

**Farm Profit-Maximization in Western Canada:  
Process, Pricing and Planning in the Marketing of Commodity Crops**

**By  
Brenda Tjaden**

**A Thesis**

**Submitted to the Faculty of Graduate Studies**

**In Partial Fulfillment of the Requirements  
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**A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University of  
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## **Abstract**

Ideally, a farmer would sell all of his or her crops when the market is believed to be peaking, at a price representing a profit to the farm. In practice, there are constraints to doing so including the fundamental challenges of choosing the most profitable crops and predicting the direction and magnitude of price changes.

This study builds on the knowledge base of 'what farmers are doing' when they market their crops, and develops a planning framework that can act as a bridge between the farm and the next-use markets in western Canada. The research into farmer marketing behaviour has revealed that sales activities are driven both from the need for the farm to sell to generate movement or revenues, i.e. the 'push' from within, and by sell signals and pricing opportunities, i.e. the 'pulls' for crops to be sold off farms that come from the marketplace.

To frame the specific situation Prairie farmers face as they approach the marketplace, the study begins with a review of the commodity crop pricing systems currently in use, the industrial change that has taken place in the grain handling industry recent years, and how these impact farmers' position in the marketplace. To clarify the focus of this research and to set the stage for the commodity-specific and farm-level analysis of marketing activities that follows, the theory of farmer utility through profit maximization is then developed, with a model that acknowledges the influence of non-monetary factors in farmers' decision-making process, and the market imperfections they face in

attempting to analyze prices and decide when, where and how to sell the various crops. Finally, a framework is offered for building and executing a marketing plan that takes into account the internal, farm-specific realities of marketing to maintain the crops' quality and pay the bills, and the external market information farmers have access to in attempting to capitalize on trends and variability in the prices.

This research has uncovered a number of improvements to the marketing process that farmers might profit from. Selling for internal farm-related reasons rather than in response to market signals is not ideal, nor is marketing to maximize revenues rather than the profitability potential of the individual farm. Hedging, pooling or any other standard risk management mechanism will not work in isolation for a typical farmer that has diversified into crops that trade in differently-structured markets. Farmers must realize that they alone bear the risk of farm failure and that their 'partners' in the supply chain are not always positioned to operate in their best interest. For these reasons and others related to personality and individual risk tolerance, only a unique marketing plan devised and controlled by farm managers themselves, will work to optimize marketing decisions and maximize profit potential. The grain industry on the whole, farmers as well all other interested parties, could also benefit from clarifying the goals and dialogue surrounding marketing systems in this respect.

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## **Chapter 1: Introduction**

The question of which structure western Canadian farms should use to market commodity crops has been studied in various contexts, with researchers coming to differing conclusions about the state of the Prairie grain industry and how it should be changed or maintained. As “agricultural trade and trade policy occupy a special niche in the discussion and analysis of economic issues” (Houck, 1986), efforts to fairly assess and improve marketing systems in the midst of cultural, political and emotional matters at play throughout the stages of the supply chain for Prairie crops is a complicated matter. Farmers themselves have adapted their operations and attitudes as best as they can in reaction to major structural changes in the industry at home, and challenges to their profitability from competing grain producers around the world, but marketing remains a confusing and cumbersome job.

The purpose of this research is to assess commodity crop sales planning and marketing at the farm level. In so doing, the line between policy and marketing may appear to be crossed, because the two are so closely intertwined in the grain industry in western Canada. But the approach taken here is simply different than past attempts to offer one standard risk management or marketing framework to producers, such as price pooling or hedging via futures, which may not encompass enough information for an individual farm to maximize profit.

One single approach will not work for the producer attempting to maximize revenues from multiple types of crops. In addition to changed positioning of farmers vis-à-vis the

major types of buyers of Prairie crops, which will be discussed in Chapter 2, the need to improve upon farmer crop marketing strategies and implementation stems from the shift in the production mix that has taken place in past decades, as shown in Table 1.1 below.

With the growth in interest in pulses and special crops, for example, the portion of the total acreage base without a corresponding futures market grew from 10% of the total cropping mix in 1975 to 23.4% thirty years later. The portion of crops tied to futures has never surpassed 40%, yet agricultural marketing texts have focused almost exclusively on hedging for price risk management. The historic reliance of western Canadian farmers on the Canadian Wheat Board (CWB) for marketing has declined most significantly in recent decades, from almost three-quarters of crops in 1975 (or more than 75% including oats) to just 38% in 2005. The table does not include alfalfa and forage grasses, which fall outside the scope of this analysis of pricing systems for crops marketed commercially, but hay and pasture production has also been taking away from the acres seeded to Board grains. Today, significantly more and different pricing and risk management alternatives have developed within the CWB system which also must be considered in farmer marketing decisions and further changes to the marketing authority appear likely in the years to come.



Table 1.1: Breakdown of Crop Area by Market Structure, 1975, 1995 and 2005

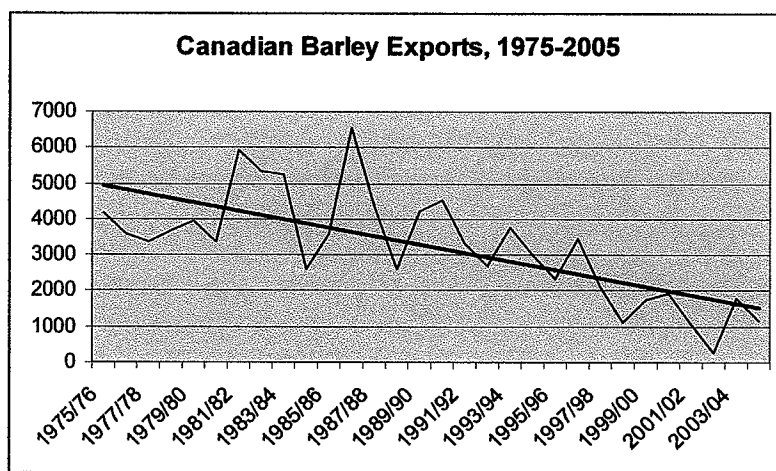
<b>Seeded Area of Crops in Western Canada (Manitoba, Saskatchewan and Alberta)</b>						
<i>000s hectares</i>	<u>2005</u>	<u>% Total</u>	<u>1995</u>	<u>% Total</u>	<u>1975</u>	<u>% Total</u>
<u>Crops With Futures</u>	<u>Area</u>	<u>Cropped Area</u>	<u>Area</u>	<u>Cropped Area</u>	<u>Area</u>	<u>Cropped Area</u>
Barley	4,162	16.57%	4,338	17.57%	4,209	13.19%
Canola	5,457	21.72%	5,310	21.51%	1,720	5.39%
<b>Total With Futures</b>	<b>9,619</b>	<b>38.29%</b>	<b>9,648</b>	<b>39.08%</b>	<b>5,929</b>	<b>18.57%</b>
<u>Crops With No Futures</u>						
Oats	1,670	6.65%	1,427	5.78%	1,882	5.90%
Fall rye	142	0.57%	146	0.59%	294	0.92%
Flaxseed	842	3.35%	876	3.55%	567	1.77%
Mixed grains	132	0.53%	140	0.57%	314	0.98%
Dry peas	1,366	5.44%	819	3.32%	30	0.09%
Total Beans	112	0.45%	38	0.15%	-	0.00%
Mustard seed	212	0.84%	267	1.08%	66	0.21%
Chickpeas	79	0.31%	0	0.00%	n/a	n/a
Triticale	54	0.21%	23	0.09%	n/a	n/a
Canary Seed	190	0.76%	148	0.60%	n/a	n/a
Grain Corn	59	0.23%	20	0.08%	5	0.02%
Soybeans	45	0.18%	0	0.00%	n/a	n/a
Lentils	884	3.52%	334	1.35%	n/a	n/a
Sunflower Seed	93	0.37%	49	0.20%	25	0.08%
Buckwheat	4	0.02%	12	0.05%	10	0.03%
<b>Total No Futures</b>	<b>5,884</b>	<b>23.42%</b>	<b>4,299</b>	<b>17.42%</b>	<b>3,192</b>	<b>10.00%</b>
<u>Board Grains</u>						
Wheat	9,620	38.29%	10,738	43.50%	22,800	71.43%
<b>Total Cropped Area</b>	<b>25,123</b>		<b>24,685</b>		<b>31,921</b>	
Summerfallow	4,087	16.27%	6,779	27.46%	11,210	35.12%

Source: Statistics Canada

Note that in Table 1.1, the 'Board grains' category includes wheat only, and it shows all of the wheat, even though the CWB markets some barley and not all of the feed wheat grown in any given year. This loose categorization was chosen for this research because the portion varies from year to year according to market conditions, rotational considerations and the weather, and because precise estimates are not needed to make the point that significant changes have taken place in recent years. Thus, the portion of the wheat crop that isn't marketed by the CWB is assumed to be about the same as the amount of barley they do market, which likely over-states the handling volumes of the

CWB, especially considering the increasing number of ‘feed’ wheat applications in the domestic market such as ethanol and the decline over time in feed barley exports as illustrated in Chart 1.1 below. Also because there is a viable Winnipeg Commodity Exchange (WCE) feed barley contract used to value the majority of the barley crop, it is included in the category of a crop that trades against futures.

Chart 1.1: Canadian Wheat Board Exports of Barley, thousands of tonnes, 1975-2005



Source: Canada Grains Council

In short, the world of marketing used to be a simpler place for commodity crop farmers on the Prairies. The percent pooled is down significantly in the last 30 years, prices are volatile over time and widely variable over space. Financial risk cannot be managed with a single approach to risk management, or a one-size-fits-all marketing strategy. The co-operative infrastructure that used to characterize the grain handling industry has been restructured and consolidated, which has changed the face of buyers in the marketplace and the mechanisms used to confer price signals. Farmers understand more about the

markets than ever before in history, but challenges remain in responding to market signals, and identifying and managing the farm's needs and goals. This study will assert that every farm is a unique organization in need of its own proprietary marketing strategy to achieve maximum profits. It also highlights the challenges and market imperfections that farmers face as they approach the markets, and establishes the theories of market efficiency and farmer profit maximization in the context of commodity crop marketing.

The first part of this study will frame farmers' position in the marketplace following two decades of industrial changes in the grain handling industry, which collectively makes up the majority of the next-use market for Prairie crops. The literature on farmer marketing decisions and the changing structures in place in western Canada are then reviewed.

Next, the theory of farmer profit-maximization through marketing will be developed. It will be shown how this process takes place in a multi-structural environment fraught with inefficiencies, politics, philosophy and emotion, which makes tracking progress a major undertaking, and measuring success highly subjective. For this reason, the pricing structures and risk-management tools for each type of crop are assessed in detail, according to each market's method of signaling good pricing opportunities and marketing pitfalls.

Following this analysis of how the three main types of Prairie crops trade, a farm marketing plan framework will be developed with the goal to act as a bridge between two different worlds: a farm's specific marketing potential, constraints, needs and goals, and the outside world that sends signals through market pricing to which producers must

respond. The ability to calculate all variables that affect profitability and then to plan sales around them in a realistic manner is expected to increase the likelihood of maintaining a profitable farm business. This hypothesis is not tested here in the traditional fashion with estimated relationships and t-statistics. Instead, this research responds to gaps identified in the literature by providing 'real-world knowledge on what farmers are doing' in their marketing.

It is hoped that by identifying the variables in the marketing decision-making process at the farm level, and the challenges of successfully selling within the various structures of their crops markets, readers will gain a better understanding what farmers might do to increase their chances of success. While there may be many causes of declining farm incomes and farm numbers, most relate to changes in the profitability equation, i.e. revenues less costs in a financial sense, and do not account for the non-monetary variables that influence success and require consideration in the marketing planning process. While difficult to measure, a key contribution of this research will be the acknowledgement and assessment of factors such as a farmer's own emotional and financial tolerance for price risk; the degree to which they may or may not be price-takers; their short and long-term goals; business and political affiliations and other factors. That these are never isolated from the day-to-day crop selling decisions suggests that a farmer will only be satisfied in his or her marketing efforts by crafting a unique approach.

## **Chapter 2: Industry Framework**

As a result of structural changes in the grain industry, farmers today have more production choices, and the industry into which they sell is more complex. The issues discussed here define pricing systems and the roles of the various players as they pertain to a farmer's crops and their next-use markets.

'Lack of transparency' is the term that will be used to describe difficulty farmers have in gauging the value of their crops, and the cost of services provided by secondary grain handlers and other intermediaries. As will be shown, all prices at the farmgate level incorporate similar cost components to move that crop to its next or end-use market, the value in which also varies depending on the buyer. Choosing who to sell to, and how, at the farmer level of the value chain thus depends on a number of both cost and value-related factors that can be difficult to discern for a number of reasons:

- There is not readily accessible information on many of the price components;
- The practice of dissecting prices and assessing the value of each component relative to its cost, and comparing between buyers, is not common in the western Canadian farm community;
- Farmers' participation in the markets is less intense and sporadic as compared to the parties they are selling to, who are regularly comparing and contrasting the valuation and cost components of crops' prices;
- Farmers' traditional role as price-takers may make the work to understand where the prices for their crops are coming from seem less worthwhile.

Opinions will differ on how well a farmer could integrate information on the origination of prices, the cost components that are deducted, and the value signals of end users, into their marketing planning and use it to their success. Others will argue that it is not in the best interests of the industry overall for high-level pricing to be publicly available, compared and discussed. The companies and organizations that charge farmers for services related to marketing, elevating and transporting grain should prefer the information to be more transparent rather than less if they have found the highest value market and their costs are competitive and fair, but at the same time it is recognized that confidentiality is considered a negotiating asset in certain circumstances.

For the purpose of this analysis, improving price transparency at the farm level is considered important to gaining control over the commodity crop marketing process, and improving the quality of ongoing decisions – for an individual producer. Being able to track prices back from the transaction between the intermediary handler/marketer and the end user to the farmgate bid not only introduces the ability to compare costs and services between different types of local marketing outlets, it also transfers information about willingness-to-pay for attributes related to the time, place and form value of the crop. The more accurate that information is, the more responsive farmers can be in planning what types of crops to grow and how to treat them to maximize their value in the marketplace, as well as when and how to sell them.

A closely-related issue to transparency in pricing is the high degree of variability in prices among buyers, for the same crop in the same condition in the same basic region on the same day. When there is a range of \$1/bu, accounting for 30% of the crop's price, it is impossible to say what the value of the crop is. In addition, it causes confusion and difficulty in marketing, and can breed distrust and uncertainty in farmers as they interact with various buyers. Further details on how this variability and the valuation information affects the farmer marketing decision-making process, as it relates to profitability, is provided in the analysis contained in Chapter 5 along with specific examples for western Canadian grain markets.

The price discovery information compiled in this research study is intended to enhance farmer's understanding of the processes that determine farm crop sales revenue streams. The analysis is replicated for the three main types of market structures: crops that trade against Winnipeg Commodity Exchange (WCE) futures contracts, crops with no corresponding futures market, and crops marketed by the Canadian Wheat Board (CWB). Following that, the shifts in the makeup of the domestic crop buying industry are explained, in the context of regulation, elevator ownership, rationalization and corporate consolidation. Although the philosophical and political issues associated with each crop sector and pricing system will be perceived differently by each individual farmer across Manitoba, Saskatchewan and Alberta, all have access to the same basic mix of pricing mechanisms and buyer types and as such the trends described below can be considered to affect the Prairie commodity crop farm business framework consistently across the region of interest.

## *2.1 Price Discovery*

The ability of futures and options risk management tools to help western Canadian farmers is clearly limited by the fact that few crops trade against one that is wholly relevant to local cash prices. Crops that trade against liquid, functioning Winnipeg Commodity Exchange (WCE) futures contracts are arguably the more price-transparent, because the futures market pricing mechanism tends to fit the definition of efficient (discussed in more detail in Chapter below). By absorbing the buying and selling interest of all interested parties, the futures price at any point in time nets out a timely and accurate reflection of the underlying value of the commodity. Prices will sometimes overshoot (or undershoot) their equilibrium level, especially in the presence of large speculators, but in general, through arbitrage and convergence it is still safe to assume that in a liquid, functioning futures markets such as canola, the portion of the crop's value that is the futures price is transparent, random and unbiased against buyers and sellers. The futures side of the local cash price accounts for upwards of 90-95% of the value of canola (assuming a 'normal' basis of -\$25 per tonne and \$350/tonne futures).

Although it varies over time and place among companies, the basis portion of the price is also largely made up of tractable, transparent and relatively stable factors. Consider Illustration 2.1 below, based on the export market, published annually by the Canada Grains Council in its Statistical Handbook.



**Illustration 2.1: Canola Basis and Cash Price Calculation Example, into an elevator in central Saskatchewan in May, 2005**

Assume the elevator company is charging the maximum tariff registered with the Canadian Grain Commission, the interest rate is 4.5% and it will take 60 days for the elevator to move the canola to export position. The grain will be stored in the elevator for 30 days and in terminal position for 10 days.

Futures Price	July Canola	\$280.00
	Export Basis (instore Vancouver)	<u>32.00</u>
	Cash Price (instore Vancouver)	312.00
<b>Basis Calculation</b>		
	Elevation	\$(8.00)
	Freight	(38.00)
	Primary Storage (30 days @ .08)	(2.40)
	Terminal Storage (10 days @ .068)	(0.68)
	Terminal Cleaning	(5.75)
	Interest (60 days at 4.5%)	<u>(3.28)</u>
	Total Deductions	(58.11)
	Cash Price in Saskatoon	\$253.89
	Basis	(26.11)

*Source: Canada Grains Council*

Few components of the basis vary significantly over time. The total of all deductions is relatively stable, and more importantly, traceable. A farmer who doesn't believe the basis is correct can determine if the transportation, storage, interest, and quality discounts are in line with industry standards by checking with the railways or trucking companies, futures market specifications, banks, and the Canadian Grain Commission. The basis in the next-use market, here the export basis, varies because it values the crop in Canada relative to import market demand, but because it is actively traded by grain companies, importers and others, brokers know this price at all times and share it with market participants in the course of their work, as well as publish it in market newsletters along with next-use basis levels for other commodities.

The basis for feed barley is also widely quoted, and calculated similarly to the above canola export basis, by subtracting off the price in Lethbridge (the main domestic consumptive base and futures delivery point) the same basic cost components to move it there from points across the rest of the region. Thus, if the basis in Lethbridge was \$5/tonne under, a broker that charged \$2/t for his marketing service, who could book trucking from Regina to Lethbridge at \$22/t, might bid an on-farm pickup basis in the Regina area of \$29/t under.

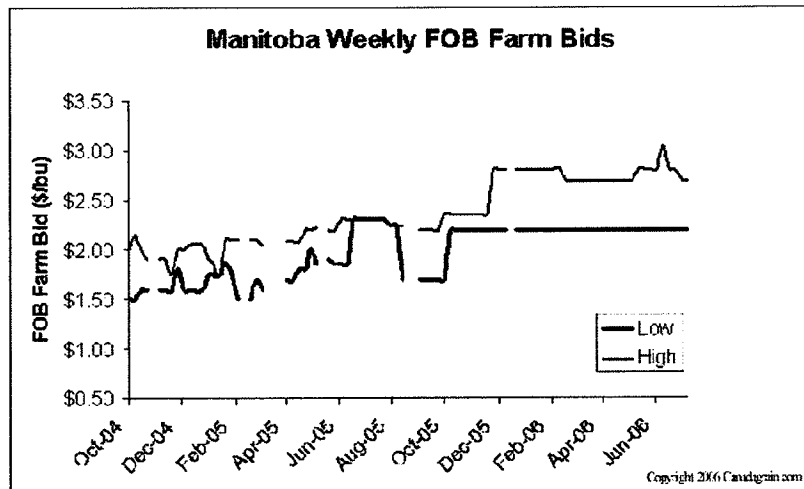
Crushers, feed mills and other domestic processors face an altogether different set of factors in developing daily bids; namely, the value of the goods produced from the raw product, in their end-use markets, less operations costs. For example, the value of canola seed to a canola crusher is technically the weighted average of the price of canola oil and meal according to the yield of each from the crushed seed, less processing costs. But with Canada an important world exporter of canola, the export basis tends can have a stronger impact on country bids. In times of surplus supplies over domestic processing capacity, crushers only need to pay \$1/tonne better than the export basis backed off in order to source canola seed into their plants (i.e. buy it away from the export market). In times of shortage and negative crush margins, domestic processors have to pay a premium over what the canola may really be worth to them in order to keep their plants running.

In both the canola and feed wheat examples, the basis in the next-use market is the starting point for the bid calculation in the farmer's local area. Confusion in basis pricing can arise from the difference between this approach and the calculation of basis as the

difference between the cash and futures price. In theory, the cash price in the region where the contract can be delivered upon should be the same as the futures price in the delivery month or different only by the costs associated with delivery against futures. Otherwise, there would be an arbitrage opportunity that commercial players could quickly profit from. For canola, which is deliverable in the Saskatoon region and feed barley, for which the WCE futures contract specifies the Lethbridge area as deliverable at par, this theory holds and convergence is observed often enough to consider the contracts as viable and efficient.

In the case of WCE feed wheat, oats and others tied to U.S. futures markets, the relationship does not hold due to issues related to liquidity, and place and form differences between the Prairie cash market and the futures contract it might be associated with. To illustrate, the feed wheat high and low cash prices in Chart 2.1 below were compiled by Canadagrains to show the extreme nature of the cash market variability that farmers in western Canada face. In Manitoba, the variability in bids can range from 50 cents/bu to over \$1/bu during a given week, even while futures prices are stable. This lack of transparency essentially clouds value signals, hindering planning and marketing efforts and creating additional work to obtain the highest possible price when the producer needs to sell.

Chart 2.1: Cash Price Variability in Farm-Level Pricing, feed wheat in Manitoba



Source: Branscombe Consulting and Canadagrains

For this reason, prices in feed wheat and other non-converging futures-traded markets are discovered more like prices of crops that don't trade against a futures contract. Pricing in this manner is less transparent than futures pricing for three key reasons. First, these crops' next-use markets are not generally active, liquid or transparent themselves. With few market participants trading smaller volumes into spottier marketing opportunities, it becomes more difficult to obtain information and there is less sharing of it amongst market participants. At the local level, this can be seen in the relatively fewer market newsletter services that cover pulses and special crops relative to canola and feedgrains.

Working on their own, it is difficult for Prairie farmers to find the asking price of yellow peas delivered to a port in India, and to be confident in the accuracy of that price.

Furthermore from that level it is the full asking price in the destination market that is backed off to a buyer/handler in western Canada, rather than the approximately 5-20% of

the price that is the basis, which leaves more room for variability and unjust fluctuations from 'normal' costs to make their way into the bid to the farmer. The components in the backoff of prices for crops that don't trade against futures can be more difficult to verify than the costs factored into a domestic basis against the WCE. For example, the ocean freight and insurance costs incorporated into the pea backoff calculation shown in Table 2.1 would not be easy for a trader to find a representative value for, let alone a farmer.

Table 2.1: Sample Price Calculation for Crops With No Futures Market

<b>Yellow Edible Peas Delivered to India</b>	
\$US/tonne delivered CIF India	\$225.00
Ocean Freight	\$70.00
Insurance	<u>\$4.00</u>
FOB Vancouver Equivalent Price	\$151.00
\$CDN/t (\$0.88 US exchange)	\$171.59
Terminal transfer	\$7.50
Rail from interior	\$30.00
Elevator handle/risk/insurance/interest	<u>\$15.00</u>
Net interior bid per tonne	\$119.09
Net interior bid per bushel	\$3.24

*Source: Kostal Ag Consulting*

Crops that are marketed through the CWB are also partially determined by the same basic calculation of subtracting the sum total of costs to move a crop from the interior to the next-use market. In this case, the next-use market for a farmer in the countryside refers to the common price referencing point 'instore Vancouver or the St. Lawrence'. The payment actually made to a farm is the relevant instore price less the costs incurred to move it there, either by the grain company the farmer delivers to, or in shipping a producer car, the total of which is commonly referred to as the CWB 'deductions'.

There are a variety of instore values a producer may choose through the CWB, including the pooled price and four distinct alternative pricing options. The “Producer Payment Options” (PPOs) were first introduced in 2001/02, and have continued to evolve and expand in each year since. Using the PPO’s still involves selling through the CWB, but there is more flexibility, risk and opportunity in pricing and payment terms.

Currently, the following five basic options are available for pricing CWB wheat.

1. Price pooling in the traditional manner, the value of which is estimated each month in the Pool Return Outlook (PRO) price forecast;
2. Price pooling with an Early Payment Option (EPO), which allows a grower to fix a minimum price as a percentage of the current PRO, for a cost that changes daily;
3. Cash pricing via the Fixed Price Contract (FPC), which removes the grower from the pools when he or she chooses instead a cash price made up of the U.S. wheat futures closing price at the day’s Canadian dollar exchange rate and a CWB Basis;
4. Cash pricing via the Basis Contract, which is the same as the FPC but allows fixing the Basis and the futures portions separately;
5. Cash pricing via the Daily Price Contract, the value of which is meant to reflect U.S. elevator prices.

The optimal contracting option to use at any particular time will depend on many factors specific to an individual farm such as its cash flow situation, mix of crops in the field and/or in inventory, personal preferences and current market conditions. In general, the