GEOGRAPHICAL AND OTHER SHIFTS IN WASHINGTON POTATO PRODUCTION */

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Potatoes were probably brought to Washington by the earliest settlers. Among the earliest settlers were representatives of the Hudson's Bay Company. They established commercial farms in western Washington at Fort Vancouver and on the Cowlitz prairie during the 1820s and 1830s. 1/

The earliest USDA record of potato production in Washington was in 1882. In that year, Washington was reported to have grown 8,000 acres with a yield of 88 cwt. and a total value of $934,000. In that same year, total U.S. acreage was 2.21 million acres. (The 1985 crop for all seasons was 1.36 million acres.)

The major producing states in 1882 were New York (380,000 ac.), Pennsylvania (196,000 ac.), Ohio (150,000 ac.), Illinois (161,000 ac.), and Michigan (156,000 ac.). 2/ None of these states is now among the top five producing states.

Closer to home, Idaho had 2,000 acres in 1882, while Oregon had 11,000 acres. In fact, in terms of acreage harvested, Washington was not surpassed by Idaho until 1921.

During the early years of settlement in Washington, potato production was located close to the centers of population. Lack of decent transportation facilities made it difficult for producers in outlying areas to deliver potatoes to cities at a competitive price. Further, lack of water in some areas made it difficult to grow potatoes.

At the turn of the century, Spokane, King, and Clark counties were major producing areas. Of the counties currently producing large acres of potatoes, only Adams County had over 100 acres.

As roads improved and railroads started completing their routes, there was a decided shift of production away from metropolitan centers and into areas that had yield advantages. Because of early irrigation developments, Yakima and Kittitas counties rapidly expanded potato production shortly after the turn of the century.

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By the mid-1930s, Yakima County dominated the Washington potato industry. Clark, King, and Spokane counties were in a downward trend in production from which they have never recovered.

The Yakima figures are somewhat misleading because part of the Yakima Valley is in Benton County. Production in Yakima Valley stayed above 10,000 acres until 1960. However, the data seems to say that, over time, production slowly moved from the north to south. It is likely disease was a key factor in this shift.

The next major shift began in the late 1940s and early 1950s. Yield reports for some of the early basin project potato production were nearly as good as the state average today. Grant County potato growers in 1948 were recording yields of 475 cwt. Meanwhile, yields in Yakima County were running about 330 cwt.

In addition to low yields, diseases were a problem in Yakima County. Hoobler mentions net necrosis as a major problem for both intermediate and late season production. [37]

Russet Burbank was the leading variety at that time. White Rose was another popular variety, particularly for early season shipments. Other varieties grown included early Pontiacs and Bliss Triumphs.

Prior to the shift into the Columbia Basin, Washington did not have a comparative advantage in yields. Our yields were comparable to most other growing areas, including Idaho, but were below those of Maine and California.

When Hoobler was writing his bulletin, the Columbia Basin was just beginning to open up. He recognized the potential for the potato industry, but even his wildest dreams were inadequate to appreciate how the industry would prosper. He "guesstimated" that 35-40,000 acres would be allocated to potato production. Today, the three major counties in the Columbia Basin (Grant, Adams, and Franklin), combine to produce about 80,000 acres yearly.

The low point in total acreage in Washington occurred in 1952 (26,000 ac.). It is likely that it would have been even lower without the potato price support programs during and after WWII. Yes, potatoes had price supports at one time. During WWII, there was concern about having an adequate supply of potatoes. Therefore, the Secretary of Agriculture formally asked farmers to grow more potatoes. According to the law at that time, when the Secretary specifically requested production of any commodity, he was required to support the price. The price support program lasted from 1942 through the 1950 crop. [47]

Since 1952, there have been two other shifts in potato production in Washington. First, by tracking county acreage data, we can follow the expansion of irrigation in the Columbia Basin.

The loss of the price support program caused production to decline in all counties in the early 1950s. Then acreage started to increase. First, Grant County farmers began planting more potatoes. Then production expanded to Adams and Franklin counties. Acreage in those three counties continued to increase until the 1976 crop. Recent acreage data show the influence of the market with both increasing and decreasing acreages from year to year.

Benton County production has not been directly influenced by the Columbia Basin project and consequently reflects somewhat different production trends. Benton County continued the long-term decline in potato acreage until the mid-1960s. Total acreage in that county went from 820 acres in 1966 to 24,000 acres in 1978. Since that time, acreages have fluctuated in much the same way as the other counties in response to market conditions.

Meanwhile, the old producing areas have become insignificant. King County production is no longer reported separately. Spokane and Clark counties are down to about 300 acres per year. Yakima County production has stabilized at about 1,400-1,500 acres.

The other major shift that seems apparent from the data is the introduction of processing. Processed products were apparently available in the late 1940s, but consumers were not generally acquainted with them. A 1947 consumer survey indicated that only about half of the U.S. population had ever heard of either frozen fries or potato flour. Further, only about 10-12 percent of the population had tried them.

The slow, but steady growth in consumption of frozen fries has had a major impact on Washington. Major acreage increases occurred when processing plants were built. The first such shift occurred in 1955 and 1956. Grant County was the location of this increase in acreage. For the next ten years, state acreage ran about 8-10,000 acres above the level in the early 1950s. Grant County acreage grew during that time, albeit somewhat erratically.

The second major increase in acreage occurred in 1965 and 1966. Grant, Franklin, and Adams counties all benefited in this shift. Then in 1973 and 1974 Benton County acreage really jumped. In 1972, acreage in Benton was 7,100 acres. By 1974, it had increased to 18,500 acres.

Since 1976, state acreage has probably been more heavily influenced by the fresh market. Acreage contracted for processing does not normally expand or contract very rapidly from year to year. In fact, with consumption per capita continuing to increase, slight increases in contracted acreage might be expected from year to year. Fresh market prices, then, become a major factor in change in total acreage from year to year.

WHERE FROM HERE

Washington's potato industry could be viewed as entering a mature phase. Further, major shifts like those of the past are unlikely. Since the industry and the supporting infrastructure is solidly in place, only radical changes in costs or consumption could cause a decline in the industry.

Change will occur, but they will be slow in coming. The sources of change will come from both the market side and on the input side. These sources of change will operate in opposite directions. How well they offset each other is a debatable issue.

Turning to the input side first. Energy cost increases are beginning to hit hard. The effects of electrical rate increases can be seen in the low pressure systems being installed today.

Rising electrical rates have a differential effect on growers depending on their water source and soil type. A study was recently completed at Washington State University that shows that differential effect. 5/

Using research data on potato varieties provided by Drs. M. W. Martin and D. E. Miller, an analysis was made of the effects of increasing electrical rates. The work included four different experiments by Martin and Miller. Data were evaluated from experiments on the Roza (1979, 1980) and at Paterson, Washington (1979, 1981). The varieties included in the 1979 work were Nooksack, R. Burbank, Lemhi, and Butte. The 1980 experiment included Nooksack, R. Burbank, Kennebec, and Lemhi. The 1981 experiment included the same varieties as 1979 along with #148.

All replications were analyzed from the processing point of view. The value of each replication was calculated on the basis of a base price with incentives for U.S. #1s, specific gravity, and ten ounce and larger tubers. Data were not available on bruise-free. From the estimated per-acre values was deducted charges for irrigation, fertilization, and harvest costs.

Three different irrigation schemes were included in the analysis. One system represented a center pivot system using ground water. The second system was a center pivot using surface water (i.e., Columbia Basin project water). The third system was rill irrigation using surface water. There are no electrical costs associated with the third system.

All costs and returns were based on 1981 values. The base electrical rate was .017¢ per KWH.

Differences in Costs

Cost differences among the systems are significant. However, because of the uncertainties surrounding available labor supplies, it is not likely that we will see a major shift back to rill irrigation. For that reason, the focus here is on the difference between having access to project water and using ground water.

The difference in total costs per acre due to two sources of water was about $150. We recognize that depth of the well and size of center pivot system will affect the total cost. For the sake of discussion, we will assume this a reasonable estimate for 1981. (Constant dollars were used so valid comparisons can be made among years.)

In addition to the initial difference in costs, as electrical rates increase, ground water users will be increasingly disadvantaged relative to growers with access to project water. Our work indicated that, as electrical rates increase, irrigation costs using ground water increased 10 percent more rapidly.

The shift to low pressure systems is an indication of what electrical rates are doing to irrigation costs. As time goes on, rates are likely to continue increasing. The end result is going to be a shift away from ground water usage. In other words, in the longer term, we will likely see a higher percentage of Washington potato acreage within the boundaries of the Columbia Basin project.

A second, and probably longer term shift will be caused by soil type. Crops grown on sandy soil require more water than crops grown on heavier soils.

The evidence here comes from the 1979 experiments at Paterson and the Roza. At the original electrical rate charges (.017¢/KWH) production from the sandy site generated higher returns. A doubling of the electrical rates resulted in better returns coming from the silt loam soil. Of the four varieties evaluated, only Butte did not generate better returns on the silt loam soil after the rate increase.

As production shifts to heavier soils, variety becomes more important. Our statistical tests indicate significant differences among returns. Data from the 1979 Roza plots indicated significant differences at all levels of application rates. In the 1980 Roza experiment, the differences were significant except at the lowest application rates.

The results from the Paterson plots did not reflect statistically significant differences among varieties in either year.

Over the longer term, then, we are likely to see several changes in potato production. Production will become more heavily concentrated in those areas of the Columbia Basin project where soils are heavier. Further, a wider range of varieties will be needed to maintain our competitive advantage. Variety selection will need to focus on both early and late season production.

Soil type needs to be considered as well. The best income generator on sandy soils may be a poor producer on heavier soils; or, require substantially different production practices.

SOURCES OF GROWTH

Since the Washington potato industry is already well established, it is unlikely to decline in importance, either locally or nationally. At the same time, there does not appear to be any major changes in the near future. The key to Washington's current position in potato production has been processing. It took nearly 30 years for processing usage to stabilize. There does not appear to be anything on the horizon that has the potential impact of processed products.

Sources of growth for the industry are likely to come from three different directions. The export market is one such source. The Pacific Rim countries are developing a taste for processed potato products. Markets currently exist in major metropolitan cities throughout the area. However, sustained long-term growth will be tied closely to growth in income. The economic health of these countries indicates that exports will continue expanding. The increased volume each year, however, will probably be measured in terms of 10s of acres. If the dollar continues to weaken, additional growth can be expected.

Another source of growth will be the domestic market. Population growth, as slow as it is, will increase total consumption of potatoes. Feeding that growth will be difficult because of competition from other producing areas.

The thing that will help Washington share in the domestic growth is the third source--quality. The ability to produce and market quality potatoes will help Washington maintain and even improve its position in the market.

The fresh market currently says that we are selling potatoes as good as anyone. The price differential between Washington and Idaho, for example, is now nearly nonexistent. This is probably partly weather related. But the opportunity to compete head-on with Idaho gives marketers the opportunity to show the quality of Washington potatoes.

Another factor in Washington's favor is the ability to provide the desired size of potato. As time goes on, increasing emphasis will be placed on count cartons. Besides the institutional trade, changes in the household in terms of both size and time will generate greater interest in uniformity. Volume sales (i.e., bags) will become less important because of the low volume consumed fresh at home. If we assumed that all fresh consumption occurred in the home, the average household would need one 10 lb. bag per month.

The more likely response by food buyers will be to select the number of potatoes needed for the meal or meals. That selection will be based on external appearance and uniformity of size. Microwave cooking requires uniformity of size and that will influence purchase patterns.

The bottom line is producing and marketing quality potatoes. Factors that are obviously important include meeting the #1 grade standard, have the appropriate size, and have a high specific gravity.

Washington already grows potatoes with those qualities. The future growth of the industry will depend on two factors. One is continued production of high quality potatoes. The second is continued emphasis on marketing--both domestically and in the export arena. Some people argue that quality sells itself and some of the time it probably does. But, not everybody recognizes quality. Some customers need to be educated and promotion does that.

SUMMARY

Like every dynamic industry, the Washington potato industry has covered a lot of ground since its beginnings at Fort Vancouver. Transportation and irrigation brought the industry to central Washington and its current importance. Changes will continue to occur. The geographic shifts will not be as dramatic, but they will continue.

Because of expanding markets and the ability to produce quality potatoes, Washington will remain a key player in the potato game.

Footnotes:

1/ For a brief history of Washington agriculture, see Washington State Department of Agriculture Atlas of Washington Agriculture. Olympia, Washington, 1963.

2/ USDA, AMS. Crop Reporting Board, Potatoes, Statistical Handbook #251. Washington, DC, June 1959.

3/ Hoobler, S. Q. Some Aspects of the Competitive Position of the Washington Potato Industry. Station Circular No. 118. Department of Agricultural Economics, Institute of Agricultural Sciences, the State College of Washington, Pullman, Washington, October 1950, p. 8.

4/ Gray, R. W., V. L. Sorenson, and W. W. Cochrane. Price Supports and the Potato Industry. Station Bulletin 424. Agricultural Experiment Station, University of Minnesota, St. Paul, Minnesota, January, 1954, pp. 5-6.

5/ Lawanka, Osman. An Economic Analysis of Alternative Potato Varieties. Unpublished M.S. thesis. Department of Agricultural Economics, Washington State University, Pullman, Washington, 1984.

WASHINGTON POTATO DATA, 1882-1984

Year	Acreage Harvested (1,000)	Yield per acre (cwt.)	Seasonal Average Price	Production (1,000 cwt.)	Value of Production ($1,000)
1882	8.0	88	1.33	701	934
1883	9.0	61	0.92	551	505
1884	10.0	86	0.50	858	429
1885	10.0	75	0.58	750	438
1886	11.0	77	0.90	851	766
1887	11.0	73	0.75	799	599
1888	12.0	75	0.57	900	510
1889	13.0	66	1.00	858	858
1890	14.0	78	1.00	1092	1092
1891	16.0	83	0.63	1325	839
1892	17.0	67	0.83	1142	952
1893	18.0	75	0.65	1350	878
1894	20.0	74	0.47	1476	689
1895	22.0	82	0.47	1808	844
1896	20.0	76	0.67	1524	1016
1897	22.0	94	0.47	2059	961
1898	22.0	74	0.65	1637	1064
1899	25.0	85	0.83	2130	1775
1900	27.0	71	0.78	1912	1497
1901	29.0	71	1.02	2053	2087
1902	34.0	82	0.63	2774	1757
1903	33.0	85	0.60	2812	1687
1904	35.0	68	0.93	2394	2234
1905	42.0	80	0.77	3352	2570
1906	44.0	76	0.93	3326	3105
1907	47.0	87	0.83	4089	3408
1908	51.0	68	1.12	3488	3895
1909	58.0	79	0.87	4594	3981
1910	55.0	68	1.33	3729	4972
1911	57.0	79	1.33	4514	6019
1912	67.0	83	0.58	5588	3260
1913	58.0	76	0.90	4385	3946
1914	56.0	71	1.05	3965	4163
1915	58.0	76	1.07	4420	4714
1916	57.0	84	2.08	4788	9975
1917	75.0	66	1.43	4950	7095
1918	62.0	68	1.65	4204	6936
1919	55.0	66	3.18	3630	11556

CONTINUED

Year	Acreage Harvested (1,000)	Yield per acre (cwt.)	Seasonal Average Price	Production (1,000 cwt.)	Value of Production ($1,000)
1920	53.0	99	1.78	5247	9357
1921	57.0	96	1.50	5472	8208
1922	64.0	99	0.85	6336	5386
1923	51.0	96	1.32	4896	6446
1924	48.0	90	1.78	4320	7704
1925	51.0	93	2.52	4743	11937
1926	53.0	108	1.65	5724	9445
1927	61.0	114	1.32	6954	9156
1928	54.0	90	1.03	4860	4922
1929	46.0	99	2.40	4554	10930
1930	53.0	96	1.30	5088	6614
1931	51.0	93	0.80	4743	3794
1932	51.0	96	0.67	4896	3199
1933	52.0	108	1.13	5616	6365
1934	57.0	98	0.90	5575	5017
1935	48.0	102	1.23	4896	6038
1936	43.0	109	1.93	4696	9078
1937	44.0	120	0.68	5280	3608
1938	42.0	108	0.95	4536	4309
1939	37.0	115	1.00	4240	4240
1940	37.0	129	0.92	4773	4375
1941	35.0	135	1.40	4725	6615
1942	33.0	123	2.52	4059	10215
1943	46.0	138	2.38	6348	15129
1944	32.0	141	2.35	4512	10603
1945	34.0	159	2.42	5406	13064
1946	39.0	168	2.15	6552	14087
1947	30.0	219	2.45	6570	16096
1948	34.0	228	2.38	7752	18476
1949	29.0	222	2.30	6434	14798
1950	31.0	230	1.80	7115	12769
1951	28.0	232	2.19	6504	14481
1952	26.0	241	3.13	6268	19497
1953	27.0	240	1.22	6482	7864
1954	30.0	271	1.68	7926	13361
1955	36.0	254	1.05	9630	9630
1956	39.0	244	1.58	10200	16038
1957	36.0	249	1.34	9960	13398
1958	42.0	240	0.94	10920	9887
1959	35.0	240	1.47	9660	14389

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Year	Acreage Harvested (1,000)	Yield per acre (cwt.)	Seasonal Average Price	Production (1,000 cwt.)	Value of Production ($1,000)
1960	35.0	288	1.89	10075	18996
1961	43.0	300	0.98	12890	12642
1962	39.0	301	1.17	11737	13691
1963	35.0	335	1.28	11720	14968
1964	39.0	305	2.36	11685	27795
1965	51.5	356	1.59	18088	28709
1966	58.0	376	1.69	21830	36878
1967	64.0	345	1.55	22090	34130
1968	64.0	378	1.67	24173	40377
1969	71.7	416	1.59	29796	47286
1970	87.0	386	1.51	33590	50566
1971	78.0	386	1.40	30110	42095
1972	75.0	418	2.09	31365	65480
1973	82.0	430	2.90	35260	102254
1974	98.0	420	3.65	41160	150234
1975	105.0	460	3.15	48300	152145
1976	124.0	450	2.50	55800	139500
1977	110.0	460	2.80	50600	141680
1978	109.0	465	2.45	50685	124178
1979	102.0	475	2.55	48450	123548
1980	87.0	505	4.40	43935	193314
1981	108.0	490	3.95	52920	209034
1982	110.0	480	3.75	52800	198000
1983	104.0	520	4.25	54080	229840
1984	115.0	495	4.65	56925	264701

Source: Crop Reporting Board AMS, USDA, Potatoes, Stat. Bul. #251, Washington, D.C. June, 1959 and Washington Agricultural Statistics, various issues.

POTATO ACREAGE FOR SELECTED WASHINGTON COUNTIES

	ADAMS	BENTON	FRANKLIN	GRANT	KITTITAS
year	acres	acres	acres	acres	acres
1899	401	--*	6	--	618
1909	840	505	179	428	1331
1919	565	606	21	521	771
1924	136	1202	164	238	568
1929	81	1881	198	198	1829
1934	94	3548	261	377	4654
1939	24	2398	141	459	7198
1944	21	1031	60	2345	5163
1949	70	5800	240	5100	5200
1950	50	7500	220	4500	3550
1951	50	7200	350	3500	3300
1952	40	6000	400	4500	3000
1953	40	6200	500	6400	2000
1954	350	4400	650	8800	2400
1955	1250	3700	1590	14500	2450
1956	2600	3500	1800	16950	2150
1957	3540	3500	2160	14100	2100
1958	3600	4630	3700	16340	2200
1959	3110	4600	3200	16130	2000
1960	3800	2200	2870	14400	1400
1961	4500	2200	5320	19300	1500
1962	3700	2400	5400	18450	1500
1963	5990	1160	4680	15850	810
1964	5910	1210	6840	15700	650
1965	8200	890	10400	21880	750
1966	9900	820	13100	24400	800
1967	10500	1630	13450	28200	650
1968	10000	2100	15000	26800	870
1969	10000	3200	16000	30600	1000
1970	12800	2400	19500	37800	700
1971	12500	5000	18600	29300	400
1972	11200	7100	16500	26200	400
1973	13000	12000	15900	28500	600
1974	14400	18500	17500	32000	900
1975	15500	18700	19000	34500	900
1976	21000	22000	23200	38000	900
1977	18000	21500	22300	30400	650
1978	15500	24000	24700	30900	600
1979	13700	23500	21500	29800	400
1980	13600	18000	18600	25500	500
1981	18500	21100	22300	33700	650
1982	16000	18000	28400	33700	500
1983	16000	17600	25200	31650	950
1984	18000	20000	28400	34000	1000

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	SPOKANE	WALLA WALLA	YAKIMA	CLARK	KING
year	acres	acres	acres	acres	acres
1899	3479	607	--	2071	1874
1909	9717	1152	6893	3302	3989
1919	9856	621	7393	4172	3069
1924	7697	567	12473	3349	1423
1929	6038	764	15502	3799	1049
1934	7135	1186	17563	3084	1652
1939	3777	475	6605	1441	299
1944	2618	331	8322	544	186
1949	1400	150	11500	825	60
1950	575	90	8175	750	40
1951	625	35	7500	750	310
1952	380	120	5800	550	30
1953	410	110	6500	600	40
1954	800	280	6300	475	65
1955	800	250	7500	550	70
1956	850	300	7300	300	55
1957	450	260	8500	450	90
1958	450	500	9000	730	70
1959	400	530	8560	950	100
1960	300	350	4700	650	120
1961	380	310	4350	600	140
1962	340	280	3350	750	150
1963	60	130	1920	690	180
1964	60	100	2500	680	190
1965	80	50	2600	780	130
1966	250	1200	2650	630	100
1967	240	1250	3000	780	80
1968	150	550	3800	800	0
1969	120	2500	3600	800	--
1970	120	4800	3800	800	--
1971	100	2800	4000	800	--
1972	100	4200	3200	750	--
1973	200	3500	3000	650	150
1974	250	3800	3000	650	130
1975	200	6000	3100	600	120
1976	300	8000	3200	600	100
1977	200	7200	2600	540	--
1978	150	5900	1600	600	--
1979	150	6300	1200	450	--
1980	200	3900	1000	500	--
1981	200	4200	1600	500	--
1982	200	6500	1800	400	--
1983	200	5800	1400	200	--
1984	300	5600	1400	300	--

* Not reported or included with other counties.
Source: U.S. Census of Agriculture, various issues. Washington Agricultural Statistics, various issues.