Economic Value of Outlook and Research Information: A Test from Southern Alberta

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The financial value of outlook and research information was tested in a simulated decision-making environment. Established farmers and farm-management students were asked to make farm-management decisions with and without selected outlook and research information. The decisions were made on a computerized case farm which was then simulated under conditions of actual prices, yields, costs, and quotas for unidentified years. Results showed a small, but positive, financial value of information.

Flexible farm management strategies require producers to consider alternative plans as additional information becomes available. Sonka et al.[1] showed that the process of producing one season's crop is not the result of a single decision; instead, the decision process is composed of a number of choices made over a several-month period. As additional information becomes available there is often an opportunity for the producer to reevaluate previous decisions, potentially leading to different production choices than were originally planned.

Decisions made by farmers in the production of agricultural commodities are affected by the quality and timeliness of information available to them. Farmers receive information on new technology and expected prices from various sources.

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The sources of new information may not be critical, but their reliability and timely application can often be the difference between better-than-average net returns and losses.

The value of outlook and research information is also affected by uncertainty. Carefully researched predictions on prices and yields of various crops can be made irrelevant by weather conditions in other countries, the decisions of others, fluctuating exchange rates, and a host of other factors. Similarly, research information that represents biological relationships may fail to produce similar results on a particular farm that faces unique soil and climatic conditions.

A problem in assessing the value of outlook and research information relates to the way it is used by farmers in the making of decisions. When farmers are given information on crop prices and yields, do they always choose to produce the crop which has the highest anticipated returns? Or do they avoid planting the crop with the high predicted return because either they distrust predictions made by agricultural economists or they expect others to plant the crop with the highest projected return, thereby creating oversupply and reducing its price. What is the value of outlook information if farmers make decisions that are contrary to the advice contained in the outlook information bulletin?

Regardless of the way in which farmers formulate their decisions, it is important to know if outlook or research information is valuable to producers. Does the information increase their net returns? In the final analysis, if outlook and research information do not change producers' decisions in ways that pay off to them, what is the social justification for expenditures on extension staff to prepare bulletins on outlook and applied research results?

The objective of this study is to assess, in an experimental setting, the monetary benefits to producers in southern Alberta of selected outlook and research information. Although some benefits from outlook and research information may be manifested in other forms than increases in net income (e.g., less risk, reduced labor), in this study only the direct increases in net incomes are measured. To assess the effects of experience and age on the value of outlook and research information, this assessment was done on students in agriculture as well as experienced, practicing farmers.

METHOD

To test the value of outlook and research information, four student and farmer workshops were held in southern Alberta. At these workshops, participants were divided into groups and asked to make crop choices and other farm decisions based on different levels of information available to them. These decisions were simulated on a computerized farm model.[2] Net farm incomes were calculated in the model for all participants. The value of information was taken to be the additional net income earned by participants who had additional information over those who did not have the extra information. A similar procedure was used by Debertin et al.[3] in their assessment of returns from additional information presented to soybean and corn producers in Indiana.

The first workshop was held at the Lethbridge Community College, Lethbridge, Alberta. The participants were 27 students who were studying farm management. Farmer workshops were held in Lethbridge, Vauxhall, and Warner, Alberta, where a sample of 32 farmers was obtained. The farmer workshops were held in conjunction with Alberta Agriculture's "Gear Up Financially" extension program.

Participants in each workshop were randomly divided into two groups. They were asked to make decisions on a case farm which would be simulated under yield, price, cost, and marketing conditions that actually existed for an unspecified year between 1970 and 1985. Participants were not told what year was being simulated on the model. In each of seven situations (four involving outlook information and three involving research information), both groups obtained current market conditions for the unspecified year, which included the current year's initial price, average yield, and current sales quota level for each crop that it was feasible to plant on dryland in southern Alberta. One group in each situation received an additional package of outlook or research information. In the case of outlook information, the packages contained a summary of information on market conditions for wheat, feed grains, and oilseeds that were expected to prevail during the coming year. The research package contained information on a current agricultural research topic. Both group's decisions were then entered into the computerized farm simulation model where their net farm incomes were computed on the basis of choices made, actual yields, actual prices, and actual costs that occurred during the year to which the outlook applied. To minimize chances of bias, the actual year that was simulated was different for the seven test situations.

Prior to making decisions, participants received a computer printout showing the assets and liabilities of a case farm. The case farm's assets and liabilities were chosen to represent, as closely as possible, a typical farm in the dark brown soil zone of southern Alberta. The representative farm had some cash on hand, machinery of varying ages thought to correspond to many farms in the area and grain storage buildings with a capacity of 15,000 bushels. A rotation of two-thirds crop–one-third fallow was assumed on this farm for most of the scenarios. Its size was 848 acres, 551 acres of which were owned (the remainder was share rented). Students and farmers were also informed of outstanding loans of varying durations that were present at the outset of the simulation. A full description of the case farm is available in Klein and Kramer.[4]

Before participants actually made any production or other farm management decisions, they were told that the information they were to receive may not always be accurate. The outlook information represented a probabilistic assessment of the future that may or may not occur during the following year. They were also told that research results were obtained under controlled conditions and they may have different effects on actual farms.

Members of each group were allowed to converse freely over their crop choices and other farm management decisions. However, each person had to submit an individual choice which was then run on the computer model. Participants exhibited a natural competitive tendency in making their choices. Clearly, their pride was at stake!

The first four tests were to assess the value of outlook information: they were labelled Scenarios A, B, C, and D. Outlook information was obtained from Alberta Agriculture's quarterly publication entitled *Alberta Farm Market Analysis*. Four years were selected from these reports: 1973, 1976, 1978, and 1981.[5–8] These years were not made known to participants because it was feared that some experienced operators might remember yields or prices that actually occurred in these years. Due to the time constraints inherent in a workshop setting, descriptions of the outlook information in these four years were condensed to allow participants to absorb as much pertinent information as possible. The outlook information provided in Scenario A (1973) is presented in Appendix A. Outlook information in the other three scenarios was presented in a similar format.

In the tests for value of outlook information, each participant was required to decide the percentage of total acreage on the case farm that would be devoted to each of the major crops grown in southern Alberta: winter wheat, rapeseed, flaxseed, spring wheat, and barley.

The second set of tests, labelled Scenarios E, F, and G, contained information on current agricultural research topics. Scenario E included research information on conventional versus zero tillage.[9] This included estimated break-even prices for herbicides under two- and three-year zero tillage rotations, a graphical presentation of spring wheat yields by conventional and zero tillage, as well as a short description of the relative costs and benefits of using herbicides to replace mechanical tillage. Participants were required to choose the number of chemical tillage operations that would be performed on stubble crops, fallow crops, and summerfallow.

Scenario F contained information on the effects of various cropping rotations.[10] This included a summary of the relative profitability and risk of different cropping programs and a chart of expected net income by crop combination and rotation. The research information provided to participants in this test situation is presented in Appendix B. In this case participants were required to choose a rotation that would be used for the following four years. Total net incomes for the four-year period were compared for the two groups.

Participants who received information in Scenario G received a graphical presentation of the yield response of spring wheat to varying phosphorus and nitrogen fertilization rates,[11] as well as a short lecture on the principle of equating marginal costs with marginal returns. Participants were required to make a fertilizer application decision for the simulated farm that had a two-thirds crop–one-third fallow rotation with all cropland planted to spring wheat.

RESULTS

Overall financial results from the students' workshop are shown in Table I. In all outlook scenarios, students who did not receive additional information actually did slightly better in terms of average net farm income than did students with the additional information. However, in all research scenarios just the opposite occurred. Those students who received the research information obtained a higher average net farm income than did those without this information. While the difference between means in all outlook scenarios is not statistically significant, the difference between the average net farm incomes of Scenarios F and G are of such magnitude as to produce statistically significant F statistics at the 95% level of confidence. Thus, it can be concluded that the research information of Scenarios F and G significantly increased the net farm income of its student recipients.

Overall financial results from the farmer workshops are shown in Table II. Farmers with outlook information in Scenario A did achieve a significantly higher average net farm income than did those without this information. In all other outlook scenarios, relatively low F statistics resulted in nonrejection of the

Table I. Net Farm Income($), Students.

Scenario	With Additional Information	Without Additional Information	F Statistic
A	20,251	22,095	0.34
B	27,911	29,621	2.99
C	44,223	49,169	1.70
D	60,292	62,097	2.93
E	23,450	23,314	0.13
F	41,912	33,347	9.56*
G	15,392	12,659	44.80*
Average	33,347	33,186	

*Results are statistically significant at the $p = .05$ level.

hypothesis of equal means. Similar decisions in Scenarios E and F led to a close correspondence in average net farm income between groups. However, as with the students, those farmers who received research information in Scenario G had a much higher net farm income than did those without this information. An F statistic of 21.97 resulted in rejection of the null hypothesis of equal means between groups in Scenario G.

A detailed interpretation of the results is provided in the following sections.

Scenario A: 1973 Outlook Information

A fairly strong market for wheat but with declining prices over the following summer was predicted in Scenario A (see Appendix A). The 1973 outlook information forecast strong prices for oilseeds and declining prices for feedgrains due to large carry-over stocks. Given this information, one would expect participants to devote a high proportion of their cropped area to wheats and oilseeds, with a relatively small area devoted to barley production.

Prices of all the crops under consideration advanced in 1973, with the largest increases in the oilseed crops. In this respect, the 1973 outlook package was

Table II. Net Farm Income($), Farmers.

Scenario	With Additional Information	Without Additional Information	F Statistic
A	28,299	20,318	7.40*
B	29,497	30,767	0.73
C	43,119	48,895	2.80
D	69,050	68,997	0.01
E	23,287	23,088	0.31
F	37,545	37,941	0.12
G	15,531	13,916	21.97*
Average	35,190	34,846	

*Results are statistically significant at the $p = .05$ level.

Table III. Average Percentage Acreage Devoted to Each Crop, Scenario A.

Crop	Students With Info	Students No Info	Farmers With Info	Farmers No Info
Winter Wheat	13.1	2.9	2.6	8.8
Rapeseed	24.5	26.8	23.1	22.6
Flaxseed	22.5	24.3	47.1	27.9
Spring Wheat	27.6	20.3	20.1	19.3
Barley	12.3	25.7	7.1	21.4
Total	100.0	100.0	100.0	100.0

correct in its predictions of strong prices for oilseeds but was in error when forecasting declining prices for wheats and feedgrains.

Student participants with the 1973 outlook information tended to produce more winter and spring wheat and less barley than did the group that did not have this information (Table III). However, their average net farm income fell below the group with no information (Table I). The group without outlook information tended to produce relatively more barley. While barley had a smaller rise in price compared to that of other crops, if the increase in price is multiplied by the average yield of barley, it is apparent that production of barley resulted in a higher addition to net farm income than did production of spring wheat, rapeseed, or winter wheat. Barley's yield advantage was large enough to outweigh any price disadvantage. Also, a slight advantage accrued to the group without outlook information because flaxseed had a large price rise in 1973. The optimal cropping pattern would have been 100% flaxseed.

Farmer participants with outlook information chose a much higher proportion of flaxseed than did those with no information (Table III). They chose to devote a much smaller proportion of available area to winter wheat and barley production than did those with no outlook information.

Farmers who had access to the outlook information had significantly higher net incomes than did those who did not have the information (Table II). A large rise in the price of flaxseed was the main reason for this. Students who received the outlook information had lower net incomes than did those without the information, though the difference was not statistically significant (Table I).

Scenario B: 1976 Outlook Information

The outlook report in Scenario B informed farmers that a strengthening of wheat prices was expected to occur in the months following release of the 1976 outlook report. It was also reported that, at the time of publication, feedgrain prices were lower than that of early 1975 but exports of oats and barley were high. The oilseeds sector was predicted to gain strength in 1976 but currently was plagued by over-supply and reduced demand which combined to lower oilseed prices. However, it was projected that reduced acreage devoted to oilseeds and a recovery in economic conditions would lead to a strengthening in the oilseeds sector during the spring of 1976.

Table IV. Average Percentage Acreage Devoted to Each Crop, Scenario B.

Crop	Students		Farmers	
	With Info	No Info	With Info	No Info
Winter Wheat	17.3	5.7	13.9	14.4
Rapeseed	14.2	27.4	19.7	29.8
Flaxseed	13.1	17.0	36.8	25.2
Spring Wheat	33.1	18.2	15.7	8.8
Barley	22.3	31.7	13.9	21.8
Total	100.0	100.0	100.0	100.0

If participants believed this outlook to be correct, one would expect to observe a higher percentage of acreage devoted to wheat on the part of those who received the outlook information. Speculation as to the proportion planted to feedgrains or oilseeds is difficult due to the various interpretations one can make of the text regarding prospects in the oilseed and feedgrain sectors.

Participants appeared to act on the basis of the outlook information. Students with the information devoted a larger proportion of their acreage to both winter and spring wheat than did students without the information (Table IV). Farmers with the information devoted a larger proportion of their acreage to spring wheat and flax than did farmers without the information.

The 1976 outlook report turned out to be wrong in its projection of prices. The prices of all crops, except barley, declined in 1976. Fairly stable prices of feedgrains prevailed during the year. The outlook report was correct in its pessimism toward the oilseeds sector because prices of rapeseed declined and the price of flaxseed rose slightly. However, the relatively small decline in the price of rapeseed still made it the most profitable crop to produce in 1976.

Since participants with the 1976 outlook report devoted a higher percentage of acreage to winter and spring wheat, both of which had a price decline in 1976, they experienced an average net farm income below that of participants who had no additional information. A lower proportion of acres devoted to barley by both students and farmers who received the information reinforced the lower net returns of those with outlook information because barley prices rose during the year. Average net farm income for the groups with outlook information was lower than that of groups without outlook information (Tables I and II).

Scenario C: 1978 Outlook Information

The 1978 outlook was generally pessimistic toward all crops. Record production of feed grains and oilseeds was expected to keep prices of these commodities at their already low levels. However, it was predicted that low 1977 wheat prices would rebound slightly in 1978. Given this outlook, it was expected that participants with outlook information would have a higher proportion of acreage devoted to wheat with correspondingly smaller amounts of flaxseed, rapeseed, and barley sown than would those without this information.

The outlook report in 1978 was perhaps the most pessimistic with regards to

Table V. Average Percentage Acreage Devoted to Each Crop, Scenario C.

Crop	Students With Info	Students No Info	Farmers With Info	Farmers No Info
Winter Wheat	12.6	17.7	26.9	28.4
Rapeseed	31.1	43.1	28.4	43.4
Flaxseed	12.4	15.4	8.4	9.9
Spring Wheat	11.8	11.9	21.3	5.9
Barley	32.1	11.9	15.0	12.4
Total	100.0	100.0	100.0	100.0

oilseed production. It included a reference to record soybean production which was expected to further depress already low oilseed prices. Thus, a lower proportion of acres devoted to rapeseed and flaxseed production on the part of those who received the outlook information can be explained (Table V). The higher proportion of acres devoted to barley production is less easily explained because the 1978 outlook report states: "unlike the wheat situation, which shows some sign of improvement, the world feed grain situation must be viewed with some pessimism." It would seem likely that those participants with this information would produce more wheat and less barley if they believed this information to be true. However, they did not respond in this way.

Students with outlook information devoted much more of their acreage to barley, and less to rapeseed and winter wheat than did students without the information. It would seem that student participants with the outlook information felt that the slight predicted rise in the price of wheat was not certain enough to devote additional acreage to its production. Farmers who had access to the outlook information, on the other hand, decided on a substantial increase in their acreage planted to spring wheat compared to those who did not have the information. Farmers with information devoted a smaller proportion of their acreage to production of rapeseed than did farmers without the information.

What actually happened in 1978 was a slight rise in spring and winter wheat prices, a large increase in the price of rapeseed and decreases in the prices of barley and flaxseed. Production of rapeseed was optimal in this scenario. Not only did the price of rapeseed increase, the 1978 yield of rapeseed was the highest recorded over the period 1972 to 1985. It is easy to see why average net income of those participants with Scenario C's outlook information was lower than that of participants without this information (Tables I and II).

Scenario D: 1981 Outlook Information

The outlook package presented to participants in Scenario D predicted strong wheat, oilseed, and feed grain markets in 1981. World wheat trade was expected to remain strong, barley prices were rising and were expected to continue to rise in the months following publication of the report. Oilseed prices were expected to rise due to predicted low production. Given the expected strong markets in all of the crops, it is difficult to predict reactions of participants who received the outlook information.

Table VI. Average Percentage Acreage Devoted to Each Crop, Scenario D.

Crop	Students: With Info	Students: No Info	Farmers: With Info	Farmers: No Info
Winter Wheat	6.8	11.5	13.1	3.1
Rapeseed	19.7	19.2	18.8	29.7
Flaxseed	8.2	17.3	9.7	6.6
Spring Wheat	33.2	33.5	35.6	36.6
Barley	32.1	18.5	22.8	24.0
Total	100.0	100.0	100.0	100.0

Student participants with the 1981 outlook information devoted a smaller proportion of their acreage to production of winter wheat and flaxseed and a larger proportion of their acreage to production of barley than did those who did not receive the information (Table VI). Farmers who received outlook information devoted more of their acreage to winter wheat and less to rapeseed than did those who did not receive the information.

Outlook information in Scenario D was correct in its prediction of rising prices in all crops. The optimal cropping pattern in this year would have been 100% winter wheat, due mainly to the high yield of this crop in 1981.

Students who had access to the outlook information had lower net incomes than did those who did not receive the information (Table I). This was because, with the exception of barley, those crops that had the highest price rise were produced in the greatest quantities by the group that did not have the information.

Net incomes for the two groups of farmer participants in this scenario were about the same (Table II). Any income advantage gained by the group with information from their higher production of winter wheat was almost fully offset by their lower production of rapeseed, as compared to the group without the information.

Scenario E: Conventional vs. Chemical Tillage

The research information provided to participants in this scenario dealt with the costs and benefits of replacing mechanical tillage operations with herbicides. Farmers were required to make decisions about the number of field operations where they would use chemical control of weeds. Responses were allowed to vary from zero to two chemical tillage operations on both pre-seed fallow and stubble crops, and from zero to four chemical tillage operations on summerfallow.

Responses between groups varied only slightly (Table VII). Students who received the information made slightly more chemical applications on summerfallow and slightly fewer chemical applications on pre-seed stubble and fallow crops than did students who did not receive the information. Farmers who received the information made slightly fewer chemical operations on average than did farmers who did not receive the information. Because there was a slight income advantage from using chemical tillage, those who chose more chemical tillage fared slightly better than did those who used more conventional tillage

Table VII. Average Number of Chemical Control Field Operations, Scenario E.

Field Operation	Students With Info	Students No Info	Farmers With Info	Farmers No Info
Pre-seed on Fallow	100.0	0.64	0.75	0.92
Pre-seed on Stubble	0.85	1.14	1.33	1.38
Summerfallow	1.54	1.50	2.58	2.46
Total	3.39	3.28	4.66	4.76

(Tables I and II). However, the net incomes did not differ significantly between those who did and those who did not receive the research information.

Scenario F: Cropping Programs

The research information provided to participants in Scenario F concerned the profitability and risk of various cropping programs in the dark brown soil zone (see Appendix B). Participants were asked to choose a crop rotation that would be maintained for the following four years. Rotations included one-half fallow–one-half crop, one-third fallow–two-thirds crop, one-quarter fallow–three-quarters crop and continuous cropping. The only crop that could be grown during the four years was spring wheat.

It was expected that those who received the research information would choose a higher proportion of total area in crop than would those who did not receive the information because the research information showed higher returns from longer rotations in years of high prices.

The price, yield, quota, and production costs for this research scenario were for the period 1973 to 1976. However, participants did not know the time period over which their decisions would be evaluated.

Decisions on crop rotation for each of the groups are shown in Table VIII. Students who received the research information had longer rotations than did those who did not receive the information. No students who received the information chose a one-half crop–one-half fallow rotation, whereas the overwhelming majority of those who did not receive the information chose the one-half crop–one-half fallow rotation. Interestingly, farmers provided a different pattern of responses than did the students. Most farmers who did not receive the information chose the two-thirds–one-third fallow rotation. Farmers who received the research information chose the one-half crop–one-half fallow, two-thirds crop–one-third fallow, and three-quarters crop–one-quarter fallow rotations in almost equal proportions.

Because the period 1973 to 1976 was a time of high and rising grain prices, the continuous crop rotation proved to be most profitable and the one-half crop–one-half fallow rotation the least profitable.

The group of students that received the research information had a significantly higher average net farm income than did the group that did not receive the information (Table I). One must conclude that research information, in this case, provided students with insight which helped to significantly raise their net farm

Table VIII. Choice of Crop Rotation (No. of Participants), Scenario F.

	Students		Farmers	
Rotation	With Info	No Info	With Info	No Info
½ crop–½ fallow	0	9	5	2
⅔ crop–⅓ fallow	4	3	4	11
¾ crop–¼ fallow	7	1	6	2
Continuous crop	3	0	1	1

income. The two groups of farmers, on the other hand, had no significant differences in average net farm income (Table II).

Scenario G: Fertilizer Application

Research information presented to participants in this scenario contained a graphical presentation of the yield response of various phosphorus and nitrogen application rates on wheat in the dark brown soil zone. The main point for participants to consider was the relationship between crop yields and fertilizer application rates while keeping in mind the diminishing returns exhibited by the production functions. It was explained that because nitrogen and phosphorus prices remain relatively constant over the short run and because the yield response shows diminishing returns, there is an optimal rate at which fertilizer should be applied: the rate at which marginal cost is equated with marginal revenue. It was then left to the participants to choose a fertilization rate.

It was found that those participants (both students and farmers) who received the additional information chose fertilization rates that had a significantly higher average net farm income than did those who did not receive this information (Tables I and II).

DISCUSSION

Students did not benefit from outlook information supplied in any of the scenarios. In all case where outlook information was provided to a group of students, the group that did not receive the outlook information actually did slightly better in terms of average net farm income.

Slightly different results emerged from the farmer's crop choices in response to outlook information. In the case of Scenario A (1973 outlook), the information supplied to farmers did help them in their crop choices. Of the remaining outlook scenarios, only in Scenario D did farmers with the outlook information gain an income advantage over those without the information. However, these results were not statistically significant. In Scenarios B and C, participants with the outlook information actually had a lower average net farm income than did those without this information. Overall, students who had outlook information averaged only an extra $161 in net farm income over those who did not have the outlook information (Table I). For experienced framers, the advantage was a bit higher; those who had the outlook information averaged an extra $344 in net farm income, over those who did not have the information (Table II).

A comparison between farmers and students of results from the outlook scenarios shows that experience pays. Farmers seemed to be better able to analyze the outlook information and assign probabilities to each of the possible outcomes mentioned. The ability to do this is certainly enhanced by experience in dealing with market fluctuations. Students lack this experience and thus were disadvantaged when compared to farmers.

Comparisons can also be made between farmers and students who did not have the benefit of outlook information. These groups had only the previous year's yield and quota data, and each crops' initial price on which to base their decisions. Again, farmers had a higher overall average net farm income than did students in these cases (Tables I and II). Students had slightly higher net incomes in Scenarios B and D while farmers had higher net incomes in Scenarios A and C.

It was found that research information contained in Scenario G helped both farmers and students with their fertilizer application decision. In both cases, participants with this information had significantly higher net incomes than did those who did not have the information. In addition, students who received research information on the risks and returns of various cropping rotations in Scenario F also had significantly higher average net farm income than did those without this information.

Previously, it was noted that experienced farmers seemed to be better able to assimilate outlook information and thus were able to generate higher incomes on average than could students. However, for research information, students had overall higher net farm incomes than did the farmers. In these cases, it seems that students, being more comfortable in a classroom setting and having recent experience at assimilating new information, were better able to make decisions based on this research information. Many of the farmers made traditional decisions due perhaps to reluctance to change old farming practices. Farmers had similar responses with and without the research information. Students made better use of this information and thus were able to gain an advantage over the farmers in these cases.

CONCLUSION

Since the outlook and research information provided to participants was not always accurate, it was expected at the outset of the study that insignificant or even conflicting results would be obtained for some of the scenarios. However, it was surprising how often the group without the outlook or research information had better results than did the group that had the information. Admittedly, some of the research procedures can be questioned: the data gathering exercise was artificial, choices were analyzed on a simulation model of an unfamiliar farm, the time available for making decisions may have been too short, group sizes were relatively small. Still, the setting was kept as realistic as was practicable under the circumstances. Participants were randomly assigned to one of two groups. In some scenarios they received information; in others, they did not. Actual prices, yields, quotas, and costs for unidentified years were used in the analysis.

This study suggests that contrary to results reported by Debertin et al.,[3] the economic value of outlook information is very small, at least in the Canadian context. The reasons may not be too surprising. First, the outlook information often turns out to be wrong. Second, because of the limited cropping choices available to farmers on the Canadian prairies, other factors, such as traditional cropping rotations and farmers' experience in growing a particular crop, often carry considerable weight in their decisions of what to produce. Many farmers kept a fairly constant cropping pattern throughout the scenarios, regardless of the different information available to them. Many farmers become specialized in the production of a particular crop on dryland and continue to grow this crop season after season in spite of changing market signals. Third, output prices are only one influence on net returns. By focusing attention on trends in output prices, outlook information reports, by their very nature, ignore the effects of yields and costs in the determination of net incomes. This doesn't matter if the outlook information is correct. However, as was demonstrated in Scenario A of this study, if prices don't move exactly as predicted, yield advantages for a particular crop can outweigh the effect of a small price change in a direction opposite to what was predicted.

Provision of outlook information to farmers always involves a risk of being not only incorrect but misleading. This is a danger faced by all organizations that prepare and distribute price forecasts. However, this type of information could probably be made more useful to farmers if some indication was given about the confidence that should be placed on these forecasts, as well as the possible range over which they might apply.

Research information appears to have a higher value than does outlook information, especially if it is presented to decision makers after it has been evaluated in an economic context. Farmers' reliance on traditional farming practices does not always produce the best financial results. They must be prompted to accept new research results. Research results are more easily understood and thus more acceptable if they are presented in a way that exposes expected changes in net income and riskiness.

The impacts on farmers' well-being of outlook and research information that may be incorrect (at least for their own unique situations) should be studied further. Information comes to farmers in a variety of ways, including extension bulletins, radio, television, farm magazines, and advertisements from input suppliers. Not all the information, if followed, would result in better outcomes for the farmers. Controlled experiments that measure the adoption rates of particular types of information as well as follow-up analyses on the benefits of its adoption would provide critically needed information for the designers of information systems for farmers.

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APPENDIX A

Scenario A: Outlook for 1973

Wheat Situation and Outlook

In the last week, prices have increased about 20¢. This late development is as yet difficult to assess. But prices will likely soften through the summer as the US wheat crop becomes available.

At this early stage it is anticipated that final payments will be in the region of 25 to 30¢, provided there is no substantial break in current price levels.

On the volume side of things it now seems certain that almost all farmers will have an opportunity to deliver all the wheat they have on hand before next harvest. Even the market for durum wheats, which six or eight months ago looked relatively less favorable, has picked up. Currently, durums are selling at a premium over primary wheats.

The decline in prairie farm stocks this season over the last three years reflect the improvement in the wheat situation.

Feed Grains Situation and Outlook

While the early optimism for world feed grain markets have not fully materialized, price levels are still substantially above year-ago levels. However, with wheat prices double those of barley at country elevator positions and Alberta barley supplies surplus to feed requirements, there is little pressure to move barley through elevators.

Surprising, in view of still substantial supplies, US corn markets have remained substantially above year-ago levels. Record domestic use and export sales are anticipated, but these will make relatively minor inroads into the current year carry-over. Initially, anticipations of further Soviet sales, more recently adverse harvesting conditions, and historically high spreads between wheat and corn values appear to have kept prices 25 to 30¢ above year-ago levels. Corn prices are likely to subside in the new year once the US corn crop is harvested and prices for Canadian barley will follow this trend if it occurs.

Supplies of feed grain available for feeding in the province are likely to be 5% larger than last year and adequate for requirements.

Oilseeds Situation and Outlook

While total Canadian farm and commercial supplies of rapeseed for the current crop year are on a par with those of last year, new market supplies, the current crop, and farm carry-over are down by about 25%. Rapeseed prices gained 30¢ during adverse weather conditions in late September. Prices backed off 10¢ following the delayed harvest, but have remained about 10¢/bushel above year-ago levels. Recently they have shown strength beyond this range.

With rapeseed exports running substantially ahead of last year, it seems likely that the current crop will find markets at current price levels.

The outcome of price developments depends on a compromise between very strong meal markets and relatively weak oil markets. Both markets could break downward. If rapeseed prices decline during late December and January, as they did last year, they are likely to repeat last year's comeback in the spring. Unfavorable winter prices mean poor producer expectation for the following crop year, prospects of a smaller acreage, reduced potential supplies, and higher prices—a hog cycle without the hogs.

Flaxseed prices continue to advance. It is difficult to assess at the current time whether this is a reaction to the tightening of supplies for traditional uses (paints, varnishes, etc.) or for the very strong protein meal market (direct incorporation of flaxseed into feedstuffs), or both. Street prices are as high as they have been in 10 years, but further increases seem likely.

A very sharp cutback in production, both in Canada and in the other major producing areas, combined with increased utilization, especially for feedstuffs in Europe, has resulted in a marked tightening in supplies. While current prices are likely to result in some decline in utilization, we may yet have some way to go before a balance is struck on the demand side.

On the supply side, flaxseed has to compete with wheat for acreage in all major producing areas. With exceptionally strong wheat markets, supply response to the higher prices may not be as marked as it would be otherwise. Further price increases during the current crop year are likely.

APPENDIX B

Scenario F: Cropping Programs

At the farm level, one study on the relative profitability and risk of different cropping programs involved, in part, a survey conducted in one area of the Dark Brown Soil Zone in Census Division 5 (Vulcan). "Results indicated that moisture conservation, weed control and income stability are the most important reasons why producers in the study area include summerfallow in their cropping programs . . . with substantial adjustments to summerfallow acreage based on spring soil moisture conditions and marketability of crops . . . Most producers would react to increased grain and oilseed prices by reducing their summerfallow acreage substantially."

Based on that survey, the effects of various cropping programs were simulated, including that "although continuous cropping is associated with higher payoffs, it is also more risky than less intensive cropping programs. Higher output prices do make continuous cropping more attractive, but again it does not dominate other less intensive cropping programs because it is riskier . . . [other analysis] suggests that, when stubble yields are 60% or less of fallow yields with mean output prices, continuous cropping pays less and is more risky than less intensive cropping programs. However, when stubble yields are 80% of fallow yields or greater, continuous cropping pays more but is still more risky than less intensive cropping programs."

Crop yield analysis indicated "significant yield differences [at the farm level] between agroclimatic zones, C.L.I. classes and subclasses . . . and that stubble crop yields in the study area were relatively high and increasing, in relation to fallow crop yields. However, stubble yields showed greater variation than fallow yields and tended to be more adversely affected in a low moisture year than fallow yields."

"It is concluded that farmers in the Dark Brown Soil Zone are likely to significantly reduce summerfallow acreages only in situations where either high grain prices prevail, or where new technology such as snow management, improved herbicides, etc., improve the stubble/fallow ratio. Nevertheless, such a reduction could result in significant crop production increases at the Census Division level."

A summary of the various price situations used in this study (Table B.I) as well as a table showing expected net income by crop combination and rotation (Table B.II) follows.

Table B.I. Summary of Price Situations Examined (Situation Table).

Price Situation			Winter	Spring	Barley			Fertilizer	Labour
Grain	N & P[c]	Labour[d]	Wheat	Wheat	($/bu)	Flax	Rape	($/lb)	($/h)
Av[a]	Med	Med	3.21	3.29	2.02	7.16	5.47	0.16	5.00
Low[b]	Med	Med	2.31	2.34	1.55	5.00	4.00	0.16	5.00
High[b]	Med	Med	4.08	4.25	2.53	9.32	6.92	0.16	5.00
Av	Low	Med	3.21	3.29	2.02	7.16	5.47	0.12	5.00
Av	High	Med	3.21	3.29	2.02	7.16	5.47	0.20	5.00
Av	Med	Low	3.21	3.29	2.02	7.16	5.47	0.16	0.00
Av	Med	High	3.21	3.29	2.02	7.16	5.47	0.16	10.00

[a]Average farm-level grain prices for the period 1972–1973 to 1976–1977.

[b]Low and high grain prices are one standard deviation below and above average prices for the period.

[c]The same unit price was assumed for both N and P205. Low, medium, and high prices were $0.26, $0.35, and $0.44/kg, respectively.

[d]Low, medium, and high labour prices were $0, $5, and $10 an hour.

Table B.II. Expected Net Income by Crop Combination and Rotation in the Dark Brown Soil Zone.

Crop Combination[a]	Average Prices[b]	Grain Price		Fertilizer Price		Labour Price	
		Low	High	Low	High	Low	High
				($/ac of rotation)			
Crop–Fallow Rotation							
Winter Wheat	22.28	7.03[c]	37.25	23.18	21.47[c]	28.13	16.43[c]
Rapeseed and Winter Wheat	20.47	5.66	34.96	21.26	19.78	26.30	14.65
Rapeseed and Spring Wheat	18.09	3.53	32.24	18.78	17.50	24.09	12.10
Rapeseed and Barley	17.42	4.36	30.14	18.11	16.86	23.58	11.27
Spring Wheat	17.54	2.78	31.84	18.24	16.94	23.71	11.38
Barley	16.14	4.41	27.55	16.79	15.62	22.65	9.64
Crop–Crop–Fallow Rotation							
Winter Wheat (Spring Wheat)	22.53	5.41	39.35	24.05	21.20	29.26	15.80
Winter Wheat (Barley)	22.56[c]	6.65	38.22	24.12	21.22	29.45	15.67
Rapeseed (Spring Wheat)	20.18	3.61	36.31	21.50	18.95	26.85	13.51
Rapeseed (Barley)	20.13	4.85	35.20	21.57	18.98	27.05	13.21
Spring Wheat (Spring Wheat)	19.36	2.58	35.73	20.73	18.16	26.31	12.42
Spring Wheat (Barley)	19.38	3.81	34.60	20.80	18.18	26.50	12.27
Barley (Spring Wheat)	18.46	3.67	32.92	19.82	17.29	25.62	11.31
Barley (Barley)	18.47	4.90	31.80	19.89	17.31	25.80	11.14
Continuous Crop Rotation							
Spring Wheat	22.26	1.40	42.78[c]	25.02	19.85	30.80	13.72
Barley	22.13	5.05	39.22	25.05[c]	19.81	31.18[c]	13.08

[a]Crop in brackets was produced on stubble.

[b]Refers to the input and product price combination in the first row of Situation Table. Similarly, other columns of this table refer to the price situation in the corresponding row of Situation Table.

[c]Refers to the cropping program with the highest expected net income for that price situation.