Present status of the industry

Oregon's agricultural diversity

More than 220 different crops and livestock commodities are produced by farmers and ranchers in Oregon. The range in geographic elevations and micro climates, soils, and weather conditions create opportunities for many different crops and livestock.

As can be observed from figure 4.1, no single commodity dominates the industry. A comparable chart for many other states would show four or five specific crops comprising up to 90 percent of all agricultural output. In Oregon, a simple visual scan of the landscape can tell the observer there is very little uniformity about agricultural production.

Telling the tale of Oregon agriculture, or state of the industry, is therefore a complicated undertaking. To analyze each commodity would take volumes. See the chart on the following page for a summary of the top 50 commodities, with a brief commentary following.

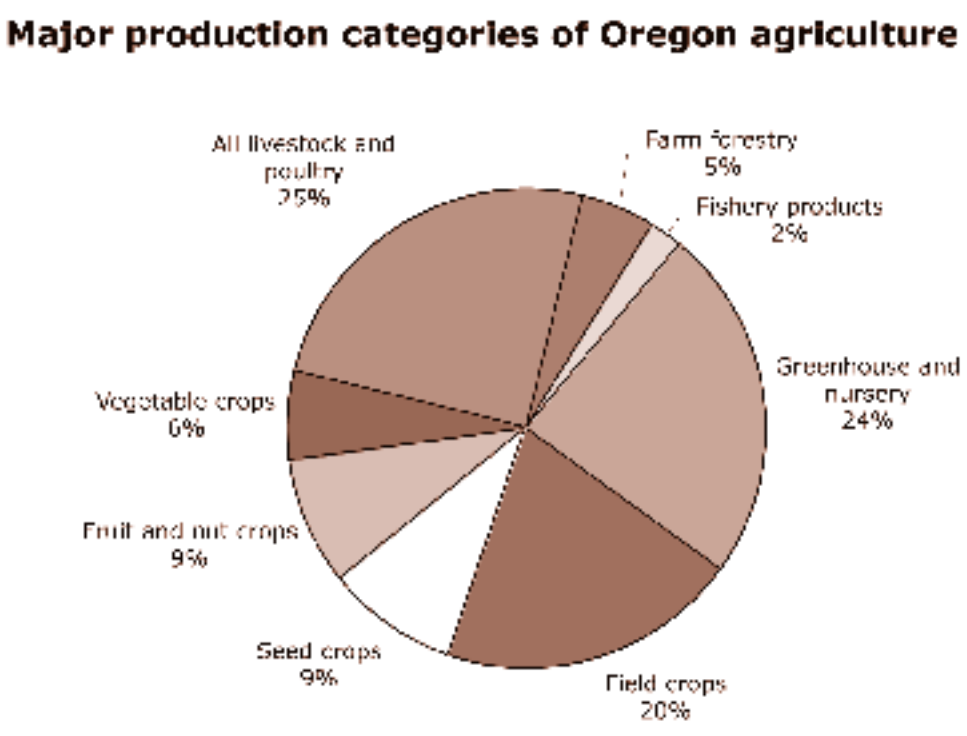


Figure 4.1. Source: USDA/ Oregon Agricultural Statistics Services, 2005.

Figure 4.2 Top 50 commodities by value of production and percentage of sales.

Table 11 - Value of agriculture and fishery production: By commodity, Oregon, 2003-2005

Commodity	2005 rank	Year of production			2005 as % of all commodities
		2003	2004	2005	
		1,000 dollars	1,000 dollars	1,000 dollars	Percent
Value by commodity groups					
All commodities		3,689,108	4,178,893	4,306,222	100.00
All farm production (less fishery)		3,616,514	4,085,144	4,195,126	97.44
All crops		2,595,360	2,806,304	2,847,297	66.[illegible]
Greenhouse, nursery and tree farms		[illegible]	988,[illegible]	1,005,699	23.42
Field crops		682,[illegible]	800,[illegible]	[illegible]	18.64
Seed crops		[illegible]	[illegible]	[illegible]	9.[illegible]
Fruit and nut crops		[illegible]	[illegible]	[illegible]	[illegible]
Vegetable crops		267,739	257,107	286,291	6.[illegible]
All livestock and poultry products		[illegible]	1,0[illegible]	[illegible]	[illegible]
Forest products, farm		108,781	256,409	235,30[illegible]	6.57
Fishery products		72,594	[illegible]	112,096	[illegible]
Top 50 commodities					
Greenhouse and nursery products	1	779,[illegible]	[illegible]	877,[illegible]	20.[illegible]
Cattle and calves	2	[illegible]	503,[illegible]	530,[illegible]	12.38
Grass seed, all	3	390,[illegible]	350,782	370,901	8.[illegible]
Milk	4	272,128	365,200	378,283	8.99
Hay, all	5	213,202	271,892	355,100	8.25
Wheat, all	6	197,320	206,339	182,084	4.22
Potatoes, all	7	112,62[illegible]	101,[illegible]	128,[illegible]	2.[illegible]
Christmas trees	8	145,401	[illegible]	125,[illegible]	2.94
Onions, all	9	85,[illegible]	[illegible]	94,[illegible]	[illegible]
Pears, all	10	67,[illegible]	[illegible]	63,[illegible]	1.48
Broilers	11	59,[illegible]	[illegible]	61,[illegible]	1.44
Eggs	12	[illegible]	[illegible]	50,[illegible]	1.1[illegible]
Crab landings, Dungeness	13	25,[illegible]	[illegible]	49,62[illegible]	1.1[illegible]
Grapes	14	36,216	32,30[illegible]	42,099	0.98
Cherries, all	15	44,555	40,819	37,300	0.87
Blackberries	16	28,[illegible]	24,[illegible]	35,[illegible]	0.8[illegible]
Blueberries	17	20,[illegible]	22,418	33,[illegible]	[illegible]
Mint for oil	18	[illegible]	[illegible]	[illegible]	[illegible]
Sweet corn, all	19	[illegible]	[illegible]	[illegible]	[illegible]
Grass and grain straw	20	27,[illegible]	[illegible]	[illegible]	[illegible]
Hazelnuts	21	26,[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	22	[illegible]	25,[illegible]	[illegible]	[illegible]
Snap beans, processing	23	[illegible]	[illegible]	[illegible]	[illegible]
Apples	24	22,[illegible]	26,[illegible]	21,[illegible]	0.[illegible]
Hops	25	21,[illegible]	19,[illegible]	20,[illegible]	0.4[illegible]
Groundfish landings, all	26	17,[illegible]	16,[illegible]	18,[illegible]	0.4[illegible]
Raspberries	27	[illegible]	11,[illegible]	18,[illegible]	0.42
Cranberries	28	[illegible]	16,[illegible]	[illegible]	[illegible]
Strawberries	29	[illegible]	[illegible]	[illegible]	[illegible]
Squash and pumpkins	30	[illegible]	[illegible]	[illegible]	[illegible]
Peppermint / [illegible]	31	[illegible]	[illegible]	[illegible]	[illegible]
Vegetable and flower seed	32	[illegible]	[illegible]	12,[illegible]	0.2[illegible]
[illegible]	33	11,117	11,066	12,0[illegible]	0.28
Garlic	34	10,940	[illegible]	[illegible]	0.2[illegible]
Sugarbeets	35	10,806	14,692	[illegible]	0.2[illegible]
[illegible]	36	8,[illegible]	10,[illegible]	[illegible]	0.2[illegible]
Salmon	37	[illegible]	[illegible]	[illegible]	0.24
[illegible]	38	[illegible]	[illegible]	[illegible]	[illegible]
Tuna, albacore landings	39	[illegible]	[illegible]	[illegible]	[illegible]
Shrimp landings, all	40	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	41	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	42	[illegible]	[illegible]	[illegible]	[illegible]
Watermelons	43	[illegible]	[illegible]	[illegible]	[illegible]
Green peas, processing	44	[illegible]	[illegible]	[illegible]	[illegible]
Hybrid poplars	45	[illegible]	4,[illegible]	[illegible]	[illegible]
[illegible]	46	[illegible]	[illegible]	[illegible]	[illegible]
Sugarbeet seed	47	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	48	[illegible]	[illegible]	[illegible]	[illegible]
Dry edible beans	49	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	50	[illegible]	[illegible]	[illegible]	[illegible]
Other commodities					
Other vegetable crops		84,[illegible]	81,[illegible]	[illegible]	[illegible]
Other livestock and poultry		[illegible]	[illegible]	[illegible]	[illegible]

The top 15 commodities comprise nearly 80 percent of total production, but the diversity and flavor of Oregon is dispersed among the entire list of agriculture's entrée.

Greenhouse and nursery production have led the state in value of production and sales for nearly a decade. However, if one takes a comprehensive look at livestock (primarily beef cattle and dairy) and the feed stocks (hay, feed grains, field corn, silage, etc.) that are used to support this segment, it will be noted that over $1 billion in economic output is generated, representing nearly a quarter of all agricultural value in Oregon.

Metrics of farm economic health

Gross value of production

Total value of production has followed a steady upward trend line over the past two decades. Growers have continued to adopt technologies, operational efficiencies, and new production methods that have enabled expanded output despite a shrinking land base.

Production value

In nominal dollars, the production value of the industry has more than doubled in the past two decades.

Agriculture is cyclical and will always have ups and downs due to weather, policies, world markets, and other factors. But the general trend in overall output is upward.

Understanding farm income numbers

Value of production—the estimated value of total farm output in a given calendar year, including crops produced, livestock born, etc. This is usually larger than cash receipts because some crops and livestock can be held over to the following year or used as future breeding stock.

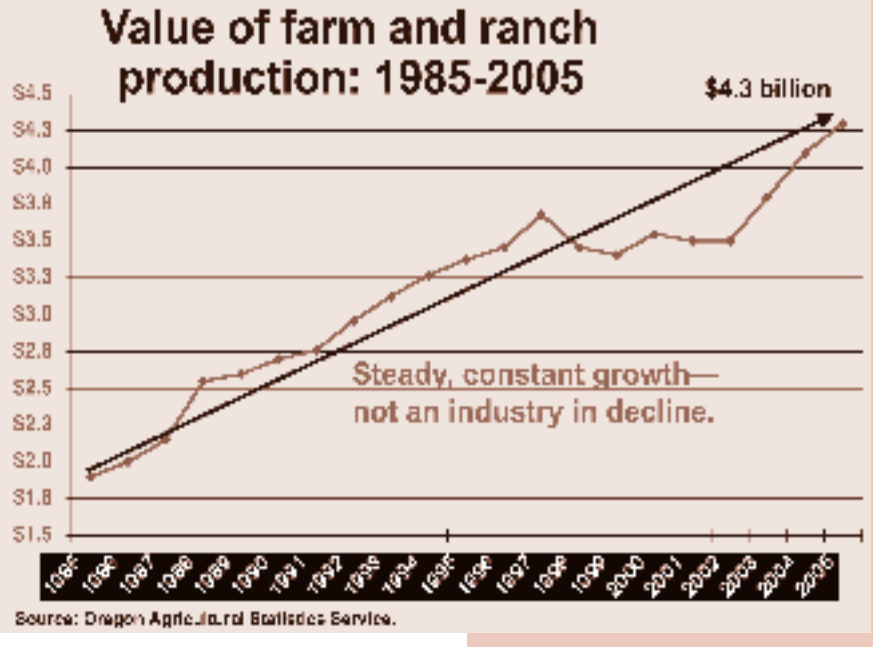
Farm cash receipts—actual sales from farm crops and livestock or other products in a given calendar year.

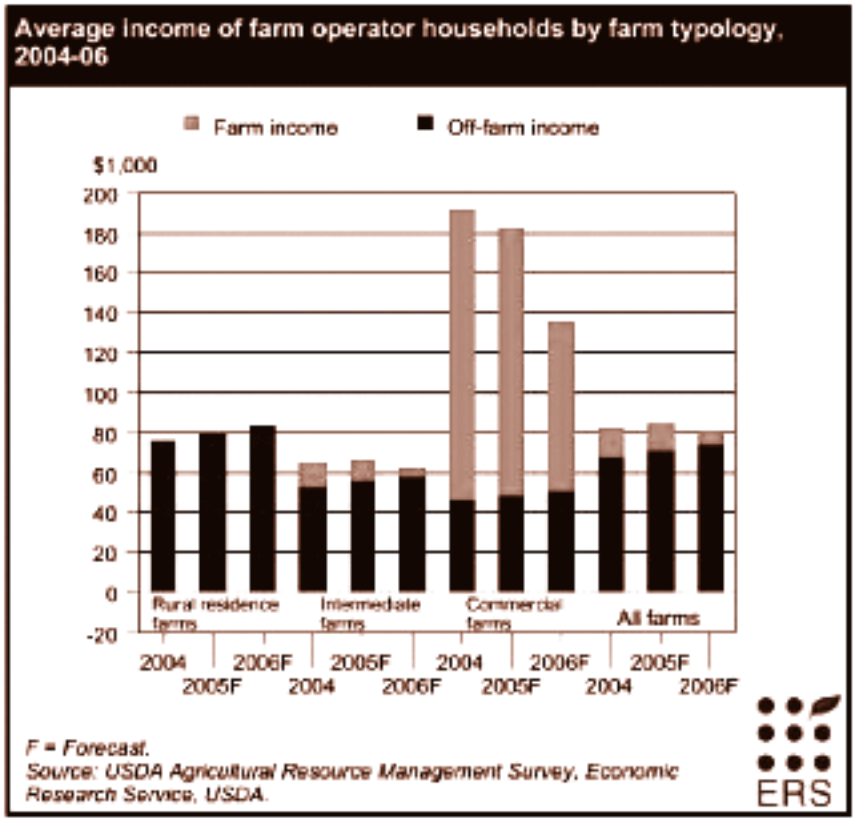
Gross farm income—includes farm cash receipts and other sources of farm income, such as custom harvesting or other equipment services for other growers, custom seed cleaning for other growers, government payments, farm forest sales (managed as timber, not farm commodity production), etc.

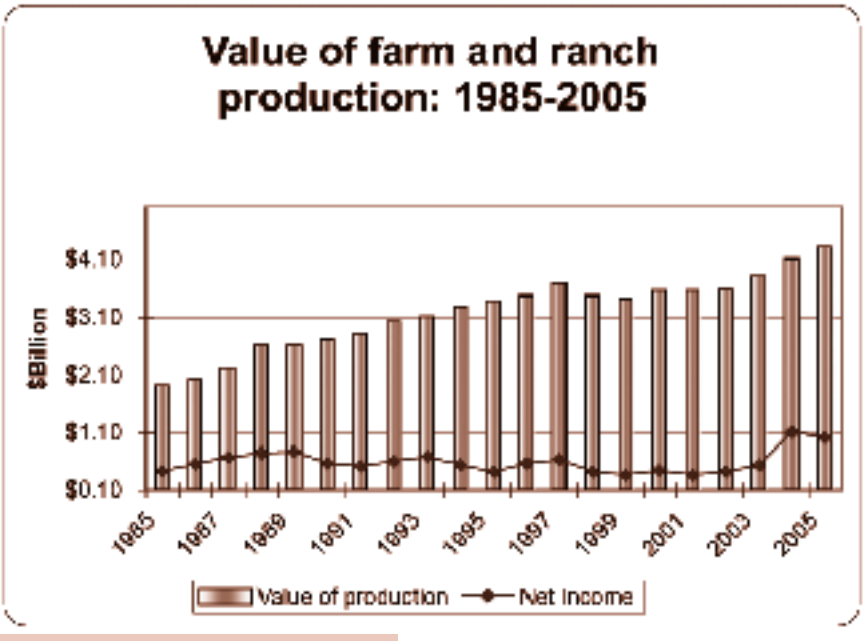
Net farm income—Computed as gross farm income less purchased inputs (fuels, feeds, fertilizers, seeds, electricity, marketing and storage costs, etc.), and subtracting payments to employees, land rental costs, interest on loans, land taxes and farm vehicle registration fees.

Household farm income—Net farm income plus other sources of income available to a farm household, such as off-farm employment income, investment income, etc.

Note: Adjustments to these measures are sometimes made by accountants or economists for categories such as inventory carryover, home use of farm products, capital depreciation, and other categories depending on whether the purpose is for calculating total value-added, income tax calculations, broad industry analysis, or for other purposes.







Household farm income

Household farm income, as noted in earlier discussion, is a combination of farm-related income and off-farm income, particularly for smaller operations.

As can be seen from Figure 4.4, household farm income hit a high in 2004 and has declined significantly in 2005 and 2006 as expenses have taken a large bite out of revenues. Larger farms tend to have less off-farm income but more total income than other rural residents or non-commercial farms. Note: Figure 4.4 is for national averages rather than Oregon-only data.

Net farm income

Net farm income is the amount of income left after accounting for the cost or expense of producing the crops and livestock. Oregon growers have been expending an increasing share of production value into the cost of realizing that output. In other words, each dollar of production value has generally cost more over time.

In 1985, Oregon growers spent about 78 cents worth of inputs to achieve $1.00 worth of output, leaving 22 cents of "net income" to be used for household living expenses, land payments, income taxes, record keeping, and new investments in equipment and farm improvement.

In 1995, growers spent 88 cents to achieve the same $1.00 worth of output, leaving 12 cents of net income. And in 2005, with improved output and growers

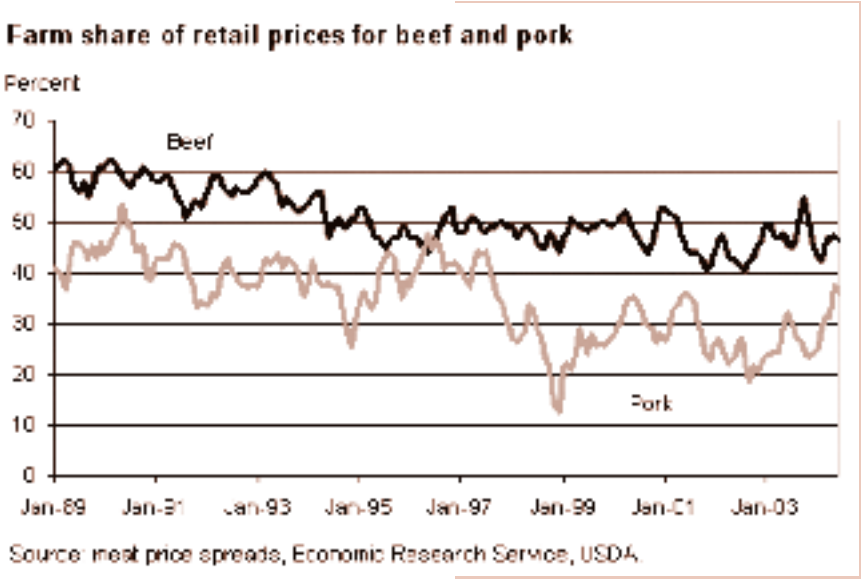
cutting back on inputs, the cost relationship moderated some to 81 cents of costs to $1.00 output, leaving 19 cents net.

Net income is defined as pre-tax (before income taxes are paid). However, some taxes are treated as expenses, such as vehicle registration, property taxes, etc. and are subtracted from gross income.

It is also important to note that net income is from the business side of the equation. From the net, growers then pay themselves. In other words, they still have to pay family living expenses for food, personal vehicles, housing, health insurance, retirement, etc. Further, land costs, if a grower is purchasing land rather than renting or leasing, are not treated as an expense by accountants. Principal payments on land are viewed as an investment. Land payments, therefore, are also made out of net income, as are income taxes.

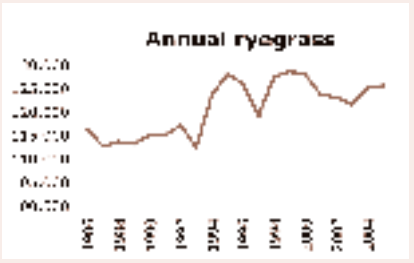
Hence, the saying: "Farmers are cash poor and asset rich." Over time, land and equipment is where equity is invested. There is very little cash that isn't obligated either to the business for land and equipment payments, operating expenses, or to the family for living expenses and those inevitable taxes.

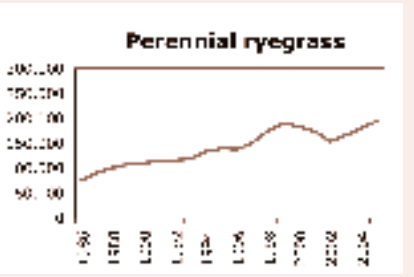
While it is true that productivity increases have cushioned the rise in input costs and have added revenue through volume, farmers still face another challenge—an increasingly concentrated wholesale and retail market. As buyers become more concentrated, with fewer competing buyers, prices to growers are pressured downward.

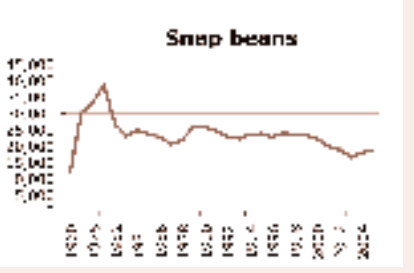


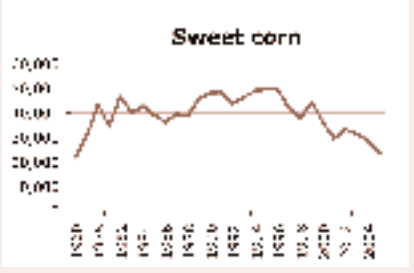
In virtually every category of production, the farmer's share of the retail food dollar has retreated over time. The following chart depicts this trend in meat prices over the past decade. For all meats, growers receive about 31 cents of each retail dollar. The share of retail expenditures on wheat and other grains is very low, under five cents on the dollar. For fresh fruits and vegetables, the farmer receives about 25 cents per retail dollar spent, and on processed fruits and vegetables, about 19 cents. For dairy products, growers receive about 34 cents of each retail dollar. On average, over all commodities, the farmer's share of a retail basket of food is about 20 cents for every dollar spent by the consumer.

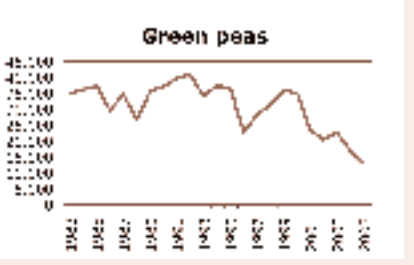
The rest of the consumer dollar pays for transactions after the food leaves the farm, such as processing, packaging, labor, transportation, wholesale and retail margins and profits.

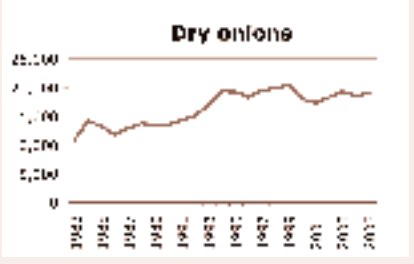


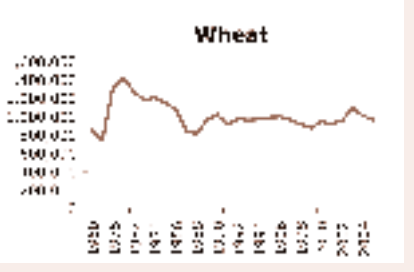


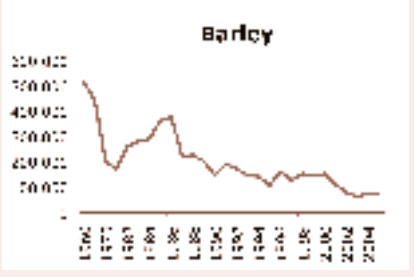


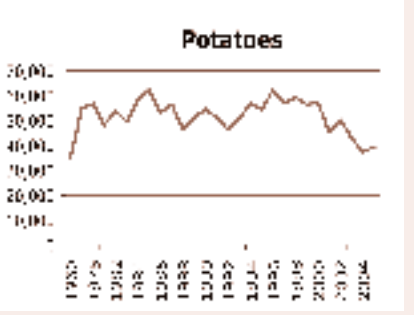


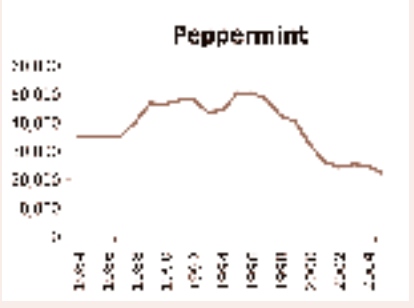


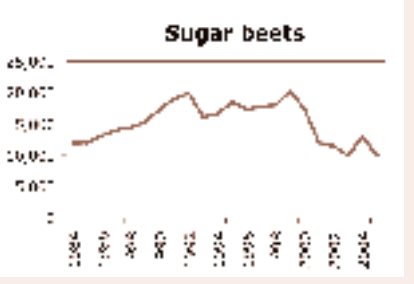












Acres in production

All of the trends, pressures, and technologies that have been discussed are reflected in the following acreage charts. The loss of vegetable processing in Oregon is evident in lower acreage for those crops and increases in others.

The charts show the cyclical nature of agriculture and the risks faced by growers due to weather, markets, and pests. Trends are evident in some commodities, and those that are currently more profitable evidence an upward momentum.

While fish and other seafood are sometimes not thought of as agriculture, harvesters are much like land-based growers in bringing in a crop. Overall poundage of landings in Oregon has been on a general upward trend, while the composition of the catch has shifted substantially with less salmon and tuna, more groundfish, and more Dungeness crab. Fishery products were valued at $110 million in 2005—a critical economic driver for Oregon coastal communities.

Tree fruits

Acreage is down but production stays relatively level. The Oregon Agricultural Statistics Service reported 39,260 acres of fruit trees in 2006. This compares to 49,465 acres of fruit trees in 1986—a loss of 10,205 acres or 21 percent of Oregon's acreage in fruit tree production.

The number of trees in production over this time period, however,

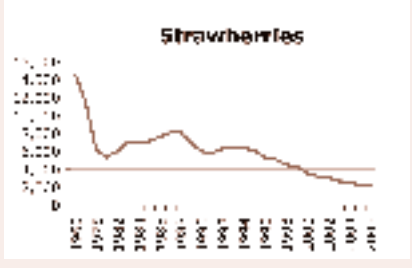
has increased from 5.85 million to 7.99 million, due to denser plantings, particularly in apples.

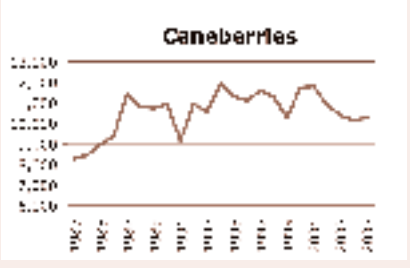
Apple trees per acre have gone from 189 to between 480 and 560, depending on which year is examined for recent plantings (2000 to the present). Pear plantings have increased from roughly 150 trees per acre to over 300 in some varieties. Sweet cherry densities have increased from about 95 trees per acre to over 200 per acre in recent plantings. Peaches have also increased from about 140 trees per acre to over 200 in some instances. Prune and plum trees have followed the same trend, increasing from 100 trees per acre to over 200.

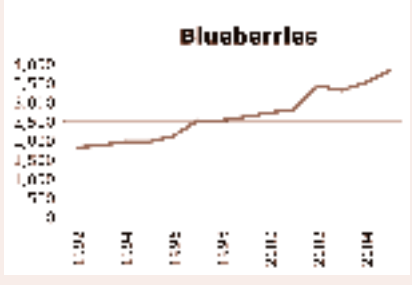
Despite acreage reduction, apple production is about equivalent to early 1980 levels. Acreage has declined by 50 percent from 10,000 acres to 5,000 acres, but improved varieties and yields, along with concentrated densities, have kept utilized production in the general area of 160 million to 180 million pounds (it varies year to year based on price, weather factors, and market demand).

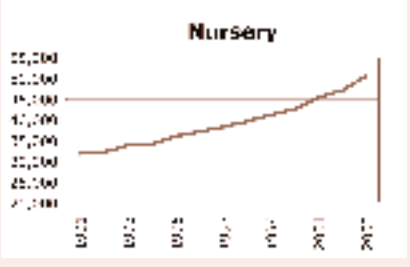
Sweet cherry acreage has increased from 12,790 in 1986 to 14,100 acres in 2006, with most of the increase in Wasco and Hood River counties. Utilized production swings significantly from year to year, peaking at 52,000 tons in 1992 and hitting a low of 29,000 tons in 2002. Utilization was back up to 42,000 tons in 2004, dropping to 33,000 tons in 2005. Cherries are subject to weather impacts of frost, rain, and heat damage, which can affect output and quality. Overall, market demand for sweet cherries continues to grow.

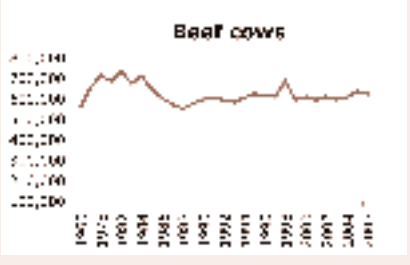
Bartlett pear utilization is slightly lower than 20 years ago, but other pear varieties have stayed relatively level. All other tree fruit production has declined significantly (peaches, tart cherries, prunes and plums).

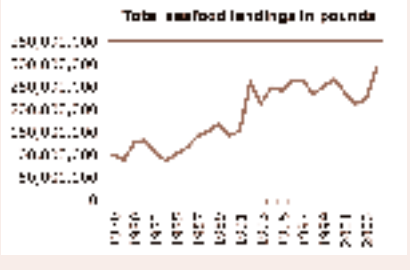












The preservation of a maximum amount of the limited supply of agricultural land is necessary to the conservation of the state's economic resources and the preservation of such land in large blocks is necessary in maintaining the agricultural economy of the state and for the assurance of the adequate, healthful and nutritious food for the people of this state and nation.

—Oregon's Agricultural Land Use Policy, ORS 214.243

Land use issues and impacts

Roughly 17.1 million acres (28 percent of Oregon's land mass) are engaged in agricultural production. About 3.5 million acres are classified as cultivated acreage that is planted and tended for annual harvesting. Another half-million acres are in fallow rotation with wheat production, and an equal number are enrolled in conservation uses. Nine million acres are in pasture lands and rangelands used for livestock. The remaining acreage is in woodlands, farm buildings, farm ponds, and miscellaneous use.

The disappearance of high value farmland and depletion of the soil have become important policy issues in many countries throughout the world. From 1950 to 1980, over one-third of the increase in world food production—with the need to feed an ever-increasing world population—was due to the expansion of arable land under cultivation.

But supply of readily available land is limited. Absolute constraints exist on agricultural land expansion in Japan, Europe, Southern Asia, and many areas of China, North Africa, and the Middle East.

Between 1950 and 1971, US farm output increased 50 percent, while consumer prices remained relatively stable. If the same farming methods had been used in 1971 as in 1950, an equivalent abundance of food and other products would have cost consumers two to three times as much and required more land under cultivation.
(National Academy of Sciences, 1975, Agricultural Productivity.)

From 1970 through 2000, productivity has continued to increase even faster.

Productivity increases in agriculture have direct benefits for consumers. Consider that 70 years ago consumers spent more than 25 percent of their disposable income on food items. As agricultural productivity increased, Americans spent about 20 percent of their income on food about the time today's baby boomers were born. By 1970, the food expenditure was reduced to 15 percent of income. And by 2000, for the first time in history, Americans, on average, were spending less than 10 percent of their disposable income on food.

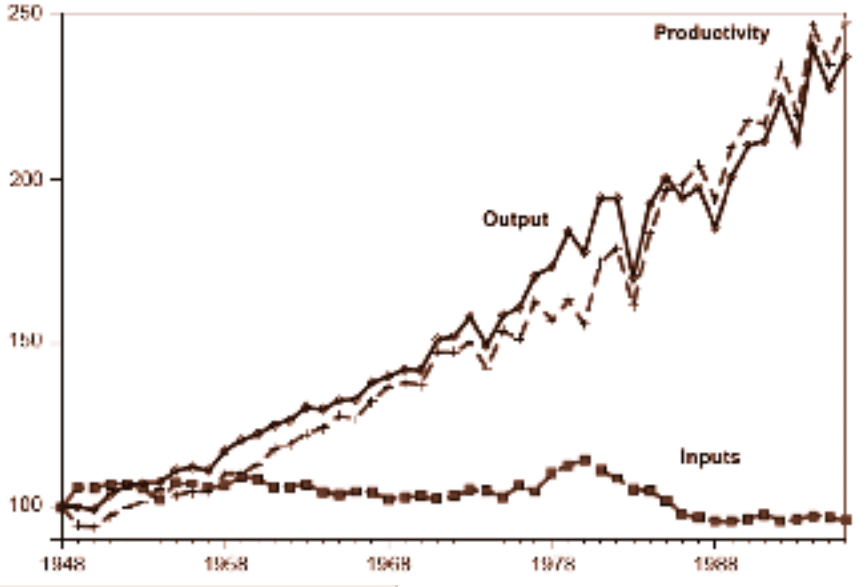


Chart 4.7: Growth in agriculture productivity, output, and inputs, 1948-1996

Source: USDA.

While technology can compensate for some amount of agricultural land lost to other uses, there is a clear connection and requirement to land availability as an input to continue sustainable levels of production. Conversion of agricultural lands to other uses has many implications.

For example, loss of land to urban or industrial uses brings an increase in paved or covered areas. This leads to several negative impacts.

- More direct runoff into streams.
- Higher ambient temperatures resulting from blacktop surfaces and roofed areas.
- Reduced open space and loss of wildlife habitat.
- Reduced carbon sequestration capacity and more vehicle emissions leading to increasing carbon in the atmosphere and implications for more global warming.
- Loss of local food production capacity.
- Loss of local businesses that support local agriculture production.

While Oregon's land use laws, developed in the 1970s, slowed farm land conversion to other uses, it didn't stop it. With varying urbanization pressures across the state, some areas needed strict protection and other areas needed more flexibility. But, many citizens felt the system didn't allow for these needs or desired uses of private property. The result was initiative Ballot Measure 37, voted into law in 2005. Measure 37 states that owners of private real property are entitled to receive "just compensation" when a land use regulation is enacted after they (or a family member) became the owners of the property, if the regulation restricts the use of the property and reduces its fair market value. In lieu of compensation, the measure also provides that the government responsible for the regulation may choose to "remove, modify, or not apply" the regulation.

Seventy percent of Oregon's highest quality soils are in the Willamette Valley where more than 70 percent of the population resides and where the population growth pressures are sure to increase. It is estimated that 200,000 people will be added to Oregon's population by 2010 (Portland State University estimates), while farmland acreage is projected to be reduced by 300,000 acres (using five year incremental loss data from 1982). (Refer to chart 2.3 for population trends and ag land loss in Oregon).

The following is an excerpt from a 2004 report by 1000 Friends of Oregon titled: "Too Many Homes on the Range: The impact of rural sprawl on ranching and habitat."

Today rural areas across the West are undergoing a transition in demography, economics, and ecosystems as more residential development is built outside of cities, suburbs, and towns. In western states, the footprint of "exurban" development is now five to ten times larger than the urban footprint. Low-density exurban and "ranchette" development is often interspersed with working farms and ranches or near formerly remote locations along public-private ownership boundaries. As exurban and ranchette

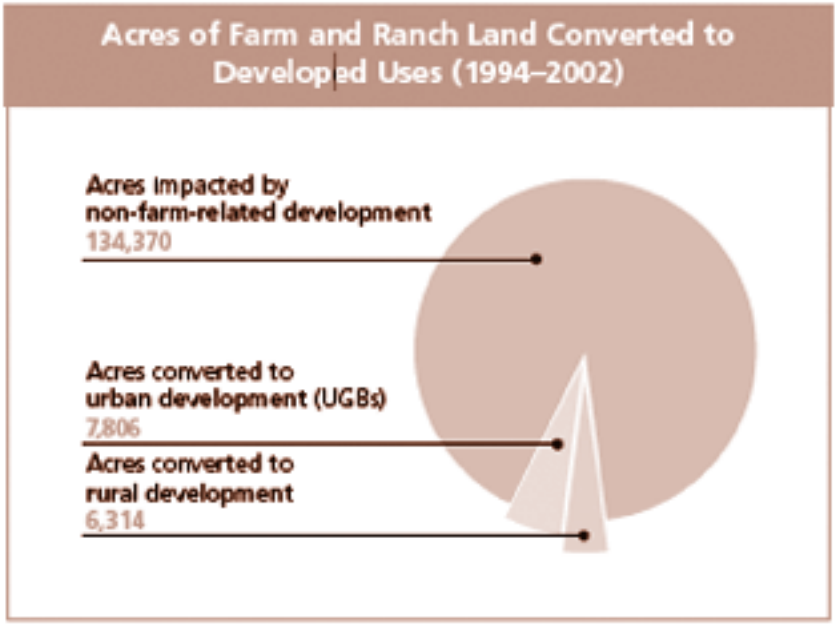
development replaces working ranches, ranchers and wildlife are driven out and displaced.

A growing body of research suggests that ranches can and do provide ecological benefits. Studies conducted in Colorado, Texas, and Wyoming show that ranches provide large, unfragmented landscapes that many plants and animals need to thrive. In contrast, low-density exurban and ranchette development breaks these landscapes apart, putting biodiversity, habitat, and ecological processes at risk.

The report further delineates that Oregon loses agricultural land to urban expansion at a rate of about 870 acres per year. Less known are the additional 700 acres of agricultural land lost each year as farm and ranch lands are rezoned for rural development (rural residential, rural commercial, rural industrial) outside of urban growth boundaries. However, both of these effects are overshadowed by ranchettes, rural home sites, and vacation homes built on farm and ranch lands. Every year, approximately 15,000 acres of farm and ranch lands are impacted by new residential development unrelated to agricultural uses in Oregon. This is 10 times the number of acres rezoned for urban or rural development, combined. While these lands remain zoned for agricultural use (EFU), such development frequently takes land out of production, and fragments the agricultural land base. In cases where land is not immediately taken out of production, it is at risk of conversion as the land is resold (which happens with greater frequency by non-farmers and non-ranchers). In addition to the impact on ranching, rural sprawl "fragments ranchlands, creating social and ecological edges that eventually diminish the rangeland ecosystem."

The report makes several recommendations to address this growing problem:

1. **Support Oregon family ranchers at the grocery**



store. Buy local beef, lamb, and other agricultural products. There is no ranchland without ranchers.

2. **Promote efforts to reduce the loss of ranchlands in Central and Eastern Oregon.** Ranching is particularly vulnerable to fragmentation and increasing land costs that further threaten its viability. Oregon has protected more ranchland through exclusive farm use zoning than any other state has through agricultural conservation easements. However, there is a significant role for other complimentary tools (such as agricultural conservation easements and transferable development credits) to protect strategic ranchlands, provide for additional conservation values, and assure that ranches are maintained in large enough parcels to be economically viable and environmentally sustainable. This effort should be funded at the state level and implemented locally, working with ranchers, environmental and conservation organizations, local officials, and the larger community of interest in the area.
3. **Increase dialogue between ranchers, environmentalists, state and local policy makers.** There is an opportunity in Oregon to have collaborative discussions and influence policy development for the protection of Oregon's ranchlands, and related wildlife, habitat, and biodiversity.
4. **Increase understanding of the economic impact of ranchlands.** Counties should be encouraged to conduct an analysis of the economic contributions of ranching. Such a fiscal impact analysis should also examine the economic impact of rezoning ranchlands to other uses (e.g. low-density ranchette development and rural residential zoning) in order to better understand the cumulative financial impact that rural residential development will have on the county.
5. **Increase understanding of the public costs of rural sprawl.** Studies on the cost of community services should be conducted for Central and Eastern Oregon, particularly in areas with the highest rates of ex-urban and ranchette development.
6. **Invest in programs that add value to ranch products.** Continue to support and expand programs like the Food Innovation Center and Oregon State University Extension Service that add value to ranch products and help those ranchers who wish to transition beyond the commodity market.

Water issues and impacts

Water quality and quantity are paramount for agriculture production.

Water quality

Many efforts in water quality protection and enhancement have evolved over the years. Soil and Water Conservation districts have existed since the 1940s. Federal programs to address soil and water quality have existed for many years as well.

To address specific water quality challenges in Oregon, mostly related to fish habitat, the 1993 Oregon Legislature passed Senate Bill 1010, creating the Agriculture Water Quality Program at the Oregon Department of Agriculture (ODA).

The legislation authorized ODA to develop Agricultural Water Quality Management Area Plans (area plans) to address water quality issues associated with agricultural activities, and gave ODA the authority to adopt rules to implement the area plans. Senate Bill 502, passed in 1995, gave ODA the responsibility for regulating agricultural practices with respect to water quality.

The State Board of Agriculture provided ODA with the following policy direction for implementing the Agriculture Water Quality Program around the state:

- Develop goal-oriented approaches, not prescriptive approaches.
- Accommodate differences between geographic areas.
- Focus on voluntary initiatives and approaches to plan goals.
- Provide clear enforcement provisions to be utilized where needed as a backstop.
- Meet agriculture's responsibilities for complying with multiple water quality laws.
- Proactively address agricultural water quality issues.
- Address fish habitat concerns related to water quality to provide the broadest possible protection for farmers and ranchers relative to both water quality and fish regulatory programs.

The Agriculture Water Quality Program is designed to assist agriculture in meeting a variety of state and federal water quality mandates, including the Clean Water Act, Groundwater Management Act, Safe Drinking Water Act, Coastal Zone Management Act, and the National Estuary Program. Combined with voluntary and regulatory programs, it also helps meet agriculture's commitments to the Oregon Plan for Salmon and Watersheds.

From 1996 to early 2004, ODA worked with agricultural producers and others in the industry around the state to develop 39 area plans to address agricultural water quality issues. The area plans cover all agricultural areas of the state except federal, reservation and tribal trust lands.

With the adoption of the area rules to implement the plans, the focus of the Agriculture Water Quality Program has shifted to working with the agricultural community, Soil and Water Conservation

Districts (SWCDs), and other partners to accomplish the goals outlined in the area plans and rules.

SWCDs are key local sources of information, technical assistance, and financial resources for landowners. Landowner requests for assistance with management system planning, project design, and funding exceed current SWCD staffing capacity to provide the service. Additional funding for SWCD technical assistance providers is needed to keep pace with growing landowner interest in water quality improvement efforts.

Through an agreed scope of work, Soil and Water Conservation Districts assist in developing and reviewing grant applications for on-the-ground projects, monitoring, outreach, and technical assistance. SWCDs and ODA staff also provide support to the Oregon Conservation Reserve Enhancement Program (CREP), a federal program, to recommend funding for CREP technical assistance in 10 regions for the 2006-2007 fiscal year.

Thousands of outreach materials, activities, training sessions, and interactions have been produced to educate landowners about projects to improve water quality. Changes in management practices and improvements that landowners accomplish on their own are common, but difficult to document because of the diversity of operations and privacy issues. Regional SWCDs report that requests for assistance far exceed their ability to respond. The Soil and Water Conservation Commission (SWCC), an advisory body to the ODA, and the Oregon Association of Conservation Districts estimate a minimum of three full-time certified resource technicians are needed in each district to meet the workload demands. Current state funding supports 75 percent to 80 percent of one full-time staff member in each district. This indicates that significant progress in water quality and support of beneficial uses could be made if additional staffing and project funds were available to SWCDs.

A comprehensive monitoring program is another essential component to demonstrating that agricultural practices protect water quality and that conditions are improving. Trend monitoring of landscape conditions and water quality is also important to show landowners their efforts are effective. Monitoring and measurement programs are being developed and implemented as resources are available.

Water quantity

Next to land availability and soil sustainability, water is the lifeblood of agriculture production. Even in Western Oregon, where the winters are wet, irrigation is needed in the dryness of summer when plant growth requires adequate moisture.

Nearly 45 percent of Oregon farms irrigate some or all of their land, totaling 1.9 million acres under irrigation. Oregon ranks third of all states in the number of farms that use irrigation, and ninth of all states in the number of acres irrigated. Indeed, 62 percent

of harvested cropland relies on irrigation, and irrigated farms produce 77 percent of the total value of harvested crops.

About 8 percent of Oregon agriculture's irrigation water comes from reservoirs, another 14 percent from groundwater sources, and 78 percent from surface water rights in rivers and streams.

While irrigation of agricultural lands is the largest use of water in Oregon, the amount diverted from above ground sources is a fraction of the volume that flows through to the ocean.

For example, producers in Eastern Oregon make a point of emphasizing that approximately 93 percent of water in the Columbia and Snake River System flows to the Pacific Ocean. Idaho removes about 4 percent of the water, and Washington uses about 3 percent, mostly for agriculture irrigation. Projects developed in Oregon that access Columbia River water amount to one-half of 1 percent (0.5 percent) of the flow. Without irrigation in eastern Oregon, desert dominates and cropping options are minimal. Water is the link to economic viability.

The same is true in other arid areas of the state. The Klamath Irrigation Project uses just 3 percent to 4 percent of total flows into the ocean in a delivery system that is one of the most efficient in the western US. Yet this project receives routine criticism from those who advocate more water for in-stream purposes.

Farmers have made significant advances in irrigation efficiencies and conservation. The center-pivot irrigation systems used in Eastern Oregon and irrigation systems in other areas of the state use laser-guided land leveling, low-pressure sprinklers, soil moisture sensing, auto-adjusted irrigation to fit plant needs, and piped delivery for minimum evaporation loss. These are the most efficient and technologically advanced irrigation systems in the world on this scale of usage. Drip irrigation is more efficient in water use, but impractical in cost on a large scale.

Research in conservation and efficiency continues; drought tolerant plants are slowly being developed; canals and irrigation ditches are being lined, piped or covered; and pumping efficiencies are increasing. Even so, additional storage is critical to the future needs of the state, including agriculture. Forward thinking is necessary to get beyond fighting over the same size pie. The population will increase. All demands on water will increase. Storage and delivery, in all areas,

Irrigation by County

1.	Klamath	242,153 acres
2.	Malheur	223,263 acres
3.	Lake	194,320 acres
4.	Harney	133,008 acres
5.	Baker	127,077 acres
6.	Umatilla	121,909 acres
7.	Marion	100,415 acres
8.	Morrow	94,798 acres
9.	Crook	77,861 acres
10.	Union	64,901 acres

require policy makers to take action, and soon.

As many observers point out, there isn't enough water under current collection, distribution, and usage regimes to meet the needs of agriculture, urban growth, the environment, and wildlife. Increased conservation and efficiency in all uses can help, but these mechanisms can't solve the dilemma alone. More water—when it is needed during peak summer demand—will require a thoughtful combination of solutions.

To diversify and expand on the economic, social, and environmental benefits of agriculture (including wildlife habitat and feed, open spaces, carbon sequestration, etc.), increased access to water is a message being delivered loud and clear by farmers around the state.

Building large irrigation projects associated with dams may not be society's first choice, but this option cannot be completely ruled out if we are to be honest about the future. If projections about global warming are anywhere near accurate, early snow melt and more rain require increased capacity to capture water during fall and winter for usage in spring and summer, not only for agriculture, but for all uses.

Snowpack is the largest natural reservoir in Oregon and around the western US. If climate change means more water coming off the mountains sooner in the season, and more moisture in the form of rainfall, this necessitates capturing the runoff at different times and in different ways than our current infrastructure allows and anticipates.

There are a variety of methods to accomplish this, some of which will require legislative changes and resource allocation. These projects are not accomplished quickly, so it necessitates action by appropriate federal, state, and local agencies and law making bodies to engage in bold and serious discussions, planning, project development and resource commitment.

One method is to inject surface water into underground aquifers during periods when above-ground water is in excess supply throughout winter months. Projects could be associated with municipal treated water or irrigation systems when appropriately structured. When needed, water can be pumped from the wells during dry months.

Another method of storing more water is to enable construction of on-farm storage ponds. A third method is off-stream storage diversion. On-stream storage should not be ruled out, even examining if current storage structures could be enhanced. Finally, desalinization of seawater, technology that is used in several other countries, may be feasible as Oregon is situated next to the Pacific Ocean.

All of these methods, and others, can be designed for minimal impacts on fish or other wildlife, and bring about substantial benefits to local economies.

To pipe or not to pipe?

Irrigation canals and ditches, the traditional delivery methods of irrigation water, have, over decades, created unique ecosystems around them—waterways that are used by wildlife, and groundwater recharge that supplies many a residential user's well.

The interest in piping or lining these canals and ditches to conserve water (preventing evaporation and leakage) carries many implications for consideration. What about the neighboring wells? What about the ecosystems that have built up around these delivery waterways? What about overall groundwater recharge? What about livestock access to water that has traditionally been available?

Every decision about water has multiple implications for consideration.

Transportation Infrastructure

Agriculture relies on a variety of transportation modes to move products to processors, wholesalers, and various markets (foreign and domestic), including truck, rail, barge, and air freight. The most efficient mode of moving all goods is by water. However, the water system is estimated to be under-utilized by 60 percent, and transportation funding (primarily gasoline taxes) is dedicated only to highway-related improvements in Oregon, hampering development of other modes. The ConnectOregon funding is helping with some of the other modes, but the needs are significant.

Truck

The highway system in Oregon outside of the Salem to Portland corridor is able to handle agricultural commodity movement. The geographical situation in Portland, where the Willamette and Columbia rivers merge, defies highway modernization without massive capital influx. Interstate 5 is used as a local road, thus creating an impediment to interstate commerce. The interstate system, authorized in the late 1950s, is in dire need of bridge replacement, widening, over-paving, rail crossings, etc. Some of these improvements are underway, but much remains to be done. Southeastern Oregon and parts of Northeastern Oregon are highway dependent on truck shipment.

Rail

There are only two trans-continental railroad companies left in the US: the Burlington Northern and Santa Fe Railway (BNSF), and the Union Pacific Railroad (UPFF).

Rail freight movement is changing from retail (a few boxcars tendered) to wholesale (the make-up of unit trains of 52 to 104 cars that are on circuits with the train kept intact). Inter-modal units consisting of double-stacked, articulated cars now make up 30 percent of the rail traffic. This reduces the access for agricultural products customarily handled in bulk loads or containers of non-unit train volume.

These rail companies are also focusing investment in Southern California ports to move imports eastward—rail investment in the Pacific Northwest is a fraction of Southern California investment.

Part of this is because the Columbia Gorge is limited to single lane rail in Oregon and Washington, with both sides of the river at capacity of 35 trains per day. Stevens Pass is at capacity of 25 trains per day and Stampede Pass at six trains per day. The Southern US (Sunset) corridor is more weather favorable and avoids the Powder Basin coal routes that move up to 190 trains per day. Neither railroad is interested in short hauls of under 300 miles because the short trains take up "slots" on 2,000 mile trains that are dedicated unit cars. Even if short line railroads such as Willamette and Pacific build train units for either railroad, the "slots" on long haul have to be given

up for short haul, which is less lucrative for the railways.

Barge/water

Without the ability to receive volumes of imported cargo to be moved on double-stack trains, one possible alternative is unloading cargo ships at the mouth of the Columbia in deep water (Astoria) and transporting containers inland via barge on the river system to ports that can build more efficient train handling systems (such as the Ports of Morrow and Umatilla to Hinkle rail yard or on-port rail).

As mentioned, the water system is under utilized by at least 60 percent. The Columbia River System could accommodate foreign manufactured imports and move them upriver from Astoria. Dredging to 43 feet is a necessary, but short-term quick fix; grain ships will only be able to increase loadings by 5,000 tons. The 43 foot depth will allow container ships that can carry up to 5,000 twenty-foot equivalent unit containers (TEUs), whereas shipping lines Hanjin and Maersk are commissioning 10-12,000 TEU container ships with drafts from 48 feet to 53 feet.

Oregon has two borders available to water transportation; inland and ocean. One of the impediments to fully developing water transportation is inadequate funding. Without public resources, the inland waterway cargo volume is in jeopardy of declining, weakening the economic health of water carriers, and placing agricultural and other exporters in jeopardy of being non-competitive in foreign markets.

Air freight

Oregon agricultural shippers use air transportation for highly perishable products and samples. Products include fresh seafood such as Dungeness crab, salmon, oysters, and urchin roe. Samples include dairy products, frozen products, and small quantities of ingredients needed by buyers. With the introduction of newer aircraft, the load capacity and range has increased to enable products to reach the major cities in China, Japan, and Korea on one aircraft, without transfer and without delay at transit airports. Air freight moves in all-cargo aircraft and also as lower hold cargo on passenger aircraft. Air transportation is not for all products. Typically, air freight is 12 to 15 times the cost of ocean freight. In addition to direct flights from Portland International Airport (PDX) to Asia, Europe, and Mexico, there is an evening truck shuttle to Sea-Tac Airport for connecting with additional direct flights. There are challenges for seafood being transported from the southern Oregon coast to PDX. Many shippers use truck transportation instead of air because of cost and frequency of service.

Transportation cost comparison and access

Inland agriculture shippers moving goods to Portland for export or distribution must have water transportation to be competitive. Freight movement by barge is one-third of the cost of truck shipment, and two-thirds of the cost by rail. The price of diesel fuel (which powers all these engines) is expected to increase in the long-term. Truck shippers have recently been adding a 30 percent fuel surcharge onto the base rate. Barges also have the flexibility to handle smaller numbers of ocean containers, whereas rail has moved to the unit train mode, bypassing short lines and rural access.

Federal legislation, known as the Jones Act, also impacts shipping prices. The Act requires short-sea shipping (from Boardman to Los Angeles, for example) to use ships or barges built in US shipyards. This results in a 30 percent cost increase when compared with ships and barges built in Asia. The crew members also must be US citizens. While this is beneficial for jobs related to shipping, it has the opposite affect on shippers via foreign competitors in a world transportation marketplace.

Farm truck regulation

In general, weight and lengths of trucks in Oregon is generous compared to other states. These have been adjusted by the legislature to enable loads of grass seed, for example, to adopt efficient load size. Few Oregon state highways restrict agricultural trucks and force a unreasonable "out of route" situation.

However, there is an issue to be resolved with the definition of cargo moving intrastate vs. interstate, which appears to be unique to Oregon. Oregon Department of Transportation's Division of Motor Vehicles maintains that grain is an interstate commodity, since most of it is shipped internationally. Therefore, the trucks are required to have annual inspections on components in compliance with federal interstate trucking laws. This can be a burden on farm operators because farm trucks moving wheat from fields to local elevators are often not equipped and maintained at these standards. Grain is not the only commodity that leaves the state. Virtually 80 percent of Oregon products are shipped outside state lines, some in raw form, others in processed products. Wheat producers are unconvinced that their crop should dictate a higher level of inspection of farm trucks than other commodities moved to local warehouses and eventually shipped out of state. Resolution of this issue requires policy makers at state and federal levels to examine common-sense options for these growers with respect to inspection standards on farm trucks that are merely moving product a few miles from farm to local elevators.

Regulatory burdens and opportunities

Farmers are not bashful about their feelings toward regulatory burdens, which are defined here as laws passed by legislative bodies, rules or compliance requirements developed by state or

federal agencies, or requirements imposed by court decisions as a result of lawsuits. While difficult to quantify in total, the Oregon Farmer's Handbook, published by the Oregon Department of Agriculture, includes hundreds of laws and regulations applicable to growers, depending on the type of operation.

- http://oregon.gov/ODA/pub_fh_index.shtml

Some regulations that farmers must comply with are similar to other businesses, but many are unique to agriculture due to the nature of their operations. Record keeping is one of the most significant issues which growers say takes up their time. It requires at least one full-time person, if not more, to track employee records, pesticide records, and production records, in addition to managing an operation's finances. The larger the farm, the more records and more time devoted to record keeping.

It has become essential for farms to keep records to track production, crop and soil response to nutrient applications, chemical use or non-use if organic, employee time and pay information, crop insurance records, financial institution requirements, and marketing purposes.

Growers recognize these needs, but also want lawmakers and regulatory agencies to fully consider the impacts of record keeping on family farming businesses, as well as the privacy concerns that growers have regarding their personal information and business records.

Other key regulatory issues have been voiced by growers.

1. Regulatory actions or court decisions that take private property out of production without due compensation, such as for wildlife habitat or stream buffers. Many growers are involved in voluntary, cost-share projects that create wildlife habitat, but they object strenuously to imposed requirements without commensurate compensation for lost production.
2. Regulatory regimes related to worker safety, chemicals, or any number of issues that many other countries do not have, thereby creating a higher cost for growers here versus other areas. The objection isn't to the standards themselves, rather, that other nations don't have to meet the same standards, thereby creating an unfair cost advantage. Prices for farm goods produced in Oregon or the US do not compensate for these higher costs, and the goods compete in an international market against farm goods from these other nations.
3. A "one size fits all" approach that attempts to fit regulations developed for other industries to agriculture. The agriculture environment is a dynamic, biological situation that requires fast action and constant decision making in response to weather and market changes. Growers demand practical approaches that recognize a low-margin business with little excess

capital for investment in non-essentials.

4. Regulations that are assumption-based without significant science or evidence of a real problem that needs to be addressed.
5. Regulations that seem counter to "common sense." Growers and predecessors in their families often have hundreds of years of experience on the land, a history of the area, and familiarity with the flora and fauna that has existed there. They often believe their knowledge isn't respected, acknowledged, or sought when regulations are developed.
6. Regulations that have no flexibility in reaching desired outcomes. The diversity of agriculture, from different soils and micro-climates to different crops and market conditions, requires flexibility or multiple options in addressing many aspects of agriculture production.
7. Regulations that do not consider the cost impacts on farming businesses, rural communities, or society in general.

Many of these concerns can be addressed by better communication, utilization of stakeholder consultation, and input from growers. Often a regulatory proposal may not be needed at all. Sometimes growers can demonstrate a better way to address an issue that doesn't impact them, or the public, in a detrimental way or doesn't include a burdensome cost.

Some of these issues have potential marketing opportunities, such as showcasing that Oregon growers meet higher standards. Certification programs are helping growers demonstrate their efforts. However, the market doesn't always match reward to costs, and many consumers simply search for the cheapest commodity on the shelf. Niche markets do exist, and they are growing. But most of agriculture still competes in a low-cost competitive environment that makes cost-sharing and other policy tools essential to meet regulatory standards.

Understanding growers' concerns will help all levels and branches of government interact with agriculture. That understanding will also help government develop appropriate regulations, when necessary, that don't have adverse costs or impacts that outweigh benefits and desired outcomes.

Pesticides as a regulatory issue

Chemicals used to control insects, address plant pests and diseases, kill weeds, and protect animal health have been characterized as both necessary medicines that have enabled miracles of production, and evil poisons that contaminate the environment and human health.

Chemicals, like medicines, are tools. Like medicines, when applied appropriately and at prescribed rates, they have predictable and beneficial results. Over time, new information may lead to additional discoveries about long-term effects. But on the whole, the benefit of

chemical use in agriculture has enabled the world to enjoy plentiful and healthy food at reasonable costs on less land than would otherwise be possible.

One recent report estimates that an additional 500,000 field workers would be required to pull weeds or hoe out unwanted vegetation that is currently controlled with herbicides in the US.

Growers face the ever-present challenge of weeds that compete for water and soil nutrients, pests that will devour crops, and diseases that can quickly destroy an entire year's work and investment. Chemicals enable less labor, less cultivation (with fewer tractor trips across a field, using less fuel), and higher yields. That means more production on fewer acres.

There are also challenges with chemical use, especially around sensitive natural resources and workers. Safe and proper handling of chemicals by all users, in any setting, is a key function of the Oregon Department of Agriculture, which provides training, certification, inspection, and investigation of chemical use.

In a state with as much agricultural diversity as Oregon, growers often have challenges finding products registered to use on crops that aren't grown on a significant number of acres. Chemical companies focus product development on high volume usage crops such as corn, soybeans, wheat, cotton, rice, etc. Due to this and the progressive efforts of growers, Oregon farmers are large adopters of IPM, or Integrated Pest Management practices, that utilize a number of approaches to pest control. These include scouting, pheromone trapping, biological controls, GPS mapping, and spot application of chemicals when needed. These efforts reduce pesticide use and, when needed, target specific areas.

The number of farms that used chemicals in Oregon increased slightly between the two Census of Agriculture years of 1997 and 2002, rising from 18,315 to 18,539 operations.

Over this five year period

- the amount of chemicals purchased declined slightly by value from $131.2 million to $130.2 million.
- acres treated to control insects declined from 605,096 to 585,754 (-3 percent).
- acres treated to control weeds, grass, and other undesirable plants increased from 1,940,342 to 2,181,158 (+12 percent)
- acres treated to control nematodes declined from 111,372 to 71,185 (-36 percent).
- acres treated to control diseases in orchards and crops declined from 585,305 to 431,907 (-26 percent).
- acres treated to control growth, thin fruit, or defoliate increased from 79,442 to 99,297 (+25 percent).

Total net acreage use of chemical products increased by 1.4 percent, or approximately 48,000 acres. Most of the increase was in herbicide use for weed and grass control. Insecticide and disease products decreased substantially (-200,000 acres), indicating more

integrated pest management (IPM) practices, some conversion to organic production, and lower pest and disease pressures during these particular production years.

It is worth noting that agriculture applications of pesticides require a pesticide applicator's license in order to use "restricted use pesticides." This license is obtained through study, testing, and annual training updates and seminars. Other commercial users are also required to obtain licenses to handle or apply restricted use pesticides.

Starting in 2007, pesticide use is being reported by all users to the Oregon Department of Agriculture through the Pesticide Use Reporting System (PURS). More information about pesticide use in Oregon will be available in the future through PURS. ODA is also conducting a survey of homeowner pesticide use to understand use rates and chemical applications by homeowners (non-commercial).

Under PURS, agriculture users and other applicators of pesticides will report annually on the use of product, including dates of use, site of use (field, orchard, livestock, pasture, etc.), location of use by water basin (non-urban areas), product name and EPA number, and purpose of use (weed control, insect control, disease control, etc.).

Interestingly, use of biotechnology seeds (GMO) have enabled significant reduction in chemical use and increased no-till farming systems that have adopted this technology in the Midwestern US. There are no significant acreages of GMO crops in Oregon at the present. (See section on GMOs.)