Fertilizer

FERTILIZER MARKETING REPORT

Report No. 2 August 1980

USE OF FERTILIZER PRODUCTS AND SERVICES BY ONTARIO FARMERS

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ISSN-0318-1804

AEEE/80/8

August, 1980

FOREWORD

This report is the second in a series of five dealing with fertilizer marketing in Ontario. The titles of all the reports in the series are:

1) Farmer Attitudes Toward Fertilizer and Fertilizer Purchasing.

2) Use of Fertilizer Products and Services by Ontario Farmers.

3) Ontario Farmers' Behaviour and Preferences in Purchasing Fertilizers.

4) Importance - Performance Analysis for Fertilizer Dealers.

5) A Comparison of Fertilizer Purchasing and Use in Ontario and Indiana.

This report was made possible with the cooperation and assistance of many people and organizations. Major funding for the research was provided through the contract research funding of the Ontario Ministry of Agriculture and Food. In addition, generous contributions were received from the following Ontario fertilizer companies: C.I.L., Cyanamid Canada Inc., Genstar, W.G.Thompson and Sons, St.Clair Grain and Feed, Kent County Fertilizers, Burford Fertilizers, and King Grain Ltd.

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July, 1980.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

Recent agricultural statistics estimate that Ontario farmers spend in excess of $150 million annually on fertilizers for various crops. In terms of total farm operating expenses, the expenditure on fertilizer is exceeded only by wages, machinery, and purchased feeds. Thus the fertilizer purchase represents a major cost component for most Ontario farmers, and, as a result, has supported the development of an important industry to supply fertilizer products and services to farmers.

The objective of the research reported in this paper, and others in the series, is to develop information to assist fertilizer manufacturers and dealers develop effective marketing programs to serve the farm market. The study, therefore, focuses on the fertilizer product/service needs, buying behaviour, attitudes, and preferences of farmers, and the manner in which this information can be used to develop product, price, promotion, and distribution policies for manufacturers and dealers. In addition, attention is given to identifying and evaluating segments in the fertilizer market, and variations in marketing programs for each segment.

The objective of this report is to discuss current and projected use of fertilizer products and services by Ontario farmers. The major areas considered are: 1) fertilizer use, 2) timing of fertilizer purchasing and use, 3) financing fertilizer purchases, 4) fertilizer application, and 5) soil testing. In addition to presenting detailed survey results in these areas, the report also discusses the survey methodology used to obtain the information, and the implications of the results for improved marketing programs.

2.0 RESEARCH DESIGN

The data for this study was obtained through a survey of Southwestern Ontario farmers. This section describes the survey methodology in terms of questionnaire design, interviewing procedures, and sampling procedures. In addition, a section is included describing the general characteristics of the sample.

2.1 Questionnaire Design

The questionnaire used in this research was developed over a period of several months by the researchers and management groups from fertilizer companies participating in the study. The primary objective in the organization and design of the questionnaire was to procure information relating to the product and service needs of farmers, their buying habits and preferences, as well as various farm and farmer characteristics to be used in defining market segments. Prior to final use, the questionnaire was pretested thoroughly under actual field conditions.

2.2 Interviewing Procedures

Undergraduate agricultural students from the University of Guelph were hired to carry out the field work. Selection of prospective interviewers was based on such factors as working knowledge of fertilizer, personality, previous interviewing experience, and location. All interviewers were trained in the general techniques of interviewing and the specific requirements of this project prior to making farm calls.

Prior to any personal contact the farmers in the sample received a letter explaining the nature of the project and seeking their co-operation. The interviewers were instructed to call each farmer on their list, arrange for an appointment, and visit the farmer for an interview. The interviews were conducted on the respondent's farm during the month of June 1979. The average time for completing an interview was approximately one hour, with some taking as long as two and one-half hours and a few as short as thirty minutes. During the period when interviews were being conducted, regular telephone contact was maintained with the interviewers to provide additional farmer names when required and to help solve any difficulties experienced by the interviewers.

2.3 Sampling Procedures

The sampling plan used in this research consisted of four steps: determination of sample size, selection of primary sampling units, allocation of the sample to sampling units, and respondent selection.

2.3.1 Sample Size

An overall sample of 200 respondents, or 50 per county, was chosen for this research. The primary basis for this number was an assessment of the estimated cost per interview in relation to the funds available for data collection. Although 50 observations per sampling unit is not excessive from a statistical point of view, it does provide reasonable accuracy at a reasonable cost.

2.3.2 Sampling Units

The primary sampling units were selected using a form of judgment sampling in which experienced fertilizer managers, together with the researchers, selected representative counties in Southwestern Ontario. Altogether four counties were selected to represent the major types of agriculture in the Province. The counties were: Kent, Huron, Oxford, and Wellington. As a group, these counties represent approximatly one-third of the market for farm fertilizers in Southwestern Ontario.

Kent County was selected to represent the cash crop area of Ontario. This county is a major producer of grain corn, winter wheat, and soybeans, along with a variety of vegetable crops. Huron County was chosen to represent a major livestock producing area. In addition to its heavy concentration of cattle and hogs, this county is also an important producer of grain corn, fodder corn, barley, mixed grains, and dry white beans. Oxford

County is similar to Huron County in that it is a major producer of cattle and hogs. In addition, it is the most important milk producing county in Ontario and among the leading producers of grain corn, fodder corn, and flue-cured tobacco.

Although the above counties represent the more important fertilizer consuming areas in Ontario, they all can be classified as mature markets because of the limited growth opportunities available in the future. This is not necessarily the case with Wellington County, the fourth county selected for the sample. Although Wellington County is also a major livestock and milk producing area, it is different from Oxford and Huron Counties because its major crops are hay and pasture. In most instances, hay and pasture are not heavily fertilized despite the fact that yields can be significantly improved through proper fertilization programs. As a result, Wellington County represents a potential growth area and, therefore, an important new dimension to the sample.

2.3.3 Allocation to Sampling Units

The sample of 200 farmers was allocated equally to the four counties. This decision was based on the fundamental principle that a sample should be allocated in such a way that sampling units with greater variability receive a larger number of observations. Since no reliable information exists on the variability of fertilizer purchasing in the four counties, it was felt that an equal allocation would maximize the amount and accuracy of information obtained.

2.3.4 Respondent Selection

Within the four representative counties the population of interest was defined as all farmers who purchased some fertilizer and grew at least 100 acres of crops in 1979. These restrictions were imposed to insure that the sample did not contain farmers who were either very small fertilizer users, or farmers who used no fertilizer at all.

The population of farmers that satisfied the above requirements were stratified into the following acreage groups: 100 to 200 acres, 201 to 400 acres, and 400 acres and greater. Within the four counties, a quota was established for each stratum: 40 percent of the 50 farmers to be interviewed in each county were to be from the 100 to 200 acre group; 35 percent from the 201 to 400 acre group; and 25 percent from the 400 acre and greater category. Table 2.1 shows the distributions of Ontario farms in each acreage category as of December 1978. The source of this data is Agritel, the direct mail division of Public Press in Winnipeg. The fact that this data is fairly recent makes it more useful than the farm acreage data from the 1976 Census of Agriculture. The farm population was adjusted to the 40:35:25 distribution to reflect the fact that the survey counties, particularly Kent and Huron, contain larger farms than the average Ontario county.

Given the above population definition, a sample of farmers divided into the desired acreage strata was purchased from Agritel. Public Press publishes "Country Guide", a publication received by virtually every farmer

in Ontario. Agritel uses the "Country Guide" mailing list and applies strict random selection procedures in drawing samples. This, combined with the fact that their master list is guaranteed to contain information on farm acreage for 75 percent of the subscribers of "Country Guide", suggests that no substantial errors were introduced into the survey as a result of the method of sampling.

TABLE 2.1

NUMBER OF ONTARIO FARMS IN VARIOUS ACREAGE CATEGORIES, 1978

Farm Acreage	Number of Farms	Percentage of Farms	Adjusted Percentage
100 - 200	4,860	59	40
201 - 300	1,631	20	
			35
301 - 400	495	6	
401 - 500	708	9	
			25
500 and Over	503	6	

Although the research plan specified 50 interviews per county, larger samples were selected to be contacted for personal interviews. The larger samples were drawn so that each interviewer had more names than required in the event certain farmers could not be reached or would not cooperate.

2.4 Sample Profile

Table 2.2 presents a description of the sample in terms of size of purchase, farm size (acres and gross income), farm type, age of the farmer, and location (county). To evaluate the representativeness of the sample, the distributions shown in this profile should be compared with similar distributions for the entire population of Ontario fertilizer purchasers. This is not possible, however, because the type of information required is not available. As a result, there is no objective basis on which the representativeness of the sample can be determined. Instead, this can be done only on the basis of any individual's intuitive estimate of the "reasonableness" of the obtained distributions.

3.0 SURVEY RESULTS

This section presents the survey results related to the current and projected use of various fertilizer products and services by Ontario farmers. Included is a discussion of 1) fertilizer use, 2) timing of fertilizer

TABLE 2.2

SAMPLE PROFILE, ONTARIO, 1979

Characteristics	Percent of Farmers	Characteristics	Percent of Farmers
Size of Purchase[1]		Farm Type[2]	
Under 25 tons	30	Cash Crop	21
26-50 tons	38	Livestock	28
51-100 tons	17	Mixed	51
Over 100 tons	15		
Total Acres		Age	
100-200 acres	41	Under 35	32
200-400 acres	36	35-44	25
Over 400 acres	23	45-54	31
		Over 55	12
Gross Income		County	
Less than $50,000	17	Wellington	25
$50,000-$100,000	27	Kent	25
$100,000-$200,000	32	Oxford	25
Over $200,000	23	Huron	25

[1] All purchase quantities are reported in metric tons.

[2] Farmers were placed into farm type categories based on the percentage of gross income derived from different enterprises. Cash crop farmers were those who reported 100 percent of their gross income from the sale of various crops; livestock farmers were those who reported 100 percent of their gross income from the sale of livestock; mixed farmers were those who reported some income from the sale of crops and some from the sale of livestock.

purchasing and use, 3) financing fertilizer purchases, 4) fertilizer application, and 5) soil testing. In addition to presenting the summary results for all farmers, this section also discusses differences in the above areas related to 1) size of purchase, 2) total acres, 3) gross income, 4) farm type, 5) age, and 6) county. These breakdowns provide useful information for designing marketing programs aimed at specific segments of the Ontario fertilizer market.

3.1 Fertilizer Use

The first area analyzed is fertilizer use. This area includes: 1) use of fertilizer on specific crops, 2) use of basic fertilizer types, 3) estimated changes in use of basic fertilizer types, 4) use of micronutrients, limestone, and liquid nitrogen - herbicide mixes, and 5) application rates.

3.1.1 Use of Fertilizer on Specific Crops

To begin each interview the farmers were asked to indicate which crops they were growing in 1979, the number of acres of each crop they were growing, and whether or not they applied commercial fertilizer to each crop. The results of these questions are summarized in Table 3.1 which shows the total acres, average acres, and number of farmers that fertilized or did not fertilize each crop. It is interesting to note that almost every acre of all crops except soybeans, pasture, and forages received some fertilizer in 1979. It is also interesting to observe that, with the exception of soybeans, the average acreage of crops not fertilized is substantially smaller than the average acreage of crops that were fertilized.

Because of the relatively high proportion of farmers who do not fertilize soybeans, pasture, and forages, it was decided to see how these farmers differ, if at all, from those who do fertilize these crops. The results of this analysis in Table 3.4 show that those farmers who use fertilizer on soybeans tend to have mixed farms in the over 400 acre size category; those farmers who use fertilizer on pastures are not significantly different from those who do not; and those farmers who use fertilizer on forages tend to be from Oxford County and fall into the $100,000 to $200,000 gross income range.[1]

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[1]Table 3.4, and others like it in the remainder of this report are set up to summarize a substantial amount of information in a small amount of space. Each of these tables list the variables of interest in the left-hand column and the farm and farmer characteristics in the top row. The second column headed "all farmers" gives the level of the variable for the total sample. The remaining columns show the types of farmers for which the level of the variable is significantly higher. The level of significance is given by the asterisks in each cell. One asterisk indicates a 10 percent level of significance; two asterisks a 5 percent level of significance; and three asterisks, a 1 percent level of significance. To illustrate the interpretation of these tables, consider the first row in Table 3.4. The information in this row shows that 21 percent of all farmers purchased

cont.....

TABLE 3.1

USE OF FERTILIZER ON CROPS IN ONTARIO, 1979

CROPS	FERTILIZED			NOT FERTILIZED			PERCENTAGE OF ACRES NOT FERTILIZED
	TOTAL ACRES	AVERAGE ACRES	NUMBER OF FARMERS	TOTAL ACRES	AVERAGE ACRES	NUMBER OF FARMERS	
GRAIN CORN	28,569	168	170				
SILAGE CORN	9,490	90	105				
SOYBEANS	4,971	128	39	1,845	128	14	27
WHEAT	2,938	47	63	35	35	1	1
OATS	517	32	16	14	14	1	3
BARLEY	2,370	64	37				
MIXED GRAINS	4,716	60	79	20	30	1	1
PASTURE	2,839	98	29	1,363	33	41	32
FORAGES	6,344	72	87	1,612	45	36	20
VEGETABLES	387	27	16	6	3	2	2
TOBACCO	304	51	6				
WHITE BEANS	1,196	54	22				
OTHER	423	47	9	5			1
	65,064			4,910			7

3.1.2 Use of Basic Fertilizer Types

The types of fertilizers purchased by farmers in 1979 are shown in Table 3.2 along with the number of percentage of farmers purchasing each type, the average tons of each type purchased, and the percentage of total fertilizer purchases accounted for by each type. As can be observed, dry bulk blends are the most commonly purchased type of fertilizer followed by custom blends, dry bulk materials, and liquid nitrogens. Of some, but considerably lesser importance, are dry bagged blends and anhydrous ammonia. Dry bagged materials and liquid mixes are shown to be of relatively minor importancd in the Ontario market.

TABLE 3.2

FERTILIZER PURCHASE BY TYPE, ONTARIO, 1979

Fertilizer Type	Number of Farmers	Percentage of Farmers	Average Tons	Percent of Total
Dry Bulk Blends	132	66	22	26
Dry Bagged Blends	67	34	14	8
Custom Blends	64	37	35	20
Dry Bulk Materials	126	63	18	20
Dry Bagged Materials	20	10	7	1
Liquid Nitrogen	53	27	35	17
Liquid Mixes	7	4	37	2
Anhydrous Ammonia	48	24	13	6

The information in Table 3.2 shows the distribution of sales by type of fertilizer for all farmers. Additional analysis was carried out to determine the extent to which this distribution varied by geographical location, size of purchase, type of farm, and age of the farmer. The results of this analysis are shown graphically in Figures 3.1 through 3.4. The important differences illustrated in these graphs are: 1) dry bulk blends are most commonly used in Kent and Huron counties, dry bagged products in Wellington county, and custom blends in Oxford and Huron counties;

[1]micronutrients. Higher percentages of those farmers in the larger size of purchase, total acres, and gross income categories, and the cash crop and mixed farm groups purchased micronutrients. By implication, lower percentages of those farmers in the small size of purchase, total acres, and gross income categories, and the livestock farm type category purchased micronutrients. There were no significant differences among age categories or counties in the purchase of micronutrients.

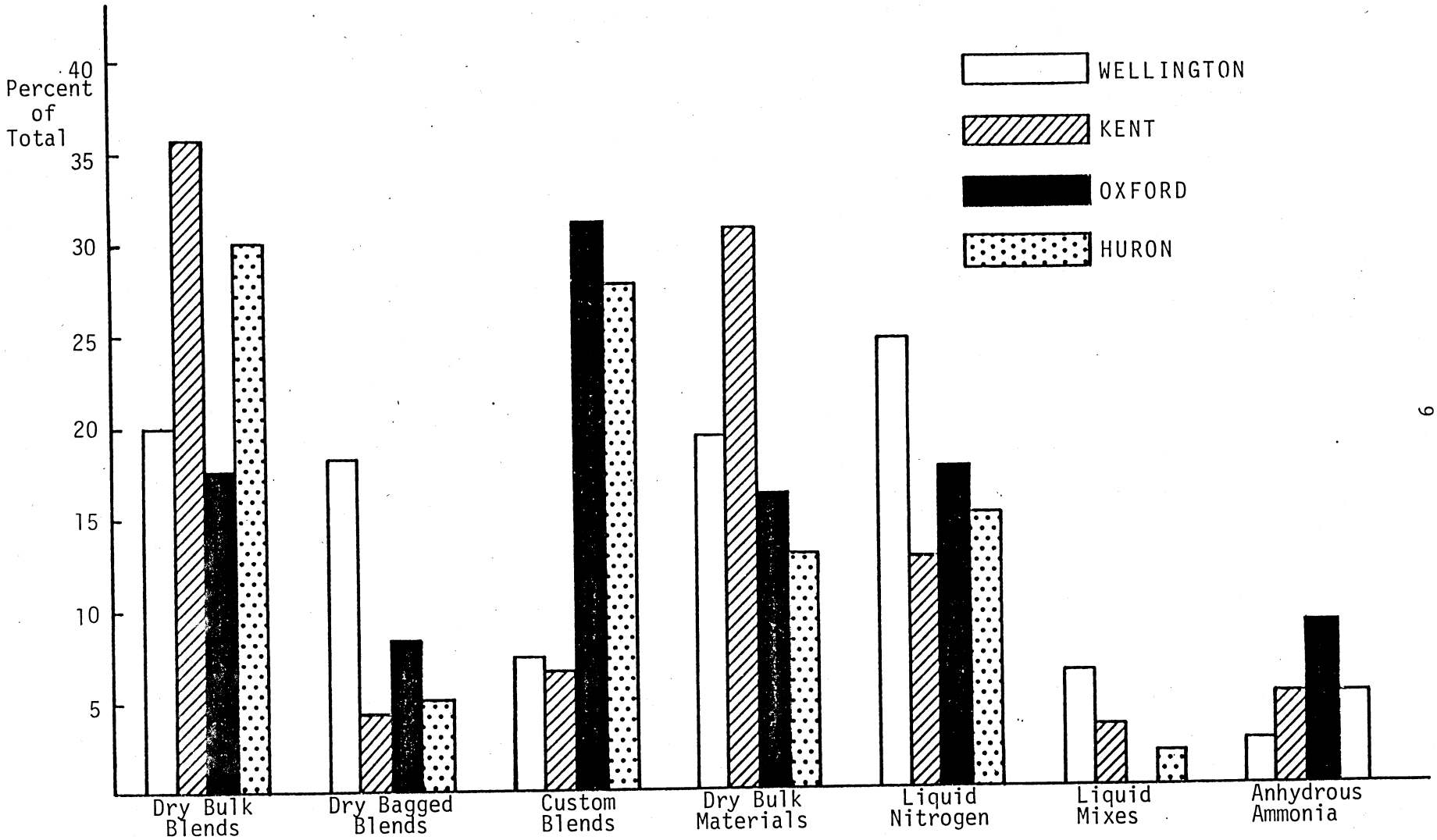

FIGURE 3.1

DISTRIBUTION OF SALES BY TYPE OF FERTILIZER AND COMPANY, ONTARIO, 1979

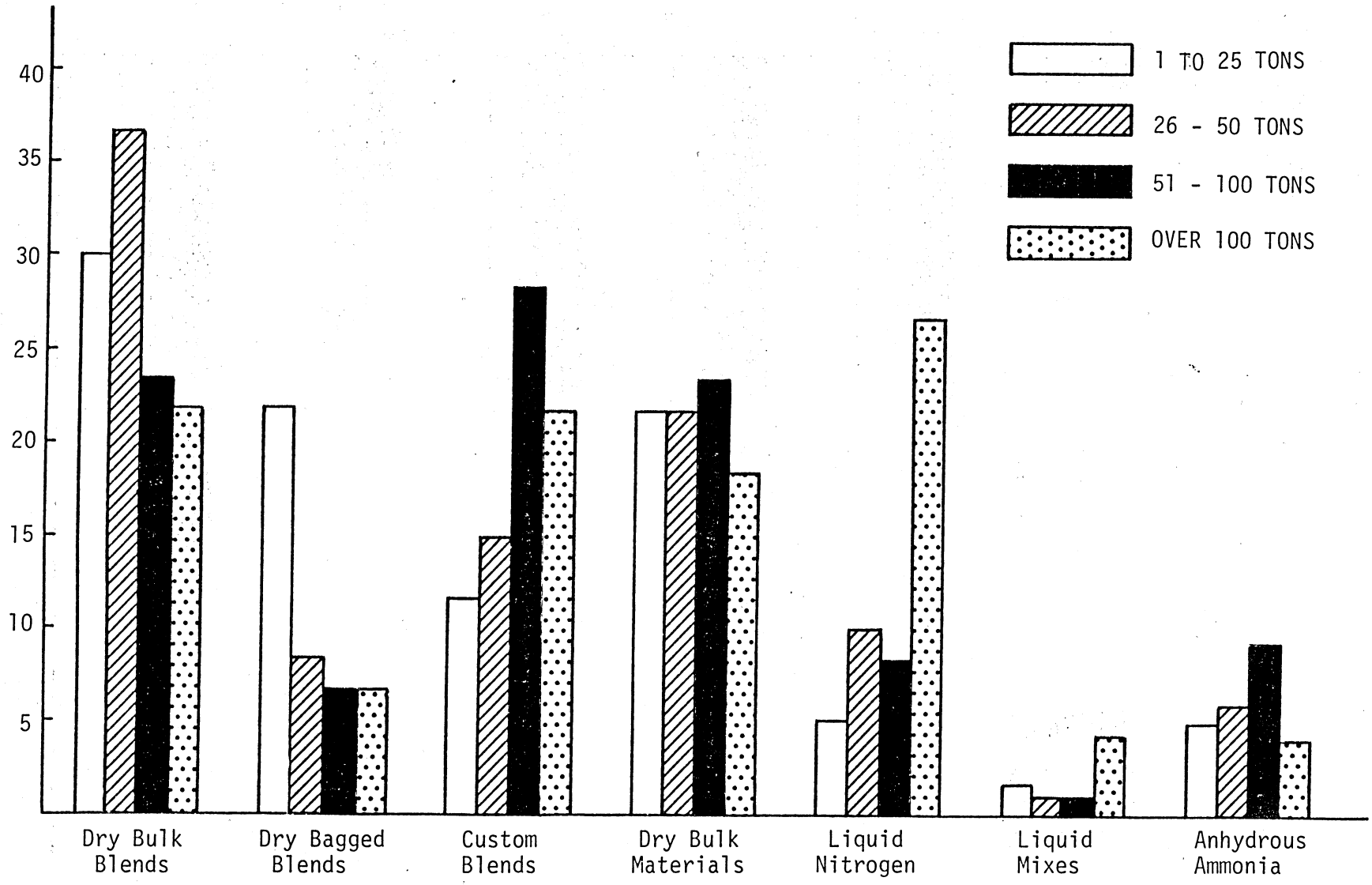

FIGURE 3.2

DISTRIBUTION OF SALES BY TYPE OF FERTILIZER AND TONS PURCHASED, ONTARIO, 1979

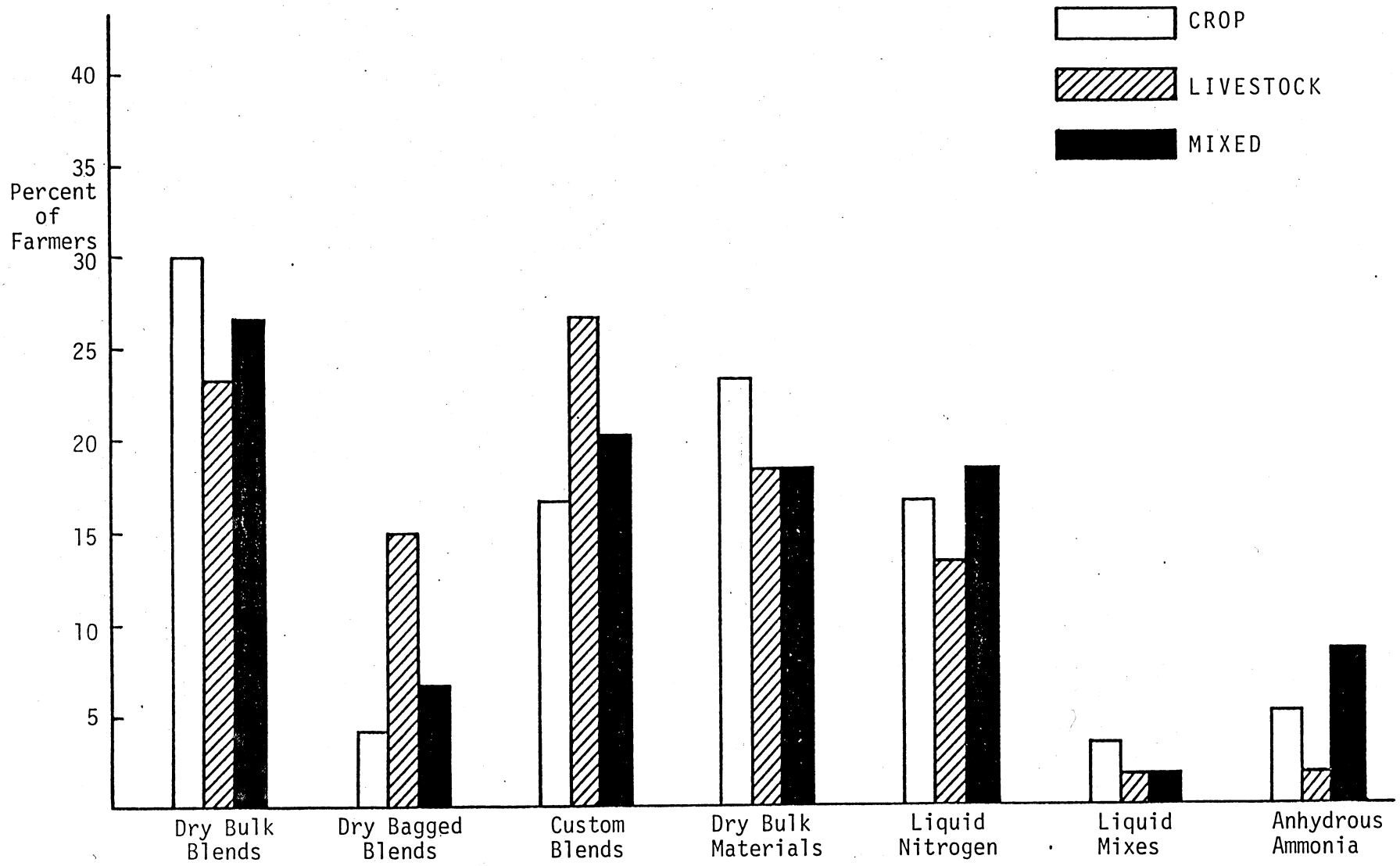

FIGURE 3.3

DISTRIBUTION OF SALES BY TYPE OF FERTILIZER AND TYPE OF FARM, ONTARIO, 1979

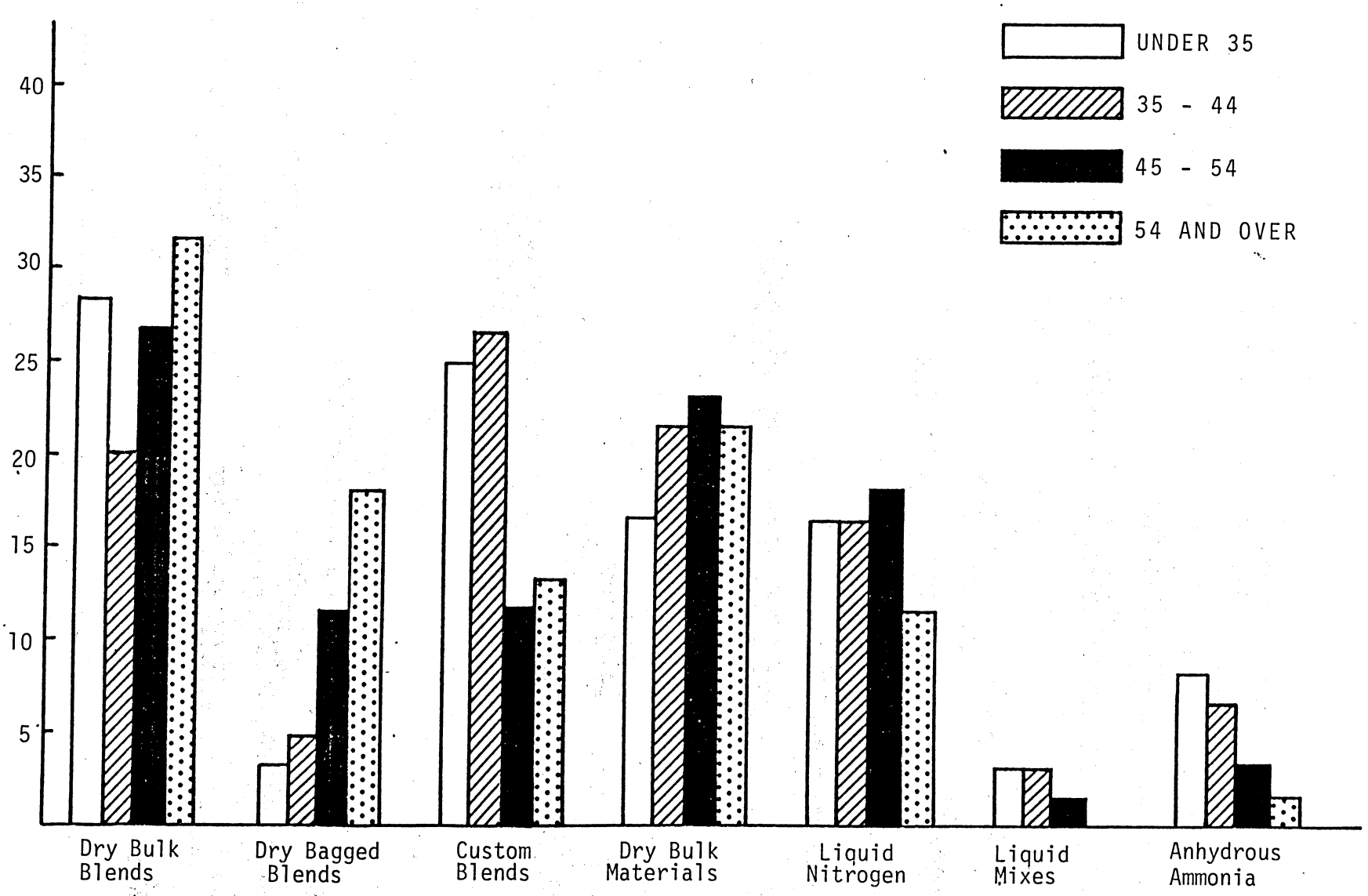

FIGURE 3.4
DISTRIBUTION OF SALES BY TYPE OF FERTILIZER AND AGE OF FARMER, ONTARIO, 1979

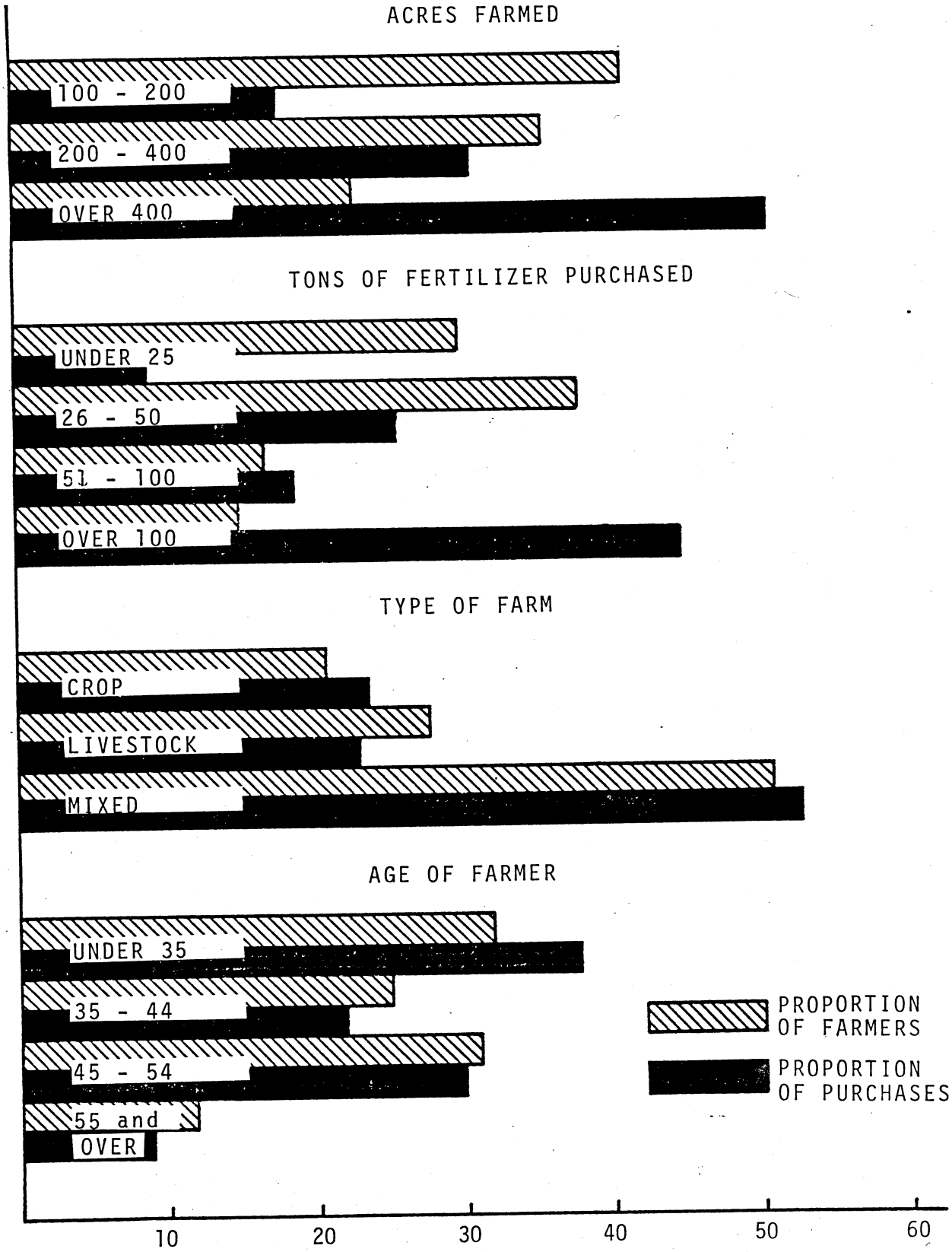

FIGURE 3.5

A COMPARISON OF THE PROPORTION OF FARMERS WITH THE PROPORTION OF FERTILIZER PURCHASES, BY FARM CHARACTERISTICS, ONTARIO, 1979

2) small purchase farmers tend to favour dry bulk and bagged blends, while large purchase farmers favour custom blends and liquid nitrogens; 3) crop farmers tend to purchase dry bulk blends and materials, livestock farmers dry bagged and custom blends, and mixed farmers anhydrous ammonia to a greater extent than other farmers; 4) younger farmers show a definite tendency to favour custom blends and anhydrous ammonia, while older farmers favour dry bulk and bagged blends.

The size of each of the above segments is illustrated in Figure 3.5 which shows the proportion of farmers and the proportion of fertilizer purchases accounted for by each segment. For example, in the case of acres farmed, over forty percent of the farmers are in the 100 to 200 acre category, yet these farmers account for less than twenty percent of the fertilizer purchases. The opposite situation occurs in the over 400 acre category. This category contains only twenty percent of the farmers, but over fifty percent of the fertilizer purchases. A similar situation occurs for the four purchase size segments with the larger purchase size categories having proportionately fewer farmers but purchasing substantially larger quantities of fertilizer. In the case of the farm type and age segments the proportions of farmers and purchases are very nearly equal with the exception that younger farmers purchase slightly more fertilizer, and older farmers slightly less than their numbers would suggest.

3.1.3 Changes in Use of Basic Fertilizer Types

In addition to measuring the amounts of each fertilizer types used in 1979, the survey attempted to estimate future use of each type. This was done by having the farmers indicate changes they might make in their use of the eight basic types over the next three years. Results here, shown in Figure 3.6, indicate that no large overall changes can be anticipated. The only changes of any consequence are projected to be in Kent and Huron counties. Kent county farmers reported plans to decrease the use of dry bagged blends and dry bulk materials while increasing the use of custom blends and anhydrous ammonia. Huron county farmers, on the other hand, reported plans to decrease the use of custom blends and dry bulk materials while increasing the use of liquid nitrogens and anhydrous ammonia.

3.1.4 Use of Related Products

Two products that are highly related to the common types of commercial fertilizers are micronutrients and limestone. The extent to which these products are used, and purchased at various sources, is shown in Table 3.3. This information shows that approximately twenty percent of the farmers in Southwestern Ontario have purchased and used micronutrients in the past five years. Of this twenty percent, most farmers purchased micronutrients mixed with their fertilizer, and most purchased from a fertilizer dealer.

The extent to which Ontario farmers use limestone is less than micronutrients, although this is largely explained by the fact that Wellington and Huron counties do not use any limestone and Oxford county uses only very small amounts. Of the limestone purchased, approximately two-thirds

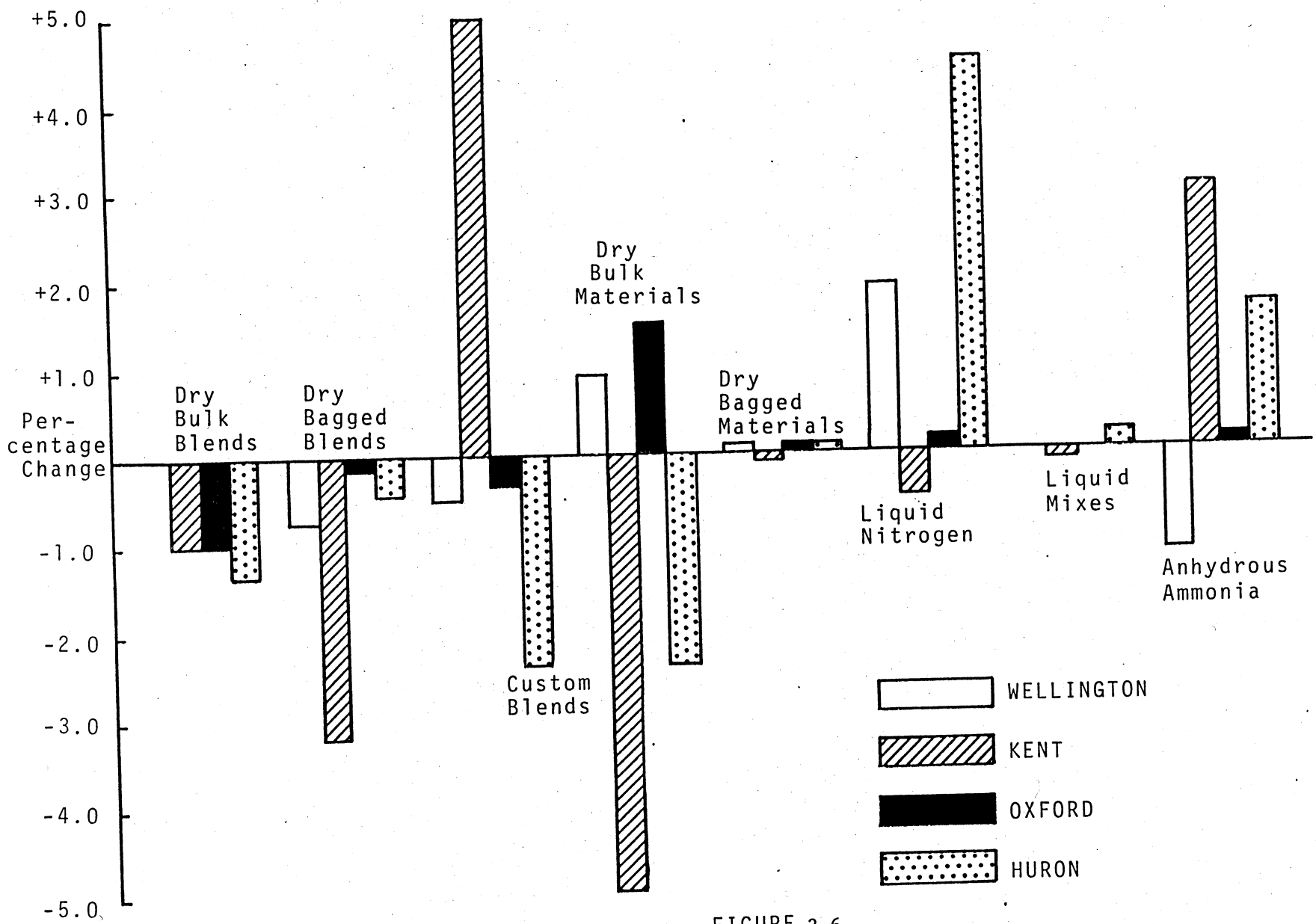

FIGURE 3.6

ESTIMATED CHANGES IN FERTILIZER USE BY TYPE
AND BY COUNTY, ONTARIO, 1979

TABLE 3.3

USE OF MICRONUTRIENTS, LIMESTONE, AND LIQUID NITROGEN - HERBICIDE MIXES, ONTARIO, 1979

	Total	Wellington	Kent	Oxford	Huron
	% of Farmers	% of Farmers	% of Farmers	% of Farmers	% of Farmers
MICRONUTRIENTS					
Purchased micronutrients in past five years[1]					
Micronutrients alone	5	6	6	6	--
Micronutrients in fertilizer	16	8	22	18	16
Micronutrients purchased[1]					
Zinc	7	6	4	10	8
Boron	4	2	--	10	4
Manganese	10	8	20	4	8
Molybdenum	--	--	--	--	2
Copper	2	--	--	--	8
Sulphur	8	4	12	12	2
Magnesium	5	3	4	8	8
Calcium	--	2	--	--	--
Iron	--	--	--	--	--
Cobalt	--	--	--	--	--
Purchase Source[2]					
Fertilizer Dealer	95	71	100	100	100
Other Source	5	29	--	--	--
LIMESTONE					
Purchased limestone in past five years[1]	15	--	54	6	--
Purchase Source[2]					
Fertilizer Dealer	67	--	70	33	--
Other Source	33	--	30	67	--
LIQUID NITROGEN-HERBICIDE MIX					
Applied LN - Herbicide[1] Mixture	17	18	12	16	24
Continue to apply LN - Herbicide Mixture[2]	79	73	88	89	69

[1] Percentage of Farmers.

[2] Percentage of those farmers using the product.

is purchased from fertilizer dealers.

Finally, with regard to the use of liquid nitrogen - herbicide mixes, the data in Table 3.3 shows that only 17 percent of Southwestern Ontario farmers currently use this practice. Almost 80 percent of these farmers plan to continue using this practice in the future.

Table 3.4 shows the farmer differences associated with the use of micronutrients, limestone, and liquid nitrogen - herbicide mixes. With regard to the purchase and use of micronutrients, the analysis revealed that farmers who use these products tend to be larger, cash crop and mixed farmers. In the case of limestone, no differences were found in terms of size of purchase or size of farm, but important differences were found in farm type and county. Finally, in the case of applying a liquid nitrogen - herbicide mix, the analysis showed that medium to large farmers and farmers from Wellington, Oxford, and Kent counties were more likely to follow this practice than other farmers.

3.1.5 Application Rates

The final area investigated under the broad heading of fertilizer use was application rates. Because of anticipated interviewing problems, no direct questions were asked in this area; however, it was possible to use available information to calculate some aggregate measures. This was done by determining the total number of pounds of fertilizer purchased for the 1979 crop year and dividing this by the total number of acres of crops that were fertilized in 1979.

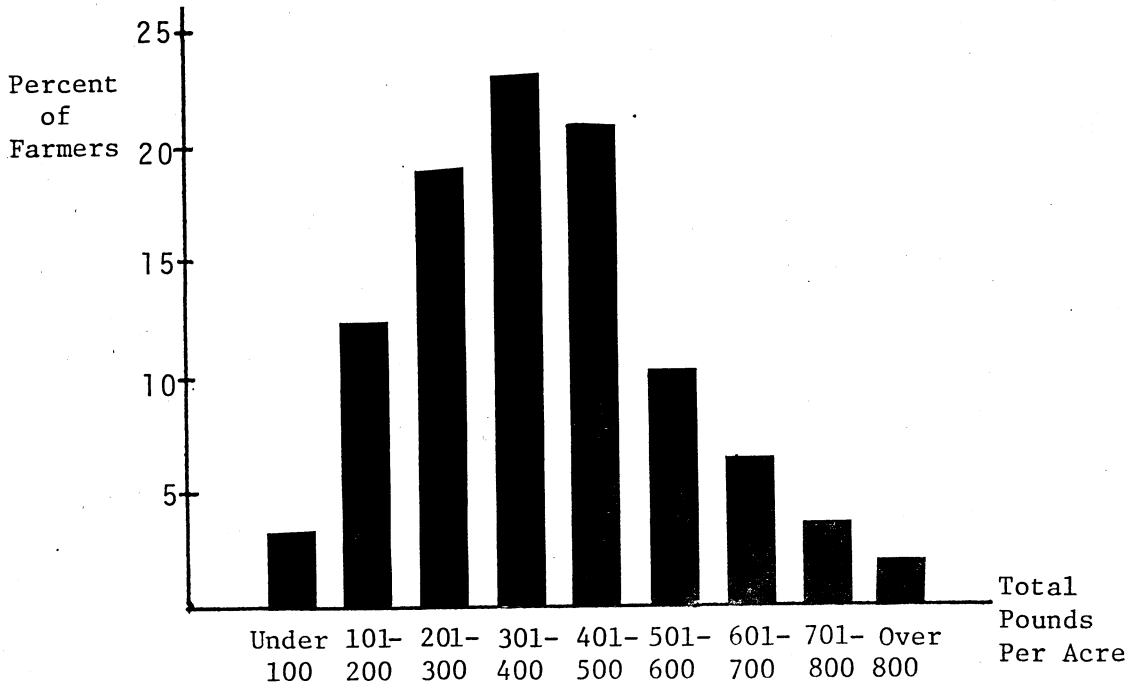

FIGURE 3.7

APPLICATION RATES, ONTARIO, 1979

TABLE 3.4

FARMER DIFFERENCES IN FERTILIZER USE, ONTARIO, 1979

CHARACTERISTICS / VARIABLES	ALL FARMERS	SIZE OF PURCHASE (tons)	TOTAL ACRES	GROSS INCOME ($000)	FARM TYPE	AGE	COUNTY
PURCHASE AND USE MICRONUTRIENTS	21%	** 51-100 Over 100	* Over 400	* 100-200 Over 200	* Cash Crop Mixed		
PURCHASE AND USE LIMESTONE	15%				*** Cash Crop Mixed		*** Kent
APPLY LIQUID NITROGEN HERBICIDE MIX	17%	* 26-50 51-100	** 200-400 Over 400	*** 100-200 Over 200			** Wellington Oxford Huron
USE FERTILIZER ON SOYBEANS	74%		* Over 400		** Mixed		
USE FERTILIZER ON PASTURE	41%						
USE FERTILIZER ON FORAGES	71%			** 100-200			*** Oxford
APPLICATION RATE	384 lbs. per acre	*** 51-100 Over 100			*** Cash Crop		*** Kent

The results of this analysis revealed that the average Ontario farmer applied fertilizer to his crops at a rate of 384 pounds per acre. As depicted in Figure 3.7, this varied from under 100 pounds per acre for 3 percent of the farmers to over 800 pounds per acre for 2 percent of the farmers. Those farmers who used higher application rates purchased larger quantities, were cash crop farmers, and resided in Kent, Oxford, and Huron counties as shown in Table 3.4.

3.2 Timing of Fertilizer Purchasing and Use

The second area investigated in this research deals with the timing of fertilizer purchasing and use activities. This section presents the results of this investigation in terms of: 1) the extent to which farmers purchase and take early delivery of fertilizer products, 2) the timing of purchasing and delivery for each basic fertilizer type, and 3) the timing of the fertilizer use decision.

3.2.1 Early Purchasing and Delivery

The extent to which farmers purchase and take early delivery of fertilizer products is shown in Table 3.5. The information in this table reveals that over one-half of the farmers purchased their Spring fertilizer requirements at least a month prior to application. Of those who did not purchase early in 1979, twenty-eight percent indicated that they most likely would do this in the future.

Those farmers who purchased early were asked whether they took early delivery, delayed delivery, or some of each. Here the results showed that only 34 percent of those farmers purchasing early also took delivery and stored the product at least a month before Spring application. An additional 13 percent indicated that they planned to do this in the future. The results were fairly consistent among counties with the exception that Wellington county farmers store more fertilizer product at the present time, and plan to store more in the future, than farmers in other counties.

In addition to determining the extent to which farmers purchase early, the reasons for purchasing/not purchasing prior to Spring application were obtained. These reasons, together with the percentage of farmers citing each, are shown in Table 3.6. The perceived price advantage or cost saving associated with early purchasing was the most common reason given by farmers who purchased at least a month before Spring application. Other important reasons were to insure product availability and to secure income tax benefits. Those farmers not purchasing early cited the fact that they did not have storage facilities as their most important reason. Other reasons advanced by some farmers were the lack of a significant price advantage, storage and handling problems, and cash flow considerations.

The information in Table 3.5 shows that approximately 25 percent of the farmers in the sample took early delivery and stored at least some of their Spring fertilizer requirements. Table 3.7 expands this analysis to look at the type and amount of on-farm storage used by these farmers. This table shows that, over the entire survey area, most fertilizer is

TABLE 3.5

EARLY PURCHASING AND STORAGE OF FERTILIZER, ONTARIO, 1979

	Total	Wellington	Kent	Oxford	Huron
	% of Farmers	% of Farmers	% of Farmers	% of Farmers	% of Farmers
Purchased early in 1979[1]	56	62	52	60	48
Will purchase early in future[2]	28	26	24	10	46
Take early or delayed delivery[3]					
Early Delivery(stored)	34	52	12	33	33
Delayed Delivery	53	32	84	57	54
Some of each	11	16	4	10	13
Change in percentage of fertilizer purchased early and stored[3]					
Increase	22	24	20	14	27
Decrease	8	5	--	--	27
Same	70	71	80	86	46
Will purchase early and store in future[3]	13	40	5	13	12

[1] Percentage of all farmers.

[2] Percentage of those farmers not purchasing early.

[3] Percentage of those farmers purchasing early in 1979.

TABLE 3.6

REASONS FOR PURCHASING/NOT PURCHASING FERTILIZERS EARLY, ONTARIO, 1979

Reasons	Percent[1]
For Purchasing Early	
Price advantage or cost savings	66
Insure product availability	29
Income tax benefits	18
Discounts	10
Help dealer manage inventories	4
Get away from spring rush	3
For Not Purchasing Early	
No storage facilities	29
No perceived price advantage	24
Storage and handling problems	21
Cash flow considerations	14
Better investments available	11
No problem obtaining fertilizer during planting season	11
Didn't take the time to purchase early	7
Wait until Spring to know what is needed	7

[1] Percentages do not add to 100 because some farmers gave more than one reason whereas others did not give any reason. The percentages refer to the percentage of farmers purchasing/not purchasing early.

TABLE 3.7

ON FARM FERTILIZER STORAGE, ONTARIO, 1979

	Percent of Farmers	Average Tons
Wellington		
Bulk	12	26
Bagged	30	20
Liquid	8	32
Kent		
Bulk	4	9
Bagged	2	6
Liquid	4	104
Oxford		
Bulk	4	80
Bagged	14	29
Liquid	12	49
Huron		
Bulk	--	--
Bagged	18	19
Liquid	4	13
Total		
Bulk	5	33
Bagged	16	21
Liquid	7	33

stored in bagged form, although a few farmers have bulk and liquid storage facilities.

Farmer differences associated with early purchasing and storage were investigated and are reported in Table 3.8. These results show that farmers who purchase larger volumes of fertilizer and farm more acres are more inclined to purchase early than other farmers. In addition, livestock farmers and farmers from Wellington, Oxford, and Huron counties are more inclined to store fertilizer products than other farmers.

3.2.2 Timing of Purchasing and Delivery

The timing of purchasing and delivery was explored by asking the farmers to indicate the month in which they purchased and took delivery of each type of fertilizer. The results of these questions are shown in Figures 3.8 through 3.13 for dry bulk and custom blends, dry bulk materials, dry bagged blends and materials, liquid nitrogens. liquid mixes, and anhydrous ammonia. The basic pattern depicted in each of these figures is essentially the same: the largest percentage of purchases and deliveries are made during April, May, and June. Some early purchases and deliveries are shown for a few products, particularly dry bagged blends and materials.

In addition to obtaining information on the timing of fertilizer purchasing, each farmer was asked to indicate when he made a decision on his fertilizer program for the current crop year; that is, types of fertilizer to use, rates of application, methods of application, and so forth. Furthermore, each farmer was asked whether or not he prepared a written fertilizer plan for his farming operation and, if so, when this plan was prepared. The results of these additional questions are shown in Figures 3.14 and 3.15 and indicate that most farmers make decisions regarding their fertilizer program in the six month period of December through May. Similarly, of the 27 percent of the farmers who prepare written fertilizer plans, most of them do this in the five month period of December through April.

Table 3.8 shows some important farmer differences associated with preparing written fertilizer plans and making fertilizer program decisions early in the year. Farmers who purchase large quantities of fertilizer, operate large farms, are younger, and are located in Wellington, Oxford, and Huron counties are the ones who prepare written fertilizer plans. Farmers in the middle age groups tend to be the ones who make fertilizer program decisions early in the year.

3.3 Financing Fertilizer Purchases

Closely related to the timing of the fertilizer purchase is the method used by the farmer to finance this purchase. This aspect of fertilizer purchasing was explored by asking each farmer to indicate the percentage of total fertilizer purchases financed using cash, bank credit, and dealer credit. The results of this question, shown in Table 3.9, indicate that by far the largest proportion of purchases are made on a cash basis. Bank credit is used to finance slightly over 20 percent of all purchases, while dealer credit is used seven percent of the time.

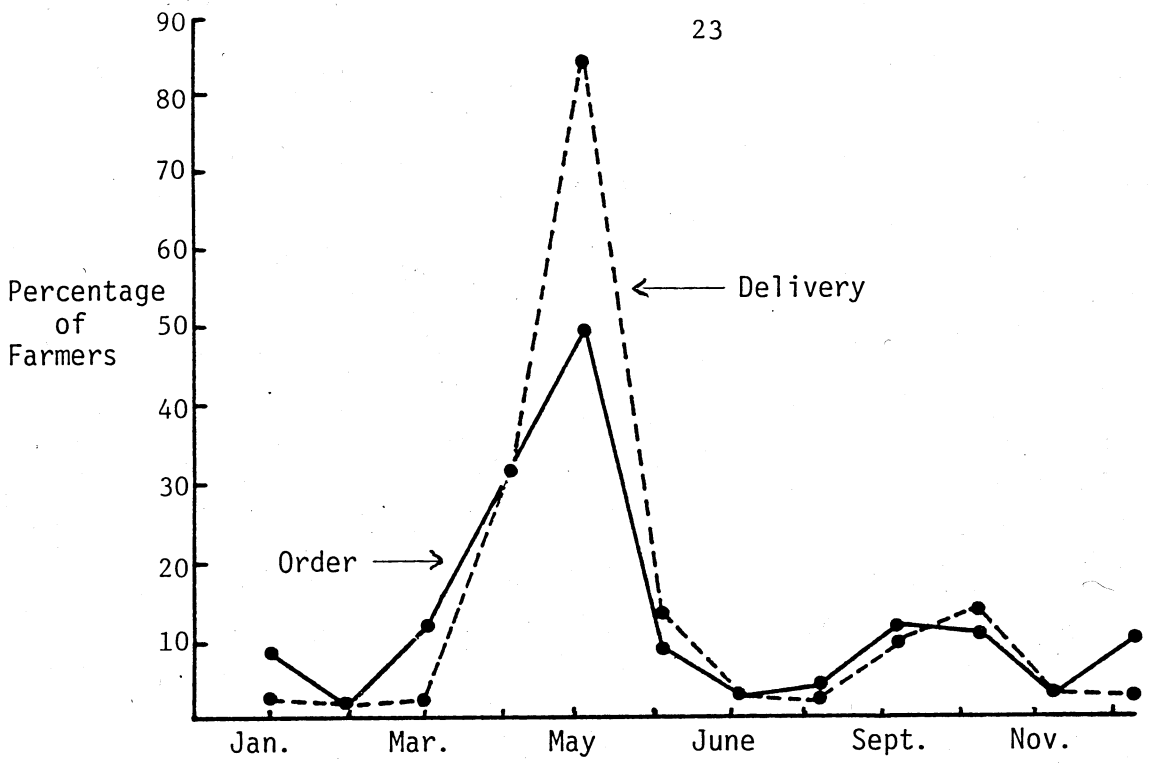

FIGURE 3.8

TIMING OF ORDER AND DELIVERY FOR DRY BULK BLENDS AND CUSTOM BLENDS, ONTARIO, 1979

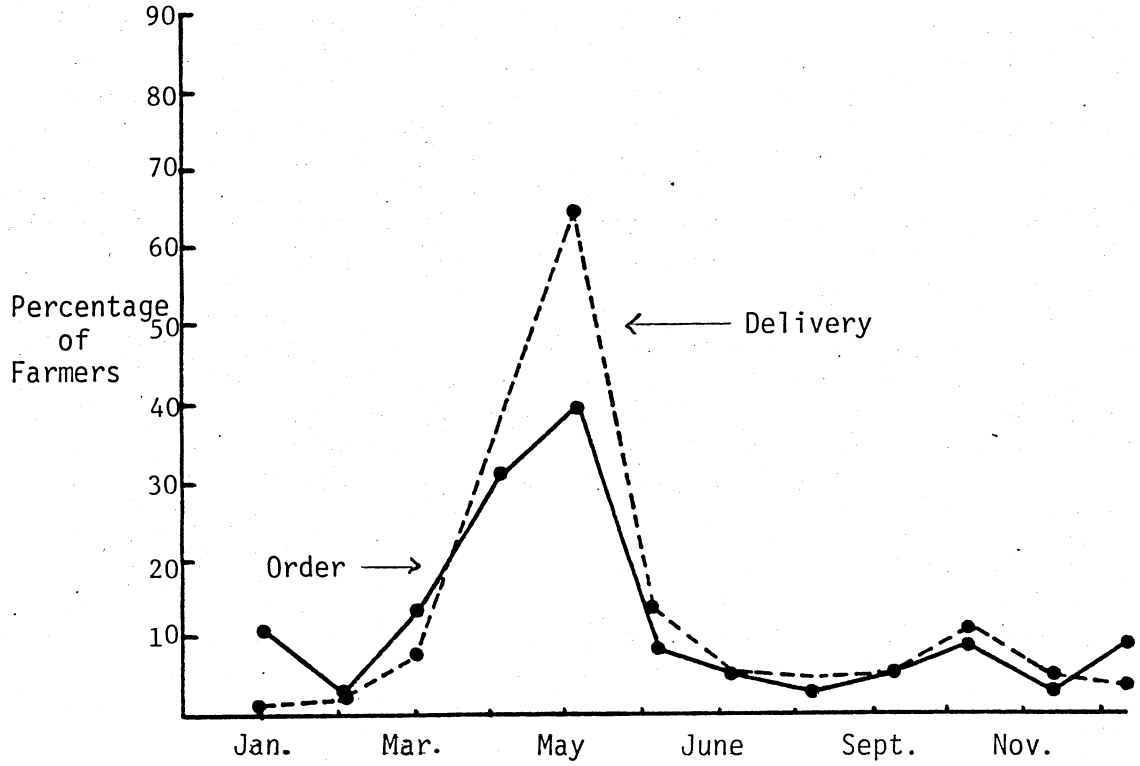

FIGURE 3.9

TIMING OF ORDER AND DELIVERY FOR DRY BULK MATERIALS, ONTARIO, 1979

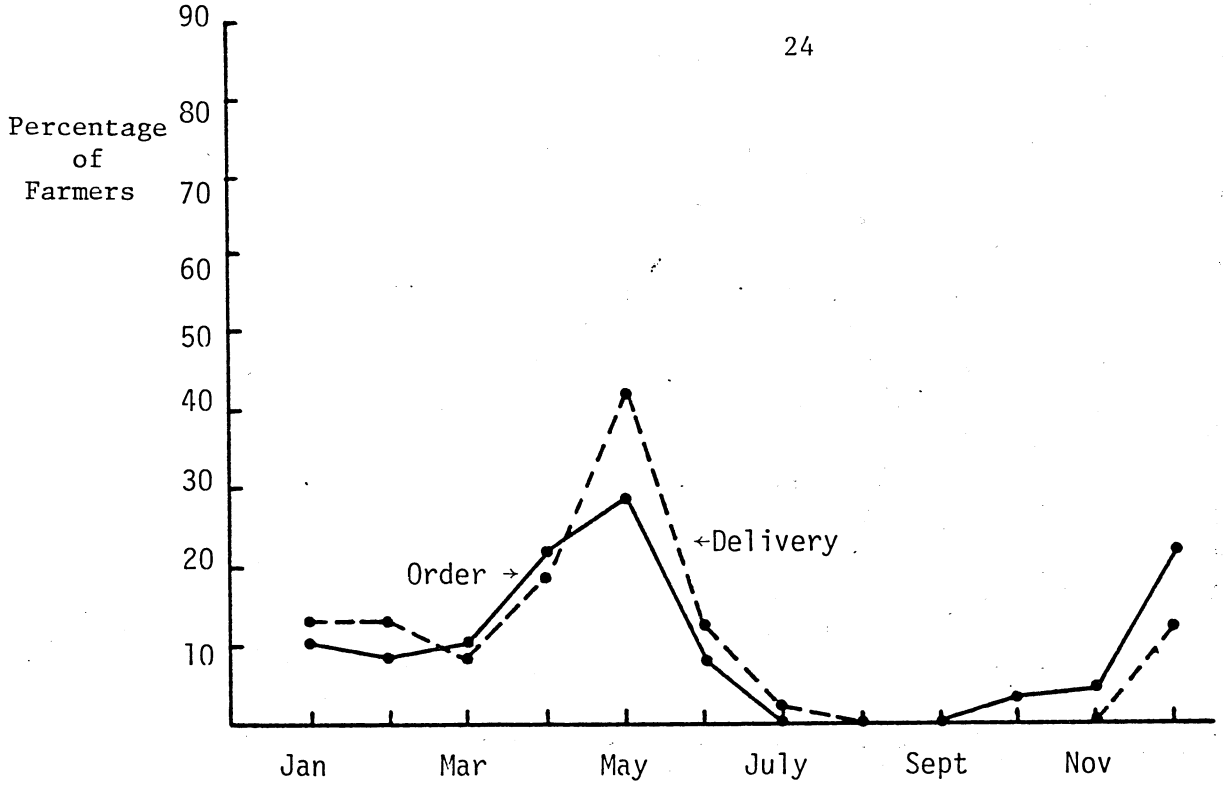

FIGURE 3.10
TIMING OF ORDER AND DELIVERY FOR DRY BAGGED BLENDS AND MATERIALS, ONTARIO, 1979

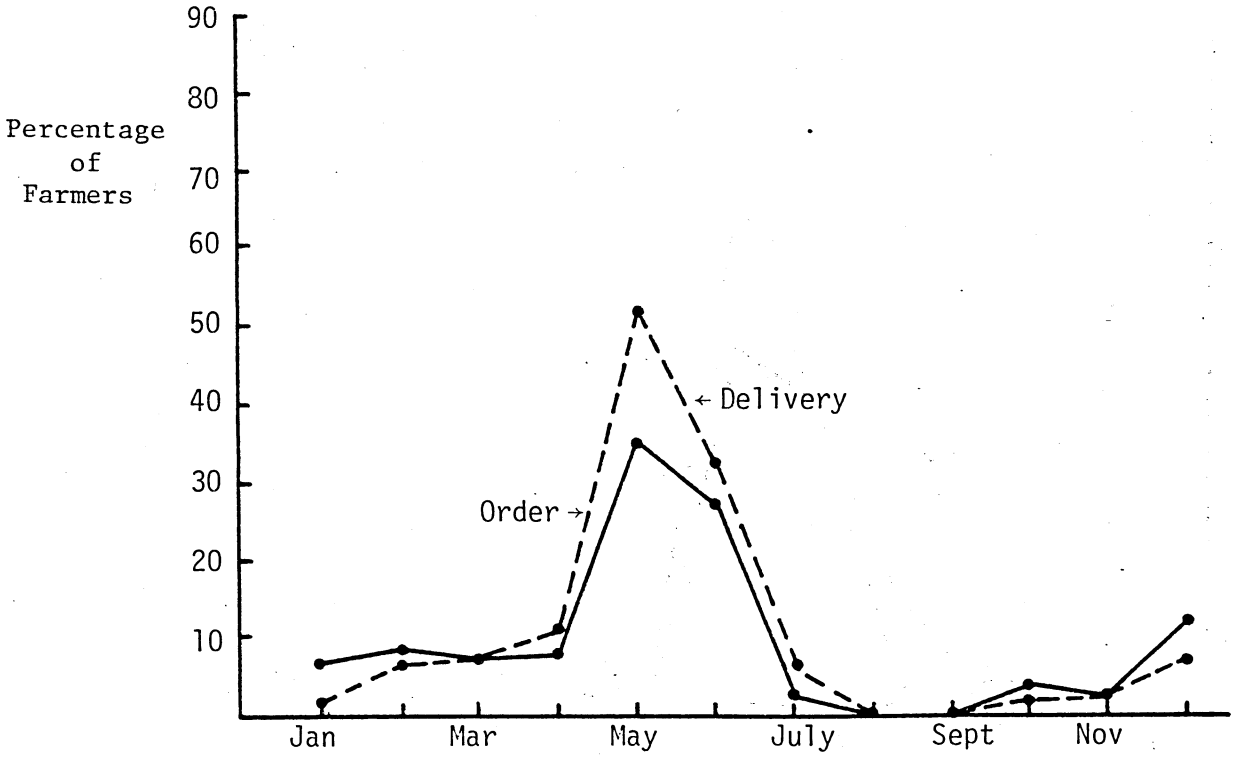

FIGURE 3.11
TIMING OF ORDER AND DELIVERY FOR LIQUID NITROGENS, ONTARIO, 1979

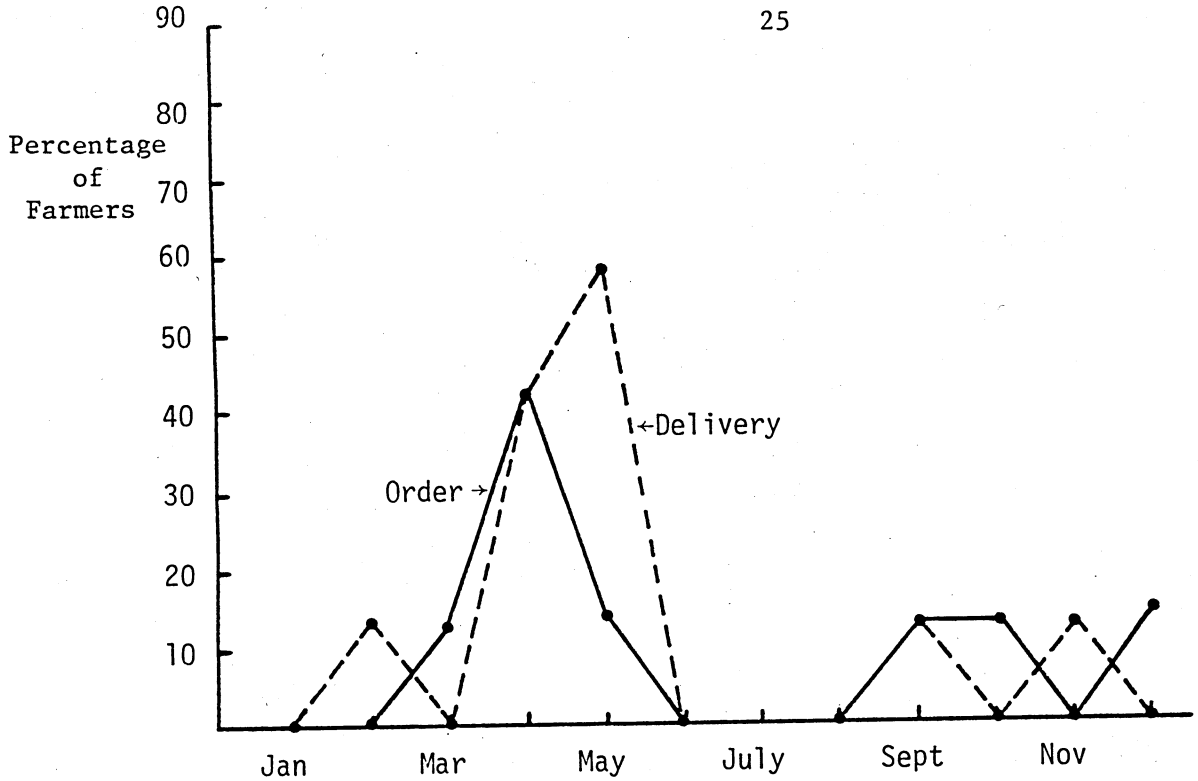

FIGURE 3.12
TIMING OF ORDER AND DELIVERY FOR LIQUID MIXES, ONTARIO, 1979

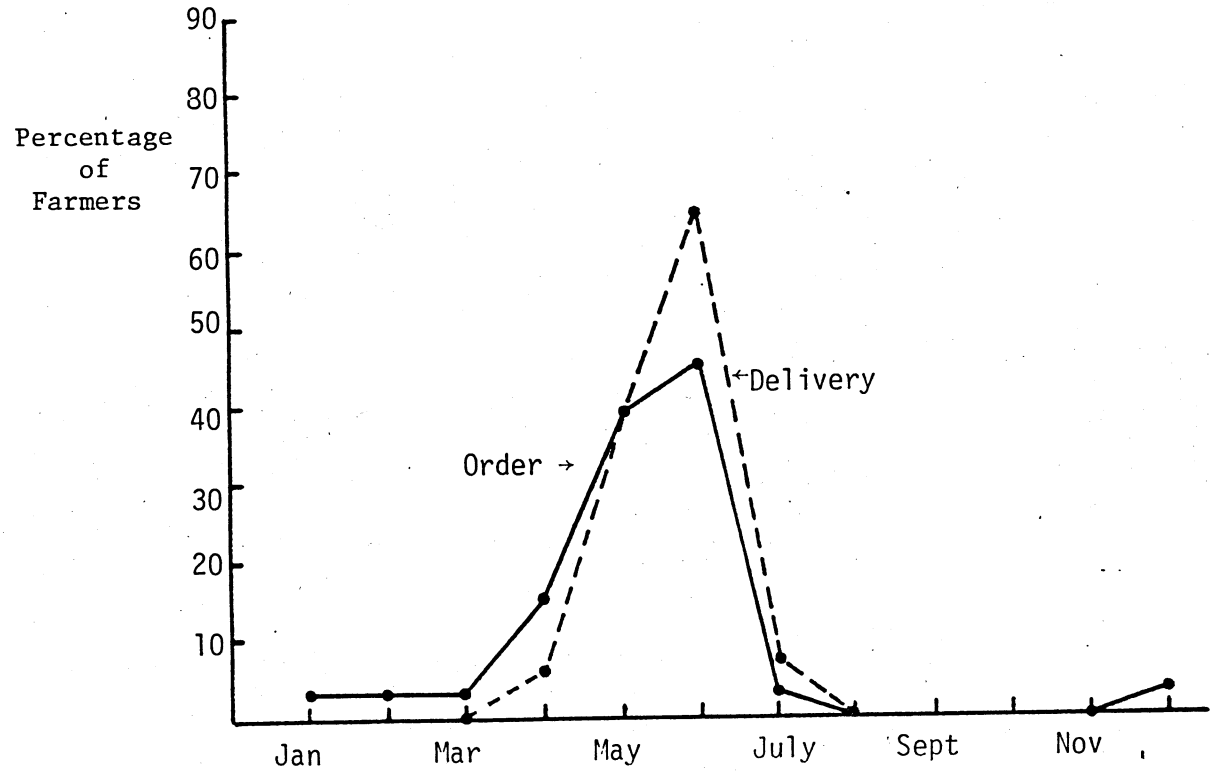

FIGURE 3.13
TIMING OF ORDER AND DELIVERY FOR ANHYDROUS AMMONIA, ONTARIO, 1979

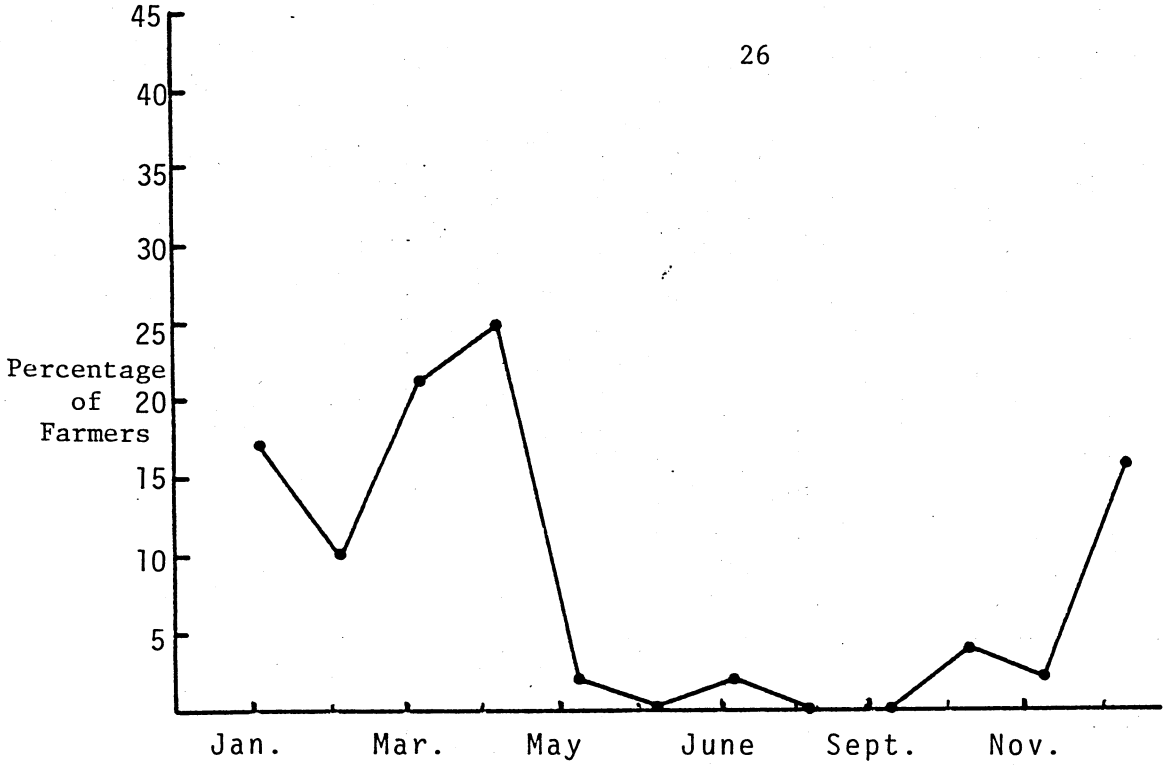

FIGURE 3.14

MONTHS IN WHICH FARMERS PREPARE WRITTEN FERTILIZER PLANS, ONTARIO, 1979

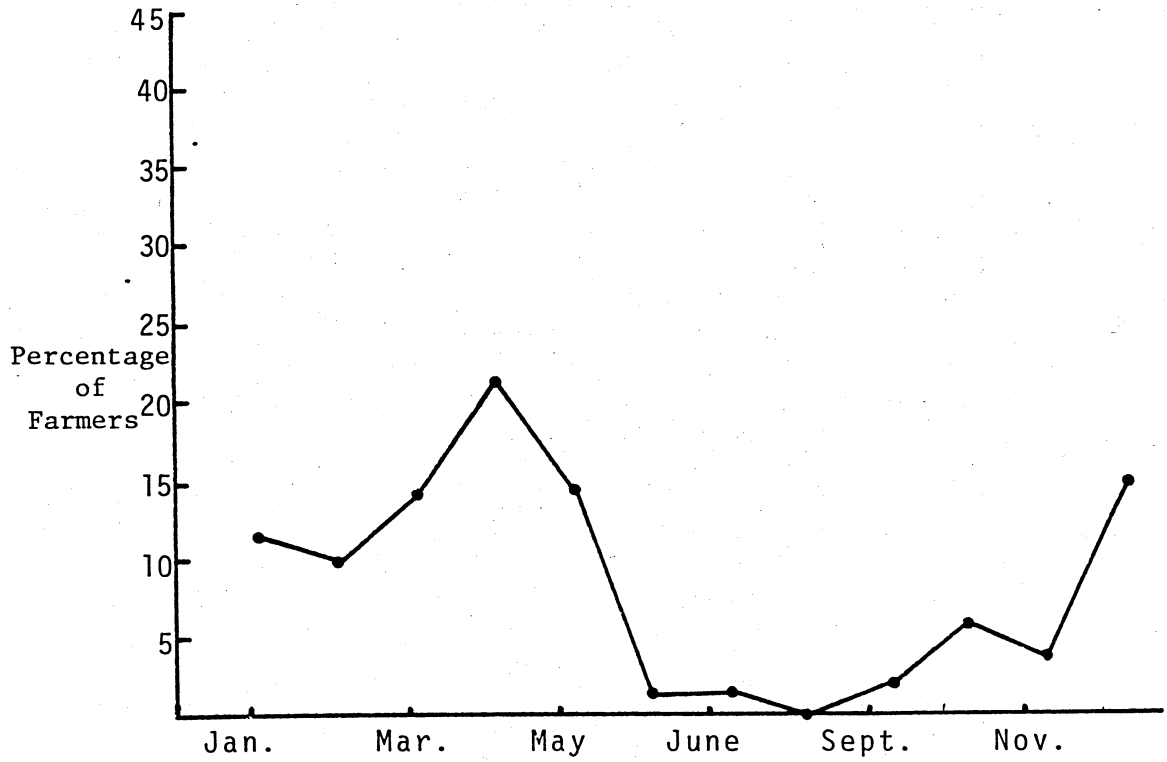

FIGURE 3.15

MONTH IN WHICH FERTILIZER USE DECISION IS MADE, ONTARIO, 1979

TABLE 3.8

FARMER DIFFERENCES IN TIMING OF PURCHASES, ONTARIO 1979

CHARACTERISTICS / VARIABLES	ALL FARMERS	SIZE OF PURCHASE (tons)	TOTAL ACRES	GROSS INCOME ($000)	FARM TYPE	AGE	COUNTY
PURCHASE MONTH BEFORE APPLICATION	56%	** Over 100	** Over 400				
STORE FERTILIZERS	25%				** Livestock		** Wellington Oxford Huron
PREPARE WRITTEN FERTILIZER PLAN	27%	* Over 100	** Over 400	** Over 200		* Under 25 35-44	*** Wellington Oxford Huron
MAKE PROGRAM DECISION IN DECEMBER AND JANUARY	27%					** 35-44 45-54	

TABLE 3.9

METHOD OF FINANCING FERTILIZER PURCHASES, ONTARIO, 1979

Method of Financing	Total % of Tons Sold	Wellington % of Tons Sold	Kent % of Tons Sold	Oxford % of Tons Sold	Huron % of Tons Sold
1979 Method of Financing Fertilizer Purchase					
Cash	71	84	77	64	65
Bank	22	9	21	23	28
Dealer	7	7	2	13	7
Future Method of Financing Fertilizer Purchase					
Cash	74	90	78	65	70
Bank	18	5	21	23	23
Dealer	7	5	1	12	7

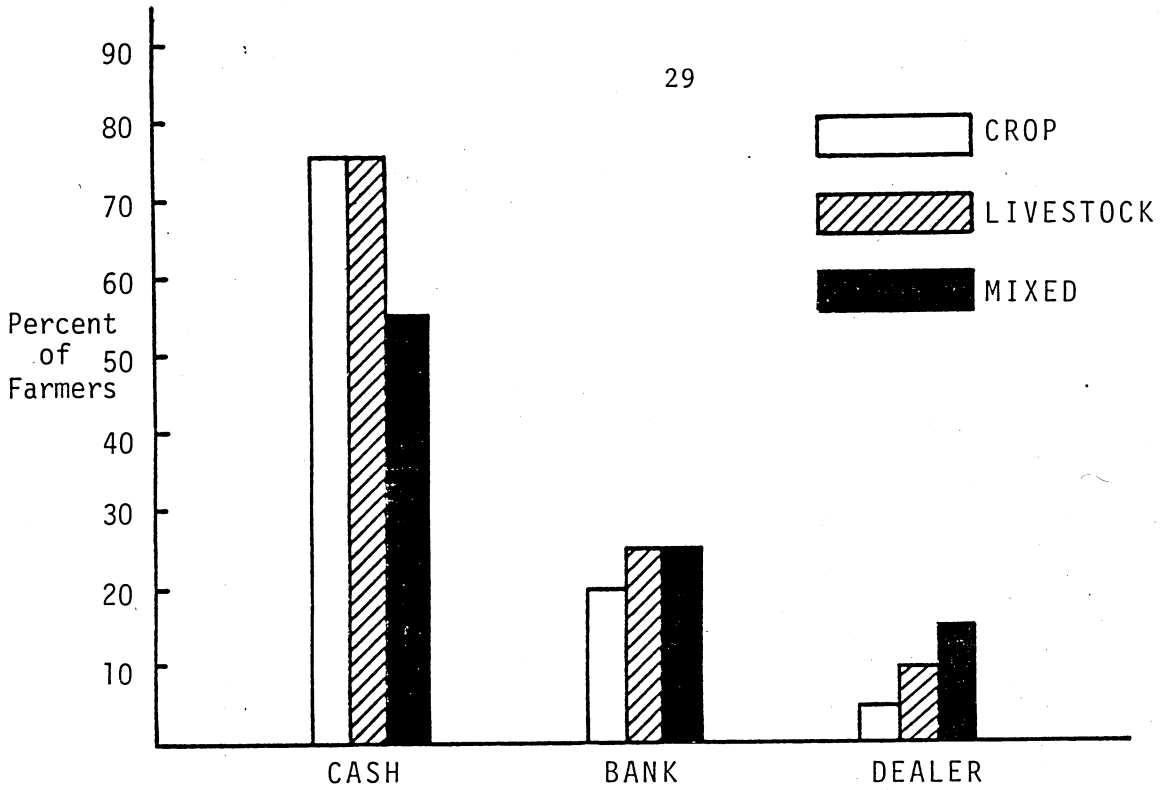

FIGURE 3.16

METHOD OF FINANCING FERTILIZER PURCHASE
BY TYPE OF FARM, ONTARIO, 1979

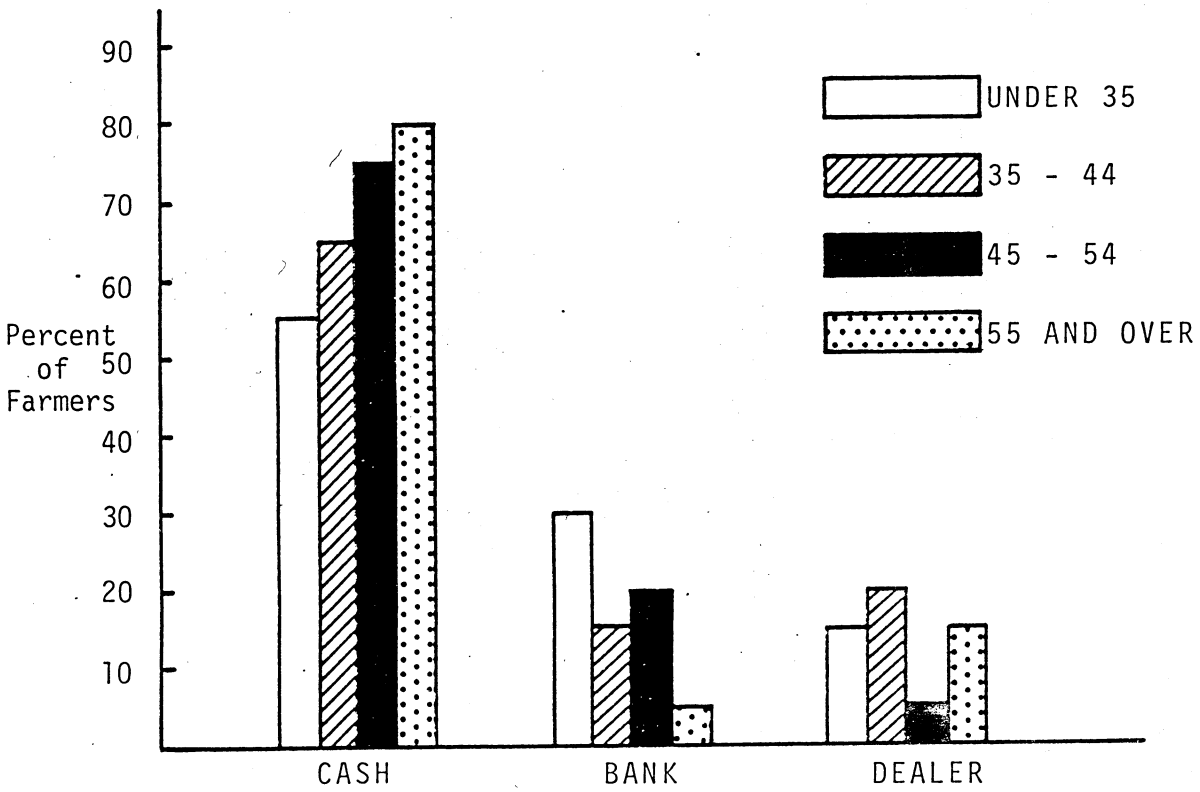

FIGURE 3.17

METHOD OF FINANCING FERTILIZER PURCHASE
BY AGE OF FARMER, ONTARIO,1979

The lower half of Table 3.9 is identical to the upper half with the exception that it refers to estimates of future use of alternative methods of financing fertilizer purchases. Although some increase in the use of cash at the expense of bank credit is indicated, the changes are very small and not significant.

As in earlier sections, farmer differences in the use of alternative methods of financing were explored. The only differences that were statistically significant were those shown in Figure 3.16 for type of farm and Figure 3.17 for age of the farmer. These results show that there is a definite tendency for mixed farmers to use less cash and more bank and dealer credit than other farmers. In addition, there is marked tendency for older farmers to use more cash and less credit than younger farmers.

3.4 Fertilizer Application

Two important decisions farmers must make in the area of fertilizer use are the timing and method of fertilizer application. This section analyses these decisions and looks in detail at two methods of application provided by many dealers: custom application and dealer supplied equipment. In addition, the use of dealer delivery services is discussed briefly at the conclusion of the section.

3.4.1 Timing of Fertilizer Application

There are four periods during the year when fertilizer can be applied: fall, spring preplant, spring planting, and post planting. The percentages of each type of fertilizer applied at each of these times is shown in Table 3.10. The totals are presented graphically in Figure 3.18 for easier interpretation. The major conclusions which can be made on the basis of the information in Figure 3.18 are: 1) very little fertilizer is applied in the fall in Ontario, 2) most dry bulk blends and materials are applied spring preplant or spring planting, 3) almost all dry bagged fertilizers and liquid mixes are applied at spring planting, 4) liquid nitrogens are evenly split between spring preplant application and post planting, and 5) almost all anhydrous ammonia is applied post planting.

3.4.2 Method of Fertilizer Application

A farmer has several alternative methods of fertilizer application available. These include using his own specialized fertilizer application equipment, using fertilizer application attachments on a planter, using dealer custom application services, and using custom application services supplied by someone other than the fertilizer dealer. The percentages of each type of fertilizer applied using these methos is shown in Table 3.11. As before, the totals are presented graphically in Figure 3.19 to aid in interpretation. The major conclusions which can be drawn from the information in Figure 3.19 are: 1) most fertilizers, particularly liquid nitrogens, liquid mixes, and dry bagged blends and materials, are applied by the farmer with his own specialized application equipment and/or application attachments on his planter; 2) most dry bulk blends and custom blends are applied with the planter or dealer application equipment;

TABLE 3.10

TIMING OF FERTILIZER APPLICATION, ONTARIO, 1979

Fertilizer Types	Fall %	Spring Preplant %	Spring Planting %	Post Planting %
Dry Bulk & Custom Blends				
Wellington	14	37	43	6
Kent	14	34	52	--
Oxford	7	27	60	6
Huron	4	45	50	1
Total	9	36	53	2
Dry Bulk Materials				
Wellington	8	59	23	10
Kent	12	61	16	11
Oxford	9	57	22	12
Huron	11	62	11	16
Total	11	60	17	12
Dry Bagged Blends & Materials				
Wellington	1	3	95	1
Kent	--	12	68	20
Oxford	--	--	100	--
Huron	--	13	86	1
Total	1	5	93	1
Liquid Nitrogens				
Wellington	--	25	18	57
Kent	--	6	--	94
Oxford	--	98	--	2
Huron	--	55	--	45
Total	--	51	5	44
Liquid Mixes [1]				
Wellington	--	--	100	--
Kent	--	--	100	--
Oxford	--	--	--	--
Huron	14	78	4	4
Total	3	17	79	1
Anhydrous Ammonia				
Wellington	--	37	--	63
Kent	--	13	--	87
Oxford	--	4	--	96
Huron	--	45	--	55
Total	--	20	--	80

[1] Based on less than ten observations.

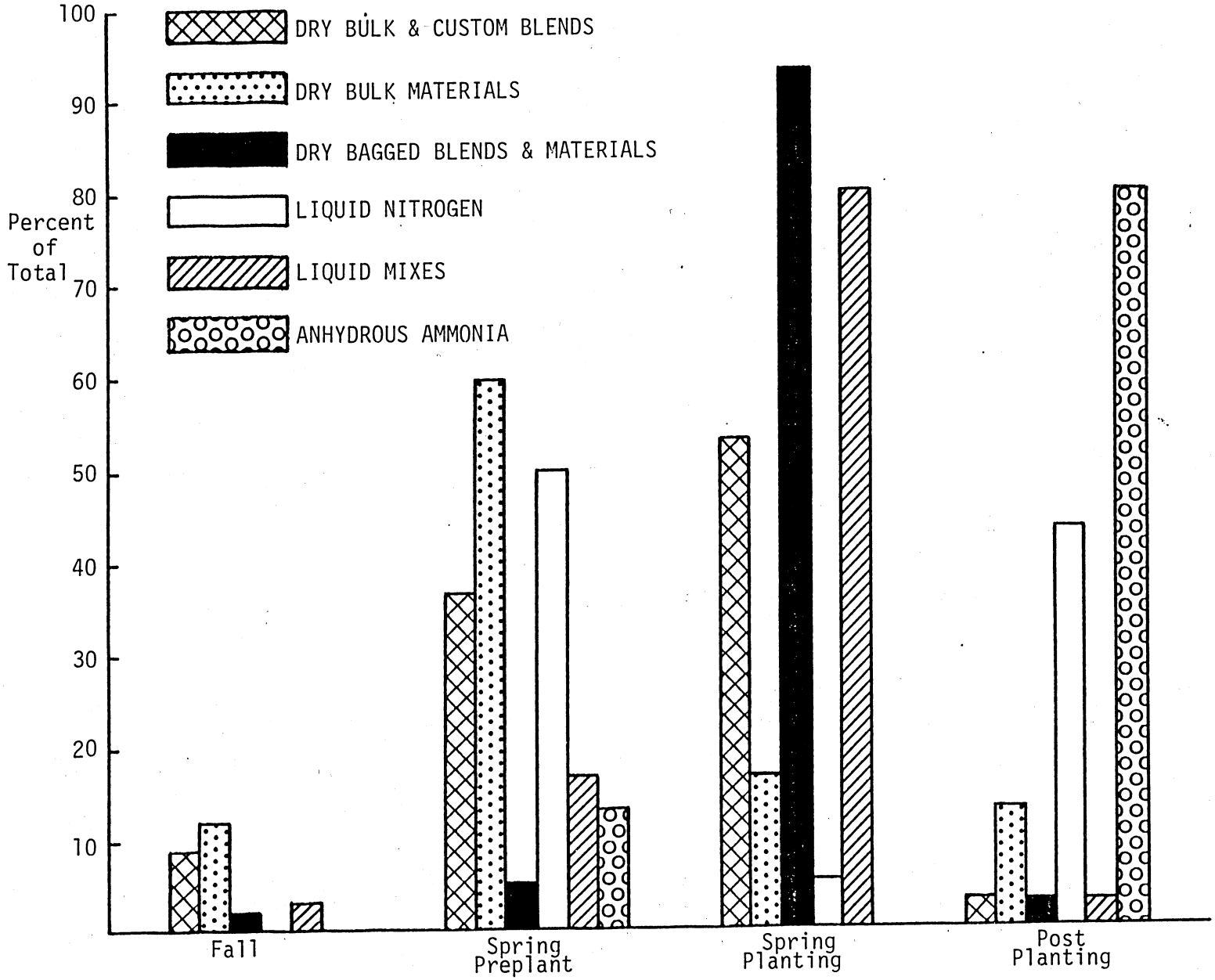

FIGURE 3.18

TIMING OF FERTILIZER APPLICATION, ONTARIO, 1979

TABLE 3.11

METHOD OF FERTILIZER APPLICATION, ONTARIO, 1979

Fertilizer Types	Own Equipment %	Planter %	Dealer Equipment %	Fertilizer Dealer %	Custom Application %
Dry Bulk and Custom Blends					
Wellington	28	17	40	13	2
Kent	8	55	29	2	6
Oxford	16	44	25	8	7
Huron	5	50	42	2	1
Total	12	46	33	5	4
Dry Bulk Materials					
Wellington	11	16	35	38	--
Kent	4	12	44	9	31
Oxford	25	22	19	28	6
Huron	15	13	66	6	--
Total	12	15	26	18	15
Dry Bagged Blends & Materials					
Wellington	57	40	1	--	2
Kent	31	67	2	--	--
Oxford	37	62	--	--	1
Huron	4	84	9	--	3
Total	36	59	3	--	2
Liquid Nitrogens					
Wellington	66	--	20	--	14
Kent	47	--	42	11	--
Oxford	94	--	--	6	--
Huron	42	--	11	26	21
Total	66	--	16	10	8
Liquid Mixes [1]					
Wellington	76	24	--	--	--
Kent	100	--	--	--	--
Oxford	--	--	--	--	--
Huron	7	--	--	93	--
Total	70	10	--	20	--
Anhydrous Ammonia					
Wellington	--	--	100	--	--
Kent	12	--	77	11	--
Oxford	51	--	25	24	--
Huron	47	--	49	--	4
Total	38	--	49	12	1

[1] Based on less than 10 observations.

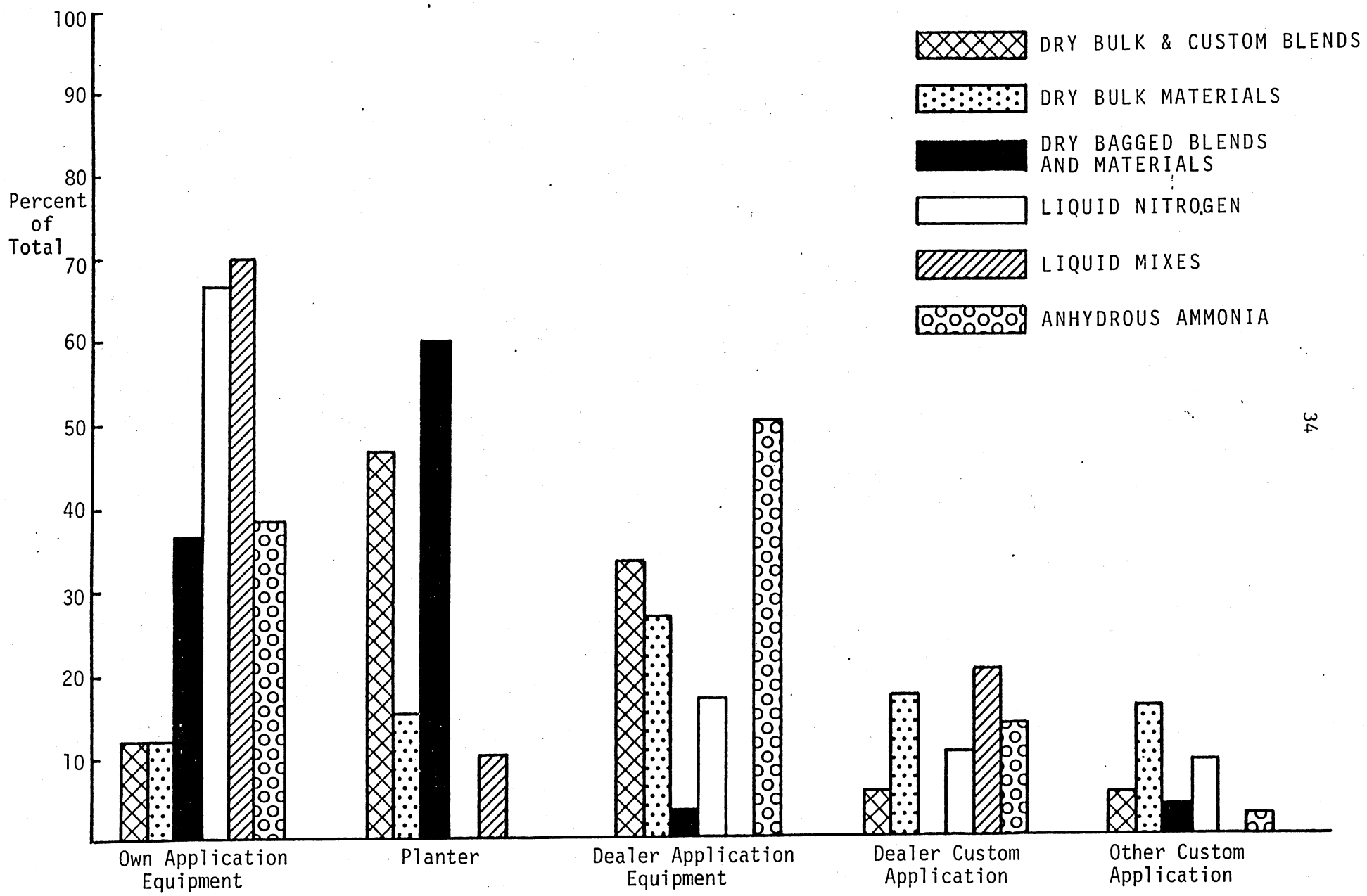

FIGURE 3.19

METHOD OF FERTILIZER APPLICATION, ONTARIO, 1979

3) most anhydrous ammonia is applied by the farmer using his own application equipment; or dealer application equipment and 4) dry bulk materials are applied in almost equal proportions by all the application methods.

3.4.3 Dealer Application Services

Of the five methods of application discussed above, two involve services provided by fertilizer dealers: dealer custom application and dealer application equipment. Table 3.12 summarizes the findings of this survey with respect to the current and expected use of these services. First, with respect to dealer custom application services, Table 3.12 shows that 31 percent of Ontario farmers used this service in 1979. Two-thirds of these farmers expect to use the same level of this service in the future while 19 percent expect to use more and 14 percent less. Of those farmers not using dealer custom application in 1979, fifteen percent anticipate using it in the future.

The farmers were asked to give their reasons for using/not using dealer custom application services. The responses shown in Table 3.13 indicate that time and equipment considerations are the primary reasons for using dealer custom application, while a desire to do it themselves and cost considerations are the main reasons for not using the service.

The lower half of Table 3.12 presents the results for dealer supplied application equipment. These results show that 76 percent of Ontario farmers used this service in 1979. Almost 80 percent of these farmers expect to use the same level of the service in the future while 11 percent expect to use more and 11 percent less. Of those farmers not using dealer application equipment in 1979, twenty-five percent expect to use it in the future.

Table 3.14 lists the reasons farmers gave for using/not using dealer application equipment. The primary reasons given for using this service were related to the costs of owning and maintaining application equipment on the farm. The primary reason given for not using this service was because the farmer already had his own application equipment.

Table 3.15 shows the farmer differences related to the use of alternative application methods. The important results in this table are: 1) those farmers who currently use or plan to use dealer custom application services purchase larger amounts of fertilizer than other farmers and tend to be cash crop and mixed farmers, and 2) those farmers who currently use or plan to use dealer application equipment are smaller, cash crop and mixed farmers.

Table 3.16 and 3.17 and Figure 3.20 show the use of dealer custom application services and dealer equipment by type of fertilizer. Reference to Figure 3.20 shows that dealer application equipment is more widely used than dealer custom application for all types of fertilizer except dry bagged materials and liquid mixes.

TABLE 3.12

USE OF CUSTOM APPLICATION AND DEALER EQUIPMENT, ONTARIO, 1979

	Total % of Farmers	Wellington % of Farmers	Kent % of Farmers	Oxford % of Farmers	Huron % of Farmers
Custom Application					
Used dealer custom[1] application service this year	31	29	37	27	30
Change in future use[2] of dealer custom application					
More	19	--	25	33	13
Less	14	15	--	25	20
Same	67	85	75	42	67
Will use dealer custom application[3] in future	15	11	21	14	14
Dealer Equipment					
Used dealer application[1] equipment this year	76	58	92	71	78
Change in future use[2] of dealer application equipment					
More	11	7	13	9	8
Less	11	14	--	12	20
Same	79	79	87	79	72
Will use dealer application equipment in future	25	20	75	21	18

[1] Percentage of all farmers.

[2] Percengage of those farmers using the service.

[3] Percentage of those farmers not using the service.

TABLE 3.13

REASONS FOR USING/NOT USING DEALER CUSTOM APPLICATION SERVICES
ONTARIO, 1979

Reasons	Percent [1]
Reasons for Using	
Saves time	55
Equipment considerations [2]	48
Saves labor	18
Cost considerations	17
Convenience	13
Reasons for Not Using	
Rather do it myself	37
Cost considerations	25
Not satisfied with custom application service or equipment	16
Have my own equipment	19
Have sufficient time and labor	11

[1] Percentages do not add up to 100 because some farmers gave more than one reason whereas others did not give any reason. The percentages refer to the percentage of farmers using/not using dealer custom application services.

[2] Includes reasons such as: accurate application equipment, equipment in good condition, specific equipment like the Terra-Gator.

TABLE 3.14

REASONS FOR USING/NOT USING DEALER APPLICATION EQUIPMENT
ONTARIO, 1979

Reasons	Percent [1]
Reasons for Using	
Too expensive to own and maintain equipment	65
Cost considerations	46
Rather do it myself	19
Convenience	15
Time considerations	9
Dealer equipment is available when needed	8
Not satisfied with dealer custom application service or equipment	8
Included in fertilizer price	2
Reasons for Not Using	
Have my own equipment	38
Rental equipment is not available when needed	12
Rather use dealer custom application	8
Short on labor	6
Rental equipment is in poor condition	6
Cost considerations	4

[1] Percentages do not add up to 100 because some farmers gave more than one reason whereas others did not gave any reason. The percentages refer to the percentage of farmers using/not using dealer application equipment.

TABLE 3.15

FARMER DIFFERENCES IN USE OF APPLICATION METHODS, ONTARIO, 1979

VARIABLES \ CHARACTERISTICS	ALL FARMERS	SIZE OF PURCHASE (tons)	TOTAL ACRES	GROSS INCOME ($000)	FARM TYPE	AGE	COUNTY
USE CUSTOM APPLICATION SERVICES AT PRESENT TIME	31%	*** 51-100 Over 100			*** Cash Crop Mixed		
PLAN TO USE MORE CUSTOM APPLICATION IN FUTURE	20%	** Over 100					* Kent Oxford
PLAN TO USE CUSTOM APPLICATION IN FUTURE	15%						
USE DEALER APPLICATION EQUIPMENT AT PRESENT TIME	76%			* Under 50 50-100 100-200	* Cash Crop Mixed		** Kent
PLAN TO USE MORE DEALER EQUIPMENT IN FUTURE	11%					* Over 55	
PLAN TO USE DEALER EQUIPMENT IN FUTURE	25%		* 200-400		** Cash Crop		

TABLE 3.16

USE OF DEALER CUSTOM APPLICATION SERVICES, ONTARIO, 1979

	Total		Wellington		Kent		Oxford		Huron	
	No. of Farmers Using Type	Percent Using C.A.	No.	%	No.	%	No.	%	No.	%
Dry Bulk Blends	132	13	27	30	42	7	29	14	31	6
Dry Bagged Blends	67	--	25	--	6	--	17	--	17	--
Custom Blends	64	16	9	22	5	40	28	14	21	10
Dry Bulk Materials	126	24	19	32	42	31	35	20	28	11
Dry Bagged Materials	20	15	8	13	5	--	3	33	4	25
Liquid Nitrogens	53	23	11	--	17	24	10	20	15	40
Liquid Mixes	7	43	2	--	2	50	--	--	3	67
Anhydrous Ammonia	48	2	5	--	17	--	16	--	10	--

TABLE 3.17

USE OF DEALER APPLICATION EQUIPMENT, ONTARIO, 1979

	Total		Wellington		Kent		Oxford		Huron	
	No. of Farmers Using Type	Percent Using D.E.	No.	%	No.	%	No.	%	No.	%
Dry Bulk Blends	132	54	27	48	42	57	29	41	31	65
Dry Bagged Blends	67	7	25	12	6	33	17	--	17	--
Custom Blends	64	55	9	44	5	60	28	50	21	71
Dry Bulk Materials	126	62	19	42	42	62	35	63	28	71
Dry Bagged Materials	20	10	8	13	5	--	3	--	4	25
Liquid Nitrogens	53	34	11	27	17	71	10	10	15	13
Liquid Mixes	7	14	2	--	2	50	--	--	3	--
Anhydrous Ammonia	48	63	5	80	17	65	16	56	10	50

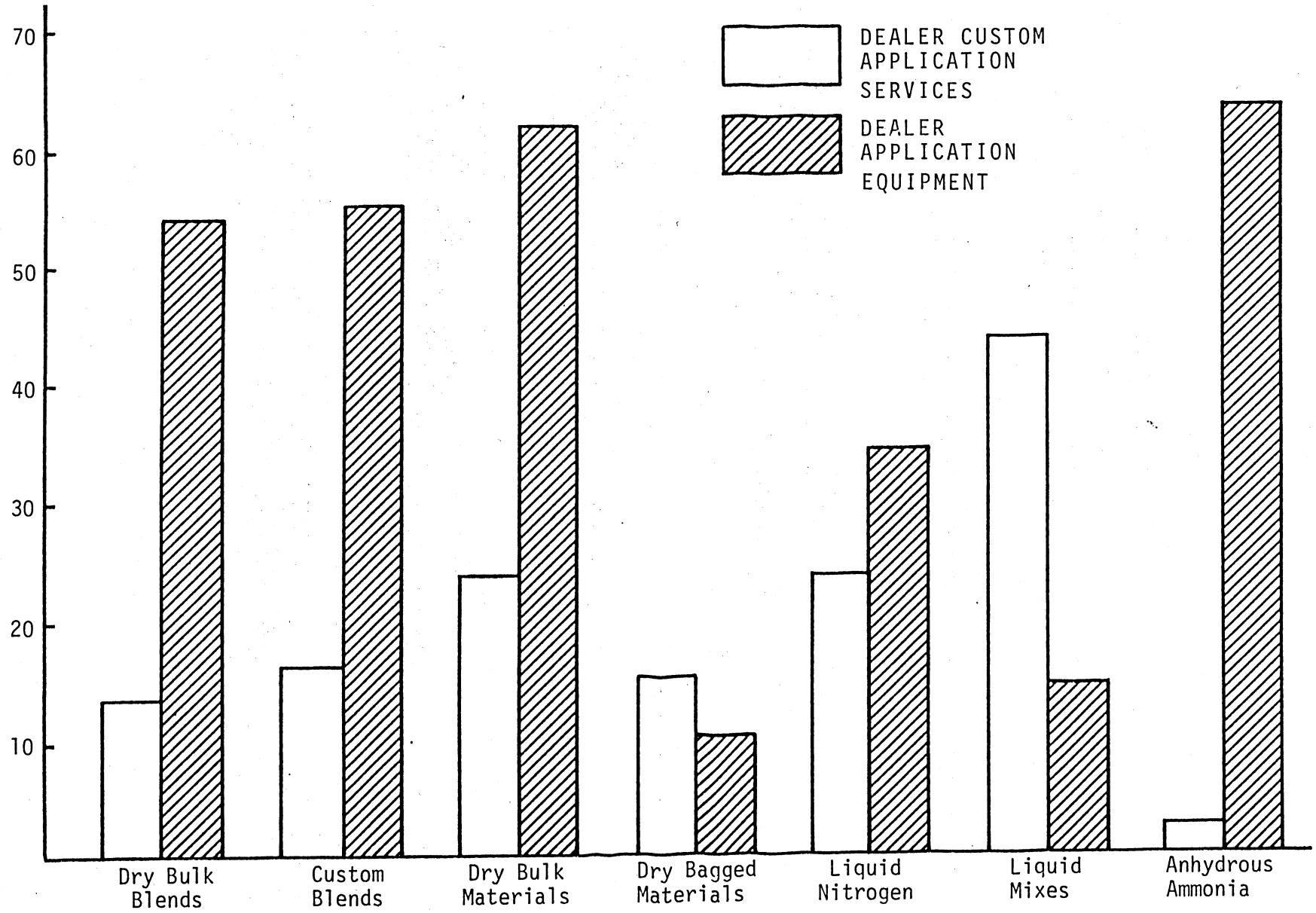

FIGURE 3.20

A COMPARISON OF FARMER USE OF DEALER CUSTOM APPLICATION SERVICES WITH DEALER APPLICATION EQUIPMENT, ONTARIO, 1979

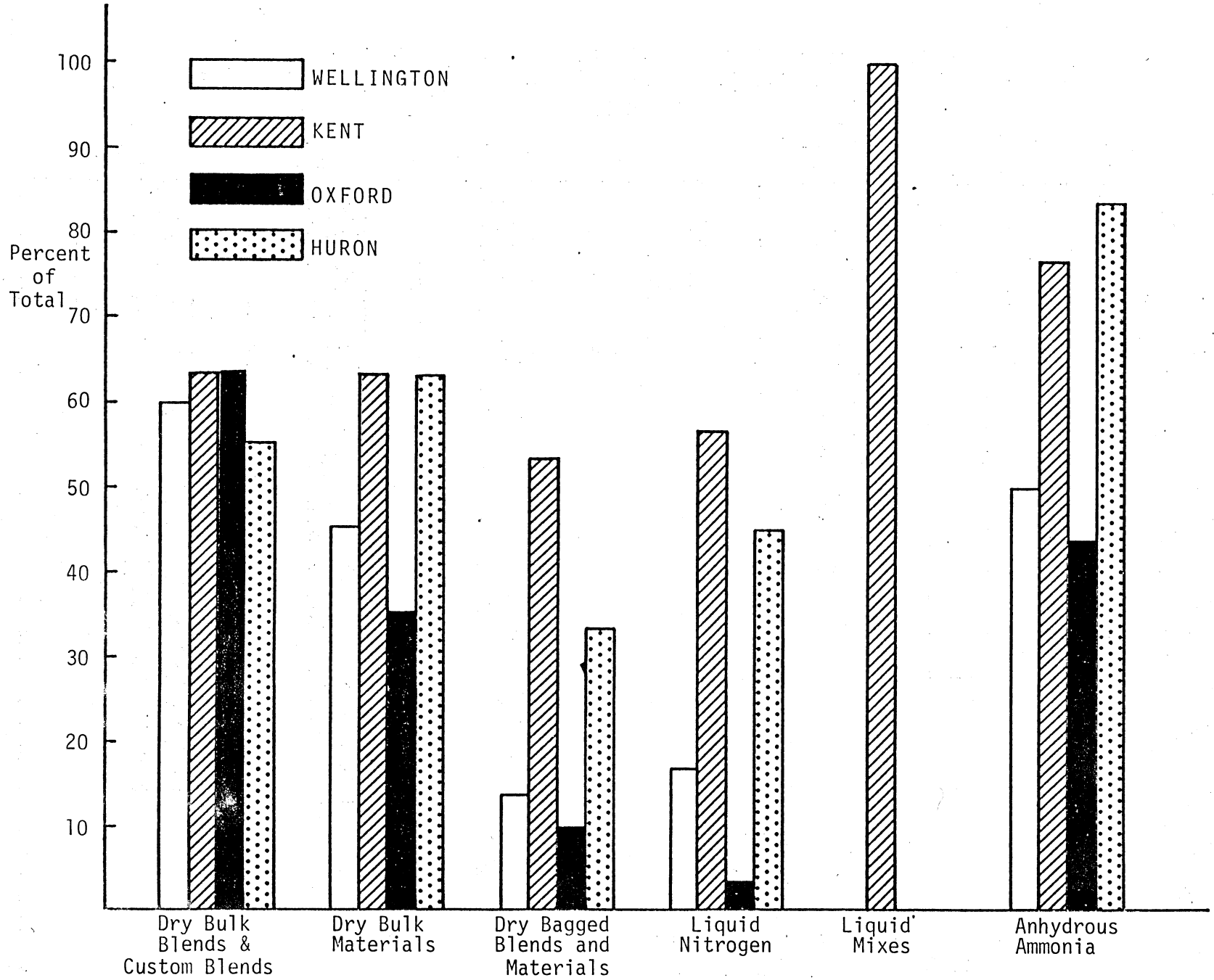

FIGURE 3.21
PERCENTAGES OF FERTILIZER PICKED UP BY THE FARMER FROM THE FERTILIZER DEALER, ONTARIO, 1979

3.4.4 Fertilizer Delivery

Related to fertilizer application is the method used to transport fertilizer products from the dealer to the farmer. Figure 3.21 shows the proportion of each type of fertilizer that is picked up by the farmer using his own truck or tractor. As can be observed in this figure, approximately one-half of the dry bulk fertilizers and anhydrous ammonia is picked up by the farmer, while the other half is delivered by the fertilizer dealer. In the case of dry bagged fertilizers and liquid nitrogens, a higher percentage is delivered by the fertilizer dealer than is picked up by the farmer.

3.5 Soil Testing

One of the major sources of information available to farmers in planning their fertilizer program is the results of soil tests. This section discusses the extent to which farmers use soil tests, the methods used to gather and analyze soil samples, and the extent to which farmers follow the recommendations of soil tests.

Table 3.18 shows that 90 percent of Southwestern Ontario farmers have had their soil tested at one time or another since they started farming. In most cases, farmers have a particular field tested every 3 to 5 years although sizeable numbers have samples taken more often. In almost all instances the farmer or his fertilizer dealer collects the samples using the representative field method. The University of Guelph analyzes the samples for almost 75 percent of the farmers, while fertilizer companies analyze most of the remaining 25 percent.

Table 3.19 shows the farmer differences associated with various methods and procedures used in soil testing. The most important results in this table are: 1) older farmers and cash crop farmers tend to take samples themselves; 2) livestock and mixed farmers are more prone to have samples collected by their fertilizer dealer; 3) large purchasers and cash crop farmers tend to use the grid method of sampling more than other farmers; 4) large acreage farmers and the young and older farmers have a greater tendency to have samples analyzed at the University; and 5) small acreage farmers and farmers in the middle age category tend to have samples analyzed by a fertilizer company.

An attempt was also made to determine the extent to which farmers follow the recommendations of soil tests. The data in Table 3.20 show that only about one half of the farmers in Southwestern Ontario apply the same amount of fertilizer as recommended by soil tests. Between 35 and 40 percent of the farmers apply more than the recommended amount while approximately 10 percent apply less than the recommended amount. Those farmers who do apply more fertilizer than recommended, apply substantially more, while those who apply less, apply slightly less. Further analysis of this data revealed that farmers who had their samples analyzed at the University exhibited a definite tendency to apply more fertilizer than recommended; farmers who had their samples analyzed by fertilizer companies tended to apply less; and farmers who had their samples analyzed by private soil testing labs tended to apply the recommended amount.

TABLE 3.18

FREQUENCY AND METHOD OF SOIL TESTING, ONTARIO, 1979

	Total % of Farmers	Wellington % of Farmers	Kent % of Farmers	Oxford % of Farmers	Huron % Of Farmers
Had Soil Tests Taken in Past	90	88	96	94	80
Frequency of Taking Soil Tests					
Every Year	14	11	13	15	13
Every Other Year	16	20	21	7	18
Every 3 to 5 Years	56	50	62	61	48
Person Taking Samples					
Farmer	65	64	85	50	60
Hired Man	5	10	2	4	5
Fertilizer dealer	23	23	9	33	28
Soil testing lab	1	--	--	2	--
Independent Agronomist	1	--	--	--	2
Method of Taking Samples					
Grid Method	5	--	11	7	3
Representative Field	84	98	61	93	92
Spot Sampling	10	2	28	--	5
Place Where Samples are Analyzed					
University	74	86	80	66	61
Fertilizer Company	23	14	16	28	37
Private Soil Testing Laboratory	3	--	4	5	2

TABLE 3.19

FARMER DIFFERENCES IN METHODS OF SOIL TESTING, ONTARIO, 1979

CHARACTERISTICS / VARIABLES	ALL FARMERS	SIZE OF PURCHASE (tons)	TOTAL ACRES	GROSS INCOME ($000)	FARM TYPE	AGE	COUNTY
FARMER TAKES SAMPLES	65%				*** Cash Crop	** 45-54 Over 55	*** Kent
HIRED MAN TAKES SAMPLES	5%			* Over 200			
FERTILIZER DEALER TAKES SAMPLES	23%				* Livestock Mixed		** Wellington Oxford Huron
SOIL TESTING LAB TAKES SAMPLES	1%						
INDEPENDENT AGRONOMIST TAKES SAMPLES	1%						
GRID METHOD	5%	** 51-100			** Cash Crop		** Kent
REPRESENTATIVE FIELD	84%						
SPOT SAMPLING	10%				** Cash Crop		** Kent
UNIVERSITY	74%		** 200-400 Over 400			* Under 35 45-54 Over 55	*** Wellington Kent
FERTILIZER COMPANY	23%		* 100-200			* 35-44	*** Oxford
PRIVATE SOIL TEXTING LAB	3%						

TABLE 3.20

DIFFERENCES BETWEEN ACTUAL APPLICATION RATES AND APPLICATION RATES RECOMMENDED BY SOIL TESTS, ONTARIO, 1979

	Applied More		Applied Less		Applied Same
	Percent of Farmers	Percent More	Percent of Farmers	Percent Less	Percent of Farmers
Nitrogen	39	38	9	15	52
Phosphorous	36	43	8	15	56
Potash	36	47	11	17	53
Limestone	4	86	2	70	94

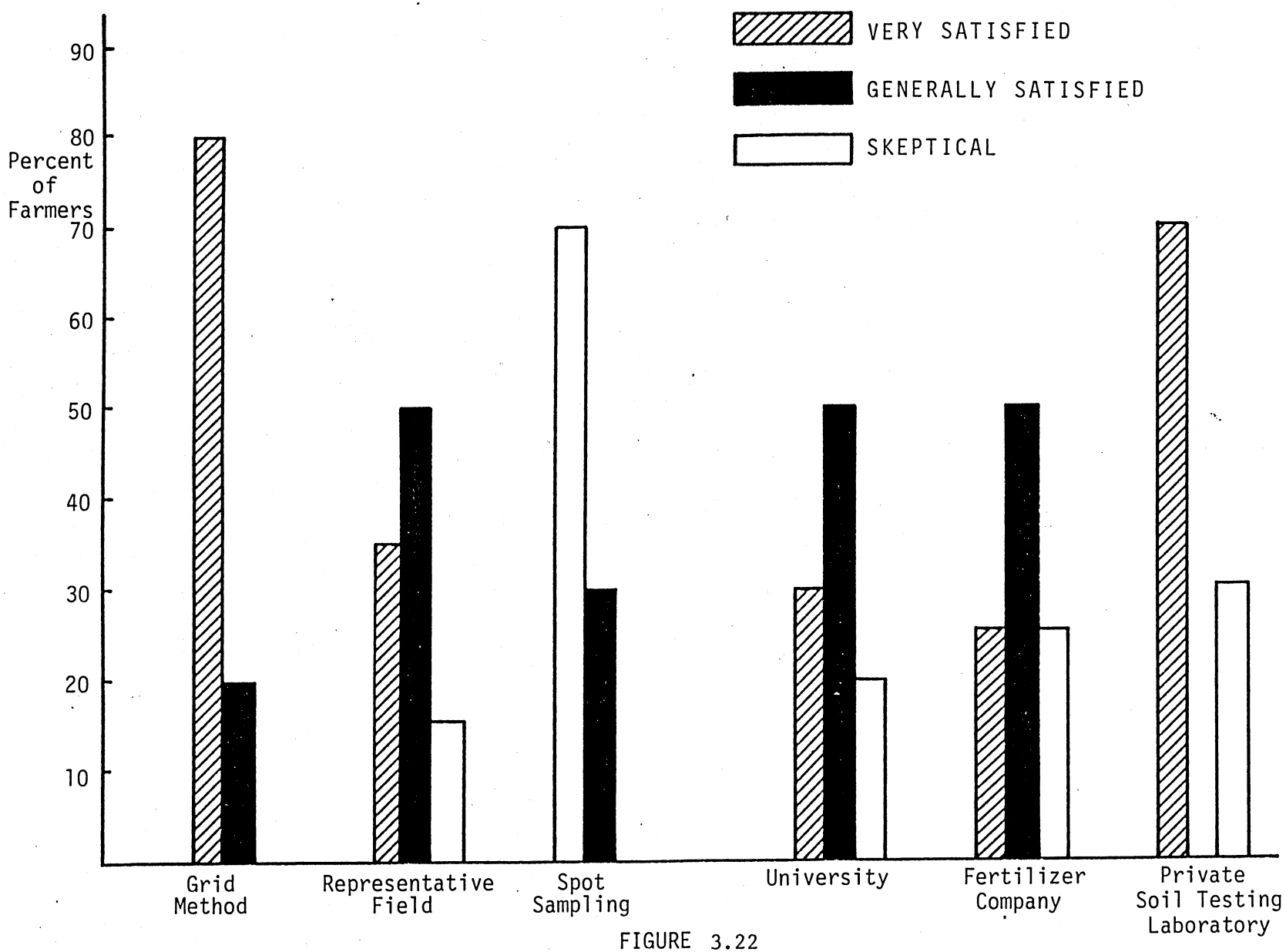

FIGURE 3.22

DEGREE OF SATISFACTION WITH DIFFERENT METHODS OF SOIL SAMPLING AND ANALYSIS, ONTARIO, 1979

Finally, Figure 3.22 shows the relationship between the methods of collecting and analyzing soil samples and the degree of satisfaction farmers have in the reliability of the results. This figure shows very clearly that farmers use spot sampling and the grid method to collect samples and private soil testing labs to analyze the samples, are more highly satisfied with the results than farmers using other methods.

3.6 Farmer Attitudes

At the conclusion of each interview the farmers were given a list of statements designed to measure attitudes toward a number of important issues involved in fertilizer marketing. Their responses to those statements in the product/service area are summarized in Table 3.21, and the farmer differences in Table 3.22.

The first two statements deal with anticipated changes in fertilizer use per acre. The responses indicate that most farmers anticipate using about the same level of fertilizer in the future as they use at the present time. Those farmers who anticipate using higher fertilizer application rates tend to be in the under 35 age bracket, while those who anticipate using lower application rates are in the over 55 age category.

Statement 3 deals with the farmers' perception of the use of fertilizer as insurance against poor growing conditions. Slightly more farmers disagreed with this statement than agreed with it. Almost all farmers, on the other hand, disagreed with statement 4, which expressed the idea that less fertilizer would be used when the price of corn decreased.

Statements 5 and 6 deal with fertilizer availability. It is interesting in statement 5 to observe that sizeable proportions of farmers anticipated some fertilizer shortages during the next five years. The responses to statement 6 indicate that most farmers are not experiencing problems at the present time with the availability of any types of fertilizer at the retail level. Those farmers who are experiencing some problems with availability tend to be the farmers who purchase larger quantities of fertilizer.

Almost all farmers agree with statements 7 and 8 that fertilizer quality is very good and that certain types of fertilizer provide better value than other types. In both cases cash crop farmers expressed stronger agreement than other farmers.

Statements 9 and 10 deal with micronutrients. In statement 9, it is apparent that approximately half the farmers agree and the other half disagree with the idea that fertilizer containing micronutrients is not worth a premium price. The large purchase farmers tended to disagree with this statement more than other farmers. Eighty percent of the farmers agreed with the statement that soil tests should include micronutrient levels. In this case, the small purchase farmers did not agree as strongly as the larger purchase farmers.

Finally, the last two statements deal with fertilizer application. The responses here indicate that slightly under half the farmers feel that

TABLE 3.21

RESPONSE TO ATTITUDE STATEMENTS, ONTARIO, 1979

Attitude Statements	Strongly Disagree % of Farmers	Disagree % of Farmers	Agree % of Farmers	Strongly Agree % of Farmers
1. I expect to be using more fertilizer per acre in the future than I am at the present time.	16	43	33	7
2. I expect to be using less fertilizer per acre in the future than I am at the present time.	27	44	23	3
3. Extra fertilizer is good insurance against poor growing conditions.	20	38	33	8
4. When the price of corn decreases I usually consider using less fertilizer.	37	45	15	3
5. There most likely will be shortages of certain types of fertilizer during the next five years.	9	32	49	9
6. The fertilizer products I want are readily available at my dealer.	3	4	37	56
7. I very seldom experience problems with fertilizer quality.	3	8	58	31
8. Certain types of fertilizer are much better values than other types	2	12	56	29
9. Fertilizer containing micronutrients is not worth a premium price.	9	43	37	10
10. Soil test results should include micronutrient levels.	3	17	45	33
11. Many fertilizer dealers do a poor job of applying fertilizer.	10	52	32	5
12. The application equipment dealers provide farmers is frequently in poor repair.	11	55	29	4

TABLE 3.22

FARMER DIFFERENCES IN RESPONSE TO ATTITUDE STATEMENTS, ONTARIO,1979

CHARACTERISTICS / STATEMENTS	ALL FARMERS	SIZE OF PURCHASE (tons)	TOTAL ACRES	GROSS INCOME ($000)	FARM TYPE	AGE	COUNTY
1. EXPECT TO BE USING MORE FERTILIZER PER ACRE IN FUTURE	3.2					** Under 35	
2. EXPECT TO BE USING LESS FERTILIZER PER ACRE IN FUTURE	2.6					* Over 55	* Wellington Oxford Huron
3. EXTRA FERTILIZER IS GOOD INSURANCE	3.1						
4. WHEN CORN PRICES DECREASE USE LESS FERTILIZER	2.2						
5. FERTILIZER SHORTAGES IN THE FUTURE	3.7				** Cash Crop		
6. FERTILIZER PRODUCTS READILY AVAILABLE	5.4			* Under 50 50-100 100-200			** Kent
7. SELDOM EXPERIENCE QUALITY PROBLEMS	4.9				** Cash Crop Mixed		** Wellington Kent Oxford
8. CERTAIN TYPES OF FERTILIZER ARE BETTER VALUES THAN OTHERS	4.8				** Cash Crop		
9. MICRONUTRIENTS NOT WORTH A PREMIUM PRICE	3.5	** 1-25 26-50 51-100					
10. SOIL TESTS RESULTS SHOULD INCLUDE MICRONUTRIENT LEVELS	4.6	* 26-50 51-100 Over 100					** Kent Oxford
11. DEALERS DO A POOR JOB APPLYING FERTILIZERS	3.1	** 51-100 Over 100	** 200-400 Over 400				
12. DEALER APPLICATION EQUIPMENT IS POOR	3.0	* 51-100 Over 100					

fertilizer dealers do a poor job of applying fertilizer and that the dealers application equipment is in poor repair. This feeling is more pronounced among the larger purchase farmers than among other types.

4.0 SUMMARY AND CONCLUSIONS

The purpose of this report has been to investigate the current use of fertilizer products and services by Ontario farmers. The major findings and their implications for the development of effective fertilizer marketing programs are:

(1) Growth in fertilizer sales through efforts to increase the number of acres fertilized appears to be limited. Survey results showed that only 7 percent of the crop acreage in Southwestern Ontario is not fertilized at the present time. This acreage is almost entirely in soybeans, pasture, and forages. As a result, dealers in areas where there are significant acreages of these crops have some potential for expanded sales if they can develop effective marketing programs to get farmers to use fertilizers on their soybeans, pasture, or forages. Because it is the smaller farmers who do not fertilze these crops, any marketing program designed to increase use must be oriented toward this group.

(2) Growth in fertilizer sales through efforts to increase application rates appears to be somewhat more likely. The overall application rate in Southwestern Ontario was calculated to be 384 pounds per acre, which is approximately 30 percent below a comparably calculated rate in Indiana. While some of this difference is due to differences in the mix of crops between the two areas, other factors are involved. Examination of the application rates by type of farmer revealed that large purchase and cash crop farmers tend to apply substantially more fertilizer per acre than other farmers. Thus it would appear that efforts to increase application rates should be made primarily in the smaller purchase, livestock and mixed farm segments. This may be difficult, however, because these farmers in particular expressed the opinion that they were not likely to increase or decrease their fertilizer application rates in the future, and because many Ontario farmers are already using higher application rates than recommended by soil tests.

(3) The major types of fertilizer used by Ontario farmers are: dry bulk blends, custom blends, dry bulk materials, and liquid nitrogens. Of lesser importance are dry bagged blends and anhydrous ammonia, and of very minor importance are liquid mixes and dry bagged materials. Some important differences in the use of fertilizer types were found to be related to geographical location, size of purchase, type of farm, and age of the farmer. These differences must be taken into account in selecting target markets, and in organizing production facilities, inventories , and services to serve these targets. The age differences have additional significance as a possible indicator of changes in the relative use of fertilizer types. Assuming that younger farmers continue to use the products they are using at the present time, then it is likely that in the future more custom blends and anhydrous ammonia will be used at the expense of bulk and bagged blends. This was supported by an analysis of expected changes which revealed the same shifts.

(4) Most farmers find the quality and availability of fertilizer products to be very good. The only exception to this is the fact that some large purchase farmers do experience availability problems with some types of fertilizer. Obviously, fertilizer suppliers and dealers should attempt to maintain their image of having quality products readily available, and, in those instances where availability is a problem, efforts should be made to improve the forecasting of customer needs.

(5) In market segments formed on the basis of size (size of purchase, total acres, or gross income), the results revealed that a small percentage of farmers purchase a large percentage of fertilizer products. This, of course, has important implications for the selection of target markets. Although many suppliers and dealers may want to market to the large farmer segment, the risks and competition involved in working with this type of farmer may mean that there are better opportunities for some organizations in the smaller farmer segment of the fertilizer market. Serving both segments at the same time is an obvious alternative, and indeed the approach followed by most firms. Care must be taken, however, when using this approach to make sure that proper marketing programs are identified and implemented for each segment. Failure to do this results in neither segment being adequately served.

(6) Only a small percentage of Ontario farmers purchase and use micronutrients. Those farmers that do purchase micronutrients tend to be larger farmers, and cash crop and mixed farmers. They almost always purchase micronutrients mixed with fertilizer from a fertilizer dealer. The low usage of micronutrients is probably due to two factors: first, many farmers hold the opinion that micronutrients are not worth a premium price, and second, there is no information on soil test reports concerning micronutrient usage. As a result many farmers do not know which micronutrients are needed, or how much of each kind. It appears that micronutrients present some opportunity for sales growth and improved service to farmers, particularly those farmers in the large purchase segment. This will probably require the incorporation of micronutrient testing techniques into soil analysis programs so that farmers have some objective basis upon which to make usage decisions.

(7) As in the case of micronutrients, only a small proportion of Ontario farmers use limestone. This is because in the total survey area only one county has the type of soil that requires this product. In this county, however, only two-thirds of the limestone sales are made by fertilizer dealers indicating some potential for sales growth. The use of liquid nitrogen - herbicide mixes is also quite low among Southwestern Ontario farmers. Because of the time and cost savings involved, this practice will undoubtedly grow in popularity in the future providing new growth opportunities for some dealers.

(8) The timing of fertilizer purchasing and delivery is of a great deal of importance to fertilizer suppliers and dealers in scheduling procurement, inventories, and labour and facilities utilization. This has always been a problem in the fertilizer industry because of the traditional sales peak in May and June. Unfortunately, the results of this survey only confirm the fact that a very large proportion of most fertilizer products are sold and delivered at the time of Spring application. There is some indication that more farmers

are considering earlier purchases, and, in some cases, storage of the product. The results of the study suggest that to encourage this, fertilizer marketers can a) make better use of price reductions or discounts in the Fall and Winter months, b) provide, or help arrange credit for those farmers with cash flow problems, c) facilitate the construction and use of on-farm storage facilities, and d) encourage more Fall application where this is advisable. Of course the extent to which a fertilizer marketer can offer incentives for early purchase and delivery depends upon a careful assessment of the benefits involved.

(9) Survey results revealed that the fertilizer use decision is made during the six-month period of December through May, with most farmers making the decision earlier in this period. Similarly, those farmers preparing written fertilizer plans do this some time before actually ordering and taking delivery of their fertilizer. Because the goal of the marketer is to influence these plans, it is important to know when they are made and time marketing efforts accordingly.

(10) The efforts of dealers over the years to reduce the amount of credit carried for their customers has apparently been successful as judged by the fact that only 7 percent of all fertilizer purchases were financed by dealer credit in 1979. It is not likely, however, that this percentage will decrease further because there will always be certain types of customers who will require dealer credit. Survey results suggest that younger farmers are more likely to use this financial service than any other type of farmers. Because of the importance of younger farmers to long run sales and profitability, it is important that efforts be made to assist them in purchasing fertilizer products and services.

(11) Although most fertilizer in Ontario is applied by the farmer with his own specialized application equipment or application attachments on his planter, a substantial amount is applied by the fertilizer dealer. Of the two types of application services offered by dealers, the use of dealer supplied equipment is much more widely used than dealer custom application. Moreover, it is expected that the use of dealer application equipment will expand at a faster rate than the use of dealer custom application services. The main reason for this is the attitude among farmers that the use of dealer application equipment is the least expensive alternative they have for getting fertilizer applied. Many farmers also are of the opinion that neither service is very good; either the dealer does a poor application job in the case of custom application, or the equipment is in poor repair in the case of dealer supplied equipment. Obviously fertilizer dealers should do what is necessary to change these attitudes and create more satisfied customers.

(12) Some important differences exist in the type of farmer using custom application versus dealer equipment. In general, large purchase, cash crop farmers tend to use custom application whereas smaller, cash crop farmers tend to use dealer equipment. This is another important consideration in selecting a target market and developing the proper services for that market.

(13) Over 90 percent of Southwestern Ontario farmers have had their soil tested at one time or another since they started farming. In most cases,

farmers have a particular field tested every 3 to 5 years although sizeable numbers have samples taken more often. In most instances the farmer or his fertilizer dealer collects the samples using the representative field method. Most samples are then analyzed by the University or by fertilizer companies. Although not widely used, the grid and spot sampling methods of collecting soil samples were judged to be more satisfactory than the more commonly used representative field technique. Similarly, the use of private soil testing labs, although limited in use at the present time, was judged to be more satisfactory than either the University or fertilizer company labs.

(14) Some important farmer differences were found in the area of soil testing. Of particular importance to fertilizer companies and dealers were the findings that a) livestock and mixed farmers are more inclined to have fertilizer dealers collect soil samples, and b) smaller acreage farmers in the 35 to 44 age category are most likely to have their samples analyzed at fertilizer company laboratories. It was interesting and perplexing to observe that while very high proportions of farmers in the young (under 35) and old (over 45) age categories used the University to have soil samples analyzed, almost no farmers in the 35 to 44 age category used the University. Instead, almost all farmers in this group used fertilizer companies. No explanation is available for this finding.

(15) Finally, the analysis of soil testing also revealed that over half the farmers who received soil test reports did not apply the recommended levels. Between 35 and 40 percent of the farmers applied more fertilizer than was recommended while approximately 10 percent applied less. Those farmers who applied more applied substantially more, while those who applied less applied slightly less. In general, farmers who had their samples analyzed at the University applied more, farmers who had their samples analyzed at fertilizer companies applied less, and farmers who had their samples analyzed at private soil testing laboratories applied the recommended amount. These results seem to reflect the idea that farmers consider the University to be too conservative in its recommendations, while fertilier companies, because they want farmers to purchase more fertilizer, are too liberal. Private soil testing labs, on the other hand, are viewed as being fairly objective in their recommendations. Because of this, and the increasing importance of soil testing, it is likely that private soil testing labs will become more important in the future.