Evaluating the Feed vs. Malt Barley Production Choice

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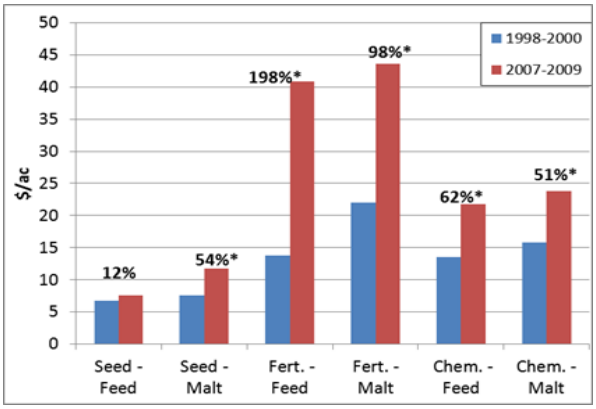
An age old question facing many Alberta grain growers relates to "should I grow malt or feed barley?" Malt varieties tend to be lower yielding but hold the promise of higher price, grade permitting. Feed varieties generally yield better but are of lower value. The "right choice" varies from farm-to-farm and producer-to-producer depending on their specific costs, productivity, variability in yield and grade, price, and overall risk. The "right choice" accounts for both risk and profit.

Barley Costing – Then & Now

AgriProfit$ brown and dark brown soil zone data was used to examine feed and malt barley costs over time. Analysis focused on comparing yield and costs for two periods considered "normal" in terms of agricultural conditions (1998-00 and 2007-09).

On average, barley yields were similar; prices were 55% higher in 2007-09; but, per acre direct input costs increased substantially[1]. Figure 1 shows the change in selected costs from 1998-00 to 2007-09[2]. Increased cost per acre (driven by increased input use, increased cost of materials, or both) challenged profitability and demanded a greater focus on management.

Figure 1. Average Costs per Acre for Selected Inputs



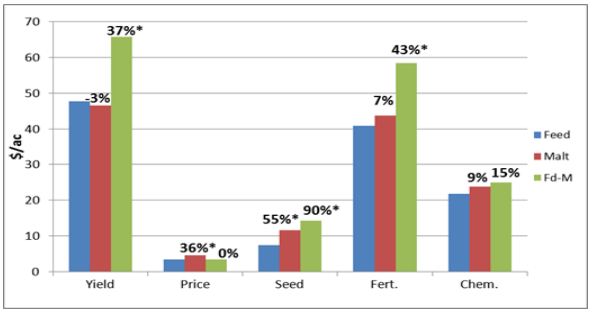
Feed vs. Malt vs. Malt as Feed

Following the adage, "you can't manage what you don't measure", ***AgriProfit$*** data showed measured differences between fields using:

- feed varieties, harvested as feed ("Feed"),
- malt varieties, harvested as malt ("Malt"), and
- malt varieties, harvested as feed ("Fd-M").

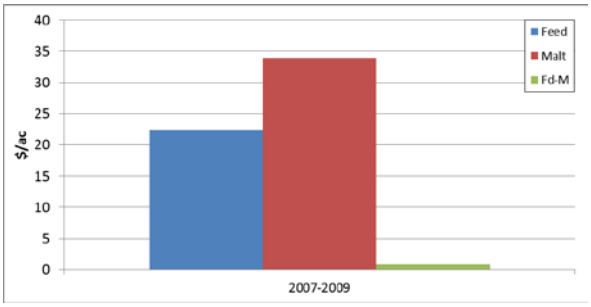
Per acre yields and selected costs for the 2007-09 period are shown in Figure 2. Under comparable management practices, feed barley is commonly expected to yield higher than malt barley. While the data showed no significant difference between feed and malt yields, malt varieties harvested and graded as feed ("Fd-M") yielded 37% more than fields managed as feed only. Differences may be attributable to higher input use and management (eg. 43% higher fertilizer).

Figure 2. Feed vs. Malt Average Costs & Yield (2007-09)



Rewards for managing by unit cost show up as profit. Figure 3 displays average profit of each crop. As expected, barley grown and grading malt is the most profitable, 51% more profitable than barley grown and grading feed. However, if malt standards are not achieved, profits are 98% lower than malt barley.

Figure 3. Feed vs. Malt vs. Fd-M Profit per Acre (2007-09)

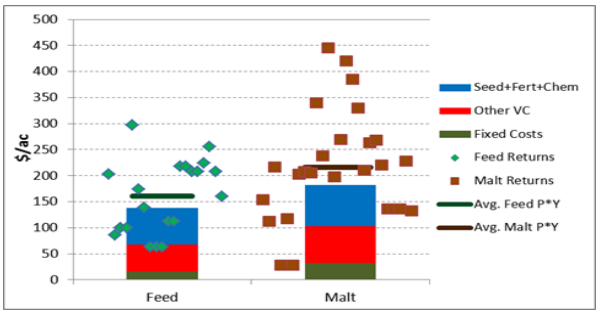


[1] An " * " indicates a significant statistical difference – this result is from a statistical test which shows that the difference follows a pattern rather than just chance.

[2] In Figure 1 percentages relate to the difference from the 1998-00 period to the 2007-09 period. In subsequent charts, percentages relate to the difference from feed.

The ***AgriProfit$*** barley data also emphasizes the distinction between "average profit" vs. "risk" or the variability of profit. Figure 3 revealed a $12/acre average profit difference between feed and malt barley, and while this may seem large, statistically it is not. The primary reason is due to the variability in malt revenue (price x yield), as shown in Figure 4. Malt revenue variability can be traced to unpredictable prices which are dependent on whether or not malt was achieved. If malt is not achieved, then price declines coupled with higher production costs can lead to significantly lower revenues, as compared to feed.

Figure 4. Feed vs. Malt Revenue & Total Costs (2007-09)



Should I grow feed or malt barley?

On "average" malt profits are 51% higher than feed. The key for individual producers is to assess the likelihood of their barley crop grading malt. Without the premium, profits almost vanish.

The ***CropChoice$*** decision tool[3] was used to address the question, "Should I grow feed or malt barley?" ***AgriProfit$*** benchmarks (Table 1), were used to define baseline costs/acre. As individual costs, yield, and pricing can vary significantly from these averages, it's critical for producers to use their own estimates to get answers that reflect their own farm.

Price and yield considerations

In ***CropChoice$***, price and yield distributions are defined by asking the following three questions[4]:

1. "I'd be surprised if the yield (price) was less than how many bu/ac ($/bu)?"
2. "I'd be surprised if the yield (price) was more than how many bu/ac ($/bu)?", and
3. "I think the most likely yield (price) will be how many bu/ca ($/bu)?"

Again, these are particular to each producer, requiring estimates tailored to their experience. Figures 5 and 6 illustrate the price and yield parameters used in the analysis, depicted as probability distributions.

Table 1. Unit Production Costs

Brown and Dark Brown Soil Zones Overall Averages ($/acre)	Feed Budget	Malt Budget
Seed	8.80	12.10
Fertilizer	58.10	47.00
Chemicals	22.20	25.20
Crop Ins. Premiums	-	-
Trucking & Marketing	2.90	2.50
Fuel	10.70	13.80
Irrig. Fuel & Electricity	0.00	0.00
Repairs - Machinery	10.60	8.60
Repairs–Bldgs/Utilities & Misc	1.70	3.30
Expenses	6.70	10.70
Custom Work & Specialized Labour	0.70	2.20
Operating Interest Paid	0.80	0.70
Labour & Benefits	7.80	14.10
Total Variable Costs	**131.00**	**140.20**
Cash/Share Rent & Land Lease	-	-
Taxes, Water Rates, Lic. & Insurance	1.70	4.93
Equip & Bldg. a) Deprec.	15.70	21.10
Equip & Bldg. b) Lease Pmts	0.20	0.02
Paid Capital Interest	-	-
Total Capital Costs	**17.70**	**26.10**

Figure 5. Sample Average Barley Price Distributions

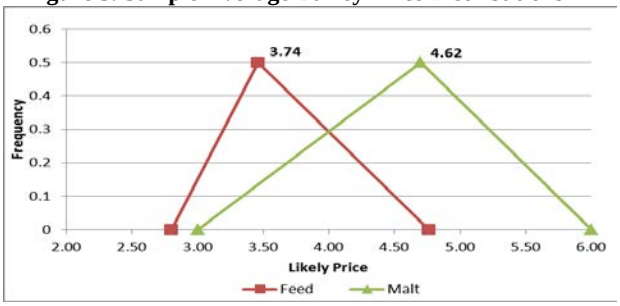
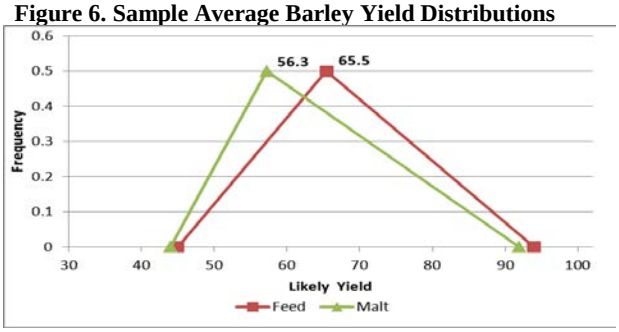


Figure 6. Sample Average Barley Yield Distributions



[3] The base case analysis excludes crop insurance, operating interest, and capital interest.

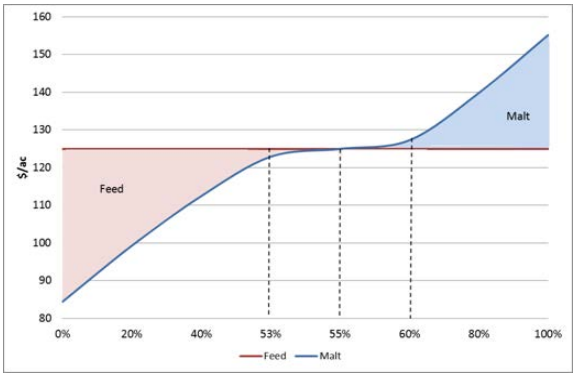
[4] For this analysis, these questions were posed to a few agronomists and barley growers in the brown and dark brown soil zones.

Scenario Analysis

The aim of the ***CropChoice$*** scenario analysis is to observe how the average profit per acre and the risk (variability of profit) changes over a range of likelihoods of achieving malt grade. At each juncture, the malt choice is compared to a feed barley profit and risk baseline.

Average costs, expected prices, and yields for both feed and malt barley are penciled in as the ***CropChoice$*** baseline scenario. Likelihood of malt is allowed to vary from 100% down to 0%. As the likelihood of malt goes down, the average profit per acre declines. This increases the occurrence where a lower net value feed barley crop can result. The resulting difference in profitability (in this case, stated as Gross Margin) between malt and feed barley choice is charted in Figure 7.

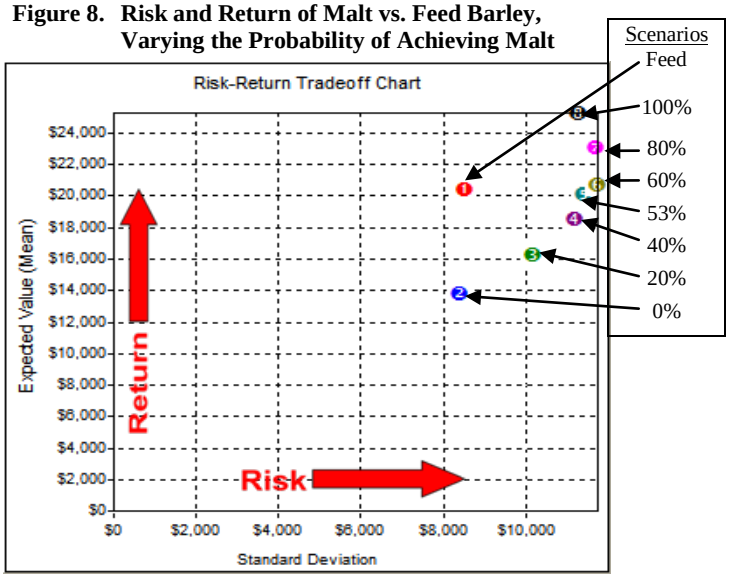
Figure 7. Sensitivity of Gross Margin to the Likelihood of Achieving Malt Grade.



The analysis shows that as the probability of malt decreases, so too does the likelihood that malt is the more profitable choice. The average gross margin for feed barley is about $125/acre. As the probability of malt decreases from 100% to approximately 55%, average profit diminishes rapidly. In the range of about 53-55% likelihood of malt, the average profit is about the same for barley planted as feed vs. barley planted for malt. Below 53%, there is an average profit advantage for feed barley production.

This assessment puts the "average" profit into context. However, risk exposure particularly with addition of grade risk, means that the choice of growing for malt deserves additional consideration and thought. ***CropChoice$*** accounts for crop risk as a matter of course, listing both the average profit and risk of a crop or crop plan. Profit and risk combinations for the gamut of malt probabilities are contrasted against that for feed barley in Figure 8.

Figure 8. Risk and Return of Malt vs. Feed Barley, Varying the Probability of Achieving Malt



Likelihood of Malt	Feed	0%	20%	40%	53%	60%	80%	100%
Scenario Number	1	2	3	4	5	6	7	8

In Figure 8 the effect of risk, shown as standard deviation, becomes apparent. You might ask, who cares about standard deviation, as a producer I want the highest possible revenue. While this is true, it is only part of the story.

Standard deviation communicates potential revenue variation due to input cost, price, and yield variation. This revenue variation translates to an identifiable economic risk allowing each scenario to be compared. With the tradeoff between return and risk identified, the producer can choose between the various scenarios based on their own assessment and risk-averse level.

For instance, if you have a 100% likelihood of malt then the high risk of scenario 8 may not be of concern. However, if there is only a 60% chance (scenario 6) of achieving malt then you may be better off growing feed (scenario 1) barley. Since scenarios 1 and 6 have a very similar expected return it makes economic sense to grow feed given a substantially lower risk level. An $8,500 variation on return in scenario 1 is more

manageable than an $11,800 variation on the same level of return in scenario 6.

Looking closer at Figure 8 we can see that any scenario that is below or to the right of another scenario is undesirable. For instance, scenario 1 is more desirable than scenarios 2, 3, 4, 5, and 6, because scenario 1 has a higher or similar level of return with similar or substantially less risk. If the additional input costs required for malt do not guarantee a higher return, then why not grow feed barley.

However, a choice between scenarios 1, 7, and 8 becomes one of personal choice. Scenario 7 carries an 80% chance of malt, however if malt is not achieved then the higher costs must be managed with a lower price. So is the $2,500 additional return enough to offset the additional $3,000 in risk between scenarios 1 and 7. This is where you, the producer, must decide what is economically best for you and your business operation.

In a nutshell, if the probability of malt is too low the crop will likely net less profit and be riskier. Under the scenario analysis, about half of the cases show malt at a potentially higher profit, however there are no circumstances under which malt will be less risky.

Home Stretch

On today's modern farm, the notion that "your reality is unique" is starting to force its way into producers' crop plans. The evaluation of the malt versus feed barley production choice has highlighted that:

- Knowing and using your own production costs is key to making a profitable choice, and
- Risk can have a significant impact on the crops you invite into your crop rotation.

Time spent in basic budgets can pay handsomely!

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