

# Guidelines For Estimating White Pea (Navy) Bean Production

**Date: January, 2006**

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)	\$0.20	\$0.20
Price of Diesel (\$/litre)	\$0.52	\$0.52

### 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)	\$0.85	\$0.85

#### 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	\$0.44
Phosphate	30	30	\$0.290
Potash	20	20	\$0.225
Sulfur	10	10	\$0.250
Zinc	0	0	\$1.50

#### 1.03 Herbicides

	<u>Row Crop</u>	<u>Solid Seed</u>
Includes application costs	<u>Cost/Acre</u>	<u>Cost/Acre</u>
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

**\$0.80**

**Row Crop**

**Solid Seed**

<u>Field Operation</u>	<u>Times Over</u>	<u>Width Feet</u>	<u>Speed MPH</u>	<u>Tractor HP</u>	<u>Field Operation</u>	<u>Times Over</u>	<u>Width Feet</u>	<u>Speed 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)	<b>10,000</b>
Fuel Consumption (miles/gal)	<b>2</b>
Round trip distance to storage (miles)	<b>5</b>
Fuel Cost \$/litre	<b>\$0.80</b>

**Other fuel expenses**

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

Estimation %	<b>4%</b>
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**1.07 Insurance**

Crop Insurance (\$/acre)	<b>\$8.07</b>	<b>\$8.07</b>
Hail (\$/acre)	<b>\$5.07</b>	<b>\$5.07</b>

**1.08 Miscellaneous**

**\$8.00**

**1.09 Land Taxes**

**\$7.00      \$5.25**

**1.10 Interest on Operating**

**5.5%**

**Interest on Investment**

**4.0%**

<b>Capital Costs</b>	<u>Row Crop Cost/Acre</u>	<u>Solid Seed Cost/Acre</u>	<u>Useful Life</u>	<u>Salvage Value</u>
Land Market Value	<b>\$850</b>	<b>\$600</b>		
Machinery Investment	<b>\$275</b>	<b>\$235</b>	<b>10</b>	<b>0</b>
Storage Investment	<b>\$53</b>	<b>\$53</b>	<b>20</b>	<b>10</b>

**Labour Costs (\$/acre)**

	<u>Row Crop</u>	<u>Solid Seed</u>
Rate per hour	<b>\$11.50</b>	<b>\$11.50</b>
Hours per acre	<b>1.8</b>	<b>1.5</b>

**Machinery Costs**

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

## White Pea (Navy) Bean - Cost of Production Summary January, 2006

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	\$44.20	\$0.0260	\$62.05	\$0.0414	_____
1.02 Fertilizer	\$31.10	\$0.0183	\$46.50	\$0.0310	_____
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	\$24.10	\$0.0142	\$18.80	\$0.0125	_____
1.07 Repair & Maintenance	\$11.00	\$0.0065	\$9.40	\$0.0063	_____
1.08 Insurance	\$13.14	\$0.0077	\$13.14	\$0.0088	_____
1.09 Miscellaneous	\$8.00	\$0.0047	\$8.00	\$0.0053	_____
1.10 Land Taxes	<u>\$7.00</u>	<u>\$0.0041</u>	<u>\$5.25</u>	<u>\$0.0035</u>	_____
Subtotal Operating	\$229.54	\$0.1350	\$268.14	\$0.1788	_____
1.11 Interest on Operating	<u>\$6.31</u>	<u>\$0.0037</u>	<u>\$7.37</u>	<u>\$0.0049</u>	_____
<b>Total Operating Costs</b>	<b>\$235.85</b>	<b>\$0.1387</b>	<b>\$275.51</b>	<b>\$0.1837</b>	_____
<b>B. Fixed Costs</b>					
<b>2. Depreciation</b>					
2.01 Machinery	\$27.50	\$0.0162	\$23.50	\$0.0157	_____
2.02 Storage	\$2.36	\$0.0014	\$2.36	\$0.0016	_____
<b>3. Investment</b>					
3.01 Land	\$34.00	\$0.0200	\$24.00	\$0.0160	_____
3.02 Machinery	\$11.00	\$0.0065	\$9.40	\$0.0063	_____
3.03 Storage	<u>\$1.16</u>	<u>\$0.0007</u>	<u>\$1.16</u>	<u>\$0.0008</u>	_____
<b>Total Fixed Costs</b>	<b>\$76.02</b>	<b>\$0.0447</b>	<b>\$60.42</b>	<b>\$0.0403</b>	_____
<b>C. Labour</b>	<b>\$20.70</b>	<b>\$0.0122</b>	<b>\$17.25</b>	<b>\$0.0115</b>	_____
<b>Total Cost of Production</b>	<b>\$332.57</b>	<b>\$0.1956</b>	<b>\$353.18</b>	<b>\$0.2355</b>	_____
<b>Estimated Yield per acre</b>	<b>1,700 lbs</b>		<b>1,500 lbs</b>		

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 \$275 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 \$850 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>\$0.85</u>	<u>seed cost treated with DCT (\$/lb)</u>	
=	<b>\$44.20</b>	<b>\$ /acre</b>	

#### 1.02 Fertilizer

Nitrogen		35 lbs/acre	
	x	<u>\$0.440</u>	<u>cost/lb</u>
	=	\$15.40	\$ /acre

P <sub>2</sub> O <sub>5</sub>		30 lbs/acre	
	x	<u>\$0.290</u>	<u>cost/lb</u>
	=	\$8.70	\$ /acre

K <sub>2</sub> O		20 lbs/acre	
	x	<u>\$0.225</u>	<u>cost/lb</u>
	=	\$4.50	\$ /acre

Sulfur		10	lbs/acre	
	x	<u>\$0.250</u>	<u>cost/lb</u>	
	=	\$2.50	\$ /acre	

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

<b>Total</b>	<b>=</b>	<b>31.10</b>	<b>\$ /acre</b>	
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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>	
	=	<b>\$42.00</b>	<b>\$ /acre</b>	

**1.04 Insecticide/Fungicide**

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

**1.05 Crop/ Weed Dry Down**

		<b>\$14.00</b>	<b>\$ /acre</b>	
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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	1.18	
Spray	1	90	7	0.45	
Cultivate	2	48	5	2.36	
Plant	1	24	6	1.97	
Cultivate	2	24	6	3.94	
Spray	2	90	7	0.90	
Puller	1	12	7	3.38	
Combine	1	24	3.5	<u>3.38</u>	
<b>Total</b>				<b>\$17.55</b>	



**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>\$0.80</u>	<u>fuel cost (\$/litre)</u>	_____
<b>Total =</b>		<b>\$1.55</b>	<b>trucking (\$ /acre)</b>	_____

**c) Other fuel costs = \$5.00 \$ /acre** \_\_\_\_\_

**Total fuel costs = \$24.10 \$ /acre** \_\_\_\_\_

**1.07 Repair & Maintenance**

		4.0%	percentage rate	_____
x		<u>\$275</u>	<u>investment/acre</u>	_____
=		<b>\$11.00</b>	<b>\$ /acre</b>	_____

**1.08 Insurance**

		\$8.07	crop insurance	_____
+		<u>\$5.07</u>	<u>hail insurance</u>	_____
=		<b>\$13.14</b>	<b>\$ /acre</b>	_____

**1.09 Miscellaneous**

**= \$8.00 \$ /acre** \_\_\_\_\_

**1.10 Land Taxes**

**= \$7.00 \$ /acre** \_\_\_\_\_

**1.11 Interest on Operating**

		\$229.54	Subtotal Operating	_____
÷		2	average	_____
x		<u>5.5%</u>	<u>interest rate</u>	_____
=		<b>\$6.31</b>	<b>\$ /acre</b>	_____

**B. Fixed Costs**

**2. Depreciation**

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

**2.01 Machinery**

	\$275.00	cost/acre	_____
-	\$0.00	salvage value	_____
÷	<u>10</u>	<u>useful life</u>	_____
=	<b>\$27.50</b>	<b>\$ /acre</b>	_____

**2.02 Storage**

	\$52.50	cost/acre	_____
-	\$5.25	salvage value	_____
÷	<u>20</u>	<u>useful life</u>	_____
=	<b>\$2.36</b>	<b>\$ /acre</b>	_____

**3. Investment**

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

**3.01 Land**

	\$850.00	cost/acre	_____
x	<u>4.0%</u>	<u>% investment rate</u>	_____
=	<b>\$34.00</b>	<b>\$ /acre</b>	_____

**3.02 Machinery**

	\$275.00	cost/acre	_____
+	\$0.00	salvage value	_____
x	<u>4.0%</u>	<u>% investment rate</u>	_____
=	<b>\$11.00</b>	<b>\$ /acre</b>	_____

**3.03 Storage**

	\$52.50	cost/acre	_____
+	\$5.25	salvage value	_____
÷	2	average	_____
x	<u>4.0%</u>	<u>% investment rate</u>	_____
=	<b>\$1.16</b>	<b>\$ /acre</b>	_____

**C. Labour**

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

## 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 \$235 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 \$600 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>\$0.85</u>	<u>seed cost treated with DCT (\$/lb)</u>			
=	<b>\$62.05</b>	<b>\$ /acre</b>			

#### 1.02 Fertilizer

	70	lbs/acre			
x	<u>\$0.440</u>	<u>cost/lb</u>			
=	\$30.80	\$ /acre			

	30	lbs/acre			
x	<u>\$0.290</u>	<u>cost/lb</u>			
=	\$8.70	\$ /acre			

	20	lbs/acre			
x	<u>\$0.225</u>	<u>cost/lb</u>			
=	\$4.50	\$ /acre			

Sulfur		10	lbs/acre	
	x	<u>\$0.250</u>	<u>cost/lb</u>	
	=	\$2.50	\$ /acre	

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

<b>Total</b>	<b>=</b>	<b>\$46.50</b>	<b>\$ /acre</b>	
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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>	
	=	<b>\$56.00</b>	<b>\$ /acre</b>	

**1.04 Insecticide/Fungicide**

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

**1.05 Crop/Weed Dry Down**

		<b>\$14.00</b>	<b>\$ /acre</b>	
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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	1.18
Spray	1	90	7	0.45
Cultivate	2	48	5	2.36
Plant	1	24	6	1.97
Spray	2	90	7	0.90
Swath	1	24	4.5	2.63
Combine	1	24	4	<u>2.95</u>
<b>Total</b>				<b>\$12.44</b>

**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>\$0.80</u>	<u>fuel cost (\$/litre)</u>	_____
<b>Total =</b>	<b>\$1.36</b>	<b>trucking (\$ /acre)</b>	_____

<b>c) Other fuel costs =</b>	<b>\$5.00</b>	<b>\$ /acre</b>	_____
<b>Total =</b>	<b>\$18.80</b>	<b>fuel costs (\$ /acre)</b>	_____

**1.07 Repair & Maintenance**

	4.0%	percentage rate	_____
x	<u>\$235</u>	<u>investment/acre</u>	_____
=	<b>\$9.40</b>	<b>\$ /acre</b>	_____

**1.08 Insurance**

	\$8.07	crop insurance	_____
+	<u>\$5.07</u>	<u>hail insurance</u>	_____
=	<b>\$13.14</b>	<b>\$ /acre</b>	_____

**1.09 Miscellaneous**

=	<b>\$8.00</b>	<b>\$ /acre</b>	_____
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**1.10 Land Taxes**

=	<b>\$5.25</b>	<b>\$ /acre</b>	_____
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**1.11 Interest on Operating**

	\$268.14	Subtotal Operating	_____
÷	2	average	_____
x	<u>5.5%</u>	<u>interest rate</u>	_____
=	<b>\$7.37</b>	<b>\$ /acre</b>	_____

**B. Fixed Costs**

**2. Depreciation**

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

**2.01 Machinery**

	\$235.00	cost/acre	
-	\$0.00	salvage value	
÷	<u>10</u>	<u>useful life</u>	
<b>=</b>	<b>\$23.50</b>	<b>\$ /acre</b>	

**2.02 Storage**

	\$52.50	cost/acre	
-	\$5.25	salvage value	
÷	<u>20</u>	<u>useful life</u>	
<b>=</b>	<b>\$2.36</b>	<b>\$ /acre</b>	

**3. Investment**

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

**3.01 Land**

	\$600.00	cost/acre	
x	<u>4.0%</u>	<u>% investment rate</u>	
<b>=</b>	<b>\$24.00</b>	<b>\$ /acre</b>	

**3.02 Machinery**

	\$235.00	cost/acre	
+	\$0.00	salvage value	
x	<u>4.0%</u>	<u>% investment rate</u>	
<b>=</b>	<b>\$9.40</b>	<b>\$ /acre</b>	

**3.03 Storage**

	\$52.50	cost/acre	_____
+	\$5.25	salvage value	_____
÷	2	average	_____
x	<u>4.0%</u>	<u>% investment rate</u>	_____
=	<b>\$1.16</b>	<b>\$ /acre</b>	_____

**C. Labour**

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

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

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