

Guidelines For Estimating White Pea (Navy) Bean Production

Date: January, 2007

This guide is designed to provide you with planning information and a format for calculating the cost of production for a white pea (navy) bean enterprise for both row crop and solid seeded production. Also available, is an Excel spreadsheet that can be downloaded from the Manitoba Agriculture, Food and Rural Initiatives website.

The cash cost inputs associated with growing a crop in Manitoba are substantial. It is extremely important for farm managers to do detailed calculations to select the optimum crop combination that will maximize profits. Detailed planning is also necessary when estimating the amount of operating credit required to finance the inputs.

Producers are encouraged to calculate their own costs of production. Costs and yields differ on each farm due to soil type, climatic conditions and agronomic practices.

Disclaimer: This budget is only a guide and is not intended as an in depth study of the cost of production of this industry. Interpretation and utilization of this information is the responsibility of the user. If you require assistance with developing your individual budget, please contact your local MAFRI office.

Industry Summary

Dry edible beans is a general term used to describe several bean market classes that include white pea (navy), pinto, black, light red kidney, dark red kidney, cranberry and great northern beans. Dry edible bean production in Manitoba is currently averaging 210,000 acres with a peak of 310,000 acres in 2002. White pea (navy) beans are the most common type accounting for over 60% of the total acres.

Traditionally white pea (navy) beans are grown as a **row crop** in 36 or 30 inch rows. Under this system weeds are managed through a combination of cultivation and herbicides. Harvest system consists of cutting the bean stems below the ground with a knife, putting them in a swath to dry and windrowing the swaths before combining.

New growers are looking at growing beans in row widths from 8 to 21 inches using their existing air seeders. This practice is often referred to as **solid seeded** or narrow row production and accounts for approximately 20% of the edible acreage in Manitoba. Solid seeded bean production relies on herbicides for weed control and requires upright varieties that lend themselves to direct combining or swathing.

White Pea (Navy) Bean - Input

Assumptions:

1. This budget outlines the cost of production for navy beans.
2. Assumes use of fertilizer.
3. Production based on recommended practices.

Table 1. Operation Profile

	<u>Row Crop</u>	<u>Solid Seed</u>
Number of Acres	400	400
Number of total acres	1,500	1500
Yield per Acre (pounds)	1,700	1,500
Custom Spraying Cost per Acre	\$5.00	\$5.00
Market Price of Navy Beans (\$/lb)	\$0.23	\$0.23
Price of Diesel (\$/litre)	\$0.68	\$0.68

A. Operating Costs

1.01 Seed

	<u>Row Crop</u>	<u>Solid Seed</u>
Target population(plants/acre)	100,000	140,000
Seeding size (seeds/lb)	2200	2200
Emergence factor	1.15	1.15
Pounds of seed per acre	52	73
Seed Cost (\$/lb)	\$0.84	\$0.84

1.02 Fertilizer

	<u>Row Crop</u>	<u>Solid Seed</u>	<u>Cost</u>
<u>Fertilizer</u>	<u>Rate (lbs)</u>	<u>Rate (lbs)</u>	
Nitrogen	35	70	\$0.32
Phosphate	30	30	\$0.280
Potash	20	20	\$0.218
Sulfur	10	10	\$0.260
Zinc	0	0	\$1.50

1.03 Herbicides

	<u>Row Crop</u>	<u>Solid Seed</u>
	<u>Cost/Acre</u>	<u>Cost/Acre</u>
Includes application costs		
Edge (PPI)	\$18.00	\$20.00
Poast (PE)	\$8.00	\$12.00
Basagran (PE)	\$16.00	\$24.00

1.04 Insecticide/Fungicide

	<u>Row Crop</u>	<u>Solid Seed</u>
Ronilan (\$/Acre)	\$30.00	\$30.00
Custom Application	\$5.00	\$5.00
# Applications	1	1

1.05 Crop/weed dry down

Desiccant	\$14.00	\$14.00
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1.05 Fuel Costs

Diesel Fuel Cost \$/litre

\$0.68

Row Crop

<u>Field</u>	<u>Times</u>	<u>Width</u>	<u>Speed</u>	<u>Tractor</u>	<u>Solid Seed</u>	<u>Field</u>	<u>Times</u>	<u>Width</u>	<u>Speed</u>
<u>Operation</u>	<u>Over</u>	<u>Feet</u>	<u>MPH</u>	<u>HP</u>	<u>Operation</u>	<u>Over</u>	<u>Feet</u>	<u>Feet</u>	<u>MPH</u>

Cultivate	1	48	5	150	Cultivate	1	48	5
Spray	1	90	7	150	Spray	1	90	7
Cultivate	2	48	5	150	Cultivate	2	48	5
Plant	1	24	6	150	Plant	1	24	6
Cultivate	2	24	6	150	Spray	2	90	7
Spray	2	90	7	150	Swath	1	24	4.5
Puller	1	12	7	150	Combine	1	24	4
Windrow	1	24	6	150				
Combine	1	24	3.5	150				

Truck Fuel-Harvesting

Truck Capacity (lbs)	10,000
Fuel Consumption (miles/gal)	2
Round trip distance to storage (miles)	5
Fuel Cost \$/litre	\$0.68

Other fuel expenses

half ton, etc. (\$/acre)	\$5.00
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1.06 Repairs & Maintenance

Estimation %	4%
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1.07 Insurance

Crop Insurance (\$/acre)	\$15.23	\$15.23
Hail (\$/acre)	\$4.90	\$4.90

1.08 Miscellaneous

\$8.00

1.09 Land Taxes

\$6.95 \$5.20

1.10 Interest on Operating

6.5%

Interest on Investment

4.0%

Capital Costs	Row Crop Cost/Acre	Solid Seed Cost/Acre	Useful Life	Salvage Value
Land Market Value	\$875	\$615		
Machinery Investment	\$300	\$260	10	0
Storage Investment	\$75	\$75	20	10

Labour Costs (\$/acre)

	Row Crop	Solid Seed
Rate per hour	\$11.50	\$11.50
Hours per acre	1.8	1.5

Machinery Costs

Pickett	\$40,000
Windrower	\$15,000
Cutter 8 row	\$10,000
Planter 8 row	\$13,000
Planter 8 row new	\$40,000
Planter 12 row	\$20,000
Planter 12 row new	\$50,000
Header 24 ft	\$30,000

White Pea (Navy) Bean - Cost of Production Summary January, 2007

A. Operating Costs	<u>Row Crop</u>		<u>Solid Seed</u>		<u>Your Cost</u>
	<u>\$/acre</u>	<u>\$/lb</u>	<u>\$/acre</u>	<u>\$/lb</u>	
1.01 Seed & Treatment	\$43.68	\$0.0257	\$61.32	\$0.0409	_____
1.02 Fertilizer	\$26.42	\$0.0155	\$37.48	\$0.0250	_____
1.03 Herbicides	\$42.00	\$0.0247	\$56.00	\$0.0373	_____
1.04 Insecticide/Fungicide	\$35.00	\$0.0206	\$35.00	\$0.0233	_____
1.05 Crop/Weed Dry Down	\$14.00	\$0.0082	\$14.00	\$0.0093	_____
1.06 Fuel Costs	\$21.30	\$0.0125	\$16.78	\$0.0112	_____
1.07 Repair & Maintenance	\$12.00	\$0.0071	\$10.40	\$0.0069	_____
1.08 Insurance	\$20.13	\$0.0118	\$20.13	\$0.0134	_____
1.09 Miscellaneous	\$8.00	\$0.0047	\$8.00	\$0.0053	_____
1.10 Land Taxes	<u>\$6.95</u>	<u>\$0.0041</u>	<u>\$5.20</u>	<u>\$0.0035</u>	_____
Subtotal Operating	\$229.48	\$0.1350	\$264.31	\$0.1762	_____
1.11 Interest on Operating	<u>\$7.46</u>	<u>\$0.0044</u>	<u>\$8.59</u>	<u>\$0.0057</u>	_____
Total Operating Costs	\$236.94	\$0.1394	\$272.90	\$0.1819	_____
B. Fixed Costs					
2. Depreciation					
2.01 Machinery	\$30.00	\$0.0176	\$26.00	\$0.0173	_____
2.02 Storage	\$3.37	\$0.0020	\$3.37	\$0.0022	_____
3. Investment					
3.01 Land	\$35.00	\$0.0206	\$24.60	\$0.0164	_____
3.02 Machinery	\$12.00	\$0.0071	\$10.40	\$0.0069	_____
3.03 Storage	<u>\$1.65</u>	<u>\$0.0010</u>	<u>\$1.65</u>	<u>\$0.0011</u>	_____
Total Fixed Costs	\$82.01	\$0.0482	\$66.01	\$0.0440	_____
C. Labour	\$20.70	\$0.0122	\$17.25	\$0.0115	_____
Total Cost of Production	\$339.65	\$0.1998	\$356.16	\$0.2374	_____
Estimated Yield per acre	1,700 lbs		1,500 lbs		

Disclaimer: This budget is only a guide and is not intended as an in depth study of the cost of production of this industry. Interpretation and utilization of this information is the responsibility of the user.

White Pea (Navy) Bean Cost of Production Worksheet Row Crop Assumptions

1. This budget provides a guideline to determine the cost of production for a row crop white pea (navy) bean enterprise, based on 400 acres.
2. The investment in machinery and equipment was assumed to be \$300 per acre. The machinery complement is similar to a grain enterprise with the addition of a row crop planter, row crop cultivator, row crop sprayer and a bean windrower.
3. A yield of 1700 lbs per acre was assumed.
4. A land value of \$875 per acre was assumed.

A. Operating Costs

Your Cost

1.01 Seed & treatment

	100,000	plants/acre	
÷	2200	seeds/lb	
x	1.15	emergence factor	
=	52	seeding rate lbs/acre	
x	<u>\$0.84</u>	<u>seed cost treated with DCT (\$/lb)</u>	
=	\$43.68	\$ /acre	

1.02 Fertilizer

Nitrogen		35 lbs/acre	
	x	<u>\$0.316</u>	<u>cost/lb</u>
	=	\$11.06	<u>\$ /acre</u>

P ₂ O ₅		30 lbs/acre	
	x	<u>\$0.280</u>	<u>cost/lb</u>
	=	\$8.40	<u>\$ /acre</u>

K ₂ O		20 lbs/acre	
	x	<u>\$0.218</u>	<u>cost/lb</u>
	=	\$4.36	<u>\$ /acre</u>

Sulfur		10	lbs/acre	
	x	<u>\$0.260</u>	<u>cost/lb</u>	
	=	\$2.60	\$ /acre	

Zinc		0	lbs/acre	
	x	<u>\$1.50</u>	<u>cost/lb</u>	
	=	\$0.00	\$ /acre	

Total	=	26.42	\$ /acre	
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1.03 Herbicide

		\$18.00	pre plant incorporated	
	+	\$8.00	post emergent	
	<u>±</u>	<u>\$16.00</u>	<u>post emergent</u>	
	=	\$42.00	\$ /acre	

1.04 Insecticide/Fungicide

		1	number of applications	
	x	\$5.00	cost/application	
	+	<u>\$30.00</u>	<u>fungicide</u>	
	=	\$35.00	\$ /acre	

1.05 Crop/ Weed Dry Down

		\$14.00	\$ /acre	
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1.06 Fuel Costs

a) Field Fuel Costs

<u>Operation</u>	<u>Times Over</u>	<u>Width feet</u>	<u>Speed mph</u>	<u>Fuel \$/ac.</u>	
Cultivate	1	48	5	1.01	
Spray	1	90	7	0.38	
Cultivate	2	48	5	2.02	
Plant	1	24	6	1.68	
Cultivate	2	24	6	3.36	
Spray	2	90	7	0.77	
Puller	1	12	7	2.88	
Combine	1	24	3.5	<u>2.88</u>	
Total				\$14.98	

b) Truck Fuel Costs from field to storage

		1700	lbs/acre gross yield	_____
=		340	total tons	_____
÷		5	tons (truck capacity)	_____
=		68	trips	_____
x		5	miles per trip	_____
=		340	total miles	_____
÷		2.0	fuel consumption (miles/gal)	_____
=		773	total litres (4.546 litres/gal)	_____
÷		400	total acres	_____
=		1.93	litres/acre	_____
x		<u>\$0.68</u>	<u>fuel cost (\$/litre)</u>	_____
Total =		\$1.32	trucking (\$ /acre)	_____

c) Other fuel costs = \$5.00 \$ /acre _____

Total fuel costs = \$21.30 \$ /acre _____

1.07 Repair & Maintenance

		4.0%	percentage rate	_____
x		<u>\$300</u>	<u>investment/acre</u>	_____
=		\$12.00	\$ /acre	_____

1.08 Insurance

		\$15.23	crop insurance	_____
+		<u>\$4.90</u>	<u>hail insurance</u>	_____
=		\$20.13	\$ /acre	_____

1.09 Miscellaneous

= \$8.00 \$ /acre _____

1.10 Land Taxes

= \$6.95 \$ /acre _____

1.11 Interest on Operating

		\$229.48	Subtotal Operating	_____
÷		2	average	_____
x		<u>6.5%</u>	<u>interest rate</u>	_____
=		\$7.46	\$ /acre	_____

B. Fixed Costs

2. Depreciation

$$\frac{\text{Original Value} - \text{Salvage Value}}{\text{Useful Life}}$$

2.01 Machinery

	\$300.00	cost/acre	_____
-	\$0.00	salvage value	_____
÷	<u>10</u>	<u>useful life</u>	_____
=	\$30.00	\$ /acre	_____

2.02 Storage

	\$74.80	cost/acre	_____
-	\$7.48	salvage value	_____
÷	<u>20</u>	<u>useful life</u>	_____
=	\$3.37	\$ /acre	_____

3. Investment

$$\frac{\text{Original Value} + \text{Salvage Value}}{2} \times \text{Investment Rate}$$

3.01 Land

	\$875.00	cost/acre	_____
x	<u>4.0%</u>	<u>% investment rate</u>	_____
=	\$35.00	\$ /acre	_____

3.02 Machinery

	\$300.00	cost/acre	_____
+	\$0.00	salvage value	_____
x	<u>4.0%</u>	<u>% investment rate</u>	_____
=	\$12.00	\$ /acre	_____

3.03 Storage

	\$74.80	cost/acre	_____
+	\$7.48	salvage value	_____
÷	2	average	_____
x	<u>4.0%</u>	<u>% investment rate</u>	_____
=	\$1.65	\$ /acre	_____

C. Labour

	\$11.50	\$/hour	_____
x	<u>1.8</u>	<u>hours/acre</u>	_____
=	\$20.70	\$ /acre	_____

White Pea (Navy) Bean Cost of Production Worksheet Solid Seed Assumptions

1. This budget provides a guideline to determine the cost of production for a solid seeded white pea (navy) bean enterprise, based on 400 acres.
2. The investment in machinery and equipment was assumed to be \$260 per acre. The machinery complement is similar to a grain enterprise with the addition of a flex header.
3. A yield of 1500 lbs per acre was assumed. This is slightly lower than the yield for row crop production to reflect the fact that much of the acreage lies outside the traditional bean production area.
4. A land value of \$615 per acre was assumed.

A. Operating Costs

Your Cost

1.01 Seed & treatment

	140,000	plants/acre	
÷	2200	seeds/lb	
x	1.15	emergence factor	
=	73	seeding rate lbs/acre	
x	<u>\$0.84</u>	<u>seed cost treated with DCT (\$/lb)</u>	
=	\$61.32	\$ /acre	

1.02 Fertilizer

	70	lbs/acre	
x	<u>\$0.316</u>	<u>cost/lb</u>	
=	\$22.12	\$ /acre	

	30	lbs/acre	
x	<u>\$0.280</u>	<u>cost/lb</u>	
=	\$8.40	\$ /acre	

	20	lbs/acre	
x	<u>\$0.218</u>	<u>cost/lb</u>	
=	\$4.36	\$ /acre	

Sulfur		10	lbs/acre	_____
	x	<u>\$0.260</u>	<u>cost/lb</u>	_____
	=	\$2.60	\$ /acre	_____

Zinc		0	lbs/acre	_____
	x	<u>\$1.50</u>	<u>cost/lb</u>	_____
	=	\$0.00	\$ /acre	_____

Total	=	\$37.48	\$ /acre	_____
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1.03 Herbicides

		\$20.00	pre plant incorporated	_____
	+	\$12.00	post emergent	_____
	<u>±</u>	<u>\$24.00</u>	<u>post emergent</u>	_____
	=	\$56.00	\$ /acre	_____

1.04 Insecticide/Fungicide

		1	number of applications	_____
	x	\$5.00	cost/application	_____
	+	<u>\$30.00</u>	<u>fungicide</u>	_____
	=	\$35.00	\$ /acre	_____

1.05 Crop/Weed Dry Down

		\$14.00	\$ /acre	_____
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1.06 Fuel Costs

a) Field Fuel Costs

<u>Operation</u>	<u>Times Over</u>	<u>Width feet</u>	<u>Speed mph</u>	<u>Fuel \$/ac.</u>	_____
Cultivate	1	48	5	1.01	_____
Spray	1	90	7	0.38	_____
Cultivate	2	48	5	2.02	_____
Plant	1	24	6	1.68	_____
Spray	2	90	7	0.77	_____
Swath	1	24	4.5	2.24	_____
Combine	1	24	4	<u>2.52</u>	_____
Total				\$10.62	_____

b) Truck Fuel Costs from field to storage

	1,500	lbs/acre gross yield	_____
=	300	total tons	_____
÷	5	tons (truck capacity)	_____
=	60	trips	_____
x	5	miles per trip	_____
=	300	total miles	_____
÷	2.0	fuel consumption (miles/gal)	_____
=	681.9	total litres (4.546 litres/gal)	_____
÷	400	total acres	_____
=	1.70	litres/acre	_____
x	<u>\$0.68</u>	<u>fuel cost (\$/litre)</u>	_____
Total =	\$1.16	trucking (\$ /acre)	_____

c) Other fuel costs =	\$5.00	\$ /acre	_____
Total =	\$16.78	fuel costs (\$ /acre)	_____

1.07 Repair & Maintenance

	4.0%	percentage rate	_____
x	<u>\$260</u>	<u>investment/acre</u>	_____
=	\$10.40	\$ /acre	_____

1.08 Insurance

	\$15.23	crop insurance	_____
+	<u>\$4.90</u>	<u>hail insurance</u>	_____
=	\$20.13	\$ /acre	_____

1.09 Miscellaneous

=	\$8.00	\$ /acre	_____
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1.10 Land Taxes

=	\$5.20	\$ /acre	_____
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1.11 Interest on Operating

	\$264.31	Subtotal Operating	_____
÷	2	average	_____
x	<u>6.5%</u>	<u>interest rate</u>	_____
=	\$8.59	\$ /acre	_____

B. Fixed Costs

2. Depreciation

$$\frac{\text{Original Value} - \text{Salvage Value}}{\text{Useful Life}}$$

2.01 Machinery

	\$260.00	cost/acre	_____
-	\$0.00	salvage value	_____
÷	<u>10</u>	<u>useful life</u>	_____
=	\$26.00	\$ /acre	_____

2.02 Storage

	\$74.80	cost/acre	_____
-	\$7.48	salvage value	_____
÷	<u>20</u>	<u>useful life</u>	_____
=	\$3.37	\$ /acre	_____

3. Investment

$$\frac{\text{Original Value} + \text{Salvage Value}}{2} \times \text{Investment Rate}$$

3.01 Land

	\$615.00	cost/acre	_____
x	<u>4.0%</u>	<u>% investment rate</u>	_____
=	\$24.60	\$ /acre	_____

3.02 Machinery

	\$260.00	cost/acre	_____
+	\$0.00	salvage value	_____
x	<u>4.0%</u>	<u>% investment rate</u>	_____
=	\$10.40	\$ /acre	_____

3.03 Storage

	\$74.80	cost/acre	_____
+	\$7.48	salvage value	_____
÷	2	average	_____
x	<u>4.0%</u>	<u>% investment rate</u>	_____
=	\$1.65	\$ /acre	_____

C. Labour

	\$11.50	\$/hour	_____
x	<u>1.5</u>	<u>hours/acre</u>	_____
=	\$17.25	\$ /acre	_____

For further information contact your Manitoba Agriculture, Food and Rural Initiatives office.

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