

MERGER OF SELECTED OREGON
FARM COOPERATIVES

by

HOWARD CARL HOGG

A THESIS

submitted to

OREGON STATE COLLEGE

in partial fulfillment of
the requirements for the
degree of

MASTER OF SCIENCE

June 1960

APPROVED:

~~Redacted for Privacy~~

Professor of Agricultural Economics

In Charge of Major

~~Redacted for Privacy~~

Head of Department of Agricultural Economics

~~Redacted for Privacy~~

~~Chairman of School Graduate Committee~~

~~Redacted for Privacy~~

Dean of Graduate School

Date thesis is presented October 22, 1959

Typed by Kay Stuck

ACKNOWLEDGEMENTS

The writer wishes to extend his appreciation to Dr. G. E. Korzan under whose guidance this study was completed, and to Dr. E. N. Castle for his assistance in setting up the linear programming transportation model. Special thanks are extended to Mr. Clarence Brownell, Valley Farmers Cooperative; to Mr. Kirsch, Mt. Angel Farmers Union Warehouse; to Mr. Pete Goers, Farmers Oil Company; to Mr. Herb Wiley, Pratum Cooperative Warehouse; and to Don Fletcher, Santiam Farmers Cooperative, for furnishing the records and answering questions that formed the basis of this study; to Mr. Harry Thorp, W. G. Stacey and Company, auditors; to D. W. Harris, National Cash Register Company; and to Mr. Matt Gillis, Dallas Cooperative Warehouse, for consultation.

TABLE OF CONTENTS

INTRODUCTION.	1
Statement of the Problem	1
Objectives of the Study.	2
Scope and Research Procedure	4
Limitations of the Study	5
Characteristics of the Associations.	7
THE IDEAL FORM OF MERGER.	10
Formal Combination	10
Areas of Possible Saving with Formal Combination	13
Reorganization of Petroleum Delivery.	13
Application of Linear Programming.	13
The Transportation Model	15
Solution of the Model.	17
Centralized Bookkeeping	24
The Present System	24
A Centralized System	25
The Present System vs. Centralization.	25
Specialization in Marketing	28
Implications	28
Results of Specialization.	31
Supplies.	32
General.	32
A PRACTICAL FORM OF MERGER.	36
Some Non-Quantitative Problems Encountered in Cooperative Merger	36
Informal Combination	37
How the Economies Resulting from Informal Combi- nation Would Vary from Those Discussed Under Formal Combination	37
Reorganization of Petroleum Delivery.	37
Centralized Bookkeeping	38
Specialization in Marketing	39
Supplies.	39
SUMMARY AND CONCLUSIONS	40
BIBLIOGRAPHY.	43
APPENDIX.	44

LIST OF TABLES

Table		Page
1	BUSINESS VOLUME BY ACTIVITY FOR EACH ASSOCIATION, 1958	6
2	GENERAL INFORMATION BY ASSOCIATION, 1958. . .	8
3	PERCENT OWNERSHIP OF TOTAL ASSETS BY MEMBERS OF THE FIVE ASSOCIATIONS INCLUDED IN THIS STUDY, 1958	11
4	COST OF DELIVERING 100 GALLONS OF FUEL FROM EACH SOURCE TO EACH DESTINATION, 1958	18
5	FIRST FEASIBLE SOLUTION	19
6	OPTIMUM SOLUTION.	20
7	SUMMARY OF COST CHANGES DUE TO DELIVERY REORGANIZATION.	21
8	NUMBER OF EMPLOYEES BY ASSOCIATION, 1958. . .	24
9	BOOKKEEPING CLASSIFICATIONS AND MACHINE TIME.	26
10	A SUMMARY OF SAVINGS RESULTING FROM CENTRALIZED BOOKKEEPING	27
11	COMPARISON OF MARKET PRICE AND AVERAGE PRICE RECEIVED BY ASSOCIATION OVER A THREE YEAR PERIOD.	29
12	POUNDS OF GRASS SEED MARKETED FOR THREE YEAR PERIOD.	30
13	DIFFERENCES IN TOTAL REVENUE DUE TO DIFFERENCES BETWEEN MARKET PRICE AND PRICE RECEIVED BY ASSOCIATIONS MARKETING GRASS SEED MULTIPLIED BY QUANTITIES SOLD OVER A THREE YEAR PERIOD	32
14	PRESENT EARNINGS AS A PERCENT OF TOTAL VOLUME.	41

LIST OF FIGURES

Figure		Page
1	Hypothetical Relationship of Unit Costs And Volume of Firms Before and After Merger.	3
2	Delivery Routes Used in the Transpor- tation Model.	14
3	Relationship of Total Costs and Total Revenue as Allocated to the Supply Activity.	34

MERGER OF SELECTED OREGON FARM COOPERATIVES

INTRODUCTION

Statement of the Problem

This study was undertaken for the purpose of demonstrating some of the advantages of cooperative mergers. There has been considerable interest recently in mergers as a means of increasing operating efficiency and the quality of service.

The five cooperative associations included in this study are, in general, all financially sound. Each firm has survived the uncertain years of infancy and early growth. There does not appear to be much possibility of business failure, but this does not mean the associations are operating at an optimum level.

The primary concern of this study will be to determine actual dollar gains that could be realized immediately under some form of merger. There is, however, another consideration that should be mentioned when discussing a possible merger. In the past few years it has become an economic necessity to increase business size. This phenomena has occurred largely because of increased competition and smaller net margins. In order to compete the firm must have sufficient volume to stay in business.

Risk can be minimized by the larger firms through diversification, orderly marketing, easier credit, and better management.¹

Objectives of the Study

The primary objective of this study is to indicate some of the economies that may result if the five associations were to merge their operations. This objective is illustrated in Figure 1. Points A, B, C, D, and E on curves 1, 2, 3, 4, and 5 denote the volume and cost per dollar of volume for each firm in 1958. Point F on curve 6 shows the combined volume and hypothesized cost per dollar of volume. As this is only an illustration it will be assumed that each firm is now operating at the optimum point on its short-run cost curve. Due to this limitation the graph shows only the relationship of the current cost per dollar volume to the hypothesized cost per dollar volume, given merger of the five firms and the same total volume for the firms.

Secondary objectives are (1) to outline the two possible types of combination and to show how each is applicable; (2) to discuss the mechanics of merger with consideration given to the problem of combining revolving funds and different degrees of ownership.

¹ For a more detailed discussion see Gerald E. Korzan (8, p. 2).

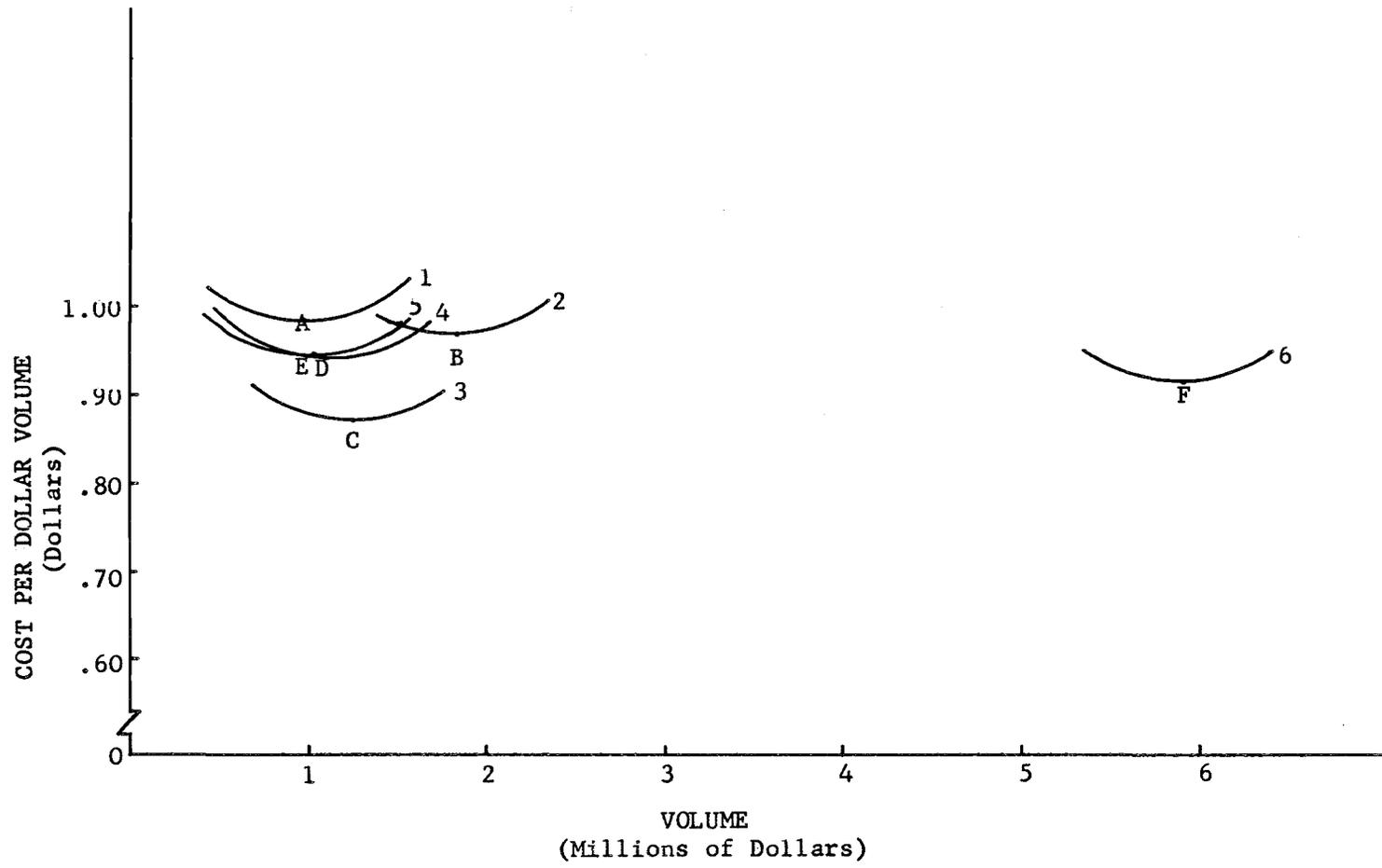


FIGURE 1. HYPOTHETICAL RELATIONSHIP OF UNIT COSTS AND VOLUME OF FIRMS BEFORE AND AFTER MERGER

The hypothesis is that under combination the cost per dollar of volume would be substantially reduced, volume held constant.

Scope and Research Procedure

The associations included in this study were selected on the basis of geographical location and similarity of operation. Four of the five associations are engaged in supply and marketing while the fifth is strictly a petroleum supply firm. The five firms are located in Marion County but several have members in neighboring counties.

A linear programming transportation model was used in finding the minimum costs, under a rerouted delivery model, with delivery capacity fixed. By observation and comparison it was then determined if further savings could be realized by shifting trucks or increasing efficiency.

A traditional budgeting approach was employed for analyzing possible economies in bookkeeping. The analysis consisted of substituting an accounting machine for labor.

An analysis of the marketing operation consisted of a simple comparison by association of the price received and the average market price. The underlying assumption is that greater specialization in marketing would result in

more frequent realization of the full market price than is now the case. When each manager attempts to do his own marketing, quantities involved are often relatively small.

The hardware activity, which in two associations is operated at a loss, is discussed in terms of variable costs. The assumption being that even if the activity did not exist, most of the fixed costs would still be incurred. The non-quantitative aspects of this enterprise are also considered.

Limitations of the Study

This study is not meant to be a complete analysis of all the possible economies that could result from a merger. The points considered here are only a part of the possible benefits or economies of merger and therefore, should be considered merely as illustrative of what might be achieved by such action.

The actual figures used in portions of this work were obtained through interview and adjustment of present data to obtain an estimate of conditions after combination. Because of this factor, which was caused by using records not originally intended for this purpose, the savings demonstrated under the various headings must be considered only as reasonably well-designed estimates.

Table 1.

BUSINESS VOLUME BY ACTIVITY FOR EACH ASSOCIATION, 1953

Association	A	B	C	D	E
	(Dollars)				
Activity					
Petroleum	153,995		1,135,181		166,867
Hardware & Supplies	71,876	129,343	81,066	15,925	130,465
Feed, Seed & Fertilizer	155,364	820,481		266,269	295,703
Marketing	592,610	780,387		742,353	355,764
Total Volume	973,847	1,730,212	1,216,247	1,024,547	948,798

Characteristics of the Associations

Four of the five associations are supply and marketing cooperatives while the fifth is strictly a petroleum supply firm. Total volume and volume by activity for each of the five associations A, B, C, D, and E, can be seen in Table 1. This table indicates a large variation in the volume of business, both total and by activity. This variation is also true with regard to the percent ownership of total assets. Percent ownership of total assets for the five associations varies from 55.7% to 96.23%. The five associations are all affiliated with Pacific Cooperatives, a regional cooperative. Association A holds non-voting B stock in Pacific but still does a considerable amount of business with them. The petroleum activity at association A is supplied by Grange Cooperative Wholesale, another regional cooperative operating in this area.

Some specialization exists in the four supply and marketing associations. This specialization is found in the area of liquid fertilizers, feed manufacturing, and some, by variety, in marketing the various seeds.

The revolving funds, retained earnings, and pooling arrangements for each association are shown in Table 2.

It can be seen that although four of the five associations are of a similar type, wide variation does

Table 2.

GENERAL INFORMATION BY ASSOCIATION, 1958

Association	Market Pool	Amount Retained	Length of Revolving Fund	Amount of Fund
A	None	Net Margin ¹	16 years	\$204,404
B	Multiple	Net Margin	8 "	102,029
C	Supply Assoc. only	Portion of ² Net Margin	6 "	310,277
D	None	Net Margin ³	8 "	127,199
E	None	Net Margin ¹	13 "	191,271

- (1) Net margin retained except for semi-annual 1 cent per gallon refund on gasoline, diesel, and stove oil.
- (2) An annual cash refund of: 1 cent per gallon on gasoline, stove oil, and kerosene; 3/4 cent per gallon on diesel; 1 cent per pound on grease; 4 cents per gallon on oil; 8% on miscellaneous; is paid patrons. The remaining net margin is retained.
- (3) 25% of the net margin is paid in cash, the remaining 75% goes into capital retains until \$500 is accumulated by each member patron, then this percentage is credited to the capital revolving fund.

exist in the financial structure and specific areas of supply and marketing.

THE IDEAL FORM OF MERGER

Formal Combination

The procedure for merger can follow one of two possible forms. The first is full merger whereby the participating associations unite forming one new firm. With this form of combination the new association usually uses an existing charter from one of the merging firms. The second form occurs when one firm purchases the assets of the other firms. The shares belonging to the purchased association's members are called in and shares of the buying firm issued in their place. When the first form is used the action must be reported to the charter granting authority of the State. In using this form the involved memberships must agree to the merger by an affirmative vote. The second form does not require a vote by all memberships, only the selling ones, but a vote is desirable to maintain favorable member relations. When a merger is contemplated the services of an attorney should always be acquired.

In order for a merger to occur the membership must be convinced not only that the new organization can give them better service and/or higher prices for their products, but also that their association, which is financially sound, will not be forced to use its assets to bail out a cooperative that has been less successful.

Table 3

PERCENT OWNERSHIP OF TOTAL ASSETS BY MEMBERS OF THE
FIVE ASSOCIATIONS INCLUDED IN THIS STUDY, 1958

Associations				
A	B	C	D	E
Percent Ownership				
72.96	63.23	96.23	68.32	55.70
Total Assets (Dollars)				
427,251	678,218	804,831	397,250	343,306

It can be seen from the data in Table 3 that there is considerable variation from one association to another in the proportion of total assets owned by members. Due to the fact, however, that the corporations are cooperative, each member would own a share of the new firm proportional to his holdings in the old one. Therefore, if it can be shown that the new business would be more efficient in some areas, and through this medium return to the patron a greater net margin, the merger could be more easily accomplished.

Under a merger the revolving fund of each association could be taken over by the new organization. It could then be revolved according to the time period as had been established by the old firm, until the cycle has been completed. Thus the existing revolving funds would be handled

apart from the revolving fund under the combined operation. The retained earnings of the new firm would be administered as a new fund, the length of which would be determined by the board of directors. In other words, the retains before merging would be revolved by the new organization along the original or an accelerated schedule. The current retains would be applied to a new fund. It should be remembered that for good member relations the pre-merger retains should be revolved at least as rapidly as they would have been by each of the old organizations.

The general manager of the merged association, because of the expense involved in adding another layer of management when it is not really needed, could be one of the present managers. This man should also continue to manage his own branch. The actual work load would not be as great as it appears, largely because of the reduction in managerial time connected with his own branch particularly on the marketing side. This point will be developed later under market specialization. Only a nominally higher salary would need to be paid the general manager so long as strong leadership would exist in most of the branches.

Areas of Possible Saving with Formal Combination

Reorganization of Petroleum Delivery

Application of Linear Programming

The areas of possible reorganization savings are (1) rerouting, which is quantified by applying a linear programming transportation model to a set of routes designed to eliminate overlap; (2) lower costs per mile traveled for associations A and E, with this analysis including varying the number of trucks at each base; and (3) transporting bulk fuel from Portland. The routes used are not intended to show the optimum delivery scheme as the data used were not complete enough for this purpose, therefore, the results obtained from the model are illustrative of what might be accomplished by some type of reorganization. The locational and efficiency advantages were analyzed by observation and simple budgeting.

In order to determine the miles traveled and gallons of fuel required for each of six routes, a series of relationships were used. A ratio of total miles traveled on each existing route to the actual route miles covered, as taken from a map of the area served, was computed. The new route miles, with overlap eliminated, were established by adjusting the existing routes. These routes are shown in Figure 2. By employing procedures similar to

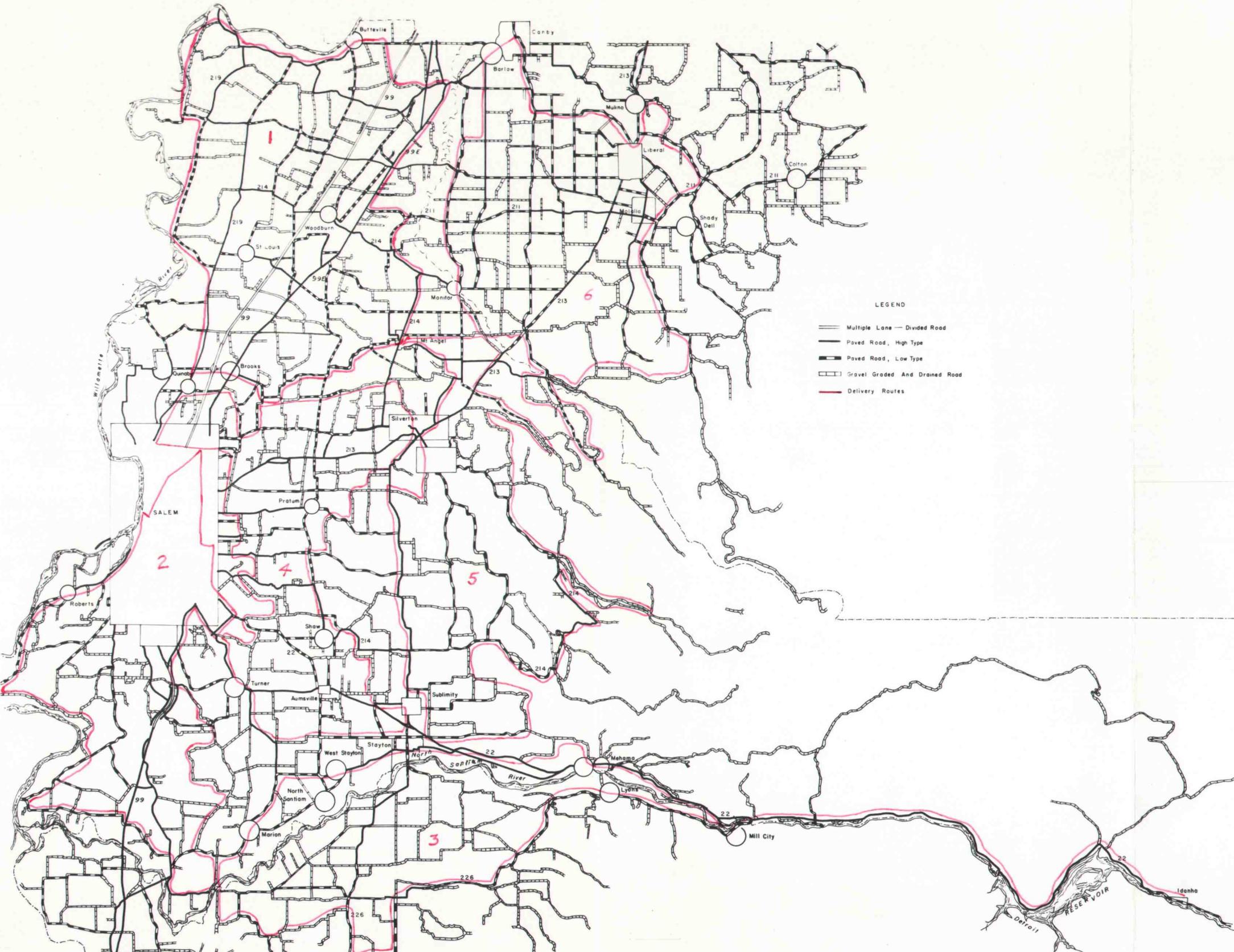


FIGURE 2. DELIVERY ROUTES USED IN THE TRANSPORTATION MODEL

those outlined above, fuel requirements were determined using a ratio of gallons delivered per route mile.

The Transportation Model

This model is employed to determine the routing system which will minimize aggregate delivery cost of fuel distribution from the three sources to six routes via six delivery trucks. To formulate the problem, the cost of delivering 100 gallons of fuel from each source to each route must be known. These rates were computed by multiplying the adjusted route miles by the present delivery cost per mile, then dividing by the fuel requirement for the route in question.

Assumptions for the transportation model can be stated or written in algebraic form.

The notations used in algebraic expression of the assumptions are:

- x_{ij} = The amount of product transferred from source i to destination j .
- c_{ij} = The cost of transporting a unit of product from source i to destination j .
- y_j = The amount required at the j -th destination.
- b_i = The supply available at the i -th source.

The total transportation cost or the sum to be minimized is expressed as:

$$T = \sum_{i=1}^m \sum_{j=1}^n C_{ij} X_{ij}$$

The assumptions are:

- (1) The commodity being transported is homogeneous.
- (2) The supply and demand of the commodity being transported is known, and supply equals demand. Algebraically $\sum_{i=1}^m x_{ij} = y_j$ or the sum of the quantities transported from the several sources to the j -th destination is equal to the total demand or consumption of the j -th destination; and $\sum_{j=1}^n x_{ij} = b_i$ that the sum of quantities transported from the i -th source to the several destinations is equal to the supply of the commodity available at the i -th source; and $\sum_{j=1}^n y_j = \sum_{i=1}^m b_i$ the sum of requirements at the several destinations is equal to the total quantity supplied.
- (3) The cost of transporting the commodity from sources to destinations is known, and constant, regardless of quantity.
- (4) Transporting the commodity from source to destination can be carried on only at non-negative levels, or algebraically $x_{ij} \geq 0$.

- (5) The objective to be minimized is total transportation costs.

Solution of the Model

Solution of the problem consists of three basic steps. These steps are (1) - deriving a first feasible solution; (2) - testing the plan to determine if it can be improved upon; and (3) - actually modifying the plan if improvement is possible. The testing and modification is a lengthy process; therefore, it will not be presented here. Table 4 shows the cost of delivering 100 gallons of fuel from each source to each destination.

The first feasible solution must not violate the capacity and requirement restrictions discussed above. Such a plan is given in Table 5. The total cost of this plan is \$62,635, which is \$8,342 greater than the present cost. The reason for this higher cost is the amount of deadheading involved in some of the deliveries. Testing the plan to determine if it can be improved upon is done by budgeting the inactive cells. If the net cost of an inactive cell is negative, it means that by increasing the flow to that cell total cost can be reduced. The procedure is to increase the flow to the cell having the greatest negative cost. Modification of the plan consists of adjusting quantities and costs. The cost adjustment makes it possible to eliminate re-budgeting after each flow change.

Table 4.

COST OF DELIVERING 100 GALLONS OF FUEL FROM
EACH SOURCE TO EACH DESTINATION, 1958

To Routes	1	2	3	4	5	6
From Source ¹ (Trucks)						
1	.95	1.36	1.19	.74	.60	.83
2	.95	1.36	1.19	.74	.60	.83
3	.95	1.36	1.19	.74	.60	.83
4	.95	1.36	1.19	.74	.60	.83
5	1.67	1.92	1.64	1.05	.91	1.35
6	2.00	1.83	1.10	1.03	.89	1.81

(1) Trucks 1, 2, 3, and 4 based at Mt. Angel; 5 at Silverton; and 6 at Stayton.

Table 5.

FIRST FEASIBLE SOLUTION

To Routes	1	2	3	4	5	6	Capacity 100 gal. Unites
From Source							
1	9,013.96						9,013.96
2	95.91	8,709.87	208.18				9,013.96
3			8,950.71	63.25			9,013.96
4				8,904.45	109.51		9,013.96
5					8,975.84	58.12	9,013.96
						9,013.96	9,013.96
Requirements							
100 gal. Units	9,109.87	8,709.87	9,158.89	8,967.70	9,085.35	9,052.08	54,083.76

Table 6.
OPTIMUM SOLUTION

To Routes	1	2	3	4	5	6	Capacity 100 gal. Units
From Source							
1	9,013.96						9,013.96
2	95.91	8,709.87	144.93			63.25	9,013.96
3				8,967.70		46.26	9,013.96
4					71.39	8,942.57	9,013.96
5					9,013.96		9,013.96
6			9,013.96				9,013.96
Requirements							
100 gal. Units	9,109.87	8,709.87	9,158.89	8,967.70	9,085.35	9,052.08	54,083.76

Table 7.

SUMMARY OF COST CHANGES DUE TO DELIVERY REORGANIZATION

Source of Change	Cost	Change	Total Savings
	(Dollars)	(Dollars)	(Dollars)
Present Costs	54,293		
1st Feasible Solution	62,635	8,342	-8,342 ¹
Optimum Solution	52,932	-9,653	1,311
One Truck for Each Route	52,992	9	1,302
Mt. Angel Costs Trucks At Present Location	46,956	-6,036	7,337
Two Trucks Silverton Others Same Location	46,599	- 357	7,695
Mt. Angel Costs All Trucks Mt. Angel	50,999	4,401	3,294

(1) This figure higher than the original cost.

The results of the model or optimum solution are given in Table 6, and a summary of the implications in Table 7. The solution shows a \$1,311 decrease in total delivery cost. If the truck capacity restriction is relaxed, which in actual practice is necessary, cost would be increased \$9 which would reduce total savings to \$1,302. The truck capacity which was set at 901,396 gallons per year (1/6 total requirements) is not a realistic restriction. At the present time several trucks are delivering over one million gallons per year. If only one truck is allowed to deliver on a given route, which is reasonable, the per truck annual deliveries would range from 870,937 to 915,889 gallons.

It can be seen from Table 7 that substantial savings could result from reorganization. Under a merger it can be assumed that the entire petroleum operation could be carried on with the same cost structure enjoyed by the most efficient association now delivering 76.34% of the total. This assumption, although not completely reliable, is illustrative of some of the potential savings that would result from merger. In reality, the cost per mile is determined in part by the relationship of fixed costs to total miles. By eliminating overlap and making the routes approximately the same size it will increase association C's costs per mile by reducing the miles

traveled. This relationship in turn would decrease association A and E's costs. As association C has four trucks the new cost per mile would be nearer C's than A or E's.

Assigning the costs of the most efficient firm to all delivery trucks, and assuming flexibility in use, it becomes apparent that maximum saving will result by minimizing the total miles deadheaded. This goal is accomplished by basing three trucks at Mt. Angel, two at Silverton, and one at Stayton.

In transporting fuel from Portland to their association, distributor B earned a net margin of .3 cents per gallon hauled. If this relationship could be maintained for the total requirements it would mean an additional saving of \$3,838. As already indicated, association B now distributes 76.34% of the total.

Several plans are summarized in Table 7. With the trucks at their present locations total savings would be \$11,175. (\$7,337 route savings + \$3,838. transport savings). If all trucks are located at Mt. Angel savings would be \$7,132. With the plan outlined above maximum savings would amount to approximately \$11,533 or .20 cents per gallon for the total petroleum volume.

Centralized Bookkeeping

The Present System

The five associations covered in this study have a total of nine full-time and one part-time employees engaged in bookkeeping. The breakdown of these employees is given in Table 8.

Table 8.

NUMBER OF EMPLOYEES BY ASSOCIATION, 1958

Association	Employees	Remarks
A	2	1 man 1 girl
B	3	1 man 2 girls
C	1	1 man but there are four people working in the office and store area.
D	1	1 man but two people work in the store area.
E	2 1/3	1 man 1 1/3 girls employed in office only; 1/3 is a part-time girl.

Through interviews with the respective managers and their bookkeepers the number of records processed was determined, i.e. the daily transactions, invoices, statements, etc. With this information it was possible

to develop a method of centralizing the bookkeeping with the objective of reducing the cost of performing this essential service.

A Centralized System

A centralized system would consist of a machine accounting installation at the new association's head office or other central point. This department would be staffed by a capable accountant, who would be in charge, and a full-time girl. Part-time help could be employed as needed. There should be one person at each branch to process the daily transactions, and to keep inventory cards. This individual would be a combination cashier-bookkeeper. The branch cashier-bookkeeper should also be responsible for preparing and forwarding the day's business to the central office.

The Present System Versus Centralization

With centralization the accounting methods would have to be standardized to some extent, in order to facilitate processing. The data given below are based on a National Cash Register Company model 31A-10-14 (24DP)26"SP, National Class 31A machine accounting installation. The general classifications and machine time are shown in Table 9. It can be seen that the daily transactions

Table 9.

BOOKKEEPING CLASSIFICATIONS AND MACHINE TIME

Item	Machine Time
General Ledger	1 hr. per day
Accounts Payable	1 hr. per day
Accounts Receivable	5 hrs. per day
Payroll	1 to 3 hrs. per week

(Accounts Receivable) take by far the most time to process. The other forms, small in number, are either monthly or annual in occurrence. A machine week would be about $7\frac{1}{2}$ hours daily for either a five or six day week depending upon total requirements.

Actual savings resulting from centralization fall into two categories: 1 - Forms, and 2 - Labor as shown in Table 10. The savings in forms costs would amount to \$3300 the first year and \$3500 in subsequent years. Labor cost of the new installation would be around \$12,300 per year. The amount of actual savings would depend directly upon the number and sex of employees replaced by the machine.

The effect of centralization could vary from a \$10,443 deficit to a \$23,057 savings the first year, with the annual effect thereafter ranging from a \$9775 deficit to \$23,725 in savings. The deficit figures would arise if all the present employees were retained. Maximum savings as given would mean reducing the number of bookkeeping

Table 10.

A SUMMARY OF SAVINGS RESULTING
FROM CENTRALIZED BOOKKEEPING

Labor Cost	Forms Cost	Machine Cost
(Dollars)	(Dollars)	(Dollars)
Present		Initial cost \angle^3 7800
Assoc. A 8900 \angle^1	All associations	6% Federal tax 468
B 11900	6000	5% Alternative
C 5900		cost \angle^4 195
D 5900		
E 9900		1st year machine
		cost \angle^5 1443
Centralized \angle^2	All forms	
Central Office	1st year 2700	Annual machine
12,300	Annual 2500	cost 975

\angle^1 Man \$5900
Girl 3000

\angle^2 Man \$8100
Girl 4200

\angle^3 10 year flat rate no salvage.

\angle^4 Alternative cost based on 5 year value at a 5% rate.

\angle^5 Federal tax written off 1st year.

employees (Table 8) at each association, leaving one person as indicated to process daily transactions and keep inventories. The person retained should be a girl, if possible since this would mean greater savings. Association A would reduce its staff by one man; association B, one man and one girl; association C, one man; association D, one man; and association E, one man and the part-time girl.

It should be recognized that a reduction of employees as indicated above would be difficult because of the varied duties several of the bookkeepers perform, such as waiting on customers from time to time. Therefore, to reduce bookkeeping personnel may often require adjustments elsewhere in the business. If these adjustments were carried out, however, it appears a reduction of the magnitude discussed above would likely occur.

Specialization in Marketing

Implications

In analyzing the advantages of specialized marketing under full combination, two areas of specialization are available. The first of these, efficiency in the utilization of the plant capacity and equipment is beyond the scope of this study. It would appear, however, that with specialized marketing the producer of a given commodity would deliver it to the branch that was selected to perform this service. The second area, specialization in the actual marketing operation, would be carried out by several of the present managers, possibly with one specializing in grain and one in grass seed marketing. This added work would be offset to a substantial degree by a reduction in the managerial requirements of the branch which would be assumed by the general manager.

Table 11.

COMPARISON OF MARKET PRICE AND AVERAGE PRICE
RECEIVED BY ASSOCIATION OVER A THREE YEAR PERIOD

(Market price is State average)

Commodity ¹	Market Price			Assoc. A			Assoc. D			Assoc. E		
	56	57	58	56-7	57-8	58-9	56-7	57-8	58-9	56-7	57-8	58-9
	- Cents per pound -											
Wheat	3.33	3.40	3.02	3.49	3.63	3.07	3.64	3.66	3.14	-	-	-
Oats	2.25	2.09	2.09	2.52	2.19	6.51 ²	2.42	2.27	2.50	-	-	-
Barley	2.19	2.04	2.10	2.60	2.14	2.61	2.57	2.41	2.80	-	-	-
Corn	3.04	2.71	2.55	3.51	3.27	3.23	3.27	3.06	3.12	-	-	-
Bent	43.5	24.0	23.0	45.1	22.9	20.0	34.6	20.6	18.2	24.8	17.7	14.6
Chewing Fescue	32.0	29.5	32.0	29.4	29.9	31.6	34.5	31.1	32.3	29.0	23.5	27.7

(1) For the year 1958 the grains included in this table represent 99.3% of the total pounds of grain handled for all associations. The grass seeds account for 98.4% of the total grass seed volume.

(2) Unreasonable price, caused by selling total production as a feed mix.

Table 12.

POUNDS OF GRASS SEED MARKETED FOR THREE YEAR PERIOD

Commodity	Association A			Association D			Association E		
	56-7	57-8	58-9	56-7	57-8	58-9	56-7	57-8	58-9
Bent	677,952	2,145,316	829,759	451,464	1,265,311	968,655	390,037	1,330,787	910,058
Chewing Fescue	756,455	871,776	701,777	218,000	794,707	628,524	137,946	364,877	254,537

Table 11 shows the general relationship of the average market price with the average price received by association. In grain marketing this relationship is reasonably close, which may demonstrate that in a well developed market such as the grain market, a non-specialist seller can do a satisfactory job of marketing. However, in a less well organized market such as that prevailing for grass seeds it is much more difficult to obtain the full market price. If one of the now existing cooperatives would specialize in the selling of all the grass seeds marketed by cooperative members in the area, it is possible the result would be a higher average price, a price that would compare favorably with the average market price.

Results of Specialization

If the price received for grass seed marketed in the years 1956, 1957, 1958 is compared with the average market price for the same year an estimate of the amount that could be gained is obtained. The total pounds marketed by association are given in Table 12. The results of such a comparison are summarized in Table 13.

It should be noted that in all three years under observation, the average price received for grass seeds by the cooperatives was less than the average market price to the extent that total revenue was substantially reduced.

Table 13.

DIFFERENCES IN TOTAL REVENUE DUE TO DIFFERENCES BETWEEN
MARKET PRICE AND PRICE RECEIVED BY ASSOCIATIONS
MARKETING GRASS SEED MULTIPLIED BY QUANTITIES
SOLD OVER A THREE YEAR PERIOD.

Commodity	1956	1957	1958	Average
		-Dollars-		
Bent	-102,270	-150,459	-148,233	-133,654
Chewing	- 18,356	+ 12,544 ^{/1}	- 11,867	- 5,890
Total	-120,626	-137,905	-160,100	-139,544

^{/1} Total revenue higher because association obtained higher than market price.

If cooperative selling of grass seeds had resulted in obtaining the average market price, an additional \$120,000 would have been paid to members in 1956, \$138,000 in 1957, and \$160,000 in 1958. It is reasonable to assume that on an average, at least, the prices received by marketing cooperatives should approach market prices. A coordinated seed marketing program should do much to bring the average pool price in line with the market price.

Supplies

General

In the hardware and miscellaneous supply activities, associations A and E show a net loss. Association A's loss was \$5,518 in 1958 and association E had a net

loss of \$2,595 in the same year. It would appear on the surface at least, that elimination of this enterprise in associations A and E would mean a savings of \$8,113. This is not necessarily the case, however, for several reasons. This line of business activity may be of a service type and provide the convenience of one stop shopping. If this is the case eliminating it may cause some members to go elsewhere. It may also be true that some supplies are priced relatively low to attract business to the association.

Data now on file in the Department of Agricultural Economics, Oregon State College indicate that a loss in this area is not uncommon, especially when traditional accounting procedures are employed to show profit and loss. A case can be made to allocate only the variable costs to the hardware activity (see Figure 3). The plant, or in this case the retailing facilities, already exist. It may, therefore, be reasonable to use only variable costs in computing profit and loss rather than assigning a full share of fixed costs to this activity. The portion of line O_1, P labeled M, N would be the amount of loss at output O_1 in conventional terms. If, however, only variable costs are used there will be a profit of K, N . With the data available for associations A and E, a family of cost curves, as shown in Figure 3, cannot be constructed because information is available for only one point on the curves.

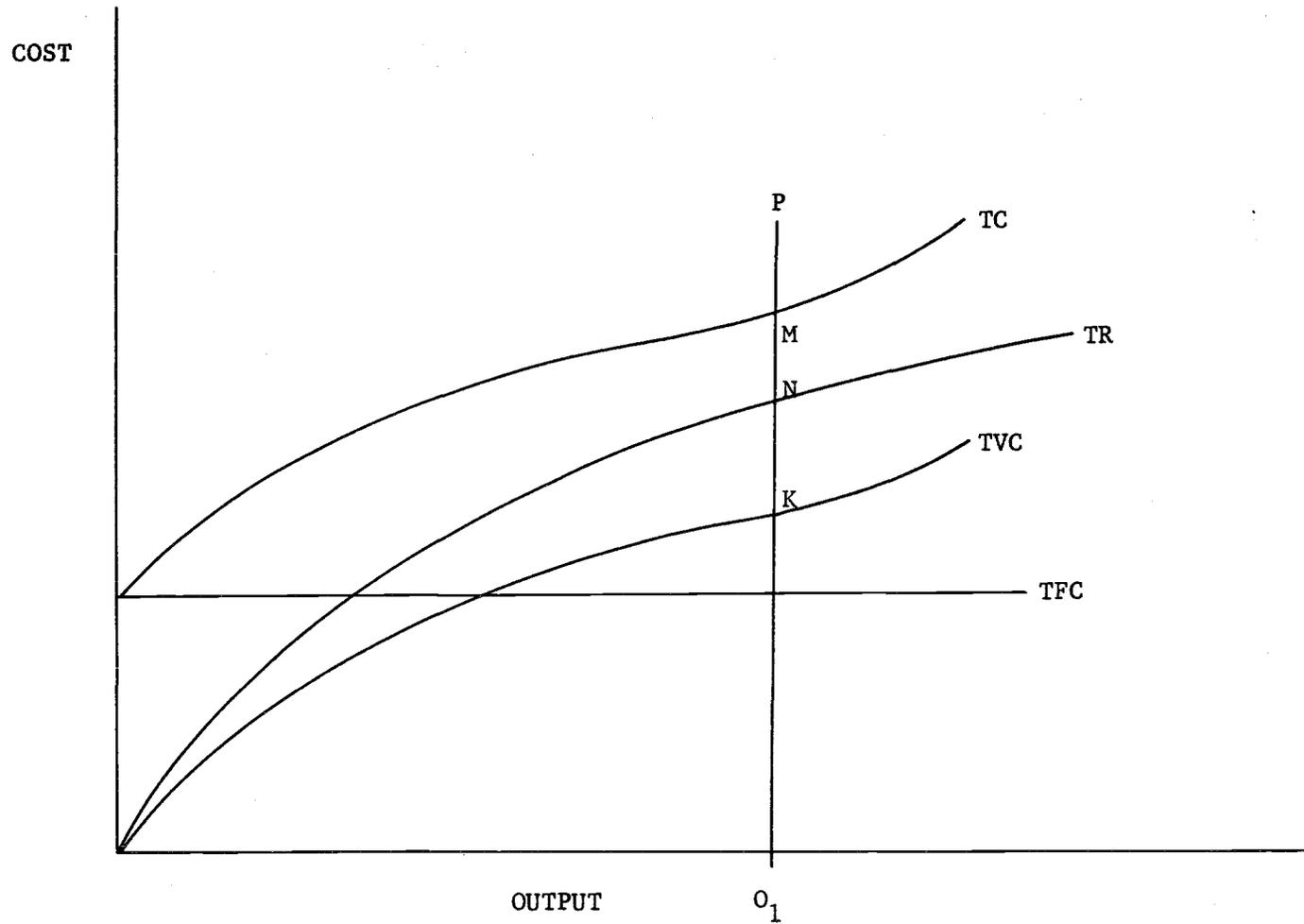


FIGURE 3. RELATIONSHIP OF TOTAL COSTS AND TOTAL REVENUE AS ALLOCATED TO THE SUPPLY ACTIVITY

With respect to Association A, if the relevant fixed costs are not charged to the supply activity, there is still a loss of \$1,400 for the year 1958 but the loss has been reduced by nearly \$4,200. This does not necessarily mean that supply activity should be discontinued. The importance of the other factors mentioned previously should be considered. After making the same adjustment in cost allocations in association E, there is a profit of more than \$1,900 for the hardware and supply activity.

A PRACTICAL FORM OF MERGER

Some Non-Quantitative Problems Encountered in Cooperative Merger

With any group of firms contemplating merger, when there are important differences in the percent of ownership and annual net margins, the members of a stronger and more efficient firm must be assured that they will not be required to subsidize the weaker ones. Even so, association members may oppose merger because it means becoming part of a large organization, thereby losing some of their autonomy.

Possible management and employee opposition may arise due to the unfavorable reflection such action may have on management and other employees previous service. A contemplated merger could also be opposed by employees due to the hazy nature of future employment opportunities.

Merging associations that are not in the same town should consider the general attitudes among the areas involved. Problems of this type can develop because of previous difficulty, religious differences and/or regional independence of an area.

Other opposition could stem from non-cooperative businessmen fearful of losing business. This feeling would probably be based on a fear of rapid expansion once the merger had occurred.

Informal Combination

Due to the problems discussed above an immediate formal merger may not be feasible. For this reason a coordinating committee may be the answer. With a committee of this type some of the economies resulting from a merger could be realized, but each association would retain its identity.

The committee consisting of the association managers and board presidents could meet periodically to make policy decisions. These meetings would provide an opportunity to discuss problems, to become aware of what the others are doing, and to determine when and where joint or coordinated action would be beneficial. If the committee approach is successful it is possible to then move toward a more formal combination.

How the Economies Resulting from Informal Combination Would Differ from Those Discussed Under Formal Combination

Reorganization of Petroleum Delivery

It is not very likely that any of the benefits discussed under this heading, in connection with formal combination, could be realized with an informal agreement.

In order for the changes to take place, rerouting, which with informal combination would imply some member

exchange, must occur. Such a move would be opposed by the former members of an association which normally returns a high net margin if they were assigned to a low return association.

It is possible, however, to overcome this objection. If the associations engaged in petroleum delivery would keep their petroleum earnings separate from those of other activities this problem could be resolved. This would result from the assumption that the entire operation could be operated as efficiently as the now most efficient firm.

If this were the case there would be no monetary gain from staying with a particular firm. In transport there would be an earning equal to that realized in formal combination by transporting for all firms. This earning would be partially dissipated, however, unless the earnings resulting from this activity were distributed apart from other (deficit) activities as discussed above.

Centralized Bookkeeping

In order to realize the advantage of centralized bookkeeping under informal combination, only two adjustments are necessary. First, the operation must be standardized, that is the records kept for each association must be of the same type and form. This task would not vary under either form of merger, since even with formal combination

information about each branch's performance is necessary in the interest of proper management. Secondly, the name should, if possible, be the same for all associations. The reason for this suggestion is a reduction of \$1,000 yearly in forms cost. This savings is the result of bulk forms purchase, and can be obtained only through bulk purchases for all of the associations.

Specialization in Marketing

The full advantages of specialized marketing possibly could be realized under informal combination. This is likely because it would not mean a member exchange by the participating organizations. The only apparent problem that could arise is the extra work load falling upon the managers selected to specialize in the marketing of given commodities.

Supplies

The supply activity would not vary under this form of combination. It is doubtful that savings will arise with any form of merger in this area. It should be realized in any case that this activity may add to total net revenue even though it may show up as a loss under traditional cost accounting procedures.

SUMMARY AND CONCLUSIONS

The associations included in this study are limited in certain activities due to size, while in other activities, duplication of service exists. For this reason, some form of combination will result in more efficient use of resources without reducing services. Emphasis in this study is given to removing duplication of service rather than showing possible economies of scale as size increases.

Even an estimate of the magnitude of possible savings under combination is difficult to determine. It is realistic to suppose that if the savings resulting from a centralized bookkeeping system and a rerouting of petroleum delivery trucks could be realized, these savings could amount to as much as \$35,000 annually. It is less realistic to assume that marketing of grass seeds could be improved in a short time to realize an increase in annual total revenue or more than \$139,000 (3 year average) which, in fact, is only the average difference between the market price and the actual price received, multiplied by the quantity sold in 1956, 1957, and 1958. However, if net savings could be increased by the full amounts indicated above, the increase under formal merger could be as much as \$174,000 annually or an increase in net earnings for 1958 of 51 percent. Present earnings are shown in terms of total volume by association in Table 14. The percent figures vary a great

deal among associations. If the savings under combination is shown as a percent of total combined volume it would be 2.97 percent.

Table 14

PRESENT EARNINGS AS A PERCENT OF TOTAL VOLUME

Association	A	B	C	D	E
Percent	2.20	3.14	13.18	5.35	5.35

Although this study shows economies from informal coordination that are about equal to the economies resulting from formal merger, such probably would not be the case under actual practice. The problem of coordinating the activities of five autonomous firms will from time to time result in something less than effective coordination. Indeed, this type of informal merger will likely break down as a result of conflicting views and policies of the five boards of directors, as reflected through their managers.

Informal combination was considered because of the many practical problems encountered in cooperative merger. Some of these problems are the revolving fund, time schedules, percent ownership, management and employee opposition, associations' members desiring autonomy, and non-cooperative businessmen who oppose merger because of the

effect on their own business. With an informal arrangement the coordinating committee would attempt, as best it could, to eliminate service duplication, and to promote greater efficiency in certain activities. If a combination of this type was successful it is possible that a more formal merger would be the next step.

It appears, because of the relative amount of savings as compared to present earnings, that a combination of one type or another should be considered by the parties involved. Although the savings are only illustrative, there is little reason to believe that they would not be substantial.

This is not a complete analysis of all the possible savings that could occur through merger. The results of this study should, however, be of value as a guide to the boards of directors of any group of associations contemplating combination. Although each situation would differ with regard to type of association, product mix, volume, types of pools, and revolving funds, the basic problems encountered in cooperative merger would be much the same as those considered here. This study offers basic "guidelines" that can be followed, and provides some facts as to what economies may result from cooperative merger.

BIBLIOGRAPHY

1. Bakken, Henry H. and Marvin A. Shaars. The economics of cooperative marketing. New York, McGraw-Hill, 1937. 583 p.
2. Bober, M. M. Intermediate price and income theory. New York, W. W. Norton and Company, 1955. 526 p.
3. Consumers Cooperative Association. Co-op mergers - some guidelines. Kansas City, Missouri, 1958. 7 p.
4. Dorfman, Robert, Paul A. Samuelson and Robert M. Solow. Linear programming and economic analysis. New York, McGraw-Hill, 1958. 527 p.
5. Easton, Edison E. and Byron L. Newton. Accounting and the analysis of financial data. New York, McGraw-Hill, 1958. 449 p.
6. Heady, Earl O. and Wilfred Candler. Linear programming methods. Ames, Iowa State College Press, 1958. 597 p.
7. Korzan, Gerald E. Financing Oregon cooperative associations. Corvallis, 1954. 30 p. (Oregon. Agricultural Experiment Station. Station Bulletin 540)
8. Korzan, Gerald E. Changing demands upon cooperatives resulting from a changing agricultural economy. Urbana, 1959. 9 p. (Paper presented at the American Institute of Cooperation, University of Illinois)
9. Leftwich, Richard H. The price system and resource allocation. New York, Rinehart, 1955. 372 p.
10. Weintraub, Sidney. Price theory. New York, Pittman, 1949. 447 p.
11. Snodgrass, Milton M. and Charles E. French. Simplified presentation of "Transportation problem procedure" in linear programming. Journal of farm economics 39:40-51. 1957.
12. Young, Ronald Edwin. Impact of transportation rates on the competitive position of Oregon's green bean industry. Master's thesis. Corvallis, Oregon State College, 1959. 71 numb. leaves.

APPENDIX

Table 1.

DELIVERY COSTS BY TRUCK UNDER VARIOUS PLANS

Optimum Solution	1 Truck per Route	Mt. Angel costs Trucks Present Location	Mt. Angel costs 2 Trucks at Mt. Angel	2 Trucks Stayton 1 Truck Mt. Angel	3 Trucks Mt. Angel
T ₁ R ₁	\$ 8,563	T ₁ R ₁ \$ 8,654	T ₁ R ₁ \$ 8,654	T ₁ R ₁ \$ 8,654	T ₁ R ₁ \$ 8,654
T ₂ R ₁	91	T ₂ R ₂ 11,845	T ₂ R ₂ 11,845	T ₂ R ₂ 11,845	T ₂ R ₂ 11,845
T ₂ R ₂	11,845	T ₃ R ₄ 6,636	T ₃ R ₄ 6,636	T ₃ R ₄ 6,636	T ₃ R ₄ 6,279
T ₃ R ₅	172	T ₄ R ₆ 7,513	T ₄ R ₆ 7,513	T ₄ R ₆ 7,513	T ₄ R ₆ 7,513
T ₂ R ₆	53	T ₅ R ₅ 8,268	T ₅ R ₅ 5,479	T ₅ R ₅ 5,451	T ₅ R ₅ 5,479
T ₃ R ₄	6,636	T ₆ R ₃ 10,075	T ₆ R ₃ 6,829	T ₆ R ₃ 10,899	T ₆ R ₃ 6,829
T ₃ R ₆	38				
T ₄ R ₅	43				
T ₄ R ₆	7,422				
T ₅ R ₅	8,203				
T ₆ R ₃	9,915				
TOTAL ^{/1}	\$52,982	52,992	46,956	50,998	46,599

^{/1} Slight variation from Table 7 may exist due to rounding error.