leaving 8 pigs.

The survey system provided valuable information concerning the type of accommodation in use, and indicated that even in a sample of presumably progressive farmers (since they were recording) many improvements were needed to raise all the farrowing accommodation to a satisfactory level.

A Note on the Survey System

No difficulty arose in recording the items necessary for the assessment of accommodation to be made by means of point allocation. Problems were encountered, however, in the interpretation of the data. The major difficulty was experienced in interpreting the data collected for the unorthodox types of buildings used in certain herds, outdoor accommodation in particular, though constructed of similar materials may vary greatly in shape and design. In this sample, however, only 6 herds used field huts regularly for farrowing.

A subjective overall estimate of the quality of the accommodation made by the field worker recording the data would have been of assistance provided it had been made in a consistent fashion. To be reliable such estimates should preferably be made by a single worker throughout the whole survey. Unfortunately, this was not possible in the present investigation.

APPENDIX I

Questionnaire No. 1.

Code No.

UNIVERSITY OF BRISTOL (Department of Economics)

Investigation into Pig Management Systems

General Size of Farm acres
Regular Labour Force men women
Type of Farm, e.g. Arable, Dairy, Mixed, etc.

The Pig Enterprise

- (a) **Breed** (i) Sows (please state principal breeds or crosses kept)
.....
(ii) Boars
- (b) **System of Management** (Please tick in the appropriate place)
- (1) **Breeding Stock.** Do your dry and in-pig sow and gilts :—
(i) Run outdoors with free range
(ii) Run outdoors in restricted pens
(iii) Run indoors with open yards
- (2) **Farrowing.** Does farrowing take place :—
(i) Outdoors in individual huts or arks
(ii) Outdoors in communal shelters or huts
(iii) Indoors in a special farrowing house
(iv) Indoors in any available building
Do you use crates rails infra red
- (3) **Rearing 0-8 weeks.** If the pigs were farrowed indoors are they :—
(i) Left in the farrowing accommodation
(ii) Transferred to other buildings
(iii) Transferred outdoors
If the pigs were farrowed outdoors, are they :—
(i) Left in the pens where farrowing took place
(ii) Transferred indoors
(iii) Transferred to pens with other litters
- (4) **After weaning during the 8-16 week period** are the pigs :—
(i) Run outdoors in groups
(ii) Run indoors in pens of more than one litter
(iii) Run indoors in pens of one litter only
- (5) **Fattening.** Is the final fattening period carried out in :—
(i) A completely enclosed building
(ii) A house with outside yards
(iii) Cattle yards in summer
- (c) **Capital Investment in Buildings**
(i) For portable arks, huts, and fencing equipment involved in farrowing and rearing, please state total cost when new
(ii) For adaptations of old buildings which are used in rearing and farrowing, please state cost of adaptation
(iii) For buildings erected specially for rearing and farrowing, please state cost when new

(d) **Feeding**

- (i) Are rations for breeding stock :—
 - (a) Home mixed
 - (b) Purchased compounds
- (ii) Are rations for fattening stock :—
 - (a) Home mixed
 - (b) Purchased compounds
- (iii) Are homegrown feeds used in the rations ?
If so, what proportion would they supply
- (iv) Is a purchased proprietary creep feed used ?

(e) **Records**

- Do you record under National Pig Records ?.....
If so, which scheme do you record under ?
Part I Part II Private

NOTES

General

The size of farm required is that to which the pig enterprise and labour force is related. If a number of farms are farmed together, only those actually connected with the pig enterprise should be included.

The labour force is that relating to the size of farm given in Part I of the question.

System of Management

(1) **Breeding Stock**

“ Outdoors with free range ” indicates that sows are allowed to range at will over the farm.

“ Outdoors in restricted pens ” indicates that sows are confined by some means to a limited area.

“ Indoors with open yards ” indicates straw yards, i.e. open sheds and yards **BUT NO** access to soil or pasture.

(2) **Fattening**

“ (iii) cattle yards ” indicates covered or open yards designed for housing cattle and with no confined sleeping quarters for pigs.

(3) **Feeding**

“ (iii) ” proportion of home-grown food required is the approximate contribution made by home-grown grain food over the twelve month period.

APPENDIX II

Questionnaire No. 2.

Code No.

PROPOSED SYSTEM FOR ASSESSMENT OF FARROWING HOUSES

University of Bristol
(Department of Economics)

I. The Factors to be Recorded

- | | | | |
|----------------|--------------------|---|---|
| 1. Outer Walls | a) Material | Brick
Breeze
Asbestos
Wood
Galvanised Iron |
.....
.....
.....
..... |
| | b) Insulated | Yes
No |
..... |
| 2. Ceilings | a) Height | Over 6ft.
Under 6ft. |
..... |
| | b) Insulated | Yes
No |
..... |
| 3. Floors | a) Material | Insulated concrete
(all or part)
Hollow Tiles
(all or part)
Wood : Double
Single
Ordinary concrete
Other |
.....
.....
.....
.....
.....
..... |
| | b) Fall or slope | Good
Poor
Uneven |
.....
..... |
| 4. Ventilation | a) Method | Electric Fans
Controlled Roof
Ventilation
Hopper type
windows
Ordinary windows
Other |
.....
.....
.....
.....
.....
..... |
| 5. Creep : | a) Separate Creep | Small area ex. sow
Insulated floor
Source of heat
Trough protected
from sow
Shielded from
draught |
.....
.....
.....
.....
.....
..... |
| | b) No creep | | |
| 6. Pens : | a) Farrowing rails | | |
| | b) Farrowing crate | | |
| 7. No. of sows | | | |

II. Notes

1. b) "Insulated" indicates cavity walls, cavity breeze blocks, or a lining of some insulating material.
2. b) "Insulated" indicates a second layer under the roof, of plaster hardboard, glass fibre, etc. If a loft is present above the house this should be called "insulated".
3. a) "Insulated concrete" indicates a layer of insulating material, tiles, etc., beneath floor.
b) "Good" fall indicates all liquid excrement runs off pen immediately. "Poor" fall indicates some liquid excrement remains in pen even though outlets are unobstructed.
4. a) Roof ventilation indicated any type of chimney or cowl ventilation or in smaller, ridge ventilation.
5. a) "Source of heat" indicated any form of extra heating, lamps, hot pipes or heated floors, etc.
"Shielded from draughts" indicates the creep is draught free. This may be as a result of protection at the creep itself, OR because whole pen is draught free, i.e. solid partitions and close fitting doors, etc.
7. No. of sows indicates the average number of sows over the recording year. This item to be completed in the regional office.

GENERAL

Where different farrowing accommodation is used in winter from that which is used in summer—record the winter accommodation only.

Where different types of accommodation are in use all the time—record only the most important one.

APPENDIX III
Provisional Marking Systems — Farrowing Houses

<i>Items</i>	<i>Criterion</i>	<i>Marks</i>
1. Outer Walls :	Insulated	6
	Not Insulated but brick, breeze or wood	4
	Not Insulated but galvanised or single asbestos	2
2. Ceilings :	6ft. or less and insulated	6
	one of above	4
	6ft. or higher not insulated	2
3. Floors :	All or part insulated concrete, hollow tiles, or double wood and with good fall	6
	Ordinary concrete or brick, single wood and with good fall	4
	Uneven with poor fall	2
4. Ventilation :	Roof or fan ventilation	6
	Hopper type windows	4
	Other windows or other ventilation	2
MAXIMUM MARKS POSSIBLE		24
5. Creep :	Separate creep with :—	
	Source of heat	6
	Insulated floor	4
	Protected from draught	3
	Trough protected from draught	2
TOTAL MARKS POSSIBLE		15 x 2=30
6. Farrowing Rails and/or crate		6
GRAND TOTAL MARKS POSSIBLE		60

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