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Fertilizers

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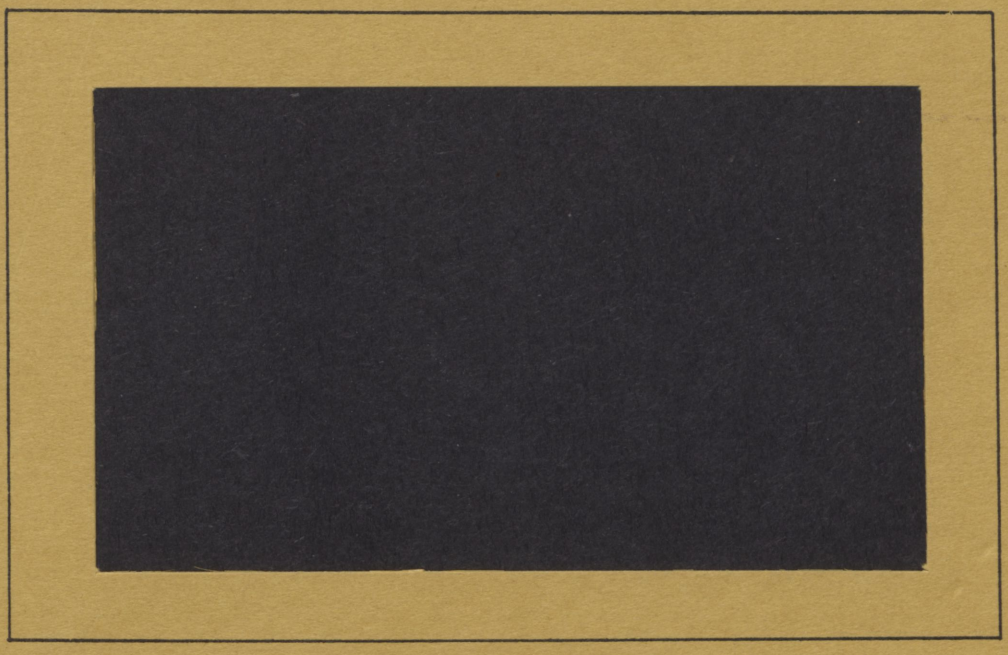

SCHOOL OF AGRICULTURAL ECONOMICS AND EXTENSION EDUCATION

ONTARIO AGRICULTURAL COLLEGE
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COST STRUCTURE OF ONTARIO BULK BLENDING FERTILIZER PLANTS

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INTRODUCTION

The School of Agricultural Economics and Extension Education at the University of Guelph, together with the Plant Food Council of Ontario, conducted a cost study of Ontario bulk blending firms in February and March of 1973. In this study, particular attention was devoted to defining and measuring the cost structure of bulk blending fertilizer plants. The results of this study are presented in this report.

Objective

The objective of this study was to determine the cost structure for Ontario bulk blending fertilizer plants. A one-year segment of costs were gathered from bulk blenders across the province. Several cost categories were defined to achieve this objective. These were: (1) operating, (2) administrative, (3) selling, (4) materials, and (5) depreciation. Averages of various cost components were calculated for all plants as well as for four separate size groupings of plants. Wherever possible, the cost categories were defined to be identical to those used in a recent TVA study of bulk blenders in the United States so that some comparisons could be made.

Methodology

Cost and sales data for Ontario bulk blending fertilizer plants were collected by means of a mail survey of all plants in the province. The questionnaire used in this survey was developed with the full cooperation of the member services committee of the Plant Food Council of Ontario, as well as several member firms. An original version of this instrument was designed in December of 1972 and pre-tested on a sample of eight representative firms. On the basis of the results of this pretest, an improved version of the questionnaire was mailed to all bulk blenders in Ontario in early January of 1973. A copy of the questionnaire is included in an Appendix for the interested reader.

The questionnaire, together with a covering letter, was mailed to all bulk blending plants in Ontario. Out of the 143 questionnaires distributed, only 39, or 27 percent, were returned. Given the low level of response, together with the fact that it is not possible to test for the representativeness of the sample, it will not be possible to generalize to the entire industry. Strictly speaking, any conclusions must apply only to the sample of 39 firms. Any broader interpretation of the results of this study must be made with caution.

A weakness of this study lies in the quality of data supplied by the cooperating firms. Even though most firms took great care in providing meaningful information, in many cases this became a difficult and somewhat arbitrary task. In order to compile consistent information it was necessary to request that all of the cost and sales data be supplied on the basis of the fertilizer operation of a single plant. This led to two major problems, both related to the type of firms prevalent in the bulk blending industry. The first problem arose from the fact that almost all firms involved in bulk blending are also involved in other enterprises as well. For example, it is common to find bulk blenders who also distribute seeds, chemicals, feeds, etc. Thus, in order to provide meaningful cost data for fertilizer alone, it was necessary to allocate costs to each product. Without enterprise accounting this can be a difficult and highly subjective process. To aid the firms in this respect, a rule of thumb was established by which only those firms whose sale of products other than fertilizers was greater than ten percent of total sales would be asked to allocate costs among products. Thus firms whose sideline enterprises amounted to less than ten percent of total sales did not allocate costs. If this rule were consistently followed, it would almost certainly tend to bias the costs of fertilizer bulk blending operations upwards.

The second allocation problem arose in those cases where firms had more than one plant. Since the basic unit of analysis was a bulk blending plant, it was necessary for these firms to allocate costs by plant. This process was

not difficult for most cost items, however, in the case of insurance and certain administrative costs, this became rather subjective. Nonetheless, these firms were asked to make as reasonable an estimate as possible.

It is impossible to accurately assess the error introduced into the cost estimates due to the above problems. Hopefully this error is random and has very little, if any, effect on the estimates.

In all cases, the bulk blending firms were asked to supply data from their last fiscal year. In most cases this corresponded to calendar year 1972.

Sample Description

The sample of firms included in the analysis consisted of 38 bulk blenders. Although 39 useable questionnaires were received, one firm was so much larger than the rest that it could not be included in any of the four size categories. To publish its data alone was not within the confidentiality guidelines established at the outset of the project. As a result, the data of this firm was excluded from further analysis.

The four size groups were defined after most of the questionnaires had been returned to the university. The definitions of the groups are:

Group A - under 1900 tons/year

Group B - 1900 to 3499 tons/year

Group C - 3500 to 5999 tons/year

Group D - Over 6000 tons/year

A brief description of the sample firms is shown in Table 1. This table shows the four size groups, and for each group the number of firms in that group, the number of firms with different types of ownership, the observed sales range in terms of tons per year, and the average sales for each group.

Figure 1 shows the geographical distribution of the sample firms. Although there are 38 firms in the sample, there are fewer than 38 locations shown on the map. This is because in a number of cases there was more than one plant in the same location.

TABLE 1. Description of Sample Firms

Size Group	Number of Plants	Ownership	Observed Sales Range (tons)	Average Sales (tons)
Group A	5	1 Independent 4 Subsidiary	467-1814	1238
Group B	9	3 Independent 1 Franchise 5 Subsidiary	1922-3463	2510
Group C	15	7 Independent 3 Partnership 5 Subsidiary	3905-5700	4710
Group D	9	1 Independent 1 Franchise 5 Partnership 2 Subsidiary	6151-9200	7395
All Plants	38	12 Independent 2 Franchise 8 Partnership 16 Subsidiary	467-9200	4368

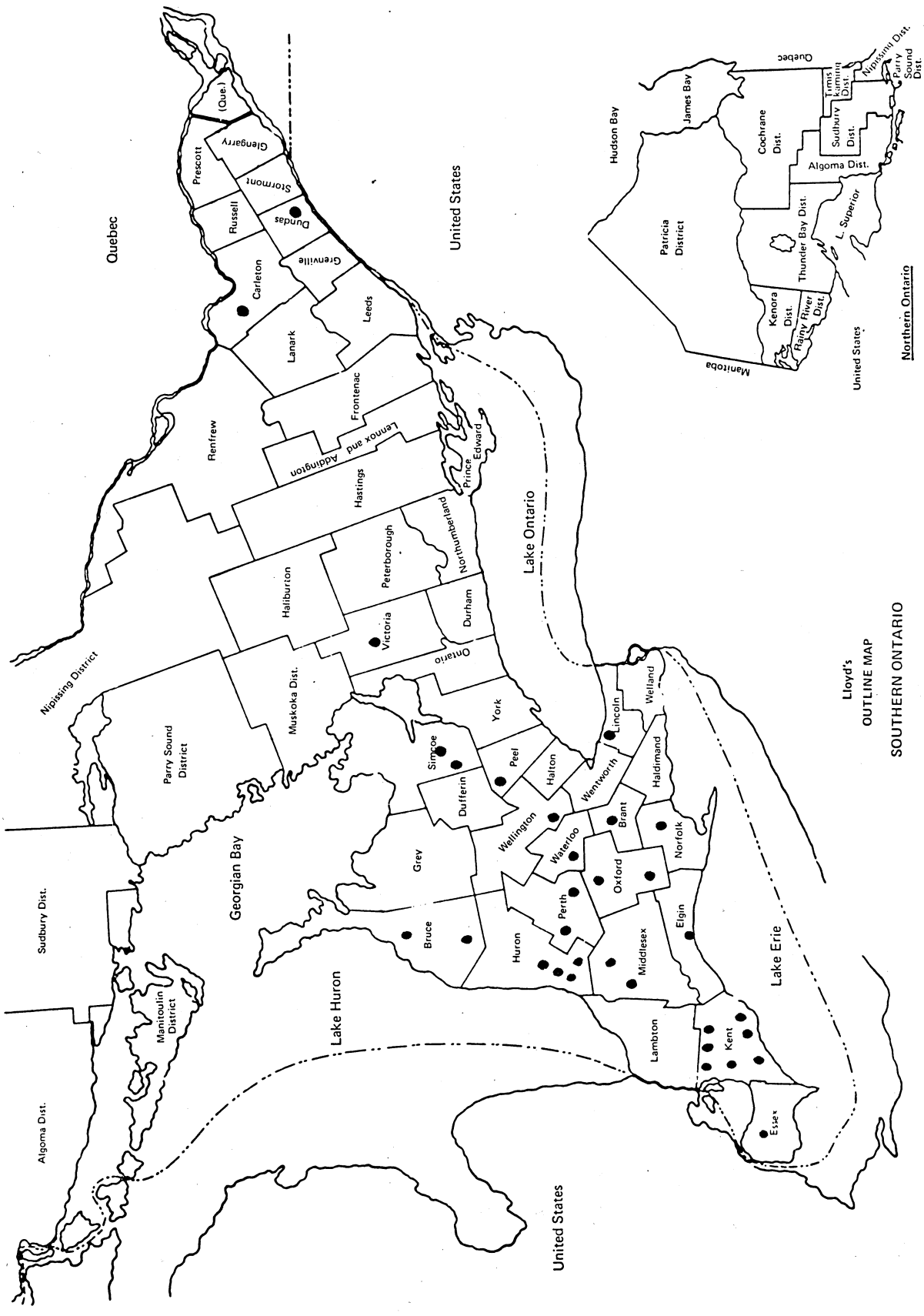

FIGURE 1. Geographical Distribution of Plants

RESULTS

The data supplied by the 38 sample firms was sorted into the four size groups and all subsequent analysis done on this basis. The major part of the analysis consisted of determining averages, by size group, for various sales and cost categories.

Sales

Each firm in the sample supplied detailed sales data. Five sales categories for fertilizer were defined and information was collected on both tonnages and dollar sales. The five sales categories were: (1) Materials, (2) Dry Mixed Fertilizers, (3) Mixed Liquid Fertilizers, (4) Nitrogen Solutions, and (5) Anhydrous Ammonia. In addition, data was collected on other income categories related to fertilizer sales. These related categories were: (1) Service charges on sales, (2) Delivery, (3) Spreading, and (4) Machine rental. The tonnage and dollar sales for each major product group are shown in Table 2.

Figure 2 illustrates the percentage breakdown of sales by product group for the average firm in the sample. Dry fertilizer sales are seen to be the most important, followed by materials, nitrogen solutions, and anhydrous ammonia. Sales of mixed liquid fertilizers for the average bulk blending plant were negligible.

In Table 3 other income is broken down into its component parts. This table shows the total dollar value of each category of other income for each size group and for all plants. In addition, it also shows the percentage each category is of the total.

Operating Costs

Data was requested from each plant on various categories of operating costs. The average operating costs for each size group and all plants are shown by cost category in Table 4.

Table 4 also gives the cost/ton for each of the operating cost categories to permit easy comparisons among the four size groups of plants. For most cost categories it can be seen that the cost/ton tends to increase as the size of the

TABLE 2. Sales Breakdown, By Size Group, for Ontario Bulk Blenders

Product	Group A		Group B		Group C		Group D		All Plants	
	Tons	Dollars	Tons	Dollars	Tons	Dollars	Tons	Dollars	Tons	Dollars
Materials	270	19,508	578	40,706	1,382	93,160	1,821	127,356	1,150	79,144
Dry Mixed Fertilizers	796	56,996	1,586	110,599	2,783	203,724	4,958	348,569	2,753	196,666
Mixed Liquid Fertilizers	-	-	-	-	50	3,454	3	260	20	1,425
Nitrogen Solutions	141	7,568	206	7,851	224	10,492	285	19,449	223	11,603
Anhydrous Ammonia	31	3,212	140	13,359	271	23,325	328	30,273	221	19,963
Total Fertilizer Sales	1,238	87,284	2,510	172,514	4,710	334,155	7,395	525,907	4,368	308,801
Other Income		2,091		6,218		12,615		21,827		10,317
Total Revenue		$89,375		$178,732		$346,770		$547,734		$319,118

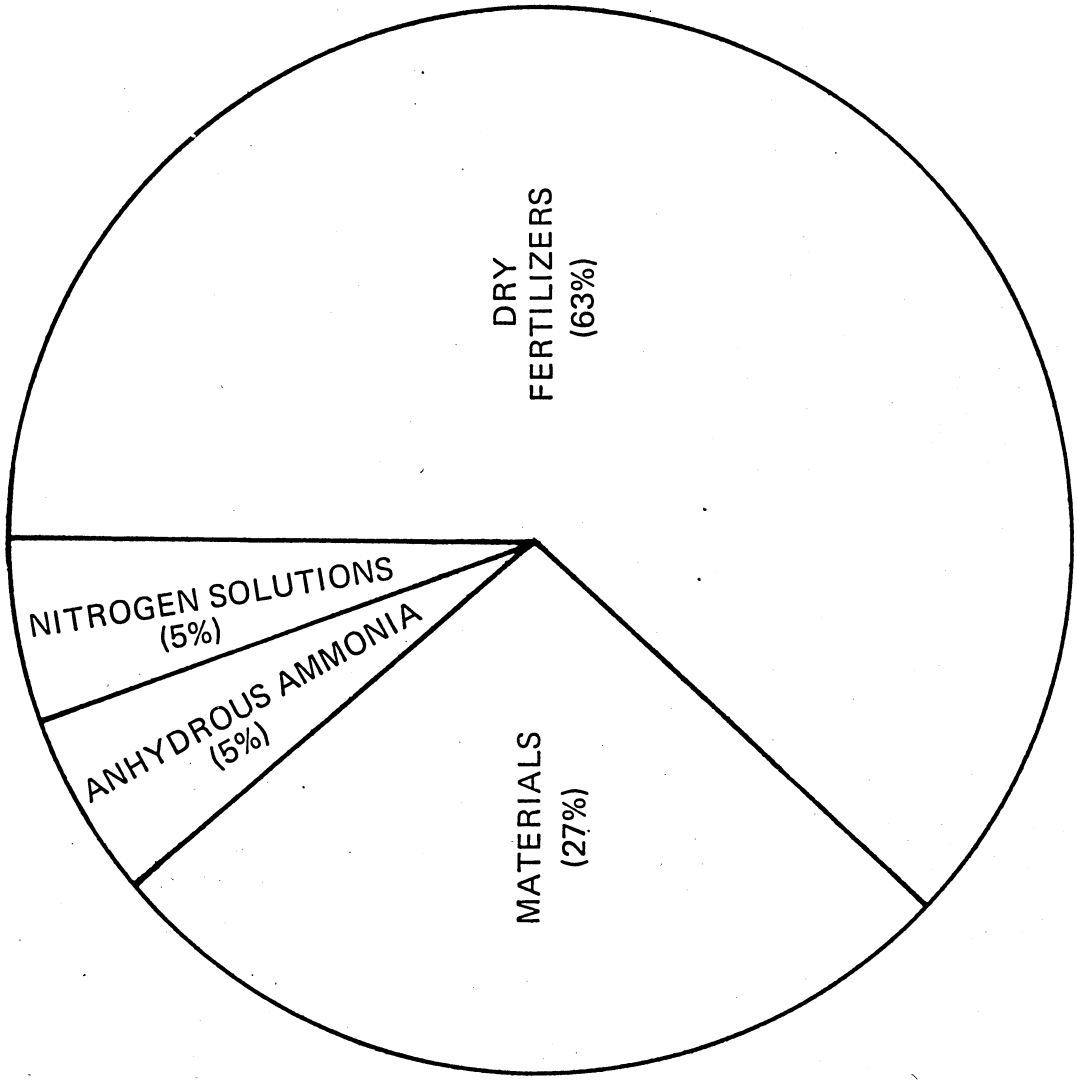

FIGURE 2. Sales Breakdown By Product

TABLE 3. Related Income Sources, By Size Group, for Ontario Bulk Blenders

Income Category	Group A		Group B		Group C		Group D		All Plants	
	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
Service Charges on Sales	0	0.0	2,189	35.2	4,768	37.8	10,230	46.8	4,824	46.7
Delivery Charges	133	6.4	774	12.4	1,290	10.2	1,417	6.5	1,044	10.1
Spreading Charges	714	34.1	1,864	30.0	1,466	11.6	4,333	19.9	2,143	20.7
Machine Rental	1,244	59.5	1,391	22.4	5,092	40.3	5,847	26.8	2,306	22.3
Total	$2,091	100.0	$6,218	100.0	$12,615	100.0	$21,827	100.0	$10,317	100.0

TABLE 4. Operating Costs, By Size Group, for Ontario Bulk Blenders

Operating Cost Category	Group A		Group B		Group C		Group D		All Plants	
	Total	$/ton	Total	$/ton	Total	$/ton	Total	$/ton	Total	$/ton
Operating Labor	$2,407	1.94	$6,216	2.48	$12,826	2.72	$25,833	3.49	$12,970	2.97
Utilities, gas, oil	312	0.25	443	0.18	1,798	0.38	2,003	0.27	1,330	0.30
Repairs and Supplies	434	0.35	1,684	0.67	6,071	1.29	10,557	1.43	5,352	1.23
License	45	0.04	147	0.06	349	0.07	364	0.05	264	0.06
Telephone, postage	139	0.11	387	0.15	917	0.19	1,949	0.26	933	0.21
Soil and Tissue Testing	0	0.00	33	0.01	44	0.01	242	0.04	82	0.02
Bad Debts	100	0.08	617	0.25	1,222	0.26	3,760	0.51	1,532	0.35
Insurance[1/]	431	0.35	531	0.21	1,722	0.37	2,415	0.33	1,434	0.32
Leased Equipment	321	0.26	829	0.33	2,237	0.47	2,240	0.30	1,652	0.38
Other Expenses	572	0.46	751	0.30	5,249	1.11	4,946	0.67	3,496	0.80
Total	$4,761	3.85	$11,760	4.68	$33,049	7.02	$55,854	7.55	$29,682	6.79

1/ Includes liability, inventory, and vehicle insurance.

plant increases. This tendency is particularly noticeable for operating labor and repairs and supplies. When the total operating labor and repairs and supplies. When the total operating costs/ton are compared for the four groups it can be seen that the cost/ton for Group A firms is less than one-half of what it is for the larger, Group D firms.

Administrative Costs

Information was also collected on several categories of administrative costs. The average administrative costs for each size group and all plants are shown by cost category in Table 5. This table also shows the administrative costs per ton of fertilizer sold.

In total it can be seen that administrative costs/ton tend to increase as the size of the plant increases. Most of this increase can be attributed to higher administrative salaries, clerical labor, fringe benefits, and legal and accounting costs for the larger firms.

Selling Costs

Several categories of selling costs were defined. The average cost and cost/ton for these categories are reported in Table 6. Again, it is clear that selling cost/ton tend to increase as the size of the plant increases. This is true in total and for most of the detailed selling cost categories.

Depreciation

Depreciation is defined as the reduction of capital investment due to wear and obsolesence. This is a difficult cost item to estimate because the depreciation period, or the number of years of useful life, varies from one piece of equipment to another, and between classes of equipment. In addition the depreciation period is influenced by the use made of the equipment and the maintenance program. Despite these difficulties, each firm was asked to supply their best estimates of depreciation costs for each major classification of facilities and equipment. The total of these estimates for each size group is:

TABLE 5. Administrative Costs, by Size Group, for Ontario Bulk Blenders

Administrative Cost Category	Group A		Group B		Group C		Group D		All Plants	
	Total	$/ton	Total	$/ton	Total	$/ton	Total	$/ton	Total	$/ton
Administrative Salaries	$1,712	1.38	$1,364	0.54	$8,848	1.88	$13,770	1.86	$7,302	1.67
Clerical Labor	240	0.19	1,150	0.46	1,701	0.36	3,250	0.44	1,745	0.40
Fringe Benefits[1]	183	0.15	946	0.38	1,974	0.42	3,419	0.46	1,837	0.42
Land Rent	5	-	48	0.02	71	0.01	260	0.04	101	0.02
Building Insurance	65	0.05	321	0.13	362	0.08	- [2]	-	227	0.05
Legal and Accounting	80	0.06	211	0.08	1,040	0.22	1,925	0.26	926	0.21
Property Taxes	499	0.40	1,380	0.55	1,702	0.36	2,329	0.31	1,615	0.37
Other Expenses	12	0.01	1,468	0.58	3,900	0.82	5,756	0.78	3,252	0.74
Total	$2,796	2.26	$6,888	2.74	$19,598	4.16	$30,714	4.15	$17,005	3.89

[1] Includes Canada Pension Plan, OHSC, OHSIP, UIC, Group Life, Group Medical, Long Term Disability, etc.

[2] The larger Group D plants did not allocate any insurance to this category. Instead, their total insurance expense is reported in Table 4.

TABLE 6. Selling Costs, By Size Group, for Ontario Bulk Blenders

Selling Cost Category	Group A		Group B		Group C		Group D		All Plants	
	Total	$/ton	Total	$/ton	Total	$/ton	Total	$/ton	Total	$/ton
Salesmen's Salaries	$1,164	0.94	$2,505	1.00	$3,235	0.69	$6,478	0.87	$3,557	0.81
Salesmen's Expenses	125	0.10	495	0.20	497	0.11	2,331	0.31	882	0.20
Advertising	109	0.08	372	0.15	808	0.17	1,464	0.20	768	0.18
Automobile Expense	173	0.14	222	0.09	855	0.18	1,303	0.18	721	0.17
Discount on Sales	220	0.18	533	0.21	2,574	0.55	3,821	0.52	2,075	0.48
Other Expenses	-	-	190	0.07	1,543	0.33	4,151	0.56	1,637	0.37
Total	$1,791	1.45	$4,317	1.72	$9,512	2.02	$19,548	2.64	$9,640	2.21

	Average Cost	$/ton
Group A	$3,847	3.11
Group B	7,605	3.03
Group C	11,334	2.41
Group D	16,295	2.20
All Plants	10,640	2.43

Materials Cost

In this study materials were not broken down into individual ingredients, but rather treated as a single item. An attempt was made, however, to separate out the transportation cost associated with delivering the materials to the plant. Since only a few firms were able to provide this detailed information, it was decided to report only the net delivered materials cost (at blender price). This cost item for each size group is as follows:

	Average Cost	$/ton
Group A	72,182	58.30
Group B	146,925	58.54
Group C	271,804	57.71
Group D	409,189	55.33
All Plants	248,499	56.89

Operating Profit

Having looked at total revenue in terms of fertilizer sales and other related income, and total cost in terms of operating, administrative, selling, depreciation, and materials cost, it is now possible to put these together to determine operating profit. This has been done and is reported in Table 7.

The income and expense categories shown in this table are simply summaries of the detailed cost information discussed earlier. The bottom line shows the operating profit for each size group in terms of total dollars and dollars/ton.

It is interesting to observe the rather wide variation in operating profits among the four size groups. Group A, the smaller bulk blenders, have by

TABLE 7. Operating Profits, By Size Group, for Ontario Bulk Blenders

	Group A		Group B		Group C		Group D		All Plants	
	Dollars	$/ton	Dollars	$/ton	Dollars	$/ton	Dollars	$/ton	Dollars	$/ton
Income:										
Sale of Fertilizer	$87,284	$70.50	$172,514	$68.73	$334,155	$70.95	$525,907	$71.11	$308,801	$70.69
Other Income	2,091	1.69	6,218	2.47	12,615	2.67	21,827	2.95	10,317	2.71
Total	89,375	72.19	178,732	71.20	346,770	73.62	547,734	74.06	319,118	73.05
Material Cost	72,182	58.30	146,925	58.54	271,304	57.71	409,189	55.33	248,499	56.89
Gross Margin	17,193	13.89	31,807	12.66	74,966	15.91	138,545	18.73	70,619	16.16
Expenses:										
Operating	4,761	3.85	11,760	4.68	33,049	7.02	55,854	7.55	29,682	6.79
Administrative	2,796	2.26	6,888	2.74	19,598	4.16	30,714	4.15	17,005	3.89
Selling	1,791	1.45	4,317	1.72	9,512	2.02	19,548	2.64	9,640	2.21
Depreciation	3,847	3.11	7,605	3.03	11,334	2.41	16,295	2.20	10,640	2.43
Total	13,195	10.67	30,570	12.17	73,493	15.60	122,411	16.54	66,967	15.32
Operating Profit	$3,998	$3.22	$1,237	$0.49	$1,466	$0.31	$16,337	$2.20	$3,652	$0.83

far the largest operating profit in terms of dollars/ton. This is largely due to the fact that, although their depreciation and materials cost is the highest of any group, their operating, administrative, and selling costs are substantially lower.

Group B firms show an operating profit of only $0.49/ton, considerably below that of the small blenders. Although there are differences between Group A and Group B firms in terms of operating, administrative, and selling costs, the major difference is due to the lower average selling price, hence gross margin of Group B firms.

Group C firms experience the lowest operating profit of any group. This is mainly the result of the large increases in most of the cost categories from the two smaller groups.

Finally, Group D firms, although not as profitable as those in Group A, showed a relatively high operating profit of $2.20/ton. In this case, the higher operating profit can be attributed to a higher gross margin per ton of fertilizer sold.

Figure 3 illustrates how each dollar of fertilizer sales for all plants is distributed among the five major cost items and operating profit.

Interest Charges

The operating profit defined in the previous section does not take into account interest charges on invested capital; thus it does not reflect the true economic profitability of the various firms in the bulk blending fertilizer industry. To determine this economic profitability it is necessary to deduct interest on invested capital.

The investment in a bulk blending operation consists of all the assets used by these firms. Two types or categories of assets are particularly relevant. These are working capital and fixed investments. Working capital usually consists of cash, inventories, and accounts receivable, however in this study only accounts receivable are considered since appropriate data on cash and inventories was not

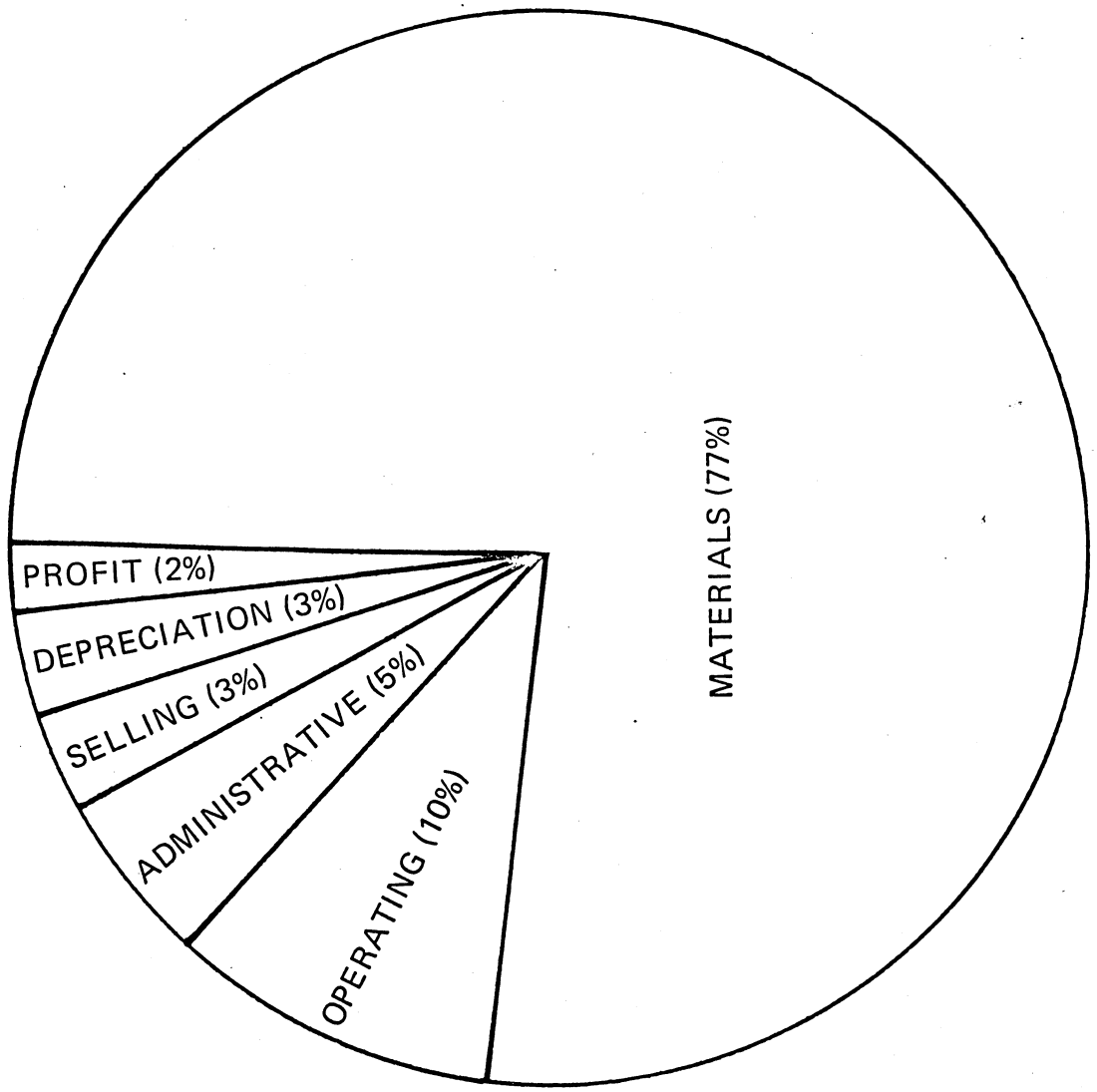

FIGURE 3. Breakdown of Fertilizer Sales Dollar Into Cost Categories

available. Fixed investments include land, buildings, and equipment. All of these fixed assets are considered in this project.

The specific measure of working captial adopted was the average annual level of accounts receivable. Unfortunately the data supplied by the cooperating firms was inadequate in this area. Only in the case of Group D firms was sufficient data received to accurately determine the average level of accounts receivable. As a result it was necessary to estimate the level of accounts receivable for the other groups. This was done by determining the level of accounts receivable for Group D firms as a percentage of total revenue, and then multiplying this percentage by the total revenue of the other groups to estimate their accounts receivable. This procedure assumes there is a constant relationship between sales and accounts receivable.

The average annual level of accounts receivable for Group D firms was determined to be $178,284. This amount is 32 percent of the total revenue of firms in this group. Using 32 percent of total revenue as a constant percentage, the following estimates of working capital were computed. Interest was charged at a rate of 8 percent to determine the interest charge for working capital.

	Working Capital	Interest Charge
Group A	$28,466	$2,277
Group B	57,194	4,575
Group C	110,966	8,877
Group D	178,284	14,262
All plants	103,319	8,705

The second major category of investment for bulk blending firms is the fixed investment in land, buildings, and equipment. Data on several categories of fixed investment was supplied by the cooperating firms and is summarized in Table 8. The major fixed investment categories considered were: (1) land, (2) buildings, (3) office equipment, (4) vehicles, (5) blender and related equipment, (6) spreading equipment, (7) storage tanks, and (8) other.

TABLE 8. Fixed Investment, By Size Groups, for Ontario Bulk Blenders

Fixed Assets	Group A		Group B		Group C		Group D		All Plants	
	Dollars	$/ton	Dollars	$/ton	Dollars	$/ton	Dollars	$/ton	Dollars	$/ton
Land	$ 825	0.67	$4,567	1.82	$ 2,687	0.57	$ 6,748	0.91	$ 3,848	0.88
Buildings	15,500	12.52	20,947	8.34	54,122	11.49	59,298	8.01	42,408	9.71
Office Equipment	75	0.06	150	0.06	1,717	0.36	1,565	0.21	1,093	0.25
Vehicles[1]	7,125	5.75	10,679	4.25	8,790	1.86	10,771	1.46	9,488	2.17
Blender and related equipment[2]	11,037	8.91	14,417	5.74	29,756	6.31	31,980	4.32	24,186	5.53
Spreading equipment[3]	7,975	6.44	23,995	9.56	29,920	6.35	53,170	7.19	31,135	7.13
Storage Tanks	1,000	0.81	4,478	1.78	1,296	0.28	2,238	0.30	2,234	0.51
Other	-	-	444	0.18	1,814	0.38	2,567	0.34	1,429	0.33
Total	43,537	35.17	79,677	31.74	130,102	27.62	168,337	22.76	115,821	26.52

1/ Includes automobiles, tractors, trucks, pickup trucks, and trailers.

2/ Includes fork lift, bagging equipment, blending equipment, and pallets.

3/ Includes Dry Spreaders, delivery units, loading and unloading equipment; rail tracks and ties; NH_3 applicators and nurse tanks; Nitrogen solution applicators, nurse tanks, and delivery units; and liquid applicators, nurse tanks, and delivery units.

In Table 8 the investment in the above categories are reported in terms of total dollars and dollars/ton. It is interesting to observe that the fixed investment per ton of fertilizer sold tends to decrease as tons sold increases.

To determine the interest charge on fixed investment, the total investment at cost in each size group was multiplied by an 8 percent interest rate. This gave the following estimates of interest on investment:

	Fixed Investment	Interest Charge
Group A	$43,537	$3,483
Group B	76,677	6,376
Group C	130,102	10,408
Group D	168,337	13,466
All Plants	115,821	9,266

Net Profit

In an earlier section, net operating profits were calculated for each size group of bulk blenders. These operating profits are more or less synonymous with accounting profits in the sense that they reflect the difference between the total value of sales and all of the direct and indirect expenses involved in producing, selling, and distributing this volume of sales. However, these operating profits do not take into account interest charges on invested capital, hence they do not reflect the opportunity cost of the capital invested in a bulk blending operation. To reflect this opportunity cost it is necessary to deduct interest charges on the investment.

These interest charges have been deducted in Table 9. The resulting profit (loss) figures thus represent pure economic profit (loss). In the case of a profit, these estimates would show the profit of a firm, or group of firms in this case, after a return of 8 percent on invested capital had been considered. In the case of a loss, these estimates show the amount by which profit would have to be increased for the firm to earn a return of 8 percent on the capital invested in the firm.

TABLE 9. Net Profit (Loss), By Size Group, for Ontario Bulk Blenders

	Group A	Group B	Group C	Group D	All Plants
Total Revenue from sale of fertilizer and related items	$89,375	$178,732	$346,770	$547,734	$319,118
Total Operating Costs	85,377	177,495	345,304	531,397	315,466
Interest on Working Capital	2,277	4,575	8,877	14,262	8,705
Interest on Fixed Investment	3,483	6,376	10,408	13,466	9,266
Net Profit (loss)	(1,762)	(9,714)	(17,819)	(11,391)	(14,319)
Net Profit (loss)/ton	(1.42)	(3.87)	(3.78)	(2.60)	(3.28)

The profit (loss) estimates in Table 9 show that all of the groups of bulk blenders operated at a loss in the sense that they failed to earn an 8 percent return on their investment. In the case of Group A firms this loss was small -- $1.42 per ton. However, in the case of the other three groups the loss was larger, particularly in the case of Groups B and C. For all plants in the sample the loss averaged approximately $3.00 per ton.

Breakeven Analysis

The costs associated with a bulk blending operation are of two types -- fixed and variable. Fixed costs, by definition, are constant; that is, they do not vary as sales volume changes. Of course this is true only within some specified range of output. A large expansion of volume beyond the capacity of the facilities and equipment of the firm will require additional fixed costs.

Variable costs, on the other hand, tend to vary directly with sales volume. For a bulk blender the major component of variable costs is the expenditure for materials. However, there are other costs incurred by bulk blenders such as labor, utilities, bags, etc. which also vary more or less directly with sales volume.

In Tables 10 through 13 all of the costs associated with a blending operation have been sorted into variable and fixed cost categories for each size group. Given this data, the following equations can be used to estimate total costs for any level of sales volume.

Group A: Total Costs = 12,437 + 63.56 X Volume

Group B: Total Costs = 26,120 + 64.67 X Volume

Group C: Total Costs = 53,358 + 66.07 X Volume

Group D: Total Costs = 84,435 + 64.17 X Volume

The above equations simply relate total costs to fixed and variable costs. For example, the equation for Group A says that total costs are equal to fixed costs

TABLE 10. Fixed and Variable Costs for Group A Blenders

Variable Costs	Total	$/ton
Operating Labor	$2,407	$ 1.94
Utilities, gas, oil	312	0.25
Repairs and supplies[2]	217	0.18
Bags	0	0.00
Leased Equipment	321	0.26
Fringe Benefits[2]	91	0.07
Discount on Sales	220	0.18
Other Operating[3]	672	0.54
Materials	72,182	58.31
Interest on Working Capital	2,277	1.83
Total Variable Costs	78,699	63.56
Fixed Costs		
Repairs and Supplies[2]	217	0.18
Insurance	431	0.35
Administrative Salaries	1,712	1.38
Clerical labor	240	0.19
Fringe Benefits[2]	91	0.07
Property Taxes	499	0.40
Other Administrative[4]	276	0.22
Selling Expenses[5]	1,571	1.27
Depreciation	3,847	3.11
Interest on Fixed Investment	3,483	2.81
Total Fixed Costs	12,437	10.04

1/ Group A Blenders are those with annual sales of 1238 tons. The average price per ton of product and associated services for this group was $72.19.

2/ Apportioned equally between fixed and variable costs.

3/ Also includes freight and bad debts.

4/ Also includes license, telephone, postage, soil and tissue testing, and legal and accounting.

5/ Includes salesmen's salaries, salesmen's expenses, advertising, automobile expense, and other selling expenses.

TABLE 11. Fixed and Variable Costs for Group B Blenders

Variable Costs	Total	$/ton
Operating Labor	$ 6,216	$ 2.48
Utilities, gas, oil	443	0.18
Repairs and Supplies[2]	842	0.34
Bags	556	0.22
Leased Equipment	829	0.33
Fringe Benefits[2]	473	0.19
Discount on Sales	533	0.21
Other Operating[3]	1,490	0.59
Materials	146,369	58.31
Interest on Working Capital	4,575	1.82
Total Variable Costs	162,326	64.67
Fixed Costs		
Repairs and Supplies[2]	842	0.34
Insurance	531	0.21
Administrative Salaries	1,364	0.54
Clerical labor	1,150	0.46
Fringe Benefits[2]	473	0.19
Property Taxes	1,380	0.55
Other Administrative[4]	2,246	0.89
Selling Expenses[5]	3,784	1.51
Depreciation	7,605	3.03
Interest on Fixed Investment	6,376	2.54
Total Fixed Costs	26,120	10.40

1/ Group B Blenders are those with annual sales of 2510 tons. The average price per ton of product and associated services for this group was $71.20.

2/ Apportioned equally between fixed and variable costs.

3/ Also includes freight and bad debts.

4/ Also includes license, telephone, postage, soil and tissue testing, and legal and accounting.

5/ Includes salesmen's salaries, salesmen's expenses, advertising, automobile expense, and other selling expenses.

TABLE 12. Fixed and Variable Costs for Group C Blenders

Variable Costs	Total	$/ton
Operating Labor	$12,826	$ 2.72
Utilities, gas, oil	1,798	0.38
Repairs and supplies[2]	3,035	0.64
Bags	2,810	0.60
Leased Equipment	2,237	0.47
Fringe Benefits[2]	987	0.21
Discount of Sales	2,574	0.55
Other Operating[3]	7,085	1.50
Materials	268,994	57.11
Interest on Working Capital	8,877	1.88
Total Variable Costs	311,223	66.07
Fixed Costs		
Repairs and Supplies[2]	3,035	0.64
Insurance	1.722	0.37
Administrative Salaries	8,848	1.88
Clerical labor	1,701	0.36
Fringe Benefits[2]	987	0.21
Property Taxes	1,702	0.36
Other Administrative[4]	6,321	1.34
Selling Expenses[5]	6,938	1.47
Depreciation	11,334	2.41
Interest on Fixed Investment	10,408	2.21
Total Fixed Costs	53,358	11.32

1/ Group C Blenders are those with annual sales of 4710 tons. The average price per ton of product and associated services for this group was $73.62.

2/ Apportioned equally between fixed and variable costs.

3/ Also includes freight and bad debts.

4/ Also includes license, telephone, postage, soil and tissue testing, and legal and accounting.

5/ Includes salesmen's salaries, salesmen's expenses, advertising, automobile expense, and other selling expenses.

TABLE 13. Fixed and Variable Costs for Group D Blenders

Variable Costs	Total	$/ton
Operating Labor	$25,833	$ 3.49
Utilities, gas, oil	2,003	0.27
Repairs and supplies[2]	5,278	0.71
Bags	2,803	0.38
Leased Equipment	2,240	0.30
Fringe Benefits[2]	1,709	0.23
Discount on Sales	3,821	0.52
Other Operating[3]	10,251	1.39
Materials	406,386	54.95
Interest on working capital	14,262	1.93
Total Variable Costs	474,586	64.17
Fixed Costs		
Repairs and Supplies[2]	5,278	0.71
Insurance	2,415	0.33
Administrative Salaries	13,770	1.86
Clerical labor	3,250	0.44
Fringe Benefits[2]	1,709	0.23
Property Taxes	2,329	0.31
Other Administrative[4]	10,236	1.38
Selling Expenses[5]	15,727	2.13
Depreciation	16,295	2.20
Interest on Fixed Investment	13,466	1.82
Total Fixed Costs	84,435	11.41

1/ Group D Blenders are those with annual sales of 7395 tons. The average price per ton of product and associated services for this group was $74.06.

2/ Apportioned equally between fixed and variable costs.

3/ Also includes freight and bad debts.

4/ Also includes lecense, telephone, postage, soil and tissue testing, and legal and accounting.

5/ Includes salesmen's salaries, salesmen's expenses, advertising, automobile expense, and other selling expenses.

($12,437) plus variable costs ($63.56 X Volume expressed in annual tons). As an example, assume a Group A firm wishes to estimate the total costs associated with a volume of 1500 tons. This would be done in the following manner:

$$\begin{aligned} \text{Total Costs} &= \$12,437 + \$63.56/\text{ton} \times 1500 \text{ tons} \\ &= \$12,437 + 95,340 \\ &= \$107,777 \end{aligned}$$

Total revenue for a firm also can be expressed in terms of an equation. Total revenue for a bulk blending firm is simply the total number of tons of fertilizer sold per year times the average price per ton. Using the average prices shown in Tables 10 through 13, the following equations can be used to estimate total revenue at any sales volume.

Group A: Total Revenue = 72.19 X Volume

Group B: Total Revenue = 71.20 X Volume

Group C: Total Revenue = 73.62 X Volume

Group D: Total Revenue = 74.06 X Volume

Continuing the above example, a Group A blender could estimate total revenue at 1500 tons in the following manner:

$$\begin{aligned} \text{Total Revenue} &= \$72.19/\text{ton} \times 1500 \text{ tons} \\ &= \$108,285 \end{aligned}$$

Profit is the difference between total revenue and total costs. In the above example, the profit estimate for a Group A blender at 1500 tons would be:

$$\begin{aligned} \text{Profit} &= \text{Total Revenue} - \text{Total costs} \\ &= \$108,285 - \$107,777 \\ &= \$508 \end{aligned}$$

In breakeven analysis, the basic idea is to determine that level of volume at which profits are zero. Below this level losses are incurred, while above this level profits are earned. Given the equations developed above it is relatively simple to determine the breakeven points for each size group.

By definition the breakeven volume is where profits are zero. Therefore, at this point total revenue is equal to total costs. Using this basic definition the breakeven points for each group are calculated in the following manner:

Group A

Total Revenue = Total Cost

72.19 X Volume = 12,437 + 63.56 X Volume

8.63 X Volume = 12,437

Breakeven Volume = 1440 tons/year

Group B

Total Revenue = Total Cost

71.20 X Volume = 26,120 + 64.67 X Volume

6.53 X Volume = 26,120

Breakeven Volume = 4000 tons/year

Group C

Total Revenue = Total Cost

73.62 X Volume = 53,358 + 66.07 X Volume

7.55 X Volume = 53,358

Breakeven Volume = 7067 tons/year

Group D

Total Revenue = Total Cost

74.06 X Volume = 84,435 + 64.17 X Volume

9.87 X Volume = 84,435

Breakeven Volume = 8537 tons/year

The breakeven chart is shown in Figure 4. In this graph the vertical axis is measured in terms of dollars, while the horizontal axis is measured in terms of tons of fertilizer sold per year. Four separate breakeven situations are shown in this one graph, one for each of the size groups of firms.

For each group, the breakeven chart shows the cost structure associated with that size. As an example, consider Group D. The average fixed cost for Group D firms is $84,435. This cost is shown by the horizontal line at the bottom of the graph. It is perfectly horizontal since it is assumed that these costs are not related to volume, hence are constant for this group between annual volumes of 7000 to 9000 tons.

The variable costs and total revenue for Group D firms are shown at the top of the graph. At volumes below 8537 tons/year total costs are greater than total revenue, hence these firms incur a loss. At 8537 tons/year total costs equal total revenue, hence profits are zero and this is the breakeven volume. Finally, at volumes above 8537 tons/year the firm will earn a profit. It should be pointed out at this point that profit in this context refers to pure economic profit, hence includes a provision for return on investment at 8 percent interest. Each of the other groups can be analyzed in this same manner.

Given the structure of costs and total returns as they exist for each group, it is clear that all groups are operating below their breakeven points. In some cases, particularly for Groups B and C, the difference between the average volume and the breakeven volume is substantial. In the case of Group A firms, this difference is quite small.

Extreme caution must be exercised in using breakeven analysis as a basis for decision-making. The immediate reaction one might have to the situation as shown in Figure 4 could be that the only alternative is to increase volume. This is certainly not the case. Given the structure of costs and total returns as shown in the Figure this approach might be true. However, other approaches aimed at changing the cost and total returns structure itself, might be more effective. If this

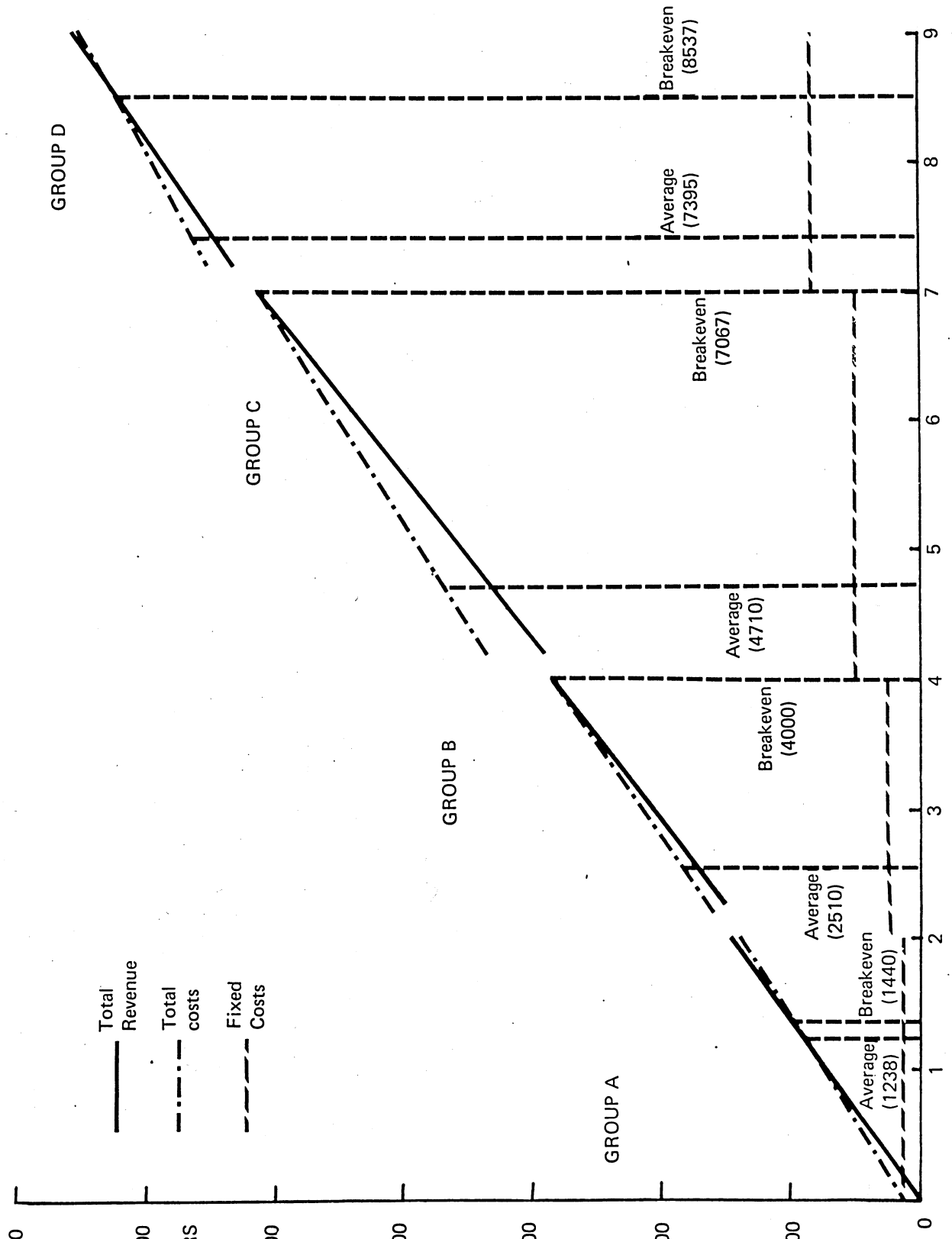

FIGURE 4. Breakeven Chart

structure can be changed the effect would be to change the breakeven point. Essentially there are three alternative ways in which the breakeven point can be lowered. These are: (1) decrease the level of fixed costs, (2) decrease the level of variable costs, and (3) increase the average price of the products sold. A fourth alternative, of course, would be some combination of these three. The particular method chosen, be it either attempts to increase the volume sold or to lower the breakeven point, must be carefully analyzed in terms of its total effects before an intelligent decision can be made. Breakeven analysis, of the kind discussed here, can provide useful information, but it does not contain all of the answers.

Seasonality

It is a well known fact that fertilizer production and sales are highly influenced by the seasonal nature of demand. An attempt was made in this project to measure the magnitude of this seasonality factor. This was done by asking each firm to supply monthly data on sales, accounts receivable, and accounts payable.

Figure 5 shows the results of this analysis. In this graph all of the variables are expressed as percentages of annual totals. For accounts receivable and payable, only the data for Group D firms has been used.

In terms of fertilizer sales it can be seen that approximately 70 percent of annual sales are made in the three months of April, May, and June. Almost 45 percent of the sales come in the single month of May. Throughout the remainder of the year, monthly sales are less than 5 percent of the annual total.

Storage Capacity

Data was also collected on storage capacity for materials and finished products at blender locations. Specific information was requested on storage capacity for: (1) materials used in bulk blending, (2) bagged products, (3) mixed liquid fertilizers, (4) Anhydrous ammonia, and (5) Nitrogen solutions.

A summary of the average storage capacities for the above uses is shown in Table 14. As might be expected, the largest single type of storage is for

TABLE 14. Storage Capacity, By Size Group, for Ontario Bulk Blenders

	Group A (tons)	Group B (tons)	Group C (tons)	Group D (tons)	All Plants (tons)
Materials Used in Bulk Blending	540	867	1306	1383	1120
Bagged Products	54	172	307	194	215
Mixed Liquid Fertilizers	0	8	10	56	20
Anhydrous Ammonia	0	11	12	34	15
Nitrogen Solutions	16	38	22	18	25
Total Storage	610	1095	1657	1685	1395
Total Storage as a percent of sales	49%	43%	35%	22%	32%

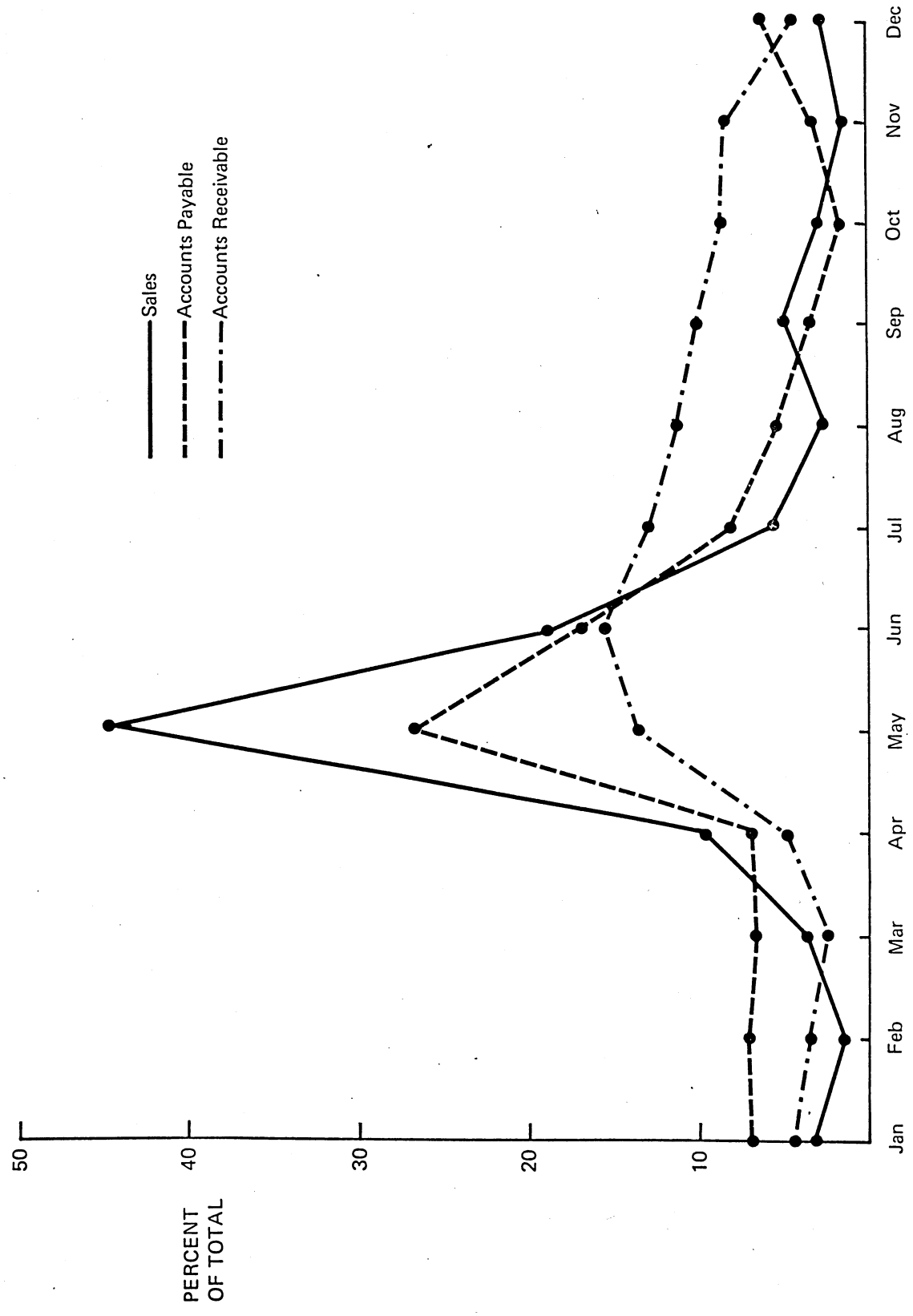

FIGURE 5. Monthly Variations in Sales, Accounts Receivable, and Accounts Payable.

materials used in bulk blending. When considered in relationship to average annual sales, it can be seen that there is a great deal of variation among the size groups of plants in terms of storage capacity. The average plant in the entire sample has sufficient storage for approximately 32 percent of its annual sales. This varies from a high of almost 50 percent for the small Group A firms to a low of only 22 percent for the large Group D firms.

COMPARISON WITH U.S. PLANTS

An attempt was made in this study to collect data in such a manner that the results could be compared with a similar study of bulk blending plants in the United States conducted in 1970. When making comparisons it should be remembered that there is a two year time difference between the studies, so that the data is not exactly comparable.

Table 15 has been constructed to show the differences between the two studies in terms of operating, administrative, selling, and depreciation costs. Both total dollar expenditures and cost/ton are shown for a wide range of cost categories. Since there is a difference between the average size plant in the TVA Study (3,457 tons/year) and the Ontario Study (4,368 tons/year), the cost/ton data is the most useful for making comparisons.

It is interesting to observe that in almost every category the cost data from the U.S. plants is higher than from the Ontario blenders. The only exceptions to this are in the case of depreciation, which is the same in both studies, and other expenses. Total operating costs are virtually the same in both cases.

Table 16 is a summary of the major sales and cost data analyzed in both studies. This summary permits a direct comparison of the profitability of bulk blending fertilizer plants in the two studies. The results of this comparison shows that bulk blenders in the United States in 1970, although achieving only narrow profits, were substantially more profitable than Ontario bulk blenders in 1972. While some of the profit difference can be attributed to higher overall costs for Ontario blenders, the major portion is due to the smaller margins observed in the Ontario study.

TABLE 15. Comparison of Operating Costs from TVA and Ontario Studies

Cost Category	TVA Study (1970)		Ontario Study (1972)	
	Cost per Plant	Cost per Ton	Cost per Plant	Cost per Ton
Salaries and Wages	$25,279	$7.31	$28,293	$6.47
Utilities, gas, oil	3,051	0.88	1,330	0.30
Telephone, postage	612	0.18	933	0.21
Property Taxes	1,700	0.49	1,615	0.37
Licenses	647	0.19	264	0.06
Insurance	1,869	0.54	1,661	0.38
Legal and Accounting	860	0.24	926	0.21
Advertising	1,703	0.49	768	0.18
Repairs and Maintenance	5,918	1.71	5,352	1.22
Depreciation	8,403	2,43	10,640	2.43
Other	697	0.20	15,185	3.48
Total	$52,510	$15.19	$66,967	$15.33

TABLE 16. Summary of Sales and Cost Data from TVA and Ontario Studies

Income and Expense Items	TVA Study[1]		Ontario Study[2]	
	Dollars	$/ton	Dollars	$/ton
Total Revenue from sale of fertilizer and related items	$245,136	$70.91	$319,118	$73.05
Material Cost	180,031	52.08	248,499	56.89
Gross Margin	65,105	18.83	70,619	16.16
Total Operating Costs	52,510	15.19	66,967	15.33
Interest on Working Capital	5,412	1.56	8,705	1.99
Interest on Fixed Investment	7,165	2.07	9,266	2.12
Total Costs	65,087	18.82	84,938	19.44
Net Profit (loss)	18	0.01	(14,319)	(3.28)

1/ The average size plant in the TVA Study was 3,457 tons/year.

2/ The average size plant in the Ontario Study was 4,368 tons/year.

A P P E N D I X A

WORKSHEETS

This appendix has been prepared to aid individual bulk blending firms to evaluate their performance in relationship to the various group averages computed in this report. The appendix consists of four worksheets, one for each size group of firms. Each worksheet is divided into five major sections: (1) Income, (2) Operating Costs, (3) Interest on Working Capital, (4) Interest on Fixed Investment, and (5) Net Profit (Loss). In addition, operating costs have been broken down into several smaller categories. Space has been provided on each worksheet for individual firms to record their income and cost data and to calculate these in terms of dollars/ton. This calculation can be compared with the average dollar/ton data for the appropriate size group. On the basis of such a comparison it will be relatively easy for any firm to quickly and accurately determine areas of relative strength and weakness. Once this has been determined, appropriate action can be initiated to improve the profit performance of the firm.

The suggested procedure for using the worksheets is the following:

(1) Determine your total fertilizer sales in tons for fiscal year 1972. Compare this number with the following categories to determine the appropriate worksheet to use.

	Sales Tonnage
Group A	Under 1,900
Group B	1,900 to 3,499
Group C	3,500 to 5,999
Group D	over 6,000

(2) From your income statement for fiscal year 1972 obtain the appropriate income and expense data and record these in the column headed "Your Plant Dollars". If you sell products other than fertilizer, or if you operate more than one plant, be sure to allocate costs so that your data reflects the fertilizer operation of a single plant. Failure to do this will result in making invalid comparisons.

(3) From monthly trial balances, or some similar source, determine the average annual level of accounts receivable. Multiply this number by .08 and place the result on the line next to interest or working capital.

(4) From your 1972 balance sheet determine your total investment at cost in land, buildings, and equipment. Multiply this number by .08 and place the result on the line next to interest on fixed investment.

(5) Determine net profit (loss) by subtracting the sum of total operating costs, interest on working capital, and interest on fixed investment from total revenue.

(6) Determine dollars/ton for each item by dividing the dollar values by your actual tonnage sold in 1972.

(7) Compare your sales and cost data with the average for comparable firms.

GROUP A

	Your Plant		$/ton for plant with annual sales of 1238 tons
	Dollars	$/ton	
Income:			
Sales of fertilizers			$70.50
Other related income			1.69
Total Revenue			72.19
Expenses:			
Operating labor			1.94
Utilities, gas, oil			0.25
Freight			0.00
Repairs and supplies			0.35
Licenses			0.04
Telephone, postage			0.11
Soil and Tissue Testing			0.00
Bad Debts			0.08
Insurance			0.35
Bags			0.00
Leased Equipment			0.26
Administrative Salaries			1.38
Clerical labor			0.19
Fringe Benefits			0.15
Land Rent			0.00
Building Insurance			0.05
Legal and Accounting			0.06
Property Taxes			0.40
Salesmen's Salaries			0.94
Salesmen's Expenses			0.10
Advertising			0.08
Automobile Expense			0.14
Discount on Sales			0.18
Depreciation			3.11
Materials			58.30
Other Expenses			0.47
Total Operating Costs			68.96
Interest on Working Capital			1.84
Interest on Fixed Investment			2.81
Net Profit (loss)			(1.41)

GROUP B

	Your Plant		$/ton for plant with annual sales of 2510 tons
	Dollars	$/ton	
Income:			
Sales of fertilizers			$68.73
Other related income			2.47
Total Revenue			71.20
Expenses:			
Operating labor			2.48
Utilities, gass, oil			0.18
Freight			0.05
Repairs and supplies			0.67
Licenses			0.06
Telephone, postage			0.15
Soil and Tissue Testing			0.01
Bad Debts			0.25
Insurance			0.21
Bags			0.22
Leased Equipment			0.33
Administrative Salaries			0.54
Clerical labor			0.46
Fringe Benefits			0.38
Land Rent			0.02
Building Insurance			0.13
Legal and Accounting			0.08
Property Taxes			0.55
Salesmen's Salaries			1.00
Salesmen's Expenses			0.20
Advertising			0.15
Automobile Expense			0.09
Discount on Sales			0.21
Depreciation			3.03
Materials			58.31
Other Expenses			0.95
Total Operating Costs			70.72
Interest on Working Capital			1.82
Interest on Fixed Investment			2.54
Net Profit (loss)			(3.87)

GROUP C

	Your Plant		$/ton for plant with annual sales of 4710 tons
	Dollars	$/ton	
Income:			
Sales of Fertilizers			$70.95
Other related income			2.67
Total Revenue			73.62
Expenses:			
Operating labor			2.72
Utilities, gas, oil			0.38
Freight			0.13
Repairs and supplies			1.29
Licenses			0.07
Telephone, postage			0.19
Soil and Tissue Testing			0.01
Bad Debts			0.26
Insurance			0.37
Bags			0.60
Leased Equipment			0.47
Administrative Salaries			1.88
Clerical labor			0.36
Fringe Benefits			0.42
Land Rent			0.01
Building Insurance			0.08
Legal and Accounting			0.22
Property Taxes			0.36
Salesmen's Salaries			0.69
Salesmen's Expenses			0.11
Advertising			0.17
Automobile Expense			0.18
Discount on Sales			0.55
Depreciation			2.41
Materials			57.11
Other Expenses			2.26
Total Operating Costs			73.31
Interest on Working Capital			
Interest on Fixed Investment			
Net Profit (loss)			

GROUP D

	Your Plant		$/ton for plant with annual sales of 7395 tons
	Dollars	$/ton	
Income:			
Sales of fertilizers			$71.11
Other related income			2.95
Total Revenue			74.06
Expenses:			
Operating labor			3.49
Utilities, gas, oil			0.27
Freight			0.21
Repairs and supplies			1.43
Licenses			0.05
Telephone, postage			0.26
Soil and Tissue Testing			0.04
Bad Debts			0.51
Insurance			0.33
Bags			0.38
Leased Equipment			0.30
Administrative Salaries			1.86
Clerical labor			0.44
Fringe Benefits			0.46
Land Rent			0.04
Building Insurance			0.00
Legal and Accounting			0.26
Property Taxes			0.31
Salesmen's Salaries			0.87
Salesmen's Expenses			0.31
Advertising			0.20
Automobile Expense			0.18
Discount on Sales			0.52
Depreciation			2.20
Materials			54.95
Other Expenses			2.01
Total Operating Costs			71.85
Interest on Working Capital			1.93
Interest on Fixed Investment			1.82
Net Profit (loss)			(1.54)

A P P E N D I X B

QUESTIONNAIRE

UNIVERSITY OF GUELPH · GUELPH · ONTARIO · CANADA AREA CODE 519 · 824-4120

January 19, 1973.

Dear Sir:

At the November 28th meeting of the Board of Directors of the Plant Food Council of Ontario a motion was passed authorizing the School of Agricultural Economics and Extension Education at the University of Guelph to conduct a "Cost of Doing Business Survey" of bulk blending plants in Ontario.

In consultation with the Member Services Committee of the Council, a survey form for fertilizer blend plants was developed and sent to seven plants during December. Based upon the results of this pre-test, the survey form was revised and is now being sent to all bulk blending installations in Ontario.

The purpose of this survey is to gather operating cost data for bulk blending plants in Ontario. This data will be condensed into a report showing the cost structures for various types and sizes of bulk blending plants. Individual plants will be able to use this information to compare their costs with the average costs of similar installations. In all cases, the data supplied to the University will be held in strict confidence.

The Member Services Committee has specified that it would be highly desirable to have a preliminary report available to all cooperating firms by the end of March. As a result, you are urged to complete the questionnaire and return it to me as soon as possible, but no later than February 5, 1973.

Thank you for your cooperation in this project.

Sincerely,

Thomas F. Funk

Thomas F. Funk,
Assistant Professor.

C O N F I D E N T I A L

COST OF DOING BUSINESS SURVEY

FOR ONTARIO BULK BLENDERS

SCHOOL OF AGRICULTURAL ECONOMICS
AND EXTENSION EDUCATION
UNIVERSITY OF GUELPH

IN CONJUNCTION WITH
THE PLANT FOOD COUNCIL OF ONTARIO

DECEMBER 1972

INTRODUCTION

The purpose of this short questionnaire is to gather operating cost data for bulk blending fertilizer plants in Ontario. This data will be condensed into a report showing the cost structures for various types and sizes of bulk blending plants. Individual plants will be able to use this information to compare their costs with the average costs of similar installations. Presumably, this will allow them to detect operating areas where they have relative strengths and weaknesses, and make corresponding changes in their operations.

This study is sponsored by the Plant Food Council of Ontario and will be conducted by the School of Agricultural Economics and Extension Education at the University of Guelph. In all cases, the data supplied to the University will be held in strict confidence. In no instance will any information be published where there is the slightest possibility that it can be traced to one firm.

The value of this study is directly dependent upon the cooperation of each member firm of the Plant Food Council of Ontario. If each firm takes sufficient time and care to supply reasonably accurate cost and sales data, then the aggregated results will also be reasonably accurate and useful for decision-making purposes. On the other hand, just a small group of questionnaires of doubtful quality will defeat the purpose of this endeavour. With the proper cooperation, this effort could provide a valuable source of information to all bulk blending fertilizer firms in the Province.

INSTRUCTIONS

1. You have been supplied with two copies of the "Cost of Doing Business Survey" questionnaire. One is a working copy, the second is to be filled in neatly and returned to the University in the enclosed envelope. All questionnaires must be returned to the University by Monday, February 5 to insure sufficient time for analysis and timely distribution of the results.

2. The information you supply should be for your last fiscal year. This may or may not correspond with calendar year 1972.

3. Each questionnaire is for a single plant. If you operate more than one plant, it will be necessary for you to break all costs, materials, and sales down for individual plants, and return separate questionnaires for each installation. In some cases where the accounting procedures are not set up already to make these divisions, it will be necessary for you to estimate the approximate costs associated with each plant. This may be difficult and somewhat arbitrary, but you are urged to be as accurate as possible.

4. The cost and sales data should relate only to your fertilizer operations. If you have other enterprises such as feed, chemicals, seed, etc. it will be necessary to separate out the costs of these operations and only report the costs associated with your fertilizer operation. Obviously, reasonableness in this regard should prevail. If, for example, you have a sideline such as farm chemicals, and this accounts for a very small percentage of your total business, then it would not be reasonable to allocate utilities, labour, and other costs to this sideline. As a rule of thumb, if your total business in products other than fertilizer is less than 10 percent of total sales, then you will not be asked to separate the costs associated with these other enterprises. If, on the other hand, these enterprises account for more than 10 percent of total sales, then you should allocate the costs.

5. It is important that you break your labour costs down as accurately as possible. At different points in the questionnaire you are asked to supply the following labour costs:

operating labour
clerical labour
salesmen's salaries
administrative salaries

In some instances you will not have full time salesmen, but rather a person who sells part of the year and is in the plant the rest of the time. The same type of situation may occur in the case of managers who spend some time in a sales capacity. Please allocate these costs to the appropriate categories as well as you can.

6. If you have any questions in interpreting the questionnaire, or supplying specific information, please call:

Professor Thomas Funk
School of Agricultural Economics
University of Guelph
Phone 519/824-4120 ext. 3427

or

Mr. Don Rutherford,
Plant Food Council of Ontario
Phone 416/274-2870

7. Thank you for your efforts in this survey.

GENERAL QUESTIONS 3.

Firm _____

Address _____

County _____

Phone _____

Person completing questionnaire _____

1. The fiscal year used for this report begins on _____ (month) _____ (year)

2. How many tons of storage capacity do you have at this plant?

Materials used in bulk blending	_____ tons
Bagged products	_____ tons
Mixed Liquid Fertilizers	_____ tons
Anhydrous Ammonia	_____ tons
Nitrogen Solutions	_____ tons
Total	_____ tons

3. What is the rated capacity of your bulk blending equipment?
_____ tons per hour

4. What percentage of your bulk blended fertilizers is distributed on a custom spread basis?
_____ percentage custom spread

5. What percentage of your dry fertilizer sales are in the following categories?

Bulk Materials	_____ %
Bulk Mixed Fertilizers	_____ %
Bagged Materials	_____ %
Bagged Mixed Fertilizers	_____ %
	100

6. What is the approximate size of your sales area in terms of miles in all directions from this plant?
_____ miles

7. What is the form of business organization under which this plant operates? Please check one.

Independent	_____
Franchise	_____
Partnership	_____
Subsidiary	_____

8. Do you have bagging facilities at this plant?
Yes _____
No _____

9. In what year did this fertilizer plant begin operations?
_____ Year

10. Please list below your total dollar sales of all fertilizers from this plant for the past 5 years or since this plant opened.

$_____ 1968	$_____ 1971
$_____ 1969	$_____ 1972
$_____ 1970	

INVENTORY AND PURCHASES (for fertilizer only)

ITEM	TONS	DOLLARS
Beginning Inventory		
All Materials	_____	_____
Finished Products	_____	_____
Ending Inventory		
All Materials	_____	_____
Finished Products	_____	_____
Material purchases (at Blender price)		
F.O.B. Material cost	_____	_____
Transportation cost		_____
Less Discounts on Purchases		_____
Net delivered materials cost		_____

SALES

ITEM	TONS	DOLLARS
Sales of (less discounts granted)		
Materials	_____	_____
Dry Mixed Fertilizers	_____	_____
Mixed Liquid Fertilizers	_____	_____
Nitrogen Solutions	_____	_____
Anhydrous Ammonia	_____	_____
Total	_____	_____
Income from		
Service charges on sales (interest)		_____
Delivery		_____
Spreading		_____
Machine rental		_____
Agricultural chemicals		_____
Other income (eg. chemicals, seeds)		_____
Total		_____

OPERATING COSTS (for fertilizer only)

Service charges on purchases	_____
Operating labour	_____
Utilities, gas, and oil	_____
Freight (other than for materials)	_____
Repairs and supplies	_____
License on vehicles	_____
Corporation license	_____
Telephone	_____
Postage	_____
Soil and tissue testing	_____
Bad debts, written off	_____
Interest on operating notes	_____
Insurance (to include liability, inventory, vehicle, building contents, etc.)	_____
Bags	_____
Leased equipment	_____
Other operating expenses	_____
Total	

ADMINISTRATIVE COSTS (for fertilizer only)

Administrative salaries	_____
Clerical labour	_____
Fringe benefits (to include Canada Pension Plan, OHSC, OHSIP, UIC, Group Life, Group Medical, Long Term Disability, contributions to pension plans, etc.)	_____
Land rent (railroads etc.)	_____
Building insurance	_____
Legal and Accounting	_____
Property Taxes	_____
Dues and subscriptions	_____
Other administrative expenses	_____
Total	_____

SELLING COSTS (for fertilizer only)

Salesmen's salaries	_____
Salesmen's expenses	_____
Advertising	_____
Automobile expenses	_____
Discounts on sales	_____
Other selling expenses	_____
Total	_____

FIXED INVESTMENTS 6.

ITEM	Number of Units	Purchase Cost	Salvage[2] Value	Years[3] of Life	Annual[1] Depreciation (Dollars)
Land	XXX	____	XXX	XXX	XXX
Buildings	XXX	____	____	____	____
Office Machines & Equipment	XXX	____	____	____	____
Automobiles	____	____	____	____	____
Tractors	____	____	____	____	____
Trucks	____	____	____	____	____
Pickup Trucks	____	____	____	____	____
Trailers	____	____	____	____	____
Spray Units	____	____	____	____	____
Fork Lift	____	____	____	____	____
Bagging Equipment	____	____	____	____	____
Blending Equipment	____	____	____	____	____
Pallets	____	____	____	____	____
Dry Spreaders	____	____	____	____	____
Dry Delivery Units	____	____	____	____	____
Dry Loading Equipment	____	____	____	____	____
Dry Unloading Equipment	____	____	____	____	____
Rail Tracks and Ties	____	____	____	____	____
NH_3 Applicators	____	____	____	____	____
NH_3 Nurse Tanks	____	____	____	____	____
Nitrogen Solution Applicators	____	____	____	____	____
Nitrogen Solution Nurse Tanks	____	____	____	____	____
Nitrogen Solution Delivery Units	____	____	____	____	____
Liquid Applicators	____	____	____	____	____
Liquid Nurse Tanks	____	____	____	____	____
Liquid Delivery Units	____	____	____	____	____
Mixed Liquid Plant	____	____	____	____	____
Storage Tanks	____	____	____	____	____
Other Equipment (please list)					
_____	____	____	____	____	____
_____	____	____	____	____	____
Total	XXX	____	XXX	XXX	____

1/ Depreciation = $\frac{\text{Purchase Cost - Salvage Value}}{\text{Years of Life}}$

2/ Salvage value = sale value at end of depreciation period.

3/ Years of life = depreciated years.

Months[1]	Sales (tons)	Sales (dollars)	Accounts Payable[2] on Materials	Accounts Receivable[2] on Products and Services
January 197_	____	____	_____	_____
February 197_	____	____	_____	_____
March 197_	____	____	_____	_____
April 197_	____	____	_____	_____
May 197_	____	____	_____	_____
June 197_	____	____	_____	_____
July 197_	____	____	_____	_____
August 197_	____	____	_____	_____
September 197_	____	____	_____	_____
October 197_	____	____	_____	_____
November 197_	____	____	_____	_____
December 197_	____	____	_____	_____
Total	____	____	_____	_____

1/ Please specify year.

2/ Outstanding Balances the first of each month.