

PRODUCER ECONOMICS BASED ON PROCESSOR CONTRACTS *

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The purpose of the Potato conference is to provide an opportunity for the potato industry to learn of the latest results on potato research. This report does not really fit in the prescribed framework. Our intention is to increase the economic understanding of an old potato marketing tool, the processing contract.

Using representative incentive clauses and actual production data provided by several processors it is possible to determine a range of returns. This is not a hypothetical analysis. The production data are real. Since the incentive clauses are representative the total returns shown here are representative of what some growers are actually receiving.

This discussion provides an indication of the size of returns different growers are actually receiving. It also provides a description of how growers can estimate the value of their contracts. By recognizing the economic value of the various clauses growers can estimate the maximum expenditure they can afford to make to generate these returns. In other words, given a signed contract this analysis shows how returns can be maximized.

INCENTIVE CLAUSES

Many of the clauses in a potato processor contract have economic as well as legal implications. This analysis concentrates on the economic aspects. Further it concentrates on those clauses which are incremental in nature. Some clauses are stated in all-or-nothing fashion, such as the rejection clauses. While these clauses certainly have economic implications their impacts on returns are obvious.

The incremental, or incentive, clauses affect returns in a less obvious manner. The addition of 50 cents per ton here or the loss of 25 cents per ton there may not seem like much individually. However, taken together, the impact of the incentive clauses can determine the difference between profit and loss.

Five incentive clauses and the base price are used to estimate returns. Included are deductions for dirt and foreign material, the specific gravity incentive, percent U.S. #1's, size incentive, and bruise free.

Dirt and Foreign Material

This clause may not always be considered an incentive clause. Yet, in fact, it provides a negative incentive. It is a charge for hauling too much top soil to the processing plant. The charge established for this example is 50 cents per gross ton for each percentage point above 8 percent dirt. The maximum allowable amount of dirt and foreign material is 14 percent.

Note that the charge is based on gross weight. If, for example, 10 tons is the gross weight after adjusting for truck tare, then a load with 10 percent dirt will be assessed a charge of \$1 per ton. An average yield of 24 tons field weight per acre means that a deduction of \$24 per acre is being assessed for the removal of dirt and foreign material at the processing plant.

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Specific Gravity

Specific gravity is covered in all contracts. Typically, there is a fairly wide range of gravities associated with this clause. Low gravities result in reduced grower returns and high gravities increase grower returns. While there is some general knowledge of what influences specific gravity, horticulturalists are not yet in complete agreement about all facets of this characteristic.

Because of this lack of agreement specific gravity has been set at 1.0800. The premium for this level of specific gravity is assumed to be 90 cents per ton of usable potatoes.

Percent U.S. #1's

The percentage of U.S. #1's in any lot is assumed to be determined by the ratio of the weight of U.S. #1's in the sample to the weight of U.S. #1's plus the weight of U.S. #2 potatoes in the sample.

The base percentage for this incentive is 60 percent. The premium (or deduct) is 40 cents for each percentage point above (or below) 60 percent. The maximum premium associated with percent #1's is \$8 per ton. The maximum percentage is 80 percent. The maximum deduction is \$6 per ton at 45 percent U.S. #1's.

At 70 percent U.S. #1's, a grower would be 10 points above the base. The premium would be .4 times 10 equal to \$4 per ton of usables. On the basis of 85 percent usable and an average yield of 24 tons per acre the per acre return from this premium would be \$81.60.

On the other hand, a grower with 50 percent U.S. #1's would have \$4 per ton of usables deducted from his returns. Under the conditions from above (85 percent usables and 24 ton yield) this deduction would amount to \$81.60 per acre.

Percentage of Ten Ounce and Larger

Size is another characteristic preferred by processors. The larger the potato the longer the french fry that can be made. Lots with uniformly long french fries are a preferred commodity.

The base for the size incentive has been assumed to be 22 percent. The percentage of 10 ounce and larger is the proportion of these large potatoes in the sample. The proportion is determined by weight.

For each percentage point above or below the base, 25 cents per ton is added to, or subtracted from, the base price per ton. The maximum premium associated with size is \$7 per ton at 50 percent 10 ounce and larger. The maximum deduction associated with having too few large potatoes is \$2.50 at 12 percent 10 ounce and larger.

Using the assumptions of 85 percent usables and yield of 24 tons, the maximum value of this incentive clause is \$142.80 per acre. At the other extreme there is a potential loss of \$51 per acre if the potatoes exhibit insufficient size.

Bruise Free Incentive

Considerable attention has been given to the bruise free incentive clause. This clause provides the greatest potential for increasing returns. Another apparent reason for the interest in this clause is the relative amount of control growers have over bruising. With the exception of the dirt and foreign matter clause, nature generally plays a more important role in the other incentive clauses than it does in the level of bruise free potatoes.

For purposes of this discussion, the base percentage for bruise free potatoes is 50 percent. The reward, or charge, for each percentage point above, or below, the base is 45 cents per point. The maximum allowable payment per ton of usable potatoes is \$11.25. This payment requires 75 percent bruise free potatoes.

The minimum allowable percentage of bruise free potatoes is 30 percent. Potatoes with this level of bruising result in the grower being assessed a charge of \$9 per ton of usable potatoes.

With 85 percent usable potatoes and 24 tons per acre the total effect of this incentive clause ranges from a maximum increase in returns of \$229.50 per acre to a maximum charge of \$183.60 per acre.

Base Price

The base price varies from one contract to another. However, a high or low base price does not necessarily mean a strong or a weak contract. In fact, contract comparisons based solely on base price are not valid.

For purposes of this analysis base price is assumed to be \$60 per ton of usable potatoes. Processing culls are priced at a rate of \$10 per ton up to a total of 10 percent of the gross weight less dirt and foreign material. Culls are valued at 10 cents per ton.

REPRESENTATIVE PRODUCTION DATA

Recognition of the value of the signed contract by any grower requires knowledge of how his potato crop grades out in terms of the various incentive clauses. Based on available data it appears that some growers are either unable to take advantage of the incentive clauses or do not fully appreciate the significance of the clauses.

Table 1 provides a summary of crop data for several processing firms. These data represent an average for the contracted potatoes as well as the actual ranges recorded by the firms. The "Average" column indicates where the typical grower's crop grades out. The "Above Average" and "Below Average" columns are representative of the extreme readings for each factor. Since these extreme readings are representative it means that the growers at either extreme may be somewhat above or below the data in Table 1. There are a few growers who have sold potatoes, the grades of which are lower than the figures reported in Table 1. The converse is true for the "Above Average" data. Some growers have been able to produce potato crops that grade out higher than the "Above Average" column.

In addition to the actual values there are two interesting points about these data. The first point is the range between the high and the low columns. The shortest range, that of percent usables and percent U.S. #1's, has 50 percent variation or more between the low and the high figures. All of the other factors have, at least, 100 percent variation between the extremes.

The other notable feature about these data is the location of the "Average" column relative to the other columns. The values in the "Average" column are closer to the "Above Average" column. Therefore, there are relatively more growers in the upper end of the range. In effect, this is saying that Washington potato growers are, in general, doing a reasonably good job of producing potatoes. It also implies that those farmers who are unable to produce quality potatoes are shifting out of potatoes.

The location of the "Average" figures relative to the extremes is a positive factor. However, there is sufficient difference between the "Average" and "Above Average" figures to represent significant amounts of income. As will be seen later, there is a substantial cost associated with being just average.

Table 1. REPRESENTATIVE PRODUCTION DATA

	<u>Below Average</u>	<u>Average</u>	<u>Above Average</u>
% Dirt	10	4	2
% U. S. #1	50	65	75
% 10 Ounce	15	40	55
% Bruise Free	40	68	80
% Culls	25	9	5
% Processing Culls	15	6	3
% Useables	60	85	92

CALCULATING RETURNSIncentive Payments/Charges

The next step is to combine the physical production data from the preceding section with the incentive clauses. The results are shown in Table 2. The figures in Table 2 indicate the absolute dollar values associated with the production data in Table 1.

Because of the variation in the manner in which the different incentives are assessed it is not valid to sum up each of the columns and adjust the base price accordingly. The only appropriate comparison is between figures on the same line. For example, the "Below Average" grower is losing \$10 per ton of usable potatoes by neglecting the grade clause. The "Average" grower is foregoing \$2.80 per ton compared to the "Above Average" grower.

Table 2. INCENTIVE PAYMENTS/CHARGES

	<u>Below Average</u> \$	<u>Average</u> \$	<u>Above Average</u> \$
Dirt	-1.00	0	0
10 Ounces	-1.75	4.50	7.00
S. G.	.90	.90	.90
% B. F.	-4.50	8.10	11.25
% U. S. #1	-4.00	3.20	6.00

Estimating Returns

Determining the overall impact of the economic incentive clauses requires a careful reading of the contract. The actual method of calculation may vary from contract to contract. The following estimation procedure is provided as an example of the type of detail involved in calculating returns. This example uses the "Below Average" production data. The "Below

Average" data are actually more difficult to evaluate because of the charge for removing dirt and foreign material.

Starting with the base price several incentive adjustments can be made directly. The assumed level of specific gravity means that the base price is increased by 90 cents per ton to \$60.90.

On the negative side several deduction are required by the overall low quality. The 15 percent ten ounce and larger result in a deduction of \$1.75 per ton. A bruise free percentage of 40 percent reduces the base price by \$4.50. The deduction for 50 percent U.S. #1 potatoes is \$4. The sum of these deductions is \$10.25.

The adjusted base price is now \$60.90 minus \$10.25 or \$50.65. This represents the return per ton of usable potatoes. Since only 60 percent of the potatoes delivered to the processor are usable another adjustment is required. Multiplying \$50.65 times 0.60 yields \$30.39. This is the return to the grower for the usable potatoes in each ton of potatoes delivered to the processor. Table 3 shows these calculations.

Table 3. ESTIMATING RETURNS: BELOW AVERAGE PRODUCTION

		Base:	\$60.00
		Plus S. G.	.90
			<u>\$60.90</u>
Less	10 ounces	\$1.75	
	% B. F.	4.50	
	% U. S. #1	<u>4.00</u>	\$10.25
			<u>\$50.65</u>
	Times % useables		<u>.60</u>
	Return per ton on		\$30.39
	Market grade potatoes		

Processing Cull Returns

There are several ways in which grower returns for processing culls may be calculated. The approach taken here is to calculate the returns on a per acre basis.

The first step is to determine the amount of processing culls per ton. The "Below Average" figure for processing culls is 15 percent. However, only 10 percent of the ton of field run potatoes will be purchased at processing cull prices. Therefore, multiplying 2000 pounds by 0.10 yields 200 pounds of processing culls per ton of field run potatoes. An average yield of 24 tons per acre means there are 4800 pounds, or 2.4 tons, of processing culls per acre. At a price of \$10 per ton the returns per acre from processing culls is \$24. Table 4 shows the calculation of processing cull returns using price per pound of processing culls.

Cull Returns

For all practical purposes, cull potatoes are worthless. However, to make the discussion complete, grower earnings are calculated.

In addition to the 25 percent culls, there are the 5 percent processing culls above the processing cull limit. Therefore, 30 percent of the ton of field grade potatoes are valued at cull prices. Multiplying 0.30 times 2000 pounds gives 600 pounds of culls per ton of field grade

potatoes. Out of an acre of field grade potatoes (24 tons) there are 14,400 pounds, or 7.2 tons, of culls. At a price of 10 cents per ton the value of these culls is 72 cents. Table 5 provides a more circuitous route to the same result.

Table 4. PROCESSING CULL RETURNS

	2,000 lbs/ton
Times % processing culls	0.1
Lbs. processing culls/ton	<u>200</u>
Times yield per acre	24
Lbs. processing culls/acre	<u>4,800</u>
Times price/lb.	<u>\$.005</u>
	\$24.00

Table 5: CULL RETURNS

	2,000 lbs/ton
Times % Culls	.30
Lbs. culls/ton	<u>600</u>
Times yield/acre	<u>24</u>
	14,400
Times price/lb.	<u>\$.00005</u>
Cull returns/acre	\$.72

Gross Returns per Acre

Table 6 contains the gross returns based on the production data for all three groups. Concentrating on the "Below Average" column first, the payment for the market grade potatoes from one acre is determined by multiplying \$30.39 by 24 tons. The result is \$729.36. To this figure is added the payment for processing culls and culls. The value of an acre of field grade potatoes for the "Below Average" group is \$754.08.

Now the deduction for dirt and foreign matter can be made. An average yield of 24 tons of field grade potatoes has been used in this analysis. This 24 tons actually represents 90 percent of the field weight delivered to the processor. The field weight per acre is determined by dividing 24 tons by 0.90. The field weight per acre is 26.66 tons. The charge for removing dirt and foreign material is \$1 per field weight ton. The cost per acre for this service is \$26.66.

Subtracting \$26.66 from \$754.08 yields \$727.42, the gross return per acre for potatoes representing the quality factors in the "Below Average" column in Table 2.

Columns 2 and 3 in Table 6 were calculated using the respective data from Table 2. With average quality potatoes gross returns using the representative incentive clauses and base price are \$1,579.42. Production of high quality potatoes increases gross receipts \$308.06 to \$1,887.48 per acre.

Table 6. GROSS RETURNS PER ACRE

	<u>Below Average</u> \$	<u>Average</u> \$	<u>Above Average</u> \$
Market Grade Returns/Acre	729.36	1,564.80	1,880.16
Processing Cull Returns	24.00	14.40	7.20
Cull Returns	<u>.72</u>	<u>.22</u>	<u>.12</u>
Sum	754.08	1,579.42	1,887.48
Less Dirt Charge	<u>26.66</u>	<u>00</u>	<u>00</u>
Gross Returns/Acre	727.42	1,579.42	1,887.48

Net Returns

Using cost data generated by Cooperative Extension at W. S. U. this analysis can be extended to its logical conclusion, the determination of net returns. The most recent cost study has cash costs of \$921.28 and noncash costs of \$418.11. Total costs are \$1,339.39 per acre.

Deducting cash costs from gross returns, it is obvious why few growers produce low quality potatoes. Returns are less than cash costs. These growers are losing \$193.86 per acre. This does not include noncash costs which must also be covered to maintain long-term viability of the farm operation.

The more relevant comparison here, since most growers are likely to be in the average or above average range, is between the "Average" and "Above Average" figures. In an absolute sense, these growers are able to cover the estimated costs. However, substantial additional returns can be earned by further concentration on the incentive clauses. The difference between "Above Average" and "Average" returns of \$308.06 represents the amount an "Average" grower can spend to generate the additional returns.

CONCLUSIONS

There are several important points to be observed about this analysis. First, the fact that we are using actual data means that some growers are able to generate reasonable returns by concentrating on the incentives. However, to emphasize the incentive clauses, growers must be able to interpret their contracts.

It is also obvious that some growers do not take advantage of the incentive clauses. There are several possible reasons for this. It is possible that the grower may not be able to take advantage of the incentive clause, or the grower does not recognize the importance of the clauses. Maybe the grower does not recognize the relationship between recommended cultural practices and the incentive clauses. It is also possible the grower doesn't really care. The point is some potato growers, for whatever reason, do not take full advantage of the potato contract.

The production data used in this analysis also provide an indication of what is possible. Knowledge of the upper extremes listed under the "Above Average" heading provides target levels toward which growers can strive.

Along with the establishment of goals or objectives it allows growers to evaluate cultural practices associated with those quality factors which are subpar by indicating which factors are subpar.

Finally, it should be noted that the net returns calculated here are not truly accurate. Production costs among the three sets of quality parameters will be different. Low quality producers are likely to be attempting to reduce costs indiscriminately. In attempting to reduce costs they are also reducing income so that net returns will be affected, usually downward. On the other hand, quality producers will have somewhat higher production costs as well as higher returns.

The other inaccuracy is caused by assuming constant yield. In fact, it is more likely to be the case that low quality producers will have lower yields than high quality producers.

The final outcome is likely to be a wider spread than shown in our analysis.

Table 7. REPRESENTATIVE NET RETURNS PER ACRE

	<u>Below Average</u>	<u>Average</u>	<u>Above Average</u>
Gross Returns	\$727.42	\$1,579.42	\$1,887.48
Cash Costs	<u>921.28</u>	<u>921.28</u>	<u>921.28</u>
Returns over Cash Costs	(193.86)	658.14	966.20
Fixed Costs	<u>418.11</u>	<u>418.11</u>	<u>418.11</u>
Returns to Management	(611.97)	240.03	548.09