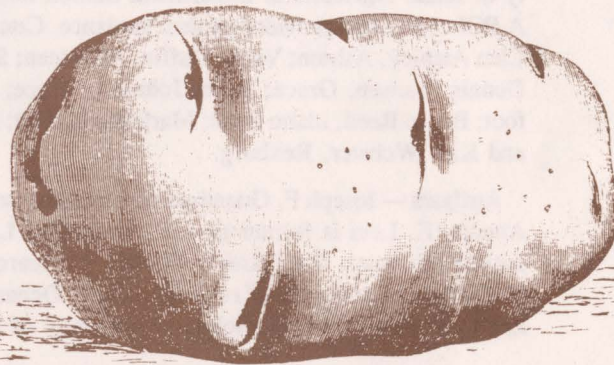


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**Analysis  
of a  
*Mandatory  
Seed Law*  
for the  
Idaho  
Potato  
Industry**



J. F. Guenther, A. E. Levi, L. D. Makus, R. Krebill-Prather, and J. E. Carlson



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# Analysis of a mandatory seed law for the Idaho potato industry

J. F. Guenther, A. E. Levi, L. D. Makus, R. Krebill-Prather, and J. E. Carlson

## Introduction

State mandatory seed laws requiring all growers to plant certified seed are one of the recommendations of a Potato Association of America task force on bacterial ring rot eradication. Proponents of mandatory seed laws say the laws could reduce the incidence of potato disease and improve potato quality. Opponents argue that mandatory seed laws are not necessary and erode growers' freedom to farm.

Some states and Canadian provinces such as Maine and New Brunswick have mandatory seed laws. Potato groups in other states are discussing them. The Idaho potato industry has been considering the issue for several years but has reached no consensus on what action should be taken.

Mandatory seed laws were on the program of the 1986 North American Seed Potato Seminar. A vice-president of Potato Growers of Idaho, Inc. (PGI), attended that seminar and brought up the topic for discussion at the 1986 PGI annual meeting. In a later annual PGI meet-

ing, it was decided that a committee appointed by the PGI president would study mandatory seed laws.

The PGI committee asked University of Idaho faculty members to assist them in the analysis of the mandatory seed law. The committee wanted to know what Idaho growers thought of a mandatory seed law and what the law's impact might be on their industry. The group outlined three objectives for a research project:

1. Determine grower attitudes toward seed potato issues
2. Determine whether growers support a mandatory seed law
3. Estimate the economic impact of mandatory seed laws

The PGI committee members and UI faculty members developed a research proposal and submitted it to the Idaho Potato Commission. In 1989, the commission decided to fund the project, which included a survey of all Idaho potato growers and an economic analysis of Maine's mandatory seed law.

## Part 1 — Idaho grower survey

### Survey methods

Potato Growers of Idaho, Inc., members and members of the University of Idaho faculty developed a questionnaire designed to discover how Idaho potato growers feel about a mandatory seed law and other seed potato issues. The questionnaire was mailed between the 1989 potato planting and harvest seasons to all growers on a comprehensive list maintained by PGI. Follow-up mailings and reminders employed the Dillman (1978) method. The first mailing was done on 14 June 1989. Postcard reminders were mailed 10 days later. Second and third mailings of the questionnaire were sent in July and August.

Mailings included postcards to be returned by recipients no longer growing potatoes. Ineligible respondents identified through the postcards were not included in follow-up mailings and were eliminated from the sample. A copy of the survey form is in the appendix (page 12).

To increase the response rate a telephone survey of nonrespondents was conducted after the potato harvest from 23 October to 15 November. These individuals were asked the same questions that appeared in the mail questionnaire.

The PGI mailing list consisted of 1,937 names. Of those individuals, 882 were found to be ineligible for



the study because they had retired, consolidated farms, or stopped growing potatoes. Of the remaining 1,055 eligible growers, 682 completed the mail survey and 166 completed the phone survey for a total response rate of 80.4 percent.

## Results

### Seed potato quality

When asked, "In general, how do you rate the quality of seed potatoes planted in Idaho?" a majority of growers (82 percent) responded with "excellent" or "good."

Growers also rated the effectiveness of some methods that might maintain seed potato quality (Table 1). A majority of growers considered the flush-out, disclosure, and certified seed requirement methods very or somewhat effective. A slight majority of growers said that separate regulations for own-grown seed would not be effective.

In another question, growers were asked whether they favored or opposed a mandatory seed law. Some growers felt that a mandatory seed law would be effective but opposed it for other reasons.

**Table 1. Idaho growers' views of the effectiveness of methods to maintain seed potato quality.**

Method	Effectiveness		
	Very (%)	Somewhat (%)	Not (%)
Flush-out or limited generation requirement for Idaho seed certification	40.1	54.1	5.8
Regulation requiring full disclosure of certification records	48.5	42.3	9.2
Law requiring that all Idaho potatoes be planted with certified seed	38.6	25.6	35.7
Separate set of certification regulations for growers who grow seed for their own use only	15.5	34.1	50.4

### Mandatory seed law

Sixty-two percent of growers favored a mandatory seed law for Idaho:

- 36 percent favored one strongly
- 26 percent favored one somewhat
- 11 percent opposed one somewhat
- 23 percent opposed one strongly

Growers were asked to explain their position toward a mandatory seed law in their own words.

Growers who favored a mandatory seed law gave the following reasons:

- It could clean up disease problems.

- It would reduce worry about neighbors' infected fields.
- It could be an alternative to banned chemicals for pest control.
- Junk growers hurt us.
- It could enhance Idaho's quality image.
- It would enhance actual quality.
- It is a possible market promotion tool.
- It helps us keep up with competition from other states.
- We must protect our industry.
- It could discourage overplanting.
- It would stop lenders from forcing use of non-certified seed.
- Idaho potato acreage estimates would be more accurate.
- It works in other states.
- It is OK if the government stays out.

Growers opposed to a mandatory seed law gave the following reasons:

- It would erode freedom to farm.
- It would impose more unwanted regulations.
- It would be like farming in the USSR.
- There would be enforcement problems.
- Let growers decide; they know risks and rewards.
- Education is needed, not more laws.
- There could be seed shortages.
- It could increase seed prices.
- It could increase production cost.
- Some certified seed is poor in quality.
- I have more trust in own-grown seed.
- Higher yields hurt prices.
- Everyone could become a seed grower.
- Current certification standards are questionable.

### Factors affecting seed-law stance

Support for a mandatory seed law differed between commercial growers and seed growers and between growers who always planted certified seed and those who never planted it. Support varied also by county, age, and farm size.

Still, a clear majority of Idaho growers favored a mandatory seed law. Support for the law appeared to be strongest among seed growers, processed growers, younger growers, medium-sized growers, and growers who always planted certified seed.

**Commercial versus seed growers** — Fifty-seven percent of commercial growers favored the law, while 82 percent of seed growers favored it.



**Farm involvement with potatoes** — Sixty-two percent of growers who were primarily potato farmers favored the law. This was similar to the 65 percent of other types of growers who favored the law.

**Use of certified seed** — Among those who never planted certified seed, 42 percent favored a mandatory seed law. Seventy-three percent of those who always planted certified seed favored it.

**Region and county** — In eastern Idaho, 54 percent of growers favored the law, in the Magic Valley 56 percent favored it, and in the Treasure Valley 76 percent favored it. In general, growers in counties where the seed market or the processed market is important were more likely to favor a mandatory seed law than growers in counties where the fresh market dominates. Because many processors require growers to use certified seed and seed growers naturally believe in their product, these geographical differences were not unexpected.

Percentages of growers who favored the law are as follows: Bingham, 52 percent; Bonneville, 39 percent; Canyon, 77 percent; Caribou, 90 percent; Jefferson, 21 percent; Madison, 40 percent; and Power, 50 percent.

**Age** — Sixty-six percent of growers younger than 40 favored the law, 62 percent of those from 40 to 55 favored it, and 58 percent of those older than 55 favored it.

**Farm size** — The smallest and largest growers were less likely than middle-sized growers to favor the law. Only 55 percent of growers with gross incomes less than \$100,000 favored the law, and only 57 percent of growers with gross incomes more than \$1 million favored it. In contrast, 62 percent of growers with incomes of \$100,000 to \$300,000 favored the law, 69 percent of growers with incomes of \$300,000 to \$500,000 favored the law, and 64 percent of growers with incomes of \$500,000 to \$1 million favored the law.

### **Type of seed planted**

The majority of Idaho growers (82.7 percent) planted some or all of their potato acreage with tagged seed from a certification program (Table 2). Although the percentage of growers who planted all of their acreage with year-out seed (one year past certification) was very small, more than 9 percent of growers planted some year-out seed grown on their own farms. This suggests that some commercial growers planted their own seed plots. They may have used certified seed for their plots but not entered them into the certification program.

### **Seed source**

Most producers (80.8 percent) reported that they purchased 76 to 100 percent of their total seed requirements. Only 1.4 percent purchased none of their seed.

Idaho was the primary source of seed potatoes for a majority of growers (Table 3). All but 6.9 percent of respondents planted at least some Idaho seed. Nearly 15 percent of respondents purchased some seed from Montana. Other seed sources included Minnesota, North Dakota, and Wisconsin.

### **Planting rate**

Seventy-seven percent of respondents planted 18 to 22 hundredweight (cwt) per acre. Thirty-one percent planted 20 cwt per acre.

### **Seed potato problems**

Growers considered seedborne diseases, the impact of non-certified seed on Idaho's reputation, and the poor quality of non-certified seed the most serious seed potato problems (Table 4). The majority rated those problems serious or moderate. At least 40 percent of respondents rated misrepresentation of certified seed and high prices for certified seed as serious or moderate problems.

### **Seedborne diseases**

Nearly one-third of respondents rated nematodes a serious problem (Table 5). More than one-fourth rated blackleg a serious problem. They rated mosaic and Potato Virus X least serious.

**Table 2. Idaho growers' use of certified and non-certified seed potatoes.**

Seed type	None (%)	Some (%)	All (%)
Tagged seed from a seed certification program	17.3	17.6	65.1
Untagged seed from a seed certification program	75.9	14.1	10.0
Year-out seed grown on own farm	90.7	9.2	0.1
Year-out seed purchased from someone else	95.9	3.3	0.8

Note: The untagged seed category is for seed potatoes that have been entered into a seed certification program but have not had the final inspection to be tagged.

**Table 3. Idaho growers' sources of seed potatoes.**

Source	None (%)	Some (%)	All (%)
Idaho	6.9	77.2	15.9
Montana	85.4	13.2	1.4
Oregon	98.6	1.3	0.1
Canada	97.2	2.2	0.6
Other	94.2	5.3	0.5



**Table 4. Idaho growers' views of the seriousness of possible seed potato problems.**

Potential problem	Serious problem (%)	Moderate problem (%)	Slight problem (%)	Not a problem (%)
Seedborne diseases	27.6	42.7	24.9	4.8
Ineffective seed piece treatment	7.2	26.7	43.0	23.1
High prices for certified seed	10.3	30.6	31.4	27.7
Poor quality of non-certified seed	39.4	27.0	19.1	14.4
Misrepresentation of certified seed	22.0	27.6	33.5	16.9
Inadequate seed piece size	7.5	34.1	34.3	24.1
Unavailable seed varieties	2.1	10.9	30.0	57.0
Poor seed cutting sanitation	11.7	28.1	36.9	23.3
Inadequate standards for seed certification	18.4	27.8	27.4	26.4
The impact of non-certified seed on the reputation of Idaho commercial potatoes	26.9	29.1	26.6	17.5
Mechanical limitations of planters	14.0	35.6	33.9	16.6
Inconsistent quality of certified seed	13.1	34.7	36.7	15.5
Commercial growers cannot always afford to buy certified seed	10.9	27.0	35.7	26.4
Quality problems in commercial potatoes due to poor-quality seed	15.0	33.3	38.9	12.8

**Table 5. Idaho growers' views of the seriousness of seedborne disease problems for farmers in their area.**

Problem	Serious problem (%)	Moderate problem (%)	Slight problem (%)	Not a problem (%)
Bacterial ring rot	18.3	22.4	37.8	21.5
Leafroll	16.5	38.7	38.4	6.4
Blackleg	26.3	38.5	28.0	7.3
Mosaic	5.4	21.3	52.6	20.7
Potato Virus X	5.7	18.9	49.5	25.8
Nematodes	31.4	29.8	21.5	17.3



## Part 2 — Economic analysis of Maine's mandatory seed law

### Methods

Because Idaho has never had a mandatory seed law, it is difficult to determine what its impact would be on the Idaho potato industry. Fortunately Maine, an important potato state, implemented a mandatory seed law beginning with the 1981 crop. We conducted a statistical analysis of factors that influenced yields, quality, acreage, and prices of Maine potatoes before (1968-80) and after (1981-88) the mandatory seed law was implemented.

The analysis method was multiple linear regression. A dummy variable measured the impact of Maine's mandatory seed law. The dummy variable was assigned a value of 0 before the mandatory seed law was implemented and a value of 1 after the law was in place. The dummy variable coefficient estimated by multiple linear regression indicated the direction and magnitude of the mandatory seed law's impact on the dependent variables.

Data came from a variety of sources. Commercial potato prices and acreage were found in the U.S. Department of Agriculture (USDA) publication *Potato Facts* (1969-89). Seed potato and hay prices came from the USDA's *Agricultural Prices* (1969-89). The state seed potato price series was discontinued in 1985. However, USDA personnel provided unpublished prices for 1986-89. Weather data for the Presque Isle, Maine, weather station was obtained from the Northeast Regional Climate Center. Data on tubers per hill, hills per acre, and planting progress for the 1968-89 period came from the USDA's *Maine Potatoes: Acreage, Yield, Size, and Grade* (1969-89). Seed potato acreages inspected and passed since 1973 were provided by the Maine Department of Agriculture.

### Results

#### Yield

Yield data were available for all Maine potatoes but not specifically for seed potatoes or commercial potatoes. Therefore, one yield model representing average yields for all types of Maine potatoes was developed using data from 1968 through 1989. The model was specified as follows:

$$Y = \beta_0 + \beta_1MSL + \beta_2LORAIN + \beta_3HIRAIN + \beta_4HILLS + \beta_5TUBERS + \beta_6GDDA + \beta_7FROST,$$

where

- $Y$  = average Maine potato yield (cwt/acre),  
 $\beta_0$  = constant term representing the overall regression intercept,  
 $MSL$  = a dummy variable whose value is 0 before

1981 and 1 for 1981 and later, years when a mandatory seed law was in effect,

$LORAIN$  = a dummy variable whose value is 1 for years when growing-season rain (May-September) was less than 14 inches in Presque Isle and 0 for other years,

$HIRAIN$  = a dummy variable whose value is 1 for years when growing-season rain was more than 20 inches in Presque Isle and 0 for other years,

$HILLS$  = average number of hills per acre in Maine potato fields,

$TUBERS$  = average number of tubers per hill in Maine potato fields,

$GDDA$  = growing degree days (base 45) during August in Presque Isle,

$FROST$  = number of days after August 1 when the first low of 30 degrees or lower was recorded at Presque Isle, and

$\beta_1$ - $\beta_7$  = regression coefficients.

The  $R^2$  value of .89 (Table 6) indicates that the variables in the equation explain 89 percent of the variation in Maine potato yields. The positive signs on the  $HILLS$  and  $TUBERS$  coefficients mean that larger numbers of hills per acre and tubers per hill tend to increase yields.

The negative  $LORAIN$  and  $HIRAIN$  coefficients indicate that too little rain or too much rain can reduce yields. The  $LORAIN$  coefficient of -30.1 suggests that when growing-season rain is less than 14 inches, yields will decrease by about 30 cwt per acre. The  $HIRAIN$  coefficient indicates that rainfall greater than 20 inches can reduce yields by about 18.5 cwt per acre.

The negative  $GDDA$  coefficient indicates that cool temperatures in August promote tuber bulking and increased yields. The  $FROST$  coefficient shows that longer growing seasons increase potato yields.

**Effect of mandatory seed law** — The  $MSL$  coefficient of 28.0 indicates that Maine potato yields increased about 28 cwt per acre after the mandatory seed law was implemented.

#### Potato acreage planted

The potato acreage model for all Maine potatoes was specified as follows:

$$ACREA = \beta_0 + \beta_1MSL + \beta_2ACREA_{t-1} + \beta_3PRICEA_{t-1} + \beta_4PRICEH_{t-1},$$

where

$ACREA$  = acres of all types of potatoes planted in Maine,



$ACREA_{t-1}$  = acres of all types of potatoes planted in Maine the previous year,  
 $PRICEA_{t-1}$  = average price for all types of potatoes grown in Maine the previous year (\$/cwt), and  
 $PRICEH_{t-1}$  = average price of Maine's previous hay crop (\$/ton).

All other terms are as previously defined.

The  $ACREA_{t-1}$  coefficient indicates that last year's planted acreage influences potato acreage for the current year (Table 6). This suggests "asset fixity" in Maine potato production. Because potato equipment, land, and facilities are relatively expensive, growers who have already invested in potato production assets are likely to continue to plant potatoes.

The  $PRICEA_{t-1}$  coefficient shows that some potato growers base price expectations on last year's price. High prices for the previous crop lead to increased potato acreage. The coefficient of 1.78 indicates that for each \$1.00 per cwt increase in potato price, Maine potato acreage increases by about 1,800 acres, assuming all other factors remain constant.

Hay appears to be an alternative crop for Maine potato growers. The negative coefficient for last year's hay price variable,  $PRICEH_{t-1}$ , indicates that if hay prices are high, growers tend to keep more land in hay rather than expand potato acreage.

**Effect of mandatory seed law** — The  $MSL$  coefficient of  $-4.05$  suggests that Maine growers planted about 4,000 fewer acres of potatoes after implementa-

tion of the mandatory seed law. However, the relationship is statistically insignificant ( $p = 0.417$ ).

### Seed potato acreage planted

The equation for seed potato acreage entered in the Maine certification program was specified as follows:

$$ACRESP = \beta_0 + \beta_1MSL + \beta_2ACRESP_{t-1} + \beta_3PRICEA_{t-1},$$

where

$ACRESP$  = acres of seed potatoes entered into the Maine certification program and

$ACRESP_{t-1}$  = acres of seed potatoes entered into the Maine certification program the previous year.

All other variables are as previously defined.

The asset fixity rationale for the lagged acreage variable,  $ACRESP_{t-1}$ , is the same as for the total acreage planted equation. Growers who invest in seed potato production assets are likely to continue to plant seed potatoes.

Some Maine seed potato growers apparently use the price of the previous potato crop to set price expectations. The  $PRICEA$  coefficient of 2.58 (Table 6) means that for each \$1.00 per cwt increase in potato price in the current year, Maine seed potato acreage will increase about 2,600 acres the next year. Maine seed potato prices for the previous crop were excluded from the equation. The general price level of all potatoes has had

Table 6. Estimated regression coefficients for Maine potato yield, acreage planted, seed acreage planted, seed rejections, and seed price models.

Variable	Yield (cwt/acre)			Acres planted (1,000 acres)			Seed acres (1,000 acres)			Seed rejections (%)			Seed price (\$/cwt)		
	$\hat{\beta}_i$	SEE	P>[t]	$\hat{\beta}_i$	SEE	P>[t]	$\hat{\beta}_i$	SEE	P>[t]	$\hat{\beta}_i$	SEE	P>[t]	$\hat{\beta}_i$	SEE	P>[t]
Intercept	-19.9	50.60	0.699	51.6	16.50	0.144	-25.4	16.50	0.147	-0.56	11.90	0.964	-4.47	2.32	0.077
MSL	28.0	9.97	0.014	-4.05	4.87	0.417	4.22	5.01	0.415	-7.10	3.08	0.040	1.22	0.69	0.099
LORAIN	-30.1	7.38	0.001												
HIRAIN	-18.5	4.62	0.001												
NORAIN										0.55	0.37	0.166			
HILLS (1,000/acre)	15.8	3.38	0.000												
TUBERS	9.5	3.35	0.013												
GDDA (100 GDD)	-6.0	2.73	0.045												
FROST	0.32	0.24	0.199							0.14	0.11	0.251			
MAYP										-0.066	0.05	0.209			
ACREA				0.69	0.18	0.001									
ACREC													0.091	0.025	0.004
ACRESP							1.22	0.26	0.000	0.21	0.15	0.198			
ACRESC													0.075	0.042	0.097
PRICEA				1.78	0.92	0.070	2.58	0.89	0.013						
PRICEC													2.070	0.200	0.000
PRICEH				-0.44	0.20	0.042									
	R <sup>2</sup> = .89			R <sup>2</sup> = .95			R <sup>2</sup> = .87			R <sup>2</sup> = .84			R <sup>2</sup> = .94		

Note:  $\hat{\beta}_i$ , regression coefficients; SEE, standard error estimates; P>[t], probability of obtaining a larger [t] under the hypothesis  $H_0:\hat{\beta}_i = 0$ .



more of an influence on Maine seed potato acreage than seed prices in particular.

**Effect of mandatory seed law** — The *MSL* coefficient of 4.22 suggests that Maine seed potato acreage increased about 4,200 acres after the implementation of the mandatory seed law. The statistical relationship, however, is insignificant ( $p = 0.415$ ).

### Seed potato acreage rejected

Because one of the goals of mandatory seed laws is to reduce the incidence of potato disease, we also modeled seed potato acreage rejected for certification. The model was specified as follows:

$$REJ = \beta_0 + \beta_1MSL + \beta_2NORAIN + \beta_3FROST + \beta_4MAYP + \beta_5ACRESP,$$

where

*REJ* = percentage of Maine seed potato acreage rejected from the certification program,

*NORAIN* = maximum number of consecutive days during the growing season when no rain was recorded at Presque Isle, and

*MAYP* = percentage of the Maine potato crop that was planted by 30 May.

All other variables are as previously defined.

The positive *ACRESP* coefficient indicates that as seed acreage increases, the rejection rate goes up (Table 6). This may occur when new, inexperienced growers enter the seed market, when growers expand into fields located in less-desirable seed production areas, or when seed growers expand too rapidly to properly care for seed potatoes.

The positive *NORAIN* coefficient suggests that drought-weakened potato plants are more susceptible to disease pathogens than plants that have adequate soil moisture. As the number of consecutive rainless days increases, so does the rejection rate.

The first frost variable, *FROST*, captures the influence of late-season infections. Early killing frosts reduce the likelihood of aphids transmitting the leafroll virus to seed potato plants. A first killing frost that comes later in the season tends to increase the rejection rate.

The percentage of the Maine crop planted by 30 May, *MAYP*, also captures the influence of late-season infections. Seed potatoes that have an early start can be vine-killed earlier to prevent late-season infections. The negative coefficient associated with this variable indicates that crops planted earlier in the season are less likely to be rejected.

**Effect of mandatory seed law** — The *MSL* coefficient of  $-7.1$  indicates that the percentage of Maine certified seed potato acreage that was rejected for

certification declined by 7.1 percentage points after implementation of the mandatory seed law.

### Commercial potato quality

Because our attempts to model commercial potato quality were unsuccessful, we present no results.

### Seed potato prices

The following equation specified Maine seed potato prices:

$$PRICES = \beta_0 + \beta_1MSL + \beta_2ACREC + \beta_3ACRESC_{t-1} + \beta_4PRICEC,$$

where

*PRICES* = average price of Maine seed potatoes, deflated by the farm prices paid index (\$/cwt),

*ACREC* = acreage of commercial potatoes planted in Maine,

*ACRESC<sub>t-1</sub>* = acreage of Maine seed potatoes that passed certification the previous year, and

*PRICEC* = average price of commercial potatoes, deflated by the farm prices paid index.

All other variables are as previously defined.

The positive *PRICEC* coefficient shows that seed potato prices and commercial potato prices move together (Table 6). High commercial potato prices allow growers to bid up the price of seed potatoes.

The commercial acreage planted in Maine, *ACREC*, also has a positive impact on seed potato prices. When commercial acreage expands, the increased demand for seed potatoes supports higher prices for Maine seed potatoes.

Maine seed potato acreage that passed certification the previous year, *ACRESC<sub>t-1</sub>*, is a supply variable. Its negative coefficient indicates that the acreage of seed potatoes produced the previous year is inversely related to seed price. As the supply of seed potatoes increases, the price declines.

**Effect of mandatory seed law** — The *MSL* coefficient of 1.22 suggests that after accounting for other price-influencing variables, including inflation, Maine seed potato prices increased \$1.22 per cwt after the mandatory seed law was implemented.

### Commercial potato prices

Various researchers have estimated the relationship between the supply of fall-crop potatoes and their price. Estimates of price flexibilities have ranged from 2.5 to 5 (Guenther 1987, Hee 1967, and Simmons 1962). This means that a 1 percent increase in the U.S. fall



potato crop can cause a 2.5 to 5 percent average price decrease during that marketing season.

Guenther (1987) found that the impact of a 1 percent increase in U.S. fall potato supply would lead to a price decline of 1.2 percent 5 years later. Likewise, the price impact of the mandatory seed law extends beyond one season. During the first year, increased production encourages lower prices, but growers respond to lower prices by reducing their acreage the following year. The reduced plantings would, in turn, cause prices to increase the year after. The year-to-year dynamics of growers' responses to prices make it difficult to estimate average price impacts that are spread over more than 1 year.

**Effect of mandatory seed law** — If the mandatory seed law did indeed cause Maine potato acreage to decline by an average 4,000 acres and yields to increase by an average 28 cwt per acre, this would have represented about a 1.1 percent increase in U.S. fall potato production. The price effect after 5 years would be a price decrease of about 1.3 percent for all U.S. potato growers. The impact on prices during other years would likely be different.

### *Maine grower profits*

The mandatory seed law may have increased annual profits for a 200-acre Maine commercial potato grower by \$14,700 (Table 7). A grower producing 200 acres of potatoes would have had 5,600 cwt more potatoes

to sell each year because of increased yields. Assuming that increased production caused an average annual 2 percent price reduction, the mandatory seed law reduced grower prices by \$0.10 per cwt during the 1981-88 period. The typical grower also paid an additional \$1.22 per cwt for seed potatoes. The additional cost of harvesting and handling the extra 28 cwt per acre was estimated at \$0.50 per cwt.

Our analysis did not include any impact the mandatory seed law may have had on commercial potato quality. However, it is likely that the mandatory seed law could enhance quality. If so, our analysis underestimates the mandatory seed law's impact on a typical grower's profitability.

**Table 7. Effect of Maine's mandatory seed law on a typical commercial Maine potato grower.**

	Without law	With law	Change
Potatoes (acres)	200	200	0
Yield (cwt/acre)	234	262	+ 28
Total production (cwt)	46,800	52,400	+ 5,600
Price (\$/cwt)	4.94	4.84	- 0.10
Revenue (\$)	231,200	253,600	+ 22,400
Seed cost (\$/cwt)	5.86	7.08	+ 1.22
Planting rate (cwt/acre)	20	20	0
Total seed cost (\$)	23,440	28,320	+ 4,900
Harvest cost (\$/cwt)	.50	.50	0
Total harvest cost (\$)	23,400	26,200	+ 2,800
Cost (\$)			+ 7,700
Change in profit (\$)			+ 14,700

## Summary and conclusions

Research objectives were to determine Idaho potato growers' attitudes toward seed potato issues in general and the mandatory seed law in particular and to estimate the economic impact of mandatory seed laws.

Mail and telephone surveys made in 1989 determined Idaho potato growers' attitudes. A majority (62 percent) of growers supported a mandatory seed law.

Eighty-two percent rated the quality of seed potatoes planted in Idaho as excellent or good. A majority of growers rated seedborne diseases, poor quality of non-certified seed, and the impact of non-certified seed on the reputation of Idaho commercial potatoes as moderate or serious problems.

In response to an open-ended question about the mandatory seed law, many growers expressed concern about the law's potential impact on potato acreage, yields, costs, prices, and profits. A statistical analysis of the Maine mandatory seed law, which was implemented in 1981, provided insight into these issues.

The analysis suggested that Maine's mandatory seed law increased profits for the typical Maine potato grower. The combination of a large increase in yields, slight reduction in commercial potato prices, and increase in seed costs boosted annual average profits nearly \$15,000 for a typical 200-acre commercial grower.

The impact of a mandatory seed law in other states might be similar to its impact in Maine. One key difference might be the law's impact on potato prices. For example, if an Idaho mandatory seed law increased yields by the 28 cwt per acre it did in Maine, Idaho potato production would increase nearly 10 million cwt. This would represent a 3 percent increase in the total U.S. fall crop.

Price declines due to the increased supply would be greater and profits smaller than was the case for Maine. Overall, however, such a law would likely create positive economic benefits for the Idaho potato industry.



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# Idaho Potato Growers: Seed Potato Issues And Concerns

A survey of  
seed potato problems  
and concerns  
of Idaho producers.



First, we are interested in your general opinions about issues affecting the Idaho potato industry.

Q-1 In general, how do you rate the quality of seed potatoes planted in Idaho? (Circle the number of your answer)

- 1..... EXCELLENT
- 2..... GOOD
- 3..... FAIR
- 4..... POOR
- 5..... NO OPINION

Q-2 Below are some possible problems related to seed potatoes. Please indicate whether you think each is a SERIOUS problem, a MODERATE problem, a SLIGHT problem, or NOT a problem in the Idaho potato industry. (Circle the number for your answer on each item)

Problem associated With seed potatoes:	SERIOUS PROBLEM	MODERATE PROBLEM	SLIGHT PROBLEM	NOT A PROBLEM
A. Seed-borne diseases.....	1	2	3	4
B. Ineffective seed piece treatment.....	1	2	3	4
C. High prices for certified seed.....	1	2	3	4
D. Poor quality of non-certified seed....	1	2	3	4
E. Misrepresentation of certified seed...	1	2	3	4
F. Inadequate seed piece size.....	1	2	3	4
G. Unavailable seed varieties.....	1	2	3	4
H. Poor seed cutting sanitation.....	1	2	3	4
I. Inadequate standards for seed certification.....	1	2	3	4
J. The impact of non-certified seed on the reputation of Idaho commercial potatoes.....	1	2	3	4
K. Mechanical limitations of planters....	1	2	3	4
L. Inconsistent quality of certified seed.....	1	2	3	4
M. Commercial growers cannot always afford to buy certified seed.....	1	2	3	4
N. Quality problems in commercial potatoes due to poor quality seed....	1	2	3	4
O. Other problems (specify)	1	2	3	4

Appendix: Survey form

Department of Agricultural Economics and Rural Sociology  
College of Agriculture  
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Moscow, Idaho 83843

1989



Q-3 More specifically, we would like to know which of the following seed-borne diseases are problems for farmers in your area. Please indicate whether you think each is a SERIOUS problem, a MODERATE problem, a SLIGHT problem, or NOT a problem. (Circle the number of your answer on each item)

Seed-Borne Disease:	SERIOUS PROBLEM	MODERATE PROBLEM	SLIGHT PROBLEM	NOT A PROBLEM
A. Bacterial ring rot.....	1	2	3	4
B. Leafroll.....	1	2	3	4
C. Blackleg.....	1	2	3	4
D. Mosaic.....	1	2	3	4
E. Potato virus X.....	1	2	3	4
F. Nematodes.....	1	2	3	4
G. Other (Please specify)				
_____	1	2	3	4

Another important purpose of this study is to learn more about how farmers feel about various ways to maintain seed potato quality in Idaho.

Q-4 Listed below are some ways that have been suggested for maintaining seed potato quality. Please indicate whether you think each one would be VERY effective, SOMEWHAT effective, or NOT effective in controlling diseases. (Circle the number of your answer for each item)

Suggestion for maintaining quality in seed potatoes:	VERY EFFECTIVE	SOMEWHAT EFFECTIVE	NOT EFFECTIVE	DON'T KNOW
A. A flush-out or limited generation requirement for Idaho seed potato certification.....	1	2	3	4
B. A regulation requiring full disclosure of certification records.....	1	2	3	4
C. A law requiring that all Idaho potatoes must be planted with certified seed.....	1	2	3	4
D. A separate set of certification regulations for growers who only grow seed for their own use.....	1	2	3	4
E. Other (Please specify)				
_____	1	2	3	4

Q-5 To what degree do you favor or oppose a state regulation which would require all Idaho potato growers to use certified seed potatoes for planting? Circle the number of your answer)

- 1..... STRONGLY FAVOR
- 2..... SOMEWHAT FAVOR
- 3..... SOMEWHAT OPPOSE
- 4..... STRONGLY OPPOSE
- 5..... NO OPINION

Q-6 We would like to know more about your views concerning a state regulation which would require potato growers to use certified seed. Please tell us how you feel about this issue in the space provided.

Please turn to next page for more questions



Next, we would like to ask about your farm operation.

Q-7 Which of the following most closely represents the PRIMARY type of farm operation you have? That is, which category has generated the highest GROSS income over the past 3 years? (Circle the number of your answer)

- 1..... LIVESTOCK OPERATION
- 2..... GRAIN OPERATION
- 3..... POTATO OPERATION
- 4..... OTHER

Q-8 Indicate the percentage of your potato acreage that was planted with the following types of seed potatoes. Please estimate an average for the past 3 years. (The total should equal 100%)

- A. Tagged seed from a seed certification program..... \_\_\_\_\_ %
  - B. Untagged seed from a seed certification program..... \_\_\_\_\_ %
  - C. Year-out seed grown on your own farm..... \_\_\_\_\_ %
  - D. Year-out seed purchased from someone else..... \_\_\_\_\_ %
  - E. Some other type of seed..... \_\_\_\_\_ %  
(Specify \_\_\_\_\_)
- TOTAL = 100 %

Q-9 Over the past 3 years, what percent of the seed you planted was purchased? (Circle the number of your answer)

- 1..... NONE → Skip to Q-10
- 2..... 1 TO 25 PERCENT
- 3..... 26 TO 50 PERCENT
- 4..... 51 TO 75 PERCENT
- 5..... 76 TO 100 PERCENT

Q-9a What percentage of your purchased seed is from each of the following sources? Please estimate an average for the past 3 years. (The total should equal 100%)

- Idaho \_\_\_\_\_ %
  - Oregon \_\_\_\_\_ %
  - Montana \_\_\_\_\_ %
  - Canada \_\_\_\_\_ %
  - Other \_\_\_\_\_ % → Specify the source
- TOTAL = 100 %

Q-10 Over the past 3 years what has been the average number of acres of potatoes you have grown for both commercial and seed markets?

Commercial acres \_\_\_\_\_

Seed acres \_\_\_\_\_

Q-11 What is your typical potato planting rate in hundredweight (sacks) per acre?

\_\_\_\_\_ Hundredweight/acre

Q-12 We would like to know which of the following seed-borne diseases are a potential threat on your farm. Please indicate whether you think each is a SERIOUS problem, a MODERATE problem, a SLIGHT problem, or NOT a problem on your farm. (Circle the number of your answer for each item)

Seed-Borne Disease:	SERIOUS PROBLEM	MODERATE PROBLEM	SLIGHT PROBLEM	NOT A PROBLEM
A. Bacterial ring rot.....	1	2	3	4
B. Leafroll.....	1	2	3	4
C. Blackleg.....	1	2	3	4
D. Mosaic.....	1	2	3	4
E. Potato virus X.....	1	2	3	4
F. Nematodes.....	1	2	3	4
G. Other (Please specify)				
_____	1	2	3	4



Finally, we would like to ask some background information for statistical purposes.

That is all the questions we have. We'd like to thank you for taking the time to fill out this questionnaire. If you have any additional concerns or suggestions regarding the Idaho potato industry, please write them here.

Q-13 In what Idaho County is your farm located? (If your farm is in more than one county, please indicate the county where most of your potatoes are grown.)

\_\_\_\_\_ County

Q-14 What is your age?

Age \_\_\_\_\_

Q-15 Please identify the category which best describes the highest level of education you have attained. (Circle the number of your answer.)

- 1 ..... ELEMENTARY SCHOOL (8th grade or less)
- 2 ..... SOME HIGH SCHOOL
- 3 ..... HIGH SCHOOL GRADUATE
- 4 ..... VOCATIONAL TRAINING BEYOND HIGH SCHOOL
- 5 ..... SOME COLLEGE
- 6 ..... COLLEGE GRADUATE
- 7 ..... ADVANCED COLLEGE DEGREE

Q-16 Please circle the number of the category below which represents your gross farm income before expenses and taxes in 1988.

- 1..... LESS THAN \$50,000
- 2..... \$50,000 to \$99,999
- 3..... \$100,000 to \$199,999
- 4..... \$200,000 to \$299,999
- 5..... \$300,000 to \$399,999
- 6..... \$400,000 to \$499,999
- 7..... \$500,000 to \$749,999
- 8..... \$750,000 to \$999,999
- 9..... \$1,000,000 OR MORE

Many thanks for your help! Please use the enclosed self-addressed envelope to return this questionnaire.

A summary of the results will be available within the next few months. If you would like a copy, please write on the back of the return envelope "results wanted" and your name and address. Please do not place this information on the questionnaire itself.

Questionnaires prepared by  
Social Survey Research

