



# Potato Grower Workbook

Each club member is required to keep a businesslike record of the projects carried out each year. It is **good business** to keep **complete** and **accurate** records. The purpose of this record book is to let you know how you stand in dollars and cents after completing the year's work. It is an important part of your club project, as it will help others know what you have done in your club work and how well you have succeeded. Be sure to take good care of it and keep it up-to-date.

Keep your record book current. As soon as an activity is completed, such as selecting land, fertilizer, or other materials, enters it in the proper space in your record book. In addition, when you finish any project-related work, make an entry in your book. This is the best way to keep accurate, useful record of your activities.

Be sure to read the instructions on each page. Make sure you understand them, and know how to make proper entries in the book. Your parents or your leader can help you get started.

When your record book is complete, turn it over to your local 4-H leader. Your leader will check it for accuracy, sign it, and forward it to your county extension educator.

Save all pictures and newspaper clippings relating to your project. If your record is selected to represent the county in some project or other club activity, you will have all of the material needed to show what you have done. Ask your local leader or county extension educator to explain the awards.

<b>Year 20</b> _____		
Name		Age
Mailing address		Birth date    Month / Day / Year ____ / ____ / ____
School grade complete	Years in 4-H/FFA	Years in 4-H/FFA Potato Project

# Potato Grower Project

## OBJECTIVES

1. To stimulate interest in growing potatoes
2. To learn effective crop management for potato production including
  - Fertilization
  - Insect control
  - Marketing
  - Irrigation
  - Disease control
  - Weed control
  - HarvestingAnd to learn how each affects crop quality.
3. To learn about the potato industry and its opportunities
4. To gain self-confidence and learn responsibility through experience and successful completion of the project.

## REQUIREMENTS

You will:

1. Grow a minimum of three acres of potatoes and deliver approximately 1,000 hundredweight (cwt) of potatoes to your contractor.
2. Supply a description of land where you grow potatoes.
3. Complete a pesticide report (under chemical costs).
4. Be an active 4-H/FFA member and fulfill meeting and demonstration requirements.
5. Own your own project with a bonafide agreement or contract with your parent or landlord covering machinery, labor, seed, share, etc. Your parent and your leader must sign this.
6. Have your parents or legal guardian co-sign the contract with the marketing company, if one. A contract with a potato company is optional.
7. Attend the annual field tour of potato projects and give an oral presentation on management practices (what it takes to produce the crop) during the tour.
8. Have an updated record book available for review during the field tour.
9. Exhibit your project at the county fair or an approved alternative.
10. If your crop is not harvested by fair, finish and turn in workbook to your county extension office on or before January 5 of the next calendar year.
11. *Individual project weight slips or market receipts **must** be included with the record book at project completion.*

## EXHIBITS

Display of potatoes according to the local county fair book.

**OR**

Display of potatoes at a public exhibit other than the county fair. Talk to your leader and/or extension educator for approval.

**AND**

Display your completed 4-H project record book and updated Potato Grower Workbook at the fair.

A special thanks to Amalgamated Sugar Company, Mini-Cassia Beet Growers, and the Minidoka and Cassia County Extension Offices for their help in developing this project. Revised February 2004.

# County Potato Grower

The potato crop project is divided into four parts. You must complete all four parts of the project to be eligible to receive a County 4-H Potato Grower Certificate and be eligible for county 4-H Champion Potato Grower. A County 4-H Champion Potato Grower will be selected based on the results of four categories:

Category	Possible Points
• Oral presentation during county field tour	100
• Preparation and exhibition of potatoes at the county fair or public event	50
• Potatoes evaluated for quality based on grower matrix	100
• <u>Record book judged and evaluated at end of year</u>	<u>100</u>
Total Points Possible	350

## Field Map

Show the location of your potato project in relation to the rest of the farm. Indicate the number of acres in your project on the map. Show how the irrigation system is laid out for your project, including details such as head ditches, field ditches, wheel lines, sprinklers, etc.

NORTH



Number of acres in this year's project \_\_\_\_\_

Number of acres in last year's project \_\_\_\_\_

## Field Map Soil Information

Soil type \_\_\_\_\_ Soil depth \_\_\_\_\_ Soil texture \_\_\_\_\_

Drainage \_\_\_\_\_ Percent Slope \_\_\_\_\_ %

### What was the crop rotation over the past three years?

Last year \_\_\_\_\_ Two years ago \_\_\_\_\_ Three years ago \_\_\_\_\_

### How much fertilizer was applied to the previous crop?

Nitrogen (N) \_\_\_\_\_ Phosphate (P) \_\_\_\_\_ Potash (K) \_\_\_\_\_

Other nutrients and amounts \_\_\_\_\_

When was manure last applied to soil? \_\_\_\_\_

### Soil Test Results (REQUIRED):

Soil pH \_\_\_\_\_ Phosphorus (ppm P) \_\_\_\_\_ Potassium (ppm K) \_\_\_\_\_

Soil organic matter \_\_\_\_\_ %

Nitrogen			
Soil depth (inches)	Nitrate nitrogen (ppm N)	Multiply by 4	Available N (Lb per acre*)
0-12	_____	x 4 =	_____
12-24	_____	x 4 =	_____
Total	_____	x 4 =	_____

ppm multiplied by 4 equals available N in lb per acre

**Attach Soil Test to Workbook Book Here:**



















# Potatoes Budget

(TO BE FILLED OUT AT BEGINNING OF PROJECT YEAR, USE YOUR BEST ESTIMATE OF WHAT IT WILL TAKE TO GROW YOUR CROP)

Number of acres in project \_\_\_\_\_

<b>ESTIMATED INCOME PER ACRE (\$)</b>	Member	Landlord	Total
1. Estimated yield per acre (cwt)			
2. Estimated price per unit (cwt)			
3. Estimated gross income per acre (line 1 X line 2)			
4. Other income (rental income for landlord)			

<b>ESTIMATED COSTS PER ACRE (\$)</b>	Member	Landlord	Total
4 Cash Rent			
5. Land Cost (mortgage, taxes, insurance)			
6. Water and pump cost (If separate from land cost)			
7. Machinery and equipment (Include all costs from ground preparation to harvest)			
8. Harvest and hauling			
9. Fertilizer			
10 Seed			
11. Chemicals (herbicides, insecticides fungicides, rodenticides)			
12. Labor			
13. Miscellaneous costs			
Total estimated costs per acre (Total for line 4 through 13)			
15 Estimated net income per acre (line 3 minus line 14)			

# EXAMPLE BUDGET

Table 1. Costs And Returns Per Acre to Produce Potatoes  
SCI Russet Burbank No Storage

	Quantity Per Acre	Unit	Price or Cost/Unit	Value or Cost/Acre
<b>Gross Returns</b>				
Potatoes	380.00	cwt	4.65	1767.00
<b>Total Gross Returns For Potatoes</b>				<b>1767.00</b>
<b>Operating Costs</b>				
<b>Irrigation:</b>				
Irr. Power - cp	26.50	acin	1.37	36.31
Labor (irrigation)	1.86	hr	8.05	14.97
Water Assessment	1.00	acre	26.40	26.40
Irr. Repairs - cp	26.50	acin	0.59	15.64
<b>Custom:</b>				
Custom Fertilize	2.00	acre	5.45	10.90
Consultant	1.00	acre	14.50	14.50
Custom Air Spray-10g	4.00	acre	8.60	34.40
Sulfuric Acid	1.00	acre	29.50	29.50
Custom Hauling	380.00	cwt	0.15	57.00
<b>Fertilizer:</b>				
Dry Nitrogen	165.00	lb	0.30	49.50
Dry P2O5	200.00	lb	0.20	40.00
K2O	180.00	lb	0.15	27.00
Sulfur	80.00	lb	0.12	9.60
Micronutrients	2.00	acre	12.00	24.00
Liquid Nitrogen	130.00	lb	0.33	42.90
Liquid P2O5	40.00	lb	0.31	12.40
<b>Other:</b>				
Crop Insurance	1.00	acre	36.00	36.00
Transloading Costs	380.00	cwt	0.055	20.90
Fees	361.00	cwt	0.13	46.93
<b>Seed:</b>				
G-3 Burbank Seed	23.00	cwt	8.65	198.95
Seed Cut & Treat	23.00	cwt	1.65	37.95
<b>Pesticide:</b>				
Thimet 20G	15.00	lb	2.25	33.75
Prowl	1.00	qt	5.50	5.50
Sencor DF	0.75	lb	20.50	15.38
Eptam 7EC	2.00	qt	8.75	17.50
Dithane F45 Rainshield	3.20	qt	3.60	11.52
Bravo Ultrex WDG	1.25	lb	7.15	8.94
Fulfill	2.75	oz	5.95	16.36
Monitor 4E	0.75	qt	21.90	16.42
Labor (machine)	6.89	hrs	12.00	82.74
Labor (non-machine)	2.75	hrs	7.15	19.66
Fuel - Gas	3.19	gal	1.65	5.27
Fuel - Diesel	25.40	gal	1.25	31.75
Lube				5.55
Machinery Repair				43.89
Interest on Operating Capital @ 5.50%				23.53
<b>Total Operating Costs per Acre</b>				<b>1123.52</b>
<b>Net Returns Above Operating Costs</b>				<b>643.48</b>
<b>Cash Ownership Costs</b>				
General Overhead				27.00
Land Rent				310.00
Management Fee				88.00
Property Taxes (machinery)				0.00
Property Insurance				4.31
Investment Repairs				4.19
<b>Total Cash Ownership Costs per Acre</b>				<b>433.49</b>
<b>Non-Cash Ownership Costs (depreciation and interest)</b>				
Transloading Equipment				40.57
Equipment				107.65
<b>Total Non-Cash Ownership Costs per Acre</b>				<b>148.22</b>
<b>Total Costs per Acre</b>				<b>1705.23</b>
<b>Returns to Risk</b>				<b>61.77</b>

# Cash Flow Worksheet

Item	Month												Total		
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
<b>Income</b>															
(1) Contracted potatoes															
(2) Uncontracted potatoes															
<b>(3) Total Income</b>															
<b>Costs</b>															
(4) Land															
(5) Water															
(6) Equipment															
(7) Harvesting															
(8) Hauling															
(9) Fertilizer															
(10) Seed															
(11) Chemicals															
(12) Labor															
(13) Insurance															
(14) Other															
_____															
(15) Other															
_____															
<b>(16) Total Costs</b>															
<b>(17) Profit</b>															
<b>(18) Net Cash Flow</b>															

**Profit (17)** = Total Income (3) minus Total Costs (16); **Net Cash Flow** = month-by-month tally of the profit figure (sum the profit figures from the previous months); Profit (17) and Net Cash Flow (18) will be negative until revenue is received in August.

# Example Cash Flow

	Sep 00	Oct 00	Nov 00	Dec 00	Jan 01	Feb 01	Mar 01	Apr 01	May 01	Jun 01	Jul 01	Aug 01	Sep 01	Oct 01	Total
<b>Preharvest:</b>															
Chop Straw	5.57														5.57
Disk	4.29		4.29												8.57
Rip	6.05														6.05
Irrigate	3.54								18.31	18.61	31.96	23.14	1.61		97.17
Fertilize	97.45								51.30						148.75
Crop Insurance								36.00							36.00
Assessments								24.70							24.70
Repairs								15.11							15.11
Plow								4.12							4.12
Mark Out and Fertilize								37.08							37.08
Seed Hauling									1.76						1.76
Plant									278.40						278.40
Cultivate									25.12						25.12
Consultant											14.50				14.50
Aerial Application											57.91	32.29			90.20
General Pickup Use	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01			24.13
<b>Total Preharvest Costs</b>	<b>118.92</b>	<b>2.01</b>	<b>6.30</b>	<b>2.01</b>	<b>2.01</b>	<b>2.01</b>	<b>2.01</b>	<b>119.02</b>	<b>376.91</b>	<b>20.62</b>	<b>106.38</b>	<b>57.43</b>	<b>1.61</b>		<b>817.24</b>
<b>Harvest:</b>															
Vine Roll													3.37		3.37
Vine Kill													25.50		25.50
Dig													38.67		38.67
Crop Hauling													69.16		69.16
Assessments														50.70	50.70
<b>Total Harvest Costs</b>													<b>136.71</b>	<b>50.70</b>	<b>187.41</b>
<b>Interest on Operating Capital</b>	<b>0.74</b>	<b>0.76</b>	<b>0.80</b>	<b>0.81</b>	<b>0.82</b>	<b>0.83</b>	<b>0.85</b>	<b>1.59</b>	<b>3.94</b>	<b>4.07</b>	<b>4.74</b>	<b>5.10</b>	<b>5.96</b>	<b>-0.32</b>	<b>30.69</b>
<b>Operating Costs Per Acre</b>	<b>119.66</b>	<b>2.77</b>	<b>7.09</b>	<b>2.82</b>	<b>2.83</b>	<b>2.84</b>	<b>2.86</b>	<b>120.61</b>	<b>380.85</b>	<b>24.69</b>	<b>111.12</b>	<b>62.53</b>	<b>144.28</b>	<b>50.38</b>	<b>1035.34</b>
<b>Cash Ownership</b>															
General Overhead	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00			36.00
Land Rent							310.00								310.00
Management Fee	7.72	7.72	7.72	7.72	7.72	7.72	7.72	7.72	7.72	7.72	7.72	7.72			92.63
Property Insurance								3.06							3.06
<b>Cash Ownership Costs</b>	<b>10.72</b>	<b>10.72</b>	<b>10.72</b>	<b>10.72</b>	<b>10.72</b>	<b>10.72</b>	<b>320.72</b>	<b>13.77</b>	<b>10.72</b>	<b>10.72</b>	<b>10.72</b>	<b>10.72</b>			<b>441.69</b>
<b>Total Cash Costs Per Acre</b>	<b>130.38</b>	<b>13.49</b>	<b>17.81</b>	<b>13.54</b>	<b>13.55</b>	<b>13.56</b>	<b>323.58</b>	<b>134.39</b>	<b>391.57</b>	<b>35.41</b>	<b>121.84</b>	<b>73.25</b>	<b>144.28</b>	<b>50.38</b>	<b>1477.02</b>



## Calculating Water Applied By Revolution or Set

### Step 1:

Determine the water depth in 24-hour inches for each irrigation set or cycle from Table 1 (see p. 10), using the appropriate water flow for your system. The head size may be measured in cubic feet per second, Idaho Miner's inches, or gallons per minute.

### Step 2:

Select an appropriate irrigation system efficiency from Table 2 on page 10.

Select lower values for 24-hour sets, larger spacing, or windy conditions.

### Step 3:

Calculate the application depth using either equation 1 or equation 2, depending upon the irrigation system type.

**Equation 1:** Water application depth per revolution for center pivot, or per pass for linear-move irrigation systems or partial center pivot system:

Inches of water applied per revolution of a center pivot =

$$\frac{(\text{Table 1 answer}) \times (\text{Table 2 answer}) \times \text{number of days per set}}{\text{acres} \times 100}$$

Example: 130 acre pivot, with flow equal to 900 gpm, efficiency rating (from Table 2) = 85%, 2.5 days per revolution

$$\text{Depth of water applied per revolution} = [47.60 \times 85 \times 2.5] / [130 \times 100] = 0.778 \text{ inch}$$

**Equation 2:** Water application per set for set-move sprinklers or gravity systems:

Inches of water applied per acre for non-center pivot systems =

$$\frac{(\text{Table 1 answer}) \times (\text{Table 2 answer}) \times \text{hours per set}}{\text{acres} \times 24 \times 100}$$

Example: 6 acres, border irrigation, flow equal to 50 Idaho Miner's inches, efficiency rating (from Table 2) = 50%, 12-hour set depth =  $[23.8 \times 50 \times 12] / [6 \times 24 \times 100] = 0.99 \text{ inch}$

**Table 1.** Calculation of water depth (24-hour inches) applied by head size

<b>Water flow (Head size)</b>			
Cubic Ft per second	Idaho Miner's inches	Gallon per minute	24-hour inches per acre
0.20	10	90	4.75
0.40	20	180	9.52
0.60	30	270	14.28
0.80	40	360	19.04
1.00	50	450	23.80
1.20	60	540	28.56
1.40	70	630	33.32
1.60	80	720	38.08
1.80	90	810	42.84
2.00	100	900	47.60
2.20	110	990	52.36
2.40	120	1080	57.12
2.60	130	1170	61.88
2.80	140	1260	66.64

**Table 2.** Typical irrigation system application efficiencies.

<b>System Type</b>	<b>Irrigation System Efficiency* (%)</b>
<b>Surface Systems</b>	
Furrow	35-65
Surge	50-55
Cablegation	50-55
<b>Sprinkler Systems*</b>	
Set-move	60-75
Solid-set	60-85
High pressure center-pivot	65-80
Low pressure center-pivot	75-85
Linear-move	80-87
<b>Microirrigation</b>	
Drip	90-95

- Use lower efficiencies with larger spacing and windy conditions.



# The Project

**Soil Preparation:**

How was the soil prepared? \_\_\_\_\_

**Planting:**

Date of planting \_\_\_\_\_ Seeding rate (lb/acre) \_\_\_\_\_

Depth of planting \_\_\_\_\_ Row width \_\_\_\_\_

Did the seed receive any treatment? \_\_\_\_\_ if so, what type? \_\_\_\_\_

Seed variety \_\_\_\_\_

Where was seed obtained? \_\_\_\_\_

**Rating of Potato Stand:**

Excellent \_\_\_\_\_ Good \_\_\_\_\_ Medium \_\_\_\_\_ Poor \_\_\_\_\_

What were the reasons for this condition? \_\_\_\_\_

## Growth Stages in Potatoes

Growth stage	Date	Comments
Seed Sprouting		
Emergence		
6-8 inch		
8-12 inch		
Row closure		
50 percent bloom		
Full Bloom		
Past Full Bloom		
Full Grown		
Near Maturity		
Maturity		



## Fertilizer Costs

			Rate	Member cost	Landlord cost	Total cost
Fertilizer nutrient(s)	Date	Method <sup>a</sup>	(units per acre)	(\$ per acre)	(\$ per acre)	(\$ per acre)
Fertilizer cost per acre \$						
<b>(3) TOTAL FERTILIZER COST</b> (cost per acre X number of acres) \$						

Choose the letter representing the method of fertilizing from below:

- (a) broadcast on surface; (b) side-dressed; (c) through irrigation system; (d) banded (near row); (e) preplant injection; (f) foliar; (g) other - please state

## Chemical Costs

Chemical	Date	Rate (units per acre)	Reason for use	Member cost (\$ per acre)	Landlord cost (\$ per acre)	Total cost (\$ per acre)
Chemical cost per acre \$						
<b>(4) TOTAL CHEMICAL COST</b> (cost per acre X number of acres) \$						



## Other Operating Costs

Include all other items for which cash was expended except seed, machinery and equipment, fertilizer, chemicals, and labor, which are reported in the preceding pages.

Item	Member cost per acre	Landlord cost per acre	Total cost per acre
Land charge, if cash rent is used*			
Water rent, if not included with land			
Consultant			
Storage			
Insurance			
Interest on borrowed money			
Miscellaneous (list)			
Total cost per acre \$			
<b>(6) TOTAL COSTS</b> (cost per acre X number of acres)			

\*Land charges include sprinkling system, depreciation and repair, water, and taxes.

## Record of Yield and Crop Revenue for Member, Landlord, and Total

Date harvested	Yield (cwt/acre)	Revenue (\$/cwt)	Member revenue (\$/acre)	Landlord revenue (\$/acre)	Total revenue (\$/acre)
<b>(7) TOTAL REVENUE FROM POTATOES</b> (revenue per acre X acres) \$					



# Financial Summary

Transfer total costs to this page, not per acre costs.

## Receipts

	Member	Landlord	Total
<b>Total value of potatoes sold, And/or in storage (see (7), pg. 22) TOTAL RECEIPTS \$'</b>			

## Costs

	Member	Landlord	Total
Seed (see (1) p. 21)			
Machinery and Equipment use (see (2) p. 21)			
Labor (see (5) p. 23)			
Fertilizer (see (3) p. 22)			
Chemicals (see (4) p. 22)			
Other operating costs (see (6) p. 24)			
<b>Total Costs \$</b>			
Average cost per unit (cwt) (divide total expenses by yield)			
Average cost per acre (divide total expenses by total acres)			
<b>PROFIT or LOSS \$</b> (total receipts minus total costs)			

*This profit (loss) figure represents your income for labor, management, and money invested.*

# Financial Performance Over Time; A History of Your Project

Transfer "Per Acre Costs" from previous years in the potato project.

**Receipts per acre**                      **This Year** \_\_\_\_\_                      **Last Year** \_\_\_\_\_                      **2 Years ago** \_\_\_\_\_  
    Member                      Landlord                      Member                      Landlord                      Member                      Landlord

(a) Total value of potatoes sold, and/or in storage (\$)						
(b) Project size (acres)						
(c) Yield (cwt per acre)						
<b>Costs per acre (\$)</b>	<b>This Year</b> _____		<b>Last Year</b> _____		<b>2 Years ago</b> _____	
	Member	Landlord	Member	Landlord	Member	Landlord
Seed						
Equipment use						
Labor						
Fertilizer						
Chemicals						
Other operating costs						
(d) Total costs (\$)						
Avg. cost per unit (cwt) (d)/(c)						
Avg. cost per acre (d)/(b)						
<b>PROFIT OR LOSS (a)-(d)</b>						

**Average Values per Acre, Years \_\_\_\_\_ thru \_\_\_\_\_** (Determine the average values per acre by adding the total costs or receipts per acre in each row in the table above and divide by the number of years in your project.)

**Avg. costs per acre (\$)**                      **Member**                      **Landlord**

Seed		
Equipment use		
Labor		
Fertilizer		
Chemicals		
Other operating costs		
(e) Total costs (\$)		
(f) Avg. revenue from (a) above		
(g) Avg. project size		
(h) Avg. yield		
Average cost per unit (cwt) (e) / (h)		
Average cost per acre (e) / (g)		
<b>PROFIT OR LOSS (f) - (e)</b>		

# THE ORAL PRESENTATION COUNTY POTATO FIELD TOUR

The oral presentation is intended to provide you with an opportunity to learn more about your project and to share your ideas and experiences with others. Your oral presentation will be evaluated as follows:

Organization and Content	Points Possible	Your Score
Opening comments	5	
Background Information (field history and site information)	10	
Knowledge and understanding of practices used (below) Variety Seed treatments Fertilization Planting information Pest control Cultivation practices Seedbed preparation Irrigation scheduling	15	
Presentation Posture Friendliness Pronunciation Ease and confident manner Distinct speech Handling of Questions	20	
General Appearance of Field, Field borders Plant population Weed control Insect damage Disease control Appearance of plants	30	
Personal Involvement	20	
<b>100 TOTAL POINTS POSSIBLE</b>	<b>Your Final Score</b>	

Judged by: \_\_\_\_\_

Date: \_\_\_\_\_

**PARENTS ARE ENCOURAGED TO ATTEND FIELD TOUR!**

## Your Workbook Score

Workbook will be graded under supervision of an extension educator at end of project year.

Points Possible	Your Score	
<b>Completeness</b> 1. All blanks properly filled	30	
<b>Accuracy</b> 1. Dates and accounts are correct. 2. Record appears logical. 3. Record is kept throughout the year and essential information is entered at proper time.	30	
<b>Results - Story - Questions</b> 1. Record shows good management, development, and care of project. 2. Proper language is used. 3. Record shows that experience was gained and that approved practices were followed 4. Questions are answered properly.	30	
<b>Neatness</b> 1. Writing is legible (pen or pencil) 2. Book is reasonably clean 3. Record shows signs of use.	10	
<b>TOTAL</b>	<b>100</b>	

Graded by: \_\_\_\_\_ Date: \_\_\_\_\_

## Your County Fair Exhibit Points

	Points Possible	Your Score
Best of Class	5	
Blue Ribbon	20	
Red Ribbon	15	
White Ribbon	5	
Exhibit at Fair	25	
<b>TOTAL</b>	<b>50</b>	

Signed by Club Leader; \_\_\_\_\_ Date: \_\_\_\_\_