



**Evaluation of Prevented Planting Program
Methodology and updating procedures for
calculating preplanting percentages**

Contract Number D13PD001146

**A Report for
Acquisition Services Directorate
and
Risk Management Agency**



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1. METHODOLOGY

This document provides the methodology we used to calculate the preplanting percentages for each crop, as well as instructions on how to update the calculations for subsequent years.

Calculating preplanting percentages for each crop required a three-step process:

- Building a production cost budget for each crop (in this case, for the 2003-2012 period);
- Estimating the percentage of each expense category that should be considered a pre-planting cost; and
- Multiplying these two data sets to determine pre-planting costs and the overall share of costs that should be considered pre-planting.

For each crop the cost data for the 2003-2012 crops is assembled in an Excel file. The first sheet shows total production costs. The second sheet contains factors that represent the percentage of each cost line item that is estimated to be incurred in a prevented planting situation. The third sheet contains the product of the total costs in the first sheet and the percentage factors in the second sheet. It also calculates the percentage of total costs that is incurred in a PP situation, which can then be compared to the current RMA coverage levels for prevented planting.

In most cases, we have structured budgets in accordance with the Economic Research Service's normal aggregated cost framework used in the agency's ongoing work on commodity costs and returns. In some cases this required us to estimate overhead costs that were not explicitly identified in state extension service production cost budgets. We have also separately included part of the cost of crop insurance to the farmer under operating costs since this is not included in the ERS cost tables. We included that portion of the farmer-paid premium per acre from RMA's Summary of Business data that one can attribute to prevented planting protection.

1.1. Determining production costs

For the nine crops covered by ARMS surveys, the production costs by farm resource region for the ten-year time period are available on the ERS website. Our only modification was to add part of the cost of crop insurance. For these crops, the regions for which there are production cost estimates are shown in Table 8. (For rice, ERS has California, Gulf Coast, Arkansas Non-Delta, and Mississippi River Delta, which more or less align with the regions shown in the table.) We also used farm resource regions for similar or related crops that have costs based on extension budgets, or in the case of cottonseed, costs based on joint production with a covered crop. Those crops are included at the bottom of Table 1.

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Table 1: Production cost budgets by farm resource region

	Northern Great Plains	Heartland	Northern Crescent	Eastern Uplands	Southern Seaboard	Mississippi Portal	Prairie Gateway	Fruitful Rim	Basin & Range
Barley									
Corn									
Cotton									
ELS cotton									
Grain sorghum									
Oats									
Peanuts									
Rice									
Soybeans									
Wheat									
Cottonseed									
Hy. corn seed									
Popcorn									
Hy. Sorg. seed									
Silage sorghum									

For the other crops (including hybrid corn and sorghum seed, popcorn, and silage sorghum) we first researched where they are grown and then searched for budgets for those states covering the ten-year timeframe. A few state extension services regularly produce budgets for multiple crops each year that are archived online. More commonly only the current year is available or a budget is published every few years. And for some states and crops there are no budgets available. For years for which no budget was available, we used price indexes from USDA's National Agricultural Statistics Service and other sources to derive the missing data from the years for which data was found.

The available budgets dictated the degree to which we could differentiate costs by region. Regions had to be defined in order to eventually compare the calculated PP costs to the indemnities paid for the Recommendations Report. Table 2 shows the states included in various regions for which we judged the available budgets to be representative.

Table 2: Region definitions on a state basis

Crop	States in Region
Buckwheat	MN, ND, SD
Canola	ND
Dry beans	ND, MN
Dry beans	NE
Dry peas	ID, MT, ND, WA
Flax	ND
Green peas	IA, IL, MN, WI
Hybrid sorghum seed	TX
Millet	CO, KS, ND, SD
Mustard	ND, MT
Onions	ID, OR, WA
Onions	CA, GA, NM, NV, TX
Potatoes	ID, OR, WA
Potatoes	AL, AZ, FL, GA, TX
Processing beans	DE, MD, NJ, NY, PA
Processing sweet corn	WA, OR, ID
Rye	ND, SD, MN
Rye	KS, OK, TX
Rye	WI, MI, IL
Safflower	CA
Safflower	MT, ND, SD
Sugar beets	MI
Sugar beets	CO, MN, ND, NE
Sugar beets	ID, MT, OR, WY
Sunflower seed	MN, ND, SD
Tobacco	KY, TN
Tobacco	NC, SC, VA

1.2. Determining costs incurred prior to planting

Our methodology for this step differed slightly for operating costs and overhead costs. For operating costs we either used the percentages that the ERS studies have developed as allocable to the pre-planting period, or we developed our own estimates based on extension service crop budgets and interviews with those who prepared them or with other experts.

For several of the cost elements, the estimates were based on the percentage of field operations that occur prior to planting. Unfortunately there is no clear cut dividing line. When fields are too wet to plant, farmers may also have been unable to complete the seed bed preparation, weed control and/or fertilization operations they would normally undertake just prior to planting. The 1996 ERS study recognized this possibility and looked at three scenarios that differed in the degree of completion of these steps. In our analysis we have generally given producers the benefit of the doubt and assumed all steps are completed.

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For overhead costs we include 100% of all except labor. Farmers have to pay taxes, insurance, and general farm overhead costs even if they are unable to plant a particular crop. Land rent must also be paid, or funds tied up in owned land could have generated a return elsewhere. Similarly, machinery replacement costs are typically accrued each year for tax purposes via depreciation schedules and are not likely to be affected much by inability to plant a particular crop. Most farmers diversify their crop production and will still be using equipment on the acreage that is unaffected.

In the case of labor, we concluded that farm operators and their hired labor typically have plenty of other ways to profitably use their time over the course of a season and we count only the labor input prior to planting. ERS includes hired labor under overhead costs, while many state extension budgets list it under variable operating costs. We treat it the same way in both cases.

One cost that farmers can incur in a PP situation that may not be part of the normal cost structure is the cost of weed control on the unplanted land. There are three options – tillage, chemical control, or planting a cover crop. The typical cost per acre for tillage or chemical control is about \$15. Planting a cover crop like annual ryegrass, radishes, or oats depends on the cost of the seed but costs were variously reported as between \$20 and \$35 per acre. However, a farmer may have weed control expenses or plant a cover crop after a spring-planted crop in any case. And cover crops add value in terms of soil fertility and structure. One recent study found that corn and soybean yields are 10% higher when following a cover crop.¹ Since our decisions on treatment of overhead costs are overwhelmingly in favor of farmers, and since cover crops provide a benefit, we chose not to include cover crop costs in our calculation of costs farmers incur in a PP situation.

Below we provide additional comments on our treatment of each cost category.

Seed

If the crop was not planted, the seed was not used. In general we found that most farmers are able to either carry the seed over for a year or return it for credit or a refund. However, there are some crops, like potatoes or tobacco, where the seed is usually a total loss if not planted.

Fertilizer

Most fertilizer for the major field crops is applied prior to planting. There are reasonably good data from the ARMS surveys and extension budgets about timing of fertilizer application, and the latter provide the total costs per acre of the different types. Our simplifying assumption is that all nitrogen applied before planting is degraded and a sunk cost, while all phosphorous, potassium and other soil amendments remain in the soil and can be used by subsequent crops.

Chemicals

Crop protection chemicals are mostly applied after planting, but soil fumigants and glyphosate “burndown” are the exceptions. We adopted whatever percentage factors for pre-planting expenses were available in the various source materials.

¹ January 23, 2013 webinar on cover crops and crop insurance hosted by the National Center for Appropriate Technology and the National Sustainable Agriculture Coalition

Custom operations

Custom operation is an aggregated category of expenses; it includes items such as soil tests and crop-specific operations such as aerial spraying. The farmer typically hires out these operations. Costs in this category that occur preplanting are generally not avoidable, e.g., soil tests are done before fertilizer applications and most likely before a foreseeable prevented planting situation.

The ERS studies cited earlier provide the factors for selected crops. Extension budgets varied in the degree to which they revealed timing of custom operations. In the absence of information, we used the percentage of all field operations occurring before planting.

Fuel, lube and electricity

For dryland production, the allocation to the pre-planting period was based on the percentage of field operations in that period. For irrigated production, energy inputs were allocated primarily to the post-planting period.

Repairs

The percentage of repairs that occur prior to planting is taken directly from the ERS data. In the cases where an extension budget was used, the percentage of repairs was judged to be equivalent to the percentage of preplant operations.

Crop insurance

The ERS production costs do not include crop insurance because the revenue side of their cost and returns tables includes only market returns from the sale of the crop at average yields. State extension budgets sometimes do include the cost of crop insurance. We concluded that the appropriate method for this study was to include that portion of the average farmer-paid premium per acre from RMA's Summary of Business data that one can attribute to prevented planting protection. For this purpose we used the ratio of prevented planting indemnities to total indemnities for the 1994-2013 period. That factor ranged from 1% for a few crops to more than 50% for canola, ELS cotton, burley tobacco, and rice.

Interest on operating costs

ERS included interest only on those costs incurred prior to planting. The simple average of the shares for the eight crops covered in the 2007 and 2013 ERS studies is 25% and we have used that percentage for all other crops.

Other variable costs

Depending on the crop, these may be separately identified as purchased irrigation water, ginning (for cotton), straw baling (oats), transload (potatoes), etc. Some extension budgets also just have a "miscellaneous" category. For the most part these are costs that come only after a crop is planted, so a zero factor is applied for calculating the PP portion.

Labor

As discussed above, whether for hired labor or the opportunity cost of unpaid operator labor, we only include the labor costs associated with activities prior to planting.

Opportunity cost of land

Some farmers own all the land they farm, some own part and rent part, and some are just renters. The 2007 Census of Agriculture reported that 20% of the harvested cropland was on farms that are fully owned, 12% was on farms that fully rented, and 68% was on a mix of owned and rented land. If one owns the land, there is no rental payment that has to be covered when a crop is not planted. And even rental contracts may have provisions that adjust the payment in a prevented planting situation. Nevertheless, if a farmer or landowner did not have money tied up in land, it could be earning something elsewhere, so we have followed the ERS model of using land rental rates as the opportunity cost of the land resource. We include 100% of that rental rate as a pre-planting cost.

Capital recovery of machinery and equipment

This is part of the ownership costs described in Section 2.1. In this case it is the annualized cost of maintaining the capital investment (depreciation and interest) in farm machinery, equipment, and facilities. Since it is a cost that does not actually have to be covered in any particular year, there is a stronger argument than for land costs for not including it at all as a pre-planting cost. However, we chose to include 100% as a pre-planting cost because the guarantee in RMA insurance plans is generally based on some concept of full cost of production.

Taxes and insurance, and general farm overhead

These are all cash outlays that must be paid on a timely basis. In cost of production budgeting, these costs are allocated among the various farm enterprises on the basis of the contribution of each enterprise to net returns. We include 100% of these costs as pre-planting costs.

1.3. Determining pre-planting costs

Once a production budget is prepared, and pre-planting percentages determined by category, one simply need multiply these two items together to obtain pre-planting costs by category, and to calculate the overall percentage of costs that should be considered preplanting costs.

In the next section, we identify how budgets and pre-planting percentages were obtained for each crop under consideration.

2. METHODOLOGY BY CROP

In the final report, crops are presented in three groupings:

- Those with ARMS cost data, with updated ERS cost timing estimates;
- Those with ARMS cost data, but lacking updated ERS cost timing estimates; and
- Other crops.

In this document, we have combined the first two groupings, since their budget data all follow the same budget format (i.e., from ARMS).

Therefore, the methodologies presented here cover first the ERS ARMS data crops, then all other crops, each in alphabetical order.

In constructing the production cost budgets, we looked at the available budgets to determine the best overall method of allocating costs in a reasonable accounting method. The AAEE handbook assisted with this task. Ultimately, it was decided that the ERS production cost accounting format was the most logical, and fortunately, the most widely adopted in extension budgets. In the case of crops covered by the ERS ARMS data, we used the exact accounting categories and data without modification. We simply removed footnotes and minor punctuation to fit our table format, and added a line for crop insurance costs.

Many of the extension budgets were also based on a format very close, or even identical, to the ERS format. For example, North Dakota State University Extension budgets, which contributed to a large number of crop budgets, were very similar to the ERS Commodity Costs and Returns budgets. We simply adapted them to our table format.

In a few cases, the university extension budgets used a very different accounting methodology. Some of these budgets provided very detailed information and sometimes detailed specific operations by month. For example, California budgets detailed the number and type of plow operations by month, the amount of each fertilizer, brand of insecticide, brand of herbicide etc. For budgets like this, we aggregated operations to approximate the ERS accounting format. For example, all the herbicides were added together into an "Herbicide" category.

2.1. ERS Survey data crops

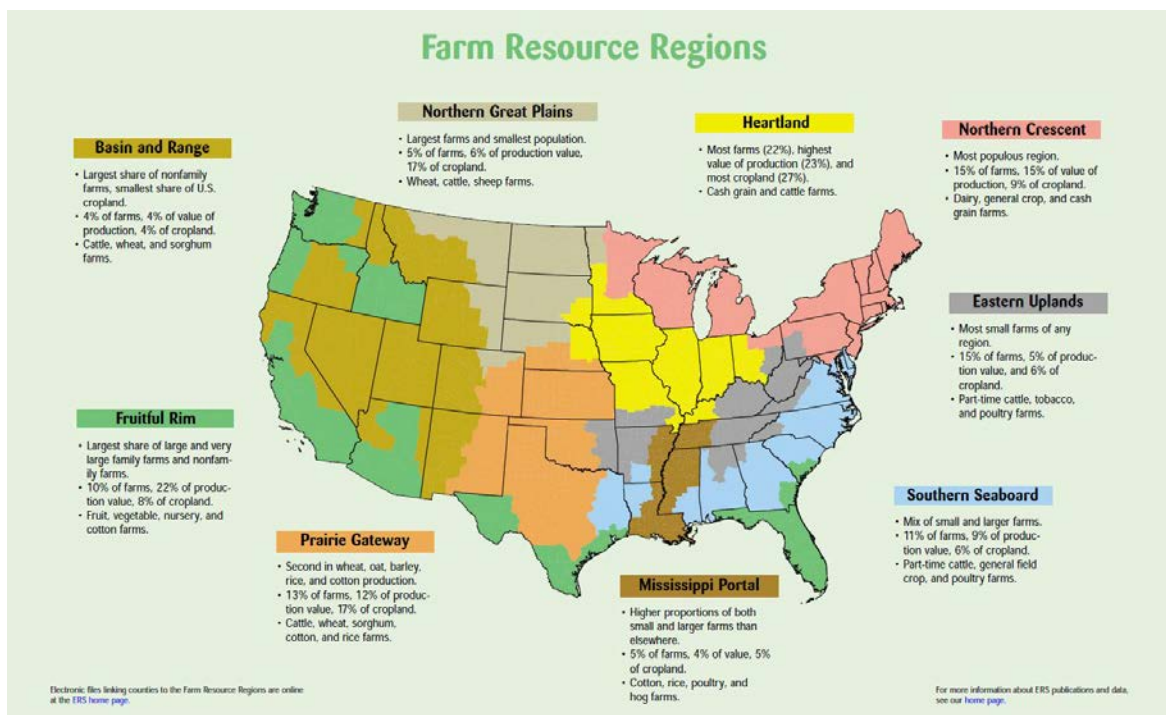
Here we provide corn as an example of how we treated the ERS crops. Other ERS survey-based crops follow a similar methodology.

Specific calculations relevant to estimating pre-planting percentages for each crop are treated under each individual crop heading.

For each of the following crops, data came from the ERS. Budgets from ERS are split into farm resource regions. These farm resource regions are detailed in the map below.

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2.1.1. The “Production costs” tab

The following table is a copy of the ERS data. We removed the data noted in red and removed the footnote numbering.

Corn production costs and returns per planted acre, excluding Government payments, Heartland, 2010-2012 1/			
Item	2010	2011	2012
dollars per planted acre			
Gross value of production			
Primary product: Corn grain	723.11	883.50	811.58
Secondary product: Corn silage	0.24	0.42	0.33
Total, gross value of production	723.35	883.92	811.91
Operating costs:			
Seed	87.72	90.78	96.53
Fertilizer 2/	118.09	155.18	166.40
Chemicals	26.95	26.95	28.26
Custom operations 3/	15.25	15.53	15.91
Fuel, lube, and electricity	22.18	27.76	25.95
Repairs	21.77	22.45	23.12
Purchased irrigation water	0.00	0.00	0.00

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Interest on operating capital	0.29	0.17	0.24
Total, operating costs	292.25	338.82	356.41
Allocated overhead:			
Hired labor	2.61	2.64	2.75
Opportunity cost of unpaid labor	20.21	20.42	21.28
Capital recovery of machinery and equipment	81.22	86.16	90.40
Opportunity cost of land (rental rate)	150.49	162.26	167.21
Taxes and insurance	7.77	8.18	8.54
General farm overhead	17.37	17.91	18.45
Total, allocated overhead	279.67	297.57	308.63
Total, costs listed	571.92	636.39	665.04
Value of production less total costs listed	151.43	247.53	146.87
Value of production less operating costs	431.10	545.10	455.50
Supporting information:			
Yield (bushels per planted acre)	167	155	119
Price (dollars per bushel at harvest)	4.33	5.70	6.82
Enterprise size (planted acres) 1/	313	313	313
Production practices: 1/			
Irrigated (percent)	5	5	5
Dryland (percent)	95	95	95
1/ Developed from survey base year, 2010.			
2/ Cost of commercial fertilizers, soil conditioners, and manure.			
3/ Cost of custom operations, technical services, and commercial drying.			

The next table is a copy of the table we used. Note that "Crop Insurance" is a cost not accounted for in the RMA data. We added crop insurance to the ERS budgets. Crop insurance was derived from the RMA Summary of Business data, and calculated as indicated in Section 1.2. It is shown in red.

One can see that the data is almost a line-for-line match with the ERS data.

Corn production costs per planted acre: Heartland

Item	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Cash expenses:										
Seed	34.89	37.05	41.23	43.83	49.40	61.29	80.61	87.72	90.78	98.83
Fertilizer	51.43	56.01	72.67	82.79	96.13	146.62	137.89	118.09	155.18	165.91
Chemicals	26.50	27.11	24.71	25.73	26.55	27.68	30.52	26.95	26.95	28.45
Custom operations	10.09	10.53	8.99	9.40	9.80	9.80	10.47	15.25	15.53	15.82
Fuel, lube, and electricity	18.81	25.41	20.32	22.48	25.00	32.73	22.13	22.18	27.76	26.10
Repairs	12.63	13.82	12.23	12.67	13.11	13.46	13.72	21.77	22.45	23.12
Purchased irrigation water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crop Insurance	8.17	9.95	8.43	10.03	17.28	23.21	17.54	14.05	23.15	20.11
Interest on operating costs	0.79	1.26	3.07	4.66	4.85	2.16	0.43	0.29	0.17	0.24
Total, operating costs	163.31	181.14	191.65	211.59	242.12	316.95	313.31	306.30	361.97	378.58
Allocated overhead:										
Hired Labor	2.30	2.30	1.41	1.46	1.51	1.56	1.59	2.61	2.64	2.75
Opportunity cost of unpaid labor	23.79	24.28	19.8	20.52	21.24	21.96	22.44	20.21	20.42	21.28
Capital recovery of machinery & equip.	53.06	58.11	60.45	63.59	66.73	73.02	77.56	81.22	86.16	90.75
Opportunity cost of land (rental rate)	100.28	103.58	104.87	103.16	110.48	123.66	142.36	150.49	163.77	184.42
Taxes and insurance	5.19	5.24	6.06	6.37	6.88	7.64	7.46	7.77	8.18	8.62
General farm overhead	10.93	11.17	12.14	12.57	13.00	13.35	13.61	17.37	17.91	18.45
Total, allocated overhead	195.55	204.68	204.73	207.67	219.84	241.19	265.02	279.67	299.08	326.27
Total costs listed	358.86	385.82	396.38	419.26	461.96	558.14	578.33	585.97	661.05	704.85

The above example applies to the following crops

- Barley
- Corn
- Cotton
- Cottonseed
- Oats
- Rice
- Rye
- Sorghum grain
- Sugar beets (see note in Special cases)
- Soybeans
- Wheat

2.1.2. The “Preplant” tab

The data used to calculate the preplant percentages also came from ERS calculations, where available. The following table shows the preplant percentage estimates of Heartland corn (following the same budget format presented earlier).

Corn - share of expenses incurred before planting: Heartland

Item	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Cash expenses:										
Seed	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Fertilizer	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%
Chemicals	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%
Custom operations	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%
Fuel, lube, and electricity	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%
Repairs	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%
Purchased irrigation water	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Crop Insurance	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%
Interest on operating costs	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%
Allocated overhead:										
Hired Labor	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%
Opportunity cost of unpaid labor	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%
Capital recovery of machinery & equip.	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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Opportunity cost of land (rental rate)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Taxes and insurance	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
General farm overhead	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

The percentages for the crops for which there was ERS data generally came from the ERS data. However, as noted earlier, not all categories were accounted as the ERS allocates them (we described our general methodology for determining preplanting percentages in section 1.2).

Crop specific details and exceptions are given in the pages that follow.

2.1.3. Barley

Agralytica used crop production cost data from ERS, based on ARMS surveys (2011, 2003). Budgets were constructed for five regions: Basin and Range, Fruitful Rim, Northern Great Plains, Heartland, and Northern Crescent.

Production costs (Tab 1)

1. Begin with ERS production cost data for 2003-2012.

Pre-planting percentage costs by expense category (Tab 2)

2. For the budget, we used the following pre-planting cost percentages, most drawn from ERS analysis of cost data:

Cash expenses:

- 30% for fertilizer
- 17% for chemicals
- 29% for custom operations
- 23% for fuel, lube, and electricity
- 20% for repairs
- 31% for crop insurance (reflective of the PP share of indemnities, 1994-2013)
- 29% for hired labor
- 25% for interest on operating costs

Overhead expenses:

- 25% of operator labor
- 100% of capital recovery of machinery & equipment
- 100% of taxes and insurance
- 100% of land charge
- 100% of general farm overhead

Pre-planting cost estimates (Tab 3)

3. Multiply appropriate cells on Tabs 1 and 2.
4. Copy values from "Total cost" line on Tab 1 to Tab 3.
5. Calculate pre-planting costs as a percentage of total costs.

Barley - References

Crop budgets available from:

<http://www.ers.usda.gov/data-products/commodity-costs-and-returns.aspx>

Other sources of information:

Agricultural Marketing Resource Center – Barley profile

http://www.agmrc.org/commodities_products/grains_oilseeds/barley-profile/

Idaho Spring Barley Production Guide

<http://www.cals.uidaho.edu/edcomm/pdf/BUL/BUL0742.pdf>

Irrigated Malt Barley Production (North Dakota)

http://www.ag.ndsu.edu/ibms/producers/documents/IrrigatedMaltBarleyProduction_001.pdf

Montana Barley Production Guide

<http://msuextension.org/publications/AgandNaturalResources/EB0186.pdf>

2.1.4. Corn

On its website, ERS provides annual estimates of corn production costs for six farm resource regions. These are based on the periodic ARMS surveys. We use these costs as our starting point. For most cost elements we use the preplanting percentages developed by ERS in their 2013 study.

In the case of fertilizer, ERS estimated that 63% of costs are incurred prior to planting. However, any phosphorus or potassium that has been applied remains in the soil and is available for a subsequent crop. Nitrogen is more degradable. ARMS data for 2010 reveals that 91% of the potassium and 77% of the phosphorus are applied in the fall or spring prior to planting. For nitrogen, 18% is applied in the fall and 50% in the spring prior to planting. However, in a PP situation, some of that spring fertilization may not occur due to wet conditions and anticipation of not planting.

State crop budgets indicate that nitrogen accounts for 55% of fertilizer costs. Multiplying that share of value times the share of pounds applied in a prevented planting situation indicates that 37% of the fertilizer dollars are expended on an input that degrades so that it is unavailable to a subsequent crop (see table below). This is just under half of the total expended. Thus we can estimate that 31% of fertilizer costs are incurred in a PP situation ($37/75 \times 63$).

Corn fertilizer assessment

Input	Share of group	Applied pre-planting	\$ Share Expended
Nitrogen	55	68	37
Phosphorous	23	77	18
Potassium/other	22	91	20
Total	100	-	75

References:

“Corn Production Handbook” – Kansas State University

<http://www.ksre.ksu.edu/mil/Resources/Crop%20Production%20Handbooks/Corn.pdf>

“The North Carolina Corn Production Guide” - NC State University

<http://www.ces.ncsu.edu/plymouth/cropsci/cornguide/>

2.1.5. Cotton

Cotton lint and cotton seed are joint products. When cotton is ginned, the process separates the lint from the cottonseed, which then goes on to be crushed, yielding cottonseed oil and cottonseed meal. The grower gets payments from the ginner for both the lint and the seed.

The ERS cost and return estimates for cotton include returns per acre for both lint and seed. For the years under study, there are two distinct periods for the relationship between lint and seed returns. During 2003-2007, the returns from lint averaged 85% of total returns. During 2008-2012, the average fell to 81% due to higher US and world market prices for protein meal and vegetable oil relative to cotton fiber.

Since lint and seed are joint products, and the seed yield guarantee is linked to the lint yield guarantee, one can simply make a pro rata attribution of the appropriate portion of production costs. In attributing cotton production costs to the preplanting period, we include only 85% of those costs for 2003-2007 and 81% for 2008-2012. That is all that the prevented planting indemnity for cotton should cover. The remainder would be covered by the cottonseed prevented planting indemnity if the farmer buys that coverage.

We have relied primarily on the ERS analysis for most of the pre-planting cost factors. We include only a very small factor for crop insurance due to the low incidence of prevented planting. The one other adjustment we make to the ERS factors is for fertilizer, based on an assessment of how much of what is applied before planting is lost and how much remains in the soil for future use. Our simplifying assumption is that all nitrogen is lost and all phosphorous, potassium and other soil amendments remain.

The more recent ARMS surveys collect information on timing of fertilizer application. This data is accessible via the ARMS app at <http://www.ers.usda.gov/data-products/arms-farm-financial-and-crop-production-practices/tailored-reports.aspx>. Under “Crop Production Practices” one selects the “Nutrient Use by Application Timing” report. In general, the data are valid only at the national level. In the case of cotton, the shares reportedly applied before planting in 2007 are shown in the table below.

The next step is to calculate the share of costs incurred that is lost. A review of cotton budgets for Texas, Arkansas, Alabama, Georgia, North Carolina and South Carolina suggests that nitrogen fertilizers account for about half of total fertilizer costs. The middle column shows the ARMS survey estimates of the

percentage of pounds applied prior to planting. The last column is the product of the first two. In this case 34% (20 divided by 58) of the pre-planting expenditure is on nitrogen and is a non-recoverable cost. Applying this to the ERS factor of 43% yields a fertilizer cost factor of 15%.

Cotton fertilizer assessment

Input	Share of group	Applied pre-planting	\$ Share Expended
Nitrogen	50	39	20
Phosphorus	20	77	15
Potassium/other	30	78	23
Total	100	-	58

References:

"2013 Cotton Guide" - NC State Cooperative Extension

http://www.cotton.ncsu.edu/guide/Cotton2013_guide.pdf

"Cotton Production in West Central Texas" - Texas A&M Agrilife Extension

<http://sanangelo.tamu.edu/extension/agronomy/agronomy-publications/cotton-production-in-west-central-texas/>

2014 Georgia Cotton Production Guide - University of Georgia Cooperative Extension

<http://www.ugacotton.com/production-guide/>

2.1.6. Cottonseed

The cottonseed endorsement establishes a grower's guarantee using an established price for cottonseed and a yield that is calculated in relation to lint yield using a conversion factor determined by RMA. Both of these are shown in the actuarial documents, on the price and rates pages.

Since lint and seed are joint products, and the seed yield guarantee is linked to the lint yield guarantee, one can simply make a pro rata attribution of the appropriate portion of production costs, in the same fashion as for upland and ELS cotton. As part of the attribution of costs for cottonseed to the preplanting period, we include only 15% of those costs for 2003-2007 and 19% for 2008-2012. These factors are applied in the PP cost worksheets.

References:

"Cottonseed And Its Products" - National Cottonseed Products Association

<http://www.cottonseed.com/publications/cottonseedanditsproducts.asp>

MRC Seeds

<http://www.mrcseeds.com/cotton-seeds/>

2.1.7. Oats

On its website, ERS provides annual estimates of oat production costs. These are based on the periodic ARMS surveys. We use these costs as our starting point. In the case of oats, no estimates of actual pre-planting percentages are calculated so we used spring wheat factors used as a starting point.

Production costs (Tab 1)

1. Begin with ERS production costs for oats (four regions): <http://www.ers.usda.gov/data-products/commodity-costs-and-returns.aspx>.
2. Production costs for 2003 and 2004 were filled using the formula that draws data from price indexes (Col A) and calculates values for that year based on the accompanying "Cost Index" data file.

Pre-planting percentage costs by expense category (Tab 2)

3. For the budgets, we used the following pre-planting cost percentages; most are the measured spring wheat factors, which can serve as a proxy for oats.

Cash expenses:

- 24% of fertilizer,
- 18% of chemicals,
- 15% of custom operations,
- 21% of fuel & lubrication,
- 18% of repairs,
- 11% of crop insurance (the percentage of farmer premium attributable to PP indemnities),
- and 25% of interest on operating costs.

And most overhead:

- 28% of hired labor
- 22% of operator labor,
- 100% of machinery capital recovery costs,
- 100% of land charge,
- 100% of taxes and insurance,
- and 100% of general farm overhead.

Pre-planting cost estimates (Tab 3)

4. Multiply appropriate cells on Tabs 1 and 2.
5. Calculate pre-planting costs as a percentage of total costs.

References:

Farm management practices were obtained from the following sources:

"Oat production no. 0.119" Colorado State University Extension

http://extension.oregonstate.edu/gilliam/sites/default/files/Oat_production.pdf

"Planting and Management Practices for Wheat and Oats" LSU Agricultural Center

<http://www.lsuagcenter.com/MCMS/RelatedFiles/%7B0217A37E-DDD5-410C-ACCB-9240D96B1EDF%7D/PlantingManagementPractices.pdf>

"Oat Production in South Dakota" South Dakota State University Cooperative Extension Service

<https://www.sdstate.edu/sdces/resources/crops/weeds/upload/48-FS384-Oat-Production-in-SD-1981.pdf>

"Oat Production in North Dakota" North Dakota State University Cooperative Extension Service

<http://www.hort.purdue.edu/newcrop/crops/oats.html>

2.1.8. Peanuts

The production costs are published annually by the Economic Research Service and rely on one of the older ARMS surveys, covering the 2004 crop. A survey covering the 2013 peanut crop is currently underway.

The ERS data for Fruitful Rim does not include 2003. We used price indexes to estimate costs for that year.

The factors for allocating the different costs were chosen based on evaluating crop budgets from Georgia, South Carolina, North Carolina and Virginia, and on discussions with peanut experts. All of these budgets broke out key costs by field operation, so we were able to allocate chemical, fuel, labor, and machinery repair costs to reflect those breakdowns.

For these budgets, we used the following pre-planting cost percentages:

- Seed: 0% because prevented planting is a rare event for peanuts and dealers allow seed returns.
- Fertilizer: 0% because any fertilizer, lime or gypsum applied remain available for another crop
- Chemicals: 30%
- Fuel, lubrication, and repairs: 33%
- Repairs: 25%
- Operator and hired labor: 28%
- Crop insurance: 1%, the PP share of total liabilities
- Interest on operating capital: 25%

And all overhead except labor is included at 100%.

References:

Texas Peanut Production Guide

http://publications.tamu.edu/PEANUTS/PUB_peanuts_Texas%20Peanut%20Production%20Guide.pdf

Georgia 2012 Peanut Production Update

<http://www.caes.uga.edu/commodities/fieldcrops/peanuts/documents/2012PeanutProductionUpdateGuide.pdf>

2.1.9. Rice

Production costs (Tab 1)

1. Begin with ERS production costs estimates for rice

Pre-planting percentage costs by expense category (Tab 2)

2. For these budgets, we used the following pre-planting cost percentages, mostly based on the 2007 ERS study results:
 - Fertilizer: 27%
 - Chemicals: 8%
 - Custom operations: 13% for 2003-2005, 25% thereafter due splitting out commercial drying into a separate category
 - Fuel, lubrication, and electricity: 10%
 - Repairs: 23%
 - Hired labor: 46%
 - Crop insurance: 56%, the share that PP indemnities are of total indemnities
 - Interest on operating capital: 16%

And most overhead

- Hired labor: Operator labor: 49%
- Capital machinery costs: 100%
- Land: 100%
- Taxes and insurance: 100%
- General farm overhead: 100%

Pre-planting cost estimates (Tab 3)

3. Multiply appropriate cells on Tabs 1 and 2.
4. Copy values for "Total cost" from Tab 1 to Tab 3
5. Calculate pre-planting costs as a percentage of total costs

References:

Budgets:

University of California Davis

<http://coststudies.ucdavis.edu/files/2012/RiceSV2012.pdf>

University of Arkansas – Research & Extension (2013)

http://www.uaex.edu/depts/ag_economics/default.htm (main page)

http://www.uaex.edu/depts/ag_economics/budgets/2014/Budgets2014.pdf (enterprise budgets)

Other:

Rice Production in Louisiana

<http://www.lsuagcenter.com/NR/rdonlyres/76225F15-7765-4AA0-8BB8-8CC77067B665/90660/2013RiceBudgets.pdf>

Rice Production Best Management Practices

http://www.agmrc.org/media/cms/2805rice_412982BFD8BCD.pdf

Agricultural Marketing Resource Center - Rice

http://www.agmrc.org/commodities_products/grains_oilseeds/rice/

2.1.10. Sorghum grain

Production costs (Tab 1)

1. Used ERS data for the four major growing regions. Heaviest production of sorghum is in the Prairie Gateway resource region.
2. Crop insurance costs were added from RMA data

Pre-planting percentage costs by expense category (Tab 2)

3. For the budget, we used the following pre-planting cost percentages, which were provided primarily from the ERS survey data:

Cash expenses:

- 0% for seed,
- 31% of fertilizer (50% of fertilizer was nitrogen, and 61% of nitrogen was estimated to be applied pre-planting)
- 40% of chemicals
- 17% of custom operations
- 16% of fuel, lube, and electricity
- 24% of repairs
- 4% of crop insurance, and
- 27% of interest on operating costs

Overhead:

- 36% of hired labor,
- 27% of the opportunity cost of unpaid labor,
- 100% of the capital recovery of machinery & equipment,
- 100% of the opportunity cost of land,

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- 100% of taxes and insurance, and
- 100% of general farm overhead

Pre-planting cost estimates (Tab 3)

4. Multiply appropriate cells on Tabs 1 and 2.
5. Link "Total cost" values from Tab 1 on Tab 3.
6. Calculate pre-planting costs as a percentage of total costs.

References:

"Nutrient Management Suggestions for Grain Sorghum" (University of Nebraska-Lincoln)

<http://www.ianrpubs.unl.edu/pages/publicationD.jsp?publicationId=671>

"Sorghum Fertility Management," Bill McClure, Pioneer

<https://www.pioneer.com/home/site/ca/template.CONTENT/products/sorghum/production-manual/guid.AE3799A5-A380-492A-B5DF-1D49E8B1735B>

"Grain Sorghum," University of Arizona

<http://cals.arizona.edu/crops/soils/aznsorghum.pdf>

Grain Sorghum Production Calendar

<http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-2620/PSS-2113web.pdf>

Others

<http://sorghumcheckoff.com/for-farmer/production-tools/>

<http://sorghumcheckoff.com/wp-content/uploads/2012/06/WhatIsSorghum.pdf>

2.1.11. Sorghum silage

Production costs (Tab 1)

1. Used ERS data for the four major growing regions. Heaviest production of sorghum is in the Prairie Gateway.
2. Crop insurance costs were added from RMA data

Pre-planting percentage costs by expense category (Tab 2)

3. For the budget, we used the following pre-planting cost percentages, which were provided primarily from the ERS survey data:

Cash expenses:

- 0% for seed,
- 35% of fertilizer (50% of fertilizer was nitrogen, and 70% of nitrogen was estimated to be applied pre-planting)
- 40% of chemicals
- 17% of custom operations

- 16% of fuel, lube, and electricity
- 24% of repairs
- 2% of crop insurance, and
- 27% of interest on operating costs

Overhead:

- 36% of hired labor,
- 27% of the opportunity cost of unpaid labor,
- 100% of the capital recovery of machinery & equipment,
- 100% of the opportunity cost of land,
- 100% of taxes and insurance, and
- 100% of general farm overhead

Pre-planting cost estimates (Tab 3)

4. Multiply appropriate cells on Tabs 1 and 2.
5. Link "Total cost" values from Tab 1 on Tab 3.
6. Calculate pre-planting costs as a percentage of total costs.

References:

ERS ARMS survey:

Estimation of the Preplanting and Planting Costs by Crop, Staff Analysis #13-468 (Internal use), Dec 2013

Texas A&M:

<http://agecoext.tamu.edu/resources/crop-livestock-budgets/budgets-by-commodity/sorghum/>

<http://agecoext.tamu.edu/files/2013/10/sorgsilpifob.pdf> (pivot irrigated grain sorghum silage)

<http://agecoext.tamu.edu/files/2013/10/sorgpi.pdf> (pivot irrigated grain sorghum)

"The Economic Benefits of Forage Sorghum Silage as an Alternative Crop" (Texas A&M)

http://publications.tamu.edu/FORAGE/PUB_forage_Economic%20Benefits%20of%20Forage.pdf

"Sorghum – Forage" (Univ. of Wisconsin-Extension)

<http://www.hort.purdue.edu/newcrop/afcm/forage.html>

"Forage Sorghum Silage Cost-Return Budget in South Central Kansas"

<http://www.ksre.ksu.edu/bookstore/pubs/mf648.pdf>

2.1.12. Soybeans

We have relied primarily on the ERS analysis for most of the pre-planting cost factors. We include the 13% of the farmer paid crop insurance premium attributable to PP indemnities. The one other adjustment we make to the ERS factors is for fertilizer, based on an assessment of how much of what is applied before planting is lost and how much remains in the soil for future use. Our simplifying assumption is that all nitrogen is lost and all phosphorous, potassium and other soil amendments remain.

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The more recent ARMS surveys collect information on timing of fertilizer application. This data is accessible via the ARMS app at <http://www.ers.usda.gov/data-products/arms-farm-financial-and-crop-production-practices/tailored-reports.aspx>. Under “Crop Production Practices” one selects the “Nutrient Use by Application Timing” report. In general, the data are valid only at the national level. The other information one needs is the relative value of the nitrogen used versus the value of the other fertilizers. One has to obtain this from state extension budgets that provide more detail.

In the case of soybeans, hardly any budgets show any application of nitrogen, since soybeans are a nitrogen fixing crop. The one exception we found was a Nebraska budget that included application of a small amount of liquid ammonium thiosulfate which is 12% nitrogen and 26% sulfur. However, ARMS survey data report that nitrogen accounted for about 10% of the total pounds of fertilizer applied for soybeans in 2006. The shares reportedly applied before planting are shown in the table below. However, one should keep in mind that the wet conditions that typically prevent planting would also prevent much of the spring application of fertilizer prior to planting, so these are likely to result in over-estimates of fertilizer costs in a PP situation.

The next step is to calculate the share of costs incurred that is lost. An average of budgets from nine states showed phosphorous accounting for 43% of fertilizer costs, and potassium and other soil amendments like lime accounting for 57%. Our subjective estimate of cost shares, reflecting the different data sources and the fact that phosphorous is more expensive, is shown in the first column of the following table. The middle column shows the ARMS survey estimates of the percentage of pounds applied prior to planting. The last column is the product of the first two. In this case 4.4% (4 divided by 90) of the pre-planting expenditure is on nitrogen and is a non-recoverable cost. Applying this to the ERS factor of 80% yields a fertilizer cost factor of 4%.

Soybean fertilizer assessment

Input	Share of group	Applied pre-planting	\$ Share Expended
Nitrogen	5	82	4
Phosphorous	41	84	34
Potassium/other	54	96	52
Total	100	-	90

2.1.13. Wheat

We have relied primarily on the ERS analysis for most of the pre-planting cost factors.

We add crop insurance costs, i.e. the share for the farmer paid premium attributable to PP indemnities. The one other adjustment we make to the ERS factors is for fertilizer, based on an assessment of how much of what is applied before planting is lost and how much remains in the soil for future use. Our simplifying assumption is that all nitrogen is lost and all phosphorous, potassium and other soil amendments remain.

The more recent ARMS surveys collect information on timing of fertilizer application. This data is accessible via the ARMS app at <http://www.ers.usda.gov/data-products/arms-farm-financial-and-crop-production-practices/tailored-reports.aspx>. Under “Crop Production Practices” one selects the “Nutrient Use by Application Timing” report. In general, the data are valid only at the national level. The other information one needs is the relative value of the nitrogen used versus the value of the other fertilizers. One has to obtain this from state extension budgets that provide more detail.

In the case of wheat, timing estimates are available for both winter and spring wheat in 2009. The shares reportedly applied before planting are shown in the tables below. However, one should keep in mind that the wet conditions that typically prevent planting would also prevent much of the spring application of fertilizer prior to planting, so these are likely to result in over-estimates of fertilizer costs in a PP situation.

The next step is to calculate the share of costs incurred that is lost. A review of winter wheat budgets for Kansas, Nebraska, Idaho and Wisconsin suggests that nitrogen fertilizers account for about two thirds of total fertilizer costs. However, none of these include potassium, and yet the ARMS data show that potassium accounts for about 30% of the pounds applied to winter wheat. Our subjective estimate of cost shares, reflecting the different data sources and the fact that phosphorous is more expensive, is shown in the first column of the table below. The middle column shows the ARMS survey estimates of the percentage of pounds applied prior to planting. The last column is the product of the first two. In this case 30% (16 divided by 54) of the pre-planting expenditure is on nitrogen and is a non-recoverable cost. Applying this to the ERS factor of 38% yields a fertilizer cost factor of 11%.

Winter wheat fertilizer assessment

Input	Share of group	Applied pre-planting (percent)	\$ Share Expended
Nitrogen	40	41	16
Phosphorous	30	46	14
Potassium/other	30	78	23
Total	100	-	54

The next table shows the calculation for spring wheat. There are few spring wheat budgets that break down fertilizer costs by type. Budgets for Idaho and Washington show use of nitrogen, phosphorous and sulfur. But again, ARMS data show significant use of potassium for winter wheat – 19% of total pounds – so we have made our own estimate of shares. For spring wheat, 62% (33/53) of the pre-planting expenditure is on nitrogen. Applying this to the ERS factor of 38% yields a fertilizer cost factor of 24% for spring wheat.

Spring wheat fertilizer assessment

Input	Share of group	Applied pre-planting	\$ Share Expended
Nitrogen	50	65	33
Phosphorous	34	32	11
Potassium/other	16	60	10
Total	100	-	53

Most of the ERS resource regions are winter wheat areas and we have used the winter wheat factors for them. For two regions we use a weighted average of the winter and spring wheat factors. For Fruitful Rim the weights are 25% spring and 75% winter. For Northern Great Plains the weights are 75% spring and 25% winter.

2.2. Budget based crops

2.2.1. Buckwheat

Buckwheat budgets for the years 2004-2012 came from North Dakota State University Extension Service. Budgets are separated into one of nine regions in the state. Each budget follows the ERS format very closely so no changes were made to the format. Budgets from the buckwheat growing regions were simply averaged together to get a state average by year. This average was used as the values for the cost of production. The production costs for 2003 were imputed using the price index.

Preplant percentages were obtained using production and timing information provided by Andrew Swenson, Extension Farm and Farm Resource Management Specialist at the North Dakota State University Extension office.

Agralytica used North Dakota University Extension budgets to estimate prevented planting costs. North Dakota is one of the larger buckwheat producers, and budgets were unavailable for Washington and New York. Also, North Dakota accounts for all of the prevented planting claims.

Budgets were available for seven regions within the state, and were averaged over all regions for each year.

Production costs (Tab 1)

1. Begin with NDSU crop budgets for buckwheat (2004-2012), averaging figures for the state's 7 buckwheat producing regions for each year.
2. Production costs for 2003 were filled using the formula that draws data from price indexes (Col A) and calculates values for that year based on the accompanying "Cost Index" data file.
3. Returns to labor & management were averaged for all years (2003-2012), the resulting average applied as the 2008 value, then values for preceding and subsequent years were calculated using the price indexes.

Pre-planting percentage costs by expense category (Tab 2)

4. For the budget, we used the following pre-planting cost percentages:

Cash expenses:

- 20% of herbicides,
- 13% of crop insurance,
- 20% of fuel & lubrication and repairs
- 10% of miscellaneous costs
- 25% of operating interest

And almost all overhead:

- 20% of labor and management,
100% misc. overhead,
100% of machinery depreciation,
100% of machinery investment, and
100% of land charge

Pre-planting cost estimates (Tab 3)

5. Multiply appropriate cells on Tabs 1 and 2.
6. Copy and paste values from "Total cost" line on Tab 1 to Tab 3.
7. Calculate pre-planting costs as a percentage of total costs.

References:

North Dakota crop budgets available at:

<http://www.ag.ndsu.edu/farmmanagement/crop-budget-archive>

Other sources of information:

http://www.agmrc.org/commodities_products/specialty_crops/buckwheat-profile/

<http://www.hort.purdue.edu/newcrop/afcm/buckwheat.html>

2.2.2. Canola

Canola budgets for the years 2004-2012 came from North Dakota State University Extension Service. Budgets are separated into one of nine regions in the state. Each budget follows the ERS format very closely so no changes were made to the format. Budgets from the Canola growing regions were simply averaged together to get a state average by year. This average was used as the values for the cost of production. The production costs for 2003 were imputed using the price index.

Preplant percentages were obtained using production and timing information provided by Andrew Swenson, Extension Farm and Farm Resource Management Specialist at the North Dakota State University Extension office.

Agralytica used North Dakota State University Extension budgets to estimate prevented planting costs. North Dakota is the primary canola producer in the US. Budgets were available for eight regions within the state, and were averaged across all regions for each year.

Production costs (Tab 1)

1. Begin with NDSU crop budgets for buckwheat (2004-2012), averaging figures for the state's 7 buckwheat producing regions for each year.
2. Production costs for 2003 were filled using the formula that draws data from price indexes (Col A) and calculates values for that year based on the accompanying "Cost Index" data file.

Pre-planting percentage costs by expense category (Tab 2)

3. For the budget, we used the following pre-planting cost percentages:

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Cash expenses:

25% of fertilizer;
25% of fuel & lubrication and repairs,
56% of crop insurance, and
25% of operating interest

And almost all overhead:

- 25% of labor and management,
100% misc. overhead,
100% of machinery depreciation,
100% of machinery investment, and
100% of land charge

Pre-planting cost estimates (Tab 3)

4. Multiply appropriate cells on Tabs 1 and 2.
5. Copy and paste values from "Total cost" line on Tab 1 to Tab 3.
6. Calculate pre-planting costs as a percentage of total costs.

References:

North Dakota crop budgets available at:

<http://www.ag.ndsu.edu/farmmanagement/crop-budget-archive>

Great Plains Canola Production Handbook June 2012

<http://www.hort.purdue.edu/newcrop/afcm/canola.html>

2.2.3. Dry Beans

Two sources of dry bean budgets were found. North Dakota State University Extension Service published dry bean budgets for the years 2004-2012. Nebraska University Extension Office published budgets for dry beans in 2004, 2006, 2009, and 2012.

North Dakota budgets are separated into one of nine regions in the state. Each budget follows the ERS format very closely so no changes were made to the format. Budgets from the Dry beans growing regions were simply averaged together to get a state average by year. This average was used as the values for the cost of production. The production costs for 2003 were imputed using the price index.

Preplant percentages were obtained using production and timing information provided by Andrew Swenson, Extension Farm and Farm Resource Management Specialist at the North Dakota State University Extension office.

Nebraska dry bean budgets were only published for four years, 2004, 2006, 2009, and 2012. There were numerous issues with these budgets but nothing serious enough to discount their inclusion. In each of the budgets there are detailed line items of particular products used Such as Basagran, AsanaXL04, and Warrior T06. These were simply added together under the appropriate category such as Insecticide.

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Also, in the 2004 and 2006 budgets, fixed costs, such as crop insurance, taxes, depreciation, and land are included, However in 2009 and 2012 these categories were not updated. These production costs were estimated for 2009 and 2012 using the index.

In addition, in 2012, the Extension office published three dry bean budgets. The 2004, 2006, and 2009 budgets were based on conventional till, center pivot irrigated at 800 GPM at 35 PSI for 8 acre-inches production costs. The 2012 budget was broken into three different production types;

- Conventional till, gravity irrigated canal water at 12 acre-inches
- Conventional till, pivot irrigated pumped water at 12 acre-inches
- Conventional till, center pivot irrigated at 800 GPM at 35 PSI for 8 acre-inches

We averaged these three budgets together to construct an average of the different production types into one 2012 budget.

We combined this with the budgets from the other years and imputed missing values using the index.

Nebraska production budget mapping

Dry Beans Pivot 800 GPM 35PSI Conventional				2009				
Field operations					Items			
Field cultivation				\$3.93	Field operations		123.50	
Disc				\$7.51	Materials and services:			
Spray(attached)				\$0.62	Fertilizer		64.71	
Plant				\$9.19	Herbicide		22.12	
Hoe				\$2.99	Seed		31.00	
Row Crop Cultivation				\$7.35	Other		39.25	
Ridge Cultivation				\$8.92	Insecticide		3.24	
Weed					Custom		8.20	
PivotE125'Lift				\$36.91	Scouting drybeans		11.08	Imputed
Spray					Drybean premium		19.64	Imputed
Pickett Windrower				11.7	Crop Insurance		18.74	Imputed
Combine				\$24.50	Interest		6.26	Imputed
Truck					Total		347.75	
Plant Wheat cover crop				9.88	Allocated overhead			
Total For field operations				\$123.50	Farm overhead		8.98	Imputed
Materials & Services					Management incl scouting		35.84	Imputed
10-34-0-1z	Fertilizer		64.71		Machinery taxes, housing, ins & int		24.46	Imputed
Eptam 7E 04, Dual II Magnum 06,	Herbicide		\$22.12		Irrigation system taxes, ins & int		15.36	Imputed
Sonalan	Herbicide				Land incl interest and depreciation		143.55	Imputed
Edible Beans	Seed		\$25.00		Total, allocated overhead		228.18	
Weeding	Other		\$36.00					
Elec Connect fees	Other		\$3.25					
Aerial Spray	Custom		\$4.20		Total costs listed		575.93	
Asana XL 04, Warrior T 06, 09	Insecticide		\$3.24					
Haul Grain cwt	Custom		\$4.00					
Wheat	Seed		\$6.00					
Total Materials & Services								
Total								
Interest								
Total								
Overheads including acctg, liab ins, vehicle, office exp								
Management including scouting and crop insurance								
Machinery taxes, housing, insurance & interest								
Irrigation system taxes, insurance & interest								
Land incl interest and depreciation								

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Nebraska

Production costs (Tab 1)

1. Begin with published Nebraska crop budgets for dry beans (2004, 2006, 2009, and 2012), averaging figures for 2012 for the three dry bean production methods.
2. Where production costs were missing, they were imputed using the NASS Farm Price index. The price index and cost data were used together to establish base prices from the years we had data. The formula draws data from price indexes (Col A) and calculates values for that year based on the accompanying "Cost Index" data file.
3. We added in a separate line for Crop insurance, subtracting this amount from the original budget's line item called "Management, including scouting & crop insurance" so as to avoid double counting.
4. The 2012 Nebraska budget was not quite comparable to the 2004, 2006, and 2009 budgets. Overhead costs were missing for 2012. These were imputed using the NASS Farm Price index.

Pre-planting percentage costs by expense category (Tab 2)

5. For the budget, we used the following pre-planting cost percentages:

Cash expenses:

- 20% of field operations,
- 20% of herbicides,
- 20% of other costs,
- 31% of crop insurance,
- 25% of operating interest,

And most overhead:

- 100% of farm overhead,
- 20% of management including scouting
- 100% of machinery taxes, housing, insurance & interest
- 100% of irrigation systems,
- and 100% of land charge.

Pre-planting cost estimates (Tab 3)

6. Multiply appropriate cells on Tabs 1 and 2.
7. Copy and paste values from "Total cost" line on Tab 1 to Tab
8. Calculate pre-planting costs as a percentage of total costs.

North Dakota

Production costs (Tab 1)

1. Begin with the crop budgets for dry beans (2004-2012), averaging figures for the state's dry bean producing regions.
2. Where production costs were missing (2003), they were imputed using the NASS Farm Price index. The price index and cost data were used together to establish base prices from the years we had data. The formula draws data from price indexes (Col A) and calculates values for that year based on the accompanying "Cost Index" data file.

Pre-planting percentage costs by expense category (Tab 2)

3. For the budget, we used the following pre-planting cost percentages:

Cash expenses:

- 20% of chemicals,
- 31% of crop insurance,
- 20% of fuel & lubrication and repairs,
- 20% of miscellaneous expenses,
- 25% of operating interest

And almost all overhead:

- 100% misc. overhead,
- 100% of machinery depreciation,
- 100% of machinery investment,
- and 100% of land charge

Pre-planting cost estimates (Tab 3)

4. Multiply appropriate cells on Tabs 1 and 2.
5. Copy and paste values from "Total cost" line on Tab 1 to Tab
6. Calculate pre-planting costs as a percentage of total costs.

References:

[North Dakota archived budgets](http://www.ag.ndsu.edu/farmmanagement/crop-budget-archive)

<http://www.ag.ndsu.edu/farmmanagement/crop-budget-archive>

[Nebraska archived budgets](http://www.ianrpubs.unl.edu/pages/publicationD.jsp?publicationId=597)

<http://www.ianrpubs.unl.edu/pages/publicationD.jsp?publicationId=597>

[Michigan archived budgets](http://www.agecon.purdue.edu/extension/pubs/)

<http://www.agecon.purdue.edu/extension/pubs/>

2.2.4. Dry Peas

Dry pea budgets for the years 2004-2012 came from North Dakota State University Extension Service. Budgets are separated into one of nine regions in the state. Each budget follows the ERS format very closely so no changes were made to the format. Budgets from the dry pea growing regions were simply averaged together to get a state average by year. This average was used as the values for the cost of production. The production costs for 2003 were imputed using the price index.

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Preplant percentages were obtained using production and timing information provided by Andrew Swenson, Extension Farm and Farm Resource Management Specialist at the North Dakota State University Extension office.

Production costs (Tab 1)

1. Begin with NDSU crop budgets for field peas, lentils, and chickpeas (2004-2012), averaging figures for the state's production regions for each crop.
2. Production costs for 2003 were filled using the formula that draws data from price indexes (Col A) and calculates values for that year based on the accompanying "Cost Index" data file.
3. Returns to labor & management were averaged for all years (2003-2012), the resulting average applied as the 2008 value, then values for preceding and subsequent years were calculated using the price indexes.

Pre-planting percentage costs by expense category (Tab 2)

4. For each crop budget, we used the following pre-planting cost percentages:

Cash expenses:

- 15% of herbicides,
- 20% of fertilizer
- 24% of crop insurance, reflecting PP indemnities from 1994-2013
- 15% of fuel & lubrication
- 15% of repairs
- 15% of miscellaneous expenses
- 25% of operating interest

And almost all overhead:

- 25% of returns to labor and management,
- 100% of misc. overhead,
- 100% of machinery depreciation,
- 100% of machinery investment,
- and 100% of land charge

Pre-planting cost estimates (Tab 3)

5. Multiply appropriate cells on Tabs 1 and 2 for each crop.
6. Copy and paste values from "Total cost" line on Tab 1 to Tab 3.
7. Calculate pre-planting costs as a percentage of total costs for each crop.

References:

New and archived North Dakota crop budgets available at:

<http://www.ag.ndsu.edu/farmmanagement/crop-budget-archive>

2.2.5. ELS Cotton

Budgets for ELS cotton came from the University of California Extension Service. The extension published budgets in 2003 and 2012 for the San Joaquin Valley where ELS cotton is primarily grown. These budgets are very detailed and include timing as well as each operation. From this type of budget, both the production costs and the preplant factors can easily be obtained. Each budget needed to be converted to our standardized format as best as possible. In the following graphics, we illustrate the details of how we did this.

The large table is the actual budget as obtained from the Extension. The cells in the “Total”, “Preplant (\$)”, and “Preplant(%)” columns have been color coded to understand which of the budget lines were summed to get to our standard format. The cells Nov-Mar in blue with purple text are preplant cells. The cells in green are the costs that occur at the time of planting. These are excluded from the preplanting costs.

The graphic that follows the large table follows the format that we used for the CAR and shows which of the lines in the budget were summed into each CAR category. It also details how the preplant percentages were calculated for each category.

Production costs (Tab 1)

1. Begin with California budgets for San Joaquin Valley Pima cotton for 2003 and 2012.
2. Production costs for missing years were filled using the formula that draws data from price indexes (Col A) and calculates values for that year based on the accompanying “Cost Index” file.

Pre-planting percentage costs by expense category (Tab 2)

3. California published the Pima budgets with breakdowns showing costs at each stage of production. Preplanting costs were simply summed and the percentage of total costs calculated.

The California budgets contained very detailed costs. Line items for things such as individual fertilizers, herbicides, insecticides, individual machines and field passes were listed. These were aggregated into reasonable categories similar to ERS categories as well as possible. For this budget, costs for each operation include labor costs as well as the cost of fuel, equipment, chemicals or other operations. Each of these costs was further broken down by month of operation. This allows us to accurately identify the exact cost of production before planting, planting costs, cost of growing, harvest costs, etc.

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Prepared for: AQD and RMA

2003 detail

SAN JOAQUIN VALLEY - 03																
Beginning NOV 02	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	TOTAL		
Ending NOV 03	02	02	03	03	03	03	03	03	03	03	03	03	03		Preplant (\$)	Preplant (%)
Cultural:																
Rip Fields 1X/3 Yrs	11	0	0	0	0	0	0	0	0	0	0	0	0	11.00	11	100%
Primary Discing 2X	11	0	0	0	0	0	0	0	0	0	0	0	0	11.00	11	100%
Weed Control - Apply Herbicide	12	0	0	0	0	0	0	0	0	0	0	0	0	12.00	12	100%
Weed Control - Incorporate Herbicide	5	0	0	0	0	0	0	0	0	0	0	0	0	5.00	5	100%
List Beds	2	0	0	0	0	0	0	0	0	0	0	0	0	2.00	2	100%
Make Ditch	0	0	0	1	0	0	1	0	1	0	0	0	0	2.00	1	33%
Irrigate (Labor includes water run UN32)	0	0	0	51	0	0	0	38	77	39	0	0	0	205.00	51	25%
Fertilizer - Water Run UN32	0	0	0	0	0	0	0	8	0	0	0	0	0	8.00	0	0%
Close Ditch	0	0	0	1	0	0	0	1	0	0	1	0	0	2.00	1	33%
Cultivate - Preplant	0	0	0	0	0	0	0	0	0	0	0	0	0	3.00	3	100%
Plant	0	0	0	0	0	26	0	0	0	0	0	0	0	26.00	0	0%
Uncap Beds	0	0	0	0	0	2	0	0	0	0	0	0	0	2.00	0	0%
Cultivate - 3X	0	0	0	0	0	3	3	3	0	0	0	0	0	9.00	0	0%
Fertilizer - Sidedress UN32	0	0	0	0	0	0	45	0	0	0	0	0	0	45.00	0	0%
Weed Control - Over-The-Top Spray	0	0	0	0	0	0	23	0	0	0	0	0	0	23.00	0	0%
Insect Control - Mites	0	0	0	0	0	0	44	0	0	0	0	0	0	44.00	0	0%
Weed Control - Hand Hoe	0	0	0	0	0	0	0	55	0	0	0	0	0	55.00	0	0%
Weed Control - Post Directed/Layby Spray	0	0	0	0	0	0	0	21	0	0	0	0	0	21.00	0	0%
Insect Control - Lygus	0	0	0	0	0	0	0	17	0	0	0	0	0	17.00	0	0%
Insect Control - Aphids	0	0	0	0	0	0	0	0	24	0	0	0	0	24.00	0	0%
Growth Regulator	0	0	0	0	0	0	0	0	25	13	0	0	0	38.00	0	0%
Defoliate Cotton 2X	0	0	0	0	0	0	0	0	0	0	0	69	0	69.00	0	0%
PCA	1	1	1	1	1	1	1	1	1	1	1	1	1	11.08	5	42%
Pickup Use	1	1	1	1	1	1	1	1	1	1	1	1	0	14.00	6	42%
TOTAL CULTURAL COSTS	43	2	2	54	6	33	118	145	129	54	3	71	1	659.08	107	16%
Harvest:																
Harvest 2X	0	0	0	0	0	0	0	0	0	0	0	0	40	40.00	0	0%
Build Module and Haul 2X	0	0	0	0	0	0	0	0	0	0	0	0	20	20.00	0	0%
TOTAL HARVEST COSTS	0	0	0	0	0	0	0	0	0	0	0	0	60	60.00	0	0%
Gin:																
Gin (paid by seed credit)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0	0%
Gin Compression Charge	0	0	0	0	0	0	0	0	0	0	0	0	16	16.00	0	0%
TOTAL GIN COSTS	0	0	0	0	0	0	0	0	0	0	0	0	16	16.00	0	0%
Assessment:																
Assessments	0	0	0	0	0	0	0	0	0	0	0	0	23	23.00	0	0%
TOTAL ASSESSMENT COSTS	0	0	0	0	0	0	0	0	0	0	0	0	23	23.00	0	0%
Postharvest:																
Chop Stalks	0	0	0	0	0	0	0	0	0	0	0	0	4	4.00	0	0%
Disc Residue - 2X	0	0	0	0	0	0	0	0	0	0	0	0	11	11.00	0	0%
TOTAL POSTHARVEST COSTS	0	0	0	0	0	0	0	0	0	0	0	0	15	15.00	0	0%
Interest on operating capital	0	0	0	1	1	1	2	2	3	3	3	4	5	25.48	2	8%
TOTAL OPERATING COSTS/ACRE	43	2	2	55	6	34	119	147	132	57	6	75	120	798.55	109	14%
Cash Overhead:																
Land Rent Cotton	0	0	0	0	0	0	0	0	0	0	0	0	150	150.00	0	0%
Office Expense	2	2	2	2	2	2	2	2	2	2	2	2	2	30.00	12	38%
Liability Insurance	0	0	1	0	0	0	0	0	0	0	0	0	0	1.00	1	100%
Property Taxes	0	0	3	0	0	0	0	0	3	0	0	0	0	5.00	3	50%
Property Insurance	0	0	0	0	0	4	0	0	0	0	0	0	0	4.00	0	0%
Investment Repairs	0	0	0	0	0	0	0	0	0	0	0	0	0	3.00	1	42%
TOTAL CASH OVERHEAD COSTS	3	3	6	3	3	7	3	3	5	3	3	3	152	193.00	16	8%
TOTAL CASH COSTS/ACRE	46	5	8	58	9	40	122	150	137	60	9	78	272	991.55	125	13%

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SJV 03	12	PP Cost	PP%
Cultivation	70.08	49.95	71%
Planting	26	0	0%
Irrigation	205	51	25%
Fertilizer	53	0	0%
Chemicals	291	0	0%
Pickup Truck	14	6	42%
Harvest costs	60.00	0.00	0%
Ginning	16.00	0.00	0%
Assessments	23.00	0.00	0%
Postharvest operations	15.00	0.00	0%
Crop Insurance**			100%
Interest on operating capital	25.48	2.05	8%
Total cultural costs	798.55	108.83	14%
Cash overhead			
Land rent	150.00	0.00	100%
Office expenses	30.00	11.54	38%
Liability Insurance	1.00	1.00	100%
Property Taxes	5.00	2.50	50%
Property Insurance	4.00	0.00	0%
Investment Repairs	3.00	1.25	42%
Total Other costs	193.00	16.29	8%
Total costs	991.55	125.12	13%

Item	2003
Cash expenses:	
Cultivation	70.08
Planting	26
Irrigation	205
Fertilizer	53
Chemicals	291
Pickup Truck	14
Harvest costs	60.00
Ginning	16.00
Assessments	23.00
Postharvest operations	15.00
Crop Insurance	8.13
Interest on operating capital	25.48
Total, operating costs	806.68
Allocated overhead:	
Land rent	150.00
Office expenses	30.00
Liability Insurance	1.00
Property Taxes	5.00
Property Insurance	4.00
Investment Repairs	3.00
Total, allocated overhead	193.00
Total costs listed	999.68

** Agralytica calculated

Preplanting costs

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Prepared for: AQD and RMA

2012 detail

SAN JOAQUIN VALLEY - 12																
Beginning 11-11	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	TOTAL		
Ending 11-12	11	11	12	12	12	12	12	12	12	12	12	12	12		Preplant (\$)	Preplant (%)
Cultural:																
Rip fields 1X/3 yrs	12													12.00	12	100%
Disc 2X	19													19.00	19	100%
Apply herbicide (Roundup)				13										13.00	13	100%
Spray Triflurex					19									19.00	19	100%
Incorporate Triflurex					9									9.00	9	100%
List beds					4									4.00	4	100%
Make ditch					1		1		1					4.00	1	25%
Pre-irrigate					95			78	62	62				297.00	95	32%
Close ditch					1			1				1		4.00	1	25%
Cultivate -Preplant					5									5.00	5	100%
Plant & Orthene treatment						64								64.00	0	0%
Uncap beds						4								4.00	0	0%
Cultivate						5	5	5						15.00	0	0%
Fertilize -Sidedress (UN32)							136							136.00	0	0%
Weed Control -Over -the-top (Staple)							38							38.00	0	0%
Weed control -Direct/layby (Shark)								19						19.00	0	0%
Insect control -Lygus (Carbine & Zephyr)								87						87.00	0	0%
Insect control -Lygus (Leverage)									29					29.00	0	0%
Apply growth regulator & KNO3									11					11.00	0	0%
Fertilize -Water run (UN32)									25					25.00	0	0%
Insect Control -Aphid whitefly (Assail)										29				29.00	0	0%
Defoliate cotton -2X												95		95.00	0	0%
PCA	1	1	1	1	1	1	1	1	1	1	1	1	1	12.00	5	42%
Chop stalks (Post-harvest)													6	6.00	0	0%
Disc residue -2X (post-harvest)													22	22.00	0	0%
Pickup truck use	1	1	1	1	1	1	1	1	1	1	1	1	1	13.00	5	38%
TOTAL CULTURAL COSTS	32	2	2	20	131	75	182	192	130	92	3	97	30	989.000	187	19%
Harvest:																
Harvest -2X													84	84	0	0%
Boll buggy -2X													6	6	0	0%
Build module (tractor #1) -2X													10	10	0	0%
Build module (machines #1 (2X) and #2)													16	16	0	0%
Build module (tractor #2)													7	7	0	0%
TOTAL HARVEST COSTS													122	122	0	0%
Assessment:																
Assessments													24	24	0	0%
TOTAL ASSESSMENT COSTS	0	0	0	0	0	0	0	0	0	0	0	0	24	24	0	0%
Interest on operating capital at 5.75%	0	0	0	0	1	1	2	3	4	4	4	5	5	30	1	3%
TOTAL OPERATING COSTS/ACRE	32	2	2	20	131	77	184	195	134	96	7	101	182	1,165	187	16%
CASH OVERHEAD																
Liability insurance							1							1	0	0%
Office expense	4	4	4	4	4	4	4	4	4	4	4	4	4	50	20	40%
Property taxes						44								89	44	49%
Property insurance					3									3	3	100%
Investment repairs	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0%
TOTAL CASH OVERHEAD COSTS	4	48	7	4	4	48	5	4	4	4	4	4	4	145	67	46%
TOTAL CASH COSTS/ACRE	36	50	9	24	135	125	189	200	138	100	11	106	186	1,310	254	19%

SJV 2012	2012	PP Cost	PP%
Cultivation	108.00	83.00	77%
Planting	64	0	0%
Irrigation	297	95	32%
Fertilizer	161	0	0%
Chemicals	320	5	2%
Pickup Truck	13	5	38%
Harvest costs	122.00	0.00	0%
Ginning			0%
Assessments	24.00	0.00	0%
Postharvest operations	28.00	0.00	0%
Crop Insurance**			100%
Interest on operating capital	30.00	1.00	3%
Total cultural costs	1167.00	189.00	16%
Cash overhead			
Land rent*			
Office expenses	50.00	20.00	40%
Liability Insurance	1.00	0.00	0%
Property Taxes	89.00	44.00	49%
Property Insurance	3.00	3.00	100%
Investment Repairs	3.00	0.00	0%
Total Other costs	146.00	67.00	46%
Total costs	1313.00	256.00	19%

* Land rent for 2012 calculated using the price index

** Agralytica calculated

Preplanting costs

For extra long staple cotton, the costs that we allocate 100% to pre-planting include: land rent, office expenses, liability insurance, taxes, property insurance, and investment repairs. (We included \$80 of the UCCE property taxes as part of the land rental rate.) For crop insurance, we allocated 82%, reflecting the longer term share of total indemnities that prevented planting claims represent. We consider these costs to be unavoidable (fixed), regardless of where they appear on a budget.

Farmers also incur other pre-planting costs during production: land prep, including preparing beds, pre-planting fertilizer, and often, other expenses such as pre-planting herbicides and/or the use of a cover crop. Preplanting costs for these categories were summed for each month before planting and a percentage was calculated from the total category cost.

Finally, cotton production yields two co-products: cottonseed and the lint or cotton fibers. Lint accounts for about 81-85% of the returns while the seed account for the remaining 15-19%. Costs of production were allocated to each co-product, so 85% of the preplanting costs were allocated to the lint for 2003-2007 and 81% for 2008-2012.

Item	2012
Cash expenses:	
Cultivation	108.00
Planting	64.00
Irrigation	297.00
Fertilizer	161.00
Chemicals	320.00
Pickup Truck	13.00
Harvest costs	122.00
Ginning	27.23
Assessments	24.00
Postharvest operations	28.00
Crop Insurance	23.23
Interest on operating capital	30.00
Total, operating costs	1217.46
Allocated overhead:	
Land rent	275.51
Office expenses	50.00
Liability Insurance	1.00
Taxes	8.90
Property Insurance	3.00
Investment Repairs	3.00
Total, allocated overhead	341.41
Total costs listed	1558.87

Pre-planting cost estimates (Tab 3)

4. Multiply appropriate cells on Tabs 1 and 2.
5. Copy and paste values from “Total cost” line on Tab 1 to Tab 3.
6. Calculate pre-planting costs as a percentage of total costs.
7. Calculate lint production costs as a percent (85%) of total preplanting costs.

References:

<http://coststudies.ucdavis.edu/>

<http://www.supima.com/whats-supima/history/>

<http://www.calcot.com/ourcotton.asp?post=pima&>

http://www.agmrc.org/commodities_products/fiber/cotton-profile/

<http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1047>

2.2.6. Flax

The primary source of production cost information comes from the North Dakota State University Extension, which publishes budgets annually for flaxseed and other crops, for a number of regions within the state. (<http://www.ag.ndsu.edu/farmmanagement/crop-budget-archive>). Other states do not publish flax crop budgets.

Production costs (Tab 1)

1. Begin with NDSU crop budgets for flaxseed (2004-2012), averaging figures for the state's NW, NC, and SW regions. Flax production is concentrated in North Dakota's Northwest (NW), North-central (NC), and Southwest (SW) regions. We used actual crop budget data for 2004-2012, and used price indices to come up with budget figures for 2003.
- 2.
3. Production costs for 2003 were filled using the formula that draws data from price indexes (Col A) and calculates values for that year based on the accompanying “Cost Index” data file.
4. The only item missing from the North Dakota budget is the “Returns to labor & management” component. To calculate this figure we took the figures for all 10 years (2003-2012), averaged them, and applied the resulting figure to 2008. We then used the NASS “LABOR, WAGE RATES – INDEX FOR PRICE PAID” index to calculate a figure for missing years.

The reason for this procedure is to be able to include in the budget a “typical” return to management labor, rather than the relatively random result that may obtain in any given year (in this case, \$57.42). The inflation adjusted actual figure for 2012 turned out to be \$12.18.

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FLAX (North Dakota, 2012)	SW	NC	NW	AVERAGE		Item	2012
Market Yield						Cash expenses:	
Market Price						Seed	11.40
Market Revenue						Herbicides	24.50
						Fertilizer	29.70
DIRECT COSTS						Crop Insurance	10.00
-Seed	10.80	12.60	10.80	11.40		Fuel & Lubrication	14.33
-Herbicides	22.50	25.50	25.50	24.50		Repairs	14.73
-Fungicides	0.00	0.00	0.00	0.00		Miscellaneous	1.50
-Insecticides	0.00	0.00	0.00	0.00		Operating Interest	2.44
-Fertilizer	24.02	34.74	30.35	29.70		Total, operating costs	108.60
-Crop Insurance	9.90	10.50	9.60	10.00			
-Fuel & Lubrication	14.49	15.47	13.03	14.33		Allocated overhead:	
-Repairs	14.81	15.31	14.07	14.73		Returns to labor & management	12.18
-Drying	0.00	0.00	0.00	0.00		Misc. Overhead	6.10
-Miscellaneous	1.50	1.50	1.50	1.50		Machinery Depreciation	16.48
-Operating Interest	2.25	2.66	2.41	2.44		Machinery Investment	9.74
SUM OF LISTED DIRECT COSTS						Land Charge	38.17
						Total, allocated overhead	82.67
INDIRECT (FIXED) COSTS							
-Misc. Overhead	6.20	6.21	5.88	6.10		Total costs listed	191.27
-Machinery Depreciation	17.05	16.80	15.59	16.48			
-Machinery Investment	10.15	10.04	9.04	9.74			
-Land Charge	34.70	46.20	33.60	38.17			
SUM OF LISTED INDIRECT COSTS							
SUM OF ALL LISTED COSTS							
RETURN TO LABOR & MGMT	46.17	73.37	52.73	57.42			

- Production costs for 2003 were filled using the formula that draws data from price indexes (Col A) and calculates values for that year based on the accompanying "Cost Index" data file.
- The only item missing from the North Dakota budget is the "Returns to labor & management" component. To calculate this figure we took the figures for all 10 years (2003-2012), averaged them, and applied the resulting figure to 2008. We then used the NASS "LABOR, WAGE RATES - INDEX FOR PRICE PAID" index to calculate a figure for missing years.

The reason for this procedure is to be able to include in the budget a "typical" return to management labor, rather than the relatively random result that may obtain in any given year (in this case, \$57.42). The inflation adjusted actual figure for 2012 turned out to be \$12.18.

Pre-planting percentage costs by expense category (Tab 2)

- For the budget, we used the following pre-planting cost percentages:

Cash expenses:

25% of herbicides,

39% of crop insurance, reflecting PP % of indemnities for 1994-2013

10% of fuel & lubrication and repairs

25% of operating interest

And almost all overhead:

- 20% of operator labor
- 100% misc. overhead,
- 100% of machinery depreciation,
- 100% of machinery investment,
- and 100% of land charge

Pre-planting cost estimates (Tab 3)

1. Multiply appropriate cells on Tabs 1 and 2.
2. Copy and paste values from "Total cost" line on Tab 1 to Tab 3.
3. Calculate pre-planting costs as a percentage of total costs.

References:

NDSU crop budgets (2004-2013)

<http://www.ag.ndsu.edu/farmmanagement/crop-budget-archive>

2.2.7. Green Peas

Green pea budgets came from several sources. Some of the cost of production data came from North Dakota State University Extensions and some came from the FINBIN database from the University of Minnesota.

NDSU budgets for the years 2004-2012 came from North Dakota State University Extension Service. Budgets are separated into one of nine regions in the state. Each budget follows the ERS format very closely so no changes were made to the format. Budgets from the dry pea growing regions were simply averaged together to get a state average by year. This average was used as the values for the cost of production. The production costs for 2003 were imputed using the price index.

FINBIN budget data

1. The FINBIN data covered all years from 2003 -2012. It is a composite of 50-100 farms reporting costs per year. We took the composite data from Minnesota and Wisconsin as a basis for average production costs in the region. The FINBIN data is in a similar format to the standard ERS format we adopted, as such we used it as it was presented Click "Crop"
2. Select "Peas" from the dropdown box
3. Click on the text in blue and select Minnesota and Wisconsin
4. Click on the year and select the appropriate years
5. Click on "Crop Tenure Type:" and select Cash Rent
6. Click Here to Generate Report

The screenshot shows the FINBIN Farm Financial Database interface. On the left sidebar, under 'GENERATE A SUMMARY REPORT', the 'CROP' button is highlighted with a red arrow. Below this, under 'GENERATE A BENCHMARK REPORT', the 'CROP' button is also highlighted with a red arrow. At the bottom of the sidebar, under 'COMPARE YOUR FARM', the 'FINANCIAL RATIOS' button is highlighted with a red arrow. The main content area is titled 'CROP SUMMARY REPORTS' and contains several sections: 1. Reports: Crop Enterprise: Peas (selected in a dropdown). 2. Location: State: Minnesota, Wisconsin (selected in a dropdown); Group: All Groups; Region: All Regions. 3. Columns: Column Headings: Years (selected in a dropdown); Include Average Column: Yes (selected in a dropdown). 4. Farm Characteristics: Year(s): 2012, 2011, 2010, 2009, 2008, 2007, 2006, 2005, 2004, 2003 (selected in a dropdown); Crop Tenure Type: Cash Rent (selected in a dropdown); Profitability Group: All Levels; Farming Practice: Normal; Enterprise Size: (Acres) All Levels; Previous Crop: All (selected in a dropdown); Tillage System: All Types; Row Width: All Widths; Chemical Resistant: All Levels; Insect Resistant: All Types; Organic Transition: No, No Answer; Manure Application: All Types; Special Sorts Items to Include: None Selected; Special Sorts Items to Exclude: None Selected. 5. Click Here to Generate Report (button). Red arrows indicate the path from the 'CROP' button in the sidebar to the 'CROP' dropdown in section 1, then to the 'State' dropdown in section 2, then to the 'Year(s)' dropdown in section 4, and finally to the 'Click Here to Generate Report' button.

Preplant percentages were obtained using production and timing information provided by Andrew Swenson, Extension Farm and Farm Resource Management Specialist at the North Dakota State University Extension office.

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FINBIN data

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Direct Expenses										
Seed	0.09	-	-	-	-	0	-	-	-	8.99
Fertilizer	15.1	15.11	14.98	15.87	14.32	26.72	40.85	26.17	32.22	39.82
Crop chemicals	13.1	14.91	14.92	12.6	15.3	15.86	17.5	17.76	18.01	18.57
Crop insurance	5.34	5.94	4.42	5.26	5.31	6.69	5.49	4.92	6.99	9.59
Fuel & oil	5.42	6.66	7.81	8.49	9.89	13.54	8.68	12.29	13.78	15.46
Repairs	10.51	10.53	11.1	10.08	13.86	15.02	20.94	17.32	18.85	21.44
Custom hire	1.85	1.99	1.96	1.65	3.36	4.99	4.01	5.47	5.14	7.9
Hired labor	0.02	0.07	-	-	0.44	2.98	2.65	3.23	1.75	1.35
Land rent	110.63	107.61	113.28	120.5	128.62	151.02	178.76	172.35	195.26	213.57
Machinery leases	0.46	0.23	0.04	0.33	0.3	0.06	0.39	1.54	0.61	1.76
Utilities	0.02	-	0.04	-	0.03	0.49	0.93	0.55	0.65	0.25
Marketing	1.08	0.34	0.08	0.32	0.06	0.28	0.47	0.37	0.06	1.84
Operating interest	3.27	3.21	3.12	4.58	4.08	4.42	4.79	4.58	2.61	4.62
Miscellaneous	0.51	0.39	0.78	1.05	1.38	1.95	1.05	4.72	1.23	2.69
Total direct expenses per acre	140.4	126.48	138.71	136.47	151.92	188.03	249.71	203.26	215.66	274.1
Return over direct exp per acre	201.2	168.12	132.08	144.19	272.02	455.17	361.73	238.91	277.73	280.31
Overhead Expenses										
Custom hire	0.64	0.92	0.68	0.72	0.7	0.28	-	0.24	-	0.31
Hired labor	3.95	3.63	3.64	3.47	4.62	4.48	14.47	5.29	6.5	6.19
Machinery leases	1.29	3.26	1.55	1.17	1.35	0.48	0.92	0.65	0.5	1.37
Building leases	-	-	0.07	0.12	0.26	0.46	0.7	0.3	0.98	0.86
RE & pers. property taxes	2.75	4.49	4.01	5.7	6.02	6.74	4.47	9.14	9.82	7.96
Farm insurance	2.64	3.67	2.61	2.67	2.32	2.77	3.7	2.78	3.35	4.44
Utilities	1.74	1.48	1.62	1.49	1.47	1.71	1.82	2.15	2.12	2.15
Dues & professional fees	0.61	0.51	1.13	1.05	0.74	0.97	1.46	1.24	1.44	1.25
Interest	11.95	14.8	13.15	15.22	18.54	15.9	11.4	19.53	17.57	16.62
Mach & bldg depreciation	11.29	10.51	10.93	10.45	12.39	14.72	16.99	17.73	16.72	22.9
Miscellaneous	2.7	1.9	2.05	1.75	3.15	3.05	6.44	4.14	4.59	4.29
Total overhead expenses per acre	39.57	45.18	41.45	43.81	51.55	51.57	62.37	63.2	63.57	68.34
Total dir & ovhd expenses per acre	179.97	171.66	180.16	180.28	203.47	239.6	312.07	266.47	279.23	342.44
Net return per acre	161.64	122.94	90.63	100.38	220.47	403.6	299.36	175.71	214.15	211.98

Agralytica budget

Item
Direct Expenses
Seed
Fertilizer
Crop chemicals
Crop insurance
Fuel & oil
Repairs
Custom hire
Hired labor
Land rent
Machinery leases
Utilities
Marketing
Operating interest
Miscellaneous
Total direct expenses
Overhead Expenses
Custom hire
Hired labor
Machinery leases
Building leases
RE & pers. property taxes
Farm insurance
Utilities
Dues & professional fees
Interest
Mach & bldg depreciation
Miscellaneous
Total overhead expenses
Total expenses

Production costs (Tab 1)

1. Begin with FINBIN processing pea budget (2003-2012) and NDSU field pea crop budgets (2004-2012); for NDSU we averaged production costs across the seven state regions for which there were budgets.

Pre-planting percentage costs by expense category (Tab 2)

2. For these budget, we used the following pre-planting cost percentages:

Direct/cash expenses:

- 0% for seed and marketing
- 25% for herbicides, fertilizer, and other chemicals
- 2% for crop insurance
- 25% for fuel & lubrication
- 25 % for repairs
- 25% for custom operations
- 25% for miscellaneous operating expenses
- 25% for operating interest

And all overhead:

- 100% of misc. overhead,
- 100% of machinery depreciation,
- 100% of machinery investment,
- and 100% of land charge

Pre-planting cost estimates (Tab 3)

3. Multiply appropriate cells on Tabs 1 and 2.
4. Copy and values from “Total cost” line on Tab 1 to Tab 3.
5. Calculate pre-planting costs as a percentage of total costs.

Pre-planting costs were determined through research, extension agronomist interviews, and a review of actual pre-planting percentages for major crops.

References:

FINBIN budget

<http://www.finbin.umn.edu/CropEnterpriseAnalysis/Default.aspx?new=1>

North Dakota State University Extension budget

<http://www.ag.ndsu.edu/farmmanagement/crop-budget-archive>

“Pea Production in the High Plains”, South Dakota University Extension, University of Wyoming, University of Nebraska-Lincoln Extension

<http://ianrpubs.unl.edu/live/ec187/build/ec187.pdf>

2.2.8. Millet

Millet production cost data came from the University of Colorado. The millet budgets from Colorado fit the ERS format exactly. Data was available for 2010 – 2012. Previous years were estimated using the price index.

The percentage of each cost that occurred prior to planting was estimated from an interview with Jessica Johnson, an Extension Economics Specialist with the University of Nebraska-Lincoln Extension.

Production costs (Tab 1)

1. Begin with CSU budgets
2. Production costs for missing years filled using the formula that draws data from price indexes (Col A) and calculates values for that year based on the accompanying “Cost Index” file.

Pre-planting percentage costs by expense category (Tab 2)

3. For these budgets, we used the following pre-planting cost percentages:

- Seed: 0%
- Herbicide: 33%
- Custom operations: 25%
- Crop insurance: 5%
- Fuel: 25%
- Repairs and maintenance: 10%
- Labor: 25%
- Interest on operating capital: 25%
- Machinery: 100%
- Land: 100%
- Real estate taxes: 100%
- Farm overhead: 100%

Pre-planting cost estimates (Tab 3)

4. Multiply appropriate cells on Tabs 1 and 2.
5. Copy values for "Total cost" from Tab 1 to Tab 3
6. Calculate pre-planting costs as a percentage of total costs

References:

Colorado State University Extension

<http://www.coopext.colostate.edu/ABM/cropbudgets.htm>

University of Nebraska-Lincoln Extension

<http://www.ianrpubs.unl.edu/pages/publicationD.jsp?publicationId=597>

2.2.9. Mustard

Mustard budgets for the years 2004-2012 came from North Dakota State University Extension Service. Budgets are separated into one of nine regions in the state. Each budget follows the ERS format very closely so no changes were made to the format. Budgets from the mustard growing regions were simply averaged together to get a state average by year. This average was used as the values for the cost of production. The production costs for 2003 were imputed using the price index.

Preplant percentages were obtained using production and timing information provided by Andrew Swenson, Extension Farm and Farm Resource Management Specialist at the North Dakota State University Extension office.

Production costs (Tab 1)

1. North Dakota represents a substantial share of national production and is geographically proximate to other key producing areas.

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2. We began with NDSU crop budgets for mustard (2004-2012), averaging figures for all 7 regions with available budgets.
3. Production costs for 2003 were filled using the formula that draws data from price indexes (Col A) and calculates values for that year based on the accompanying "Cost Index" data file.

Pre-planting percentage costs by expense category (Tab 2)

4. For the budget, we used the following pre-planting cost percentages:

Cash expenses:

- 10% restocking fees for unused seed,
- 30% of herbicides and fertilizer,
- 11% of crop insurance,
- 20% (1/5) of fuel & lubrication, repairs, and miscellaneous costs
- 50% of operating interest

And almost all overhead:

- 20% of labor & management
- 100% misc. overhead,
- 100% of machinery investment and depreciation,
- and 100% of land charge

Pre-planting cost estimates (Tab 3)

For each crop type:

5. Multiply appropriate cells on Tabs 1 and 2.
6. Copy and paste values from "Total cost" line on Tab 1 to Tab 3.
7. Calculate pre-planting costs as a percentage of total costs.

References:

NDSU crop budgets (2004-2013)

<http://www.ag.ndsu.edu/farmmanagement/crop-budget-archive>

"Alternate Field Crops Manual: Mustard", University of Wisconsin Cooperative Extension

<http://www.hort.purdue.edu/newcrop/afcm/mustard.html>

"Mustard Production in Montana", Montana State University Extension

<http://ipm.montana.edu/MPIN/Cropfiles/Mustard.html>

"Yellow Mustard Production Tips", Mountain States Oilseeds

<http://msoilseeds.com/mustardProduction.html>

"Mustard Greens and Condiment Mustard" Oregon State University
<http://nwrec.hort.oregonstate.edu/mustard.html>

2.2.10. Onions

Onion crop budget availability varies by state, but apart from Texas, which produces annual onion budgets, no other large producing states publish annual onion crop budgets. Episodic budgets are available from New Mexico (2011), Idaho/Oregon (2011), Colorado (2008, 2010), Georgia (2001, 2008), Nevada (2008), and Washington (2004). California has multiple onion budgets, but for different varieties in different years.

Production costs (Tab 1)

1. Begin with Texas A&M budgets for fresh market onions and University of Idaho budgets for storage onions.

Mapping the production budget: Fresh market onions ("Southern onions")

We built the fresh market onion budget ("Southern onions") based on Texas A&M's annual hybrid yellow onion budget (available at <http://agecoext.tamu.edu/resources/crop-livestock-budgets/by-commodity/fruits-and-vegetables/archives.html>). Mapping the budget to the CAR was as shown in the following graphic.

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DIRECT EXPENSES					Item	2004
FERTILIZER					Cash expenses:	
Fert 10-34-0	cwt	12.22	2.0000	24.44	Fertilizer	152.16
Foligro	qt	17.38	7.0000	121.66		
UAN (32% N)	cwt	7.78	0.7800	6.06	Fungicide	133.93
FUNGICIDE					Herbicides	40.48
Dithane F-45	qt	3.54	2.0000	7.08	Insecticide/miticide	33.94
Rovral 4f	pt	20.35	3.0000	61.05	Irrigation	45.44
Ridomil Gold	oz	5.10	8.0000	40.80	Seed/plants	150.00
Bravo Ultrex	qt	12.50	2.0000	25.00	Custom harvest	1825.00
HERBICIDE					Other labor	67.61
Prefar 4E	qt	10.00	2.7500	27.50	Fuel	12.12
Goal 2XL	gal	105.00	0.1000	10.50	Repair & maintenance	15.09
Trifluralin 4EC	pt	2.48	1.0000	2.48	Crop insurance	
INSECTICIDE/MITICIDE					Interest on operating capital	77.70
Lorsban 4E	pt	6.12	1.7500	10.71	Total, operating costs	2553.47
Diazinon AG500	pt	3.75	1.0000	3.75		
Karate	oz	2.03	9.6000	19.48	Allocated overhead:	
IRRIGATION SUPPLIES					Capital recovery of machinery & equip	48.63
Irrigation Water	ac-ft	16.23	2.8000	45.44	Opportunity cost of land (rental rate)	100.00
SEED/PLANTS					Total, allocated overhead	148.63
Onion Seed	unit	100.00	1.5000	150.00	Total costs listed	2,702.10
CUSTOM HORT. HARVEST						
Harvest Onions	bag	1.50	500.0000	750.00		
Drying Onions	bag	0.30	500.0000	150.00		
Pack & Count Onions	bag	1.45	500.0000	725.00		
Sale Consign. Onions	bag	0.40	500.0000	200.00		
OPERATOR LABOR						
Tractors	hour	8.31	1.5270	12.68		
HAND LABOR						
Implements	hour	6.91	0.3680	2.54		
IRRIGATION LABOR						
Labor (Flood)	hour	6.91	7.0000	48.37		
Labor (Irr. Setup)	hour	6.91	0.4000	2.76		
UNALLOCATED LABOR						
Tractors	hour	8.31	0.1527	1.26		
DIESEL FUEL						
Tractors	gal	1.06	11.4429	12.12		
REPAIR & MAINTENANCE						
Implements	acre	5.38	1.0000	5.38		
Tractors	acre	9.71	1.0000	9.71		
INTEREST ON OP. CAP.						
	acre	77.70	1.0000	77.70		
TOTAL DIRECT EXPENSES						2553.54
RETURNS ABOVE DIRECT EXPENSES						2005.95
FIXED EXPENSES						
Implements	acre	18.32	1.0000	18.32		
Tractors	acre	30.31	1.0000	30.31		
TOTAL FIXED EXPENSES						48.63
TOTAL SPECIFIED EXPENSES						2602.17
RETURNS ABOVE TOTAL SPECIFIED EXPENSES						1957.32
ALLOCATED COST ITEMS						
Cash Rent, Irr. Veg	acre	100.00	1.0000	100.00		
RESIDUAL RETURNS						1857.32

The only item missing from the Texas budget is crop insurance. We were given the figure \$450 for 2012 by the crop extension specialist there. We then used NASS's AG Services Price Index to work backward and calculate the inflation adjusted figure for 2004, which (coincidentally) turned out to be \$350.

Mapping the production budget: Storage onions ("Northern onions")

We built the storage onion budget ("Northern onions") based on the University of Idaho's *2011 Cost and Returns Estimate for Southwestern Idaho and Eastern Oregon: Treasure Valley*. It is available at: <http://web.cals.uidaho.edu/idahoagbiz/files/2012/11/EBB2On11.pdf>.

Mapping the budget to the CAR was as shown in the following graphic.

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Table 1. Costs and Returns Per Acre to Produce Onions					Item	2011
	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre		
GROSS RETURNS					Cash expenses:	
Yellow Onions	535.00	cwt	8.50	4,547.50	Fertilizer	283.05
TOTAL GROSS RETURNS	535.00	cwt		4,547.50	Storage	316.25
OPERATING COSTS					Herbicides / pesticides	631.87
Seed:				407.55	Irrigation	48.60
Onion Seed - Yellow	0.33	pail	1150.00	379.50	Seed/plants	407.55
Onion Seed: Prime, Treat & Coat	0.33	pail	85.00	28.05	Custom labor - pre-planting	93.80
Fertilizer:				283.05	Custom labor - post-planting	284.50
Dry Nitrogen	50.00	lb	0.61	30.50	Labor	232.78
Dry P205	115.00	lb	0.57	65.55	Fuel & lubrication	154.00
Micro nutrients	2.00	ac	6.00	12.00	Marketing	53.50
Liquid Nitrogen	250.00	lb	0.70	175.00	Repair & maintenance	69.77
Pesticide:				631.87	Crop insurance	30.00
Vapam 42%	40.00	gal	4.65	186.00	Interest on operating capital	73.18
Lorsban 15G	6.00	lb	2.25	13.50	Total operating costs	2678.85
Roundup Originl Max	1.00	pint	8.60	8.60		
Prowl H2O	2.50	pt	5.72	14.30	Allocated overhead:	
Buctril 2EC	2.00	pt	4.74	9.48	General overhead	265.00
Picual 1.5EC	2.00	pint	13.38	26.76	Taxes and insurance	6.02
Meth. Seed Oil	2.00	pint	1.85	3.70	Equipment	218.04
Dual Magnum	1.00	pint	13.90	13.90	Land	450.00
Goal 2EC	1.00	pint	10.50	10.50	Total allocated overhead	939.06
Success	12.00	fl oz	5.60	67.20		
AZA-Direct	24.00	fl oz	1.41	33.84	Total costs listed	3617.91
Lannate LV	9.00	pt	9.53	85.77		
Carzol	1.00	lb	50.70	50.70		
Dithane 75DF	3.00	oz	2.40	7.20		
Quadris	15.00	oz	2.95	44.25		
MH30 Sprout Inhibitor	1.33	gal	14.40	19.15		
Pristine	18.00	oz	2.80	50.40		
Custom and Consultants:				378.85		
Custom Fertilize: Row Crops	1.00	acre	8.50	8.50		
Custom Fumigate - Deep Injection	1.00	acre	40.00	40.00		
Custom Sidedress Fertilizer	2.00	acre	12.65	25.30		
Hand Weed	2.00	acre	120.00	240.00		
Custom Air Spray - 5 gal.	5.00	acre	8.90	44.50		
Consultant & Soil Testing	1.00	acre	20.00	20.00		
Irrigation:				48.60		
Water Assessment	1.00	acre	45.85	45.85		
Ing. Repairs - Concrete Ditch	1.00	acre	2.75	2.75		
Other:				83.50		
Crop Insurance	1.00	acre	30.00	30.00		
Marketing	535.00	cwt	0.10	53.50		
Storage:				316.25		
Storage Op. Costs	275.00	cwt	0.20	55.00		
Storage Bin Rental	275.00	cwt	0.95	261.25		
Labor				232.78		
Equipment Operator Labor	5.70	hrs	16.25	92.67		
Truck Driver Labor	4.90	hrs	13.00	63.65		
Irrigation Labor	5.25	hrs	11.55	60.64		
Non-Machine Labor	1.72	hrs	9.20	15.82		
Machinery				223.77		
Fuel-Gas	2.52	gal	3.50	8.82		
Fuel-Diesel	31.68	gal	3.50	110.88		
Fuel-Road Diesel	3.55	gal	4.00	14.21		
Lube				20.00		
Machinery Repair				68.77		
SOUTHWESTERN IDAHO						
University of Idaho						
EBB2						
Interest on Operating Capital @ 6.75%				73.18		
TOTAL OPERATING COSTS/ACRE				2,678.85		
NET RETURNS ABOVE OPERATING COSTS				1,868.65		

Table 1. Costs and Returns Per Acre to Produce Onions, cont.					Item	2011
	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre		
CASH OVERHEAD COSTS						
General overhead				265.00		
Land Rent				450.00		
Management Fee				200.00		
Property Taxes				6.02		
Investment Repairs				0.00		
TOTAL CASH OVERHEAD COSTS/ACRE				721.02		
TOTAL CASH COSTS/ACRE				3,399.87		
NON-CASH OVERHEAD COSTS (Capital Recovery)						
Equipment				218.04		
TOTAL NON-CASH OVERHEAD COSTS				218.04		
TOTAL COST/ACRE				3,617.91		
TOTAL COST/CWT				6.76		
NET RETURNS ABOVE TOTAL COST				928.09		

2. Production costs for missing years were filled using the formula that draws data from price indexes (Col A) and calculates values for that year based on the accompanying "Cost Index" file.

Pre-planting percentage costs by expense category (Tab 2)

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3. For these budgets, we used the following pre-planting cost percentages:

Item	Fresh market onions	Storage onions
Seed	0.0%	0.0%
Herbicide	0.0%	0.0%
Fertilizer	10.0%	20.0%
Storage	--	20.0%
Irrigation	--	20.0%
Custom labor, pre-planting	--	100.0%
Custom labor, post planting	--	0.0%
Other labor	10.0%	25.0%
Fuel & lubrication	50.0%	66.7%
Marketing	--	0.0%
Repairs & maintenance	50.0%	66.7%
Crop insurance	22.0%	22.0%
Interest on operating capital	25.0%	25.0%
General overhead	--	100.0%
Taxes and insurance	--	100.0%
Machinery and equipment	100.0%	100.0%
Land	100.0%	100.0%

Production costs vary by so much from one area to another, and pre-planting costs are no different. For onions, the costs that we allocate 100% to pre-planting include interest on operating capital, machinery & equipment, rent, and general overhead. We consider these costs to be unavoidable (fixed), regardless of where they appear on a budget.

Farmers also incur other pre-planting costs with onion production: land prep, including preparing beds, pre-planting fertilizer, and often, other expenses such as pre-planting herbicides and/or the use of a cover crop.

Pre-planting cost estimates (Tab 3)

4. Multiply appropriate cells on Tabs 1 and 2.
5. Copy and paste values from "Total cost" line on Tab 1 to Tab 3.
6. Calculate pre-planting costs as a percentage of total costs.

References:

Budgets used:

Texas A&M budget archives (1998-2012)

<http://agecoext.tamu.edu/resources/crop-livestock-budgets/by-commodity/fruits-and-vegetables/archives.html>

University of Idaho (Southwestern Idaho / Eastern Oregon):

<http://web.cals.uidaho.edu/idaahoagbiz/files/2012/11/EBB2On11.pdf>

Additional budgets referenced:

Georgia: http://www.caes.uga.edu/publications/pubDetail.cfm?pk_id=7749#Production

Colorado: <http://www.coopext.colostate.edu/ABM/cropbudgets.htm>
<http://www.coopext.colostate.edu/ABM/westernonions10.pdf>

California: <http://coststudies.ucdavis.edu/files/OnionsIR2011.pdf>

Washington: http://www.farm-mgmt.wsu.edu/PDF-docs/irrigated/eb1979e_onions.pdf

2.2.11. Popcorn

The most detailed source of popcorn production cost information is a 2008 budget published by Ohio State University (<http://aede.osu.edu/sites/aede/files/import/popcorn2008.pdf>). We used this as the key budget in our analysis.

Production costs (Tab 1)

1. Begin with Ohio State University crop budget for popcorn (2008). Expense categories map to the budget as follows:

2008 POPCORN PRODUCTION BUDGET Large-Scale, Conservation Tillage Practices Authors: Brian Freytag, Ohio State University Extension Intern Barry Ward: Leader, Production Business Management Andrew Kleinschmidt: Extension Educator **						Item		2008
ITEM	EXPLANATION	Your Prod Numbers	PRICE PER UNIT	Updated YIELD (lb/A)	5/19/2008 YOUR BUDGET			
RECEIPTS ¹	Popcorn		\$22.09 / cwt	\$574.44	\$751.20	\$927.95	\$950.04	
VARIABLE COSTS	Seed ²	24000	\$10.00 / 10000	24.00	26.00	30.00	28.00	26.00
	Fertilizer ³							144.74
	Chemicals ⁴							52.81
	Fuel, lube, and repairs ⁵							51.10
	Hired labor ⁶							48.60
	Miscellaneous ⁷							9.00
	Crop insurance ⁸							15.50
	Interest on operating capital ⁹							15.71
	Total, operating costs							363.46
	Allocated overhead:							
	Management expenses ¹⁰							37.56
	Capital recovery of machinery & equip ¹¹							65.07
	Opportunity cost of land (rental rate) ¹²							123.50
	Total, allocated overhead							226.13
	Total costs listed							589.59
	FIXED COSTS							
	Labor Charge ¹³	3.6 hours	13.50 / hr.	48.60	48.60	48.60	48.60	
	Mach. And Equip. Charge ¹⁴			65.07	65.07	65.07	65.07	
	Land Charge ¹⁵	Rent		94.82	123.50	156.88	156.88	
	Management Charge ¹⁶	5% of gross revenue		28.72	37.56	46.40	47.59	
	TOTAL FIXED COSTS			237.21	274.73	316.95	318.05	
	TOTAL COSTS	-Per Acre		519.27	589.59	667.32	667.82	

2. Production costs for missing years filled using the formula that draws data from price indexes (Col A) and calculates values for that year based on the accompanying "Cost Index" file.

Pre-planting percentage costs by expense category (Tab 2)

3. For these budgets, we used the following pre-planting cost percentages:

- Fertilizer: 31%, same as for corn for grain

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- Chemicals: 25%
- Fuel, lubrication, and repairs: 25%
- Hired labor: 30%
- Crop insurance: 7%, the PP share of total liabilities
- Interest on operating capital: 25%

And most overhead

- Management expenses: 30%
- Capital machinery costs: 100%
- Land: 100%

Several of these categories are rounded percentages drawn from the feed corn prevented planting cost percentages provided by ERS (chemicals, hired labor, management expenses).

Pre-planting cost estimates (Tab 3)

4. Multiply appropriate cells on Tabs 1 and 2.
5. Copy values for "Total cost" from Tab 1 to Tab 3
6. Calculate pre-planting costs as a percentage of total costs

References

Budgets:

Ohio State University Extension (2008)

<http://aede.osu.edu/sites/aede/files/!import/popcorn2008.pdf>

University of Missouri Extension (2013)

http://extension.missouri.edu/seregion/Crop_Budgets_PDF.htm

Iowa State University Extension (2010)

<http://www.extension.iastate.edu/publications/bfc16.pdf>

Other references:

Popcorn Production and Marketing, Purdue

<https://www.extension.purdue.edu/extmedia/NCH/NCH-5.html>

Agricultural Marketing Resource Center

http://www.agmrc.org/commodities_products/grains_oilseeds/corn_grain/popcorn-profile/

2.2.12. Northern Potatoes

Production costs (Tab 1)

Begin with University of Idaho budgets for 2005-2012, available at

<http://web.cals.uidaho.edu/idoagbiz/enterprise-budgets/>.

Map budget entries to consolidated budget CAR format:

Table 3. Eastern Idaho Southern Counties Russet Burbank Potato - No Storage: Production costs per acre for major cost categories, annual dollar and percentage change for total operating and total cost per acre and per hundredweight, and 5-year dollar and percentage changes from 2007 to 2012.										Item	2012
Item	2006	2007	2008	2009	2010	2011	2012	2007 to 2012 \$ Change	2007 to 2012 % Change		
Operating Inputs											
Seed	\$209	\$227	\$252	\$330	\$227	\$317	\$301	\$74	33%	Seed	301.00
Fertilizer	\$245	\$307	\$540	\$421	\$338	\$465	\$524	\$212	71%	Fertilizer	524.00
Chemicals/Pesticides	\$110	\$102	\$123	\$173	\$163	\$184	\$234	\$132	125%	Chemicals	234.00
Custom & Consultants	\$122	\$133	\$146	\$150	\$162	\$187	\$212	\$79	56%	Custom operations	212.00
Irrigation	\$61	\$64	\$70	\$74	\$73	\$74	\$77	\$12	20%	Machinery: Fuel, oil, lube, repairs	161.00
Machinery: F, O, L, R	\$152	\$149	\$198	\$123	\$143	\$153	\$161	\$12	8%	Transload	58.00
Labor	\$127	\$126	\$133	\$139	\$130	\$134	\$142	\$16	13%	Irrigation	77.00
Transload	\$33	\$33	\$36	\$41	\$50	\$53	\$58	\$25	76%	Hired labor	142.00
Other	\$81	\$88	\$92	\$106	\$108	\$120	\$124	\$36	41%	Miscellaneous	106.66
Operating Interest	\$41	\$45	\$49	\$44	\$38	\$55	\$53	\$6	16%	Crop insurance	17.34
Total Operating Costs per Acre	\$1,181	\$1,274	\$1,639	\$1,601	\$1,432	\$1,742	\$1,886	\$612	48%	Interest on operating capital	53.00
\$ Change from Previous Year	\$114	\$83	\$365	-\$38	-\$169	\$310	\$144			Total, operating costs	1,886.00
% Change from Previous Year	10.7%	7.9%	28.6%	-2.3%	-10.6%	21.6%	8.3%				
Operating Cost per Cwt	\$3.47	\$3.64	\$4.75	\$4.57	\$3.92	\$4.77	\$5.03	\$1.39	38%		
\$ Change from Previous Year	\$0.24	\$0.17	\$1.11	-\$0.18	-\$0.65	\$0.85	\$0.26			Allocated overhead:	
% Change from Previous Year	7.4%	4.8%	30.5%	-3.7%	-14.2%	21.6%	5.4%			Opportunity cost of unpaid labor	135.00
Ownership Costs:										Capital recovery of machinery & equip	233.00
Transloading Equip. Ownership *	\$29	\$30	\$33	\$34	\$35	\$52	\$54	\$24	60%	Opportunity cost of land (rental rate)	475.00
Field Equipment Ownership	\$180	\$191	\$201	\$211	\$186	\$178	\$179	-\$12	-6%	General farm overhead	46.00
Land	\$270	\$325	\$375	\$425	\$425	\$445	\$475	\$150	46%	Total, allocated overhead	889.00
Overhead	\$29	\$32	\$41	\$40	\$36	\$43	\$46	\$14	44%		
Management Fee	\$84	\$90	\$100	\$120	\$125	\$130	\$135	\$45	50%	Total costs listed	2,775.00
Total Ownership Costs per Acre	\$592	\$668	\$750	\$830	\$807	\$848	\$869	\$221	33%		
Ownership Cost per Cwt	\$1.74	\$1.91	\$2.17	\$2.37	\$2.21	\$2.32	\$2.37	\$0.46	24%		
Total Costs per Acre	\$1,773	\$1,942	\$2,389	\$2,431	\$2,239	\$2,590	\$2,775	\$833	43%		
\$ Change from Previous Year	\$150	\$169	\$447	\$42	-\$192	\$351	\$185				
% Change from Previous Year	9.2%	9.6%	23.0%	1.8%	-7.9%	15.7%	7.1%				
Total Cost per Cwt	\$5.21	\$5.55	\$6.92	\$6.95	\$6.13	\$7.10	\$7.40	\$1.85	33%		

1. Calculate average crop insurance costs using RMA data (premium-subsidy)/acres for each year. In the case above, farmer premiums were \$5,270,503 (\$17,703,812 in total premiums less the subsidy of \$12,432,309). These farmer premiums divided by 303,913 insured acres yield a crop insurance cost per acre, to the farmer, of \$17.34). (This was then broken out of the "other category," which also included miscellaneous items, primarily marketing assessments).
2. Production costs for missing years (2003, 2004) are filled in using the formula that draws data from price indexes (Col A) and calculates values for that year based on the accompanying "Cost Index" file.

Pre-planting estimates by expense category (Tab 2)

3. For these budgets, we used the following pre-planting cost percentages:
 - Seed: 100% - typically not returnable for potatoes, never returnable if treated, does not keep
 - Chemicals: 15% (assuming no pre-planting fungicide)
 - Custom operations: 10%
 - Crop insurance: 12%
 - Fuel: 25%

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- Repairs and maintenance: 25%
- Hired labor: 10%
- Irrigation: 10% (however, purchased water is typically a sunk cost, for those not being supplied by municipal authorities)
- Interest on operating capital: 25%
- Unpaid labor: 15%
- Machinery: 100%
- Land: 100%
- General overhead: 100%

Pre-planting cost estimates (Tab 3)

4. Multiply appropriate cells on Tabs 1 and 2.
5. Copy values for "Total cost" from Tab 1 to Tab 3
6. Calculate pre-planting costs as a percentage of total costs

2.2.13. Southern Potatoes

Production costs (Tab 1)

1. Begin with University of Florida IFAS potato budgets for the Hastings area (2007/08 and 2008/09). Map budget entries to consolidated budget CAR format:

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Prepared for: AQD and RMA

Table Potatoes: Estimated production costs in the Hastings area, 2008-2009.			Item	2009
Category	Average Per Acre	Cwt		
YIELD	200			
OPERATING COSTS	---	DOLLARS ---		
Seed	525.00		Cash expenses:	
Fertilizer	550.90		Seed	525.00
Fumigant	138.00		Fertilizer	550.90
Fungicide	122.80		Chemicals	545.95
Herbicide	47.48		Custom operations	19.50
Insecticide	237.67		Machinery: Fuel, oil, lube, repairs	449.82
General Farm Labor (includes tractor driver wages)	284.15		Harvest & marketing costs	742.00
Machinery Variable Cost	404.60		Hired labor	284.15
			Miscellaneous	20.00
MISCELLANEOUS			Crop insurance	35.00
Farm Vehicles	45.22		Interest on operating capital	190.87
Crop Insurance	35.00		Total, operating costs	3,363.19
Cover Crop Seed	20.00			
Aerial Spray	19.50		Allocated overhead:	
Interest on Operating Capital	190.87		Capital recovery of machinery & equip	99.15
Total Operating Cost	2,621.18		Opportunity cost of land (rental rate)	150.00
			General farm overhead & mgmt	535.89
FIXED COSTS			Total, allocated overhead	785.04
Land Rent	150.00			
Machinery Fixed Cost	99.15		Total costs listed	4,148.23
Overhead and farm management	535.89			
Total Fixed Cost	785.04		Total costs listed	2,775.00
TOTAL PREHARVEST COST	3,406.22	17.03		
HARVEST AND MARKETING COSTS				
Sell	140.00	0.70		
Potato Sacks	152.00	0.76		
Grade	310.00	1.55		
Dig and Haul	140.00	0.70		
Total Harvest and Marketing Cost	742.00	3.71		
TOTAL COST	4,148.22	20.74		

- Production costs for missing years (2003-2007 and 2010-2012) are filled in using the formula that draws data from price indexes (Col A) and calculates values for that year based on the accompanying "Cost Index" file.

Pre-planting estimates by expense category (Tab 2)

- For these budgets, we used the following pre-planting cost percentages:
 - Seed: 100% - typically not returnable for potatoes, never returnable if treated, does not keep
 - Chemicals: 22% (to reflect the actual ratio for 2007/08)
 - Custom operations: 10%
 - Crop insurance: 12%
 - Machinery: Fuel, oil, lube, repairs: 25%
 - Hired labor: 10%
 - Interest on operating capital: 25%
 - Machinery: 100%
 - Land: 100%
 - Operator labor / management: 30%

- General overhead and management: 30%

Pre-planting cost estimates (Tab 3)

4. Multiply appropriate cells on Tabs 1 and 2.
5. Copy values for "Total cost" from Tab 1 to Tab 3
6. Calculate pre-planting costs as a percentage of total costs

References

Current / recent budgets:

University of Idaho – Extension

Crop budgets

<http://web.cals.uidaho.edu/idaahoagbiz/enterprise-budgets/>

University of California Davis

Klamath Basin – Fresh Market potatoes - 2008

http://coststudies.ucdavis.edu/files/potatoesir1_08.pdf

University of Florida – Extension

<http://www.fred.ifas.ufl.edu/iatpc/files/HastingsTablePotato09.pdf>

Other resources:

Potato production handbook (pp. 19-23)

http://potatoassociation.org/documents/A_ProductionHandbook_Final_000.pdf

United Seed Potato Growers of Idaho

<http://www.unitedseedpotato.com/index.shtml>

2.2.14. Processing Beans

Budgets for processing beans came from New York and Oregon. Both the New York and Oregon budgets are highly detailed. They require some aggregation of the categories to fit into our standardized format.

The budgets and mapping for each state is shown below. We used the categories and values as shown to construct our budget.

The Oregon budget provided the preplanting percentages we used as well as the cost of production data. This budget is probably the most complex we dealt with. The "Labor" and "Machinery" categories are taken from the columns with the same names. The remaining categories are aggregated from the row labels being careful not to count labor or machinery costs twice.

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Prepared for: AQD and RMA

Oregon Bush Beans, Processed market, Willamette Valley region 2010

Description	Units	Labor	Machinery	Materials	Total
Variable cash costs					
Field Preparations & Planting					
Tandem disk harrow	1 x/acre	1.69	4.29		\$ 5.99
Mold Board plow	1 x/acre	2.13	5.25		\$ 7.39
Harrow/roller packer	2 x/acre	3.05	7.67		\$ 75.72
Preplant Fertilizer				65	
Field cultivator	2 x/acre	0.85	1.84		\$ 2.69
Rotovator	1 x/acre	3.81	10.98		\$ 14.79
Plant beans	1 x/acre	2.54	6.57		\$ 259.10
seed	200			200	
sidedress Fertilizer	50			50	
Cultivating weeds	1 x/acre	0.85	1.84		\$ 2.69
Self propelled boom sprayer	1 x/acre	0.43	0.46		\$ 50.90
herbicide	50			50	
Self propelled boom sprayer	1 x/acre	0.43	0.46		\$ 55.90
fungicide	50			50	
insecticide	5			5	
Irrigation		55		78	\$ 133.00
Labor	5 x/acre				\$ 11.00
Electricity	8 Acre/inch				\$ 3.50
Maint & repairs	1 x/acre				\$ 50.00
Harvesting					
Bush bean harvester	1 x/acre	30.37	53.81		\$ 84.18
truck	2 x/acre		7.45		\$ 7.45
Post Harvest					
Flail crop residue	1 x/acre	3.05	4.48		\$ 7.53
soil test	1 x/acre			2	\$ 2.00
lime application	0.25 x/acre			75	\$ 75.00
Other costs					
Pickup & ATV	1 x/acre		5.31		\$ 5.31
Interest: Operating Capital	6 months			31.58	\$ 31.58
Total Variable costs		104.2	110.41	606.58	\$ 821.20
Fixed Cash Costs					
Property Insurance	1 x/acre				\$ 25.00
Property taxes	1 x/acre				\$ 20.00
Land Rent	1 x/acre				\$ 200.00
Total Fixed Cash Costs					\$ 245.00
Fixed Non-Cash costs					
Machinery & equip - deprec, Int & Ins					\$ 122.68
Pickups, truck & ATV - deprec, Int & Ins					\$ 14.29
Total Fixed Non-Cash Costs					\$ 136.96
Total Fixed Costs					\$ 381.96
Total costs					\$ 1,203.17

PREVENTED PLANTING CALCULATIONS			
	Cost	PP	%
Machinery	\$ 110.41	\$ 34.51	31.3%
Miscellaneous	\$ 2.00	\$ -	0.0%
Labor	\$ 104.21	\$ 14.58	14.0%
Seed	\$ 200.00	\$ -	0.0%
Fertilizer	\$ 190.00	\$ 65.00	34.2%
Chemicals	\$ 105.00	\$ -	0.0%
Irrigation	\$ 78.00	\$ -	0.0%
Crop insurance*	\$ 10.47	\$ 10.47	100.0%
Operating interest	\$ 31.58	\$ 7.90	25.0%
Total overhead costs	\$ 831.67	\$ 132.46	15.9%
Property Insurance	\$ 25.00	\$ 25.00	100.0%
Property taxes	\$ 20.00	\$ 20.00	100.0%
Land Rent	\$ 200.00	\$ 200.00	100.0%
Machinery & equip - deprec, Int & Ins	\$ 122.68	\$ 122.68	100.0%
Pickups, truck & ATV - deprec, Int & Ins	\$ 14.29	\$ 14.29	100.0%
Total Fixed costs	\$ 381.97	\$ 381.97	100.0%
All costs	\$ 1,213.64	\$ 514.43	42.4%

* RMA website: Crop insurance Oregon 2010 was \$20,341 producer premium over 1942 acres ----> \$10.47 / acre

The New York budget detail is shown below. This budget is straightforward in mapping with the exception of "Herbicides", "Fungicides", and "Insecticides". These were summed into one category called "Chemicals".

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Prepared for: AQD and RMA

New York Snap bean budget 2010

Cost Per Acre (\$)	Average		Cost Per Acre (\$)	Average
Land Rent	54.09	→	Land Rent	54.09
Office	10.3	→	Office	10.30
Utilities	2	→	Utilities	2.00
Liability	1.88	→	Liability	1.88
Property Taxes	30.76	→	Property Taxes	30.76
Property Insurance	3.09	→	Property Insurance	3.09
Investment Repairs	8.06	→	Investment Repairs	8.06
Total Overhead Costs	110.18	→	Total Overhead Costs	110.18
Fixed Costs			Fixed Costs	
Tractors	5.45	→	Tractors	5.45
Implements	40.91	→	Implements	40.91
Total Fixed Costs	46.36	→	Total Fixed Costs	46.36
Variable Costs			Variable Costs	
Seed	59	→	Seed	59.00
Fertilizer	96.77	→	Fertilizer	96.77
Land Preparation	42.3	→	Land Preparation	42.30
Plowing	11.52	→	Planting	11.88
Disking and Harrowing	15.56	→	Irrigation	15.36
Others	7.36	→	Chemicals	64.80
Planting	11.88	→	Custom	64.61
Cultivation	0.71	→	Repair and Maintenance	13.85
Irrigation	15.36	→	Other Variable Costs	36.59
Central Pivot	11.79	→	Business Expenses	0.71
Irrigation Gun	3.57	→	Crop Insurance	5.19
Herbicides	42.3	→	Total Variable Costs	411.06
Dual, Treflan, Eptam, San	16.71	→	Total Costs	567.60
Reflex+Basagran	16.93	→		
Roundup	6.21	→	Chemicals	
Others	2.44	→	Herbicides	42.30
Fungicides	14.81	→	Fungicides	14.81
Bravo	3.74	→	Insecticides	7.69
Topsin M	8.2	→		
Other	1.66	→		
Insecticides	7.69	→		
Warrior	0.92	→		
Capture	0.82	→		
Brigade	0.28	→		
Lambda-Cyhalothrin	0.86	→		
Acephate	0.61	→		
Orthene	0.43	→		
Custom	64.61	→		
Soil Testing	3.34	→		
Applying Calcium Lime	11.71	→		
Pest Scouting	3.7	→		
Pesticide Spraying	8	→		
Machine Harvesting	37.86	→		
Repair and Maintenance	13.85	→		
Tractors & Implements	7.11	→		
Interest Charge	1.79	→		
Other Variable Costs	36.59	→		
Equipment	0.71	→		
Misc Field/Shop Tools	0.94	→		
Labor	8.62	→		
Gas	0.71	→		
Diesel	10.31	→		
Interest on Capital	6.04	→		
Business Expenses	0.71	→		
Crop Insurance	5.19	→		
Total Variable Costs	411.06	→		
Total Costs	567.6	→		

References:

Crop budgets

Cornell University Extension Service

<http://dyson.cornell.edu/outreach/extensionpdf/2011/Cornell-Dyson-eb1110.pdf>

Oregon State University Extension

<http://arec.oregonstate.edu/oaeb/files/pdf/AEB0004.pdf>

University of California Cooperative Extension

<http://coststudies.ucdavis.edu/files/beanslqimavn10.pdf>

<http://coststudies.ucdavis.edu/files/beanslqimavn04.pdf>

Other references

Examining the Costs of Producing Processing Snap Beans and Green Peas in New York State

<http://dyson.cornell.edu/outreach/extensionpdf/.../Cornell-Dyson-eb1110.pdf>

Commercial Lima Bean Production in Wisconsin, University of Wisconsin

<http://www.soils.wisc.edu/extension/wcmc/2005/ppt/Bussan.pdf>

Lima Beans, Oregon State University

<http://nwrec.hort.oregonstate.edu/lima.html>

Commercial Snap Bean production in Georgia, University of Georgia College of Agricultural & Environmental Sciences

http://www.caes.uga.edu/publications/pubDetail.cfm?pk_id=7881

Snap Bean Production, Pennsylvania State University

<http://extension.psu.edu/business/ag-alternatives/horticulture/vegetables/snap-bean-production>

2.2.15. Processing Sweet Corn

Few states publish budgets specifically for sweet corn for processing. One of the most recent budgets in a key producing region is a 2010 budget from Oregon State University Extension for the Willamette Valley:

<http://arec.oregonstate.edu/oaeb/files/pdf/AEB0006.pdf>.

The budget for processing sweet corn is another detailed budget. However, it also breaks down cost by planting stage. It is easy to conform this budget to our standardized format and very easy to determine the preplanting factors.

Production costs (Tab 1)

1. Begin with OSU processing sweet corn budget for 2010.

The budget is detailed, and mostly chronological. The various line items from our condensed budget map are as follows:

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GROSS INCOME								
		Quantity	Unit	\$/Unit	Total	Price/Ton		
Sweet Corn		10.00	Ton	105.00	1,050.00	105.00		
VARIABLE CASH COSTS								
Field Preparations & Planting	Descript.	Units	Labor	Machinery	Materials	Total	Cost/Ton	
V-Rip	1.00	x/acre	2.54	5.77	0.00	8.31	6.83	
Harrow/Roller Packer	2.00	x/acre	3.05	7.67	65.00	75.72	7.57	
Pre-plant Fert.	\$65	1.00	x/acre	1.69	4.29	5.99	6.60	
Tandem Disk Harrow	1.00	x/acre	2.54	6.37	170.00	179.10	17.91	
Plant Corn	\$100	1.00	x/acre					
Seed	\$70	1.00	x/acre					
Sidedress Fert.								
Preharvest								
Cultivating weeds	1.00	x/acre	0.85	1.64	0.00	2.69	0.27	
Pest Control, Boom Sprayer	2.00	x/acre	0.86	0.93	70.00	71.79	7.18	
Herbicide	\$30	1.00	x/acre					
Insecticide	\$40	1.00	x/acre					
Fertilize	\$60	1.00	x/acre	0.69	0.97	60.00	61.67	
Top Dress								
Custom Topping	1.00	x/acre	0.00	0.00	10.00	10.00	1.00	
Irrigation								
Labor, \$11.00	3.00	hours	33.00	0.00	85.00	118.00	11.80	
Electricity, \$3.50	10.00	acre-inch						
Maint. & Repairs, \$50.00	1.00	x/acre						
Harvesting								
Corn Picker	1.00	x/acre	4.32	27.02	0.00	31.34	3.13	
Truck	2.00	x/acre	0.00	7.45	0.00	7.45	0.75	
Postharvest								
Soil Test	1.00	x/acre	0.00	0.00	2.00	2.00	0.20	
Lime application, custom	0.25	x/acre	0.00	0.00	75.00	75.00	7.50	
Disk	2.00	x/acre	3.05	8.59	0.00	11.64	1.16	
Other Costs								
Pickup & ATV	1.00	x/acre	0.00	5.31	0.00	5.31	0.53	
Interest: operating capital	6.0	months	0.00	0.00	24.04	24.04	2.40	
Total variable costs			52.60	76.40	561.04	690.03	69.00	
FIXED CASH COSTS								
				Unit	Total	Cost/Ton		
Property insurance	1.00	x/acre		acre	25.00	2.50		
Property taxes	1.00	x/acre		acre	20.00	2.00		
Land Rent	1.00	x/acre		acre	200.00	20.00		
Total fixed cash costs					245.00	24.50		
FIXED NON-CASH COSTS								
				Unit	Total	Cost/Ton		
Machinery and equip - depreciation, interest & insurance				acre	32.73	3.27		
Pickup, truck & ATV - depreciation, interest & insurance				acre	14.29	1.43		
Total fixed non-cash costs					47.02	4.70		
Total fixed costs					292.02	29.20		
Total of all costs per acre					\$982.05	98.21		
Net projected returns					\$67.95	6.79		

Item	2010
Cash expenses:	
Seed	100.00
Fertilizer	280.00
Chemicals	70.00
Fuel, lube, and repairs	76.41
Irrigation	85.00
Hired labor	52.59
Miscellaneous	2.00
Crop insurance	4.36
Interest on operating capital	24.04
Total, operating costs	694.40
Allocated overhead:	
Returns to management / risk	67.95
Capital recovery of machinery & equip	47.02
Opportunity cost of land (rental rate)	200.00
Taxes and insurance	45.00
Total, allocated overhead	359.97
Total costs listed	1,054.37

The only item missing from the Oregon budget is crop insurance. We calculated this directly from RMA's summary of business files for 2010. Farmer premiums for sweet corn in Oregon were \$146,400 (\$374,325 in total premiums less the subsidy of \$227,925). These farmer premiums divided by 33,600 insured acres yield a crop insurance cost per acre, to the farmer, of \$4.36.

2. Production costs for other years were filled using the formula that draws data from price indexes (Col A) and calculates values for that year based on the accompanying "Cost Index" data file.

Pre-planting percentage costs by expense category (Tab 2)

3. For the budget, we used the following pre-planting cost percentages:

Cash expenses:

- 23% of fertilizer to reflect the actual percentage in the budget,
- 23% of fuel, lube, & repair to reflect the actual percentage in the budget,
- 14% to reflect actual cost of labor prior to planting in the budget,
- 3% of crop insurance, and
- 25% of operating interest.

And almost all overhead:

- 30% of returns to management risk, to reflect approximate pre-planting effort,
- 100% of machinery depreciation,
- 100% of opportunity cost of land, and
- 100% of taxes and insurance.

Pre-planting cost estimates (Tab 3)

4. Multiply appropriate cells on Tabs 1 and 2.
5. Copy and paste values from "Total cost" line on Tab 1 to Tab 3.
6. Calculate pre-planting costs as a percentage of total costs.

References:

Oregon State University Extension

<http://arec.oregonstate.edu/oaeb/files/pdf/AEB0006.pdf>

Washington State University Extension

<http://www.farm-mgmt.wsu.edu/PDF-docs/irrigated/eb1941e.pdf>

(Note: processing corn accounted for 97.5% of state sweet corn production in 2002 – see p.1 of the report)

2.2.16. Rye

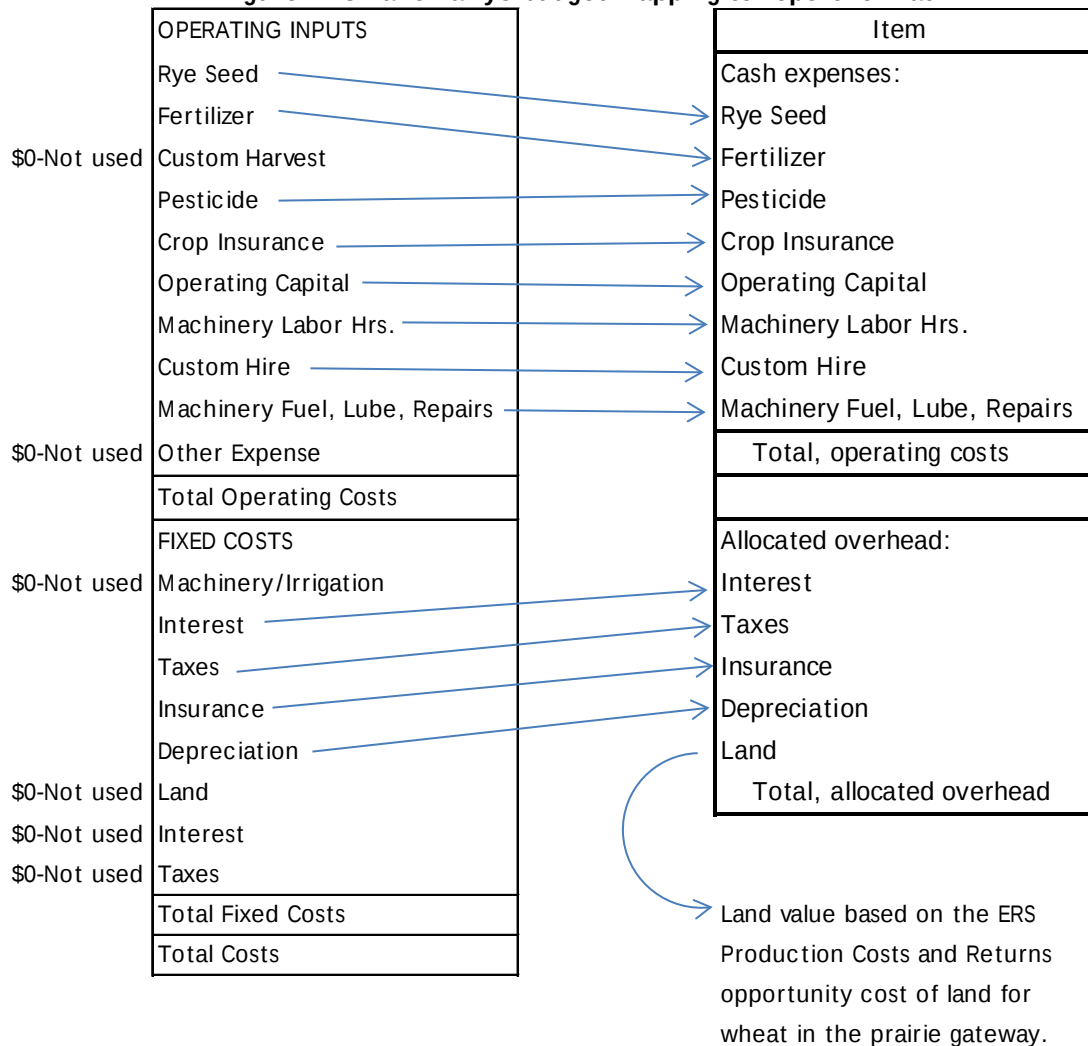
The rye budgets came from 3 major sources, North Dakota State University, Oklahoma State University, and Wisconsin University. The North Dakota budgets cover 2004-2012 and are separated into one of nine regions in the state. Each budget follows the ERS format very closely so no changes were made to the format. Budgets from the rye growing regions in the state were simply averaged together to get a state average by year. This average was used as the values for the cost of production. The production costs for 2003 were imputed using the price index.

The Oklahoma State University budgets cover 2003, and 2005-2012. Although there was a budget for 2003, it was ultimately dropped as the production costs were not in line with the budgets for 2005-2012. The production costs for 2003 and 2004 were imputed using the price indexes. In, addition some minor tweaking was needed to align the accounting items.

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Figure 1: Oklahoma rye budget mapping to report format.



The budget from Wisconsin was mainly used as a check. There was only one rye budget available for one year, 2013. Although the Wisconsin budget has limited usefulness, it can provide insight and necessary clues to the overall picture. As only the 2013 data was available, the production costs for 2003 -2012 were imputed using the price indexes. In addition, some reformatting was necessary to conform to the budget to our standard format.

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Operating Costs		(\$/acre)		Operating Costs		(\$/acre)
Fertility	Urea 46-0-0	22.95		Fertilizer		53.40
	Phosphorus 18-46-0	10.85		Rye Seed		24.00
	Potassium 0-0-60	19.60		Crop ins		9.93
				Pest Scouting		9.00
Seed Plants	Rye Seed	24.00		Custom operations		11.44
				Hauling		8.90
Miscellaneous	Actual production history - Rye 70%	9.93		Herbicides		3.04
	Pest Scouting	9.00		Labor		4.31
	Custom fertilizer spreading	11.44		Fuel, lube, elec.		22.04
	Hauling	8.90		Repairs and Maintenance		17.79
Weed Control	2,4-D (amine)	3.04		Interest on operating costs		3.15
				Total Operating Costs		167.00
Disease Control	None	0.00				
Insect Control	None	0.00				
Part-time Labor		4.00				
	Part-time Labor Benefits	0.31				
Energy Expenses						
	Diesel Fuel (with WI tax credit)	16.00				
	Gasoline (with WI tax credit)	3.17				
	Electricity	0.00				
Engine Lubrication		2.88				
Repairs and Maintenance						
	Power Units	10.74				
	Implements	7.05				
	Durables	0.00				
	Sub-Total	163.85				
Interest on Operating Capital - 6 months		3.15				
Total Operating Costs per Acre		167.00				
Fixed Expenses		(\$/acre)		Fixed Expenses		(\$/acre)
Management charge		0.00		Hired Labor		13.80
Land ownership costs		125.00		Capital recovery of machinery & equip		25.09
Labor Expenses		13.80		Opportunity cost of land (rental rate)		125.00
Interest and Insurance Expenses				Interest and insurance		13.72
	Power Units	8.16		Total Fixed Expenses per Acre		177.61
	Implements	5.56		Total Costs per Acre		344.61
	Durables	0.00				
Depreciation Expenses						
	Power Units	11.15				
	Implements	13.94				
	Durables	0.00				
Total Fixed Expenses per Acre		177.61				
Total Costs per Acre		344.61				

References:

Budgets:

North Dakota budgets are available at

<http://www.ag.ndsu.edu/farmmanagement/crop-budget-archive>

Wisconsin budget available at

<http://www.uwex.edu/ces/farmteam/budgets/fieldcrop.cfm>

Oklahoma budget (available on request for a fee) from

<http://agecon.okstate.edu/budgets/>

Other references:

“Alternate Field Crops Manual: Rye”, University of Wisconsin Cooperative Extension

<http://www.hort.purdue.edu/newcrop/afcm/rye.html>

“Rye Profile” Kansas State University

http://www.agmrc.org/commodities_products/grains_oilseeds/rye-profile/

“Crop Profile for Rye in Georgia”, University of Georgia University Cooperative Extension

<http://www.ipmcenters.org/cropprofiles/docs/GArye.html>

“Cereal Rye” USDA NRCS Plant Guide

http://plants.usda.gov/factsheet/pdf/fs_sece.pdf

2.2.17. Safflower

Safflower budgets for the years 2004-2012 came from North Dakota State University Extension Service. Budgets are separated into one of nine regions in the state. Each budget follows the ERS format very closely so no changes were made to the format. Budgets from the safflower growing regions were simply averaged together to get a state average by year. This average was used as the values for the cost of production. The production costs for 2003 were imputed using the price index.

Production costs (Tab 1)

1. Begin with NDSU safflower budgets for NW and SW North Dakota (2004, 2012) and UC Davis crop budgets for bed-planted, irrigated safflower (2005, 2011). NDSU regions were averaged and are easily mapped line-for-line; the CA safflower (2011) budget is mapped below.

UC COOPERATIVE EXTENSION Table 1 COSTS PER ACRE to PRODUCE SAFFLOWER SACRAMENTO VALLEY - 2011							Item	2011
Operation	Operation Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost	
Cultural:								
Land Prep: Stubble Disc	0.15	3	7	0	0	10		Seed 13.00
Land Prep: Finish Disc	0.13	2	6	0	0	8		Fertilizer 58.00
Land Prep: List Beds	0.06	1	3	0	0	4		Chemicals 19.00
Weed: (Roundup)	0.07	1	0	10	0	12		Custom operations 36.00
Fertilize: Preplant N (20-0-0)	0.15	3	3	58	3	66		Fuel, lube, and repairs 34.00
Weed: (Treflan)	0.14	3	3	9	0	25		Hired labor 30.00
Plant: (seed)	0.12	2	3	13	0	19		Irrigation water 11.00
Irrigate: Make Drain	0.01	0	0	0	0	1		Crop insurance 3.40
Irrigate: (water & labor)	0.30	4	0	11	0	14		Interest on operating capital 5.00
Irrigate: Close Drain	0.01	0	0	0	0	0		Total, operating costs 209.40
Weed: Cultivate	0.14	3	3	0	0	5		Allocated overhead:
Land Prep: Chop (mow) Stubble	0.14	3	3	0	0	6		Managerial labor 25.00
Pickup Use	0.10	4	2	0	0	6		Capital recovery of machinery & equip 27.00
ATV Use	0.10	2	0	0	0	2		Opportunity cost of land (rental rate) 73.00
TOTAL CULTURAL COSTS	1.62	30	34	102	3	168		Taxes and insurance 4.00
Harvest:								Other farm overhead 15.00
Harvest	0.20	7	18	0	0	26		Total, allocated overhead 144.00
Bank Out Grain	0.20	4	4	0	0	8		
TOTAL HARVEST COSTS	0.40	11	22	0	0	33		Total costs listed 353.40
Interest on operating capital @ 5.75%						5		
TOTAL OPERATING COSTS/ACRE		41	56	102	3	206		
CASH OVERHEAD:								
Liability Insurance						1		
Office Expense						15		
Field Sanitation						1		
Share Rent @ 20%						73		
Supervisor Salary						25		
Property Taxes						2		
Property Insurance						1		
Investment Repairs						1		
TOTAL CASH OVERHEAD COSTS						117		
TOTAL CASH COSTS/ACRE						324		
NON-CASH OVERHEAD		Per producing Acre		Annual Cost				
Investment				Capital Recovery				
Fuel Tanks & Pumps		6		0		0		
Fuel Wagon		1		0		0		
Shop Buildings		24		2		2		
Shop Tools		5		0		0		
Siphon Tubes		4		0		0		
Tool Carrier		5		0		0		
Equipment		239		24		24		
TOTAL NON-CASH OVERHEAD COSTS		283		27		27		
TOTAL COSTS/ACRE						350		

- Production costs for missing years were filled using the formula that draws data from price indexes (Col A) and calculates values for that year based on the accompanying "Cost Index" data file.

Pre-planting percentage costs by expense category (Tab 2)

- For the budget, we used the following pre-planting cost percentages, after consulting with a safflower expert:

Cash expenses:

- 100% of fertilizer,
- 100% of herbicides,
- 65% of fuel & lubrication and repairs,
- 50% of hired labor,
- 29% of crop insurance,
- and 25% of operating interest.

And most overhead:

- 20% of managerial labor (supervisor),

- 100% of machinery capital recovery costs,
- 100% of land charge,
- 100% of taxes and insurance,
- and 100% of other overhead.

Pre-planting cost estimates (Tab 3)

4. Multiply appropriate cells on Tabs 1 and 2.
5. Calculate pre-planting costs as a percentage of total costs.

References:

Budgets:

CA Budgets (2005, 2011)

<http://coststudies.ucdavis.edu/archived.php>

NDSU crop budgets (2004, 2012)

<http://www.ag.ndsu.edu/farmmanagement/crop-budget-archive>

Utah Budgets 2003, 2006, 2013)

<http://extension.usu.edu/agribusiness/htm/budgets>

Other references

Agricultural Marketing Resource Center

On safflower: http://www.agmrc.org/commodities_products/grains_oilseeds/safflower/

"Safflower Production", North Dakota State University Extension Service

<http://www.ag.ndsu.edu/publications/landing-pages/crops/safflower-production-a-870>

2.2.18. Sunflower Seeds

Sunflower seed budgets for the years 2004-2012 came from North Dakota State University Extension Service. Note that separate budgets were built for confectionery and oil sunflower seeds. North Dakota publishes separate budgets for each region; these regional budgets were averaged (9 for oil sunflower seeds, 8 for confectionery sunflower seeds) to calculate costs for each year.

Each budget follows the ERS format very closely, with most budget categories clearly matching the final format. Herbicides and insecticides were combined for the "chemicals" entry, and machinery depreciation and machinery investment were combined to form "capital recovery of machinery and equipment." Finally, returns to labor and management were averaged over all 10 years, with the resulting average used as the figure for 2008. The figures for 2003-2007 and 2009-2012 were subsequently computed using the NASS price index for "LABOR, WAGE RATES."

Finally, all other 2003 production costs were calculated using appropriate price indexes, identified on the first tab of each of the sunflower CAR (costs and returns) files.

Preplant percentages were obtained using production and timing information provided by extension experts.

Production costs (Tab 1)

1. North Dakota represents 50% of national production and is geographically proximate to other key producing areas.
2. We began with NDSU crop budgets for oil sunflower seed and confectionery sunflower seed (2004-2012), averaging figures for all regions with available budgets. In this case, 8 budgets for oil sunflower seed and 7 for confectionery sunflower seed.
3. Production costs for 2003 were filled using the formula that draws data from price indexes (Col A) and calculates values for that year based on the accompanying "Cost Index" data file.

Pre-planting percentage costs by expense category (Tab 2)

4. For the budget, we used the following pre-planting cost percentages:

Cash expenses:

- 25% of herbicides,
- 47% of crop insurance,
- 1/4 of fuel & lubrication and repairs
- 25% of operating interest
- 1/3 of miscellaneous costs, including soil testing but excluding aerial applications

And almost all overhead:

- 30% of operator labor
- 100% misc. overhead,
- 100% of capital recover of machinery,
- and 100% of land charge

Pre-planting cost estimates (Tab 3)

For each crop type:

5. Multiply appropriate cells on Tabs 1 and 2.
6. Copy and paste values from "Total cost" line on Tab 1 to Tab 3.
7. Calculate pre-planting costs as a percentage of total costs.

References:

NDSU crop budgets (2004-2013)

<http://www.ag.ndsu.edu/farmmanagement/crop-budget-archive>

"Sunflower Production", North Dakota State University Extension Service

<http://www.ag.ndsu.edu/extensionentomology/recent-publications-main/publications/A-1331-sunflower-production-field-guide>

2.2.19. Tobacco

The USDA ERS published budgets for 2003 and 2004 for flue cured and Burley tobacco. These budgets are no longer published. We combined the ERS budgets with available budgets from the Kentucky and North Carolina Extension offices to come up with estimates for the entire 2003-2012 period. Budgets from both state extension offices required aggregation of line items to fit into our standard format. See the graphics below for the way we constructed the tobacco budgets.

The seedlings represent a sunk cost because there is probably no market for them, as all growers would have produced their own or contracted for them. Application of lime, phosphorous and potassium would occur before planting but remains an asset if it's on owned land. Nitrogen would typically be applied just before or after planting, so would not be a cost in a prevented planting situation. Soil fumigants would probably have been applied in flue-cured production areas and represent about 35% of chemical costs.

The NCSU budgets include all labor, including operator labor, in one category. They do not include a land charge so we used 1.5 times the NASS cash rent figures for the state. They also do not include taxes and insurance or general farm overhead, so we used the ERS estimates for corn for the Southern Seaboard region.

The Kentucky budgets did not include separate costs for custom operations or fuel, lube and electricity. Fuel costs were included in variable machinery costs and are included in the repairs line. We used ERS estimates for corn in the Eastern Uplands region for general farm overhead.

Kentucky Burley tobacco budget for 2008

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University of Kentucky Burley Tobacco Budget, Per Acre Costs and Returns				
Item	Amount (Per acre)	Units	Price	Total \$/Ac
GROSS REVENUE				
Tobacco Sales	2200	lb	\$1.75	\$3,850.00
VARIABLE COSTS				
Transplants	6.5	thousand	\$40.00	\$260.00
Nitrogen	250	lb	\$0.70	\$175.00
Phosphorus	100	lb	\$0.75	\$75.00
Potassium	250	lb	\$0.60	\$150.00
Lime	1.5	ton	\$17.00	\$25.50
Herbicides	1	acre	\$65.00	\$65.00
Insecticides	1	acre	\$80.00	\$80.00
Fungicides	1	acre	\$125.00	\$125.00
Sucker Control	1	acre	\$50.00	\$50.00
Tillage	6	trips	\$8.50	\$51.00
Planting	1	acre	\$30.00	\$30.00
Spraying	3	trips	\$30.00	\$90.00
Cover Crop	1	acre	\$15.00	\$15.00
Materials & Supplies	1	acre	\$14.00	\$14.00
Trucking	25	miles	\$3.00	\$75.00
Crop Insurance	1	acre	\$100.00	\$100.00
Hired Labor	150	hours	\$12.00	\$1,800.00
Migrant Housing & Tr	1	acre	\$0.00	\$0.00
Other	1	acre	\$0.00	\$0.00
Operating Interest (1	\$3,705.50	dollars	3.75%	\$138.96
TOTAL VARIABLE COST				\$3,319.46
RETURN OVER VARIABLE C				\$530.54
FIXED COSTS				
Land Rental Cost	1	acre	\$250.00	\$250.00
Buildings/facilities co	\$4,000	dollars	5.0%	\$200.00
Property taxes/insura	1	acre	\$148.00	\$148.00
TOTAL FIXED COSTS				\$598.00
RETURN TO OPERATOR LABOR AND MANA				-\$67.46
OPERATOR LABOR				
Operator labor/mana	35	hours	\$ 15.00	\$525.00
RETURN TO CAPITAL & MAI				-\$523.64
TOTAL COSTS				
				\$4,442.46

Item	2008
Cash expenses:	
Seed and plant bed	\$260.00
Fertilizer	\$425.50
Chemicals	\$320.00
Custom operations	
Fuel, lube, and electricity	
Repairs	\$186.00
Hired labor	\$1,800.00
Marketing expenses	\$75.00
Miscellaneous	\$14.00
Crop insurance	\$100.00
Interest on operating capital	\$138.96
Total, operating costs	\$3,319.46
Allocated overhead:	
Opportunity cost of unpaid labor	\$525.00
Capital recovery of machinery & equip	\$200.00
Opportunity cost of land (rental rate)	\$250.00
Taxes and insurance	\$148.00
General farm overhead*	
Total, allocated overhead	\$1,123.00
Total costs listed	\$4,442.46

*General farm overhead - used Corn Eastern Uplands

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North Carolina Flue cured tobacco

Variable Costs

Plants	155
Fumigation	136.5
Fertilizer	208.53
8-16-24	143.5
15.5-0-0	51
Lime (prorated)	14.03
Herbicides	43.23
Insecticides	34.5
Sucker control	112.94
Hauling	48
Cover Crop	0
Curing Fuel	392
Electricity	99
Crop Ins	65
Baling Supplies	7.2
Tractor/Machinery	217.32
Labor	
Pre Harvest	241.92
Harvest	376.32
Mach Pre Harvest	34.23
Mach Harvest	163.52
Interest on Operating capital	27.63
Fixed costs	
Tractor/Machinery	317.94
Bulk Barn	173.33

Item	2008
Cash expenses:	
Seed and plant bed	155.00
Fertilizer	208.53
Chemicals	327.17
Custom operations/hauling	48.00
Fuel, lube, and electricity	99.00
Curing fuel	392.00
Repairs/machinery costs	217.32
Hired labor	815.99
Marketing expenses	
Miscellaneous	7.20
Crop insurance	65.00
Interest on operating capital	27.63
Total, operating costs	2,362.84
Allocated overhead:	
Opportunity cost of unpaid labor	
Capital recovery of machinery and equipment	491.27
Opportunity cost of land (rental rate)	81.75
Taxes and insurance	8.95
General farm overhead	18.05
Total, allocated overhead	600.02
Total costs listed	2,962.86

Rent based on 1.5 x NASS cash rent for the state
Taxes & insurance = ERS S. Seaboard # for corn
General farm overhead = ERS S. Seaboard # for corn

References:

Foreman, Linda, and William McBride. *Policy Reform in the Tobacco Industry: Producers Adapt to a Changing Market*, EIB-77, U.S. Department of Agriculture, Economic Research Service, May 2011.

<http://www.ers.usda.gov/publications/eib-economic-information-bulletin/eib77.aspx>

"2011-2012 Kentucky & Tennessee Tobacco Production Guide", University of Tennessee institute of Agriculture & University of Kentucky College of Agriculture
<http://www2.ca.uky.edu/agc/pubs/id/id160/id160.pdf>

2.3. Special cases

There are three special cases, hybrid corn seed, hybrid sorghum seed, and sugar beets. Sugar beet production costs were combined from ERS data and University budgets. Both hybrid corn seed and hybrid sorghum seed were special cases for which no budget existed at all. These crops are different from the other crops covered by the Prevented Planting provisions. First, these crops produce the seed stock for the following year's crop. Second, there are relatively few producers for hybrid seed stocks and the farmers usually specialize in seed production. Third, production inputs are similar to the production crop but management practices are much more intense. Fourth, some costs are borne by the seed companies and in most cases any extraordinary costs are borne by the seed company. Fifth, crop failure is rare due to the intense management from the farmer and extensive support from the seed company. For these reasons, production costs are generally not known outside the community of farmers that produce seed stocks. In order to produce any sort of budget we resorted to interviews with seed company agronomists. They work in the test fields and closely with the farmers who produce the seed stocks and are in the best position to estimate costs and production practices.

2.3.1. Hybrid corn seed

There are no known published hybrid corn seed estimates of production. Production costs were estimated based on ERS corn cost data and expert opinion of costs for the 2013 crop year. Production costs for previous years were imputed using the price indexes to calculate the value.

In the absence of a production cost budget for hybrid seed corn, we adapted the corn production budget as follows:

- We deleted seed costs and crop insurance costs.
- We added a line for detasseling, using a figure of \$280/acre we found for 2007 and indexing it for the other years.
- We increased the factors for fuel and repairs to 44% and 40% to reflect the higher number of field operations prior to planting.

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Production costs

Item	
Cash expenses:	
Seed	Paid by seed co
Fertilizer	Similar fert costs to 120-160 bu./acre com corn Some paid by seed co., com. If needed, very little cost maybe \$0.50 per acre
Chemicals	
Custom operations	ERS Corn Commodity Costs and Returns
Fuel, lube, and electricity	Zero no till. Ops. One to 2 extra passes preplanting.
Repairs	Zero no till. Ops. One to 2 extra passes preplanting.
Purchased irrigation water	Some preplant irrigation in central Corn belt
Crop Insurance	Paid by seed co
Detasseling	Estimate came from research paper, independently verified by seed company agronomist
Interest on operating costs	
Allocated overhead:	
Hired Labor	ERS Corn Commodity Costs and Returns
Opportunity cost of unpaid labor	ERS Corn Commodity Costs and Returns
Capital recovery of machinery & equip.	ERS Corn Commodity Costs and Returns
Opportunity cost of land (rental rate)	ERS Corn Commodity Costs and Returns
Taxes and insurance	ERS Corn Commodity Costs and Returns
General farm overhead	ERS Corn Commodity Costs and Returns

Prevented planting factor

Item	
Cash expenses:	
Seed	0%, Paid by seed co
Fertilizer	Similar fert costs to 120-160 bu/acre com corn
Chemicals	Some paid by seed co., com. If needed, very little cost maybe \$0.50 per acre
Custom operations	ERS Corn Commodity Costs and Returns
Fuel, lube, and electricity	One to 2 extra passes preplanting. 22 -> 44
Repairs	One to 2 extra passes preplanting. 19 -> 40
Purchased irrigation water	Some preplant irrigation in central Corn belt
Crop Insurance	0% Paid by seed co
Detasseling	0%
Interest on operating costs	ERS Corn Commodity Costs and Returns
Allocated overhead:	
Hired Labor	ERS Corn Commodity Costs and Returns
Opportunity cost of unpaid labor	ERS Corn Commodity Costs and Returns
Capital recovery of machinery & equip.	100%
Opportunity cost of land (rental rate)	100%
Taxes and insurance	100%
General farm overhead	100%

References:

APHIS - Pioneer Hi-Bred DP32138-1

http://www.aphis.usda.gov/brs/aphisdocs/08_33801p_dea.pdf

Detasseling:

http://www.pantagraph.com/business/teens-drawn-to-cash-rewards-of-detasseling-corn/article_09e58722-998a-5dfe-aea6-20282a782b7e.html

2.3.2. Hybrid sorghum seed

There are no known published hybrid sorghum seed production cost estimates. Production costs were estimated based on ERS sorghum grain data and expert opinion of costs for the 2013 crop year. Production costs for previous years were imputed using the price indexes to calculate the value.

The seed company representative we spoke with indicated production costs of seed for grain sorghum, forage sorghum, and sudangrass sorghum. Each has the same costs except for the way the seed companies handle what they provide the farmer at no charge.

Production costs:

The table below details the production costs provided by a seed company representative.

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Item	2013
Cash expenses:	
Seed	0 Seed company provides seed
Fertilizer	150 Same as for grain sorghum 65% pre planting
Chemicals	115 Same as for grain sorghum 50% pre planting
Custom operations	30 Same as for grain sorghum 50% pre planting
Fuel, lube, & electricity	200 11 field passes 5 before planting = 45%
Repairs	same as for Prairie Gateway grain sorghum
Purchased irrigation water	180 18in/acre, about \$10/inch, same as sorghum and 30% less than irr corn
Hauling	0 Seed company provides hauling
Crop Insurance	same as for Prairie Gateway grain sorghum
Interest on operating capital	same as for Prairie Gateway grain sorghum
Allocated overhead:	
Hired labor	25 same as for other comparable crops in TX including grain sorghum
Opportunity cost of unpaid labor	50% preplanting
Capital recovery of machinery & equip	same as for Prairie Gateway grain sorghum
Opportunity cost of land (rental rate)	same as for Prairie Gateway grain sorghum
Taxes and insurance	same as for Prairie Gateway grain sorghum
General farm overhead	same as for Prairie Gateway grain sorghum

Prevented planting factors:

The table below shows the details of the prevented planting factors provided by a seed company representative. The cash expenses all came from his recommendations. The allocated overhead factors follow our normal convention except hired labor and opportunity cost of labor. The hired labor and Opportunity cos categories were a reasonable estimate provided by the seed company representative.

Item	2013
Cash expenses:	
Seed	0%
Fertilizer	65%
Chemicals	50%
Custom operations	50%
Fuel, lube, & electricity	45%
Repairs	45%
Purchased irrigation water	25%
Hauling	0%
Crop Insurance	
Interest on operating capital	25%

Allocated overhead:	
Hired labor	50%
Opportunity cost of unpaid labor	50%
Capital recovery of machinery & equip	100%
Opportunity cost of land (rental rate)	100%
Taxes and insurance	100%
General farm overhead	100%

Grain sorghum - Methodology

Production costs (Tab 1)

7. We used a combination of expert testimony for 2013 and 2003-2012 ERS production data to estimate production costs. The experts' numbers for 2013 were then adjusted using the indexes to fill in values for 2003-2012.
8. Crop insurance costs were added from RMA data

Pre-planting percentage costs by expense category (Tab 2)

9. For the budget, we used the following pre-planting cost percentages, which again are a composite of ERS data and expert opinion respectively.

Cash expenses:

- 0% for seed,
- 65% of fertilizer
- 50% of chemicals
- 50% of custom operations
- 45% of fuel, lube, and electricity
- 45% of repairs
- 0.2% of crop insurance, and
- 25% of interest on operating costs

Overhead:

- 50% of hired labor,
- 50% of the opportunity cost of unpaid labor,
- 100% of the capital recovery of machinery & equipment,
- 100% of the opportunity cost of land,
- 100% of taxes and insurance, and
- 100% of general farm overhead

Pre-planting cost estimates (Tab 3)

10. Multiply appropriate cells on Tabs 1 and 2.
11. Link "Total cost" values from Tab 1 on Tab 3.

Calculate pre-planting costs as a percentage of total costs.

References:

"Nutrient Management Suggestions for Grain Sorghum" (University of Nebraska-Lincoln)

<http://www.ianrpubs.unl.edu/pages/publicationD.jsp?publicationId=671>

"Sorghum Fertility Management," Bill McClure, Pioneer

<https://www.pioneer.com/home/site/ca/template.CONTENT/products/sorghum/production-manual/guid.AE3799A5-A380-492A-B5DF-1D49E8B1735B>

"Grain Sorghum," University of Arizona

<http://cals.arizona.edu/crops/soils/aznsorghum.pdf>

Grain Sorghum Production Calendar

<http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-2620/PSS-2113web.pdf>

Others

<http://sorghumcheckoff.com/for-farmer/production-tools/>

<http://sorghumcheckoff.com/wp-content/uploads/2012/06/WhatisSorghum.pdf>

2.3.3. Sugar beets

Sugar beets represent a special case of the ERS data. Future updates will require an approach as described in the budget based crops section.

ERS prepared estimates of production cost for sugar beets up through 2007 in connection with the sugar program. Estimates are available for three regions, defined as Great Lakes, Great Plains, and Northwest.

For later years one has to rely primarily on state extension budgets. We found full or partial budgets for selected years for Idaho (2009, 2011), Michigan (2011), Colorado (2010, 2012), Nebraska (2011) and Minnesota (2010). The recent budgets specifically address costs for Roundup Ready beet production. Fortunately we also found actual production cost data for Minnesota and North Dakota through the University of Minnesota's FINBIN database which compiles actual farm financial and operating data from participating farmers. An average of 135 sugar beet growers participate each year, which is a respectable sample.

We used the Michigan and Idaho budgets and the FINBIN cost data in extending the production cost estimates for the three regions in the ERS data. The resulting budgets are representative of 85 percent of total sugar beet harvested area.

For Idaho and Michigan, the crop insurance cost is based on RMA SOB data and the share of indemnities attributable to prevented planting claims. We estimated taxes.

The Michigan budget did not include figures for custom operations, capital recovery, general farm overhead or the coop share cost. These were extrapolated using price indexes

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For the Red River Valley of Minnesota and North Dakota, the FINBIN data included a crop insurance cost which we used. We estimated the Coop share.

The linkages to our ERS budget format are shown on the next three pages.

Idaho Costs for 2011:

Table 1. Costs and Returns Per Acre to Produce Roundup Ready Sugarbeets					Item	2011
	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre		
GROSS RETURNS					Cash expenses:	
Sugarbeets	33.00	ton	50.00	1,650.00	Seed	127.34
TOTAL GROSS RETURNS	33.00	ton		1,650.00	Fertilizer 2l	180.15
OPERATING COSTS					Chemicals	45.28
Seed:				127.34	Custom operations	26.10
Roundup Ready Beet Seed: Raw	0.50	unit	127.00	63.50	Fuel, lube, and electricity	160.57
Roundup Ready Technology Fee	0.48	unit	133.00	63.84	Repairs	61.83
Fertilizer:				180.15	Hired labor	114.58
Dry Nitrogen	115.00	lb	0.61	70.15	Purchased irrigation water	41.30
Dry P2O5	40.00	lb	0.57	22.80	Freight and dirt hauling	18.15
K2O	60.00	lb	0.51	30.60	Miscellaneous	51.08
Sulfur	50.00	lb	0.22	11.00	Hauling allowance (-)	2.23
Liquid Nitrogen	10.00	lb	0.70	7.00	Crop insurance	10.02
Liquid P2O5	35.00	lb	0.76	26.60	Interest on operating capital	28.23
Micronutrients - Sugarbeets	1.00	acre	12.00	12.00	Total, operating costs	864.64
Pesticide:				45.28		
Poncho Beta Seed Treatment	0.48	unit	47.50	22.80	Allocated overhead:	
Roundup Power Max 4.5	54.00	fl oz	0.19	10.26	Opportunity cost of unpaid	80.00
Ammonium Sulfate	2.40	lb	0.59	1.42	Capital recovery of machin	174.19
Tilt	4.00	fl oz	2.70	10.80	Opportunity cost of land an	350.00
Custom and Consultants:				26.10	Taxes and insurance	60.85
Custom Fertilize - Row Crops	1.00	acre	8.10	8.10	General farm overhead	24.00
Consultant/Soil Test - Sugarbeet	1.00	acre	18.00	18.00	Coop share	35.00
Irrigation:				104.00	Total, allocated overhead	724.04
Irrigation Power - CP	33.00	ac-in	1.45	47.85		
Water Assessment	1.00	acre	41.30	41.30	Total costs listed	1,588.68
Irrigation Repairs - CP	33.00	ac-in	0.45	14.85		
Other:				74.15		
Crop Insurance	1.00	acre	56.00	56.00		
Sugarbeet Hauling Charge*	33.00	ton	0.55	18.15		
Labor				114.58		
Equipment Operator Labor	3.51	hrs	16.25	57.06		
Truck Driver Labor	2.23	hrs	13.00	29.03		
Irrigation Labor	1.64	hrs	11.55	18.94		
General Farm Labor	1.00	hrs	9.55	9.55		
Machinery				159.69		
Fuel-Gas	2.75	gal	3.50	9.61		
Fuel-Diesel	20.30	gal	3.45	70.03		
Fuel-Road Diesel	4.65	gal	3.95	18.38		
Lube				14.70		
Machinery Repair				46.96		
Interest on Operating Capital @ 6.75%				28.23		
TOTAL OPERATING COSTS/ACRE				859.52		
NET RETURNS ABOVE OPERATING COSTS				790.48		
CASH OVERHEAD COSTS						
Co-op Stock				35.00		
General Overhead				24.00		
Land Rent				350.00		
Management Fee				80.00		
Property Taxes				0.00		
Property Insurance				4.85		
Investment Repairs				0.00		
TOTAL CASH OVERHEAD COSTS/ACRE				493.85		
TOTAL CASH COSTS/ACRE				1,353.37		
NON-CASH OVERHEAD COSTS (Capital Recovery)						
Equipment				174.19		
TOTAL NON-CASH OVERHEAD COSTS				174.19		
TOTAL COST/ACRE				1,527.56		
TOTAL COST/TON				46.29		
NET RETURNS ABOVE TOTAL COST				122.44		

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Michigan costs

*CASH COST	AMOUNT		
NITROGEN	130.00	\$ 78.00	
Phos	60.00	\$ 39.00	
Potash	60.00	\$ 28.20	
LIMESTONE	0.00	\$ -	
SEED ***		\$ 75.00	
HERBICIDE ***		\$ 29.00	
INSECT&CHEMICALS ***		\$ 75.00	
CROP INS.		\$ 25.00	
FUEL & Lube	10.00	\$ 31.63	
REPAIR	2.50	\$ 62.50	
SUPPLIES	1.50	\$ 9.00	
UTILITIES	1.00	\$ 5.00	
MO STORED	0.00		
STORAGE		\$ -	
MARKETING	0.00	\$ -	
DRYING	15.00	\$ -	
TRUCKING	17.50	\$ 68.25	
T VARIABLE		\$ 525.58	
Breakeven Var Cash		\$ 20.21	
**FIXED Factors			
INSURANCE	1.00	\$ 3.00	
LABOR	2.50	\$ 75.00	
INTEREST	1.00	\$ 21.02	
Breakeven Fixed Cash		\$ 3.81	
RENT	1.30	\$ 169.00	
TAX'S- land	1.00	\$ -	
DRAW \$/AC	1.00	\$ 50.00	
PRINCIPAL PAY	1.00	\$ -	
Breakeven Capital/Mgt. Cash		\$ 8.42	
Total Cash Fixed&Capital Exp		\$ 318.02	
T EXPENSE CASH		\$ 843.60	
Breakeven All Cash Costs		\$ 32.45	
DEPRECIATION ***	2.00	\$ -	
RETURN TO CAPITAL&Mgt		\$ -	
TOTAL ALL EXP		\$ 843.60	
BREAKEVEN		\$ 32.45	
NET /ACRE		\$ 336.40	
EXPENSE ALL AC		\$ 843.60	
INCOME PER UNIT		\$ 45.38	
INCOME ALL AC		\$ 1,180.00	
NET ALL AC		\$ 336.40	
Breakeven Yield		18.6	
Return to Investment/Acre		\$336.40	

Item	2011
Cash expenses:	
Seed	75.00
Fertilizer	145.20
Chemicals	104.00
Custom operations	38.05
Fuel, lube, and electricity	36.63
Repairs	62.50
Hired labor	75.00
Freight and dirt hauling	68.25
Miscellaneous	9.00
Crop insurance	0.00
Interest on operating cap	21.02
Total, operating costs	634.65
Allocated overhead:	
Opportunity cost of unpa	50.00
Capital recovery of mach	267.74
Opportunity cost of land	169.00
Taxes and insurance	28.00
General farm overhead	42.93
Coop share	15.71
Total, allocated overhea	573.37
Total costs listed	1,208.03

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Red River Valley 2011 costs from FINBIN:

Direct Expenses				
Seed	155.15		Item	2011
Fertilizer	97.08		Cash expenses:	
Crop chemicals	86.08		Seed	155.15
Crop insurance	24.8		Fertilizer	97.08
Fuel & oil	80.86		Chemicals	86.08
Repairs	98.99		Custom operations	19.26
Custom hire	14.39		Fuel, lube, and electr	80.86
Total Custom hire	19.26		Repairs	98.99
Hired labor	23.77		Hired labor	72.24
Total hired labor	72.24		Freight and dirt hauli	9.40
Land rent	92.62		Miscellaneous	11.02
Stock/quota lease	122.19		Hauling allowance (-)	0.00
Land plus quota	214.81		Crop insurance	24.80
Machinery leases	3.97		Interest on operating	17.84
Hauling and trucking	9.4		Total, operating cos	672.72
Marketing	0.42			
Organic certification	2.11		Allocated overhead:	
Operating interest	17.84		Opportunity cost of u	119.14
Miscellaneous	4.52		Capital recovery of m	102.20
Total Miscellaneous	11.02		Opportunity cost of la	214.81
Total direct expenses per acre	834.2		Taxes and insurance	16.15
Return over direct exp per acre	352.38		General farm overhea	14.04
			Coop share	16.00
Overhead Expenses			Total, allocated ove	482.34
Custom hire	4.87			
Hired labor	48.47		Total costs listed	1,155.06
Machinery leases	8.54			
Building leases	2.38			
RE & pers. property taxes	4.32			
Farm insurance	11.83			
Taxes + insurance	16.15			
Utilities	8.18			
Dues & professional fees	5.86			
Interest	21.7			
Mach & bldg depreciation	91.28			
Machinery & equipment	102.2			
Miscellaneous	12.88			
General farm overhead	14.04			
Total overhead expenses per acre	220.31			
Total dir & ovhd expenses per acre	1,054.51			
Net return per acre	132.07			
Government payments	11.69			
Net return with govt pmts	143.76			
Labor & management charge	119.14			
Net return over lbr & mgt	24.61			

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References:

Idaho budgets

<http://web.cals.uidaho.edu/idoagbiz/enterprise-budgets/>

FINBIN budgets (see instructions under green peas, Section 2.2.7)

<http://www.finbin.umn.edu/>

Michigan budgets

http://firm.msue.msu.edu/budgets_cost_of_production_and_decision_making_tools

2013 Sugar Beet Production Guide

NDSU and U. Minnesota Extension Service

<http://www.sbreb.org/production/2013/2013SBProductionGuide.pdf>

Characteristics and Production Costs of U.S. Sugarbeet Farms

<http://www.ers.usda.gov/publications/sb-statistical-bulletin/sb974-8.aspx>

3. UPDATING PREVENTED PLANTING COST ESTIMATES

3.1. Updating methodology

Producing estimates of prevented planting costs involves four basic steps.

Step one: identify crop budgets for all available years

The goal here was to include, on a yearly basis for the years 2003 through 2012, annual cost estimates for various expense categories for each crop. Categories were listed under operating costs (fertilizer, fuel, repairs, etc.) or overhead costs (capital costs of machinery, land, etc.).

For the major crops, and some others, we had data available from USDA's ERS for all years, derived from ARMS surveys. The ERS publishes CAR (cost and returns) data for the eight major crops. The CAR information relies on surveys to account for farm production costs. As such, it is as statistically representative of average costs as possible. Where available, we used these figures.

For minor crops there are no statistically valid historical data; one must rely on published budgets. These are generally published by state university extension offices in key growing states. They tend to be forecast models that only represent a rough/best guess as to costs for the upcoming crop year. Most are based on small surveys or conversations with farmers.

- For some states and crops, these budgets are updated annually, thus we had data for all (or almost all) years.
- For other states and crops, we had episodic budgets (published only once or every few years).

Extensions in some cases published multiple budgets for the same crop type, but differing by management practice (till vs. no till, irrigated vs. non-irrigated), by variety, by geographic regions within the state, or in some other way. We dealt with these situations in different ways. In some cases, we chose a single, "most representative" budget. In others, we averaged multiple budgets (e.g., averaging regional budgets within a state).

Typically, one or more expense items that we considered to be a pre-planting cost had to be added to any given crop budget (e.g., crop insurance payments or a land charge).

Step two: estimate values for missing years

For crops where published budgets were not available for every year, we had to estimate the costs for that year. We did this by using price index data to estimate the missing values. For example, to calculate a 2006 machinery expense we did not have, we would take a published 2005 machinery expense and use NASS's prices paid index for machinery costs (i.e., reflecting machinery inflation) to calculate the value for 2006. The price index data come from the USDA NASS Quick Stats database. We considered using price indexes from other sources but concluded that the various NASS series sufficiently comprehensive.

This process required the use of a separate Cost Index file, which includes all the relevant price indexes. In each crop budget, each expense line also identifies the relevant index (e.g., CONSUMER PRICE INDEX, or MACHINERY, or REPAIRS).

We then used formulas that would "look up" both the relevant index and values already available, then calculate and populate the missing values. This exercise was complex and is described below.

Step three: estimate the percentage of each cost category that should be considered pre-planting

Just as with budget availability, the precision of our pre-planting percentages varied.

- For several major crops, ERS updated (in late 2013) its pre-planting percentage estimates.
- For some other crops, previous ERS pre-planting percentage estimates were available, though not updated.
- For the remaining crops, we relied on multiple techniques to identify the most appropriate percentage for each expense category for each crop:
 - In some cases, we chose percentages for analogous major crops (e.g., using the same land costs for rye as for spring wheat).
 - For some categories, we considered the proportion of field operations, based on an analysis of budgets (for example, if 2 of 7 field passes occurred prior to planting, our fuel and repair estimates would be 2/7 or 29% of overall reported fuel and repair costs).
 - Some budgets, in addition to detailing expenses by category, also detail expenses *chronologically*, thus allowing us to identify the proportion of expenses in each category that was spent pre-planting.
 - In other cases, we were influenced by conversations with extension/crop experts. References are provided in each crop section.
 - We used other techniques as well.

For each crop, we provide a detailed methodology, including any special circumstances or techniques employed.

Step four: multiply budgets by pre-planting percentages to get pre-planting costs

Once (1) a cost budget spreadsheet and (2) a pre-planting percentages spreadsheet were built, we multiplied their corresponding values onto a third spreadsheet, one listing (3) pre-planting costs.

This third spreadsheet also divided these pre-planting costs by total costs to identify the percentage of costs for each year that are pre-planting costs.

3.2. Updating procedures

How to update the prevented planting estimates will depend on the source of the crop budget data, generally either the ERS Cost of Production Survey or university extension budgets.

1. Updating ERS cost and return estimates

Updating the ERS cost and return estimates are straightforward. Simply obtain the most recent budgets from <http://www.ers.usda.gov/data-products/commodity-costs-and-returns.aspx>.

- In the “Production costs” tab, append the table with the new years, then plug the updated numbers into the excel spreadsheet in the correct region and year.
- In the “Preplant” tab, append new years to the existing table and finally extend the factors across to the appropriate ending year.

- Finally, in the “[crop] prevented planting” tab, append the new years into the table and copy the formulas to the right to fill in the estimates.

2. Updating university extension budgets

- For the university extension budgets, check the source to see if there are updated budgets. Next, review the methodology specifics for the crop to see if anything needs to be done to the budget.
- Enter the new budget data for available years.

Any missing years and/or data will need to be estimated using NASS price indexes.

3. Estimate missing values using NASS price indexes.

Two files are needed for each crop:

- a CAR file (that contains the production costs, prevented planting factors, and the prevented planting percentages), and
- a cost index file (that contains the NASS index for prices paid).

These files must be located together in the same folder. The CAR files follow this naming convention: “[Crop] CAR.xlsx”.

Name	Date modified	Type
 Canola CAR.xlsx	1/23/2014 13:31	XLSX File
 Cost Index.xlsx	9/17/2013 10:58	XLSX File

The data for the cost index file comes from the NASS QuickStats 2.0 online web query tool, [http://www.nass.usda.gov/Quick Stats/](http://www.nass.usda.gov/Quick_Stats/).

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Cost Index.xlsx - Microsoft Excel																		
File Home Insert Table Tools Formulas Data Review View Developer																		
Clipboard Font Alignment Number Styles Cells Editing																		
A B C D E F G H I J K L M N O P Q R S T U V																		
	Item	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1	USANA AG SERVICES - INDEX FOR PRICE PAID, 1990 - 1992	186	165	114	180	120	120	125	127	133	139	146	148	156	161	164	167	171
2	USANA AG SERVICES, CUSTOM RATES - INDEX FOR PRICE PAID, 1990 - 1992	185	167	115	120	121	120	125	120	121	123	125	144	145	145	148	153	156
3	USANA AG SERVICES, OTHER - INDEX FOR PRICE PAID, 1990 - 1992	186	165	114	117	120	120	124	128	135	141	143	146	150	153	156	159	162
4	USANA AUTOS - INDEX FOR PRICE PAID, 1990 - 1992	113	113	112	112	111	110	100	107	108	109	109	108	110	111	114	116	117
5	USANA BUILDING MATERIALS - INDEX FOR PRICE PAID, 1990 - 1992	188	188	120	121	121	122	124	134	142	152	155	165	163	166	171	176	179
6	USANA CHEMICAL TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	121	122	121	120	119	119	121	121	123	126	129	139	138	144	145	153	156
7	USANA NA CONSUMER PRICE INDEX - INDEX FOR PRICE PAID, 1990 - 1992	128	131	133	136	140	145	150	154	160	164	169	173	177	180	182	187	193
8	USANA NA CROP SECTOR - INDEX FOR PRICE PAID, 1990 - 1992	121	125	126	131	137	146	155	166	173	188	194	213	221	227	231	237	243
9	USANA NA FARM SECTOR - INDEX FOR PRICE PAID, 1990 - 1992	107	113	113	118	129	132	137	152	160	180	184	219	247	253	267	270	276
10	USANA NA FERTILIZER TOTALS, INC. LIME & SOIL CONDITIONERS - INDEX FOR PRICE PAID, 1990 - 1992	121	112	105	110	123	108	124	140	164	176	236	332	275	252	328	333	340
11	USANA NA FERTILIZER, MIXED - INDEX FOR PRICE PAID, 1990 - 1992	188	186	113	106	109	105	112	124	139	155	206	319	274	247	319	322	329
12	USANA NA FIELD CROP TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	119	122	122	125	134	144	158	163	173	188	211	270	314	327	352	379	397
13	USANA NA FUELS - INDEX FOR PRICE PAID, 1990 - 1992	106	84	94	129	121	115	140	155	216	239	264	344	229	284	362	360	355
14	USANA NA FUELS, DIESEL - INDEX FOR PRICE PAID, 1990 - 1992	100	78	89	129	121	114	137	155	232	253	284	376	233	300	396	406	395
15	USANA NA FUELS, GASOLINE - INDEX FOR PRICE PAID, 1990 - 1992	117	118	114	111	112	111	112	113	116	123	122	130	141	132	130	130	139
16	USANA NA FUELS, LP GAS - INDEX FOR PRICE PAID, 1990 - 1992	121	97	110	133	131	121	163	180	200	217	241	315	253	266	311	348	360
17	USANA NA FUNGICIDES & OTHER - INDEX FOR PRICE PAID, 1990 - 1992	119	119	120	120	120	121	117	117	122	127	134	150	166	168	174	183	188
18	USANA NA GRASSES & LEGUMES TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	128	125	122	117	117	118	111	110	116	129	140	164	160	143	144	173	182
19	USANA NA HERBICIDES - INDEX FOR PRICE PAID, 1990 - 1992	117	118	114	111	112	111	112	113	116	123	122	130	141	132	130	139	148
20	USANA NA INSECTICIDES - INDEX FOR PRICE PAID, 1990 - 1992	130	136	141	145	144	140	146	144	144	143	148	156	161	164	168	175	181
21	USANA NA INTEREST - INDEX FOR PRICE PAID, 1990 - 1992	105	104	106	113	104	100	94	97	111	133	142	143	137	133	145	147	153
22	USANA NA LABOR, WAGE RATES - INDEX FOR PRICE PAID, 1990 - 1992	123	123	135	140	146	153	157	160	165	171	177	183	188	189	192	199	207
23	USANA NA MACHINERY TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	128	132	135	139	144	148	151	152	157	162	169	176	182	188	194	201	208
24	USANA NA MACHINERY, OTHER - INDEX FOR PRICE PAID, 1990 - 1992	130	134	138	142	147	153	155	164	177	186	196	221	236	242	253	266	280
25	USANA NA NITROGEN - INDEX FOR PRICE PAID, 1990 - 1992	129	108	93	113	143	111	141	161	193	203	231	373	257	241	330	349	358
26	USANA NA PITW, (PRODUCTION ITEMS, INTEREST TAXES & WAGE RATES) - INDEX FOR PRICE PAID, 1990 - 1992	118	114	113	117	121	121	125	133	141	150	162	188	181	187	210	222	228
27	USANA NA POTASH & PHOSPHATE - INDEX FOR PRICE PAID, 1990 - 1992	109	114	116	109	108	106	109	128	158	156	181	432	333	304	362	385	372
28	USANA NA PVTW, (COMMODITIES, SERVICES, INTEREST, TAXES & WAGE RATES) - INDEX FOR PRICE PAID, 1990 - 1992	118	115	115	119	123	124	129	134	142	150	161	176	183	193	203	255	220
29	USANA NA PRODUCTION ITEMS - INDEX FOR PRICE PAID, 1990 - 1992	119	113	111	115	120	119	124	132	140	148	160	190	182	188	215	228	233
30	USANA NA RENT - INDEX FOR PRICE PAID, 1990 - 1992	136	120	113	110	117	120	123	126	129	141	147	165	184	190	205	212	217
31	USANA NA RENT, CASH - INDEX FOR PRICE PAID, 1990 - 1992	135	135	137	139	143	145	147	153	153	166	178	205	236	243	262	270	278
32	USANA NA RENT, SHARE - INDEX FOR PRICE PAID, 1990 - 1992	136	107	91	83	91	95	95	94	111	112	118	124	129	139	145	147	147
33	USANA NA REPAIRS - INDEX FOR PRICE PAID, 1990 - 1992	119	121	122	125	129	132	136	140	146	149	154	156	159	162	168	174	174
34	USANA NA SEEDS & PLANTS TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	119	122	122	124	132	142	154	158	160	162	204	259	289	310	332	359	376
35	USANA NA SELF PROPELLED - INDEX FOR PRICE PAID, 1990 - 1992	128	131	134	136	143	147	152	168	178	189	193	214	229	238	256	272	279
36	USANA NA SUPPLIES - INDEX FOR PRICE PAID, 1990 - 1992	114	115	118	111	116	117	119	121	126	137	140	149	153	155	162	166	171
37	USANA NA SUPPLIES & REPAIRS - INDEX FOR PRICE PAID, 1990 - 1992	118	119	118	120	124	127	130	134	140	145	149	154	157	160	166	171	172
38	USANA NA TAXES - INDEX FOR PRICE PAID, 1990 - 1992	115	119	125	123	128	130	129	133	155	177	200	209	204	213	222	237	244
39	USANA NA TRACTORS - INDEX FOR PRICE PAID, 1990 - 1992	126	130	133	137	138	140	142	147	155	162	167	177	186	193	205	211	216
40	USANA NA TRUCKS - INDEX FOR PRICE PAID, 1990 - 1992	120	119	120	120	118	117	116	115	115	115	115	115	115	115	116	116	120
41	USANA NA TRUCKS & AUTOS - INDEX FOR PRICE PAID, 1990 - 1992	119	119	119	119	116	111	114	114	112	111	108	110	113	116	118	120	120

Update the "Reference Calcs" tab of the "Cost Index.xlsx" file by extending columns F through H.

Item	Row	Year	Column
1 AG SERVICES - INDEX FOR PRICE PAID, 1990 - 1992	2	1997	C
2 AG SERVICES, CUSTOM RATES - INDEX FOR PRICE PAID, 1990 - 1992	3	1998	D
3 AG SERVICES, OTHER - INDEX FOR PRICE PAID, 1990 - 1992	4	1999	E
4 AUTOS - INDEX FOR PRICE PAID, 1990 - 1992	5	2000	F
5 BUILDING MATERIALS - INDEX FOR PRICE PAID, 1990 - 1992	6	2001	G
6 CHEMICAL TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	7	2002	H
7 CONSUMER PRICE INDEX - INDEX FOR PRICE PAID, 1990 - 1992	8	2003	I
8 CROP SECTOR - INDEX FOR PRICE PAID, 1990 - 1992	9	2004	J
9 FARM SECTOR - INDEX FOR PRICE PAID, 1990 - 1992	10	2005	K
10 FERTILIZER TOTALS, INC. LIME & SOIL CONDITIONERS - INDEX FOR PRICE PAID, 1990 - 1992	11	2006	L
11 FERTILIZER, MIXED - INDEX FOR PRICE PAID, 1990 - 1992	12	2007	M
12 FIELD CROP TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	13	2008	N
13 FUELS - INDEX FOR PRICE PAID, 1990 - 1992	14	2009	O
14 FUELS, DIESEL - INDEX FOR PRICE PAID, 1990 - 1992	15	2010	P
15 FUELS, GASOLINE - INDEX FOR PRICE PAID, 1990 - 1992	16	2011	Q
16 FUELS, LP GAS - INDEX FOR PRICE PAID, 1990 - 1992	17	2012	R
17 FUNGICIDES & OTHER - INDEX FOR PRICE PAID, 1990 - 1992	18	2013	S
18 GRASSES & LEGUMES TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	19		
19 HERBICIDES - INDEX FOR PRICE PAID, 1990 - 1992	20		
20 INSECTICIDES - INDEX FOR PRICE PAID, 1990 - 1992	21		
21 INTEREST - INDEX FOR PRICE PAID, 1990 - 1992	22		
22 LABOR, WAGE RATES - INDEX FOR PRICE PAID, 1990 - 1992	23		
23 MACHINERY TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	24		
24 MACHINERY, OTHER - INDEX FOR PRICE PAID, 1990 - 1992	25		
25 NITROGEN - INDEX FOR PRICE PAID, 1990 - 1992	26		
26 PITW, (PRODUCTION ITEMS, INTEREST TAXES & WAGE RATES) - INDEX FOR PRICE PAID, 1990 - 1992	27		
27 POTASH & PHOSPHATE - INDEX FOR PRICE PAID, 1990 - 1992	28		
28 PVTW, (COMMODITIES, SERVICES, INTEREST, TAXES & WAGE RATES) - INDEX FOR PRICE PAID, 1990 - 1992	29		
29 PRODUCTION ITEMS - INDEX FOR PRICE PAID, 1990 - 1992	30		

Each column contains a sequence. These must be continued, e.g., 2013 is followed by 2014, 2015 etc., S is followed by T, U, V etc. If the sequence goes past Z the next character would be AA, then AB, and so on.

In the "[CROP] Car.xlsx" file there are three (3) tabs. The first tab is where the production budget data is entered. It also references the appropriate price index in the "Cost Index.xlsx" file.

Evaluation of Prevented Planting Program: Methodology and updating procedures

Prepared for: AQD and RMA

Canola production costs per planted acre: North Dakota												
Index used	Item	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
SEEDS & PLANTS TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	Cash expenses:											
FERTILIZER TOTALS, INCL LIME & SOIL CONDITIONERS - INDEX FOR PRICE PAID, 1990 - 1992	Seed	16.08	16.50	17.05	17.60	18.15	18.25	39.50	40.00	2.50	45.50	
CHEMICAL TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	Fertilizer	23.45	26.48	29.99	35.10	32.33	49.08	63.83	42.69	5.47	79.92	
CHEMICAL TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	Herbicides	15.75	15.75	16.00	17.50	18.25	19.31	18.00	14.00	6.00	18.00	
FUELS - INDEX FOR PRICE PAID, 1990 - 1992	Insecticides	7.00	7.00	7.00	6.00	7.00	6.00	0.00	0.00	0.00	0.00	
REPAIRS - INDEX FOR PRICE PAID, 1990 - 1992	Fuel & lubrication	5.03	5.93	8.44	10.79	11.16	14.16	10.18	12.16	5.01	16.74	
CONSUMER PRICE INDEX - INDEX FOR PRICE PAID, 1990 - 1992	Repairs	9.56	9.84	9.73	9.96	10.00	10.72	12.41	13.97	4.79	15.26	
AG SERVICES - INDEX FOR PRICE PAID, 1990 - 1992	Miscellaneous	0.97	1.00	1.00	1.00	2.00	2.63	3.75	3.75	4.00	4.00	
INTEREST - INDEX FOR PRICE PAID, 1990 - 1992	Crop insurance	6.65	7.27	6.80	7.88	10.37	21.29	12.12	12.18	7.83	14.82	
	Interest on operating capital	2.53	2.61	3.07	3.98	4.47	5.00	4.43	3.67	4.27	4.46	
	Total, operating costs	87.03	92.38	99.08	109.81	113.73	146.44	164.22	142.42	19.87	198.70	
	Allocated overhead:											
LABOR, WAGE RATES - INDEX FOR PRICE PAID, 1990 - 1992	Returns to labor & management	3.55	3.62	3.73	3.87	4.00	4.14	4.25	4.28	4.34	4.50	
CROP SECTOR - INDEX FOR PRICE PAID, 1990 - 1992	Miscellaneous overhead	3.35	3.50	3.39	3.44	3.41	3.52	4.84	5.07	6.24	6.34	
MACHINERY TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	Machinery depreciation	11.31	12.13	12.11	12.42	12.45	13.13	14.90	16.11	7.05	17.58	
MACHINERY TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	Machinery investment	7.07	7.59	7.29	7.48	7.35	7.70	8.75	9.49	0.01	10.28	
RENT, CASH - INDEX FOR PRICE PAID, 1990 - 1992	Opportunity cost of land (rental rate)	33.35	34.71	33.94	35.03	35.56	38.44	42.15	43.68	5.70	51.34	
	Total, allocated overhead	58.63	61.55	60.46	62.24	62.77	66.93	74.89	78.63	33.34	90.04	
	Total costs listed	145.66	153.93	159.54	172.05	176.50	213.37	239.11	221.05	263.21	288.74	

Source for budget(s): NDSU extension
Notes: Based on 2004-2012 budgets; 2003 and select values derived using price indices (in italics)
Data reflects average of budgets for 8 ND regions w/canola budgets

In the picture above, the blue boxes indicate (1) the cost index references and (2) the expense categories for the budget data. These will not change. The red box is where new data will need to be appended, if it was not already entered directly from available budgets (in step #2).

Missing data will be estimated using formulas that use the price index listed in Column A to then pull a scaling factor from the Cost Index file.

The formula we used is highlighted in the following image.

Canola production costs per planted acre: North Dakota												
Index used	Item	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
SEEDS & PLANTS TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	Cash expenses:											
FERTILIZER TOTALS, INCL LIME & SOIL CONDITIONERS - INDEX FOR PRICE PAID, 1990 - 1992	Seed	16.08	16.50	17.05	17.60	18.15	18.25	39.50	40.00	42.50	45.50	
CHEMICAL TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	Fertilizer	23.45	26.48	29.99	35.10	32.33	49.08	63.83	42.69	65.47	79.92	
CHEMICAL TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	Herbicides	15.75	15.75	16.00	17.50	18.25	19.31	18.00	14.00	16.00	18.00	
FUELS - INDEX FOR PRICE PAID, 1990 - 1992	Insecticides	7.00	7.00	7.00	6.00	7.00	6.00	0.00	0.00	0.00	0.00	
REPAIRS - INDEX FOR PRICE PAID, 1990 - 1992	Fuel & lubrication	5.03	5.93	8.44	10.79	11.16	14.16	10.18	12.16	15.01	16.74	
CONSUMER PRICE INDEX - INDEX FOR PRICE PAID, 1990 - 1992	Repairs	9.56	9.84	9.73	9.96	10.00	10.72	12.41	13.97	14.79	15.26	
AG SERVICES - INDEX FOR PRICE PAID, 1990 - 1992	Miscellaneous	0.97	1.00	1.00	1.00	2.00	2.63	3.75	3.75	4.00	4.00	
INTEREST - INDEX FOR PRICE PAID, 1990 - 1992	Crop insurance	6.65	7.27	6.80	7.88	10.37	21.29	12.12	12.18	17.83	14.82	
	Interest on operating capital	2.53	2.61	3.07	3.98	4.47	5.00	4.43	3.67	4.27	4.46	
	Total, operating costs	87.03	92.38	99.08	109.81	113.73	146.44	164.22	142.42	179.87	198.70	
	Allocated overhead:											
LABOR, WAGE RATES - INDEX FOR PRICE PAID, 1990 - 1992	Returns to labor & management	3.55	3.62	3.73	3.87	4.00	4.14	4.25	4.28	4.34	4.50	
CROP SECTOR - INDEX FOR PRICE PAID, 1990 - 1992	Miscellaneous overhead	3.35	3.50	3.39	3.44	3.41	3.52	4.84	5.07	6.24	6.34	
MACHINERY TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	Machinery depreciation	11.31	12.13	12.11	12.42	12.45	13.13	14.90	16.11	17.05	17.58	
MACHINERY TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	Machinery investment	7.07	7.59	7.29	7.48	7.35	7.70	8.75	9.49	10.01	10.28	
RENT, CASH - INDEX FOR PRICE PAID, 1990 - 1992	Opportunity cost of land (rental rate)	33.35	34.71	33.94	35.03	35.56	38.44	42.15	43.68	45.70	51.34	
	Total, allocated overhead	58.63	61.55	60.46	62.24	62.77	66.93	74.89	78.63	83.34	90.04	
	Total costs listed	145.66	153.93	159.54	172.05	176.50	213.37	239.11	221.05	263.21	288.74	

Source for budget(s): NDSU extension
Notes: Based on 2004-2012 budgets; 2003 and select values derived using price indices (in italics)
Data reflects average of budgets for 8 ND regions w/canola budgets
Returns to labor & management: avg for 2004-2012, used if 2008, then adjusted fwd & back using labor index

Prepared for: *AQD and RMA*[illegible]

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Evaluation of Prevented Planting Program: Methodology and updating procedures

Prepared for: AQD and RMA

Item	Row	Year	Column
AG SERVICES - INDEX FOR PRICE PAID, 1990 - 1992	2	1997	C
AG SERVICES, CUSTOM RATES - INDEX FOR PRICE PAID, 1990 - 1992	3	1998	D
AG SERVICES, OTHER - INDEX FOR PRICE PAID, 1990 - 1992	4	1999	E
AUTOS - INDEX FOR PRICE PAID, 1990 - 1992	5	2000	F
BUILDING MATERIALS - INDEX FOR PRICE PAID, 1990 - 1992	6	2001	G
CHEMICAL TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	7	2002	H
CONSUMER PRICE INDEX - INDEX FOR PRICE PAID, 1990 - 1992	8	2003	I
CROP SECTOR - INDEX FOR PRICE PAID, 1990 - 1992	9	2004	J
FARM SECTOR - INDEX FOR PRICE PAID, 1990 - 1992	10	2005	K
FERTILIZER TOTALS, INCL LIME & SOIL CONDITIONERS - INDEX FOR PRICE PAID, 1990 - 1992	11	2006	L
FERTILIZER, MIXED - INDEX FOR PRICE PAID, 1990 - 1992	12	2007	M
FIELD CROP TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	13	2008	N
FUELS - INDEX FOR PRICE PAID, 1990 - 1992	14	2009	O
FUELS, DIESEL - INDEX FOR PRICE PAID, 1990 - 1992	15	2010	P
FUELS, GASOLINE - INDEX FOR PRICE PAID, 1990 - 1992	16	2011	Q
FUELS, LP GAS - INDEX FOR PRICE PAID, 1990 - 1992	17	2012	R
FUNGICIDES & OTHER - INDEX FOR PRICE PAID, 1990 - 1992	18	2013	S
GRASSES & LEGUMES TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	19		
HERBICIDES - INDEX FOR PRICE PAID, 1990 - 1992	20		
INSECTICIDES - INDEX FOR PRICE PAID, 1990 - 1992	21		
INTEREST - INDEX FOR PRICE PAID, 1990 - 1992	22		
LABOR, WAGE RATES - INDEX FOR PRICE PAID, 1990 - 1992	23		
MACHINERY TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	24		
MACHINERY, OTHER - INDEX FOR PRICE PAID, 1990 - 1992	25		
NITROGEN - INDEX FOR PRICE PAID, 1990 - 1992	26		
PITW, (PRODUCTION ITEMS, INTEREST TAXES & WAGE RATES) - INDEX FOR PRICE PAID, 1990 - 1992	27		
POTASH & PHOSPHATE - INDEX FOR PRICE PAID, 1990 - 1992	28		
PITW, (COMMODITIES, SERVICES, INTEREST, TAXES & WAGE RATES) - INDEX FOR PRICE PAID, 1990 - 1992	29		
PRODUCTION ITEMS - INDEX FOR PRICE PAID, 1990 - 1992	30		
RENT - INDEX FOR PRICE PAID, 1990 - 1992	31		
RENT, CASH - INDEX FOR PRICE PAID, 1990 - 1992	32		
RENT, SHARE - INDEX FOR PRICE PAID, 1990 - 1992	33		
REPAIRS - INDEX FOR PRICE PAID, 1990 - 1992	34		
SEEDS & PLANTS TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	35		
SELF PROPELLED - INDEX FOR PRICE PAID, 1990 - 1992	36		
SUPPLIES - INDEX FOR PRICE PAID, 1990 - 1992	37		
SUPPLIES & REPAIRS - INDEX FOR PRICE PAID, 1990 - 1992	38		
TAXES - INDEX FOR PRICE PAID, 1990 - 1992	39		
TRACTORS - INDEX FOR PRICE PAID, 1990 - 1992	40		
TRUCKS - INDEX FOR PRICE PAID, 1990 - 1992	41		
TRUCKS & AUTOS - INDEX FOR PRICE PAID, 1990 - 1992	42		

A step-by-step explanation of the formula

=IFERROR((VLOOKUP(\$A17,PPI,(VLOOKUP(CHAR(CODE(K\$2)+1),Column,2,FALSE)),FALSE)/VLOOKUP(\$A17,PPI,(VLOOKUP(K\$2,Column,2,FALSE)),FALSE))*K17,"ERR") is as follows:

1. ((VLOOKUP(\$A17 looks up the index phrase in \$A17 = LABOR, WAGE RATES - INDEX FOR PRICE PAID, 1990 - 1992
2. PPI, then finds that phrase in the Cost Index workbook and finds that the index is on Row 23
3. (VLOOKUP(CHAR(CODE(K\$2)+1) looks up the character code in cell \$K2 for the "Column" reference (Q) then adds one --> R
4. Column,2,FALSE)),FALSE)/, looks up R in the "Column" range to find in column the data point in R23 --> 199
5. 199 divided by
6. ((VLOOKUP(\$A17, looks up the index phrase in \$A17 = LABOR, WAGE RATES - INDEX FOR PRICE PAID, 1990 - 1992
7. PPI, then finds that phrase in Cost Index workbook and finds that the index data is on Row 23
8. (VLOOKUP(CHAR(CODE(K\$2)), looks up the character code in cell \$K2 for the "Column" reference (Q)
9. Column,2,FALSE)),FALSE)/, looks up Q in the "Column" range to get the data point in Q23 --> 192
10. 199/192= 1.0364583333

11. *K17, multiplied by cell K17 --> 4.50

Canola production costs per planted acre: North Dakota

Index used	Item	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
SEEDS & PLANTS TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	Seed	16.08	16.50	17.05	17.60	18.15	18.25	39.50	40.00	42.50	45.50
FERTILIZER TOTALS, INCL LIME & SOIL CONDITIONERS - INDEX FOR	Fertilizer	23.45	26.48	29.99	35.10	32.33	49.08	63.83	42.69	65.47	79.92
CHEMICAL TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	Herbicides	15.75	15.75	16.00	17.50	18.25	19.31	18.00	14.00	16.00	18.00
	Insecticides	7.00	7.00	7.00	6.00	7.00	6.00	0.00	0.00	0.00	0.00
FUELS - INDEX FOR PRICE PAID, 1990 - 1992	Fuel & lubrication	5.03	5.93	8.44	10.79	11.16	14.16	10.18	12.16	15.01	16.74
REPAIRS - INDEX FOR PRICE PAID, 1990 - 1992	Repairs	9.56	9.84	9.73	9.96	10.00	10.72	12.41	13.97	14.79	15.26
CONSUMER PRICE INDEX - INDEX FOR PRICE PAID, 1990 - 1992	Miscellaneous	0.97	1.00	1.00	1.00	2.00	2.63	3.75	3.75	4.00	4.00
AG SERVICES - INDEX FOR PRICE PAID, 1990 - 1992	Crop insurance	6.65	7.27	6.80	7.88	10.37	21.29	12.12	12.18	17.83	14.82
INTEREST - INDEX FOR PRICE PAID, 1990 - 1992	Interest on operating capital	2.53	2.61	3.07	3.98	4.47	5.00	4.43	3.67	4.27	4.46
	Total, operating costs	87.03	92.38	99.08	109.81	113.73	146.44	164.22	142.42	179.87	198.70
	Allocated overhead:										
LABOR, WAGE RATES - INDEX FOR PRICE PAID, 1990 - 1992	Returns to labor & management	3.55	3.62	3.73	3.87	4.00	4.14	4.25	4.28	4.34	4.50
CROP SECTOR - INDEX FOR PRICE PAID, 1990 - 1992	Miscellaneous overhead	3.35	3.50	3.39	3.44	3.41	3.52	4.84	5.07	6.24	6.34
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MACHINERY TOTALS - INDEX FOR PRICE PAID, 1990 - 1992	Machinery investment	7.07	7.59	7.29	7.48	7.35	7.70	8.75	9.49	10.01	10.28
RENT, CASH - INDEX FOR PRICE PAID, 1990 - 1992	Opportunity cost of land (rental rate)	33.35	34.71	33.94	35.03	35.56	38.44	42.15	43.68	45.70	51.34
	Total, allocated overhead	58.63	61.55	60.46	62.24	62.77	66.93	74.89	78.63	83.34	90.04
	Total costs listed	145.66	153.93	159.54	172.05	176.50	213.37	239.11	221.05	263.21	288.74

Source for budget(s): NDSU extension
<http://www.ag.ndsu.edu/farmmanagement/crop-budget-archive>
 Notes: Based on 2004-2012 budgets; 2003 and select values derived using price indices (in italics)
 Data reflects average of budgets for 8 ND regions w/canola budgets
 Returns to labor & management: age for 2004-2012, used f/2008, then adjusted fwd & back using labor index

The IFERROR [=IFERROR (,"ERR")] function simply alerts the user to a breakdown in the formula.

Finally, make sure that the columns and factors on Tabs 2 (Preplant) and 3 ([Crop] prevented planting costs) of the CAR file have been extended to cover the additional years.