

**POTATO PRODUCTION PRACTICES
IN SOUTHEASTERN IDAHO**

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Survey

A survey of a limited number of potato growers in Bingham, Bonneville and Power counties was conducted during the winter and early spring of 1995. The purpose of this survey was to obtain information on the cultural practices used in the production of commercial potatoes. This information is used to revise the southeastern Idaho cost of production estimates published by the University of Idaho. While these cost of production estimates are revised and published every other year, an in-depth survey of producers such as this are done only every five or six years.

In addition to general information about the farm such as size, rotation, irrigation system, etc., detailed information on all inputs applied and all machinery operations performed is obtained. Basically, we want to know what the growers do, when they do it and how they do it. Information from the survey is summarized and then used to construct a "representative" southeastern Idaho farm." A microcomputer program, *Budget Planner*, is used to process this information. The output of this program shows the cost of potato production on a per acre and on a per cwt basis. It is important to note, however, that while growers use many of the same inputs and similar farming practices, each farm is different with a unique set of resources and having different levels of productivity, different production problems, and therefore different costs. Farm size, crop rotation, irrigation system and age of equipment are all crucial components in determining cost.

The farming practices and inputs specified are based on survey information. They are not recommendations. Because of constantly changing labels, laws and regulations, the University of Idaho can assume no liability for the consequences of using chemicals specified here. In all cases, read and follow the directions and precautionary statements on the specific pesticide product label. To simplify information, trade names have been used. No endorsement of named products is intended nor is criticism implied of similar products not mentioned.

Rotation

A potato and grain rotation varying in length was the most common rotation reported. Sixty two percent of the growers completing the survey had a potato/grain rotation. The most common, potatoes followed by two years of grain, was used by 38 percent of the growers. Potato growers who also grow sugarbeets, 23 percent of those surveyed, follow a four year or five year rotation, with one or two years of grain separating the potatoes and sugarbeets. Fifteen percent of the growers surveyed grew alfalfa as part of a 9-year

rotation. Alfalfa was grown for three years, potatoes were grown two or three years and grain was grown for two or three years. Rotations for the growers in the survey averaged between 4 and five years.

Farm Size and Potato Acreage

All farms in the survey were irrigated. Farms ranged in size from 450 to 2,630 acres, and averaged 1,340 acres. The acreage in potatoes ranged from 75 to 525 acres, averaging 401 acres. Russet Burbank potatoes were grown on 90 percent of the commercial acreage. The remaining acreage was split between Shepody and Frontier, 6 and 4 percent, respectively.

Seed

Growers plant early generation seed, with only 13 percent planting G4. The majority, 73 percent, planted G3, while 13 percent planted G2. Most growers, 93 percent, purchase whole seed, with the remaining buying seed already cut and treated. One third of the growers purchased seed through a broker, with the remainder buying directly from the seed grower. The average price paid for whole seed for 1994 was \$6.45 per cwt.

Growers planted an average of 20 cwt per acre, with seeding rates ranging from 17 to 24 cwt. Seed spacing averaged 12 inches, ranging from 11 to 13 inches. The averaged seed piece size was 2.3 ounces, with a range from 1.75 to 2.5 ounces. All growers reported planting to a 36 inch row spacing.

Yield

Growers were asked to report a field run and a paid yield for both 1993 and 1994. Only information on Russet Burbank is reported because of the limited data on Shepody and Frontier Russet. For 1993, growers reported an average field run yield of 316 cwt and a paid yield of 293 cwt, or 93 percent of field run. For 1994, growers reported an average field run yield of 345 cwt and a paid yield of 316 cwt, or 92 percent.

Water Source and Irrigation

Water for irrigation included both surface, 37 percent, and ground water, 63 percent. The lift on ground water averaged 177 feet, ranging from 25 feet to 425 feet. Growers who received water from an irrigation district or canal company paid an average of \$10.25 per acre for water, ranging from \$4.50 to \$14.50 per acre.

Pivots or linear systems were used on 58 percent of the acres. Wheelines were the second most common system, 25 percent, while handlines were used on 17 percent of the acres. (See Table 1.) No grower in the survey reported using a surface irrigation system.

Consultants

Forty percent of the growers reported using some type of consulting service and paid an average of \$13.08 per acre. The fees ranged from \$6 to \$17 per acre. No information was obtained about the type of service provided, however. Several growers not using consultants commented that they buy fertilizer and pesticides from a full service dealer where the price of the fieldman is included in the products they purchase.

Harvesting

The survey also obtained information on the number of workers used during harvest besides truck and tractor drivers. Typically these include workers picking rocks and clods on the potato harvester, as well as workers used to remove debris when potatoes are transloaded or moved into grower storage facilities. The average number of workers reported was six. Growers indicated that the size of the harvest crew did not vary whether potatoes were transloaded or placed in on-farm storage.

Growers were also asked about the number of trucks used per harvester, depending on whether the potatoes were being placed in on-farm storage, transloaded or hauled to a processor. On average, growers reported using the same number of trucks whether potatoes were being transloaded or hauled directly to the processor, 4.4 trucks per harvester. However, this includes responses from growers who only did one or the other, as well as growers who both transload and haul directly to a processor from the field. When only growers providing information both on transloading and hauling directly to processors was analyzed, one less truck per harvester was used when transloading. The number of trucks per harvester averaged somewhat less when potatoes were hauled to on-farm storage, 3.9 trucks per harvester.

Information on the hauling capacity of trucks, round trip hauls and trips per day were also obtained. Growers reported using trucks averaging a 300 cwt hauling capacity. The average round trip distance to on-farm storage was 4.1 miles with each truck averaging 9 trips per day. The round trip distance to a processor or a processor storage was 10.6 miles with each truck making 6 trips per day. Growers reported that if they were hauling to a processor, they could harvest an average of 26.4 acres per day. This increased to 32.5 if they were hauling to on-farm storage. The length of a "day" as reported by the growers was 12.6 hours on average. The range was from 11 to 14 hours.

Input Summary

Table 1 provides a summary of inputs applied by growers in this survey. Inputs were placed in one of nine general categories, including: irrigation, fumigation, insecticides/nematicides, herbicides, fungicides, sprout inhibitor, fertilizer, seed and vine kill. Within these general categories, additional categories were used to distinguish when the input was being applied, i.e. pre-plant, at-plant or post-plant. The specific products being applied and the percentage of growers who use them is also listed. The percentage in bold type is the percent of all growers who use that input. The percentages below that refer only to the growers using that category of inputs. For example, 31 percent of growers responding to the survey used a fumigant. Of that 31 percent, 40 percent used Telone II and 60 percent used Vapam. Vapam was applied at two different rates.

All inputs applied after harvest of the crop preceding potatoes are credited to the potato crop. In all cases, the data provided was when the crop preceding potatoes was grain. Water was applied in the fall following grain harvest by 85 percent of the growers, and averaged 3 inches. An average of 21 inches of water was applied during the growing season and an additional inch of water was applied prior to harvest for a total of 25 inches of water.

Thirty one percent of the growers indicated that they were using a fumigant prior to growing potatoes. Forty percent used Telone and 60 percent used Vapam. Two different rates of application were reported on Vapam, 37.5 and 25 gallons per acre. Only one rate was reported on Telone.

Pre or at-planting applications of insecticides/nematicides were used by 46 percent of the growers. The pre-plant application was generally made at markout. Thimet was reported as the most commonly used product, 67 percent. Some growers used more than one product. Only 15 percent of the growers reported using a post plant insecticide. One-half of these growers used Asana and the other half used Ambush.

All growers reported using a herbicide for weed control. Thirty one percent of the growers were applying a pre-plant herbicide, while 92 percent were applying a post-plant herbicide. Obviously, some applied both. Sencor (Leone) and Eptam were the most commonly used herbicides

Post plant fungicides were used by 46 percent of the growers. Bravo was the most commonly used fungicide. MH30 was applied as a sprout inhibitor by 8 percent of the growers.

Fertilizer application was classified as fall and spring preplant, at-plant or markout and post plant. A fall preplant fertilizer application was used by 69 percent of growers, 62 percent used a spring preplant application and 23 percent applied fertilizer at markout or planting. All growers made a postplant fertilizer application. The average amount of

fertilizer applied included: 236 lbs of nitrogen, 203 lbs of P₂O₅, 113 lbs of K₂O and 79 lbs of Sulfur. Seventy three percent of growers applied micronutrients.

Thirty eight percent of the growers reported using a desiccant to kill vines, with 80 percent using Diquat and 20 percent using sulfuric acid. A significant shift back to mechanical vine kill has occurred in recent years with 62 percent of growers using this method.

Field Operation Summary

Table 2 provides a summary of field operations reported by growers responding to the survey. Field operations following the harvest of the crop preceding potatoes (grain) are credited to potatoes. This includes operations to deal with crop residue (straw) and any fall tillage. The average number of fall field operations performed was three. If an implement was used more than once, for example the field is disked twice, these are listed separately. The implement width and horse power of the tractor pulling the implement are also given. The number of spring tillage operations preceding planting was two. Markout, used by 34 percent of growers, was classified as a planting operation, not as a tillage operation.

A six-row planter was the most commonly used. 69 percent. One-third of the growers reported using two potato planters. Ninety two percent of the growers reported using a mechanical cultivation after planting using a variety of implements.

Fertilizer and pesticide applications are classified as to the time of application. The type of equipment used is also given, unless it was custom applied. Custom application of preplant fertilizer is most common, 83 percent, while postplant fertilizer applications were made mostly through the irrigation system, 85 percent.

Rolling vines was listed separately from vine kill since the primary objective is to seal cracks in the soil.

Ninety two percent of the growers were using some artificial means to kill vines. Sixty three percent of these were using a mechanical method and the remaining 38 percent were using a chemical (Diquat or sulfuric acid).

The majority of growers, 92 percent, are using a two-row harvester, with 8 percent using a 4-row harvester. Sixteen percent reported using 2-row windrowers, while the remainder used 4-row windrowers. The typical operation was using a 4-row windrower in combination with a 2-row harvester.

Table 1. Summary of Inputs

	Inputs	Quantity		% Usage	Average # Applied	Average # Applications	
		Per Acre	Unit				
IRRIGATION	Average Pre-Tillage Irrigation		3 in	85%			
	Average Post Plant Irrigation		21 in	100%			
	Average Pre-Harvest Irrigation		1 in	85%			
	Average Total Irrigation		25 in				
	Handlines				17%		
	Wheelines				25%		
	Center Pivot				58%		
FUMIGATION				31%			
	Telone		19 gal	40%			
	Vapam			60%			
	Vapam - High Rate		37.5 gal				
	Vapam - Low Rate		25 gal				
INSECTICIDES/ NEMATICIDES	Pre or At Plant			46%	1.2	1	
	Dyfonate		2 qt	33%			
	Thimet		14.75 qt	67%			
	Mocap		4 qt	17%			
	Post Plant			15%	1.0	1	
	Asana		2 qt	50%			
	Ambush		5 oz	50%			
	HERBICIDES	Pre-Plant			31%	1.3	1
		Eptam		1.8 qt	75%		
		Sencor		0.5 lbs	25%		
Roundup			0.5 qt	25%			
Post Plant				92%	1.8	1.3	
Eptam			1.85 qt	50%			
Prowl			0.93 qt	17%			
Sencor (Lexone)			0.47 qt	42%			
Sencor DF (Lexone)			0.62 lbs	50%			
Treflan			14 oz	8%			
FUNGICIDES	Post Plant			46%		1.5	
	Bravo		0.79 qt	67%		1.5	
	Kocide		0.375 gal	17%		2	
	Maneb		?	17%		1	
SPROUT INHIBITOR	MH30		6 qt	8%			

Table 1. Summary of Inputs (cont.)

FERTILIZER	Inputs	Quantity		% Usage	Average # Applied	Average # Applications
		Per Acre	Unit			
	Fall Pre-Plant				69%	
	N	63 lbs		78%		
	P2O5	163 lbs		100%		
	K2O	144 lbs		67%		
	SO4	85 lbs		44%		
	Micros			33%		
	Spring Pre-Plant				62%	
	N	84 lbs		89%		
	P2O5	139 lbs		63%		
	K2O	88 lbs		50%		
	SO4	48 lbs		50%		
	Micros			25%		
	At Plant (Markout & Planting)				23%	
	N	73 lbs		100%		
	P2O5	121 lbs		100%		
	K2O	120 lbs		33%		
	SO4	100 lbs		33%		
	Humic Acid	2.7 qt		100%		
	Pennasoil	1 gal		33%		
	Post Plant				100%	
	N	124 lbs		100%		
	P2O5	59 lbs		15%		
	K2O	43 lbs		23%		
	SO4	100 lbs		31%		
	Micros			15%		
SEED	G-2 Burbank Seed	23 cwt		15%		
	G-3 Burbank Seed	19 cwt		77%		
	G-4 Burbank Seed	20 cwt		8%		
VINE KILL					38%	
	Diquat	0.5 qt		80%		
	Sulfuric Acid	80 lbs		20%		

Table 2. Summary of Field Operations

	Implement	Average Rows	Average Width	Average Tractor HP	% Usage	Average # Operations
FALL RESIDUE MANAGEMENT/ TILLAGE	Beater		19	158	100%	3.2
	Chisel - 1/2 acreage		20	200	64%	
	Culti-chisel		20	325	7%	
	Custom Rip, Disk - 1/2 acreage				7%	
	Dammer Diker	6		195	14%	
	Disk		36	200	7%	
	Marker		18	200	7%	
	Moldboard Plow		6	143	14%	
	Offset Disk		21	192	50%	
	Offset Disk - 2		24	185	14%	
	Plow	9		200	7%	
	Ripper - 2		18	200	21%	
	Tandem Disk		20	200	7%	
	Tandem Disk - 2		20	200	7%	
SPRING RESIDUE MANAGEMENT/ TILLAGE	Bed Splitter	6		200	8%	1.8
	Chisel Plow		18	200	33%	
	Disk		22	200	8%	
	Disk - 2		22	200	8%	
	Moldboard Plow/Roller Harrow		12	200	8%	
	Offset Disk		20	192	25%	
	Ripper		19	225	17%	
	Spike Harrow		24		8%	
	Tandem Disk		22	143	25%	
PLANTING	Marker	6	19	177	54%	
	Planter	4		160	31%	
	(25% Use 2 4-row Planters)					
	Planter	6		194	69%	
	(11% Use 2 6-row Planters)					
CULTIVATION					92%	1.2
	Chisel	4		140	8%	
	Cultivator	6		145	8%	
	Dammer Diker	4		150	8%	
	Dammer Diker	6		198	50%	
	Harriston - Hiller	6		200	8%	
	Rip Centers Shovels	4		200	8%	
	Rolling Cultivator	4		140	17%	
	Rolling Cultivator	6		200	8%	
	(33% of those using mechanical cultivation use 4-row equipment, 67% use 6-row)					
FERTILIZER APPLICATIONS	Pre-Plant				92%	
	Air Spreader		36		8%	
	Air Spreader		60		8%	
	Custom				83%	
	Sprayer		60		8%	
	At Plant				23%	
	Custom				25%	
	Planter	6			75%	
	Post Plant				100%	
	Aerial Application				8%	
	Air Spreader		36		8%	
	Custom				15%	
	Fan Spreader		60		8%	
	Fertilizer Spreader				8%	
	Irrigation System				85%	

Table 2. Summary of Field Operations (cont.)

PESTICIDE APPLICATIONS	Implement	Average	Average	Average	% Usage	Average # Operations
		Rows	Width	Tractor HP		
	Fumigants				31%	
	Custom				40%	
	Irrigation System				40%	
	Injector	6		190	20%	
	Pre & At Plant Insecticides				46%	
	Custom				17%	
	Planter				83%	
	Post Plant Insecticides				15%	
	Custom				50%	
	Irrigation System				50%	
	Pre-Plant Herbicides				31%	
	Custom				75%	
	Sprayer		60	?	25%	
	Post Plant Herbicides				92%	
	Aerial Application				8%	
	Custom				25%	
	Dammer Diker				25%	
	Irrigation System				33%	
	Spray Coupe	18			17%	
	Sprayer		52	?	8%	
	Post Plant Fungicide				46%	
	Aerial Application				50%	
	Custom				33%	
	Irrigation System				17%	
VINE ROLL					46%	
	Vine Roller	4		87	50%	
	Vine Roller	6		122	50%	
VINE KILL					92%	
	Mechanical Only				63%	
	Mechanical/Chemical				0%	
	Chemical Only				38%	
	Mechanical				62%	
	Vine Beater	4		150	13%	
	Vine Beater	6		179	88%	
HARVEST						
	Potato Harvester	2		162	54%	
	2 Potato Harvesters	2		162	36%	
	Potato Harvester	4		200	8%	
	Potato Windrower	2		?	8%	
	2 Potato Windrowers	2		135	8%	
	Potato Windrower	4		187	46%	
	2 Potato Windrowers	4		188	31%	