CROP MANAGEMENT DECISION-MAKING: INFORMATION USED AND REQUIRED BY MANITOBA CROP PRODUCERS

A Report on the 1988-89 Farmer Survey

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and

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Department of Agricultural Economics and Farm Management
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Winnipeg, Manitoba
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ABSTRACT

As part of the project entitled "Management Options for Grain Production in the 1980s and 1990s", a farmer survey was conducted during the fall and winter of 1988-89. A total of 234 Manitoba crop producers were interviewed, and asked questions concerning the information used and required in making specific crop management decisions.

The survey respondents were asked questions pertaining to the following management decisions:

i. fertilizer rates, and method/timing of nitrogen application,

ii. method/timing of pesticide application,

iii. varietal selection for wheat and canola, and

iv. canola acreage decisions.

In each case, farmers were requested to provide actual practices, information used in making decisions, and perceived information gaps.

Producers were also asked questions in two other areas relating to crop production. First, feedback concerning the degree of use and usefulness of several Manitoba Agriculture publications was requested. Secondly, farmers were asked to comment on two current issues in crop production; the dry conditions that were experienced during 1988, and the prevalence of soil conservation practices.

The survey respondents indicated that most of the information that is available to them is put to use in making crop management decisions. However, the producers indicated, through their responses, that further information is required in order to make the proper decisions. This

conclusion was consistent for all of the various management decisions that were addressed in the survey.

The primary recommendation arising from this study is that information required for crop management decisions should be more specific. The specificity may be for regional differences, soil type differences, crop/varietal differences, or climatic differences, depending upon the type of decision being considered.

ACKNOWLEDGEMENTS

The time and effort provided by many individuals made the task of completing this report much easier. A vital role was played by the members of the Management Options for Grain Production in the 1980s and 1990s' working group in helping to guide this survey from start to finish. As well, we would like to thank Ken Malenko for his work in actually carrying out the survey. The financial support provided by Imperial Oil is also greatly appreciated. The work of Dr. D. Donaghy, Dr. C.F. Framingham and Professor R.M. Josephson in reviewing this report is also acknowledged. Finally, we would like to extend our appreciation to the farmers who participated in the survey. This study would not have been possible without their cooperation.

1. INTRODUCTION

Crop production in Manitoba is characterized by many uncertainties. As a result, farmers must have access to accurate and useful information for the purposes of making informed crop decisions. "Management Options for Grain Production in the 1980's and 1990's" is a project designed to assess the quality of information that Manitoba farmers have available to them for making economically efficient crop decisions, and provide direction for future research and extension activities in this area. The project is jointly sponsored by the Manitoba Department of Agriculture and the Faculty of Agriculture, University of Manitoba.

The first part of the study has focused on cultural practices and management, and in particular on the information farmers perceive as being required in order to evaluate profit and risk management strategies. Two farmer surveys (1987 and 1988-89) have been conducted within the overall framework of this project.

The objectives of the 1987 survey, conducted in late fall of that year, were as follows:

a. the identification of actions taken by producers to combat the effects of low grain prices,

b. the identification of information used to make crop management decisions, and

c. the identification of additional information needs as expressed by the farmers.

The results of the survey have been compiled into a report by Zbeetnoff and Josephson.[1] The findings of the 1987 survey, based on responses from 140 Manitoba grain farmers, were that:

a. information requirements under low commodity price scenarios are similar to those under other economic situations,

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[1]Zbeetnoff, D.M. and R.M. Josephson. "Changes in Crop Production Practices Made by Manitoba Farmers in 1987 in Response to Low Grain Prices". Unpublished Report, Department of Agricultural Economics and Farm Management, University of Manitoba. February, 1988.

b. use of existing information by farmers depends upon its accuracy, specificity, perceived payoff and relevance in terms of improved decision-making,

c. variable field conditions, cultural practices and economic considerations limit options that Manitoba farmers can realistically consider in making management decisions, and

d. significant gaps limit the value of existing information to farmers, indicating the need for specific new research priorities and increased emphasis on improving the economic content of information provided for use in decision-making.

A number of information gaps were identified by the results of the 1987 survey. The 1988-89 survey was designed as a follow up to the previous survey in order to obtain more details concerning the information uses and needs for Manitoba crop producers. One goal of this survey was to determine, in more exact terms, the information used and required by Manitoba crop producers in making specific crop management decisions. Another goal of this survey was to provide some recommendations as to the direction that future research and extension efforts should take.

Within this general framework, the specific objectives of the survey were to provide some detailed feedback in the following areas:

a. information used and required for making decisions with respect to fertilizer rates, and the method and timing of nitrogen application,

b. information used and required for making decisions related to the method and timing of pesticide application,

c. information used in the selection of wheat and canola varieties,

d. factors influencing farmers' canola acreage decisions (i.e., decisions to increase or decrease canola acreage),

e. the degree of use and usefulness of several Manitoba Department of Agriculture publications (i.e., *Field Crop Variety Recommendations*, *Field Crop Production Guide* and *Guide to Chemical Weed Control*),

f. information needs arising from the dry conditions during 1988, and

g. the prevalence of soil conservation practices among crop producers, and information uses and needs for making soil conservation decisions.

2. SURVEY METHODOLOGY

Given the specific objectives of the survey, a questionnaire was developed in conjunction with the crop management study working group. This working group consisted of representatives from government (Manitoba Department of Agriculture and Agriculture Canada), industry, as well as the Faculty of Agriculture, University of Manitoba. The questions were designed, as much as possible, to be open-ended; that is, farmers could provide as many responses as they felt were relevant. In addition, farmers were not prompted with any suggested responses. A copy of the survey questionnaire is provided in Appendix A.

Before proceeding with the survey, the questionnaire was pre-tested by the interviewer. Several Manitoba crop producers were interviewed to ensure that farmers could understand what was being asked of them, and also to ensure that the survey was relatively easy to administer.

The selection of the survey sample followed the same basic procedure used in the 1987 survey. There were several major criteria used to determine the farmers to be surveyed. The survey sample was to be geographically representative of Manitoba crop producers. In other words, the proportion of surveyed farmers in each region of Manitoba was to parallel provincial proportions. Secondly, the survey sample was to consist of farmers who were involved primarily in crop production. Providing an economic cross-section of farms was important. Finally, willingness to participate was an important consideration.

The sample from the 1987 survey (162 farmers) was used as the base for the new survey. In addition, agricultural representatives were to identify additional farmers in order to enlarge the survey sample to 324 producers. The surveys were administered through personal interviews, conducted from October, 1988 through February, 1989. New participants were initially contacted by agricultural representatives concerning their willingness to participate in the survey. The interviewer, if necessary, made several attempts to arrange a suitable time to meet with farmers.

3. GENERAL RESULTS[2]

3.1 Farmer Response

As noted earlier, the survey sample was designed so as to consist of the 162 farmers from the 1987 survey sample plus an additional 162 farmers, identified by agricultural representatives. The regional breakdown of the desired sample is shown in Table 3.1. Due to problems in identifying willing producers, the actual sample for the survey was 297 farmers (91.7 percent of the desired sample). The regional breakdown of the actual sample is also shown in Table 3.1. The geographical locations of the five regions are provided in Figure 3.1.

Of the 297 farmers in the sample, 234 were surveyed, a response rate of 78.8 percent. By comparison, the response rate for the 1987 survey was 86 percent. The regional breakdowns for respondents and response rate are provided in Table 3.1. The response rates were

[2]It should be noted that the survey sample was not designed to serve as a representative sample of Manitoba farmers. Accordingly, readers should not assume that the survey results regarding production practices such as methods of pesticides and fertilizer application represent practices typical of the population of Manitoba farmers. In many cases, better information is available from alternative sources.

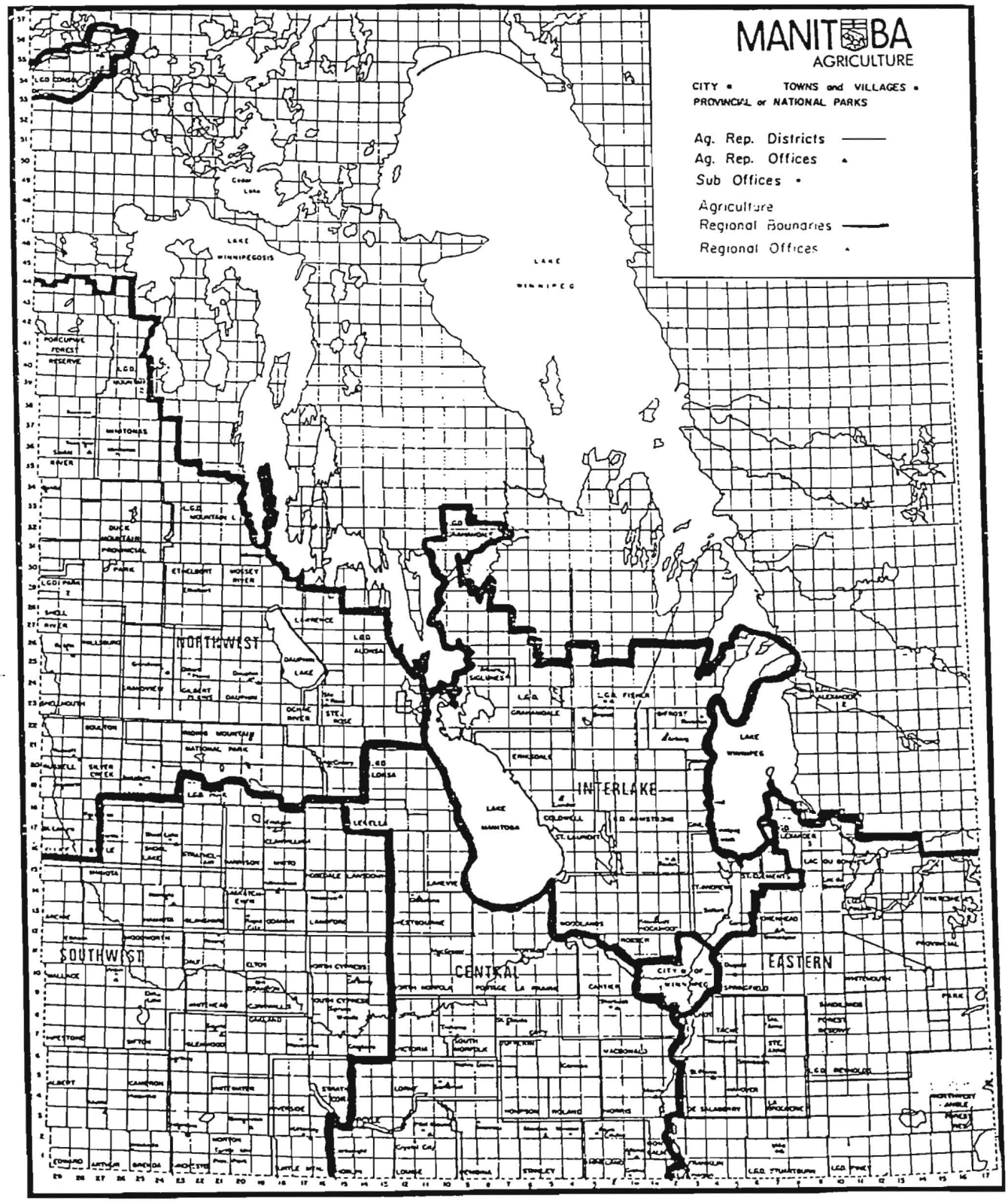
Table 3.1

Regional Breakdown of 1988-89 Farmer Survey

Region	Desired Sample	Actual Sample	Respondents	Response Rate
	Numbers (% of Total)			(%)
Southwest	84 (25.93)	78 (26.26)	54 (23.08)	69.2
Northwest	54 (16.67)	59 (19.87)	52 (22.22)	88.1
Central	84 (25.93)	82 (27.61)	72 (30.77)	87.8
Interlake	54 (16.67)	31 (10.44)	22 (9.40)	71.0
Eastern	48 (14.81)	47 (15.82)	34 (14.53)	72.3
Provincial Totals	324 (100.0)	297 (100.0)	234 (100.0)	78.8

Figure 3.1

Regional Demarcation in the 1988-89 Farmer Survey



highest in the Northwest and Central regions. The most common reasons for non-response were inability to make contact with the farmer or inability to agree upon a suitable time for the interview.

A comparison of the two farmer surveys (1987 and 1988-89), in terms of regional participation, is provided in Table 3.2. The participation by producers in the Interlake region declined from 1987 to 1988-89, both in absolute and percentage terms. This was largely due to difficulties in soliciting participation from additional farmers (as shown in Table 3.1). As a result, percentage participation by producers in most other regions increased from 1987 to 1988-89. This makes comparing or combining the results of the two surveys very difficult.

3.2 Seeded Acreage Comparisons

Tables 3.3 and 3.4 provide information concerning seeded acreage for survey respondents, as well as provincial acreages. This information can be used to , in some sense, validate the survey sample. As well, the regional breakdown may help to place regional responses to other survey questions into perspective.

As indicated in Table 3.3, 54.9 percent of the survey respondents' acreage was seeded to cereals and 23.6 percent to oilseeds in 1988. This represented a reduction in the percentage of cereal grain acreage, relative to 1987. The significant increase in canola acreage occurring across the prairies in 1988 was offset in Manitoba by a decline in other oilseed acreage. As a result, little change was observed in total oilseed acreage from 1987 to 1988.

Table 3.2

Comparison of Regional Breakdown for 1987 and 1988-89 Farmer Surveys

Region	Numbers of Farmers by Region (% of Provincial Total)	
	1988-89 Survey	1987 Survey
Southwest	54 (23.1)	35 (25.0)
Northwest	52 (22.2)	23 (16.4)
Central	72 (30.8)	39 (27.9)
Interlake	22 (9.4)	25 (17.9)
Eastern	34 (14.5)	18 (12.8)
Provincial Totals	234 (100.0)	140 (100.0)

Table 3.3

Regional Comparison of Seeded Acreage: 1987 and 1988-89 Farmer Surveys

Crops	Percent of Total Acres in 1988 (1987)[a]					
	SW	NW	CE	INT	EAST	PROV
Cereals	60.3 (66.2)	49.9 (53.0)	55.0 (55.9)	52.4 (55.3)	54.9 (59.1)	54.9 (58.4)
Oilseeds	22.0 (20.3)	24.9 (21.9)	23.5 (24.4)	21.1 (28.2)	26.9 (23.0)	23.6 (23.5)
Special Crops	4.5 (3.8)[b]	3.1 (9.7)	11.3 (18.5)	12.2 (8.9)	3.7 (9.5)	6.7 (10.3)
Forages & Hay	5.5	10.6	7.9	9.4	11.3	8.4
Summerfallow	7.8 (9.7)	11.5 (15.4)	2.3 (1.2)	5.0 (7.6)	3.2 (8.4)	6.4 (7.8)
Regional Percent	27.3 (24.6)	24.0 (15.5)	27.3 (25.9)	9.7 (19.9)	11.7 (14.1)	100.0 (100.0)
1988 Acreage	72,018	63,279	71,881	25,619	30,778	263,575
1987 Acreage	37,258	23,722	39,497	30,365	21,491	152,603

[a]Regional Abbreviations:
- SW - Southwest
- NW - Northwest
- CE - Central
- INT - Interlake
- EAST - Eastern
- PROV - Provincial

[b]Percentages of special crops & forages/hay combined for 1987.

Table 3.4

Comparison of 1988 Seeded Acreage: 1988-89 Farmer Survey and Provincial Acreages

Crops	Percent of Total Acreage	
	1988 Survey	Province[a]
Cereals	54.9	56.7
Oilseeds	23.6	18.8
Special Crops	6.7	2.6
Forages & Hay	8.4	12.8
Summerfallow	6.4	9.1
Total Acres	263,575 (100)	12,665,000 (100)

[a]Source: Manitoba Department of Agriculture, Market Summary, June, 1988.

Regional comparisons indicated a drop in summerfallow acreage in 1988 compared to 1987, most noticeable in the Northwest, Interlake and Eastern regions. The Southwest region exhibited the highest percentage of cereal acres in the province in both 1987 and 1988. TheInterlake and Central regions had the highest percentage of specialty crops in 1988, while the Eastern and Northwest regions had the highest percentages of seeded forages (including hay).

The provincial summary of seeded acreage (Table 3.4) suggests that the acreage seeded to cereals by the farmers surveyed is comparable. On the other hand, survey respondents had more acreage devoted to oilseeds and specialty crops and less to forages and summerfallow than the provincial average, in percentage terms.

3.3 Regional Soil Types

All farmers were asked to indicate the predominant soil type on their farms. The results of this question were related to management practices to provide a context for evaluating specific decision factors in regions of the province (e.g. fertilizer and pesticide application methods/timing).

As illustrated in Table 3.5, the prevalent soil type of survey respondents in most regions was clay-loam. This was particularly true in the Southwest, Northwest and Central regions. Sandy-loam was the second most common soil type in these three regions. Conversely, the clay soils were most prevalent among respondents in the Eastern region, with clay-loam and sandy-loam ranking a distant second and third, respectively. In the Interlake, there was no apparent predominant soil type, as clay, clay-loam, sandy-loam and organic soils were each present in significant proportions. Provincially, 44.0 percent of the respondents reported clay-loam as the predominant soil type on their farms.

Table 3.5

Regional Breakdown of Survey Respondents By Farm Soil Type

Soil Type	Percent of Total Respondents in Region[a]					
	SW	NW	CE	INT	EAST	PROV
Clay	1.9	3.8	20.8	18.2	61.8	18.2
Clay-loam	66.7	53.8	40.3	27.3	11.8	44.0
Loam	1.9	1.9	1.4	--	--	1.3
Sandy-loam	14.8	26.9	22.2	13.6	8.8	18.8
Sand	--	--	2.8	--	5.9	1.7
Organic	--	--	--	--	--	--
Clay/clay-loam	--	--	13.9	--	5.9	1.3
Clay-loam/ Sandy-loam	9.3	9.6	6.9	18.2	--	8.1
Two or more incl. sand	3.7	1.9	2.8	4.5	2.9	3.0
Two or more incl. organic	1.9	1.9	1.4	18.2	2.9	3.4
Total Number of Farmers	54	52	72	22	34	234

[a]Regional Abbreviations:

SW - Southwest
NW - Northwest
CE - Central
INT - Interlake
EAST - Eastern
PROV - Provincial

The remainder of the survey results are presented in the following sections. The makeup of the various sections is based on the individual questions in the survey (presented in Appendix A). The actual survey results are tabulated and included in tables, both in the main body of the report, and in Appendix B.

No attempt was made to test the statistical significance for any of the survey responses. In general, the frequency of response in any category, for a given question, is assumed to indicate the importance of the particular practice, factor, or piece of information being used or requested.

It should be noted that the survey was designed to obtain responses from farmers relating specifically to management decisions on stubble acres. As a result, no information about summerfallow cropping practices was generated by the survey. This was justified by the fact that less than 8 percent of the respondents' acreage, in either 1987 or 1988, was summerfallowed.

4. FERTILIZER DECISIONS

A major objective of this survey, as outlined earlier, was to generate results with respect to information uses and needs for fertilizer decisions, particularly for nitrogen (N) decisions. Three questions that specifically deal with this issue were included in the questionnaire (i.e., Questions 4, 5 and 11). This was done in response to results obtained from the 1987 survey.

The 1987 farmer survey requested information concerning changes in crop management practices made by Manitoba farmers in response to low grain prices. While the survey results provided some answers, they also raised new questions. For example, 31 percent of the 1987 survey respondents indicated that their fertilization practices changed in reaction to low grain prices. However, actual practices and the factors affecting fertilizer decisions were not known. In addition, 79 percent of the respondents indicated that they use soil test recommendations in

selecting fertilizer rates. Again, there was no indication of the source for these recommendations, or the frequency with which testing was done. The three questions in the 1988-89 survey were designed to follow up on these issues.

4.1 Soil Testing

The 1988 survey confirmed the high level of farmer soil testing reported in the 1987 survey, as indicated in Table 4.1. Of the 234 surveyed farmers, 221 (94.4 percent) indicated that they have soil tested at some point in time. Of the 234 farmers, 33 (14.1 percent) indicated that they sample every field every year. An additional 83 farmers (35.5 percent) indicated that at least some testing is done each year, sampling either some field every year, or rotating the sampling by doing one-half of the fields in each year. In total, 116 (49.6 percent) of the farmers surveyed do some soil testing annually. The remaining farmers that soil test do so on an irregular basis, or at intervals of 2 years or more.

A regional breakdown of these results is provided in Table B.1. As indicated in that table, there was no significant difference between regions, in terms of the percentage of respondents who soil test. There were differences, however, with respect to the frequency of testing. A higher proportion of respondents in the Northwest and Eastern regions test all fields every year. The Eastern region had the highest level of annual soil testing; that is, over 67 percent of respondents in that region do some soil testing each year. Conversely, the Southwest region had the highest proportion of respondents who have stopped soil testing because of dissatisfaction with the results.

Table 4.1

Frequency of Soil Testing by Survey Respondents

Response	Number of Farms	% of Total
Sample some field every year	77	32.9
Sample every field every year	33	14.1
Sample irregularly but more than once	30	12.8
Sample every second year	20	8.5
Stopped, not satisfied with recommendations	17	7.3
Sample for specific crops/problems	13	5.6
First time ever or in a long time in 1988	10	4.3
Sample every third year more than once	8	3.4
Sampled only once	7	3.0
Rotate sampling, half of fields every year	6	2.6
Never soil tested	13	5.6
Total	234	100.0
Total Respondents that have soil tested at least once	221	94.4

The frequency with which soil testing laboratories are used by respondents is indicated in Table 4.2. The Manitoba Provincial Soil Testing Laboratory (MPSTL) is the soil testing service most frequently used by survey respondents. MPSTL is the tester of 55.6 percent of soil samples, representing 71.5 percent of respondents who indicated that they soil test. It should be noted that respondents were asked to name all laboratories at which they had tested, not only those used in 1988. Of the 221 farmers who had soil tested, 53 had used two services and an additional 11 had submitted samples to three labs to compare recommendations.

The use of American laboratories was indicated in 96 of 284 total responses (33.8 percent). Although not directly available from Table 4.2, this represented 39.8 percent of the respondents who soil test. The use of Alberta laboratories was indicated in 25 responses (8.8 percent), representing 11.3 percent of the respondents who soil test.

The results with respect to the use of MPSTL are particularly interesting. MPSTL estimated that approximately 10 percent of Manitoba farmers involved in crop production use their services annually (McGill, personal communication, 1989). However, survey results indicated that of the 116 respondents who do some soil testing each year (from Table 4.1), 83 used MPSTL services. This represented 35.5 percent of total respondents, which is significantly greater than the estimated provincial average.

In addition, MPSTL estimated that 20 percent of fields represented by those farmers who test annually are sampled each year. The survey figures did not allow a direct comparison but nevertheless indicated that of the 116 farmers soil testing annually, 33 (28.4 percent) sample every field every year with a further 6 (5.2 percent) sampling 50 percent of their fields annually.

Table 4.2

Use of Soil Testing Laboratories by Survey Respondents

Soil Test Laboratory	Number of Responses	Percent of Total Responses	Percent of[a] Farmers
Manitoba Provincial Soil Testing Laboratory	158	55.6	71.5
Harris (Nebraska)	31	10.9	14.0
A&L (Nebraska)	25	8.8	11.3
Agvise (North Dakota)	40	14.1	18.1
Crossfields (Alberta)	11	3.9	5.0
Norwest (Alberta)	6	2.1	2.7
Unidentified (Alberta)	8	2.8	3.6
Don't Know	5	1.8	2.3
Total	284	100.0	

[a]These percentages are based on the 221 farmers who indicated that they test their soil.

These results would indicate that surveyed farmers use MPSTL more extensively and intensively than indicated by the provincial average.

The main factors considered by farmers in choosing their soil testing labs (see Table B.2) were fertilizer dealer recommendations, perceived quality of recommendations, and the use of Manitoba data. Use of Manitoba data in making soil test recommendations was considered more important in the Southwest and Interlake regions (from Table B.3). Farmers in the Northwest and Eastern regions indicated, through their responses, that they rely on fertilizer dealer recommendations to a greater extent in choosing their soil testing lab.

Respondents provided several alternative ways in which soil test results are used. Tables B.4 and B.5 provide a summary of the responses, both provincially and regionally. Use of the tests as guides to adjust fertilizer rates for local conditions and experience was indicated by the survey responses. These findings corresponded to the results of the 1987 survey; that is, predominant use of the farmers' own yield experience on specific soil types to select fertilization rates and the indicated need for more regional fertilization information.

The most common use of soil test results by respondents is as a guide only. Soil test information is used as recommended by 27.1 percent of the farmers surveyed. Also, 12.2 percent reported that they tend to exceed soil lab recommendations. As indicated in Table B.4, many farmers indicated that they use only portions of the recommendations, such as soil N reserves, micro-nutrient, P-K-S, or N recommendations.

Table B.5 shows that farmers in the Northwest and Interlake regions follow all fertilization recommendations more frequently than the survey average. The most prevalent use of

recommendations as a guide only is in the Southwest. Farmers in the Eastern region reported the highest proportion of adjustments using soil N reserve levels provided by soil testing labs.

The final question concerning soil tests related to who actually takes the sample. Of the 221 respondents who soil test, 139 (62.9 percent) have their fertilizer dealer take at least some of the samples, while 66 (29.9 percent) take at least some samples themselves. Custom operators take samples for 23 (10.4 percent) of respondents. These findings are consistent with estimates made by MPSTL (McGill, personal communication, 1989). This would suggest that if sampling procedure is perceived to be a problem in maintaining the consistency/accuracy of fertilizer recommendations in Manitoba, new information should be directed at individuals or companies who sample for farmers.

4.2 Factors in Selecting Fertilizer Rates

Farmers were asked to provide factors that they use in making decisions about actual fertilizer rates. The results are tabulated in Table B.6. On average, three factors per respondent were provided (694 responses by 234 farmers). The most prevalent factors considered in the decision were soil test recommendations and past experience. Approximately 26 percent (61 farmers) of the respondents indicated that they use the same amount of fertilizer each year. Table B.6 provides a list of other factors provided by the surveyed farmers. Generally, responses were similar between regions. As a result, regional responses to this question are not reported here.

4.3 Nitrogen Application Decisions

4.3.1 Methods and Timing of Nitrogen Fertilization on Wheat

Information was requested from farmers concerning the methods and timing of N application on stubble wheat acreage. The results, by variety of wheat, are presented in Table 4.3. Provincially, the predominant method/timing combination used is fall banding. The proportion of farmers using fall banding for Durum wheat is higher than for the other varieties. Spring banding and broadcasting are proportionately higher for hard red spring (HRS) wheat. Meaningful comparisons for methods used on Glenlea wheat were difficult because of the lack of observations.

Table B.7 presents a regional breakdown of N application methods and timing for stubble wheat acreage. Practices and timing are variable within the province. The highest proportion of fall banding is found in the Central and Southwest regions, reflecting the tailoring of fertilization practices to predominant soil types in those areas. Spring banding predominates in the Northwest region, but only slightly. Spring broadcasting of N is the favoured method in both the Interlake and Eastern regions. As well, the Eastern region exhibits a much higher proportion of seed placed N fertilization.

Considering only the method used, the majority of respondents utilize some form of banding on stubble wheat acreage. Regionally, banding predominates in the Southwest, Northwest and Central regions. In the Interlake region, banding is slightly more prevalent than broadcasting. Broadcasting is most prevalent in the Eastern region.

Table 4.3

Methods and Timing of Nitrogen Fertilization on Stubble Wheat Acreage, by Variety

Method/Timing	Glenlea	HY Varieties	Durum	HRS[a]	Total
	Number of Responses (% of Total)				
Band/Fall	2 (40.0)	17 (48.6)	21 (67.7)	115 (42.8)	155 (45.6)
Band/Spring	2 (40.0)	7 (20.0)	6 (19.4)	63 (23.4)	78 (22.9)
Broadcast/Spring	1 (20.0)	5 (14.3)	2 (6.5)	55 (20.4)	63 (18.5)
Broadcast/Fall	--	1 (2.8)	1 (3.2)	2 (0.7)	4 (1.2)
Seed Placed	--	5 (14.3)	1 (3.2)	29 (10.8)	35 (10.3)
Did Not Fertilize	--	--	--	5 (1.9)	5 (1.5)
Total Methods	5 (100.0)	35 (100.0)	31 (100.0)	269 (100.0)	340 (100.0)
Total Farmers	3	31	26	219	279[b]

[a]Hard Red Spring
[b]Exceeds numbers of farmers surveyed because some farmers seed more than one variety of wheat.

The differences in N application methods between soil types can be seen in Table B.8. This table presents fertilization practices for 218 respondents who grew HRS wheat. This wheat variety was selected because it was the most prevalent variety among respondents. Respondents with clay soils utilize fall banding to a greater degree than farmers with other soil types. While fall banding is also most common for clay-loam soils, it is not as dominant. A significant number of farmers with this soil type use spring applications. Spring applications (banding and broadcast) are more prevalent than fall application methods for farmers with sandy-loam soils.

As indicated in Table B.9, the majority of respondents in all regions use only one method for application of N on stubble wheat acreage. The proportion using one method is slightly higher in the Central region. In all regions, however, a significant proportion of respondents use two application methods. This is particularly true in the Eastern region, where 31.7 percent of surveyed farmers utilize two methods.

4.3.2 Methods and Timing of Nitrogen Fertilization on Canola

As is the case for wheat, information was requested concerning the methods and timing of N application on stubble canola acreage. Table 4.4 presents the results, by variety of canola. Fall banding is again the most common method of application. However, approximately 50 percent of farmers indicated that they apply N in the spring, through banding (26.2 percent) or broadcasting (24.4 percent). These are slightly higher percentages than for wheat. Differences in practices between early maturing (Polish) and late maturing (Argentine) varieties were negligible.

Table B.10 presents a regional breakdown of N application methods and timing for stubble canola acreage. Regionally, fall banding of N is the prevalent practice for canola in the

Table 4.4

Methods and Timing of Nitrogen Fertilization on Stubble Canola Acreage, by Variety

Method/Timing	Argentine	Polish	Total
	Number of Responses (% of Total)		
Band/Fall	81 (40.7)	10 (45.5)	91 (41.2)
Band/Spring	53 (26.6)	5 (22.7)	58 (26.2)
Broadcast/Spring	49 (24.6)	5 (22.7)	54 (24.4)
Broadcast/Fall	3 (1.5)	--	3 (1.4)
Seed Placed	13 (6.5)	2 (9.1)	15 (6.8)
Total Methods	199 (100.0)	22 (100.0)	221 (100.0)
Total Farmers	166	15	181

Southwest and Central regions. Spring banding on canola acres is slightly more prevalent than fall banding in the Northwest region. Farmers in the Eastern and Interlake regions rely on spring broadcasting to meet N requirements. There were also a significant number of respondents in the Eastern region using seed placing. The use of broadcast methods on canola acres is proportionately different from wheat acres only in the Central region. As was the case with wheat acreage, the most common method of N application on stubble canola acreage is banding (149 of 221 responses). The regional pattern exhibited is also similar to that for wheat. Banding predominates in the Southwest, Northwest and Central regions. In the Interlake region, banding is only slightly more common than other methods. Broadcasting accounted for 50 percent of the responses in the Eastern region, and is the predominant method in that region.

There were some slight differences in the method/timing of N application with respect to soil types, as indicated in Table B.11. Fall banding predominates on clay-loam and clay soils. These two soil types differed with respect to the second most prevalent category, however. Spring banding accounts for 22.9 percent of responses for clay-loam soils, while spring broadcasting is more common on heavier clay soils (22.2 percent). Spring application, both banding and broadcast, is more common than fall applications on sandy-loam soils.

Table B.12 provides information concerning the number of application methods used by respondents on canola acreage. The use of one method only was the dominant response in all regions. There was some variation in the degree of dominance between regions, ranging from 71.9 percent in the Central region to 87.5 percent in the Southwest and Interlake regions.

Whereas the Central region had the highest percentage of respondents using one method for applying N on stubble wheat acreage, respondents in this region showed more variability in N application practices for canola.

4.3.3 Factors Influencing the Method and Timing of Nitrogen Application

One of the major goals of the survey was to evaluate information uses and needs for Manitoba crop producers. Therefore, the final section of the questionnaire dealing with fertilizer decisions asked survey respondents to provide factors, both major and minor, that influence their choice of method and timing of N application. Tables 4.5 and 4.6 provide a summary of responses with respect to major factors for wheat and canola, respectively. More detailed results for major and minor factors are provided in Tables B.13 to B.18.

Costs associated with N fertilization on wheat acres were mentioned as a "major" factor in the choice of method/timing in 20.6 percent of responses (Table 4.5) and in 19.6 percent of responses for canola (Table 4.6). The rankings of other "major" factors were identical for both wheat and canola application decisions. As such, feasibility of methods in terms of equipment and farming system, efficacy in terms of N placement, and convenience are the next most important determinants of fertilization practices for both crops, according to respondents. Tables B.13 and B.15 provide a complete list of responses for the two crops.

Table 4.5

Major Factors Influencing Method/Timing of Nitrogen Fertilization of Stubble Wheat Acreage, Summary

Factor	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Cost comparison of methods/carriers	103	20.6	45.4
Most feasible for my equip./farm system	59	11.8	26.0
Best fertilizer placement method	42	8.4	18.5
Most convenient for my farming system	39	7.8	17.2
Availability of extra time	34	6.8	15.0
Moisture conservation consideration	27	5.4	11.9
Recovery efficiency of method	26	5.2	11.5
Combined fertilizer with tillage operation	21	4.2	9.3
Ease of handling	19	3.8	8.4
Satisfied with yields from current method	18	3.6	7.9
Speed of application	17	3.4	7.5
Fall field conditions	13	2.6	5.7
Availability of fertilizer/fert. type	10	2.0	4.4
All Others[a]	72	14.4	--
Totals	500	100.0	227

[a]None of the individual responses included in this category account for more than 1.8 percent of total responses.

Table 4.6

Major Factors Influencing Method/Timing of Nitrogen Fertilization of Stubble Canola Acreage, Summary

Factor	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Cost comparison of methods/carriers	75	19.6	45.2
Most feasible for my equip./farm system	38	9.9	22.9
Best fertilizer placement method	26	6.8	15.7
Most convenient for my farming system	25	6.5	15.1
Availability of extra time	22	5.8	13.3
Moisture conservation consideration	19	5.0	11.4
Recovery efficiency of method	19	5.0	11.4
Combined fertilizer with tillage operation	18	4.7	10.8
Satisfied with yields from current method	17	4.5	10.2
Ease of handling	16	4.2	9.6
Combined with pesticide application	16	4.2	9.6
Nitrogen carried with P or S fertilizer	15	3.9	9.0
Speed of application	12	3.1	7.2
Fall field conditions	11	2.9	6.6
All Others[a]	53	13.9	--
Totals	382	100.0	166

[a]None of the individual responses included in this category account for more than 1.6 percent of total responses.

Table B.14 provides a regional breakdown of the major factors for wheat. Regionally, the top four "major" factors affecting wheat fertilization decisions do not vary significantly. In the Interlake region, cost comparisons do not seem to be as important, in relative terms, as in other regions. Feasibility and efficacy of N placement seem to be more important in the Interlake region. Respondents in the Northwest and Southwest considered the opportunity to combine tillage and N fertilization to be more important in choosing the method of N application than did respondents in other regions. At the same time, moisture conservation during N fertilization seems to be a relatively more significant factor in the Southwest and Central regions.

Table B.16 presents a similar regional breakdown for canola. Similar to wheat, the top four "major" factors in canola N fertilization vary in ranking but not in importance among the regions. Cost comparisons of methods are an important "major" factor in all regions except for the Interlake. In the Interlake region feasibility, N placement, and moisture conservation considerations were considered to be the most important "major" factors. In addition, tillage/fertilization combinations are more important in the Southwest and Northwest.

Tables B.17 and B.18 present similar results for "minor" factors influencing N application decisions for wheat and canola, respectively. For both crops the most important secondary factors are availability of extra time, convenience, cost considerations, feasibility for the farmer's operation and the ease of handling, in that order. These factors are, in general, not that different from the "major" factors outlined earlier. The exceptions are time availability and ease of handling, which are two factors that do not show up as important "major" factors.

4.3.4 Information Needs Related to Nitrogen Application Decisions

Finally, the farmers were asked to suggest additional information that would be beneficial in making N application decisions. The responses are provided in Tables 4.7 (summary) and B.19 (detailed). The results indicated that additional agronomic data would be useful. Efficiency of methods by soil type, information on overwintering losses, relative efficiency of fall versus spring banding were all common responses. In addition, information on new methods and equipment, cost comparisons, as well as unbiased sources of information were frequently requested.

5. PESTICIDE DECISIONS

Another objective of the 1988-89 farmer survey was to examine pesticide decisions made by Manitoba crop producers. What combinations of application method and timing are utilized, and what factors determine the use of these application practices? Also, what additional information is desired by farmers to aid in the decision-making process? Question 12 on the survey questionnaire (Appendix A) addressed these issues for wheat and canola grown on stubble acreage.

5.1 Methods and Timing of Pesticide Application on Wheat

Survey respondents were first asked for information concerning the methods and timing of pesticide application on stubble wheat acreage. The results, by variety of wheat, are presented in Table 5.1. The methods of pest control carried out on stubble wheat acreage showed little variation for different varieties of wheat. Post-emergent spring applications represented 66.9

Table 4.7

Information Needs for Nitrogen Application Method/Timing
Identified by Survey Respondents, Summary

Information Need	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Information on new methods and equipment	25	13.1	22.1
Efficiencies of methods on different soil types	17	8.9	15.0
Information on NH3 vs. liquid vs. dry fert.	16	8.4	14.2
Accurate data on overwintering losses	12	6.3	10.6
Efficiencies of fall vs. spring banding	11	5.8	9.7
Expected losses of methods under different field conditions	10	5.2	8.8
Information independent of dealers/companies	9	4.7	8.0
Amount of fertilizer that can be applied with seed for different soil types	8	4.2	7.1
Information on optimal placement depth	8	4.2	7.1
Information on airseeders for fertilization	8	4.2	7.1
Comparison of yields vs. placement method	7	3.7	6.2
All Others[a]	60	31.3	--
Totals	191	100.0	113

[a]None of the individual responses included in this category account for more than 3.1 percent of total responses.

Table 5.1

Methods and Timing of Pesticide Application on Stubble Wheat Acreage, by Variety

Method/Timing	Glenlea	HY Varieties	Durum	HRS[a]	Total
	Number of Responses (% of Total)				
Pre-Emergent/Fall	--	3 (6.3)	4 (9.8)	13 (4.3)	20 (5.1)
Pre-Emergent/Spring	--	5 (10.4)	8 (19.5)	51 (16.8)	64 (16.2)
Seed Treatment[b]	--	10 (20.8)	3 (7.3)	21 (6.9)	34 (8.6)
Post-Emergent/Spring	3 (100)	28 (58.3)	25 (61.0)	209 (68.8)	265 (66.9)
Post-Emergent/Fall[c]	--	2 (4.2)	1 (2.4)	7 (2.3)	10 (2.5)
No Pesticides	--	--	--	3 (1.0)	3 (0.8)
Insecticide/Summer	--	--	--	--	--
Foliar Fungicide	--	--	--	--	--
Total Responses	3 (100.0)	48 (100.0)	41 (100.0)	304 (100.0)	396 (100.0)
Total Farmers[d]	3	30	27	216	276

[a]Hard Red Spring
[b]May include fungicide, insecticide and/or herbicide treatments.
[c]All fall post-emergents reported are applications to control weeds in stubble after harvest.
[d]Total farmers exceeds number of farmers surveyed because some farmers grow several varieties of wheat and it also includes farmers who use no pesticides.

percent of all reported practices and were the most frequent types of applications for all varieties. Pre-emergent spring treatments were the second most common treatment method, representing 16.2 percent of practices.

A regional breakdown of these responses is provided in Table B.20, in Appendix B. Post-emergent spring applications dominate in each region, but there are some regional variations, however. Pre-emergent spring applications of pesticide are relatively more common in the Southwest, Northwest and Eastern regions than in the Central and Interlake regions. Seed treatment as a pesticide application practice is slightly more common in the Central and Eastern regions and pre-emergent fall applications are utilized by a significant percentage of respondents in the Southwest region.

Table B.21 provides the number of pesticide application practices used by respondents, on a regional basis. Of 276 total responses, 172 (62.3 percent) indicated the use of one application method/timing combination. In all regions, however, a significant number of respondents utilize more than one combination. Table B.21 shows that the incidence of three and four pesticide practices per farmer on wheat is highest in the Southwest. In contrast, the proportion of farmers using one pesticide practice is highest in the Interlake, Eastern and Central regions.

5.2 Methods and Timing of Pesticide Application on Canola

Table 5.2 presents pesticide application practices utilized by respondents on stubble canola acreage. Unlike wheat, no one method/timing combination was predominant for canola. As is

Table 5.2

Methods and Timing of Pesticide Application on Stubble Canola Acreage, by Variety

Method/Timing	Argentine	Polish	Total
	Number of Responses (% of Total)		
Pre-Emergent/Fall	60 (13.9)	5 (9.3)	65 (13.4)
Pre-Emergent/Spring	73 (16.9)	13 (24.1)	86 (17.7)
Seed Treatment[a]	157 (36.3)	18 (33.3)	175 (36.0)
Post-Emergent/Spring	94 (21.8)	12 (22.2)	106 (21.8)
Post-Emergent/Fall[b]	3 (0.7)	1 (1.9)	4 (0.8)
No Pesticides	2 (0.5)	--	2 (0.4)
Insectcide/Summer	43 (10.5)	5 (9.3)	48 (10.0)
Foliar Fungicides	--	--	--
Total Responses	432 (100.0)	54 (100.0)	486 (100.0)
Total Farmers[c]	167	21	183

[a]May include fungicide, insecticide and/or herbicide treatments.
[b]All fall post-emergents reported are applications to control weeds in stubble after harvest.
[c]Includes those farmers who do not use pesticides.

discussed later, this is evidence of more intensive pesticide application practices for canola (i.e., more application practices per farmer). The most frequently used pest control method for canola is seed treatment, representing 36 percent of all practices reported by respondents. Post-emergent spring treatment is the second most common method of control, followed by pre-emergent spring control. Pre-emergent spring control is more prevalent on Polish varieties than on Argentine varieties.

Table B.22 presents a regional breakdown of the responses. As with wheat, there are some regional differences in pesticide application practices for stubble canola acreage. Seed treatment is the most common practice in all regions, but is relatively more prevalent in the Interlake and Eastern regions. Post-emergent spring applications are also relatively morecommon in these two regions. Pre-emergent pest control measures (spring and fall) are most frequent in the Southwest, Northwest and Central regions. Summer insecticide applications were concentrated in Southwest and Central regions, at least during 1988.

As mentioned earlier, pesticide application practices exhibited by respondents for canola acreage were more intensive than for wheat acreage in that more application practices are used. This is shown, on a regional basis, in Table B.23.

The number of applications of pest control per canola farmer varied from one to four, but the proportion of respondents using less than two practices was extremely small. The most common category was two practices, except in the Southwest region, where three was the most common response. Insecticide treatments contributed to the significant percentage of respondents reporting four practices in the Southwest and Central regions. Differences between pest control for Argentine and Polish varieties were not significant.

5.3 Factors Influencing the Method/Timing of Pesticide Application

Tables 5.3 and 5.4 provide a summary of responses to the question "What major factors determined your choice of pesticide control methods?", for wheat and canola, respectively. All responses are presented in tabular form in Tables B.24 and B.25. "Major" factors which determine the selection of pest control practices in stubble wheat and canola acreage are similar. As indicated in Tables 5.3 and 5.4, effectiveness of control is the most prominent major factor for both wheat and canola pest control decisions, followed by field conditions. Pest control in canola seems to be more heavily influenced by crop/variety considerations than is the case for wheat. This is probably related to seedbed preparation. More emphasis is placed on efficiency considerations (e.g., combining of operations, tank mixing and residue carryover in pest control) in choosing methods/timing on wheat acres.

Tables B.26 and B.27 present similar results with respect to "minor" factors influencing pesticide application decisions. As with the "major" factors, there are similarities between responses for wheat and canola acreage. Effectiveness of control, availability of extra time, choosing a method according to the choice of crop/variety, and least cost considerations are important "minor" factors influencing pesticide decisions for wheat and canola acreage, according to respondents. Waiting to see if control is required is relatively more important for wheat acreage. This is probably a reflection on the predominant application practice (i.e., post-emergent spring application). Residue carryover is relatively more important for canola acreage, reflecting the intensive nature of pesticide application for this crop.

Table 5.3

Major Factors Influencing Pesticide Application Practices by Survey Respondents On Stubble Wheat Acreage, Summary

Factor	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Effectiveness of control observed	125	25.5	55.1
Selected method for field conditions	73	14.9	32.2
Most effective chemical for weed problem	54	11.0	23.8
Method for crop/variety choice	38	7.7	16.7
Wanted to see if control was required	31	6.3	13.7
Most convenient for farming system	23	4.7	10.1
Moisture conservation consideration	22	4.5	9.7
Soil erosion consideration	19	3.9	8.4
Most feasible for equipment/farming system	18	3.7	7.9
Chose lowest cost alternative	17	3.5	7.5
Availability of extra time	12	2.4	5.3
Weather/moisture conditions	10	2.0	4.4
All Others[a]	49	10.0	--
Total	491	100.0	227

[a]None of the individual categories aggregated into "All Others" accounts for more than 1.8 percent of total responses.

Table 5.4

Major Factors Influencing Pesticide Application Practices by Survey Respondents On Stubble Canola Acreage, Summary

Factor	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Effectiveness of control observed	98	24.8	58.7
Selected method for field conditions	64	16.2	38.3
Method for crop/variety choice	49	12.4	29.3
Most effective chemical for weed problem	46	11.6	27.5
Chose lowest cost alternative	20	5.1	12.0
Moisture conservation consideration	17	4.3	10.2
Most convenient for farming system	13	3.3	7.8
Strategy/benefit re: residue carryover	13	3.3	7.8
Availability of extra time	12	3.0	7.2
Most feasible for equipment/farming system	11	2.8	6.6
Soil erosion consideration	8	2.0	4.8
Weather/moisture conditions	8	2.0	4.8
All Others[a]	36	9.1	--
Totals	395	100.0	167

[a]None of the individual categories aggregated into "All Others" accounts for more than 1.8 percent of all responses.

5.4 Information Needs Related to Pesticide Application Decisions

Additional information needs identified by respondents are presented in Tables 5.5 (summary) and B.28 (detailed). Information needs identified by farmers to select pest control methods for wheat and canola crops focused on data gaps related to the effectiveness of control under variable soil/climate/moisture conditions (i.e., three of the first four most frequent responses, representing 38.1 percent of responses). Information on insect control was requested in one form or another in a significant number of responses. A need for more information on new/better technology and methods was also reflected in the responses.

A regional breakdown of these responses is presented in Table B.29. Regional differences in information needs relating to the method/timing of pesticide control were subtle. As might be expected, the need for information on effectiveness of control under different climate scenarios was emphasized in all regions. Improved insect control information was requested more frequently in the Eastern region than elsewhere, even though insect control through the use of insecticide was more common among respondents in the Southwest and Central regions (from Table B.22).

6. SELECTION OF WHEAT AND CANOLA VARIETIES

Question 6 and 7 of the survey questionnaire (Appendix A) dealt with issues related to the selection of wheat and canola varieties. What changes, if any, were made in wheat and/or canola varieties grown in 1988? What factors influence the choice of variety and what information sources are used in making this decision?

Table 5.5

Information for Pesticide Application Decisions Requested by Survey Respondents, Summary

Information	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Effectiveness under different weather scenarios	34	15.4	28.3
Information on insect control	32	14.5	26.7
Relate efficacies of methods to moisture conditions	26	11.8	21.7
Prob. of control under different weather conditions	24	10.9	20.0
Information on diamond back moth control	20	9.0	16.7
Any new information	13	5.9	10.8
All Others[a]	72	32.6	--
Totals	221	100.0	120

[a]None of the individual categories aggregated into "All Others" accounts for more than 4.1 percent of total responses.

6.1 Changes in Wheat and Canola Varieties

As indicated in Table 6.1, 25 of 234 respondents (10.7 percent) indicated that they changed wheat varieties in 1988. Another 21 respondents (9.0 percent) indicated that a new variety of wheat was added to the crop mix. The same table presents the results with respect to canola, with 63 respondents (27.0 percent) indicating a change in variety, and 20 (8.5 percent) respondents indicating that a new variety was added.

The actual changes in wheat varieties made by respondents are reported in Tables B.30 (by variety) and B.31 (by variety type). The wheat varietal changes indicated shifts from recommended hard red spring (HRS) varieties to other HRS varieties, most of which (but not all) were recommended. A significant proportion of net varietal additions were recommended HRS wheats. HY wheat varieties comprised 21.7 percent of the varieties that respondents were changing from and 15.2 percent of the varieties that respondents were changing to in 1988. Overall, respondents tried more grades and varieties of wheat in 1988, compared to 1987 (from four types, eight varieties to six types, seventeen varieties, respectively).

As indicated in Table 6.1, additions or changes in canola varieties in 1988 were more common among respondents, relative to the situation for wheat. Table B.32 reports, by variety, the changes made by respondents. Table B.33 reports the changes, by distinguishing agronomic characteristic. Varietal changes in canola, for those individuals who switched or added varieties, were more dramatic than for wheat. A significant switch from Argentine Westar to Polish and triazine resistant varieties was indicated by the results presented in the two tables. Farmers also dropped Westar in favour of other late maturing varieties, some of which were not recommended for Manitoba in 1988. Overall, the changes involved trying more types of canola, as farmers

Table 6.1

Frequency of Changes in Wheat and/or Canola Varieties by Survey Respondents

	Wheat		Canola	
	Number of Responses	Percent of Total	Number of Responses	Percent of Total
Did not change varieties in 1988	180	76.9	138	59.2
Did change varieties in 1988	25	10.7	63	27.0
Added a variety in 1988	21	9.0	20	8.6
Did not seed the crop	8	3.4	12	5.2
Totals	234	100.0	234	100.0

switched from two varieties in 1987 to nine varieties of rapeseed/canola in 1988. Nevertheless, the vast majority of total canola acres seeded in 1988 by those farmers who did not switch or add varieties were devoted to Argentine varieties.

6.2 Factors Influencing the Choice of Wheat and Canola Varieties

As well as knowing what varietal changes are made, it is useful to understand the factors that affect the selection of wheat and canola varieties by Manitoba farmers. Tables 6.2 and 6.3 outline the factors given by respondents for changing varieties of wheat and canola, respectively, in 1988.

Factors causing farmers to change wheat varieties varied, according to the results in Table 6.2. Of the farmers who changed or added wheat varieties, 17.3 percent grew varieties for seed sales and wanted to try new varieties for that reason. Of the 46 respondents who switched or added wheat varieties, 6 (13 percent) indicated a desire like to experiment with new varieties on their farms. Factors relating to agronomic advantages such as higher yield potential, drought tolerance, etc. were mentioned in 46 percent of responses, 6 percent of which indicated a switch to a variety with better historical yield experience (e.g., Selkirk). Market/price prospects related to grade were provided as factors in varietal choice in 20 percent of the responses.

Changes and additions to canola varieties grown in 1988 were affected by three main factors. First, shifts to triazine resistant varieties occurred in response to weed conditions for 34.4 percent of respondents who indicated that varietal changes were made. Secondly, potential reseeding due to poor seedling emergence, drought and frost damage played a role in the selection of earlier varieties for 21.9 percent of respondents. Finally, higher yield potential was

Table 6.2

Reasons Given by Survey Respondents for Changes in Wheat Varieties

Reason	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Seed grower - testing new variety	8	16.0	17.3
Higher yield potential	7	14.0	15.2
Better market/price prospect	7	14.0	15.2
Experimental/desire to try new variety	6	12.0	13.0
Agronomic advantages other than yield	6	12.0	13.0
Disease conditions	4	8.0	8.7
Better historical experience	3	6.0	6.5
Potential for higher grade	3	6.0	6.5
More drought tolerant variety	3	6.0	6.5
Availability of seed	3	6.0	6.5
Totals	50	100.0	46

Table 6.3

Reasons Given by Survey Respondents for Changes in Canola Varieties

Reason	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Weed conditions	11	28.2	34.4
Reseeded/length of growing season	7	17.9	21.9
Higher yield potential	6	15.4	18.8
Agronomic advantages other than yield	4	10.3	12.5
Better historical experience	3	7.7	9.4
Disease conditions	2	5.1	6.3
Better market/price prospect	2	5.1	6.3
Experimental/desire to try new variety	2	5.1	6.3
Early spring seeding date	1	2.6	3.1
Potential for better grade	1	2.6	3.1
Totals	39	100.0	32

an important factor influencing the change to late maturing varieties other than Westar and Regent for 18.8 percent of respondents.

Table 6.4 provides a summary of information sources utilized by survey respondents in making varietal decisions. This included responses from all farmers surveyed, regardless of whether or not varietal changes were made in 1988.

Responses to this question clearly indicate that varietal decisions are not made on the basis of evaluating one factor. On average, 2.7 factors are taken into consideration by each respondent (i.e., 630 responses by 234 farmers). Manitoba Department of Agriculture variety recommendations were mentioned as one specific source of information used to choose varieties by 68.8 percent of respondents (25.6 percent of total responses).

Use of local performance information (i.e., neighbours' and personal experience) was indicated in 20 percent of responses representing 53.8 percent of respondents. Information from seed growers was a factor in selecting varieties for 38 percent of farmers (14.1 percent of responses). In general, regional and local field performance is probably the type of information relied upon the most for choosing varieties for production. This information may come from a combination of plot trial results, seed growers, neighbours and personal experience.

The use of various information sources by respondents is broken down on a regional basis in Table B.34. The table shows that respondents in the Central region tend to rely on more sources of crop/variety information than farmers in other areas, as indicated by the fact that a significant percentage of responses fall into the "All Others" category. This is undoubtedly attributable, in some degree, to the greater diversity of cropping options related to the longer growing season in the region. Other than that, there are no prominent regional differences,

Table 6.4

Information Sources Used by Survey Respondents in Selecting Wheat and/or Canola Varieties

Information Source	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
MDA Field Crop Variety Recomm.	161	25.6	68.8
Local farmers' advice/experience	126	20.0	53.8
Seed grower/sellers' recommdations	89	14.1	38.0
Personal experience/experimentation	88	14.0	37.6
Industry publications/articles	60	9.5	25.6
Secan information	28	4.4	12.0
Local variety trials/test plots	18	2.9	7.7
Local meetings	13	2.1	5.6
Data from plant breeders/researchers	11	1.7	4.7
Zonation trial reports	10	1.6	4.3
Seed avail. in proximity to farm	9	1.4	3.8
Potential for seed sales	8	1.3	3.4
Recomm. from adjacent province/state	5	0.8	2.1
Advice of elevator agent	4	0.6	1.7
Totals	630	100.0	234

in terms of the importance of specific information sources used to choose crops and varieties for production.

7. CANOLA ACREAGE DECISIONS

Information concerning canola acreage decisions was requested from survey respondents in Question 10 of the survey questionnaire (Appendix A). Particular attention was paid to factors that influence farmers' decisions to alter canola acreage.

Canola acreage reported by survey participants was 29,591 acres in 1987 and 44,806 acres in 1988, an increase of 51.4 percent. Table 7.1 reports the frequency with which changes in canola acreage were made. A total of 94 respondents (40.2 percent of the total) reported an increase in canola acreage, including 40 producers who did not grow any canola in 1987. For those producers who reported canola acreage for both years and increased acreage from 1987 to 1988, the average increase was 125.2 percent, representing more than doubling of the 1987 acreage.

Conversely, 16 respondents (6.8 percent) reported decreased canola acreage in 1988, with the average percentage decrease being 57.1 percent. This included four producers who decreased their canola acreage in 1988 by 100 percent (i.e., did not grow any canola in 1988).For the purposes of generating more and better information for farmers, the factors influencing decisions to change canola acreage are as important as the decisions themselves. Tables 7.2 and 7.3, as well as Tables B.35 to B.38 in Appendix B, report farmers' responses with respect to "major" and "minor" factors influencing 1988 canola acreage decisions.

Table 7.1

Frequency of Changes in Canola Acreage Made by Survey Respondents

Nature of Change	Number of Responses	Percent of Total Responses	Average Percent of Change
Increased acreage in 1988, grew canola in 1987	54	23.1	125.2
Increased acreage in 1988, did not grow canola in 1987	40	17.1	--
No change in acreage	65	27.8	--
Decreased acreage in 1988[a]	16	6.8	-57.1
Do not grow canola	59	25.2	--
Totals	234	100.0	

[a]This category includes four respondents who decreased canola acreage from 1987 to 1988 by 100 percent (i.e., grew no canola in 1988).

Table 7.2

Major Factors Influencing Decisions by Survey Respondents to Increase or Maintain Canola Acreage

Factor	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Crop rotation consideration	82	31.8	51.3
Profit potential	71	27.5	44.4
Change in relative prices of crops	40	12.9	25.0
Weed conditions	20	7.8	12.5
Don't change proportion of canola seeded	18	7.0	11.3
Additional suitable land available (summerfallow, rented, purchased)	10	3.9	6.3
Historical yield experience	7	2.7	4.4
Disease conditions	4	1.6	2.5
Crop plans eliminated other oilseed/ specialty crops	3	1.2	1.9
Reseeded/length of growing period	2	0.8	1.3
Current on-farm grain inventory	1	0.4	0.6
Totals	258	100.0	160

Table 7.3

Major Factors Influencing Decisions Leading to Reduced or Constrained Canola Acreage

Factor	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Crop rotation consideration	115	40.1	67.6
Weed conditions	49	17.1	28.8
Profit potential	38	13.2	22.4
Disease conditions	25	8.7	14.7
Change in prices of alternate crops	14	4.9	8.2
Moisture of seedbed	8	2.8	4.7
Prefer growing other oilseed/special crops	6	2.1	3.5
Yield risk	5	1.7	2.9
Extra management required for canola	5	1.7	2.9
Historical yield experience	5	1.7	2.9
Increased production costs	4	1.4	2.4
Do not change proport. seeded to canola	4	1.4	2.4
Soil erosion considerations	3	1.0	1.8
Potential insect problems	2	0.7	1.2
Quality of seedbed	1	0.3	0.6
Production forecasts for canola/oilseeds	1	0.3	0.6
Current on-farm grain inventory	1	0.3	0.6
Market forecast analysis	1	0.3	0.6
Totals	287	100.0	170

The "major" factors influencing respondents to increase or maintain canola acreage are presented in Table 7.2. A "major" factor leading to increased or maintained canola acres was the consideration of crop rotation. Decision factors related to economic returns, such as profit potential and relative prices of crops were also important. Weed conditions influenced canola seeding decisions (i.e., increased acreage) for a significant number of respondents, reflecting the use of canola in crop rotations to eliminate problem weeds.

A regional breakdown of these responses is presented in Table B.35. In most cases, regional differences were not significant. Crop rotation considerations in the decision to maintain or increase canola acres were slightly more important, in relative terms, for farmers in the Southwest and Northwest. Central and Interlake region farmers indicated profit potential to be the most frequent consideration in their choices to expand or maintain canola acres. Weed conditions supported canola seeding decisions in all regions except the Eastern region, in part reflected by the absence of triazine-tolerant canola grown there in 1988.

Respondents were also asked to provide "minor" factors that influenced decisions to increase or maintain canola acreage. These are reported in Table B.36. The responses indicated that, in cases where they are not major factors, profit potential and crop rotation considerations were likely to be at least minor factors considered in the decision-making process. Table 7.3 reports factors provided by respondents that either constrained the amount of land devoted to canola, or resulted in reduced canola acreage. Over 67 percent of farmers responding to this question indicated that consideration of the crop rotation was a "major" factor leading to reduced or constrained canola acreage. Weed conditions, disease conditions and profit potential were other "major" factors constraining the decision to seed canola. It is noteworthy that potential

economic return was a rationale for both increased/maintained and reduced/constrained canola acreage decisions. Clearly, different farmers evaluating the profit potential of growing canola arrived at different production decisions based upon their assessments of varietal yield expectations and production risk.

Consideration of the existing crop rotation was the most prevalent "major" factor constraining canola acreage in all regions, as shown in Table B.37. The regional breakdown

Table 7.3 reports factors provided by respondents that either constrained the amount of land devoted to canola, or resulted in reduced canola acreage. Over 67 percent of farmers responding to this question indicated that consideration of the crop rotation was a "major" factor leading to reduced or constrained canola acreage. Weed conditions, disease conditions and profit potential were other "major" factors constraining the decision to seed canola. It is noteworthy that potential economic return was a rationale for both increased/maintained and reduced/constrained canola acreage decisions. Clearly, different farmers evaluating the profit potential of growing canola arrived at different production decisions based upon their assessments of varietal yeild expectations and production risk.

Consideration of the existing crop rotation was the most prevalent "major" factor constraining canola acreage in all regions, as shown in Table B.37. The regional breakdown also indicated that there were a greater diversity of factors influencing decisions in the Central and Northwest regions than elsewhere (i.e., significant percentage of responses in the "All Others" category in Table B.37). Profit potential appeared to be a more significant factor in reduced or constrained canola acreage in the Eastern region.

The common "minor" factors influencing decisions to reduce canola acreage were similar to the most prevalent "major" factors. Crop rotation considerations, weed conditions and profit potential were the most common responses. Again, this is probably an indication that most farmers take these factors into account, whether as major or minor considerations, in their decision-making process.

8. EVALUATION OF MANITOBA DEPARTMENT OF AGRICULTURE GUIDES

Survey respondents were asked to evaluate the usefulness of three Manitoba Department of Agriculture publications; the *Field Crop Variety Recommendations*, the *Field CropProduction Guide*, and the *Guide to Chemical Weed Control.* For each of these guides, farmers were asked to indicate the degree to which the publication is used, the time of year when required, and the degree of usefulness for specific aspects of the publication. These inquiries were contained in Questions 7, 8 and 9 on the survey questionnaire (Appendix A).

8.1 Degree of Use and Need by Manitoba Producers

The frequency with which survey respondents use Manitoba Department of Agriculture guides is reported in Table 8.1. Those producers who indicated that they use the guides only occasionally or never were also asked to provide reasons why. These responses are presented in Tables B.39 to B.41.

As indicated in Table 8.1, the *Field Crop Variety Recommendations* is always or frequently used by 150 respondents (64.1 percent of the total). A further 75 producers (32.1 percent) occasionally use the guide.

Table 8.1

Frequency of Use for Manitoba Department of Agriculture Guides by Survey Respondents

Response	Field Crop Variety Recommendations	Field Crop Production Guide	Chemical Weed Control Guide
	Number of Responses (% of Total)		
Always use	50 (21.4)	21 (9.0)	125 (53.4)
Frequently use	100 (42.7)	60 (25.6)	90 (38.5)
Only occasionally use	75 (32.1)	93 (39.7)	13 (5.6)
Never use	3 (1.3)	5 (2.1)	1 (0.4)
Not familiar with publication, but have seen it	1 (0.4)	15 (6.4)	2 (0.9)
Not familiar with publicaton, have never seen it	5 (2.1)	40 (17.1)	3 (1.3)
Totals	234 (100.00)	234 (100.0)	234 (100.0)

For the 78 respondents who use the *Field Crop Variety Recommendations* only occasionally or never, the most common reason given (33 responses, representing 42.3 percent of responding farmers) is that they do not change varieties very often (Table B.39). Other reasons commonly provided involved reliance on other sources of information, including those sources that provide local performance information.

The *Field Crop Production Guide* is frequently or always used by only 81 respondents (34.6 percent), as shown in Table 8.1. Of the remaining respondents, 93 (39.7 percent of total respondents) use the guide occasionally, while 5 producers indicate that they never use it. A significant proportion of respondents (23.5 percent) was not familiar with the publication, including 40 producers who had never seen it.

Table B.40 reports the respondents' reasons for not (or only occasionally) using the *Field Crop Production Guide*. The predominant reason given was that the information provided by the guide is common knowledge. Other common reasons given were that the guide is only used if a new crop is to be grown and that the guide is used as a reference only.

The most frequently used Manitoba Department of Agriculture crop guide is the *Guide to Chemical Weed Control*. This publication is frequently or always used by 215 of 234 respondents (91.9 percent). Another 13 producers (5.6 percent) use the guide occasionally. Only 5 respondents indicated that they are not familiar with the guide. For those 14 producers who seldom or never use the *Guide to Chemical Weed Control*, the most common reason given was that they obtain information concerning pesticides from their chemical dealer (Table B.41).

Respondents were asked to indicate the time of year at which the three guides would be first required. The responses are reported in Table 8.2. The distributions for the responses

Table 8.2

Time of Year When Manitoba Department of Agriculture Guides are First Required, as Reported by Survey Respondents

Month	Field Crop Variety Recommendations	Field Crop Production Guide	Chemical Weed Control Guide
	Number of Responses (% of Total)		
September/October	8 (3.4)	3 (1.3)	1 (0.4)
November	16 (6.8)	6 (2.6)	3 (1.3)
December	27 (11.5)	9 (3.8)	3 (1.3)
January	90 (38.5)	57 (24.4)	37 (15.8)
February	63 (26.9)	39 (16.7)	48 (20.5)
March	11 (4.7)	13 (5.6)	62 (26.5)
April	1 (0.4)	1 (0.4)	58 (24.5)
May	--	--	10 (4.3)
Not required	18 (7.7)	106 (45.3)	12 (5.1)
Totals	234 (100.0)	234 (100.0)	234 (100.0)

indicated that the *Field Crop Variety Recommendations* should be available in January/February. The *Field Crop Production Guide* should also be available in January/February, although a significant number of respondents (45.3 percent) indicated that the guide is not needed at all. The majority of respondents indicated that the *Guide to Chemical Weed Control* should be available in March/April, although there seems to be a significant demand for this publication in January/February as well.

8.2 Evaluation of the *Field Crop Variety Recommendations*

The information in the *Field Crop Variety Recommendations* was divided into three sections for the purposes of the survey; yield/quality characteristics, agronomic characteristics and disease resistance. Respondents' ratings of specific aspects of this guide are reported in Table B.42. For each category of information, the top two ratings, in terms of frequency of response, are highlighted.

In terms of yield/quality characteristics, yield estimates and relative yield comparisons among varieties received good ratings from respondents. The ratings with the greatest frequency for these two categories were "useful" and "very useful". Most other information relating to yield/quality characteristics received mixed reviews. With the exceptions of seed weight/bulk density and seed size, the ratings with the greatest numbers of responses for the other characteristics were "useful" and "not useful". This may reflect a need to reconsider the quality of information in terms of usefulness for farmer decision-making. Among agronomic characteristics, several categories received good ratings, including days to maturity,resistance to lodging and resistance to shattering. For each of these three categories, the most popular ratings

lodging and resistance to shattering. For each of these three categories, the most popular ratings among respondents were "useful" and "very useful". Days to bloom/silk and plant height were also indicated to be "useful" or "useful infrequently" for a large number of respondents. Winter survival, heat unit ratings, and hybrid type were "not relevant" for a majority of respondents. Where relevant, however, these categories also received good ratings.

The disease resistance characteristics in the *Field Crop Variety Recommendations* consistently received good ratings from respondents. The most common responses for all categories were "useful" and "very useful".

Despite the good ratings received for much of the information in the *Field Crop Variety Recommendations*, survey respondents had several suggestions for improvements to the guide. These are tabulated in Table 8.3. The suggestions dealt primarily with more specific information. The most prevalent responses suggest that the guide could be improved by including specific recommendations for specific regions of the province, regional yield information, and relating recommendations to soil type and/or moisture availability. Analysis of respondents' suggestions indicated that there are no significant regional differences.

8.3 Evaluation of the *Field Crop Production Guide*

The information provided by the *Field Crop Production Guide* was also divided into several categories, for the purposes of constructing the survey questionnaire. These categories related to general guidelines, fertilizer use, species/crop recommendations, and forage crops. Farmers' ratings for this guide are reported in Table B.43.

Table 8.3

Improvements for the *Field Crop Variety Recommendations*
Suggested by Survey Respondents

Suggested Improvement	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Specific recommendations for specific regions	43	24.6	50.0
Regional yield information	25	14.3	29.1
Relate recommendations to soil type	9	5.1	10.5
Relate recommendations to moisture availability	8	4.6	9.3
Retain/include Imperial measures for all data	8	4.6	9.3
Include information on varieties in Alta, Sask, U.S.	8	4.6	9.3
More quality comparisons/descriptions	7	4.0	8.1
Do and report on "field testing" of varieties	7	4.0	8.1
Do more testing at more sites	7	4.0	8.1
Include details of varietal tests/results	7	4.0	8.1
Combine MDA farm guides into one publication	7	4.0	8.1
Test new varieties for longer periods	6	3.4	7.0
Information on unregistered/unlicensed varieties	6	3.4	7.0
Provide data on yield ranges/probabilities	5	2.9	5.8
Better recommendation for SW Manitoba	5	2.9	5.8
More accurate disease ratings	4	2.3	4.7
Include information on resistance to drought stress	4	2.3	4.7
More information on forages	4	2.3	4.7
More information on seed size, weight, vigor vs yield	3	1.7	3.5
More information on winter survival	2	1.1	2.3
Totals	175	100.0	86

The *Field Crop Production Guide* is limited in its exposure among respondents. The information contained in the guide was generally considered to be "useful" by a majority of respondents that actually use the publication, however. Within the general guidelines section, disease/insect control information was rated as "useful" or "very useful" by 89 of 97 respondents. Other general guidelines were considered to be "useful" or "useful infrequently" by a majority of respondents.

In the section dealing with fertilizer use, placement efficiency received the highest ratings. The other two categories also scored well, with a majority of producers indicating that the information is "useful" or "useful infrequently".

All but one of the species/crop recommendation categories were rated as "useful" or "very useful" by most respondents. The only exception was the section containing the riskmaps for corn. The majority of respondents indicated that they do not use this information (i.e., "not relevant"), reflecting cropping practices in the province.

A similar situation existed for information on forage crops. For each category in this section, the ratings with the greatest frequency of response were "useful" and "not relevant". This is likely an indication that respondents who require information concerning forage crops feel that this information is useful.

Due to the limited use of the *Field Crop Production Guide* by respondents, there were relatively few suggestions for improvements. The responses received were tabulated and reported in Table 8.4. The most common suggestion for improvement was that more information on forage crop production should be provided. This may suggest that, although the percentage of farmers incorporating forage production in their operations is low, the need for more information

Table 8.4

Improvements for the *Field Crop Production Guide*
Suggested by Survey Respondents

Suggested Improvement	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
More information on forage crop production (seed, feed & pastures)	11	20.8	28.2
Higher level of detail in guidelines	7	13.2	17.9
Combine with Field Crop Variety Recommendations	7	13.2	17.9
More specific regional data	6	11.3	15.4
Relate recommendations to soil type	5	9.4	12.8
Relate seeding/fertilizer information to equipment type	5	9.4	12.8
More specific recommendations for disease/insectcontrol	5	9.4	12.8
Retain Imperial measures	4	7.5	10.3
Provide information for advanced farmers about latest technology/management	3	5.7	7.7
Totals	53	100.0	39

by forage producers is high. More detailed information and more region-specific information were also indicated as possible improvements. Regional analysis of suggested improvements was not practical because of the low level of response for this question.

8.4 Evaluation of the *Guide to Chemical Weed Control*

The ratings of information categories for the *Guide to Chemical Weed Control* are tabulated and presented in Table B.44. In most instances, the information in this guide received very good ratings (i.e., "useful or "very useful") from a majority of respondents. Most exceptions to this were categories of information that are not relevant for respondents. These categories included recommendations for forage and horticultural crops, aerial applications and chemical fallow recommendations. The other notable exception to the general trend was the section concerning metric conversion factors. The most common rating among respondents for this category was "useful". The second most common rating, however, was "not useful". This is likely an indication of the general attitude of producers towards the metric system.

Despite the high ratings received for the information in the *Guide to Chemical Weed Control*, respondents had several suggestions for improvements. These are reported in Table 8.5. The most common suggestion (32.7 percent of farmers responding) was to eliminate the use of the metric system, or barring that, to retain the use of metric per acre measures. Other suggestions were very similar to suggestions for the other two guides; that is, to include more specific information. In the case of weed control it was suggested that the effectiveness of chemicals should be related to temperature and moisture conditions, particularly in conditions of stress. Some respondents indicated that the overall package of crop production information

Table 8.5

Improvements for the *Guide to Chemical Weed Control*
Suggested by Survey Respondents

Suggested Improvement	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Eliminate metric or at least retain metric/acre	48	16.8	32.7
Relate effectiveness to temperature conditions	30	10.5	20.4
Relate effectiveness to weather stress	23	8.1	15.6
Relate effectiveness to moisture availability	22	7.7	15.0
Combine weed seedling ID, mature plant ID and Weed Control Guide into one book	19	6.7	12.9
Improve format (see Sask. & Alta. guides)	19	6.7	12.9
Provide measures in both Imperial and metric with clearer conversions	18	6.3	12.2
More accurate crop tolerance information	12	4.2	8.2
Much more information on weed control in forages	11	3.9	7.5
Expand specialized sections on dessication, aerial application and special weeds	11	3.9	7.5
Cost of application comparisons	9	3.2	6.1
More information on soil residue carryover	9	3.2	6.1
Effectiveness calibration (e.g. 1-10 scale)	8	2.8	5.4
Information on newest chemicals/newest uses	7	2.5	4.8
Provide rates in acres per container	6	2.1	4.1
Improve charts for easier reading	5	1.8	3.4
Information on chemical safety/health/environ. effects	5	1.8	3.4
Improve "effect of rainfall on efficacy" section	5	1.8	3.4
Attach charts to booklet so they do not get lost	5	1.8	3.4
More information on herbicide incorporation	4	1.4	2.7
More information on perennial weed control	4	1.4	2.7
Better tank mix information	3	1.1	2.0
Specific recommendations for specific regions	2	0.7	1.4
Totals	285	100.0	147

could be improved by combining the three guides into a single booklet with an improved format. As with the other guides, there was little regional variation among suggestions for improvement.

9. INFORMATION NEEDS ARISING FROM 1988 CLIMATIC CONDITIONS

The final two sections of the survey questionnaire addressed issues of current interest to the agricultural community. Of particular concern to Manitoba farmers are the effects of 1988 climatic conditions, and the information needs resulting from these conditions. As a result, survey respondents were asked, in Question 2 of the survey (Appendix A), to indicate information needs in two areas. First, what information would have helped them to more adequately cope with the 1988 climatic conditions (i.e., related to 1988 crop decisions). Secondly, what additional information would have aided them in making 1989 crop decisions, given the conditions that existed in 1988?

Table 9.1 presents the responses relating to information needs for 1988 crop decisions. As indicated in the Table, performance of pesticides under abnormal climate conditions was identified as the most significant information need, as the two most common requests were for information related to pesticides. Not surprisingly, farmers also indicated that information relating to the probability of rainfall (i.e., better climate information) would have been helpful. Survey results also indicated that 33 respondents (14.1 percent of total respondents) escaped the drought conditions.

Table B.45 provides a regional breakdown for the responses in Table 9.1. There were a few significant regional differences worth noting. Respondents in the Interlake and Eastern regions requested better information concerning pesticides in greater relative numbers (i.e., in

Table 9.1

Information Needs Related to 1988 Weather Conditions for 1988 Crop Decisions

Information Need	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Herbicide recommendations for dry conditions	68	19.2	29.1
Probability of success or failure of spraying under stress conditions	66	18.6	28.2
Probability of rainfall information	66	18.6	28.2
Escaped the drought	33	9.3	14.1
Impact of spraying under stress conditions	32	9.0	13.7
Knowledge in spring that drought was coming	16	4.5	6.8
Assessment of crop potential early in year	9	2.5	3.8
Crop choice for drought conditions	8	2.3	3.4
More accurate weather forecasting	7	2.0	3.0
Better long-range forecasting	7	2.0	3.0
Global carryover/product./status reports	6	1.7	2.6
Tillage practices to conserve moisture	5	1.4	2.1
Earlier indication of government programs	5	1.4	2.1
Short/long term outlook reports	5	1.4	2.1
Earlier/more accurate price forecasts	4	1.1	1.7
Insect control information	4	1.1	1.7
Grain inventory reports	4	1.1	1.7
Field management to counter drought	3	0.8	1.3
Variety choice for droughty conditions	3	0.8	1.3
When to sell stored commodity	3	0.8	1.3
Totals	354	100.0	234

percentage terms) than respondents in other regions. Respondents in the Southwest and Central regions requested climate information in greater relative numbers than respondents in other regions. Finally, the majority of farmers indicating that they escaped the drought were located in the Northwest. That response accounted for over 50 percent of total responses from farmers in that region. In all other regions, it accounted for less than 5 percent of total responses.

As indicated above, respondents were also asked to suggest additional information that would have helped them in making 1989 crop decisions, given the conditions in 1988. The responses to this question, reported in Table 9.2, were more varied than those for the previous question. Pesticide performance and climate information were once again the most common responses for farmers who did not escape the dry conditions. Information needs related to all aspects of crop decisions were provided by respondents (i.e., price forecasts for marketing, crop choices for dry conditions, tillage and seeding practices, etc.).

Table B.46 presents the a summary of these responses on a regional basis. The regional differences for this question did not differ greatly from those reported for the previous question. As might be expected, respondents who identified more information needs across a broader spectrum of management issues were located in those regions most affected by the drought conditions.

10. SOIL CONSERVATION DECISIONS

Another issue of major importance to Manitoba farmers in the late 1980's is soil conservation. How prevalent are soil erosion problems? What conservation practices are being used to combat soil erosion, and what types of information are used and needed in making soil conservation decisions? These are all important questions that this survey attempts to address.

Table 9.2

Information Needs Related to 1988 Weather Conditions, for 1989 Crop Decisions

Information Need	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Escaped the drought	30	9.1	12.8
Herbicide recommendations for dry conditions	29	8.8	12.4
Probability of rainfall information	27	8.2	11.5
Probability of success or failure of spraying under stress conditions	22	6.7	9.4
Earlier/more accurate price forecasts	18	5.5	7.7
Impact of spraying under stress conditions	15	4.6	6.4
Crop choice for drought conditions	15	4.6	6.4
Moisture deficits in fall and spring	14	4.3	6.0
Tillage practices to conserve moisture	13	4.0	5.6
Seeding date/depth/fert. for dry conditions	13	4.0	5.6
Short/long term outlook reports	13	4.0	5.6
Variety choice for droughty conditions	12	3.7	5.1
Better long-range weather forecasting	12	3.7	5.1
Nutrient carryover for soil type/field conditions	11	3.4	4.7
Earlier indication of government programs	11	3.4	4.7
Moisture requirements of crops for normal yields	9	2.7	3.8
Fert. adjustments for moisture/field conditions	8	2.4	3.4
More accurate weather forecasts	8	2.4	3.4
Field management to counter drought effects	6	1.8	2.6
Pesticide reisdue carryover	6	1.8	2.6
Global carryover/product./status reports	5	1.5	2.1
Grain inventory reports	5	1.5	2.1
When to sell stored commodity	5	1.5	2.1
Accuracy of fall '88 soil tests	4	1.2	1.7
Variety recommendations for region/area	4	1.2	1.7
Information on crop insurance re: late seeding, etc.	4	1.2	1.7
More up-to-date soil test recommendations	3	0.9	1.3
Marketing options	3	0.9	1.3
Assessessment of crop potential early in year	3	0.9	1.3
Totals	328	100.0	234

In particular, Question 13 of the survey (Appendix A) requested information concerning soil conservation decisions made by respondents.

10.1 Soil Conservation Practices

Farmers were first asked whether or not a soil erosion problem exists on their farm, and whether or not soil conservation is practised. Their responses are reported in Table 10.1. Of the 234 farmers surveyed, 110 (47.0 percent) indicated that they do not have a soil erosion problem. The remaining 124 responded that they do have problems, of which 26 indicated that the problem first appeared in 1988.

The number of respondents indicating that they do have a soil erosion problem was relatively equal to the number indicating that no soil erosion problems exist. This was not the case for the use of soil conservation practices, however. As indicated in Table 10.2, the vast majority of respondents (197 or 84.2 percent) indicated that they always or frequently use soil conservation practices. Only 5 respondents indicated that they have never used soil conservation practices. The reason given by all 5 of these farmers was that soil conservation practices are not needed.

Table B.47 presents the results of Tables 10.1 and 10.2, broken down by major soil types reported by respondents (i.e., clay, clay-loam and sandy-loam). As might be expected, a larger percentage of farmers with sandy-loam soils indicated that they have soil erosion problems, relative to farmers with clay or clay-loam soils. Conversely, a larger percentage of farmers with clay soils indicated that 1988 was the first year in which a soil erosion problem had existed on their farms.

Table 10.1

Frequency of Soil Erosion Problems, as Indicted by Survey Respondents

Existence of a Soil Erosion Problem	Number of Responses	Percent of Total Responses
No	110	47.0
Yes	98	41.9
Not until this year (1988)	26	11.1
Totals	234	100.0

Table 10.2

Frequency of Use of Soil Conservation Practices, as Indicated by Survey Respondents

Soil Conservation is Practised	Number of Responses	Percent of Total Responses
Always	111	47.4
Frequently	86	36.8
Only occasionally	27	11.5
Never	5	2.1
Not until this year	5	2.1
Totals	234	100.0

In terms of the use of soil conservation practices, a large percentage of farmers for all three soil types indicated that they always or frequently practise soil conservation. The percentages were largest for clay-loam and sandy-loam soils, however (i.e., 86.4 percent for each).

The types of soil conservation practices used by respondents are reported in Tables 10.3 (summary) and B.48 (detailed). The practices employed by respondents reflect a number of farming systems and a spectrum of conservation concepts. Reduced tillage operations in the fall was identified as the most common practice. Continuous cropping, minimum or zero tillage and the use of less summerfallow are all common soil conservation practices used by respondents. These responses do not characterize a single type of farming system. As a result, the practices that constitute soil conservation will vary as well.

Tables B.49 and B.50 provide a breakdown of soil conservation practices, by region and major soil type, respectively. Regionally, little variation was exhibited for the most common soil conservation practices. Respondents in the Interlake region seemed to utilize continuous cropping to a lesser extent than other regions, and placed greater emphasis on trash management, again relative to the other regions.

As was the case with regional differences, there were few very significant differences in soil conservation practices between major soil types. One noticeable difference was that farmers with predominantly sandy-loam soils seem to utilize a greater range of practices. Conversely, over 60 percent of responses from farmers with clay soils are contained in the first five practices listed in Table B.50.

Table 10.3

Soil Conservation Practices Utilized by Survey Respondents, Summary

Soil Conservation Practice	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Reduced tillage operations in fall	121	12.9	52.8
Chop/incorporate straw	87	9.3	38.0
Snow trapping/standing stubble	82	8.7	35.8
Continuous cropping	67	7.1	29.3
Do not burn straw	50	5.3	21.8
Leave trash cover on stubble fields	45	4.8	19.7
Added grasses/legumes in crop rotation	44	4.7	19.2
More stubble mulching/cultivator use	37	3.9	16.2
Plant shelterbelts/windbreaks	34	3.6	14.8
Make less summerfallow	29	3.1	12.7
Plant water runways to grasses/legumes	28	3.0	12.2
Seed lighter lands to pastures/forages	28	3.0	12.2
Seed cover crops (rye, winter wheat, fall strips	27	2.9	11.8
Eliminated plowing	27	2.9	11.8
Minimum/zero - till farming	23	2.4	10.0
Attention to tillage depth/direction/speed	23	2.4	10.0
More chemical/less tillage control	23	2.4	10.0
All Others[a]	164	17.5	--
Totals	939	100.0	229

[a]No individual response aggregated into the "All Others" category accounts for more than 1.8 percent of total responses.

10.2 Factors Influencing Soil Conservation Practices

Respondents were asked, as part of the survey, to indicate important factors that limit their use of conservation practices. The responses, presented in Table 10.4, indicated that the most significant factors are the cost of chemicals, availability of the proper equipment, weed control problems and the suitability of practices for the particular soil type. Overall, perceived problems with weed control (including the related cost of chemicals) and economic considerations seemed to be the most important factors among respondents.

Regionally, there were some differences in the limiting factors indicated by respondents, as shown in Table B.51. The cost of chemicals seemed to be slightly more important in the Southwest and Northwest regions. Soil type limitations were significantly more important in the Eastern region. In general, however, respondents in all regions indicated a variety of factors that limit the uptake of conservation practices.

Table B.52 presents a similar breakdown by major soil type. As indicated in that table, soil type limitations were more important for farmers with clay soils. Respondents with clay-loam and sandy-loam soils, on the other hand, were relatively more constrained by weed control problems and the suitability of equipment.

10.3 Information Needs Related to Soil Conservation

Finally, survey respondents were requested to provide their perceptions of information needs related to soil conservation decisions. The responses to this question are presented in Tables 10.5 (provincial summary), B.53 (by region) and B.54 (by major soil type).

Table 10.4

Factors Limiting the Choice and Use of Soil Conservation Practices by Survey Respondents

Factor	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Cost of chemicals	71	20.1	36.4
Do not have suitable equipment	35	9.9	17.9
Weed control problems with reduced tillage	33	9.3	16.9
Limited by soil type (e.g. clay)	24	6.8	12.3
Budgetary constraints	21	5.9	10.8
Excess straw	21	5.9	10.8
Economics of methods not apparent	20	5.7	10.3
Economic losses not experienced	20	5.7	10.3
Need summerfallow for weed control/seed prod./ economic reasons/it is beneficial	15	4.2	7.7
Extra tillage required for herbicide incorp.	14	4.0	7.2
Low grain prices (summerfallow reduces spending)	11	3.1	5.6
Economics that favour pulses/oilseeds	11	3.1	5.6
Chemical fallow not economic	11	3.1	5.6
Moisture conditions	10	2.8	5.1
Extra tillage required to band fertilizer	7	2.0	3.6
Lack of more effective post-emerg chemicals	6	1.7	3.1
Practices limited by stoney conditions	6	1.7	3.1
Desire to leave good seedbed in fall	5	1.4	2.6
Need straw for livestock	4	1.1	2.1
Straw incorporation not compatible with weed control methods	4	1.1	2.1
Risks associated with new practices	4	1.1	2.1
Totals	353	100.0	195

Table 10.5

Information Needs Related to Soil Conservation Practices

Information Need	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Recommend specific practices for my area/soil type	40	30.3	42.6
Information on new/different soil conservation methods	25	18.9	26.6
Practical minimum/zero - till information for my farm	13	9.8	13.8
More information on straw management	7	5.3	7.4
Unbiased information on conservation seeding equipment/practices/performance	6	4.5	6.4
Local demonstration of conservation practices	6	4.5	6.4
Yield comparison of recommended vs. conventional practices	5	3.8	5.3
Information on how to economically incorporate soil conservation practices in my farming system	5	3.8	5.3
More information on snow trapping	5	3.8	5.3
Cost comparison of recommended vs conventional practices	4	3.0	4.3
Better alternatives to weed control under soil conservation systems	4	3.0	4.3
More on using green plowdowns	4	3.0	4.3
More on shelterbelts (design, maintenance)	4	3.0	4.3
Unbiased information on minimum/zero-till equipment and performance	3	2.3	3.2
Demonstrate economic losses caused by my existing farming system	1	0.8	1.1
Totals	132	100.0	94

The perceived information needs, related to soil conservation, that were identified by respondents focus on more specific regional recommendations and new methods of soil conservation. A broad range of information deficiencies are also evident in terms of the practicality of existing soil conservation methods for respondents' farming systems (i.e., straw management, snow trapping, plowdowns, etc.). The responses indicated that conservation practices are viewed as a composite of several techniques used to achieve a desired end result, rather than demonstrated feasible farming systems or approaches. Also, there seems to be an indication that any particular system of practices will not be suitable in all regions of Manitoba.

As noted earlier, a regional breakdown for these results is presented in Table B.53. The low number of total responses for several regions, however, prevented any meaningful comparison.

There are some differences in information needs related to soil type, as indicated in Table B.54. Additional information concerning practices specific to soil type seemed to be relatively more important for respondents with clay soils. This is not surprising, given that soil type was a major factor limiting the uptake of conservation practices by these farmers. As well, information related to the economics of incorporating soil conservation into respondents' farming systems seemed to be a higher priority for farmers with sandy-loam soils. Again, this might have been expected given responses provided by these farmers concerning major factors limiting the uptake of soil conservation practices.

11. SUMMARY

As mentioned earlier, the 1988-89 survey was designed as a follow up to the previous survey in order to obtain more details concerning the information uses and needs for Manitoba

crop producers. The goals of this survey were to determine information used and required by Manitoba crop producers in making specific crop management decisions, and to provide some recommendations as to the direction that future research and extension efforts should take.

A large part of the survey results provide a record of management practices exhibited by survey respondents. These have received adequate coverage already and are not repeated or summarized here. Instead, this summary concentrates on information uses and needs, as expressed by the Manitoba farmers who were surveyed.

11.1 Fertilizer Decisions

The first specific objective of the survey was to examine information used and required for making decisions with respect to fertilizer rates. As indicated in Section 4, a majority of respondents use soil test information in making fertilizer decisions. The way in which the recommendations are used varies, however. Naturally, prior experience also plays a major role in the determination of actual fertilizer rates.

Major factors influencing the method and timing of N application include cost considerations, feasibility of methods (e.g., availability of proper equipment), efficacy of N placement and convenience. These are consistent for both wheat and canola.

Respondents indicated that additional information would be helpful for making fertilizer decisions. There is an apparent need for more regional or localized information. Also, information related to efficiency of methods by soil type, overwintering losses, efficiency of fall versus spring banding, etc., would be useful.

11.2 Pesticide Decisions

Another objective of the survey was to determine information uses and needs for decisions related to the method and timing of pesticide application. As indicated in Section 5, effectiveness of control is the major consideration in choosing a method/timing combination for pesticide application on wheat and canola acreage. Of secondary importance for canola is crop/variety considerations, while efficiency considerations are important for wheat.

Information gaps identified by respondents focus on the effectiveness of control under varying soil/climate/moisture conditions. This is consistent for both wheat and canola.

11.3 Varietal Selection Decisions

A third survey objective was to determine information uses by farmers in selecting wheat and canola varieties. Section 6 presents the responses related to this issue. Decisions by respondents who changed wheat varieties were influenced by both agronomic (i.e., yield potential, drought tolerance, etc.) and economic (i.e., market/price prospects, etc.) factors. Decisions by respondents who changed canola varieties were influenced primarily by agronomic factors (e.g., resistance to triazine, yield potential).

Information sources utilized by farmers in making varietal selections include plot trial results, seed growers, neighbours and personal experience. In general, regional and local field performance seem to be of primary importance.

11.4 Canola Acreage Decisions

Factors influencing farmers' canola acreage decisions (i.e., decisions to increase or decrease canola acreage) are discussed in Section 7. Crop rotation considerations (including

weed conditions) and potential economic returns were important factors considered in canola acreage decisions. It is noteworthy that these factors were considered to be important factors by respondents, regardless of whether the farmer decided to increase or reduce canola acreage.

11.5 Information Needs Related to Current Issues Facing Manitoba Farmers

Another important objective of the survey was to examine information needs related to issues of current interest and importance to Manitoba farmers. These issues include the impacts of 1988 climatic conditions, and soil erosion/conservation, and are addressed in Sections 9 and 10, respectively.

Information needs related to the drought conditions of 1988 related primarily to pesticide performance under abnormal climate conditions. Better climatic information (e.g., probability of rainfall) was also requested. In terms of making 1989 crop decisions, given 1988 conditions, respondents indicated that information related to all aspects of cropping decisions was needed.

A high percentage of respondents utilize soil conservation practices. As discussed in Section 10, however, farmers are limited in their uptake of soil conservation by several factors and information gaps. Factors such as cost considerations, availability of equipment, weed control problems, etc. limit the use of soil conservation practices. In some regions, soil type is also a limiting factor. Perceived information needs focus on more recommendations specific for regional and/or soil type differences, and information concerning new methods of soil conservation.

11.6 Manitoba Department of Agriculture Guides

Several Manitoba crop guides were evaluated by respondents, in terms of their usefulness for making crop decisions. As discussed in Section 8, the guides are considered to be fairly useful, for the most part. In particular, the *Field Crop Variety Recommendations* and the *Guide to Chemical Weed Control* are used by a majority of respondents. The *Field Crop Production Guide* is not as widely used, but is considered useful by those producers who do use it.

While the three guides are considered to be useful, respondents did indicate that improvements could be made. These improvements are primarily in the area of more specific information and recommendations, particularly on a regional basis. This is particularly true for crop varietal recommendations.

11.7 Recommendations

The farmers responding to this survey seem to make use of the information placed at their disposal for the purposes of making crop decisions. However, through their survey responses, they indicated that additional information is required. This information will likely have to be provided through both research and extension efforts.

The primary recommendation arising from this survey is that information that producers require for crop management decisions should be more specific. This specificity may be for regional differences, soil type differences, crop/varietal differences or climatic differences. Evidence of this is present in all sections of the survey results.

APPENDIX A

1988-89 Farm Survey

1. a. Location of Farm _____

1 - SW
2 - NW
3 - CE
4 - INT
5 - EAST

b. Which category best reflects your soil type?

_____

1 - clay
2 - clayloam
3 - loam
4 - sandy loam
5 - sand
6 - organic
7 - other (specify)

c. Indicate your 1988 seeded acres of:

_____ cereals
_____ oilseeds
_____ special crops
_____ summerfallow
_____ forages (hay)

2. What information could have helped you better cope with the 1988 drought? (open ended)

3. What information gaps have emerged from conditions during the 1988 drought for farming decisions in 1989? (open ended)

4. a. Do you soil test?

Yes No

b. Where do you send your sample?

_____ Manitoba Provincial Soil Laboratory
_____ Harris
_____ APL, Nebraska
_____ AgVice - North Dakota
_____ Other (specify)

c. Why do you use the laboratory indicated above? (open-ended)

d. How do you soil test?

_____ sample every field every year
_____ sample some field every year
_____ sample every second year
_____ sample every third year but more than once
_____ sample irregularly but more than once
_____ sample only once
_____ sample for specific crops only
_____ other

e. How do you use your soil test?

_____ exceed recommendations for all nutrients
_____ follow all recommendations
_____ use soil reserve levels only
_____ use N recommendations
_____ use P, K, or S recommendations
_____ use micro-nutrient recommendations
_____ adjust recommendations for local soil/field conditions
_____ other

f. Who takes your soil test?

_____ self
_____ custom operator
_____ fertilizer dealer
_____ other

5. How do you select fertilization rates? (open ended)

6. a. Did you change the varieties of

wheat _____ canola _____ grown in 1988?

1. Yes
2. No (If both (No), go to question 7.)

b. What was the change?

wheat _____ to _____
canola _____ to _____

c. What caused you to change? (open-ended)

7. a. What information source or sources do you most often use to choose cultivars or varieties for production? (open ended)

b. How often do you use MDA Field Crop Variety Recommendations for Manitoba to select varieties?

_____

_____

1 - always
2 - frequently
3 - only occasionally
4 - never
5 - do not know MDA recommendations for my area/crops

if (1) or (2)
(go to question 7c)

if (3) or (4)
Why?

_____

_____

1 - not accurate
2 - not specific enough
3 - common knowledge
4 - not relevant
5 - do not know
6 - other (specify)

(go to question 7d)

if (5)

Have you ever seen the Field Crops Variety Recommendations for Manitoba?

_____

_____

1 - Yes
2 - No

(go to question 7e)

7c 7d 7e

7. c. Please rate the following information contained in MDA Field Crop Variety Recommendations for Manitoba.

1 - very useful
2 - useful
3 - useful infrequently
4 - not useful
5 - not relevant
6 - do not know (use)
7 - other (specify)

Usefulness	Yield/Quality Characteristics
_____	yield estimates for crops and varieties
_____	comparisons among crops
_____	relative yield comparisons among varieties
_____	seed weight/bulk density
_____	% seed oil/oil quality
_____	% meal protein/protein content
_____	% hull
_____	seed size
	Agronomic Characteristics
_____	winter survival
_____	days to bloom/silk
_____	days to maturity
_____	resistance to lodging
_____	resistance to shattering
_____	plant height
_____	heat unit rating
_____	hybrid type
	Disease Resistance
_____	ergot
_____	leaf spot
_____	head rot
_____	rust/staghead
_____	smut
_____	bunt
_____	root rot
_____	net blotch
_____	blackleg
_____	wilt
_____	mildew

d. How could MDA Field Crop Variety Recommendations be improved for your use? (open ended)

7. e. When would you first require Field Crop Variety information for farm planning decisions? _____

1 - November
2 - December
3 - January
4 - February
5 - March
6 - April
7 - May
8 - not required
9 - other (specify)

8. a. How often do you use information contained in the MDA Field Crop Production Guide for Manitoba?

_____

_____

1 - always
2 - frequently
3 - only occasionally
4 - never
5 - not familiar with MDA production guide

if (1) or (2)
(go to question 8b)

if (3) or (4)
Why?

_____

_____

1 - not accurate
2 - not specific enough
3 - common knowledge
4 - not relevant
5 - do not know
6 - other (specify)

(go to question 8c)

if (5)

Have you ever seen the MDA Field Crop Production Guide for Manitoba?

_____

_____

1 - Yes
2 - No

(go to question 8d)

8b

8c

8d

8. b. Please rate the following information contained in MDA Field Crop Production Guide for Manitoba.

1 - very useful
2 - useful
3 - useful infrequently
4 - not useful
5 - not relevant
6 - do not know (use)
7 - other (specify)

Usefulness	General Guidelines
_____	disease/insect control
_____	erosion control
_____	harvesting
_____	grain drying
_____	grain storage
_____	general management
	Fertilizer Use
_____	calculations
_____	placement efficiencies
_____	fallow vs breaking versus stubble calibration
	Species/Crop Recommendations
_____	fertilizer rate/method
_____	seeding dates
_____	rates and spacing
_____	depth of seeding
_____	risk maps for corn
	Forage Crops
_____	seeding rate
_____	species selection
_____	mixtures
_____	silage recommendations
_____	pasture management

c. How could the Field Crop Production Guide for Manitoba be improved (open ended)?

d. When would you first require the Field Crop Production Guide information for your farm planning decisions? _____

1 - November
2 - December
3 - January
4 - February
5 - March
6 - April
7 - May
8 - not required
9 - other (specify)

9. a. How often do you use information contained in the MDA Guide to Chemical Weed Control?

_____

_____

1 - always
2 - frequently
3 - only occasionally
4 - never
5 - not familiar with the Chemical Weed Guide

if (1) or (2) (go to question 9b)

if (3) or (4) Why?

_____

_____

1 - not accurate
2 - not specific enough
3 - common knowledge
4 - not relevant
5 - refer to specific product label instructions
6 - other (specify)

(go to question 9c)

if (5)

Have you ever seen the MDA Guide to Chemical Weed Control?

_____

_____

1 - Yes
2 - No

(go to question 9d)

9b 9c 9d

b. Please rate the following information contained in the MDA Guide to Chemical Weed Control.

1 - very useful
2 - useful
3 - useful infrequently
4 - not useful
5 - not relevant
6 - do not know (use)
7 - other (specify)

Usefulness

_____ chart of recommended herbicides for specific crops and weeds
_____ metric conversion factors
_____ Field Crop tolerance information

_____ Field Crop weed control recommendations
_____ Forage Crop tolerance information
_____ Forage Crop weed control recommendations
_____ Perennial weed control recommendations
_____ Chemical Fallow recommendations
_____ Horticultural crop weed control recommendations
_____ Non-crop weed control
_____ Special Weeds control
_____ desiccation
_____ aerial application requirements and recommendations
_____ herbicide incorporation
_____ grazing and feeding restrictions
_____ effect of rainfall on efficiency
_____ soil residues
_____ chemical storage

9. c. How could the Guide to Chemical Weed Control be improved (open-ended)?

d. When would you first require the Guide to Chemical Weed Control for your farm planning decisions? _____

1 - November 6 - April
2 - December 7 - May
3 - January 8 - not required
4 - February 9 - other (specify)
5 - March

10. a. Did you alter your canola acreage in the 1988 crop year compared to last year?

_____ acres 1987 _____ 1988 _____

1 - increased
2 - no change
3 - decrease
4 - do not grow canola (go to question 11)

b. What factors led to an increase or maintenance of acreage seeded into canola? (open ended)

c. What factors led to reduced acreage or constrained the number of acres seeded to canola? (open ended)

11. a. What methods and timing of fertilization did you use to apply nitrogen on your 1988 stubble wheat and stubble canola acreage?

Wheat		Canola
_____	fall banded	_____
_____	fall broadcast	_____
_____	spring banded	_____
_____	spring broadcast	_____
_____	seed-placed	_____
_____	post emergent	_____
_____	other (specify)	_____
_____	did not fertilize	_____
_____	other	_____

b. What factors influenced your choice of fertilization method? (open-ended)

c. What additional information could you have used to decide which fertilization method(s) to use? (open-ended)

12. a. What methods and timing of pesticide (weed and insect) application did you use on your stubble wheat and stubble canola acreage in 1988?

1. herbicides 2. insecticides

Wheat		Canola
_____	pre-emergent-fall	_____
_____	pre-emergent-spring	_____
_____	seed treatment	_____
_____	post-emergent spring	_____
_____	post-emergent fall	_____
_____	other (specify)	_____
_____	no pesticides applied	_____

b. What factors determined your choice of control methods? (open-ended)

c. What additional information could you have used to decide which pest control methods to use? (open-ended)

13. a. Do you have a soil erosion problem?

_____ 1. Yes 2. No 3. Not until this year

b. Do you use soil conservation practices?

_____

_____

1 - always
2 - frequently
3 - only occasionally
4 - never
5 - do not know any
6 - not until this year

if (1), (2), (3) or (6) (go to question 13c)

if (4) or (5) Why?

_____

_____

1 - not needed
2 - not economic
3 - cannot be bothered
4 - satisfied with existing farming system
5 - do not know
6 - other (specify)

(go to question 13e)

13c 13d 13e

c. What soil conservation practices do you use? (open-ended)

d. What factors have limited your choice/uptake of soil conservation practices? (open-ended)

e. What information could you use to better assess the suitability of soil conservation practices for your farm? (open-ended)

APPENDIX B

1988-89 Survey Results

Regional Abbreviations Used in Appendix Tables:

SW	- Southwest
NW	- Northwest
CE	- Central
INT	- Interlake
EAST	- Eastern
PROV	- Provincial

Other Abbreviations Used in Appendix Tables:

HRS	- Hard Red Spring
MPSTL	- Manitoba Provincial Soil Testing Laboratory

Table B.1

Frequency of Soil Testing by Survey Respondents, by Region

Response	SW	NW	CE	INT	EAST	PROV
	(Percent of Responses)					(Number of Responses)
Sample some field every year	24.1	44.2	29.2	27.3	41.2	77
Sample every field every year	13.0	9.6	13.9	13.6	23.5	33
Sample irregularly but more than once	13.0	11.5	16.7	9.1	8.8	30
Sample every second year	9.3	1.9	13.9	4.6	8.8	20
Stopped, not satisfied with recommendations	16.7	3.9	5.6	9.1	0.0	17
Sample for specific crops/problems	9.3	5.8	2.8	13.6	0.0	13
First time ever or in a long time in 1988	1.9	1.9	11.1	0.0	0.0	10
Sample every third year more than once	1.9	1.9	1.4	4.6	11.8	8
Sampled only once	3.7	5.8	0.0	9.1	0.0	7
Rotate sampling, half of fields every year	0.0	5.8	1.4	4.6	2.9	6
Never Soil Tested	7.4	7.7	4.2	4.6	2.9	13
Total Responses	54	52	72	22	34	234
Percentage of Respondents that have soil tested at least once	92.6	92.3	95.8	95.4	97.1	
Percentage of Respondents that soil test each year	37.1	59.6	44.5	45.5	67.6	

Table B.2

Factors Considered by Respondents in Choosing a Soil Testing Laboratory - Provincial Totals

Factor	Number of Responses	Percent of Total Responses	Percent of Farmers Responding*
Recommended by fertilizer dealer	79	27.9	35.7
Gives the best recommendations	43	15.2	19.5
Uses Manitoba data	40	14.1	18.1
Convenience	14	4.9	6.3
No reason/no preference	14	4.9	6.3
Closest to farm	12	4.2	5.4
Have always used MPSTL	10	3.5	4.5
Lab does not require dry samples	9	3.2	4.1
Test requires deep sampling	9	3.2	4.1
Other reasons	9	3.2	4.1
Recommended by Ag. Rep./MDA	7	2.5	3.2
Send to two labs for comparison	7	2.5	3.2
Believe MPSTL to be unbiased	6	2.1	2.7
Use same lab each year/know how to interpret results	6	2.1	2.7
Does not require deep sampling	6	2.1	2.7
Recommended by neighbour/associate	5	1.8	2.3
Best recommend. for micro-nutrients	4	1.4	1.8
Used by crop yield club	3	1.1	1.4
Total	283	100.0	

*These percentages are based on the 221 farmers who indicated that they test their soil.

Table B.3

Factors Considered by Respondents in Choosing a Soil Testing Laboratory, by Region

Factor	SW	NW	CE	INT	EAST	PROV (Number of Responses)
	(Percent of Responses)					
Recommended by fertilizer dealer	23	38	24	21	32	78
Gives the best recommendations	16	16	13	14	17	43
Uses Manitoba data	20	15	12	25	<5	41
Convenience (including quickness)		<5	<5	8	<5	6 14
No reason/no preference	7	7	<5	7	<5	14
Have always used MPSTL	<5	--	7	7	--	10
Test requires deep sampling	<5	<5	<5	--	6	9
Recommended by Ag. Rep./MDA	--	<5	<5	7	<5	7
Send to two labs for comparison	--	--	5	--	<5	6
Use same lab each year/know how to interpret results	9	--	1	--	--	6
All Others[a]	21	11	24	18	17	54
Total Responses	56	61	91	28	47	283

[a]Each factor aggregated in "All Others" represents less than 5% of responses in every region.

Table B.4

Use of Soil Test Results by Survey Respondents - Provincial Totals

Use	Number of Responses	Percent of Total Responses	Percent of Farmers Responding*
Use all recommendations as guide only	84	30.7	38.0
Follow all recommendations	60	21.9	27.1
Use soil reserve levels only	33	12.0	14.9
Exceed recommendations for some/all nutrients	27	9.9	12.2
Adjust for local soil/field conditions based on soil reserve levels	25	9.1	11.3
Use P, K or S recommendations	17	6.2	7.7
Follow all recommendations but adjust for own experience	11	4.0	5.0
Fert. under recommendations for some/all nutrients		7	2.6 32
Use nitrogen recommendations	5	1.8	2.3
Use micro-nutrient recommendations	5	1.8	2.3
Totals	274	100.0	220

*These percentages are based on the 221 farmers who indicated that they test their soil.

Table B.5

Use of Soil Test Results by Survey Respondents, by Region

Use	SW	NW	CE	INT	EAST	PROV
	(Percent of Responses)					(Number of Responses)
Use all recommendations as guide only	45	30	29	29	20	84
Follow all recommendations	14	35	19	29	18	60
Use soil reserve levels only	14	13	10	7	16	33
Exceed recommendations for some/all nutrients	11	6	13	7	8	27
Adj. for local soil/field conditions based on soil reserve levels	7	<5	9	7	22	25
Use P, K or S recommendations	<5	6	7	11	7	17
Follow all recommendations but adjust for own experience	<5	--	7	<5	<5	11
Under recommendations for some/all nutrients	--	<5	<5	7	--	7
All Others[a]	<5	6	<5	--	<5	10
Total Responses	56	54	91	28	45	274

[a]Each factor aggregated into "All Others" represents less than 5% of responses in every region.

Table B.6

Factors Used in Selection of Fertilizer Rates by Survey Respondents

Factor	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Soil test fertilizer recommendations	155	22.3	66.2
Experience	135	19.5	57.7
Adjust for specific crop/variety	62	8.9	26.5
Use same amount every year	61	8.8	26.1
Adjust for moisture/weather conditions	49	7.1	20.9
Pessimism/optimism/price outlook.	40	5.8	17.1
Budgetary constraints	34	4.9	14.5
Depends on fertilizer prices/economic analysis	25	3.6	10.7
Adjust for manure, trash, stubble, summerfallow	23	3.3	9.8
Use neighbour's soil test/fertilizer experience	21	3.0	9.0
Previous year's crop growth/rotation	21	3.0	9.0
Fertilizer dealer's advice	18	2.6	7.7
Adjust for fall/early-late spring application	10	1.4	4.3
Last minute assessment of crop yield potential	8	1.2	3.4
Based on individual field history	8	1.2	3.4
What crop takes out/maintain soil levels	7	1.0	3.0
Generally do not fertilize	5	0.7	2.1
Ag. Rep./MDA advice	5	0.7	2.1
General recommendations for my area	4	0.6	1.7
Balance fertilizer nutrients	3	0.4	1.3
Totals	694	100.0	234

Table B.7

Methods and Timing of Nitrogen Fertilization on Stubble Wheat Acreage, by Region

Method/Timing	SW	NW	CE	INT	EAST	PROV (Number of Responses)
	(Percent of Methods per Region)					
Band/Fall	53.7	34.2	64.6	32.0	27.1	155
Band/Spring	30.5	39.7	19.8	20.0	--	78
Broadcast/Spring	8.5	15.1	11.5	44.0	39.0	63
Broadcast/Fall	--	--	2.1	--	3.4	4
Seed Placed	7.3	11.0	2.1	4.0	30.5	35

Fertilization Method	SW	NW	CE	INT	EAST	PROV (Number of Responses)
	(Percent of Methods per Region)					
Broadcast	8.5	15.1	13.5	44.0	42.4	67
Banded	84.2	73.9	84.4	52.0	27.1	233
Seedplaced	7.3	11.0	2.1	4.0	30.5	35
Total Methods	82	73	96	25	59	335
Total Farmers Fertilizing	69	59	84	21	41	274[a]

[a]Exceeds number of farmers surveyed because some farmers seeded more than one variety of wheat. This table does not include those farmers who did not fertilize.

Table B.8

Methods and Timing of Nitrogen Fertilization on Stubble HRS Wheat Acreage, by Soil Type

Method/Timing	Soil Type				Total (Number of of Responses)
	Clay Loam	Clay	Sandy Loam	Other[a]	
	(Percentage of Responses)				
Fall Banded	39.4	53.7	27.8	16.7	78
Spring Banded	18.2	0.0	33.3	23.8	40
Spring Broadcast	11.1	14.6	25.0	16.7	33
Fall and Spring Banded	15.2	2.4	2.8	7.1	20
Seed Placed	5.1	4.9	5.6	9.5	13
Fall Banded and Spring Broadcast	4.0	4.9	2.8	19.0	11
Other[b]	7.0	19.5	2.7	7.2	23
Total Responses	99	41	36	42	218

[a]All other soil types.
[b]All other methods as well as combinations of methods.

Table B.9

Number of Nitrogen Application Methods Utilized by Respondents on Stubble Wheat Acreage, by Region

Number of Methods	SW	NW	CE	INT	EAST	PROV (Number of Responses)
	(Percent of Farmers Responding)					
No Fertilization (0)	2.8	--	2.3	4.5	--	5
One Method (1)	78.9	78.0	83.7	77.3	61.0	216
Two Methods (2)	18.3	20.3	14.0	18.2	31.7	54
Three Methods (3)	--	1.7	--	--	7.3	4
Total Farmers	71	59	86	22	41	279

Table B.10

Methods and Timing of Nitrogen Fertilization on Stubble Canola Acreage, by Region

Method/Timing	SW	NW	CE	INT	EAST	PROV (Number of Responses)
	(Percent of Methods per Region)					
Band/Fall	48.1	37.5	47.9	27.8	20.0	91
Band/Spring	31.4	39.3	17.8	27.8	5.0	58
Broadcast/Spring	9.3	17.9	30.1	44.4	45.0	54
Broadcast/Fall	3.7	--	--	--	5.0	3
Seed Placed	7.4	5.4	4.1	--	25.0	15
Total Methods	54	56	73	18	20	221
Total Farmers	48	44	57	16	16	181

Fertilization Method	SW	NW	CE	INT	EAST	PROV (Number of Responses)
	(Percent of Methods per Region)					
Broadcast	13.0	17.9	30.1	44.4	50.0	57
Banded	79.6	76.8	65.8	55.6	25.0	149
Seed Placed	7.4	5.3	4.1	--	25.0	15
Total Methods	54	56	73	18	20	221

Table B.11

Methods and Timing of Nitrogen Fertilization on Stubble Argentine Canola, by Soil Type

Method/Timing	Soil Type				Total (Number of of Responses)
	Clay Loam	Clay	Sandy Loam	Other[a]	
	(Percentage of Responses)				
Fall Banded	41.0	37.0	24.1	17.2	56
Spring Banded	22.9	11.1	31.0	24.1	38
Spring Broadcast	10.8	22.2	27.6	24.1	30
Fall and Spring Banded	9.6	3.7	3.5	6.9	12
Seed Placed	2.4	0.0	6.9	6.9	6
Fall Banded and Spring Broadcast	8.4	3.7	3.5	6.9	11
Other[b]	4.9	22.3	3.4	13.9	15
Total Responses	83	27	29	29	168

[a]All other soil types.
[b]All other methods as well as combinations of methods.

Table B.12

Number of Nitrogen Application Methods Utilized by Respondents on Stubble Canola Acreage, by Region

Number of Methods	SW	NW	CE	INT	EAST	PROV (Number of Responses)
	(Percent of Farmers Responding)					
One Method (1)	87.5	77.3	71.9	87.5	75.0	143
Two Methods (2)	12.5	18.2	28.1	12.5	25.0	36
Three Methods (3)	--	4.5	--	--	--	2
Total Farmers	48	44	57	16	16	181

Table B.13

Major Factors Influencing Method/Timing of Nitrogen Fertilization of Stubble Wheat Acreage

Factor	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Cost comparison of methods/carriers	103	20.6	45.4
Most feasible for my equipment/farm system	59	11.8	26.0
Best fertilizer placement method	42	8.4	18.5
Most convenient for my farming system	39	7.8	17.2
Availability of extra time	34	6.8	15.0
Moisture conservation consideration	27	5.4	11.9
Recovery efficiency of method	26	5.2	11.5
Combined fertilizer with tillage operation	21	4.2	9.3
Ease of handling	19	3.8	8.4
Satisfied with yields from current method	18	3.6	7.9
Speed of application	17	3.4	7.5
Fall field conditions	13	2.6	5.7
Availability of fertilizer/fertilizer type	10	2.0	4.4
Nitrogen carried with P or S fertilizer	9	1.8	4.0
Safety concerns	7	1.4	3.1
N used exceeded recommended for N with seed	7	1.4	3.1
Best method for my soil type	6	1.2	2.6
Soil erosion consideration	6	1.2	2.6
Seedbed conditions	5	1.0	2.2
Combined with pesticide application	5	1.0	2.2
Budgetary constraint	4	0.8	1.8
Cash flow/time of expenditure considerations	4	0.8	1.8
Spring field conditions	4	0.8	1.8
Availability of rental equipment	4	0.8	1.8
Availability of custom appliers	3	0.6	1.3
Best method for crop choice	2	0.4	0.9
Avoiding overwinter losses	2	0.4	0.9
Availability of labour	2	0.4	0.9
Fertilizer dealer service	2	0.4	0.9
Totals	500	100.0	227

Table B.14

Major Factors Influencing Method/Timing of Nitrogen Fertilization of Stubble Wheat Acreage, by Region

Factor	SW	NW	CE	INT	EAST	PROV
	(Percent of Total Responses)					(Number of Responses)
Cost comparison of methods/ carriers	21	20	27	8	18	103
Most feasible for equipment/ farm system	13	14	8	12	13	59
Best fertilizer placement method	9	<5	10	10	9	42
Most convenient for farming system	9	7	5	8	12	39
Availability of extra time	<5	6	10	<5	8	34
Moisture conservation considerations	8	<5	7	<5	<5	27
Recovery efficiency of method	<5	<5	<5	12	5	26
Combined fertilizer with tillage operations	5	10	<5	<5	<5	21
Ease of handling	<5	5	<5	6	<5	19
Satisfied with yields of current methods	<5	--	6	6	<5	18
Speed of application	<5	<5	<5	8	<5	17
Fall field conditions	<5	--	5	<5	<5	13
Availability of fertilizer /fertilizer type	<5	<5	<5	6	<5	10
N used exceed N with seed recommendations	--	<5	--	<5	5	7
All Others[a]	15	19	9	10	12	65
Total Responses	116	113	143	50	78	500

[a]Each factor aggregated into "All Others" represents less than 5 percent of responses in every region.

Table B.15

Major Factors Influencing Method/Timing of Nitrogen Fertilization of Stubble Canola Acreage

Factor	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Cost comparison of methods/carriers	75	19.6	45.2
Most feasible for my equipment/farm sys.	38	9.9	22.9
Best fertilizer placement method	26	6.8	15.7
Most convenient for my farming system	25	6.5	15.1
Availability of extra time	22	5.8	13.3
Moisture conservation consideration	19	5.0	11.4
Recovery efficiency of method	19	5.0	11.4
Combined fertilizer with tillage operation	18	4.7	10.8
Satisfied with yields from current method	17	4.5	10.2
Ease of handling	16	4.2	9.6
Combined with pesticide application	16	4.2	9.6
Nitrogen carried with P or S fertilizer	15	3.9	9.0
Speed of application	12	3.1	7.2
Fall field conditions	11	2.9	6.6
Best method for crop choice	6	1.6	3.6
Availability of fertilizer/fertilizer type	6	1.6	3.6
Safety concerns	5	1.3	3.0
Best method for my soil type	5	1.3	3.0
Soil erosion consideration	4	1.0	2.4
Seedbed conditions	4	1.0	2.4
Cash flow/time of expenditure considerations	4	1.0	2.4
Spring field conditions	4	1.0	2.4
Availability of rental equipment	4	1.0	2.4
Budgetary constraint	3	0.8	1.8
Availability of custom appliers	3	0.8	1.8
N used exceeded recommended for N with seed	2	0.5	1.2
Avoiding overwinter losses	2	0.5	1.2
Fertilizer dealer service	1	0.3	0.6
Totals	382	100.0	166

Table B.16

Major Factors Influencing Method/Timing of Nitrogen Fertilization of Stubble Canola Acreage, by Region

Factor	SW	NW	CE	INT	EAST	PROV
	(Percent of Total Responses)					(Number of Responses)
Cost comparison of methods/carriers	20	23	24	<5	18	75
Most feasible for equipment/ farm system	12	11	7	13	9	38
Best fertilizer placement method	9	<5	7	13	<5	26
Most convenient for farming system	11	<5	<5	<5	12	25
Availability of extra time	5	7	6	5	<5	22
Moisture conservation consideration	<5	5	<5	13	<5	19
Recovery efficiency of method	6	<5	5	5	<5	19
Combined fertilizer with tillage operation	6	11	<5	<5	--	18
Satisfied with yields of current method	5	--	5	8	9	17
Ease of handling	5	<5	<5	8	<5	16
Combined with pesticide application	<5	<5	7	<5	6	16
N carried with P or S fertilizer	<5	<5	5	5	--	15
Speed of application	<5	<5	<5	8	6	12
Fall field conditions	<5	--	6	<5	<5	11
Best method for crop choice	<5	--	<5	--	6	6
Availability of fertilizer /fertilizer type	<5	<5	--	<5	6	6
Safety concerns	--	--	<5	--	6	5
All Others[a]	10	19	<5	10	<5	36
Total Responses	104	95	110	40	33	382

[a]Each factor aggregated into "All Others" represents less than 5 percent of responses in every region.

Table B.17

Minor Factors Influencing Method/Timing of Nitrogen Fertilization of Stubble Wheat Acreage

Factor	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Availability of extra time	30	12.3	19.2
Most convenient for farming system	26	10.7	16.7
Cost comparison of different methods	19	7.8	12.2
Most feasible for my equipment/farm system	19	7.8	12.2
Ease of handling	19	7.8	12.2
Moisture conservation consideration	16	6.6	10.3
Recovery efficiency of method	15	6.2	9.6
Fall field conditions	12	4.9	7.7
Satisfied with yields from current method	11	4.5	7.1
Best fertilizer placement method	10	4.1	6.4
Speed of application	9	3.7	5.8
Combined fertilizer with tillage operation	7	2.9	4.5
Cash flow/timing of expenditure considerations	6	2.5	3.8
Safety concerns	6	2.5	3.8
Spring field conditions	5	2.0	3.2
Avoiding overwinter losses	4	1.6	2.6
Availability of fertilizer/fertilizer type	4	1.6	2.6
Combined N with pesticide application	4	1.6	2.6
Best method/timing for my soil type/area	3	1.2	1.9
N carried with P or S fertilizer	3	1.2	1.9
Seedbed conditions	3	1.2	1.9
N used exceeded N recommended with seed	3	1.2	1.9
Availability of labour	2	0.8	1.3
Availability of custom appliers	2	0.8	1.3
Availability of rental equipment	2	0.8	1.3
Best method for crop choice	1	0.4	0.6
Soil erosion consideration	1	0.4	0.6
Fertilizer dealer service	1	0.4	0.6
Totals	243	100.00	156

Table B.18

Minor Factors Influencing Method/Timing of
Nitrogen Fertilization of Stubble Canola Acreage

Factor	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Availability of extra time	20	11.0	17.9
Most convenient for farming system	23	12.7	20.5
Cost comparison of different methods	12	6.6	10.7
Most feasible for my equipment/farm system	17	9.4	15.2
Ease of handling	13	7.2	11.6
Moisture conservation consideration	12	6.6	10.7
Recovery efficiency of method	11	6.1	9.8
Fall field conditions	9	5.0	8.0
Satisfied with yields under current method	7	3.9	6.3
Best fertilizer placement method	8	4.4	7.1
Speed of application	8	4.4	7.1
Combined fertilizer with tillage operation	3	1.7	2.7
Cash flow/timing of expenditure considerations	2	1.1	1.8
Safety concerns	2	1.1	1.8
Spring field conditions	4	2.2	3.6
Avoiding overwinter losses	3	1.7	2.7
Availability of fertilizer/fertilizer type	4	2.2	3.6
Combined N with pesticide application	5	2.8	4.5
Best method/timing for my soil type/area	2	1.1	1.8
N carried with P or S fertilizer	4	2.2	3.6
Seedbed conditions	2	1.1	1.8
N used exceeded N recommended with seed	3	1.7	2.7
Availability of labour	2	1.1	1.8
Availability of custom appliers	2	1.1	1.8
Best method for crop choice	1	0.6	0.9
Soil erosion consideration	1	0.6	0.9
Fertilizer dealer service	1	0.6	0.9
Totals	181	100.0	112

Table B.19

Information Needs for Nitrogen Application Method/Timing
Identified by Survey Respondents

Information Need	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Information on new methods and equipment	25	13.1	22.1
Efficiencies of methods on different soil types	17	8.9	15.0
Information on NH3 vs. liquid vs. dry fertilizer	16	8.4	14.2
Accurate data on overwintering losses	12	6.3	10.6
Efficiencies of fall vs. spring banding	11	5.8	9.7
Expected losses of methods under different field conditions	10	5.2	8.8
Information independent of dealers/companies	9	4.7	8.0
Amount of fertilizer that can be applied with seed for different soil types	8	4.2	7.1
Information on optimal placement depth	8	4.2	7.1
Information on airseeders for fertilization	8	4.2	7.1
Comparison of yields vs. placement method	7	3.7	6.2
Amount of fertilizer that can be applied with seed for different moisture levels	6	3.1	5.3
Need for seedrow/seed placed vs. banding	6	3.1	5.3
Information on nutrient uptake by plants	6	3.1	5.3
Banding total blends vs. separate applications	6	3.1	5.3
Information on NH3 vs. liquid	5	2.6	4.4
Effects of NH3 on soil properties	5	2.6	4.4
Information on micro-nutrients	5	2.6	4.4
Information on zero-till fertilization	5	2.6	4.4
Information on new spoke-wheel applicators	5	2.6	4.4
Effectiveness of placement for fertilizer blends	4	2.1	3.5
Cost comparison of methods	3	1.6	2.7
Information on banding P	3	1.6	2.7
Best placement vs. weather conditions	1	0.5	0.9
Totals	191	100.0	113

Table B.20

Method/Timing of Pesticide Application on Stubble Wheat Acreage, by Region

Method/Timing	SW	NW	CE	INT	EAST	PROV
	(Percent of Responses per Region)					(Number of Responses)
Pre-Emergent/Fall	12.2	3.4	--	6.9	1.9	20
Pre-Emergent/Spring	20.0	21.8	9.8	6.9	17.0	64
Seed Treatment[a]	7.0	5.7	11.6	6.9	11.3	34
Post-Emergent/Spring	59.1	66.7	73.2	79.3	64.2	265
Post-Emergent/Fall[b]	1.7	2.3	2.7	--	5.7	10
No pesticides	--	--	2.7	--	--	3
Total Responses	115	87	112	29	53	396

[a]May include fungicide, insecticide and/or herbicide treatments.
[b]All fall post-emergents reported are applications to control weeds in stubble after harvest.

Table B.21

Number of Pesticide Practices Used by Survey Respondents on Stubble Wheat Acreage, by Region and Variety of Wheat

Number of Practices	SW	NW	CE	INT	EAST	PROV (Number of Responses)
	(Percent of Responses per Region)					
No Practices (0)	--	--	3.5	--	--	3
One Practice (1)	52.1	55.2	68.2	78.3	69.2	172
Two Practices (2)	33.8	39.7	27.1	17.4	20.5	82
Three Practices (3)	11.3	5.2	1.2	4.3	10.3	17
Four Practices (4)	2.8	--	--	--	--	2
Total Respondents[a]	71	58	85	23	39	276

Number of Practices	Wheat Variety				PROV (Number of Responses)
	Glenlea	HY	Durum	HRS	
	(Percent of Respondents per Variety)				
No Practices (0)	--	--	--	1.3	3
One Practice (1)	100.0	56.7	55.6	63.4	172
Two Practices (2)	--	30.0	37.0	29.2	82
Three Practices (3)	--	10.0	7.4	5.6	17
Four Practices (4)	--	3.3	--	0.5	2
Total Respondents[a]	3	30	27	216	276

[a]Total farmers exceeds number of farmers surveyed because some farmers grow several varieties of wheat.

Table B.22

Method/Timing of Pesticide Application on Stubble Acreage, by Region

Method/Timing	SW	NW	CE	INT	EAST	PROV (Number of Responses)
	(Percent of Responses per Region)					
Pre-Emergent/Fall	21.7	14.0	8.4	10.0	5.1	65
Pre-Emergent/Spring	13.0	20.2	23.9	12.5	7.7	86
Seed Treatment[a]	31.9	36.0	36.8	42.5	41.0	175
Post-Emergent/Spring	15.9	25.4	18.1	30.0	38.5	106
Post-Emergent/Fall[b]	--	1.8	--	--	5.1	4
No Pesticides	0.7	0.9	--	--	--	2
Insecticide/Summer	16.7	1.8	12.9	5.0	2.6	48
Foliar Fungicide	--	--	--	--	--	--
Total Responses	138	114	155	40	39	486

[a]May include fungicide, insecticide and/or herbicide treatments.
[b]All fall post-emergents reported are applications to control weeds in stubble after harvest.

Table B.23

Number of Pesticide Practices Used by Survey Respondents on Stubble Canola Acreage, by Region and Variety of Canola

Number of Practices	SW	NW	CE	INT	EAST	PROV (Number of Responses)
	(Percent of Responses per Region)					
No Practices (0)	2.0	2.2	--	--	--	2
One Practice (1)	4.0	4.4	3.3	5.9	--	7
Two Practices (2)	26.0	44.4	50.0	58.8	56.0	82
Three Practices (3)	48.0	40.0	35.0	29.4	44.0	75
Four Practices (4)	20.0	8.9	11.7	5.9	--	22
Total Respondents	50	45	60	17	16	188

Number of Practices	Canola Variety		
	Argentine	Polish	PROV (Number of Responses)
	(Percent of Respondents per Variety)		
No Practices (0)	2	--	2
One Practice (1)	5	2	7
Two Practices (2)	74	8	82
Three Practices (3)	67	8	75
Four Practices (4)	19	3	22
Total Respondents	167	21	188

Table B.24

Major Factors Influencing Pesticide Application Practices
By Survey Respondents on Stubble Wheat Acreage

Factor	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Effectiveness of control observed	125	25.5	55.1
Selected method for field conditions	73	14.9	32.2
Most effective chemical for weed problem	54	11.0	23.8
Method for crop/variety choice	38	7.7	16.7
Wanted to see if control was required	31	6.3	13.7
Most convenient for farming system	23	4.7	10.1
Moisture conservation consideration	22	4.5	9.7
Soil erosion consideration	19	3.9	8.4
Most feasible for equipment/farming system	18	3.7	7.9
Chose lowest cost alternative	17	3.5	7.5
Availability of extra time	12	2.4	5.3
Weather/moisture conditions	10	2.0	4.4
Strategy/benefit re: residue carryover	9	1.8	4.0
Control method used in the past	7	1.4	3.1
Fall field conditions	5	1.0	2.2
Selected method for trash conditions	4	0.8	1.8
Avoid extra work required for incorporation	4	0.8	1.8
Weather conditions at post-emergent spraying	4	0.8	1.8
Spring field conditions	4	0.8	1.8
Budget constraint	3	0.6	1.3
Selected method for soil type/area	2	0.4	0.9
Most efficient method for attaining yields	2	0.4	0.9
Combined application with fertilizer operation	2	0.4	0.9
Post emergent/Spring allows chemical combinations with reduced number of passes	2	0.4	0.9
Recommended method for chemical selected	1	0.2	0.4
Totals	491	100.00	227

Table B.25

Major Factors Influencing Pesticide Application Practices
By Survey Respondents on Stubble Canola Acreage

Factor	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Effectiveness of control observed	98	24.8	58.7
Selected method for field conditions	64	16.2	38.3
Method for crop/variety choice	49	12.4	29.3
Most effective chemical for weed problem	46	11.6	27.5
Choose lowest cost alternative	20	5.1	12.0
Moisture conservation consideration	17	4.3	10.2
Most convenient for farming system	13	3.3	7.8
Strategy/benefit re: residue carryover	13	3.3	7.8
Availability of extra time	12	3.0	7.2
Most feasible for equipment/farming system	11	2.8	6.6
Soil erosion consideration	8	2.0	4.8
Weather/moisture conditions	8	2.0	4.8
Wanted to see if control was required	7	1.8	4.2
Fall field conditions	6	1.5	3.6
Selected method for trash conditions	6	1.5	3.6
Control method used in the past	4	1.0	2.4
Spring field conditions	3	0.8	1.8
Avoid extra work required for incorporation	3	0.8	1.8
Weather conditions at post-emergent spraying	2	0.5	1.2
Combined application with fertilizer operation	2	0.5	1.2
Most efficient method for attaining yields	1	0.3	0.6
Post emergent/Spring allows chemical combinations reduced number of passes	1	0.3	0.6
Recommended method for chemical selected	1	0.3	0.6
Totals	395	100.0	167

Table B.26

Minor Factors Influencing Pesticide Application Practices
By Survey Respondents on Stubble Wheat Acreage

Factor	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Most effective chemical for weed problem	12	11.8	16.0
Wanted to see if control was required	9	8.8	12.0
Availability of extra time	9	8.8	12.0
Method for crop/variety choice	8	7.8	10.7
Choose lowest cost alternative	8	7.8	10.7
Selected method for field conditions	7	6.9	9.3
Most convenient for farming system	7	6.9	9.3
Effectiveness of control observed	6	5.9	8.0
Most feasible for equipment/farming system	5	4.9	6.7
Strategy/benefit re: residue carryover	5	4.9	6.7
Soil erosion consideration	4	3.9	5.3
Weather/moisture conditions	3	2.9	4.0
Weather conditions at post-emergent spraying	3	2.9	4.0
Spring field conditions	2	2.0	2.7
Moisture conservation consideration	2	2.0	2.7
Most efficient method for attaining yields	2	2.0	2.7
Recommended method for chemical selected	2	2.0	2.7
Post emergent/Spring allows chemical combinations/ reduced number of passes	2	2.0	2.7
Fall field conditions	1	1.0	1.3
Selected method for trash conditions	1	1.0	1.3
Avoid extra work required for incorporation	1	1.0	1.3
Control method used in the past	1	1.0	1.3
Budget constraint	1	1.0	1.3
Totals	102	100.0	75

Table B.27

Minor Factors Influencing Pesticide Application Practices
By Survey Respondents on Stubble Canola Acreage

Factor	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Most effective chemical for weed problem	17	20.7	27.9
Strategy/benefit re: residue carryover	16	19.5	26.2
Choose lowest cost alternative	10	12.2	16.4
Availability of extra time	5	6.1	8.2
Method for crop/variety choice	5	6.1	8.2
Selected method for field conditions	4	6.1	6.6
Wanted to see if control was required	3	3.7	4.9
Weather conditions at post-emergent spraying	3	3.7	4.9
Most convenient for farming system	3	3.7	4.9
Effectiveness of control observed	2	2.4	3.3
Most feasible for equipment/farming system	2	2.4	3.3
Most efficient method for attaining yields	2	2.4	3.3
Recommended method for chemical selected	2	2.4	3.3
Weather/moisture conditions	1	1.2	1.6
Spring field conditions	1	1.2	1.6
Moisture conservation consideration	1	1.2	1.6
Soil erosion consideration	1	1.2	1.6
Post emergent/Spring allows chemical combinations/reduced number of passes	1	1.2	1.6
Selected method for trash conditions	1	1.2	1.6
Avoid extra work required for incorporation	1	1.2	1.6
Totals	82	100.0	61

Table B.28

Information for Pesticide Application Decisions
Requested By Survey Respondents

Information	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Effectiveness under different weather scenarios	34	15.4	28.3
Information on insect control	32	14.5	26.7
Relate efficiency of methods to moisture conditions	26	11.8	21.7
Probability of control under different weather conditions	24	10.9	20.0
Information on diamond back moth control	20	9.0	16.7
Any new information	13	5.9	10.8
Economic threshold levels of control	9	4.1	7.5
Information on potential insect threats	8	3.6	6.7
More on control of problem weeds in my area	8	3.6	6.7
More on application equipment/methods	8	3.6	6.7
Relate efficiency of methods to soil type	7	3.2	5.8
Relate efficiency of methods to timing (including time of day)	7	3.2	5.8
Information on ideal water volume/droplet size/pressure	7	3.2	5.8
Information on non-recommended/farmer-tested practices (e.g., tank mixes, reduced rates)	7	3.2	5.8
Information on insect identification	4	1.8	3.3
Better/more information on soil residues/carryovers	4	1.8	3.3
More on biological control of weeds/insects	3	1.4	2.5
Totals	221	100.0	120

Table B.29

Information for Pesticide Application Decisions Requested by Survey Respondents

Information	SW	NW	CE	INT	EAST	PROV
	(Percent of Total Responses)					(Number of Responses)
Effectiveness under different weather scenarios	13	20	16	19	10	34
Information on insect control	11	13	11	15	31	32
Relate efficiency of methods to moisture conditions	13	7	15	12	7	26
Probability of control under different weather conditions	10	20	<5	19	14	24
More on diamond back moth control	15	<5	11	--	7	20
Any new information	5	7	<5	12	7	13
Economic threshold levels of control	5	--	7	--	<5	9
More on potential insect threats	<5	7	<5	<5	<5	8
More on control of problem weeds	<5	10	<5	--	<5	8
More on application equipment/methods	7	<5	<5	<5	<5	8
Relate efficiency of methods to soil type	<5	--	5	--	7	7
Relate efficiency of methods to timing (including time of day)	5	--	5	--	--	7
Information on ideal water volume/droplet size/pressure	7	--	<5	<5	--	7
Information on non-recommended and farmer-tested practices	<5	7	<5	<5	--	7
More on insect identification	--	--	<5	8	--	4
All Others[a]	--	<5	7	--	<5	7
Total Responses	61	30	75	26	29	221

[a]Each factor aggregated into "All Others" represents less than 5% of responses in every region.

Table B.30

Changes in Wheat Varieties Made by Survey Respondents

Variety Changed From	Number of Responses	Percent of Total
Added a variety	20	43.5
Columbus	4	8.7
Katepwa	4	8.7
Marshall	4	8.7
Medora	4	8.7
Benito	3	6.5
HY320	3	6.5
Wheaton	3	6.5
Neepawa	1	2.2
Totals	46	100.0

Variety Changed To	Number of Responses	Percent of Total
Katepwa	9	19.6
Roblin	9	19.6
Columbus	5	10.9
Sceptre	4	8.7
Marshall	3	6.5
Kenyon	2	4.3
Selkirk	2	4.3
Oslo	2	4.3
Wheaton	2	4.3
Benito	1	2.2
Laura	1	2.2
Neepawa	1	2.2
HY355	1	2.2
Norak	1	2.2
Glenlea	1	2.2
Arcola	1	2.2
Medora	1	2.2
Totals	46	100.0

Table B.31

Changes in Wheat Varieties Made by Survey Respondents, by Variety Type

Type Changed From	Number of Responses	Percent of Total
Added a Variety	20	43.5
HRS (recommended)	12	26.1
HY (recommended)	3	6.5
HY (not recommend.)	7	15.2
Durum (recommend.)	4	8.7
Totals	46	100.0

Type Changed To	Number of Responses	Percent of Total
HRS (recommend.)	28	80.4
HRS (not rec.)	3	4.3
HY (recommended)	3	4.3
HY (not recomm.)	5	10.9
Durum (recomm.)	6	13.1
Utility (recomm)	1	2.2
Totals	46	100.0

Table B.32

Changes in Canola Varieties Made by Survey Respondents

Variety Changed From	Number of Responses	Percent of Total
Added a Variety	13	40.6
Westar	17	53.1
Tobin	2	6.3
Totals	32	100.0

Variety Changed To	Number of Responses	Percent of Total
Triton	11	34.4
Tobin	7	21.9
Global	5	15.6
Westar	2	6.3
Tribute	2	6.3
Topas	2	6.3
Regent	1	3.1
Legend	1	3.1
High Acid Rapeseed	1	3.1
Totals	32	100.0

Table B.33

Changes in Canola Varieties Made by Survey Respondents
By Distinguishing Agronomic Characteristics

Variety Changed From	Number of Responses	Percent of Total
Added a Variety	13	40.6
Late (recommended)	17	53.1
Early (recommended)	2	6.3
Totals	32	100.0

Variety Changed To	Number of Responses	Percent of Total
Late (recommended)	8	25.0
Early (recommended)	7	21.9
Triazine resistant	13	40.6
Late (not recommended)	3	9.4
High acid	1	3.1
Totals	32	100.0

Table B.34

Information Sources Used by Survey Respondents in Selecting Wheat and/or Canola Varieties, by Region

Information Source	SW	NW	CE	INT	EAST	PROV
	(Percent of Total Responses)					(Number of Responses)
MDA Field Crop Variety Recommendations	24	25	24	31	29	161
Local farmers' advice/experience	19	18	21	26	20	126
Seed grower/sellers' recommendation	16	17	12	14	11	89
Personal experience /experimentation	16	9	16	10	18	88
Industry publications/articles	10	11	8	10	10	60
Secan information	5	7	<5	<5	<5	28
Local variety trials/test plots	<5	<5	<5	--	5	18
All Others*	8	8	14	7	6	60
Total Responses	154	138	200	58	80	630

*Each factor aggregated into "All Others" represents less than 5% of responses in every region.

Table B.35

Major Factors Influencing Decisions by Survey Respondents to Increase or Maintain Canola Acreage, by Region

Factor	SW	NW	CE	INT	EAST	PROV
	(Percent of Responses per Region)					(Number of Responses)
Crop rotation consideration	36	35	28	26	29	82
Profit potential	21	27	32	37	25	71
Change in relative prices of crops	14	16	13	15	29	40
Weed conditions	7	6	10	11	<5	20
Don't change proportion seeded to canola.	11	10	<5	<5	--	18
Additional suitable land available (Summerfallow, rented, purchased)	<5	6	<5	--	--	10
All Others[a]	8	--	8	7	13	17
Total Responses	73	63	71	27	24	258

[a]Each factor aggregated into "All Others" represents less than 5% of responses in every region.

Table B.36

Minor Factors Influencing Decisions by Survey Respondents to Increase or Maintain Canola Acreage

Factor	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Profit potential	11	27.5	29.7
Crop rotation consideration	9	22.5	24.3
Do not change proportion seeded to canola	6	15.0	16.2
Change in prices of alternate crops	4	10.0	10.8
Weed conditions	3	7.5	8.1
Reseeded/length of growing season	2	5.0	5.4
Crop plan eliminated other oilseed/ speciality crops	2	5.0	5.4
Historical yield experience	1	2.5	2.7
Current on-farm grain inventory	1	2.5	2.7
Additional suitable land available (Summerfallow, rented, purchased)	1	2.5	2.7
Totals	40	100.0	37

Table B.37

Major Factors Influencing Decisions Leading to
Reduced or Constrained Canola Acreage, by Region

Factor	SW	NW	CE	INT	EAST	PROV
	(Percent of Responses per Region)					(Number of Responses)
Crop rotation consideration	47	41	35	40	33	115
Weed conditions	17	16	19	17	13	49
Profit potential	16	15	6	14	23	38
Disease conditions	7	7	10	14	7	25
Price change of alternate crops	7	<5	<5	<5	13	14
Prefer other oilseed /special crops	--	<5	<5	6	--	6
Yield risk	--	--	5	<5	--	5
My historical yield experience	--	--	5	--	<5	5
Don't change proportion of canola acreage	<5	5	--	--	--	4
All Others[a]	<5	13	14	<5	7	26
Total Responses	75	61	86	35	30	287

[a]Each factor aggregated into "All Others" represents less than 5% of responses in every region.

Table B.38

Minor Factors Influencing Decisions Leading to Reduced or Constrained Canola Acreage

Factor	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Crop rotation consideration	9	16.4	19.6
Weed conditions	8	14.5	17.4
Profit potential	7	12.7	15.2
Potential insect problems	5	9.1	10.9
Yield risk	4	7.3	8.7
Disease conditions	4	7.3	8.7
Soil erosion considerations	4	7.3	8.7
Do not change acres seeded to canola	3	5.5	6.5
Change in prices of alternative crops	2	3.6	4.3
Moisture of seedbed	2	3.6	4.3
Current on-farm grain inventory	2	3.6	4.3
Higher production costs	1	1.8	2.2
Quality of seedbed	1	1.8	2.2
Historical yield experience	1	1.8	2.2
Production forecasts for oilseeds	1	1.8	2.2
Market forecast analysis	1	1.8	2.2
Totals	550	100.0	46

Table B.39

Reasons Given by Survey Respondents for
Not Using *Field Crop Variety Recommendations*[a]

Response	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Do not change varieties very often	33	35.9	42.3
Rely more on local performance/results	18	19.6	23.1
Rely on advice from other sources	18	19.6	23.1
Use as reference/for comparison only	8	8.7	10.3
Just not that useful	7	7.6	9.0
Not specific enough	5	5.4	6.4
Not accurate	3	3.3	3.8
Totals	92	100.0	78

[a]This question was asked of all respondents who indicate that they use the guide only occasionally or never (see Table 8.1).

Table B.40

Reasons Given by Survey Respondents for
Not Using *Field Crop Production Guide*[a]

Response	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Common knowledge	41	43.6	41.8
Use mostly for a new crop on my farm	19	20.2	19.4
Use as a reference only	12	12.8	12.2
Do not know	8	8.5	8.2
Not specific enough	6	6.4	6.1
Just not that useful	5	5.3	5.1
Not relevant	3	3.2	3.1
Totals	94	100.0	98

[a]This question was asked of all respondents who indicate that they use the guide only occasionally or never (see Table 8.1).

Table B.41

Reasons Given by Survey Respondents for
Not Using *Chemical Weed Control Guide*[a]

Response	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Get information from chemical dealer	6	46.2	42.8
Common knowledge	2	15.4	14.3
Not relevant	2	15.4	14.3
Refer to product labels	2	15.4	14.3
Not specific enough	1	7.7	7.1
Totals	13	100.0	148

[a]This question was asked of all respondents who indicate that they use the guide only occasionally or never (see Table 8.1).

Table B.42

Survey Respondents' Evaluation of Specific Aspects of the *Field Crop Variety Recommendations*

Information	Rating[a] 1	2	3	4	5	6	7
	(Number of Responses)						
Yield/Quality Characteristics							
Yield estimates for crops and varieties	**46**	**100**	8	6	0	1	1
Comparisons among crops	25	**84**	19	**26**	1	7	0
Relative yield comparisons	**56**	**100**	4	2	0	0	0
Seed weight/bulk density	22	**57**	**44**	27	2	8	2
% seed oil/oil quality	11	**39**	27	**50**	10	24	1
% meal protein	7	**38**	28	**53**	10	25	1
% hull	6	**46**	20	**57**	8	24	1
Seed size	16	**69**	**39**	26	2	8	2
Agronomic Characteristics							
Winter survival	18	**52**	6	6	**66**	13	1
Days to bloom/silk	16	**55**	**28**	18	**28**	17	0
Days to maturity	**53**	**95**	7	4	0	2	1
Resistance to lodging	**58**	**90**	11	1	1	0	1
Resistance to shattering	**50**	**99**	11	1	0	0	1
Plant height	27	**88**	**33**	13	0	0	1
Heat unit rating	18	**41**	18	4	**76**	5	0
Hybrid type	12	**31**	21	2	**87**	9	0
Disease Resistance							
Ergot resistance	**50**	**90**	15	1	0	5	1
Leaf spot resistance	**34**	**89**	22	2	1	13	1
Head rot resistance	**33**	**74**	20	4	4	27	0
Rust/staghead resistance	**50**	**90**	16	1	0	5	0
Smut resistance	**47**	**92**	16	2	0	4	1
Bunt resistance	**37**	**83**	25	2	0	14	1
Root rot resistance	**39**	**87**	20	2	0	13	1
Net blotch resistance	**32**	**80**	26	4	1	19	0
Blackleg resistance	**47**	**84**	14	3	3	11	0
Wilt resistance	**37**	**74**	21	3	4	23	0
Mildew resistance	**39**	**72**	24	3	3	21	0

[a]The interpretation of the rating codes is as follows:

1 - Very Useful
2 - Useful
3 - Useful Infrequently
4 - Not Useful
5 - Not Relevant
6 - Do Not Know (Use)
7 - Useful But Incomplete

Table B.43

Survey Respondents' Evaluation of Specific Aspects of the *Field Crop Production Guide*

Information	Rating[a] 1	2	3	4	5	6
	(Number of Responses)					
General Guidelines						
Disease/insect control	**33**	**56**	8	0	0	0
Erosion Control	12	**32**	**28**	10	2	13
Harvesting	14	**51**	**24**	4	1	3
Grain drying	9	**36**	**25**	14	1	12
Grain storage	9	**41**	**23**	14	1	9
General management	12	**46**	**27**	4	1	7
Fertilizer Use						
Fertilizer calculations	13	**42**	**23**	15	1	3
Placement efficiencies	**18**	**54**	15	9	0	1
Fallow versus breaking versus stubble calibration	12	**33**	**21**	15	7	9
Species/Crop Recommendations						
Fertilizer rate/method	**21**	**52**	15	7	0	2
Seeding dates	**23**	**59**	12	3	0	0
Rates and spacing	**21**	**56**	17	2	0	1
Depth of seeding	**27**	**54**	13	2	0	1
Risk maps for corn	13	**18**	4	1	**58**	3
Forage Crops						
Forage seeding rate	15	**33**	9	3	**36**	1
Species selection	10	**36**	6	6	**37**	2
Forage mixtures	10	**33**	8	6	**39**	1
Silage recommendations	7	**17**	5	7	**58**	3
Pasture management	9	**21**	6	8	**50**	3

[a]The interpretation of the rating codes is as follows:

1 - Very Useful
2 - Useful
3 - Useful Infrequently
4 - Not Useful
5 - Not Relevant
6 - Do Not Know (Use)

Table B.44

Survey Respondents' Evaluation of Specific Aspects of the *Guide to Chemical Weed Control*

Information	Rating* 1	2	3	4	5	6	7
	(Number of Responses)						
Chart of recommended herbicides for specific crops and weeds	**129**	**79**	6	0	0	0	2
Metric conversion factors	47	**69**	33	**58**	1	5	3
Field crop tolerance information	**75**	**120**	11	3	0	0	7
Field crop weed control recommendations	**80**	**132**	0	0	0	0	4
Forage crop tolerance information	29	**49**	25	3	**82**	21	7
Forage crop weed control recommendations	27	**52**	26	3	**81**	22	5
Perennial weed control recommendations	**61**	**112**	31	1	0	9	2
Chemical fallow recommendations	30	**54**	24	9	**49**	**49**	1
Horticultural crop weed control recommendations	19	30	31	6	**64**	**65**	1
Non-crop weed control	31	**74**	38	8	11	**53**	1
Special weeds control	**43**	**100**	**43**	2	2	25	1
Desiccation	29	**52**	26	5	18	**84**	2
Aerial application requirements and recommendations	29	**62**	31	7	11	**73**	3
Herbicide incorporation	**46**	**108**	33	2	3	22	2
Grazing and feeding restrictions	36	**70**	23	3	**63**	20	1
Effect of rainfall on efficiency	**88**	**108**	6	4	1	6	3
Soil residues	**67**	**110**	13	1	1	19	5
Chemical storage	**44**	**114**	27	10	3	18	0

*The interpretation of the rating codes is as follows:

1 - Very Useful
2 - Useful
3 - Useful Infrequently
4 - Not Useful
5 - Not Relevant
6 - Do Not Know (Use)
7 - Useful But Incomplete

Table B.45

Information Needs Related to 1988 Weather Conditions, for 1988 Crop Decisions, by Region

Information Need	SW	NW	CE	INT	EAST	PROV
	(Percent of Responses per Region)					(Number of Responses)
Herbicide recommendations for dry conditions	16	9	22	25	29	68
Probility of success/failure of spray under stress conditions	17	11	18	28	27	66
Probability of rainfall information	21	<5	28	11	15	66
Escaped the drought	<5	53	--	<5	<5	33
Impact of spray in stress conditions	9	5	9	17	7	32
Knowledge that drought was coming	10	7	<5	--	--	16
Assessment of crop potential earlier	<5	--	<5	<5	7	9
Global productivity/status reports	<5	--	<5	6	<5	6
All Others[a]	24	11	18	8	10	58
Total Responses	103	55	119	36	41	354

[a]Each factor aggregated into "All Others" represents less than 5% of responses in every region.

Table B.46

Information Needs Related to 1988 Weather Conditions,
for 1988 Crop Decisions, by Region

Information Need	SW	NW	CE	INT	EAST	PROV
	(Percent of Responses per Region)					(Number of Responses)
Escaped the drought	<5	50	--	<5	<5	30
Herbicide recommendations for dry conditions	6	7	10	15	6	29
Probability of rainfall information	7	<5	13	5	9	27
Probability of success/failure of spray under stress conditions	<5	6	8	13	6	22
Earlier/more accurate price forecasts	11	<5	<5	10	<5	18
Impact of spray in stress conditions	<5	<5	6	8	6	15
Crop choice for drought conditions	6	--	6	5	<5	15
Moisture deficits in fall/spring	6	6	<5	<5	--	14
Tillage practices to conserve moisture	5	<5	<5	<5	<5	13
Seed date/depth/fertilizer in dry conditions	6	<5	<5	<5	6	13
Short/long term outlook reports	7	--	<5	5	--	13
Variety for droughty conditions	5	--	5	5	--	12
Long-range weather forecasting	5	<5	<5	8	--	12
Nutrient carryover for soil type and field conditions	<5	<5	<5	--	13	11
Earlier indication of government prog.	<5	<5	<5	<5	13	11
Moisture requirements for normal yields	5	<5	<5	--	9	9
More accurate weather forecasts	6	--	<5	<5	<5	8
Pesticide reisdue carryover	<5	--	<5	--	6	6
Marketing options	--	--	<5	5	--	3
All Others*	11	7	19	5	6	40
Total Responses	84	54	119	39	32	328

*Each factor aggregated into "All Others" represents less than 5% of responses in every region.

Table B.47

Frequency of Soil Erosion Problems and Soil Conservation Practices, By Major Soil Type

Existence of a Soil Erosion Problem	Clay	Clay-loam	Sandy-loam	PROV
	(Percentage of Total Responses)			
No	46.5	52.4	43.2	47.0
Yes	16.3	42.7	52.3	41.9
Not until this year	37.2	4.9	4.6	11.1
Total Responses	43	103	44	234

Soil Conservation is Practised	Clay	Clay-loam	Sandy-loam	PROV
	(Percentage of Total Responses)			
Always	41.9	42.7	56.8	47.4
Frequently	27.9	43.7	29.6	36.8
Only Occasionally	20.9	12.6	6.8	11.5
Never	0.0	1.0	4.6	2.1
Not until this year	9.3	0.0	2.3	2.1
Total Responses	43	103	44	234

Table B.48

Soil Conservation Practices Utilized by Survey Respondents

Soil Conservation Practice	Number of Responses	Percent of Total Responses	Percent of Farmers Responding
Reduced tillage operations in fall	121	12.9	52.8
Chop/incorporate straw	87	9.3	38.0
Snow trapping/standing stubble	82	8.7	35.8
Continuous cropping	67	7.1	29.3
Do not burn straw	50	5.3	21.8
Leave trash cover on stubble fields	45	4.8	19.7
Added grasses/legumes in crop rotation	44	4.7	19.2
More stubble mulching/cultivator use	37	3.9	16.2
Plant shelterbelts/windbreaks	34	3.6	14.8
Make less summerfallow	29	3.1	12.7
Plant water runways to grasses/legumes	28	3.0	12.2
Seed lighter lands to pastures/forages	28	3.0	12.2
Seed cover crops (rye, winter wheat, fall strips	27	2.9	11.8
Eliminated plowing	27	2.9	11.8
Minimum/zero - till farming	23	2.4	10.0
Attention to tillage depth/direction/speed	23	2.4	10.0
More chemical/less tillage control	23	2.4	10.0
Post-emergent instead of pre-emergent chemical	17	1.8	7.4
Less harrowing	16	1.7	7.0
Preserve existing treecover/windbreaks	16	1.7	7.0
Manure on Summerfallow and erosion-prone areas	15	1.6	6.6
Reduced/more careful tillage of Summerfallow	14	1.5	6.1
Water management (e.g., improved drainage, preserve potholes)	14	1.5	6.1
Reduced spring tillage	13	1.4	5.7
Improved crop rotation	12	1.3	5.2
Leave fall growth on Summerfallow	11	1.2	4.8
No fall tillage of water runways	9	1.0	3.9
Make use of local conservation group	7	0.7	3.1
Tillage leaving rough, lumpy texture	7	0.7	3.1
High fertilizer use /higher residue crops	4	0.4	1.7
Contour farming	4	0.4	1.7
Use green manure/plowdowns	3	0.3	1.3
Use chemical fallow	2	0.2	0.9
Totals	939	100.0	229

Table B.49

Soil Conservation Practices Utilized by Survey Respondents, by Region

Soil Conservation Practice	SW	NW	CE	INT	EAST	PROV
	(Percent of Responses per Region)					(Number of Responses)
Reduced fall tillage operations	12	9	15	13	15	121
Chop/incorporate straw	7	6	12	5	13	87
Snow trapping/standing stubble	8	8	12	<5	6	82
Continuous cropping	6	7	9	<5	7	67
Do not burn straw	5	7	<5	<5	7	50
Trash cover on stubble fields	5	6	<5	15	6	45
Grasses/legumes in crop rotation	<5	<5	5	5	6	44
More stubble mulch/cultivator use	<5	<5	6	<5	9	37
Plant shelterbelts/windbreaks	5	<5	<5	<5	<5	34
Make less summerfallow	5	<5	<5	<5	<5	29
Grasses/legumes in water runways	<5	5	<5	<5	--	28
Lighter lands to pastures/forages	<5	<5	<5	<5	<5	28
Seed cover crops (rye, winter wheat, fall strips)	<5	<5	<5	<5	<5	27
Eliminated plowing	<5	<5	<5	5	6	27
Minimum/zero - till farming	5	<5	<5	<5	<5	23
Attention to tillage depth/ direction/speed	<5	<5	<5	<5	<5	23
More chemical/less tillage control	<5	<5	<5	<5	--	23
Post-emergent instead of pre-emergent chemical	<5	<5	<5	<5	<5	17
Less harrowing	<5	<5	<5	5	--	16
Preserve treecover/windbreaks	<5	<5	<5	<5	<5	16
Manure on Summerfallow/ erosion-prone areas	<5	<5	<5	--	<5	15
Leave fall growth on Summerfallow	<5	<5	--	7	<5	11
All Others*	7	11	<5	12	<5	62
Total Responses	219	209	338	60	113	939

*Each factor aggregated into "All Others" represents less than 5% of responses in every region.

Table B.50

Soil Conservation Practices Utilized by Survey Respondents, by Major Soil Type

Soil Conservation Practice	Clay	Clay-loam	Sandy-loam	PROV
	(Percentage of Total Responses)			
Reduced tillage in fall	16.3	11.8	12.0	12.9
Chop/incorporate straw	14.3	8.3	9.7	9.3
Snow trapping/standing stubble	10.9	8.3	7.4	8.7
Continuous cropping	9.5	8.3	5.1	7.1
Do not burn straw	10.2	5.2	<5	5.3
Added grasses/legumes in crop rotation	<5	5.0	5.1	4.7
Plant shelterbelts/ windbreaks	<5	<5	6.9	3.6
Seed lighter lands to pastures/forages	<5	<5	6.3	3.0
Seed cover crops	--	<5	5.7	2.9
All Others[a]	31.3	47.0	37.2	42.5
Total Responses	147	424	175	939

[a]None of the individual practices aggregated in the "All Others" category accounts for more than 4.9 percent of total responses for any major soil type.

Table B.51

Factors Limiting the Choice and Use of Soil Conservation Practices
By Survey Respondents, by Region

Factor	SW	NW	CE	INT	EAST	PROV
	(Percent of Responses per Region)					(Number of Responses)
Cost of chemicals	25	26	18	19	7	71
Do not have suitable equipment	11	5	14	--	9	35
Weed control problems with reduced tillage	11	9	12	<5	<5	33
Limited by soil type (e.g. clay)	<5	<5	6	<5	28	24
Budgetary constraints	9	5	5	8	1	21
Excess straw	<5	9	10	<5	<5	21
Economic methods not apparent	7	<5	6	8	<1	20
Economic losses not experienced	<5	11	<5	19	13	20
Need Summerfallow for weed control/seed production/economic reasons/beneficial	7	9	<5	<5	<5	15
Tillage required for herbicide incorporation	<5	<5	<5	12	<5	14
Low prices (Summerfallow reduces spending)	<5	9	--	--	<5	11
Economics favour pulses/ oilseeds	<5	--	5	--	<5	11
Chemical fallow not economic	<5	--	5	--	7	11
Limited by stoney conditions	<5	<5	<5	8	--	6
Need to leave good seedbed in fall	<5	--	<5	8	<5	5
All Others[a]	11	<5	14	<5	9	35
Total Responses	99	57	125	26	46	353

[a]Each factor aggregated into "All Others" represents less than 5% of responses in every region.

Table B.52

Factors Limiting the Choice and use of Soil Conservation Practices
By Survey Respondents, by Major Soil Type

Factor	Clay	Clay-loam	Sandy-loam	PROV
	(Percentage of Total Responses)			
Cost of chemicals	9.0	20.8	30.4	20.1
Do not have suitable equipment	7.5	11.0	14.3	9.9
Weed control problems with reduced tillage	<5	8.1	12.5	9.3
Limited by soil type	19.4	<5	<5	6.8
Budgetary constraints	6.0	5.8	<5	5.9
Excess straw	9.0	7.5	--	5.9
Economics of methods not apparent	6.0	5.8	<5	5.7
Economic losses not experienced	9.0	5.8	<5	5.7
Need summerfallow for weed control/seed production/economic reasons/etc.	<5	5.8	<5	4.2
Low grain prices	<5	<5	7.1	3.1
Economics that favour pulses/oilseeds	<5	<5	7.1	3.1
Moisture conditions	7.5	<5	<5	2.8
All Others*	17.9	18.5	14.3	17.5
Total Responses	67	173	56	353

*None of the individual factors aggregated in the "All Others" category accounts for more than 4.9 percent of total responses for any major soil type.

Table B.53

Information Needs Related to Soil Conservation Practices, by Region

Information Need	SW	NW	CE	INT	EAST	PROV
	(Percent of Responses per Region)					(Number of Responses)
Recommend specific practices for my area/soil type	27.3	6.3	31.5	42.9	45.5	40
Information on new/different soil conservation methods	12.1	37.5	25.9	--	<5	25
Practical minimum/zero - till information for my farm	9.1	12.5	7.4	--	18.2	13
More on straw management	6.1	12.5	<5	--	<5	7
Unbiased information on conservation seeding equipment /practices/performance	<5	--	<5	14.3	9.1	6
Local demonstrations of conservation practices	6.1	12.5	<5	--	<5	6
Yield comparison of recommended vs. conventional practices	<5	--	<5	28.6	<5	5
How to economically incorporate soil conservation practices in farming system	<5	--	7.4	--	--	5
More information on snow trapping	9.1	6.3	<5	--	--	5
Cost comparison of recommended vs conventional practices	6.1	--	<5	14.3	--	4
Better alternatives to weed control under soil conservation systems	6.1	--	<5	--	--	4
More on using green plowdowns	6.1	--	--	--	9.1	4
More on shelterbelts (design, maintenance)	--	--	7.4	--	--	4
Unbiased information on minimum /zero till equipment and performance	<5	6.3	<5	--	--	3
Demonstrate economic losses caused by my existing farming system	--	6.3	--	--	--	1
Total Responses	33	16	54	7	22	132

Table B.54

Information Needs Related to Soil Conservation Practices, by Major Soil Type

Information Need	Clay	Clay-loam	Sandy-loam	PROV
	(Percentage of Total Responses)			
Recommend specific practices for my area/soil type	43.5	33.9	25.0	30.3
Information on new/different soil conservation methods	17.4	19.4	20.8	18.9
Practical minimum/zero-till information for my farm	8.7	8.1	12.5	9.8
More information on straw management	<5	<5	12.5	5.3
Information on how to economically incorporate conservation practices in my farming system	--	<5	8.3	3.8
More information on using green plowdowns	8.7	<5	--	3.0
All Others[a]	17.4	30.7	20.8	28.9
Total Responses	23	62	24	132

[a]None of the individual factors needs aggregated in the "All Others" category accounts for more than 4.9 percent of total responses for any major soil type.