ESTIMATING COSTS OF SWINE PRODUCTION

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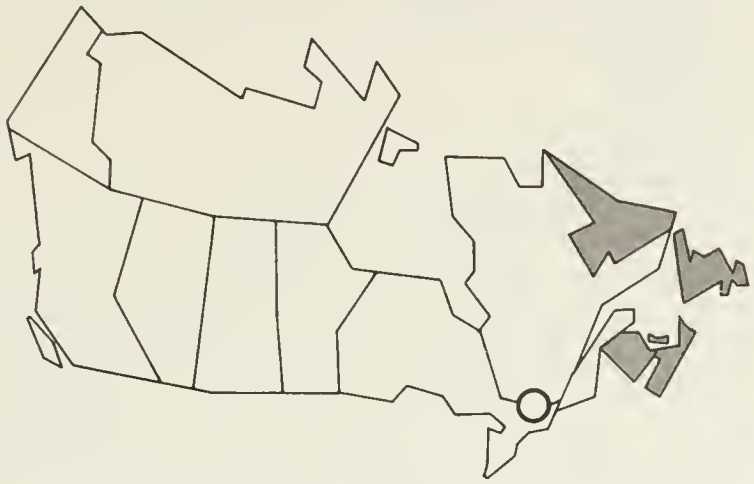

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ESTIMATING COSTS OF SWINE PRODUCTION

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ESTIMATING COSTS OF SWINE PRODUCTION

This publication contains procedures for estimating costs of swine production in farrow-weanling, feeder and farrow-finish enterprises. Figures are provided to represent a very wide range of swine production situations. Some of these situations will be unprofitable under most swine price conditions, some will be profitable at average prices and others will be profitable under nearly all price conditions experienced in the past decade.

For those already producing swine, and for those thinking of entering swine production, estimates of likely costs and returns are important. In particular, the latter should have a good knowledge of the levels of performance that they will need to reach if they are to be successful. They need to know what pork prices they can expect and how this price varies from time to time. Successful operation requires that average price levels and price fluctuations be recognized and taken into account.

Table 1 shows the percentage of months with various levels of pork prices during the past 10 years.

The tables and costing procedure in this bulletin allow swine producers to estimate the effects of a large variety of production alternatives quickly and easily.

FARROW-WEANLING ENTERPRISE

The expense items to be accounted for in this enterprise are feed (nursing sow, dry sow, boar, creep and starter), veterinary services, medicine, utilities, depreciation of sows and boars (including death loss), buildings, labor, and interest or cost of capital. Important variation, from farm to farm and from time to time on the same farm, can be expected in enterprise size, number of pigs weaned per sow per year, number of farrowings per sow per year, feed requirements, length of nursing period, feed prices and percentage of building capacity used. The following tables can be used to calculate the expenses associated with different levels of these items.

FEED

Table 2 shows six combinations of length of nursing period and daily feed consumption for nursing sows. The daily feed consumptions of 11 and 12.5 lb per day are for light and heavy sows weighing about 350 lb and 450 lb, respectively.*

After deciding which program in Table 2 is applicable and the number of farrowings per sow per year (1.9 to 2.3) that best represent the situation to be costed, Table 3 can be used to find the amounts of dry sow and nursing sow rations required per sow per year. These amounts can then be multiplied by the appropriate prices to give feed cost per sow.**

Table 4 shows the annual requirements for creep and starter rations on a per sow basis for different levels of these rations per weaned pig and for various numbers of

*Gilts would normally be classed with light sows for estimating feed intake.

**See Appendix 1 for a procedure for costing farm-prepared feeds.

TABLE 1. FREQUENCY DISTRIBUTION OF MONTHLY PORK PRICES,[1] MARITIMES, TORONTO, WINNIPEG AND EDMONTON, JUNE 1965 – JUNE 1974[2]

monthly price, $/cwt	Maritimes	Toronto	Winnipeg	Edmonton
	Percentage of months			
Below $35.00	57.8	58.7	66.0	71.6
35.00 – 38.99	18.3	15.6	16.5	13.8
39.00 – 42.99	8.2	10.1	4.6	2.7
43.00 – 46.99	5.5	3.7	3.7	4.6
47.00 – 50.99	2.7	3.7	3.7	1.8
51.00 – 53.99	1.8	2.7	0.1	1.8
54.00 – Over	5.5	5.5	4.6	3.7

[1] Base price index 100.

[2] Livestock Market Review.

TABLE 2. COMBINATIONS OF NURSING PERIOD AND DAILY FEED INTAKE, LIGHT AND HEAVY SOWS

Program	Nursing period, days	Daily feed intake, lb	
		Heavy sows	Light sows
A	21	12.5	–
B	35	12.5	–
C	49	12.5	–
D	21	–	11.0
E	35	–	11.0
F	49	–	11.0

TABLE 3. ANNUAL NURSING AND DRY SOW RATION REQUIREMENTS PER SOW

Litters/ sow/yr	Nursing and feed program	No. of days/yr on nursing ration	Feed intake /day, lb	Nursing ration, lb/sow/yr	No. of days/yr on dry sow ration	Feed intake /day, lb	Dry sow ration, lb/sow/yr
1.9	A	40	12.5	500	325	5.5	1788
	B	66	12.5	825	299	6.0	1794
	C	93	12.5	1163	272	6.5	1768
	D	40	11.0	440	325	4.5	1463
	E	66	11.0	726	299	5.0	1495
	F	93	11.0	1023	272	5.5	1496
2.0	A	42	12.5	525	323	5.5	1777
	B	70	12.5	875	295	6.0	1770
	C	98	12.5	1225	267	6.5	1736
	D	42	11.0	462	323	4.5	1454
	E	70	11.0	770	295	5.0	1475
	F	98	11.0	1078	267	5.5	1469
2.1	A	44	12.5	550	321	5.5	1766
	B	74	12.5	925	291	6.0	1746
	C	103	12.5	1288	262	6.5	1703
	D	44	11.0	484	321	4.5	1445
	E	74	11.0	814	291	5.0	1455
	F	103	11.0	1133	262	5.5	1441
2.2	A	46	12.5	575	319	5.5	1755
	B	77	12.5	963	288	6.0	1728
	C	NA[1]	- - - -	- - - -	- - -	- - -	- - - -
	D	46	11.0	506	319	4.5	1436
	E	77	11.0	847	288	5.0	1440
	F	NA	- - - -	- - - -	- - -	- - -	- - - -
2.3	A	48	12.5	600	317	5.5	1744
	B	81	12.5	1013	284	6.0	1704
	C	NA	- - - -	- - - -	- - -	- - -	- - - -
	D	48	11.0	528	317	4.5	1427
	E	81	11.0	891	284	5.0	1420
	F	NA	- - - -	- - - -	- - -	- - -	- - - -

[1] Not applicable.

pigs weaned per sow per year. The higher levels of creep and starter ration per weaned pig correspond to short nursing periods and large numbers of weaned pigs per sow per year. The example of costing on page 11 and labor requirements on page 11 are based on disposal of weanlings at 8 weeks of age. Any disposal age may, however, be used; the amounts of creep and starter feeds should be chosen to properly reflect the selected disposal age.

Table 5 shows the annual amount of boar feed required on a per-sow basis for several different levels of both feed per boar and sow/boar ratio.

TABLE 4. ANNUAL REQUIREMENTS FOR CREEP AND STARTER FEED ON A PER-SOW BASIS

Creep feed, lb/pig	No. of pigs weaned/sow/yr					
	12	14	16	18	20	22
			lb required/sow/yr			
2	24	28	32	36	40	44
4	48	56	64	72	80	88
6	72	84	96	108	120	132
8	96	112	128	144	160	176
10	120	140	160	180	200	220
12	144	168	192	216	240	264
14	168	196	224	252	280	308
Starter feed, lb/pig			lb required/sow/yr			
15	180	210	240	270	300	330
20	240	280	320	360	400	440
25	300	350	400	450	500	550
30	360	420	480	540	600	660
35	420	490	560	630	700	770
40	480	560	640	720	800	880
45	540	630	720	810	900	990

TABLE 5. ANNUAL REQUIREMENTS FOR BOAR FEED ON A PER-SOW BASIS

Feed/boar /yr, lb	Sow/boar ratio						
	12	15	18	21	24	27	30
				lb of feed/sow/yr			
2000	167	133	111	95	83	74	67
2200	183	147	122	105	92	81	73
2400	200	160	133	114	100	89	80
2600	217	173	144	124	108	96	87
2800	233	187	156	133	117	104	93

ANIMAL DEPRECIATION

The amount of sow depreciation (change in the sow's value over her productive life) to be charged on a per-year basis depends on the initial value of the sow, her value when culled, the total number of farrowings and the number of farrowings per year.* Table 6 shows sow depreciation per year for various levels of total sow depreciation, total farrowings and farrowings per year.

*Sow depreciation/yr, $ =

$$\frac{\text{(total sow depreciation, \$) X (no. of farrowings/yr)}}{\text{(total farrowings)}}$$

TABLE 6. ANNUAL SOW DEPRECIATION

Total farrowings	Total sow depreciation	No. of farrowings/sow/yr 1.9	2.0	2.1	2.2	2.3
				$/yr		
3	$20	$12.67	$13.33	$14.00	$14.67	$15.33
	30	19.00	20.00	21.00	22.00	23.00
	40	25.33	26.67	28.00	29.33	30.67
	50	31.67	33.33	35.00	36.67	38.33
	60	38.00	40.00	42.00	44.00	46.00
	70	44.33	46.67	49.00	51.33	53.67
	80	50.67	53.33	56.00	58.67	61.33
4	20	9.50	10.00	10.50	11.00	11.50
	30	14.25	15.00	15.75	16.50	17.25
	40	19.00	20.00	21.00	22.00	23.00
	50	23.75	25.00	26.25	27.50	28.75
	60	28.50	30.00	31.50	33.00	34.50
	70	33.25	35.00	36.75	38.50	40.25
	80	38.00	40.00	42.00	44.00	46.00
5	20	7.60	8.00	8.40	8.80	9.20
	30	11.40	12.00	12.60	13.20	13.80
	40	15.20	16.00	16.80	17.60	18.40
	50	19.00	20.00	21.00	22.00	23.00
	60	22.80	24.00	25.20	26.40	27.60
	70	26.60	28.00	29.40	30.80	32.20
	80	30.40	32.00	33.60	35.20	36.80
6	20	6.33	6.67	7.00	7.33	7.67
	30	9.50	10.00	10.50	11.00	11.50
	40	12.67	13.33	14.00	14.67	15.33
	50	15.83	16.67	17.50	18.33	19.17
	60	19.00	20.00	21.00	22.00	23.00
	70	22.17	23.33	24.50	25.67	26.83
	80	25.33	26.67	28.00	29.33	30.67
7	20	5.43	5.71	6.00	6.29	6.57
	30	8.14	8.57	9.00	9.43	9.86
	40	10.86	11.43	12.00	12.57	13.14
	50	13.57	14.29	15.00	15.71	16.43
	60	16.29	17.14	18.00	18.86	19.71
	70	19.00	20.00	21.00	22.00	23.00
	80	21.71	22.86	24.00	25.14	26.29
8						

Farm-raised replacements should be charged to the sow-weanling enterprise at either production cost or market value.

The amount of boar depreciation (change in the boar's value over his productive life) to be charged per sow per year depends on the initial value of the boar, his value when culled, the sow/boar ratio and his expected service life. Table 7 shows boar depreciation per sow per year for different levels of total boar depreciation, sow/boar ratio and expected boar life.*

REAL ESTATE COSTS

Investment in housing for sows (together with control of labor, veterinary, medicine, feed and mortality costs) is important in achieving desirable levels of net return. Annual real estate costs are made up of building (and associated equipment) depreciation, repairs, taxes and insurance.

All of these annual costs are commonly expressed as a percentage of total investment. Thus, if total real estate investment per sow is $675, and annual depreciation is 7%, repairs are 2%, taxes are 2.5% and insurance is 0.5% of total investment, the annual charge for these items together would be 12% of $675, or $81 per sow. Table 8 shows annual real estate cost per sow for several different levels of total real estate investment per sow and for different levels of annual cost percentage of total investment.

Real estate investment per sow is usually calculated on the full capacity of the building. If the building is not used to its full capacity, the investment per sow should be calculated on the number of sows actually housed.

*Boar depreciation/sow/yr, $ =

$$\frac{\text{(total boar depreciation, \$)}}{\text{(expected boar life, yr) X (sow/boar ratio)}}$$

TABLE 7. ANNUAL BOAR DEPRECIATION PER SOW

Boar life, yr	Total boar depreciation	Sow/boar ratio 12	15	18	21	24	27	30
		boar depreciation/sow/yr, $						
1	$120	$10.00	$ 8.00	$ 6.67	$ 5.71	$ 5.00	$ 4.44	$4.00
	150	12.50	10.00	8.33	7.14	6.25	5.55	5.00
	180	15.00	12.00	10.00	8.57	7.50	6.67	6.00
	210	17.50	14.00	11.67	10.00	8.75	7.78	7.00
	240	20.00	16.00	13.33	11.43	10.00	8.89	8.00
	270	22.50	18.00	15.00	12.86	11.25	10.00	9.00
2	120	5.00	4.00	3.33	2.86	2.50	2.22	2.00
	150	6.25	5.00	4.17	3.57	3.13	2.78	2.50
	180	7.50	6.00	5.00	4.29	3.75	3.33	3.00
	210	8.75	7.00	5.83	5.00	4.38	3.89	3.50
	240	10.00	8.00	6.67	5.71	5.00	4.44	4.00
	270	11.25	9.00	7.50	6.43	5.63	5.00	4.50
3	120	3.33	2.67	2.22	1.90	1.67	1.48	1.38
	150	4.17	3.33	2.78	2.38	2.08	1.85	1.67
	180	5.00	4.00	3.33	2.86	2.50	2.22	2.00
	210	5.83	4.67	3.89	3.33	2.92	2.59	2.33
	240	6.67	5.33	4.44	3.81	3.33	2.96	2.67
	270	7.50	6.00	5.00	4.29	3.75	3.33	3.00
4	120	2.50	2.00	1.67	1.43	1.25	1.11	1.00
	150	3.13	2.50	2.08	1.79	1.56	1.39	1.25
	180	3.75	3.00	2.50	2.14	1.88	1.67	1.50
	210	4.38	3.50	2.92	2.50	2.19	1.94	1.75
	240	5.00	4.00	3.33	2.86	2.50	2.22	2.00
	270	5.63	4.50	3.75	3.21	2.81	2.50	2.25

TABLE 8. ANNUAL REAL ESTATE COST PER SOW

Total real estate investment/sow, $	Annual real estate cost % (of total investment)[1]						
	8	10	12	14	16	18	20
	annual cost/sow, $						
200	16	20	24	28	32	36	40
250	20	25	30	35	40	45	50
300	24	30	36	42	48	54	60
350	28	35	42	49	56	63	70
400	32	40	48	56	64	72	80
450	36	45	54	63	72	81	90
500	40	50	60	70	80	90	100
550	44	55	66	77	88	99	110
600	48	60	72	84	96	108	120
650	52	65	78	91	104	117	130
700	56	70	84	98	112	126	140
750	60	75	90	105	120	135	150
800	64	80	96	112	128	144	160

[1] Total investment includes structure, pens, watering, feeding and ventilating systems and manure storage.

TABLE 9. ANNUAL LABOR REQUIREMENTS FOR SOWS[1]

Nursing program from Table 2	No. of farrowings/sow/yr				
	1.9	2.0	2.1	2.2	2.3
	hr/per sow/yr				
A or D	7.8	7.9	8.1	8.2	8.4
B or E	9.0	9.3	9.5	9.7	10.0
C or F	10.3	10.6	10.9	11.2	11.5

[1] These labor requirements are averages from four farrow-weanling enterprises ranging from 50 to 100 sows. Enough observations on these farms were made to allow an estimate of average times within 10% of the true averages at the 95% confidence level. The jobs included in these labor figures are feeding, cleaning, bedding, preparing sows for farrowing and moving sows within the barn. For miscellaneous tasks and observation of sows, 20% has been added to the actually observed times.

LABOR

Labor used in the sow-weanling enterprise varies widely from farm to farm. It depends on the nature of the barn and the equipment in it, the nursing program, the number of pigs weaned per sow, the length of time the pigs are fed after weaning, the number of farrowings per sow per year and the sow/boar ratio.

Labor, as discussed here, includes all activities in the barn; but does not include preparation of feed, delivery of feed to the barn, purchasing and marketing of animals and removal and disposal of manure from its storage area. The topic is discussed in two parts; (1) labor for the sow and pigs during the nursing period and that for the sow during gestation and (2) labor for the pigs in the period from weaning to disposal as feeders; age at disposal in this study is taken to be 8 weeks. Labor in part 1 is basically independent of the number of pigs weaned per sow per year, but labor in part 2 is directly proportional to the number of pigs weaned per sow per year.

Direct observations of sow-weanling enterpise labor usage indicate that these labor requirements likely would not vary appreciably on a per sow basis for enterprises ranging from 50 to 150 sows providing the kind of building, its equipment and the work routine remained the same.

Table 9 shows annual labor requirements per sow for differing nursing programs (Table 2) and for various numbers of farrowings per sow per year; this is the labor described as part 1 above. Table 10 shows the annual labor requirements per sow per year, caring for pigs from weaning to disposal (described as part 2 above) for different periods after weaning and for various numbers of pigs weaned per sow per year.

TABLE 10. ANNUAL LABOR REQUIREMENTS PER SOW; CARING FOR PIGS FROM WEANING TO 8 WEEKS[1]

Days from weaning to 8 wk of age	Time/ weaned pig, hr	No. of weaned pigs/sow/yr 12	14	16	18	20	22
		hr/sow					
7 (C or F)[2]	.065	0.8	0.9	1.0	1.2	1.3	1.4
21 (B or E)	.113	1.4	1.6	1.8	2.0	2.3	2.5
35 (A or D)	.160	1.9	2.2	2.6	2.9	3.2	3.5

[1] Tasks included are feeding, cleaning bedding, castrating, giving iron and clipping teeth. These figures are based on 18 pigs/pen. The same conditions described for Table 9 apply here also.

[2] Letters in parentheses refer to the corresponding nursing program.

Labor for building and equipment repairs and maintenance are not included in these figures. Labor for repairs and the cost of materials are included in real estate cost.

Although the labor requirements shown in Tables 9 and 10 may not adequately reflect the situation on all farms it is easy to substitute more appropriate figures if they are available. The percentage differences in labor per sow that result from various levels of the relevant factors in these tables should apply to different total labor requirements.

OTHER COSTS

Costs of utilities and veterinary services and medicine vary widely from farm to farm and from time to time. In the following example of costing a farrow-weanling enterprise, the single values used for these items have been taken from farm surveys. Other figures more appropriate to different situations should be used if they are available.

Annual interest charges or cost of capital on a per-sow basis can be calculated to a good degree of approximation by using the following procedure:

Annual interest is the interest rate multiplied by the average total investment per sow. Average total investment per sow is the sum of:

a) $^1/_2$ X (sow purchase value + sow cull value)

b) $^1/_2$ X $\frac{\text{(boar purchase value + boar cull value)}}{\text{sow/boar ratio}}$

c) $^1/_2$ X total real estate investment/sow

d) $^1/_2$ X total feed cost/sow

While the assignment of a charge for management is usually subjective and arbitrary in general situations, individual operators may find it relatively easy. A common procedure used in calculating this cost is to take a percentage of gross receipts.

AN EXAMPLE COSTING:

Following is an example of costing of a farrow-weanling enterprise. The figures used represent good management.

The first step is to describe the enterprise by providing the necessary information items (page 13).

POSSIBILITIES FOR ADJUSTMENT

In the example given, which represents a high level of management, all feed makes up about 58% of total cost,* real estate about 15% and cost of capital about 10%. These are the three largest items in the cost of producing weaner pigs.

Of the three, feed offers the greatest opportunity for reducing costs. Depending on the circumstances on particular farms, feed cost may be substantially reduced by preparing the rations on the farm.

There is, perhaps. some opportunity for reducing real estate cost when a new barn is being built, by careful management of material and labor. Since most operators have no control over the cost of capital, this item can only be reduced by limiting investment in sows, boars, real estate and feed to an extent that is consistent with desired production rates.

*This figure is lower than some of those commonly seen; there are many ways of making this calculation. In comparing figures from different sources, make sure they are calculated on the same basis.

ITEM AMOUNTS AND COSTS PER SOW PER YEAR

Expense		Item no.	Table	Amount	Cost/yr	% of total cost
A	Nursing ration	1,2,3	3	925 lb	$ 79.36	14.9
B	Dry sow ration	1,2,4	3	1746 lb	139.68	26.1
C	Creep feed	5,7,9	4	120 lb	22.13	4.1
D	Starter	6,8,9	4	600 lb	62.88	11.8
E	Boar feed	10,11,12,	5	100 lb	8.00	1.5
F	Subtotal, items A-E, total feed				$312.05	58.4
G	Sow depreciation	2,15,16	6	– –	10.50	2.0
H	Boar depreciation	10,19,20	7	– –	2.43	0.5
I	Real estate charge	21,22	8	– –	81.00	15.1
J	Veterinary services, medicine	– –	–	– –	10.00	1.9
K	Utilities and miscellaneous	– –	–	– –	6.50	1.2
L	Subtotal, items G-K				$110.43	20.7
M	Sow labor	1,2,23	9	9.5 hr	28.50	
N	Weanling labor	1,9,23	10	2.3 hr	6.90	
O	Subtotal, items M and N			11.8 hr	$ 35.40	6.6
P	Cost of capital	10,13,14, 17,18,21, 24	–	– –		

sow boar barn feed

$$.09 \times \left(\frac{(125+100)}{2} + \frac{(250+75)}{2 \times 24} + \frac{675}{2} + \frac{312.05}{2}\right) =$$ $ 55.15 10.3

Q	Management	9,25,26	–	– –		
	.04 x 20 pigs x $27/pig =				$ 21.60	4.0
	Total cost/sow				$534.63	100.0
	Total production cost/weaned pig				$ 26.73	
R	Receipts, 20 pigs x $27/pig =				$540.00	
S	Return to labor, management and capital				/sow	/pig
	R-F-L = $540.00 – $312.05 – $110.43 =				$117.52	$5.87
T	Return to management and labor					
	S-P = $117.52 – $55.15 =				$ 62.37	$3.12
U	Return to management					
	T-O = $62.37 – $35.40 =				$ 26.97	$1.35
V	Return to capital					
	S-O-Q = $117.52 – $35.40 – $21.60 =				$ 60.52	$3.03
W	Return to labor					
	T-Q = $62.37 – $21.60 =				$40.77	$2.04

Information item no.	Item	Level
1.	Nursing and sow feeding program	B
2.	Number of litters/sow/yr	2.1
3.	Ration price for nursing sows	$8.58/cwt
4.	Ration price for dry sows	$8/cwt
5.	Amount of creep feed/ weaned pig	6 lb
6.	Amount of starter/weaned pig	30 lb
7.	Price of creep feed	$18.44/cwt
8.	Price of starter	$10.48/cwt
9.	Number of pigs weaned/ sow/yr	20
10.	Sow/boar ratio	24
11.	Amount of feed/boar/yr	2400 lb
12.	Price of boar feed	$8/cwt
13.	Initial sow value	$125
14.	Cull sow value	$100
15.	Total sow depreciation	$25
16.	Total number of farrowings expected/sow	5
17.	Initial boar value	$250
18.	Cull boar value	$75
19.	Total boar depreciation	$175
20.	Boar's expected service life, yr	3
21.	Total real estate investment/ sow	$675
22.	Annual real estate cost %	12
23.	Hourly wage rate	$3
24.	Annual interest rate	9%
25.	Annual management charge, % of pig receipts	4
26.	Expected weanling price/ head	$27

Table 11 shows the influence of various percentage changes in feed costs, real estate costs, real estate cost percentage and interest rate on production cost per pig, when all other factors are at the levels shown in the example.

The single most important factor in reducing the cost per pig produced, however, is the number of pigs weaned per sow per year. Table 12 shows the influence of this factor on per sow and per pig costs for feed, real estate, labor and cost of capital, when all other factors are at the levels shown in the example.

FEEDER ENTERPRISE

The expense items to be accounted for in this enterprise are feed, veterinary services, medicine, hog mortality, buildings, labor, weanlings (feeders) and interest. Important variation among feeder hog enterprises occurs in enterprise size, feed conversion, length of feeding period or rate of turnover, weight at which hogs are purchased and sold, feed prices and proportion of building capacity used. The following tables can be used to calculate expenses per hog when these items are at various levels.

FEED

Table 13 shows feed requirements per hog for various levels of feed conversion (pounds of feed per pound of liveweight gain) and of total liveweight gain. It allows the easy calculation of feed costs for hogs with a wide variety of purchase and sale weights.

TABLE 11. EFFECT OF CHANGES IN FEED AND REAL ESTATE COSTS, ANNUAL REAL ESTATE COST PERCENTAGE AND INTEREST RATE ON TOTAL COSTS PER SOW AND PER PIG

Factor	Example level	% change	Cost difference /sow	Cost difference /pig[1]
Feed	$312.05	10	$31.20	$1.56
Real estate charges	$ 81.00	20	16.20	0.81
Annual real estate cost %	12%	33	28.00	1.40
Interest rate	9%	25	13.79	0.69

[1] Cost difference/pig is based on 20 pigs weaned/sow/yr.

TABLE 12. EFFECT OF THE NUMBER OF PIGS WEANED PER SOW ON PER-PIG COSTS OF FEED, REAL ESTATE, LABOR AND INTEREST

	No. of pigs weaned/sow/yr					
Factor	12	14	16	18	20	22
			$/pig			
All feed	$26.00	$22.29	$19.50	$17.34	$15.60	$14.18
Real estate	6.75	5.79	5.06	4.50	4.05	3.68
Labor	2.95	2.53	2.21	1.97	1.77	1.61
Interest	4.60	3.94	3.45	3.06	2.76	2.51

TABLE 13. FEED REQUIREMENTS PER HOG, LB

Liveweight	Feed conversion										
gains, lb	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6
130	338	364	390	416	442	468	494	520	546	572	598
135	351	378	405	432	459	486	513	540	567	594	621
140	364	392	420	448	476	504	532	560	588	616	644
145	377	406	435	464	493	522	551	580	609	638	667
150	390	420	450	480	510	540	570	600	630	660	690
155	403	434	465	496	527	558	589	620	651	682	713
160	416	448	480	512	544	576	608	640	672	704	736
165	429	462	495	528	561	594	627	660	693	726	759
170	442	476	510	544	578	612	646	680	714	748	782
175	455	490	525	560	595	630	665	700	735	770	805
180	468	504	540	576	612	648	684	720	756	792	828
185	481	518	555	592	629	666	703	740	777	814	851
190	494	532	570	608	646	684	722	760	798	836	874
195	507	546	585	624	663	702	741	780	819	858	897
200	520	560	600	640	680	720	760	800	840	880	920
205	533	574	615	656	697	738	779	820	861	902	943
210	546	588	630	672	714	756	798	840	882	924	966

The range of feed conversions has been made large enough to take account of widely differing feeds and management procedures. The feed price used should be selected to properly reflect the proportions and prices of starter, grower and finisher feeds fed. Appendix 1 provides a procedure for costing farm-prepared rations.

REAL ESTATE COSTS

Table 14 shows annual real estate cost per hog for different levels of total real estate investment* per hog

*Total real estate investment should include the hog barn and its equipment as well as storage for mixed feeds.

TABLE 14. ANNUAL REAL ESTATE COST PER HOG, $

Total real estate investment /hog, $	Annual real estate cost % 8	10	12	14	16	18	20
20	$1.60	$ 2.00	$ 2.40	$ 2.80	$ 3.20	$ 3.60	$ 4.00
25	2.00	2.50	3.00	3.50	4.00	4.50	5.00
30	2.40	3.00	3.60	4.20	4.80	5.40	6.00
35	2.80	3.50	4.20	4.90	5.60	6.30	7.00
40	3.20	4.00	4.80	5.60	6.40	7.20	8.00
45	3.60	4.50	5.40	6.30	7.20	8.10	9.00
50	4.00	5.00	6.00	7.00	8.00	9.00	10.00
55	4.40	5.50	6.60	7.70	8.80	9.90	11.00
60	4.80	6.00	7.20	8.40	9.60	10.80	12.00
65	5.20	6.50	7.80	9.10	10.40	11.70	13.00
70	5.60	7.00	8.40	9.80	11.20	12.60	14.00
75	6.00	7.50	9.00	10.50	12.00	13.50	15.00
80	6.40	8.00	9.60	11.20	12.80	14.40	16.00
85	6.80	8.50	10.20	11.90	13.60	15.30	17.00
90	7.20	9.00	10.80	12.60	14.40	16.20	18.00
95	7.60	9.50	11.40	13.30	15.20	17.10	19.00
100	8.00	10.00	12.00	14.00	16.00	18.00	20.00

and of annual real estate cost percentage. The level of total real estate investment per hog should be calculated from total real estate investment and the number of hogs actually housed in the building at one time. This allows total real estate investment per hog to reflect the actual proportion of maximum building capacity being used, and whether or not cleanout or continuous feeding is practiced.

Table 15 shows real estate cost per hog sold for different levels of annual real estate cost per hog and of rate of turnover, or the number of days in a year divided by the average number of days required to finish the hogs. The wide range shown for turnover rate is designed to reflect many combinations of feeding efficiency and/or average daily gain and total liveweight gain per head. Farmers purchasing heavy feeders for finishing, for example, are likely to show high turnover rates.

LABOR

The labor requirement per hog sold is shown in Table 16. The figures shown in this table have been calculated from direct observation of work routines on five feeder enterprises in P.E.I. and include feeding, barn cleaning, shipping and receiving hogs.

Receiving hogs includes all of the jobs involved in putting new feeders in the barn from the time the truck is stopped in its unloading position. Shipping includes all of the necessary jobs up to the time the truck is closed up and ready to leave. To allow for hog observation and miscellaneous activities 20% has been added to these observed times. Removal of manure from its storage, manure spreading, feed mixing and putting feed into the storage from which it is removed for feeding are not included.

The barns in which these observations were taken contained an average of 700 animals, had self-contained overhead feed storage, the use of feed carts and used sloping floors and gutters for manure movement to an adjacent storage. The observations of individual work elements on the five farms permit the inference that the labor requirement per hog would not vary appreciably with the number of hogs provided that the kind of building, its equipment and work routine remain the same. Labor for building and equipment repairs and maintenance is not included in these figures. Labor for repairs and the cost of materials are included in real estate cost.

Although the labor requirements shown in Table 16 may not adequately reflect the situation on all farms it is easy

TABLE 15. REAL ESTATE COST PER HOG SOLD, $

Annual real estate cost/hog	Rate of turnover[1] 2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0
$ 1.50	$0.63	$0.58	$0.54	$0.50	$0.47	$0.44	$0.42	$0.39	$0.38
2.00	0.83	0.77	0.71	0.67	0.63	0.59	0.56	0.53	0.50
2.50	1.04	0.96	0.89	0.83	0.78	0.74	0.69	0.66	0.63
3.00	1.25	1.15	1.07	1.00	0.94	0.88	0.83	0.79	0.75
3.50	1.46	1.35	1.25	1.17	1.09	1.03	0.97	0.92	0.88
4.00	1.67	1.54	1.43	1.33	1.25	1.18	1.11	1.05	1.00
4.50	1.88	1.73	1.61	1.50	1.41	1.32	1.25	1.18	1.13
5.00	2.08	1.92	1.79	1.67	1.56	1.47	1.39	1.32	1.25
5.50	2.29	2.12	1.96	1.83	1.72	1.62	1.53	1.45	1.38
6.00	2.50	2.31	2.14	2.00	1.88	1.76	1.67	1.58	1.50
6.50	2.71	2.50	2.32	2.17	2.03	1.91	1.81	1.71	1.63
7.00	2.92	2.69	2.50	2.33	2.19	2.06	1.94	1.84	1.75
7.50	3.13	2.88	2.68	2.50	2.34	2.21	2.08	1.97	1.88
8.00	3.33	3.08	2.86	2.67	2.50	2.35	2.22	2.10	2.00
8.50	3.54	3.27	3.04	2.83	2.66	2.50	2.36	2.24	2.13
9.00	3.75	3.46	3.21	3.00	2.81	2.65	2.50	2.37	2.25
9.50	3.96	3.65	3.39	3.17	2.97	2.79	2.64	2.50	2.38
10.00	4.17	3.85	3.57	3.33	3.13	2.94	2.78	2.63	2.50
10.50	4.38	4.04	3.75	3.50	3.28	3.09	2.92	2.76	2.63
11.00	4.58	4.23	3.93	3.67	3.44	3.24	3.06	2.89	2.75
11.50	4.79	4.42	4.11	3.83	3.59	3.38	3.19	3.03	2.88
12.00	5.00	4.62	4.29	4.00	3.75	3.53	3.33	3.16	3.00
12.50	5.21	4.81	4.46	4.17	3.91	3.68	3.47	3.29	3.13
13.00	5.42	5.00	4.64	4.33	4.06	3.82	3.61	3.42	3.25
13.50	5.63	5.19	4.82	4.50	4.22	3.97	3.75	3.55	3.38
14.00	5.83	5.38	5.00	4.67	4.38	4.12	3.89	3.68	3.50
14.50	6.04	5.58	5.18	4.83	4.53	4.26	4.03	3.82	3.62
15.00	6.25	5.77	5.36	5.00	4.69	4.41	4.17	3.95	3.75
15.50	6.46	5.96	5.54	5.17	4.84	4.56	4.31	4.08	3.88
16.00	6.67	6.15	5.71	5.33	5.00	4.71	4.44	4.21	4.00
16.50	6.88	6.35	5.89	5.50	5.16	4.85	4.58	4.34	4.12
17.00	7.08	6.54	6.07	5.67	5.31	5.00	4.72	4.47	4.25
17.50	7.29	6.73	6.25	5.83	5.47	5.15	4.86	4.60	4.38
18.00	7.50	6.92	6.43	6.00	5.62	5.29	5.00	4.74	4.50
18.50	7.71	7.12	6.61	6.17	5.78	5.44	5.14	4.87	4.62
19.00	7.92	7.31	6.79	6.33	5.94	5.59	5.28	5.00	4.75
19.50	8.13	7.50	6.96	6.50	6.09	5.74	5.42	5.13	4.88
20.00	8.33	7.69	7.14	6.67	6.25	5.88	5.56	5.26	5.00

[1] Rate of turnover is 365 divided by the number of days taken to finish the hogs.

to substitute more appropriate figures if they are available. The difference in labor required per hog between turnover rates of 2.4 and 4.0 is about 7 minutes which at $3.00 per hour amounts to $0.35 per hog. Labor requirement costs in the hog feeder enterprise form only a small part of total costs. As a result, it can be concluded that the possibilities for reducing costs per hog by adjusting labor efficiency are limited, at least for most farms with the kinds of feeding facilities considered in this discussion.

TABLE 16. LABOR REQUIREMENTS PER HOG[1]

Rate of turnover	Time/hog min	Time/hog hr
2.4	23	0.4
2.6	22	0.4
2.8	20	0.3
3.0	19	0.3
3.2	18	0.3
3.4	18	0.3
3.6	17	0.3
3.8	16	0.3
4.0	16	0.3

[1] These labor requirements are averages from five feeder enterprises feeding about 700 head at one time. Enough observations were made to permit an estimate of average times within 10% of the true averages at the 95% confidence level.

OTHER COSTS

Costs of utilities, death loss, miscellaneous and veterinary services and medicine vary widely from farm to farm and from time to time. In the following example of costing for a feeder enterprise the values used for these items have been taken from farm surveys. Other figures more appropriate to different situations should be used if they are available.

Interest charges or cost of capital per hog can be calculated to a good degree of approximation by using the following procedure:

Interest per hog is the interest rate multiplied by the average total investment per hog where average total investment per hog is the sum of

a) $\frac{1}{2} \times \frac{\text{total real estate investment/hog actually housed}}{\text{rate of turnover}}$

b) $\frac{1}{2} \times \frac{\text{total feed cost/hog}}{\text{rate of turnover}}$

c) $\frac{\text{feeder cost/head}}{\text{rate of turnover}}$

As indicated previously, the assignment of a charge for management is usually subjective and arbitrary in general situations. A common procedure used in calculating this cost is to take a percentage of gross receipts.

AN EXAMPLE COSTING

Following is an example of per-hog costing of a feeder enterprise. The figures used in it represent good management.

The first step is to describe the enterprise by providing the necessary information items.

Information item no.	Item	Level
1.	Liveweight gain	170 lb
2.	Feed conversion	3.4
3.	Ration price	$8.15/cwt
4.	Proportion of hog barn in use	100%
5.	Total real estate investment/ hog housed	$60
6.	Rate of turnover	2.8
7.	Annual real estate cost %	12
8.	Labor requirement/hog, hr	0.3
9.	Hourly wage rate	$3
10.	Annual interest rate	9%
11.	Management charge, % of gross receipts	4
12.	Price of feeder	$27
13.	Utilities and miscellaneous	$0.70
14.	Veterinary services, medicine	$0.50
15.	Death loss	1.5%
16.	Expected pork price, dressed, lb	$0.56
17.	Expected dressing %	76
18.	Expected index	104

POSSIBILITIES FOR ADJUSTMENT

In the example shown above, feed makes up about 55% of total cost,* the feeder pig about 32% and real estate cost about 3%.

As with sows, reducing feed costs appears to offer the greatest opportunity for reducing hog production costs. Feed cost per hog may be reduced depending on individual situations, by decreasing the price per unit of feed through on-farm mixing, by increasing the efficiency of feed conversion by using better stock or better

*This figure is lower than some of those commonly seen; there are many ways of making this calculation. In comparing figures from different sources, make sure they are calculated on the same basis.

ITEM AMOUNTS AND COST PER HOG

Expense		Item no.	Table	Amount	Cost	% of total cost
A	Feed	1,2,3	13	578 lb	$47.11	55.2
B	Real estate cost	4,5,6,7	14, 15	– –	2.57	3.0
C	Feeder	12	– –	1 head	27.00	31.7
D	Death loss	12, 15	– –	– –	0.41	0.5
E	Veterinary services, medicine	14	– –	– –	0.50	0.6
F	Utilities, miscellaneous	13	– –	– –	0.70	0.8
	G Subtotal, items A-F				$78.29	91.8
H	Labor	8,9	16	0.3 hr	$ 0.90	1.1
I	Cost of capital	4,5,10,12,6	– –	– –		
	$\frac{.09}{2.8} \times (\frac{\text{barn } \$60}{2} + \frac{\text{feed } \$47.11}{2} + \text{feeder } \$27) =$				2.59	3.0
J	Management	11,16,17,18	– –	– –		
	.04 x 200 x 0.76 x 0.56 x 1.04 =				3.54	4.1
	Total cost /hog				$85.32	100.0
K	Receipts/hog					
	200 x 0.76 x 0.56 x 1.04 =				$88.52	
L	Return to labor, management and capital				/hog	
	K-G = $88.52 – $78.29 =				$10.23	
M	Return to management and labor					
	L-I = $10.23 – $2.59 =				$ 7.64	
N	Return to management					
	M-H = $7.64 – $0.90 =				$ 6.74	
O	Return to capital					
	L-H-J = $10.23 – $0.90 – $3.54 =				$ 5.79	
P	Return to labor					
	M-J = $7.64 – $3.54 =				$ 4.10	

balanced rations, or by better controlling other important aspects of the hog's surroundings. A change in feed conversion from 4.6 to 3.6 will lower feed cost per hog by $13.60 for a 170-pound liveweight gain when feed is priced at $8 per hundredweight.

The purchase price of feeder pigs is an important part of hog production costs, but only those operators raising their own weanlings have real opportunity to influence their price, or cost to the feeder enterprise.

VARIABILITY IN WEANLING PRICES

Variation in weanling prices is one of the main sources of variation in hog production costs as well as in gross and net returns to weanling producers. Many weanling producers and feeders have found it to their mutual advantage to operate on a contract basis. Often the price of the weanlings is related to the current price of dressed pork by a formula.

The advantages of contracts and formula pricing are:*

1. The sow owner is assured of a market for his weanlings.

2. The feeder is assured of a supply of weanlings.

3. The terms of the contract give both parties better knowledge of costs and returns for planning their operations.

4. The weanling is moved only once, providing the feeder with a pig having a better chance of survival.

5. The feeder can have some influence on the breed and weight of weanling that he will be buying.

6. Weanling costs and returns are stabilized to some extent.

One common pricing formula is:

weanling price = 1.5 X weanling weight X price/lb of dressed pork.

FARROW-FINISH ENTERPRISE

Costings for this enterprise can be estimated by using the procedures and tables for the farrow-weanling and feeder enterprises. The weanling can be considered to be 'sold' to the feeder enterprise. If the weanling is 'sold' at the cost of production calculated for the farrow-weanling enterprise, any profits above a normal return to all inputs including labor and management will be attributable only to the feeder enterprise.

If the weanling is 'sold' at an estimated market value, any profits above the normal returns to all inputs will be attributed to the two enterprises in proportion to the contribution that each makes to the earning of those profits. Since it is usually important to know the costs and returns situation for each enterprise separately for planning purposes, the use of an estimated market value for 'sold' weanlings is likely to be most useful.

Whichever source of value is used for weanlings, remember that the weanling or feeder price used in estimating costs for the feeder enterprise covers all costs of the sow-weanling enterprise and that this one figure is the only item common to the cost calculations for both enterprises.

Some physical items such as feed storage, manure handling equipment and occasionally buildings may be used jointly by both the farrow-weanling and feeder enterprises. The costs arising from such items should be allocated between the two enterprises in the process of costing each of them separately, and need not be considered again for the combined farrow-finish enterprise.

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*Taken from John H. Chandler: Study of Factors Affecting Profitability of Feeder Hog Production in Prince Edward Island, Paper, Dept. of Agricultural Economics, University of Wisconsin, 1970.

APPENDIX 1.

COST CALCULATIONS FOR FARM PREPARED RATIONS[1]

Capital investment in:

Equipment	$ _____ (1)	
Storage and buildings[2]	_____ (2)	
	$ _____ (3)	

Annual fixed costs:

Depreciation: Equipment, _____ (1) at ____ %[3]	$ _____
: Storage and buildings, ____ (2) at ____ %[3]	$ _____
Cost of capital investment, _____ (3) at ____ %	_____
Repairs[4]	_____
Insurance	_____
Taxes on storage and buildings _____ (2) at ____ %	_____

Annual operating costs:

Power and utilities: _____ tons at $ _____	_____
Transportation: actual cost, or ____ miles at $ _____	_____
Labor, _____ hours at $ _____	_____
Custom work, actual cost, or _____ tons at $ ____ /ton	_____
Feed ingredients: _____ _____ tons at $ _____ /ton	_____
_____ _____ _____	_____
_____ _____ _____	_____
_____ _____ _____	_____
_____ _____ _____	_____
_____ _____ _____	_____
_____ _____ _____	_____
_____ _____ _____	_____
Total annual costs	$ _____
Annual feed volume	_____ tons
Cost/ton	$ _____

[1] See Gervason and Jose: Economics of Farm Feed Processing, Economics Division, Nova Scotia Dept. of Agriculture and Marketing, Truro, N.S., 41 pp., August 1970.

[2] Those in addition to feed storage associated with the swine barn.

[3] Typical depreciation rates are 10% of original value for equipment and 5% of original value for storages and buildings.

[4] Repairs would commonly be about 5% of original value for equipment and about 2% of original value for buildings.

APPENDIX 2
COSTING BLANKS FOR THE SOW-WEANLING ENTERPRISE

Item no.	Item	Level
1.	Nursing and sow feeding program	_____
2.	Number of litters/sow/year	_____
3.	Ration price for nursing sows	_____
4.	Ration price for dry sows	_____
5.	Amount of creep feed/weaned pig	_____
6.	Amount of starter/weaned pig	_____
7.	Price of creep feed	_____
8.	Price of starter	_____
9.	Number of pigs weaned/sow/year	_____
10.	Sow/boar ratio	
11.	Amount of feed/boar/year	_____
12.	Price of boar feed	_____
13.	Initial sow value	_____
14.	Cull sow value	_____
15.	Total sow depreciation	_____
16.	Total number of farrowings expected/sow	_____
17.	Initial boar value	_____
18.	Cull boar value	_____
19.	Total boar depreciation	_____
20.	Boar's expected service life, yr	_____
21.	Total real estate investment/sow	_____
22.	Annual real estate cost %	_____
23.	Hourly wage rate	_____
24.	Annual interest rate	_____
25.	Annual management charge, % of pig receipts	_____
26.	Expected weanling price/head	_____

ITEM AMOUNTS AND COSTS PER SOW PER YEAR

Expense		Item no.	Table	Amount	Cost/yr	% of total cost
A	Nursing ration	1, 2, 3	3	_____	$_____	_____
B	Dry sow ration	1, 2, 4	3	_____	_____	_____
C	Creep Feed	5, 7, 9	4	_____	_____	_____
D	Starter	6, 8, 9	4	_____	_____	_____
E	Boar feed	10, 11, 12	5	_____	_____	_____
	F Subtotal, items A-E, total feed				$	
G	Sow depreciation	2, 15, 16	6		_____	_____
H	Boar depreciation	10, 19, 20	7		_____	_____
I	Real estate charge	21, 22	8		_____	_____
J	Veterinary services, medicine	. .	.		_____	_____
K	Utilities and miscellaneous	. .	.		_____	_____
	L Subtotal, items G-K				$	
M	Sow labor	1, 2, 23	9	_____	_____	_____
N	Weanling labor	1, 9, 23	10	_____	_____	_____
	O Subtotal, items M and N				$	
P	Cost of capital	10, 13, 14, 17, 18, 21, 24				

sow boar barn feed

_____ x (_____ / 2 + _____ / 2x___ + _____ / 2 + _____ / 2) = _____ _____

Q	Management	9, 25, 26	
	_____ x _____ pigs x ____ /pig =		$ _____ _____
	Total cost/sow		$
	Total production cost/weaned pig		$ _____
R	Receipts, _____pigs x $_____ /pig =		$ _____
			/sow /pig
S	Return to labor, management and capital		_____ _____
	R-F-L = (_____) - (_____) - (_____) =		$ _____ $_____
T	Return to management and labor		
	S-P = (_____) - (_____) =		$ _____ $_____
U	Return to management		
	T-O = (_____) - (_____) =		$ _____ $_____
V	Return to capital		
	S-O-Q = (_____) - (_____) - (_____) =		$ _____ $_____
W	Return to labor		
	T-Q = (_____) - (_____) =		$ _____ $_____

COSTING BLANKS FOR THE FEEDER ENTERPRISE

Item no.	Item	Level
1.	Liveweight gain	_____
2.	Feed conversion	_____
3.	Ration price	_____
4.	Proportion of hog barn in use	_____
5.	Total real estate investment per hog housed	_____
6.	Rate of turnover	_____
7.	Annual real estate cost percentage	_____
8.	Labor requirement per hog, hours	_____
9.	Hourly wage rate	_____
10.	Annual interest rate	_____
11.	Management charge, percentage of gross receipts	_____
12.	Price of feeder	_____
13.	Utilities and miscellaneous	_____
14.	Veterinary services, medicine	_____
15.	Death loss	_____
16.	Expected pork price, dressed, lb	_____
17.	Expected dressing percentage	_____
18.	Expected index	_____

ITEM AMOUNTS AND COSTS PER HOG

Expense		Item no.	Table	Amount	Cost	% of total cost
A	Feed	1, 2, 3	13	_____	$_____	_____
B	Real estate cost	4, 5, 6, 7	14, 15		_____	_____
C	Feeder	12			_____	_____
D	Death loss	12, 15			_____	_____
E	Veterinary services, medicine	14			_____	_____
F	Utilities, miscellaneous	13			_____	_____
	G Subtotal, items A-F				$	
H	Labor	8, 9	16	_____	$_____	_____
I	Cost of capital	4, 5, 10, 12				
	_____ x ($\frac{\text{barn}}{2}$ + $\frac{\text{feed}}{2}$ + feeder) =				$_____	_____
J	Management	11, 16, 17, 18				
	_____ x _____ x _____ x _____ x _____ =				$_____	_____
	Total cost/hog				$	
K	Receipts/hog _____ x _____ x _____ x _____ =				$_____	
L	Return to labor, management and capital				/hog	
	K-G = (_____) · (_____) =				$_____	
M	Return to management and labor					
	L-I = (_____) · (_____) =				$_____	
N	Return to management					
	M-H = (_____) · (_____) =				$_____	
O	Return to capital					
	L-H-J = (_____) · (_____) · (_____) =				$_____	
P	Return to labor					
	M-J = (_____) · (_____) =				$_____	

DATE DUE
DATE DE RETOUR

MAY 23 MAI	1986		

INFORMATION
Edifice Sir John Carling Building
930 Carling Avenue
Ottawa, Ontario
K1A 0C7

IF UNDELIVERED, RETURN TO SENDER EN CAS DE NON-LIVRAISON, RETOURNER À L'EXPÉDITEUR