Introduction

The 2005 Oregon Legislature passed HB 2196 requiring the State Board of Agriculture to prepare biennial reports to the governor and legislative assembly regarding the status of the agriculture industry.

This document is a comprehensive overview of many topics and issues related to, impacting, and affected by agriculture.

An executive summary outlines the current highlights, while the report delves into the background and details of these topics.

Acknowledgements

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Executive summary

Oregon's agricultural roots

Agriculture, along with timber production, is the historical backbone that provided early economic development of Oregon. The connection to agriculture is still evident in all 36 counties of the state, benefiting Oregon's economy, environment, and social fabric. More than 1,000 family farms and ranches in Oregon are designated as "century farms," having ownership in the same family for over 100 years. No other segment of Oregon's economy can claim such a feat.

Agricultural security

Agricultural security, like energy security and other national security interests, deserves high priority attention at all levels of government. Food and other critical items that originate on farms and forests rely on protection of farmland and water resources dedicated to natural resource uses. These resources are also imperative in protecting against agro-terrorism threats.

State of the industry

2004 was a banner year, with value of agricultural production farm gate value) breaking the $4 billion mark. Net farm income was estimated at over $1.3 billion, also a record high point for Oregon. Higher demand and higher prices for many of Oregon's top commodities led to record sales for nursery products, cattle, dairy products, some grass seed, hazelnuts, cherries, blueberries, Dungeness crab landings, and others. A declining dollar value and overseas demand for Oregon agricultural products pushed exports higher.

2005 brought a moderation of crop prices to producers coupled with record increase in costs for fuels, fertilizers, chemicals, and other inputs. An extremely dry winter, followed by a very wet spring brought about an explosion in the population of voles and field mice (estimated loss of $35 million to grass seed growers), rust, and other pests and diseases. Tree fruit and grass seed production was the hardest hit. While overall statewide output value remained fairly constant, net farm income suffered a reduction, particularly in specific sectors affected by weather or input costs. Many sectors struggled, particularly wheat and other cash grain crops, along with some vegetables and other row crops. The cost of fuels and fertilizers rose from 10 percent of total production cost to more than 25 percent. Shipping costs rose dramatically, affecting the nursery industry and others exporting product out of state. In short,

all agriculture felt the impact of petroleum price surges. Yet there were some bright notes in Oregon agriculture—hazelnut growers received the highest payment, per pound, in the history of the crop, at more than one dollar per pound. Overall net farm income, at $1 billion, was the second highest in history.

2006 started out very wet, which delayed fieldwork, planting, and crop development. Heavy rains and late freezing weather cut production of some caneberries in Marion County by 50 percent. Some grass seed fields experienced significant losses, as well. However, the mountain snowpack and abundant spring rains guaranteed an adequate supply of irrigation water through the summer. Wheat and barley plantings were at near record low acreages due to low prices and high input costs. However, wheat prices rebounded later in the year. Wholesale milk prices paid to dairy producers plummeted. Lower milk prices and higher feed and energy prices hit dairy farmers hard. A record heat surge in June scorched berry crops and a shortage of field workers made it difficult to harvest salvageable berries. Prices for inputs remain at all-time highs. On the positive side, blueberry growers had a decent harvest and received good prices. Growers of tree fruit also had good yields and moderate prices, however, labor shortages left some fields and orchards unharvested. On the whole, a moderately good year for the industry.

Agriculture Diversity

From early statehood, many different agricultural crops and animals have been grown in Oregon. Today more than 220 different commodities are produced commercially. Oregon leads the nation in blackberries, Loganberries, hazelnuts, grass seed, Dungeness crab, Christmas trees, dried herbs, and potted florist azaleas. The diversity of production presents both opportunities and challenges for growers. On one hand finding equipment suppliers, crop protection materials and markets for niche crops is very difficult and can be expensive; however, the diversity of Oregon agriculture broadens grower options and balances farm income, overall.

Oregon's Farm Structure

Roughly 40,000 business entities in Oregon claim over $1,000 per year in agricultural sales—the definition of a farm according to the US Department of Agriculture. Over 88 percent of these are sole proprietor farms or ranches. Another 5 percent to 6 percent are family partnerships, with an equal amount organized as family corporations. That leaves approximately 1 percent or less of Oregon's farms as non-family corporate operations. Oregon agriculture is dominated by family farm operations!

The number of small operations (less than $10,000 in annual sales) are increasing. Approximately 70 percent of Oregon's farms and ranches fall into the category of life-style, hobby, or retirement

operation. This group of producers generates less than 2 percent of total agricultural output/sales for the state; yet they own 13 percent of agricultural lands. Most of these producers work off the farm or are retired. For them, agriculture is more of a lifestyle, not a primary occupation. But this group is visible; they participate in farmers' markets, operate roadside stands, are involved in community supported agriculture, and sell directly to restaurants. This group may not generate a large amount of agricultural production, however, it wields a large impact due to its direct contact with the urban consumer.

The middle group of growers, who generate between $10,000 and $250,000 in annual sales, is shrinking in number, now less than 25 percent of all farms. A decade earlier they comprised 32 percent of all farms. They are faced with increasing costs, fewer market outlets, and not enough economy of scale to keep up with the competition of imports and larger producers. There appear to be trends toward off-farm employment and downsizing. The output from this group decreased from 27 percent to 19 percent of total farm production value, and acreage decreased from 51 percent to 45 percent over the past decade.

Full-time larger commercial family operations number about 2,250, or less than 6 percent of all farms in Oregon. Yet this group of operators produces nearly 80 percent of total output (up from 71 percent in 1992) on 42 percent of the land in farm use. The operational efficiencies, adoption of technology, and economies of scale required to stay competitive in a global market are evident in this category of growers. Even so, margins are tight and high volumes of production are now required.

Contribution to Oregon's Economy

- More than 150,000 jobs in Oregon—one in 12—have a connection to agriculture.
- Farmers purchase over $3.2 billion in goods and inputs to grow their crops and livestock—a huge stimulus to Oregon's economy.
- Value-added processing contributes another $2.1 billion to the state's economy.
- Nearly $2.5 billion in salaries and wages are tied to agriculture.
- Agriculture is a key traded sector, ranking first in volume of exported products and third in value of exported products, bringing new dollars to the state economy.
- Total agriculture-related activity accounts for 10 percent of Oregon's gross state product.

Contribution to Oregon's Environment

- Oregon farmers and ranchers provide food and habitat to over 70 percent of the state's wildlife.
- Erosion on cropland and rangeland has been reduced by more than 35 percent, in the past decade, due to changes in practices by Oregon's farmers and ranchers.
- Oregon has earned a reputation for being a national leader in

natural resource management. Oregon has implemented agricultural water quality management plans statewide that address such issues as waste handling on livestock operations and irrigation water containment and recycling on nursery operations.

- Oregon farmers and ranchers have enrolled nearly 600,000 acres in conservation programs.
- Oregon leads the nation in the number of water transfers and the amount of water used for conservation and wildlife.
- Agriculture will play a critical role in the future development of renewable energy through biofuels, micro-hydro power, geothermal, solar, and other biobased products. Oregon is already a leader in wind energy development (located on ag lands). Anaerobic methane digesters on dairies are gaining more interest by the industry.
- Oregon is nationally known for integrated pest management (IPM) practices and the use of biological control agents to combat invasive plant pests.
- An increasing number of Oregon farmers are documenting their good management practices through certification programs, such as ODA's Good Agricultural Practices/Good Handling Practices (GAP/GHP), Food Alliance, Oregon Tilth (organic), and Salmon Safe. Approximately 15 percent of Oregon's ag lands are enrolled in some sort of certification program.

Change has been dramatic

Technology

Over the past century, technology, mechanization, high yielding seeds, commercial fertilizers, and plant pest and weed control products have multiplied output, reduced labor needs, and allowed 99 percent of the US public to spend their time and resources in pursuits other than food production.

Consolidation and global trade

Consolidation in the food processing and retail distribution sectors has left growers with fewer outlets for their crops and livestock. International companies control large segments of the food market. As a result of global trade agreements and improvements in transportation and communication, these companies now source food and fiber products from all over the world.

Global trade presents challenges and opportunities for Oregon agriculture. One challenge is the movement of plant and animal pests and diseases around the globe. This raises control costs and the need for biosecurity at the farm and processing levels, in Oregon and throughout the US, as well as the need for programs to monitor and eradicate exotic pests and plants. World movement of goods also presents disparity in labor costs, regulatory regimes, infrastructure, and other competitive factors. The rise in oil prices presents additional cost increases in many farm inputs,

including fuels, fertilizers, and other products.

On the opportunity side, 95 percent of the world's population resides outside the US, including areas that are fast developing a middle-class with purchasing power for many of the specialty crops produced in Oregon. More than 80 percent of Oregon agriculture production leaves the state, with over half of this going overseas, primarily to Japan and other Pacific Rim nations. Cherries, blueberries, processed foods, grains, grass straw, and many other products are shipped to these countries, bringing traded-sector dollars to Oregon. Indeed, agricultural products are the largest Oregon export by volume, and third largest by value.

Consumer trends

Consumer trends are increasingly dynamic and segmented, creating new markets that are rapidly changing and demanding more specialty products. A growing segment of the population makes food purchases based on health claims, function characteristics (such as "heart healthy"), or other nutriceutical benefits. Others make choices based on specific production or processing traits, —organic, kosher, sustainable, location of production, or "free-from foods" such as wheat-free, dairy/lactose-free, or GMO-free.

Population growth

Population growth continues to create competition for natural resources—land and water—the primary inputs of agricultural production. Will the US and Oregon "outsource" food production in order to build houses on the best lands?

As land prices escalate and production costs increase, an aging farm population finds it challenging to attract new growers or children back to the farm.

Marketplace dynamics and niche opportunities are showing trends that are segmenting the farm population in Oregon, resulting in

- an increased number of small farms that are lifestyle/hobby operations.
- a reduced number of medium-sized family operations, due to the cost-price squeeze.
- a stable number, but increased size of large family and non-family operations, taking advantage of economies of scale.

Infrastructure

Oregon moves more than 80 percent of agricultural production out of state, with half of that going overseas. This illustrates the critical importance of a reliable and affordable transportation infrastructure and energy/fuel resources to move products from here to there. Port, rail, truck, inter-modal, and air transportation all play a part. The deepening of the Columbia River is imperative for larger carriers to call on Portland for delivery and exports. There are significant opportunities to relieve pressure on roads and railways by moving more products through the Columbia River System, via barge.

Agricultural Labor Availability and Cost

Oregon's agricultural diversity lends itself to many specialty crops that are labor intensive. Tree fruits, berries, nursery, vineyards, and many other Oregon crops require labor rates much higher than traditional field crops grown in other areas. Consider that Oregon ranks 26th in total agricultural output among states, but ranks fifth of all states in overall employee compensation paid to farm workers. Adequate labor is critical for Oregon's crop mix.

Federal legislation addressing illegal immigration is of significant interest to Oregon growers. A large portion of the workforce may face sanctions, deportation, or other actions that might affect labor availability and worker status. In 2006, some growers experienced labor shortages.

While compensation in Oregon, averaging near 10 dollars per hour, is among the highest in the nation, it is pushed higher every year due to the initiative measure that ties the minimum wage to the consumer price index (CPI) for inflation in Portland. For labor-intensive sectors of the industry this is a major concern, especially since many of the products they produce compete against imports from Mexico, China, Chile, Brazil and other places where wages range from 25 cents to three dollars per hour.

Growers concerns about labor availability and rising costs may lead to increased mechanization and loss of some of Oregon's specialty crops. This could limit grower options for crop production and consumer access to locally produced fresh fruits and vegetables. In response, growers are moving toward mechanization of harvest equipment for asparagus, wine grapes, apples, berries and other crops. Strawberries, broccoli, and cauliflower are examples of crops that have nearly disappeared from Oregon and Washington, only to become more established in California and Mexico.

Land Resources and Issues

Roughly 28 percent of Oregon land (17.1 million acres) is in agricultural use. About 14.7 million acres are in commercial agriculture use (farms with over $10,000 in annual sales).

Oregon's land use laws, enacted in the 1970s, established exclusive farm use zones with the intent of protecting farm operations from urbanization pressures and speculative buying. While this system has slowed farmland loss in Oregon, it has not been without controversy. The passage of Ballot Measure 37 in 2005 set back the clock on farmland use to all development allowed prior to the land use laws taking effect. More than two-thirds of the 2,000 plus Measure 37 claims filed with state and local government entities are for development on farmland

Members of the agriculture industry have differing opinions on Measure 37. Those subject to urbanization pressures, primarily in the Willamette Valley and other urban areas, have generally supported strong land use laws to

protect farmland from conversion. Growers in Eastern Oregon, with little pressure from urbanization and marginal farm income returns, are looking for alternative uses of their property, or at least some flexibility that would allow other income-generating prospects.

Water Issues—Quality and Quantity

Landowners are making great strides incorporating water quality protection into their operations. They are supported by a network of local, state, and federal agencies that provide information, technical assistance, and financial incentives. Traditional agricultural operations are better positioned to learn about and incorporate water quality improvements because they are familiar with agency programs. It is a bigger challenge to inform and engage non-commercial or "life-style," small acreage landowners in water quality protection efforts. Locally based demonstration projects, workshops, brochures and other activities, sponsored by Soil and Water Conservation Districts (SWCDs), inform landowners of agricultural water quality issues and opportunities.

Nearly 45 percent of Oregon's farmers irrigate some or all of their land, totaling 1.9 million acres. Oregon ranks third of all states for the number of farms that use irrigation, and ninth of all states for 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.

Water storage, delivery, and efficiency are key to future agricultural development and viability in Oregon. Some scientists predict that global warming will result in less snowfall and earlier snow melt, emphasizing the need to develop water storage for agricultural and non-agricultural uses. Multiple options are available, such as aquifer recharge (groundwater injection), expanded use of farm storage ponds, off-stream diverted storage, and desalinization of seawater. These options take time to develop and require urgent attention.

New Technologies

High-tech farming techniques include the use of GIS and GPS guided-tractors, laser land leveling, sophisticated center-pivot irrigation, radio controlled weather monitoring and soil testing, field mapping that directs spot application of soil nutrients and chemicals, high-tech harvesters and sorting equipment, biotechnology, and seeds adapted to resist plant pests.

New Regulatory Issues

Air quality issues are now looming over the agriculture industry—from dust control to air emissions caused by animal waste. Discussions are underway at the state and national levels regarding large-scale operations and potential impacts on air and water quality.

The 2002 US Census of Agriculture indicates that 18,500 Oregon farms report using some form of chemical products to

control insects, weeds, plant diseases, animal health, or related functions. Approximately $130 million was spent in 2004 on plant and animal chemical products.

The Pesticide Use Reporting System (PURS) has had an "on again, off again" existence as funding and implementation issues have lurched back and forth. Presently, the system is online and functional. The system requires all pesticide users to annually report use and type of application, by water basin in non-urban areas, and by ZIP code in urban areas.

Regulatory challenges that present uncertainty for growers include the Clean Water Act, the Endangered Species Act, the Wild and Scenic Rivers System, the National Environmental Policy Act, and the Federal Power Act. The complexity and rigidity of these laws often result in frustration about regulatory options that growers feel are inappropriate, unrealistic, difficult to understand and implement, and may even conflict with state law. Permitting processes are lengthy and costly. Projects may be stalled, due to ongoing study and analysis.

However, farmers are adaptive, most are meeting regulatory requirements, and many exceed them. Documenting the innovative and sustainable efforts of many Oregon growers has led to an increase interest in certification programs.

Even so, the added pressure and cost of regulatory programs may be viewed as one additional cause for the reduction in the number of medium-sized operations. Whereas, larger operations have the resources and employees to oversee compliance with regulatory requirements, smaller operations don't. The medium sized operation is forced to become larger or smaller—hence, we see more consolidation into larger farms or downsizing into "micro-farms" that fall under the radar of regulatory requirements, due to their limited size and small number of employees.

Top 20 issues facing the industry

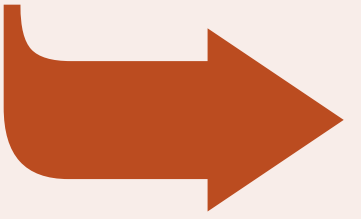
Developed in conjunction with the Oregon Department of Agriculture

In no order of importance or rank…

- Labor availability and cost (immigration reform, minimum wage indexing and its impacts, and resolution of farm worker bargaining law).
- Federal farm bill legislation and how Oregon growers participate or benefit.
- Plant protection research, material availability, and cost in a state that produces mostly "specialty" crops.
- Availability, storage, and distribution of water, with impending pressure from climate change.
- Land use. Preserving farmland. Balancing development pressures, private property rights, and regional opportunities and needs.
- Transportation infrastructure, fuel cost, and movement of products to market.
- Need for more locally-based, value-added processing infrastructure (due to loss of a significant portion of the local processing industry, over the past decade).
- Biotechnology in agricultural crops, assessing benefits and risks for Oregon producers.
- Development of new technology and its adaptation to agriculture; critical need to develop links with higher education and the high tech industry with focus on nanotechnology, laser and infrared technology, precision agriculture, mechanization, and energy and water conservation.
- Renewable energy development, in which local producers can participate and benefit.
- Access to foreign markets and development of stateside markets. Resources to address non-tariff barriers, market development, and product introduction.
- Resources to combat invasive species and their impacts on local agriculture and ecosystems.
- Regulatory challenges and the continually tightening environmental standards (costs) in Oregon and the US versus other nations.
- Aging of farmers and pending land turnover with few younger people choosing to farm; need for tax structures, financing programs and succession planning assistance to ensure a local, dynamic and viable farm infrastructure and farm population.
- Global animal disease prevention and response to maintain a viable and healthy livestock industry. Reduce disease potential for humans and animals.
- Direct marketing, certification, and access to local food markets for smaller growers.
- Public sector research funding for Oregon State University and other institutions that develop and improve agriculture production, new crops, management systems, and value-added processing.
- Public education and policy that support economically, environmentally, and socially sustainable agricultural production.
- Wildlife damage and mitigation assistance for agricultural and timber production.
- Grower access to financing and business models in order to adopt new technologies, crops, and production methods.

Note: The most recent data for agricultural income is 2005 as the marketing year lags one year beyond the production year. This chart compares changes from a decade ago and from the prior year to the most recent year for which data is available.

Overall score: B+



Cash sales have risen nearly 35 percent over the past decade (not adjusted for inflation). Net income fluctuates significantly from year to year and recent increases in fuels, fertilizers, labor and other costs are placing growers in a tight squeeze, with total cash from farm operations rising 6 percent and expenses rising over 22 percent in the past year. The net cash income (line F) does not include outlays for principal payments on land, household living withdrawal and expenses, income taxes, or regulatory compliance costs that are difficult to document. These costs or outlays are beyond, or in addition to, the production expense categories measured by government agencies.

Economic scorecard for Oregon's agricultural industry

Key indicators	1995	2004	2005	Change 2004-2005	Decade change 1995-2005	Score
A. Cash receipts from farm sales[1]	$2.8 billion	$3.70 billion	$3.77 billion	2%	35%	B
B. Government payments[2]	$51.8 million	$81 million	$129 million	59%	149%	A
C. Farm-related income[3]	$524 million	$774 million	$954 million	23%	82%	A-
D. Total farm income = A+B+C	$3.37 billion	$4.47 billion	$4.73 billion	5.8%	40%	A-
E. Production expenses[4]	$3.21 billion	$ 2.76 billion	$3.37 billion	22%	1%	C
F. Net cash farm income=D-E	$165.3 million	$1.38 billion	$1.05 billion	-24%	536%	B
Oregon's rank among states[3]						
Net cash farm income	#29	#23	#28	—	—	B-
Net income per acre	#41 $16/acre	#34 $50/acre	#41 $38/acre	—	—	B
Value of total production	#21	#26	#26	—	—	B+
Value of total production per acre	#38 $124/acre	#39 $157/acre	#39 $166/acre	—	—	B
Net income per operation	$10,250/farm	$35,600/farm	$27,300/farm	-23%	166%	B

Footnotes

1. OSU Extension and USDA Oregon Agriculture Statistics Service; cash sales from farms.
2. USDA Farm Service Agency and USDA Natural Resources Conservation Service. NOTE—approximately half the amount is in the form of support payments to wheat/grain growers; an increasing portion of federal funding is for conservation projects and soil and water stewardship efforts.
3. USDA Economic Research Service: includes custom machine work, farm forest products sold, other farm income, and an imputed/estimated value for farm dwelling.
4. Includes purchases of farm origin (feed, seed, livestock), manufactured inputs (fertilizers, chemicals, fuels, electricity), services (machine repair, marketing, storage, etc.), employee compensation, rent, and interest on loans.

NOTE: ODA believes many expenses in 2004 were underestimated by USDA/ERS. Does not include non-cash items such as depreciation or capital consumption.

Farm employment expanded over the past decade, gaining more than 13,000 jobs, largely due to growth in the nursery/greenhouse sector. Increases in wages and compensation have accompanied the expansion in employees. Some segments of the industry can pass these costs on, others cannot, and face tighter operating budgets. The food processing sector has experienced considerable consraction, losing nearly one quarter (5,500) of its workforce and more than 20 of the larger food processing firms, due to global competition and cost factors. Other farm-related jobs have increased, along with wages.

Employment	1995	2004	2005	2004-2005 change	1995-2005 change	Score
Total on-farm employment estimate (annual average)	45,000	58,000	58,600	1%	30%	A
Total farm payroll	$450 million	$802 million	$881 million	10%	96%	B
Food processing employment	25,399	22,048	19,860	-10%	-22%	C
Food processing payroll	$604 million	$664 million	$610 million	-8%	1%	B-
Other farm-related Employment[1]	16,000	19,100	19,020	—	19%	B+
Farm-related payroll	$415 million	$595 million	$608 million	2%	47%	A

Value-added processing	1995	2004	2005	2004-05 change	1995-2005 change	Score
Number of licensed processors	1,500	n/a	2,200	Primarily, small domestic bakeries.	47%	B
Number of firms with more than 10 employees	503	515	528	2.5%	5%	C
Percent of production with value-added	49%	—	52.2%			

Agricultural exports	$728 million	$905 million	$883 million	-2.3%	21.3%	B-

Land in agricultural production	17.5 million acres	17.2 million acres	17.1 million acres	-0.6%	-2.3%	B-

1. Includes services, research, veterinarians, wholesale distributors, transportation, warehousing, and related functions that are directly tied to agriculture. *Source: Oregon Employment Department.*

Summary of commodity status for 2005-2006

The GOOD... relatively good prices or markets

Nursery: 2005-2006 was another record year for the nursery and greenhouse industry, up 4 percent overall, to $870 million. Remains Oregon's number one ag sector.

Beef cattle: Domestic consumer demand stayed strong despite occasional BSE issues and export market jitters. Some softening, but still good prices. Remains Oregon's number two ag sector, at over $530 million.

Hay: With strong demand from livestock markets and weather factors around the country affecting production, hay is at all-time high prices. At over one million acres in production (45 percent alfalfa), hay is the largest acreage of harvested cropland in Oregon; over $380 million, number five.

Christmas trees: steady market and level prices; $126 million, number eight.

Pears: Prices continue to rebound from 2002 crop year lows. Demand is increasing and is aligning with supply. Much more optimism in the industry. Number 10, at $75 million.

Wine grapes: Steady increases in volume, acreage, and quality have helped growers move past the $36 million mark. Regional and international attention to Oregon wines continues to grow. Number 14 crop.

Blueberries: Strong demand for fresh market berries and new plantings going in. Good prices; total output over $33 million. Number 17 commodity.

Cranberries: 2006 was the first year, of many, where growers saw a good crop and good price at over 50 dollars per barrel; should push past $20 million in sales, a 60 percent increase from previous years. Number 26 crop in 2005.

The MEDIOCRE... struggling or holding steady

Grass seed: Voles, rust, excessive moisture affected the 2005 crop. The 2006 harvest was a bit under average but prices were higher; however acreage was down and costs were up, leaving growers about neutral. Number three, at $374 million.

Dairy: After banner years in 2003 and 2004, the trend in milk prices was down with costs for feed and other inputs going upward in 2005-06. Remains number four, at $358 million.

Potatoes: After several years of surplus production, grower efforts of balancing output with demand are helping to bolster prices, but challenges remain. Number seven, $130 million.

Onions: Recovering in acres, yields and prices. Number 9, $124 million.

Hazelnuts: After a banner year in 2005 with the highest price in the history of production in Oregon at over one dollar per pound, the 2006 harvest was decent, but prices retreated to 56 cents per pound, due to a large crop in Turkey. Number 11, at $57 million sales.

Caneberries: Weather related problems affected the 2006 crop. Acreage is flat for most caneberries and prices aren't improving as fast as costs. Number 28 at $15 million in sales.

Cherries: Weather problems in 2005 and 2006 affected cherry crops. Prices were correspondingly high in 2005 but down in 2006 due to general lower quality of the crop and challenges with harvest. $36 million. Ranked number 13.

Sweet corn: Acreage up in 2006 after several years of decline. Number 18, at $30 million.

The UGLY... really hurting

Peas: Only one major pea processor remains in Eastern Oregon, leaving growers with few options for marketing their crop. Acreage has declined over 50 percent in the past few years.

Wheat: The cost of fuels and fertilizers have taken any profit out of wheat production. Acreage has fallen by nearly 100,000 acres, from 2005. Prices finally rebounding at the end of 2006, boosted by production of biofuels, but longer-term indication of profitability remains uncertain.

Garlic: Imports from China have depressed the market to such an extent that growers in Central Oregon are losing customers. White rot is also affecting fields and making garlic increasingly costly to grow.

Strawberries: 30 percent drop in production from 2004 to 2006. Less than 2,000 acres remain in production. Some fresh market and u-pick; most commercial production going away due to competition from California and Mexico.

Historical perspective: Agriculture's role in Oregon

Oregon, historically, was a vast region dominated by many Native American tribes, and subsequently claimed by the Spanish (Balboa, 1513), the Russians, the English (Sir Francis Drake, 1600; Captain James Cook and others), and the United States (Captain Robert Gray, 1792; Lewis and Clark, 1804).

In 1819 Spain gave up its claim to all the land north of the southern boundary of the Oregon Country. In 1824, Russia also gave up its claims by treaties with the United States and England. In 1846, England and the US agreed on a boundary line between the two countries, giving Britain the northern part of the Oregon Country above the 49th parallel and granting the US possession south of that demarcation (current border with Canada).

Fur traders dominated the Pacific Northwest in the early 1800s. But by the late 1830s settlement in the Willamette Valley by farmers began to change the dynamics of the region. It was the recognition of this fertile valley as advantageous to agriculture production that drew thousands of settlers to Oregon to farm these lands.

Fertile soil, mild climate, level land, and seasonal rainfall brought thousands of immigrants to Western Oregon. Few other areas in the US are so well suited to the growing of berries, tree fruits, and many other specialty crops. The Willamette Valley soon became noted for its cherries, prunes, pears, Loganberries, blackberries, raspberries, strawberries, cranberries, and many other products. Orchards of walnuts and filberts (hazelnuts as they are now known) were staked out. Canneries and processing facilities sprang up in all areas of the valley.

In 1839 so many settlers had come to Oregon that a petition was submitted to Congress to organize a territorial government. Congress failed to act, and so the settlers organized a provisional government, lasting until 1846 when another petition was submitted. In 1846 Oregon was designated as a territory with a temporary capital established in Oregon City. Two years later the capital was moved to Salem.

In 1853 the territory of Oregon was divided, creating the present boundaries of the state of Oregon and Washington. In 1859 Oregon was granted statehood.

By the early 1900s many other commodities were cultivated in the Willamette Valley, including spearmint, peppermint, flax, wheat, other small grains, potatoes, other vegetable crops, hops, dairy cattle, sheep, and goats. Portland was well established as a port

Jeffersonian agrarian ideology

- ***Agriculture is the basic occupation of humankind.***
- ***A nation of small independent farmers is the proper basis for a democratic society.***
- ***Farmers are good citizens and a high percentage of the population should live on farms.***
- ***Farming should be a family enterprise.***
- ***The land should be owned by the person who tills it.***
- ***Anyone who wants to farm should be able to do so.***
- ***A farmer should be his own boss.***
- ***It is good to make two blades of grass grow where one grew before.***

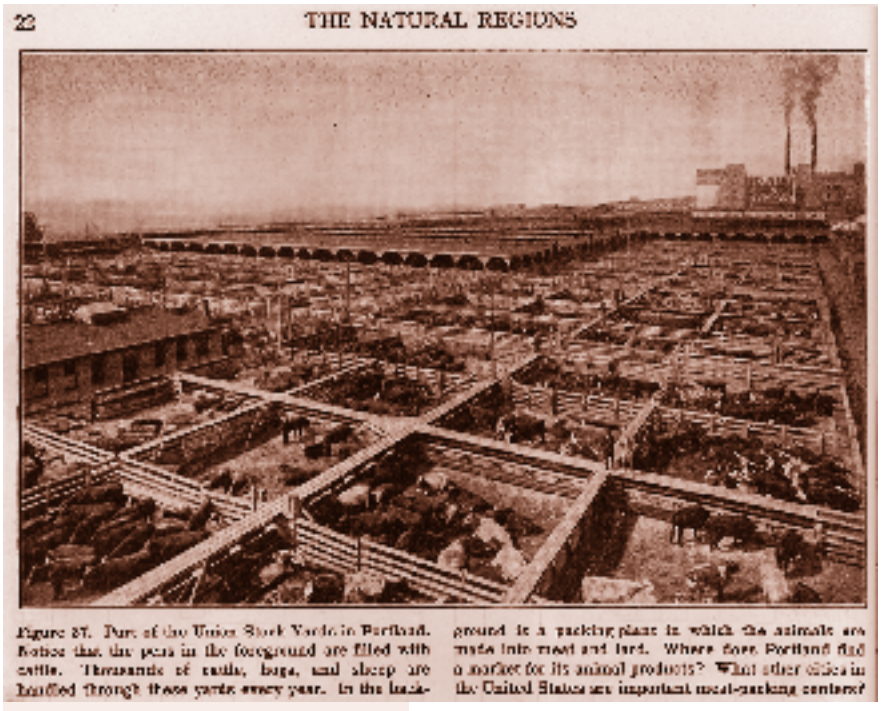


Figure 27. Part of the Union Stock Yards in Portland. Notice that the pens in the foreground are filled with cattle. Thousands of cattle, hogs, and sheep are handled through these yards every year. In the background is a packing plant in which the animals are made into meat and lard. Where does Portland find a market for its animal products? What other cities in the United States are important meat-packing centers?

Would anyone today remember Portland's agricultural history and stock yards teaming with cattle and the Swift processing facility in the background?

"The State of Oregon," 1931 school textbook, Ginn & Co.

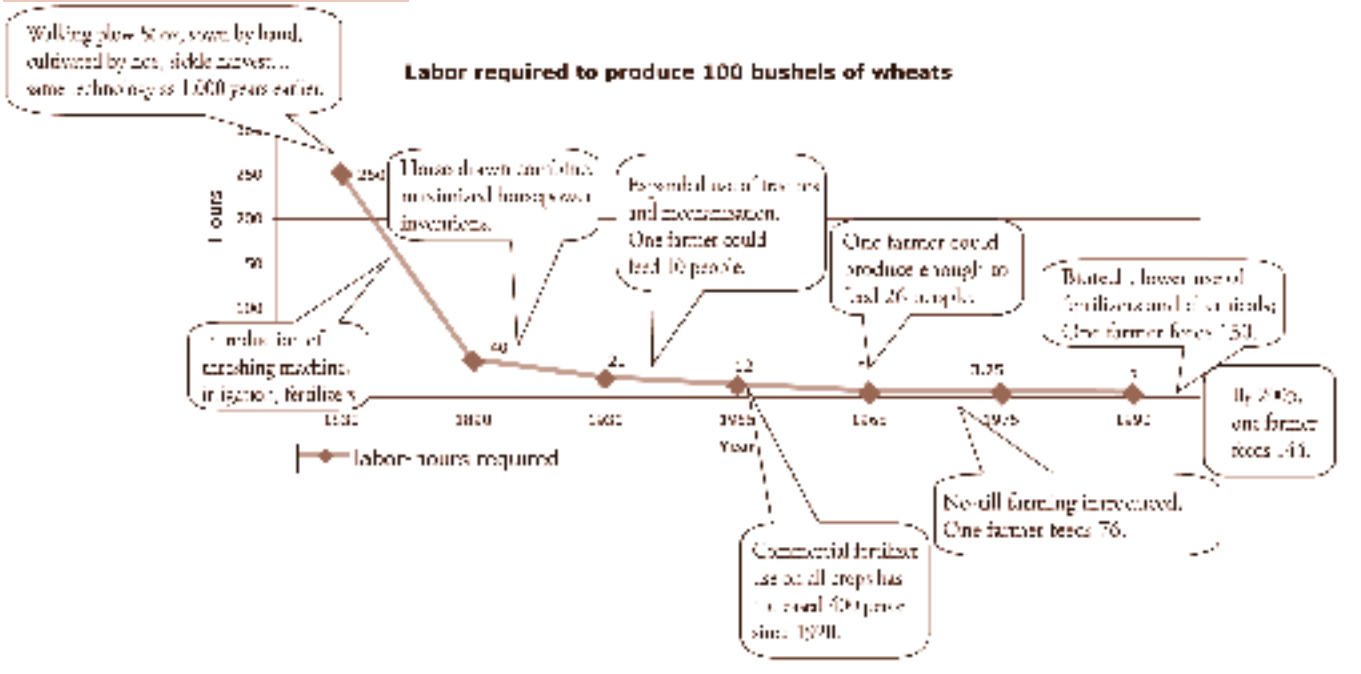
city, and both raw and processed products from the region were exported to the world.

Portland also became a manufacturing center for machinery used in timber and farming operations, including engines, tractors, pumps, and food processing machinery. Portland was also a significant livestock center and had considerable meat packing facilities. Next to Boston, Portland became the largest wool market in the US, boasting many textile mills, knitting mills, and clothing factories. Linen mills in the Willamette Valley used the long-fiber flax grown largely in Marion County for producing cloth, ropes, and fiber.

Salem and Eugene had some of the largest fruit and vegetable packing and cold storage facilities in the Northwest. Creameries, woolen mills, flour mills, and wood mills turned the raw materials of farm and forest into manufactured products, supplying jobs and other economic development to the region.

Other settlements were established around the state, and agriculture and timber were again the mainstays of Oregon.

The Umpqua River Valley became known for production of grains, grasses, vegetables, berries, and tree



fruits. Poultry, especially turkeys, were raised in the region.

The Rogue River Valley required irrigation and proved suitable for grains, vegetables, hay, livestock, and dairies. The valley became best know for its fruits, particularly pears.

Nearly all the cities in Southern Oregon—Ashland, Medford, Grants Pass—had significant fruit production with fruit-packing plants, storage, and canning facilities. Hundreds of trainloads of fruit were shipped from this region to other parts of the US.

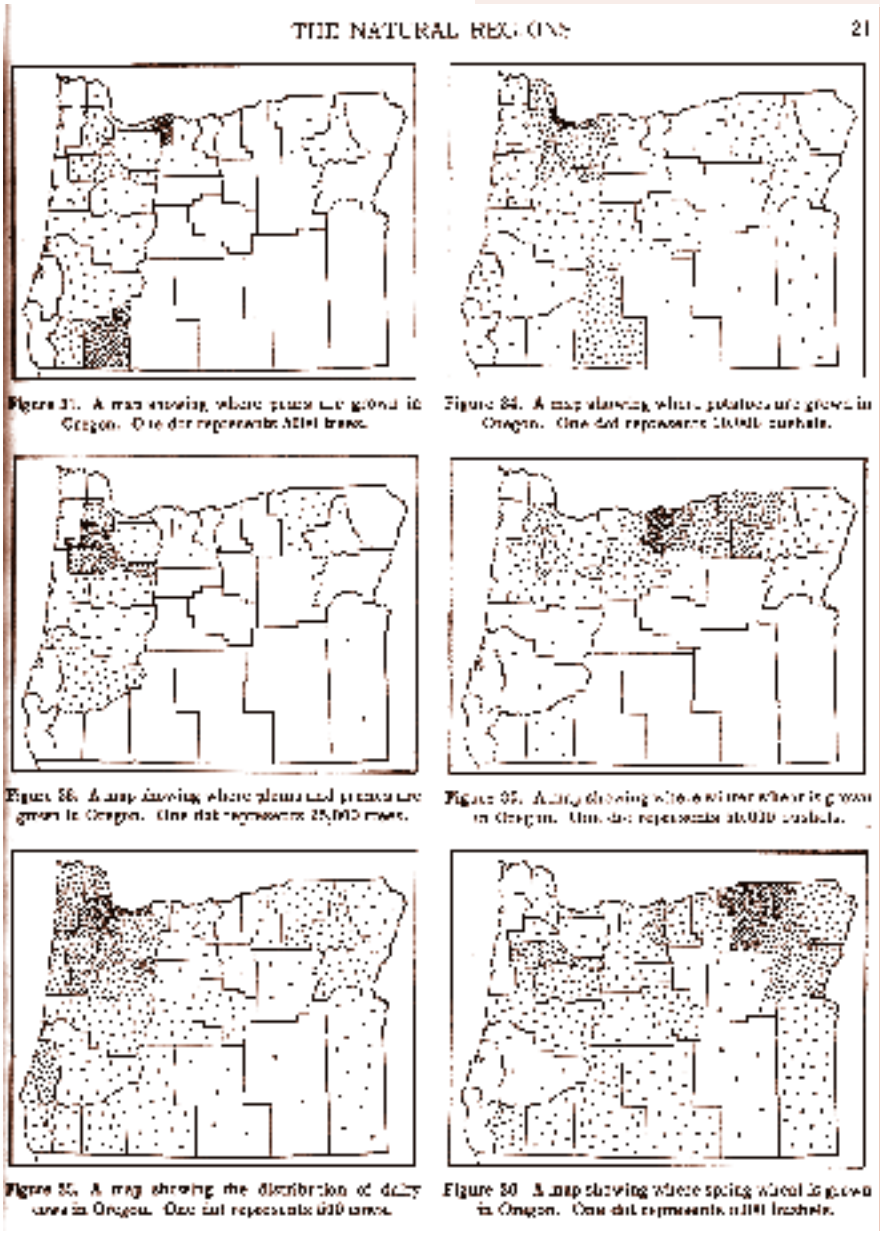
The Coast Range and the Cascades force the clouds and winds to give up their moisture before weather systems reach the Columbia Plateau. Farming adapted to these arid conditions and dry-land wheat production became dominant. Alfalfa, oats, barley, and some fruit and vegetable farming also developed. Sheep and cattle grazing dominated the areas unsuited for cultivation, and Pendleton became noted for its woolen mills. With production of regional alfalfa, dairies also flourished. Irrigation development expanded production of potatoes, peas, onions, and other crops.

The Hood River Valley became a center of fruit production—apples, pears, cherries, and even strawberries were grown there.

The Wallowa River Valley was conducive to raising livestock and general farm crops. Dairy became an important industry. Through irrigation and dryland farming, alfalfa, potatoes, barley, oats, corn, other vegetables, and fruits were produced.

The Grande Ronde Valley in Union County became home to acres and acres of wheat and alfalfa, apple orchards, vegetable farms, and chicken ranches. Grant County was the center of livestock production—cattle, sheep, hogs, turkeys, and chickens. Baker County's dominant output was hay, potatoes, wheat, fruits, cattle, sheep, and dairy products.

These regional production graphs from a 1931 school textbook depict principal commodities and their growing regions. Pears, potatoes, wheat, prunes and plums, and dairy cattle are plotted by production significance. The 1930s represent the mid-point between statehood and present day agriculture.



Klamath, Harney, Lake, and Malheur counties became home to thousands of sheep and cattle. Hay, potatoes, wheat—and with irrigation—even some berry and vegetable crops were established.

These early roots of settlement and the economic ties with the land forged the history of Oregon and laid the foundation for all other development as productivity increased and allowed more of the population to work off the farm.

Major changes and trends in the past 20 years

Agriculture has developed more rapidly in the 20th century than all previous centuries combined. The adoption of mechanization, technology, high yielding seeds, commercial fertilizers, and plant disease and weed control products have enabled nearly 99 percent of the US population to spend its time in pursuits other than food production.

A cow or potato field is as foreign to many of today's children—and adults—as an elephant or a far-away jungle. In fact, more children in the US have visited a zoo than a farm.

But there is a growing interest in where food comes from, stirring a renaissance of sorts among urban consumers about food and agriculture.

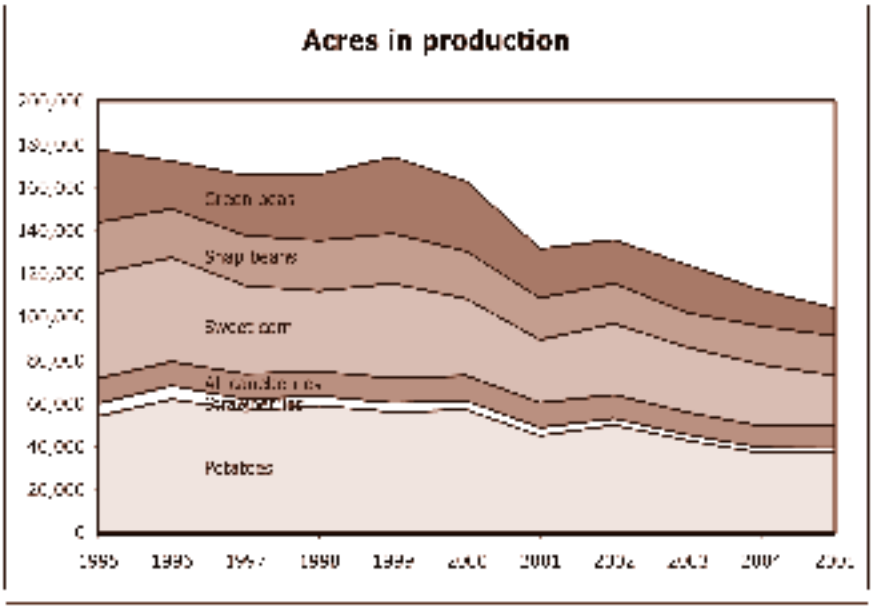
Food production and distribution have changed more in the past two decades than in the previous 100 years. The data demonstrates that agriculture is not in decline, but it certainly is facing change. The industry is evolving, adjusting, and adapting.

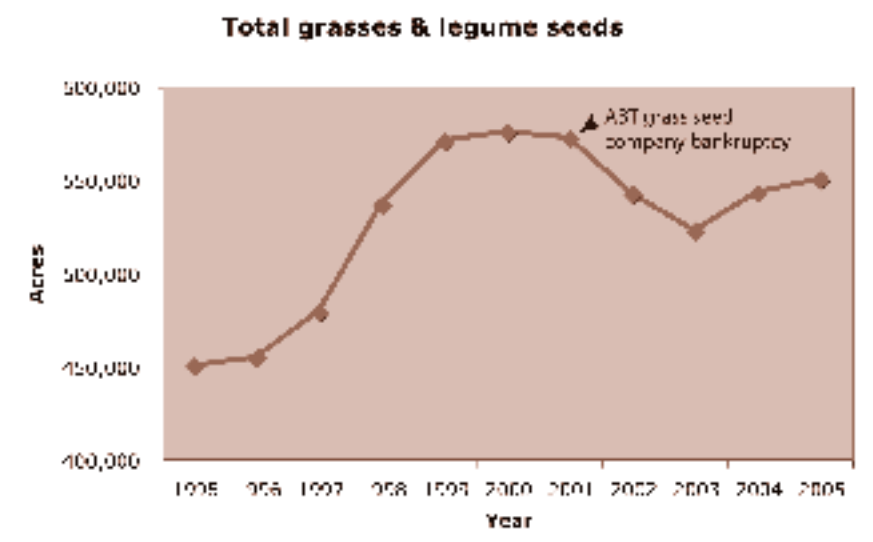
Goals of public farm and food policy in the US, 1860 to the present

- Raise the standard of living for farmers and non-farmers.
- Stabilize farm income, prices, and production.
- Support the private ownership of farmland.
- Encourage public and private research to increase production efficiencies and technology improvements.
- Provide an ample supply of food at reasonable prices to consumers.
- Address hunger and malnutrition.
- Improve human health and reduce health hazards by ensuring a safe food supply.
- Preserve natural resources of land and water for use by future generations of producers.
- Produce feedstock for domestically-derived fuels and energy sources.

Consolidation and takeovers in the food processing and retail industries

In the past decade, food businesses (processors, wholesalers, and retailers) have structured between 600 and 800 buyouts, takeovers, or consolidations each year. Six food retailers now control nearly half of all retail food sales in the US and even higher amounts in the urban areas—75 percent of food sales in the 100 largest US cities. Wal-Mart alone accounts for 12 percent of US food sales and is projected to have more than 20 percent of the market share in another eight years. The other five companies are 75 percent shareholder owned, hence they are driven by profit motive. While sharing Wal-Mart's mantra of low prices, these companies have sought a 15 percent annual compound return over the past decade. This has led to sourcing worldwide—wherever the food product is least expensive. Oregon is not a cheap supplier, due to its distance from markets, input costs related to labor and land, and lower volumes of production.





The value of the dollar is also a factor in farm profitability. When the dollar is strong, imports are cheaper and Oregon's exported ag products appear more expensive, hurting Oregon producers who sell locally and those that export. A weak dollar is better for Oregon agriculture, as nearly 45 percent of production goes overseas.

Oregon's food processing industry has not been isolated from the consolidating pressures in the food business. Recent examples of impacts in Oregon include Simplot closing potato processing and fertilizer plants, costing 500 jobs, and building new plants in Canada, Chile, and China. The AgriPac bankruptcy (1999-2000), the ABT bankruptcy (2001), and the AgriLink/AgriFrozen bankruptcy collectively took about $80 million of equity from Oregon producers, due to production expenses incurred and the value of crops for which they were not paid. Loss of major processors means fewer buyers, fewer options for

cropping alternatives, and generally lower prices.

The lost capacity of local vegetable and berry processing in Oregon resulted in a 73,000 acre loss of primary processing crops between 1995 and 2005.

Most of the acreage in the Willamette Valley has been converted to various grass and vegetable seed crops, increasing nearly 100,000 acres over this same period.

Global Trade and Movement of Goods—Including Pests

Worldwide movement of foods, plants, and livestock creates opportunities for diseases and invasive species to be introduced, incidentally or intentionally. This adds costs to the food system and the economy. These costs are associated with human health, biocontrol on the farm, and monitoring and eradication efforts. Examples of recent concerns include Avian influenza, anthrax, *E.-coli*, Asian longhorned beetle, Japanese beetle, gypsy moth, noxious invasive weeds… just to name a few.

Global trade presents opportunities and costs. Agriculture sees both sides. Nearly 45 percent of Oregon's agricultural production goes overseas, much more than the national average of 25 percent. Product reaching our shores, however, can carry hitchhiking pests or diseases. This requires vigilant monitoring and eradicating of pests and diseases before there is an impact on domestic production or health.

The results of a March 2006 survey show that, on average, Americans say funding to protect against terrorist attacks on our food supply should be increased. While people think the most likely target of a terrorist attack would be a train or a subway, they are actually more concerned about an attack on the food system. The National Center for Food Protection and Defense, an organization created by the Department of Homeland Security, sponsored the survey

Escalating Costs

Fuels, fertilizers, electricity and other energy inputs, labor, land, and equipment costs have escalated at unprecedented rates in the past three to five years.

Fuel and related components—fertilizers, chemicals, etc.—have increased upwards of 200 percent in the past two years. Fuel and fertilizer are two constants all farmers have to deal with year in and year out. These "core costs of production" continue to reflect changes in petroleum costs. Fertilizer has gone from 17 cents a pound to 37 cents a pound in the past year.

Land prices, particularly around urban areas, are being pushed upward. Measure 37, opening the potential for residential development in farm zones, could have dramatic impacts on agricultural land values, driven by

A recent example of global trade and rising cost

After 19 years growing garlic, Madras-based farmer Loren Roff, of Roff Farms Inc., left the garlic business this year, but not due to white rot. "We thought white rot would get us first, but our partner in California went broke due to falling prices," he said.

Roff had worked with a 30-year-old, family-owned farm in California for the past 19 years, but the California farm went out of business when Chinese garlic farmers offered cheaper garlic to larger retailers such as Wal-Mart and Costco.

"The larger companies didn't want to pay what it cost us to produce," he said. "As a result, [the California farm] went out of business fully stocked with fine quality garlic powder and nowhere to sell it."

So far, Roff has not found any new crop to replace garlic and doesn't expect to find anything soon. He estimated that the loss of the garlic crop cost his business one-third of its total income. "There's nothing of the same caliber," he said. "And there's nothing on the horizon."

"Garlic fungus haunts high desert farmers," By Jeff McDonald, WesCom News Service, May 12, 2006.

development pressures. In Eastern Oregon, the pressure comes more significantly from non-farm interests purchasing farm or ranch lands for recreational purposes.

Labor costs have risen in connection to the indexed minimum wage, pushing wages higher throughout the industry. In caneberries and fruit production, labor costs can constitute upwards of 70 percent of the cost of producing the crop. Competition for workers with other industries, including construction, retail, food service, and hospitality/tourism, have also pushed wages higher. Agriculture, however, does not compete in a local economy alone. The products produced on Oregon farms compete head-to-head with similar products from Mexico, Chile, China, and other areas of the world where labor costs are a fraction of that paid in Oregon. Taken in the aggregate, labor/wages is the single highest expense for Oregon farms.

Farmers cannot, in most cases, pass on the cost increases for commodities they produce. Since buyers can source anywhere in the world where the commodity is cheapest, Oregon growers must continually find ways to reduce costs or reduce the already marginal profits to the business.

Additionally, many retailers are increasingly demanding traceability of product—another added cost with difficulty of implementation in a diversified industry with many small farms. Further, retailers are demanding many different packaging forms for segmented consumer preferences that add costs to growers involved in value-added processing.

Consumer Trends and Segmented Markets

American consumers are fickle. Do we really want healthy foods and will we choose to have healthy diets? Food producers, processors, and retailers are confused by the trends and are trying to identify which markets will gain traction.

Considering that 23 percent of Americans pay no attention to nutritional facts and figures on food labels, 59 percent are aware of but do not follow the USDA Food Pyramid, and only 26 percent are aware that the pyramid was recently revised, it's no wonder that food producers, processors, and retailers are struggling to understand public desires. ***(2005 survey by PARADE Magazine, What America Eats).***

When it comes to eating habits, what Americans say and what they do are two different things. Tim Ryan, President of the Culinary Institute of America, says we suffer from "dietary schizophrenia. Americans tend to 'talk skinny' but 'eat fat.'" For example, 84 percent say they try to eat a well-balanced diet but mostly fail; and 42 percent eat a healthy mix of foods, yet undermine their efforts by indulging in snacks and other pleasure foods as a reward.

We're eating more vegetables (but only 2.4 servings per day when USDA guidelines recommend five), salads, whole grains, and chicken, yet continue to snack in the evening and eat more dessert than

is healthy. We are concerned with the obesity crisis, yet nearly half of surveyed parents say their own kids' weight is just fine, and only 25 percent of adults are on diets to lose weight.

Some interests are taking the approach that healthy food should be mandated and food companies should be responsible for unhealthy products. Others argue that informed consumers make their own choices and should accept responsibility for how and what they eat. History has shown it is hard to legislate consumer choices.

Despite the influx of health-focused food and beverage products produced each year for retail store shelves, US consumers are still spending one-third of their food budget on products consumed for pure enjoyment rather than nutritional value.
("The Enjoyment Factor: Consumers' Unwavering Demand for Taste, Indulgence and Variety," Information Resources, Inc., 2005)

Some companies are reacting to these mixed consumer signals. After a fan-fare introduction in 2006, Wendy's International, Inc. pulled fresh fruit from the menu at its burger restaurants because sales did not live up to expectations.

Other trend indicators are sending mixed messages, leading to market segmentation, increased numbers of niche products, and diversity of marketing venues. Some of these major trends follow.

Diet craze and food for function

Two years ago, approximately 10 percent of the US population was on a low-carb diet, affecting products made with wheat, potatoes, and some other starch-based commodities. Today, less than 3 percent of the population is on a low-carb diet. "Functional foods" are now taking the lead. This includes foods containing probiotics, energy-boosters, vitamin and mineral supplements, cholesterol-lowering foods, and "diabetes friendly" foods. Whole-grains, for example, are recommended because of their benefits to the heart and digestive systems. Sales of whole-grain bread and baked goods in the past year have risen more than 18 percent to about $1.1 billion.

Preferred purchase

Another 10 percent of the US population consistently makes food purchases based on specific production or processing traits, organic, kosher, sustainable, location of production, "free-from foods" such as wheat-free or dairy/lactose-free, or other features of preference.

Organic

Growing consumer demand for organic food is outstripping supplies of organic vegetables, grain, dairy products, and other commodities, partly due to the intense labor requirements for organic production. This has created a vacuum for imports of organics from Mexico, China, Chile and other locations where labor is cheaper, but presents a

dilemma defining a "sustainable" food being shipped thousands of miles to market. Wal-Mart recently announced it is doubling its organic offerings, which may lead to a broader price appeal, but may complicate the sourcing issue.

Fast-food breakfast market

This segment is growing at three times the rate of the overall food market, hitting $30.6 billion in 2005, up 22 percent from $25 billion in 2001. Chains including Carl's Jr., Papa John's Pizza, Dunkin' Donuts and Chick-fil-A are rolling out new breakfast products.

Online

About 10 percent of consumers are doing some amount of grocery buying online, affecting how products are displayed, packaged, and distributed. The percentage of retailers with an online presence has almost doubled to 94 percent in 2005 from 50 percent the year before. For many specialty retailers, including those using direct ag marketing, the Web site is their largest store.

Pets and what they eat

More US households now have pets than have children. Currently, 63 percent of all US households own a pet—73 million dogs, 90 million cats, 148 million fish, 18 million small animals, 16 million birds, and 11 million reptiles. Think about this for a minute and how it affects food purchases and other resource issues. There is more pet food than baby formula on the grocery store shelves. Pets are increasingly viewed as part of the family, even taken out to dinner and on vacations. The implications are significant. In June 2006, a Chicago restaurant introduced "doggie dining" to give owners a chance to dine with their dogs, selecting exclusive doggie menu foods.

Ethnic foods

Thirty of the 100 largest US cities now have a "minority" as the "majority" population. Increasing numbers of ethnic groups are seeking foods that fit their culture and tastes. The US Department of Agriculture says Americans are eating four times more Mexican food than they ate 20 years ago, and sales of salsa—once a specialty condiment used for tacos—are outstripping ketchup sales. The estimated sales of tortillas topped $6 billion in 2004—twice the sales of a decade ago.

Quick or cheap

The number of meals eaten in a restaurant annually has decreased from 93 meals per person in 1985, to 80 meals per person today. However, the number of meals to-go purchased at a restaurant and eaten elsewhere has increased from 19 meals per person in 1985, to 32 meals per person today. About 92 percent of take-out lunches come from fast food restaurants today, and 92 percent of individuals consume some form of "ready-to-eat" foods in the home on a daily basis. As a result of time-pressed lifestyles, the major factors that drive our eating habits seem to

be time and money. If a meal is not cheap, it better be quick, and vice versa. Prepared meal consumption in Europe and America is forecast to double in the next ten years.

Demographics

The baby boomers are now gray-haired and wanting smaller portions, more convenience, and more variety in the foods they buy.

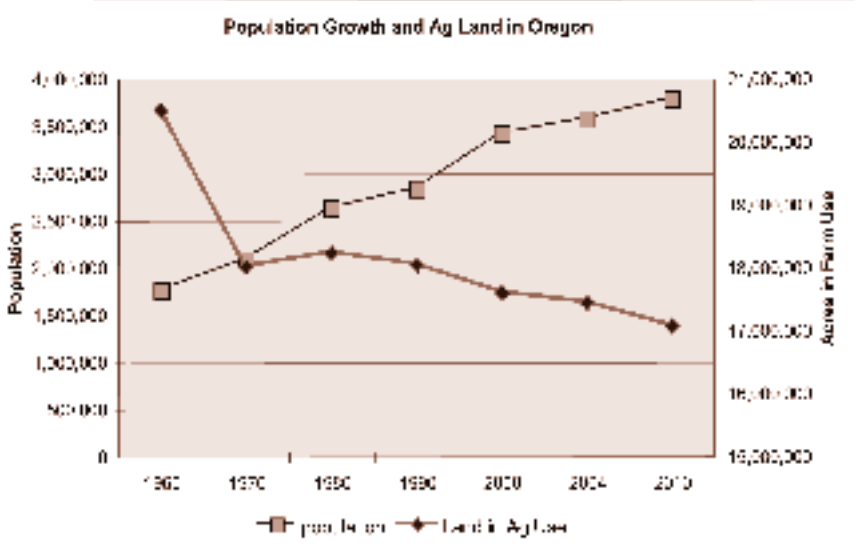
All of these trends and others will determine which products are successful in the marketplace. They will require close scrutiny and skilled marketing, and top quality production and processing to keep the agricultural industry viable. Oregon producers and processors are following these trends, trying to understand them, and modifying their production to satisfy consumer demands. Many growers are also venturing into value-added processing and direct marketing as they adapt.

Population Growth and Competition for Natural Resources

As evident from the following graph, population growth in Oregon has a significant upward trajectory, while land in farm use shows a trend line in the opposite direction.

Significant conversion of farm land during the 1960s led to the passage of Oregon's landmark zoning laws which provided designated areas of growth for urban communities, and exclusive farm and forest zones for commercial production of crops, livestock, and forestry products.

The implementation of land use laws slowed the erosion of farmland conversion but did not stop it. As population in the state increased, particularly in the Willamette Valley, urban areas stretched their growth boundaries onto surrounding farmlands.



Population increases also create more water needs in urban areas, and public interest in retaining more water in-stream for fish and other wildlife also puts pressure on water availability for agriculture.

Without technological improvements in water efficiency and increased production, agriculture cannot keep up with the demand to "produce more with less."

However, it is unrealistic to hypothesize that a long-term strategy of conservation and downsizing of land and water devoted to agriculture and natural resources will lead to an endless supply of food, fiber, and other products in demand.

New technologies

While one-third of the world's crop production increases in the past three decades have come from more land placed under cultivation, mostly in developing countries, two-thirds have derived from improved farm practices. These practices include the use of fertilizers and pest control products, higher yielding seed varieties, and irrigation development. More recently, new technologies have included precision application through GIS/GPS-adapted equipment, biotechnology, mechanization of planting and harvesting, computer-controlled machinery, and other dynamic applications of technology to agriculture.

Farmers around the world used the same basic technologies of human and animal labor for thousands of years. The "green revolution," between 1950 and 1970, introduced new plant varieties, fertilizers, chemicals, and irrigation to increase farm output 50 percent while consumer prices remained stable. Wheat yields in Mexico increased over 400 percent, rice yields in Asia were doubled. If the same farming methods of 1950 had been used in 1970, an equivalent abundance of food and other products would have cost consumers two to three times as much due to higher costs associated with labor, land, and fuels (National Academy of Sciences, 1975).

The ratio of outputs to inputs, however, has leveled off. All this new technology required more capital and financing—farmers took on an increasing amount of debt. In the US, increased debt load, coupled with falling prices and decreased world demand for ag products in the 1980s, led to widespread defaults on loans, foreclosures on farmland, agricultural banks going out of business, and a very challenging decade of restructuring.

A second "green revolution" is taking place today in agriculture through a bifurcated scenario with the dramatic adoption of genetically modified seeds and other technologies on the one hand, and "organic" or "natural" agriculture on the other. Both offer tactics that can be sustainable when applied with good management techniques. Growers that use GMO seeds and no-till planting have dramatically reduced chemical use, soil erosion, fuel, and other inputs costs—and have

increased outputs. Growers that use organic methods of farming also reduce chemical inputs, build up soil humus, and replace purchased fertilizers with animal and other natural plant nutrients. Research into both of these and other "sustainable" farming practices is increasing, and farmers are adopting what they perceive as the best of these approaches to fit their markets, soils, and cropping opportunities. In fact, it is not uncommon for growers across the US to have conventional, organic, and genetically modified production on the same farm in response to various market niches.

Regulatory issues

The last four decades have brought about monumental changes in farming practices with passage of federal laws such as the Endangered Species Act, the Clean Water Act, the Clean Air Act, the National Environmental Policy Act, the Wild and Scenic Rivers System, and many program requirements in various farm bills related to wetlands, sod or grass lands, water quality, soil erosion, pest management, and other natural resource management protocols.

The results of these programs are mixed. Some programs have produced widely recognized benefits to land and water quality, while others appear to have a much higher cost than return of benefit. The agriculture industry largely feels over-regulated and stifled by the mounting costs of complying with more and more rules and requirements. Record keeping is a monumental task. The "regulatory burden" is often cited as a major reason that the younger generation isn't returning to the farm. "It just isn't enjoyable any more as a lifestyle," is an often heard statement.

Indeed, farming is no longer a lifestyle for full-time operators. It is a complex, fast-paced, management-intensive, technologically-advanced business. Costs associated with regulatory compliance are significant, but difficult to quantify.

Cost of compliance is not the only consideration. Growers who undertake projects to improve their operation and enhance environmental benefits often face a daunting regulatory maze that requires time taken away from operating the farm, often hiring lawyers or other specialists, and "one size fits all" options that are difficult to adapt to a specific farm site.

Many growers, however, are taking an approach of documenting their efforts and having them certified, providing the marketplace with evidence of the production methods used, the location, or special quality of their products and how they interact with the environment. This has led to a rise in many certification programs. If a market niche can be identified and consumers are willing to support specific activities (with their related costs), growers are finding a way to help take the sting out of some regulatory requirements.

Even so, the pressure and costs of regulatory impacts have an influence on the make-up of

agricultural operations. Whereas larger operations have the resources and employees to oversee compliance with the hundreds of regulatory requirements, smaller operations don't.

Regulatory compliance can contribute to farm consolidation, driving farms to become larger to enable the resources required to address compliance costs. Medium-sized operations that simply don't have the economies of scale either get bigger or smaller. "Micro-farms" fall under the regulatory requirements in some instances due to the limited size of the operation, fewer employees, etc. As an example, unemployment insurance exemptions exist for growers with fewer than 10 employees or $20,000 in quarterly payroll. Scale makes a difference—both in terms of potential impacts and ability to mitigate those impacts.

A compilation of many of the regulatory requirements applicable to farm operators can be viewed online.

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

Impacts on agriculture and how growers are adapting

Changes in farm structure and size

Oregon farms number roughly 40,000. About one-fifth of farm operators (19 percent) earn at least 50 percent of their income from farming (2002 Census of Agriculture).

Farms vary significantly in size by acreage, volume of production, and sales. Many barely meet the definition of a farm ($1,000 in annual sales or potential sales). Others produce millions of dollars of product.

As figure 3.1 depicts, the number of small farms (those with less than $10,000 in total annual sales) has increased over the past decade from 62 percent to nearly 70 percent of all farms. Ironically, the output of these farms as a percentage of total production and sales has decreased from 2.3 percent to

The "fallacy of composition"

This is an economic concept that helps explain the expansion in farm size and the never-ending struggle between individual actions and collective results.

Individual growers of commodity products have no ability to influence the market because other farmers grow the same thing and buyers dictate prices based on market demand.

Therefore, individual growers have the incentive to plant more acres of product to increase their revenue and spread costs across more units.

When many growers do this, output increases overall, and prices and profits fall. Even though it appears profitable for an individual farm to expand production, the collective actions of all farms expanding leads to a decline in profits for all farms.

It is a continuous treadmill in a purely competitive marketplace for commodity crops and livestock.

Figure 3.1: Change in farm size value, and acreage, 1992-2002

	% of farms			% of ag production $$			% of acres under management		
Farm size by value of sales	1992	1997	2002	1992	1997	2002	1992	1997	2002
Small farms: Less than $10,000 in annual sales	62.1%	61.8%	69%	2.3%	1.9%	1.9%	11%	9%	13%
Medium-sized farms: $10,000 to $250,000 annual sales	31.6%	31.2%	25.3%	27.1%	21.5%	18.6%	51%	51%	45%
Full-time commercial farms: Over $250,000	6.3%	7%	5.6%	70.6%	76.6%	79.6%	38%	40%	42%

Source: US Department of Agriculture, Census of Agriculture.

A major question for Oregon policy makers is: Should food and agricultural policies in Oregon focus on the greatest number of growers (small-scale, lifestyle operations) or commercial growers who earn their living on the farm and who produce virtually all the production?

While this isn't an either/or situation, it does point out that agriculture is diverse and there are no "one-size fits all" strategies for Oregon agriculture. Policies, incentives, regulatory issues, and land management must recognize the broad range of operational types and sizes, and provide an appropriate range of options to match.

1.9 percent. This has occurred despite an increase in acreage under management, indicating that this group of growers, though large in numbers, consists of primarily lifestyle, hobby, or retirement operations not oriented toward production efficiencies and economic output. Even so, this group of growers manages more than 2.5 million acres of property, about 40 percent of which hovers around the urban fringe in the Willamette Valley. Many of these growers tend to be engaged with urban marketing efforts through farmers' markets, farm stands, and local restaurants, with total sales of approximately $60 million as a group—about $2,250 per farm.

The growing number of small farms in Oregon has resulted in a decreased average size of farm. Average farm size, when including all farms, is 427 acres. The average for commercial operations (those with annual sales over $10,000) is 1,170 acres.

Medium-sized farms (between $10,000 and $250,000 in annual sales) have decreased in number from 32 percent to 25 percent of all farms in Oregon between 1992 and 2002. Output from these farms declined from 27 percent to 19 percent of total, while acres under management declined from 51 percent to 45 percent over the past decade. Clearly, the mid-size farm is being squeezed. Many growers are taking off-farm employment; others are selling out altogether. Still others are adapting their management and marketing strategies to remain in business. Only 37 percent of growers in this group are able to earn at least 50 percent of their income from farming. Off-farm income meets a significant portion of family living expense and a way to provide family health insurance, retirement plans, and other benefits.

Economies of scale (generating enough volume of production to serve larger markets, obtain contracts, and spread costs over more units of production) are a challenge for this group because the wholesale and retail food markets have consolidated and have changed the sourcing requirements of raw food products. This increases the pressure on producers to grow in size (volume of production) or reduce in size. Other strategies growers are using to adapt include bypassing traditional marketing outlets and direct marketing to consumers (farmers' markets, roadside stands, internet sales, specialize contracts); certification programs for niche markets; adding value to products through on-farm processing; and using resources in different ways (diversification into farm recreation or agri-tourism, fee-hunting/fishing, and renewable energy production such as leasing ground for wind towers, etc.).

Oregon has about 2,250 full-time commercial operations with over $250,000 in annual sales. More than 70 percent of this group earns over half of its income from farming. Indeed, with today's costs, $250,000 in total sales is a minimal amount of business transaction needed to cover production expenses and have enough left over for family living income.

The number of farms in this category has held almost constant over the past decade, but as a percentage of all farms it has shrunk because of the increase in small farm numbers. The output, however, has increased substantially, from 71 percent of total agricultural production in 1992 to 80 percent in 2002. Acreage under management has increased from 38 percent to 42 percent of total, indicating that these growers are increasing economies of scale by obtaining land from the mid-size farmers that are being squeezed out of business. These larger operations are able to meet regulatory requirements, specifications, and volumes for present-day global market wholesale standards by increasing volume, adopting new technologies, and focusing on efficiencies. Still, margins are tight and global competition is fierce.

Complexity of operations

Historically, farms were small and diverse—growing for most of their own food and fiber needs, selling some excess for cash. As industrialization of agriculture progressed, larger volumes of production enabled growers to sell raw products off the farm. These producers had very little involvement in processing or end-marketing of their products.

However, all of the many trends noted in this report are forcing growers to adapt in a variety of ways. Some of the tactics that growers are taking include

1. increasing in size to gain economies of scale, or conversely, decreasing in size and working at off-farm jobs to supplement family income.
2. vertically integrating or taking on "value-added" functions in order to gain a higher portion of the market dollar, enter niche markets, or to remain competitive. In today's agriculture you can find many farms that are engaged in on-farm processing—from cheese making to processing of fruits into preserves or candies.
3. taking on complex activities designed to address environmental concerns or market needs, such as the construction of an anaerobic digester at a dairy; composting wastes; or undertaking certain practices to obtain "certification" of product.

4. diversifying crops or using their land for new enterprises, such as planting oilseed crops to produce biofuels.
5. finding new farm-direct outlets that increase revenue, such as restaurant sales, farmers' markets, and community-supported agriculture.
6. increasing use of technologies, such as GPS/GIS guidance and precision application systems, laser identification, spot and variable application of chemicals and fertilizers, advanced irrigation technologies, etc.

Any and all of these tactics and activities increase the complexity of the operation. Farmers are faced with navigating unfamiliar regulatory structures and obtaining new permits, learning new technology and its impacts on their operation and management, adjusting to direct interactions with consumers and end-users of products, and potentially taking on increased debt to finance these new undertakings.

The flip side of these developments is that regulatory agencies are having to re-evaluate their programs that weren't designed for these evolving on-farm activities. In some cases, it even involves determining which agency should be the regulatory body. The important policy lesson is that governments at all levels must recognize the trends and pressures facing agriculture and adapt their approaches of oversight to assist in this transition while conducting their regulatory responsibilities—creating pathways, not roadblocks.

Photo courtesy of Volbeda Farms. Employees making specialty cheeses at the farm operation.

Direct Marketing, Value-Added Enterprises, New Business Alignments

As traditional outlets for small and medium-sized producers have disappeared, growers began to look for more direct marketing opportunities.

Some of these now include

- community supported agriculture (CSA), where growers produce on a "contract" basis for consumers and deliver a package of in-season products throughout the year.
- farmers' markets and roadside stands.
- u-pick operations.
- agri-tourism and "fee-for" activities, such as hunting,

fishing, bird watching, hiking, horse riding, and other recreational activities.
- direct sales to restaurants.
- Internet sales.

The number of farmers' markets in Oregon has grown from just 10 in the early 1990s, to nearly 80 in 2006. Farmers' markets exist across the state, from the Portland metropolitan area, down the Willamette Valley, into Southern Oregon, along the coast, and east of the Cascades. More than 1,000 growers (2.5 percent of all farms) participate each year in selling direct at Oregon farmers' markets. Approximately 90,000 customers visit Oregon farmers' markets each week throughout the season.

The value of growers' receipts in Oregon farmers' markets is estimated between $30 million and $50 million (1.25 percent of total ag sales in the state). While this market category is growing and provides critical outlets for smaller operations, it still represents a fraction of overall production. But if not for the development of farmers' markets, many operations that sell through these outlets wouldn't have a market for their goods.

Growers are also recognizing that the present market structure requires forming new relationships and organizations, partnering, and pooling resources. More growers are forming limited liability corporations (LLCs), farmer cooperatives, and other business arrangements to enable joint product sales, sharing of equipment and resources, and addressing marketing costs.

These developments are largely centered in small and medium-sized operations, but larger sized operations are also finding value in partnering and sharing marketing efforts and project development interests.

Certification and Market Access

Traditional certification programs in Oregon were focused on seed purity. For over 80 years, Oregon State University has operated grass seed, wheat, and seed potato certification programs that assist growers in meeting standards for marketing their products. In 2006, more than 231,000 acres of seed crops were certified by Oregon State University.

Another recent example of certification includes the Perennial Ryegrass Bargaining Association's development of a "tournament quality" standard certification that created a top tier criteria program for perennial turf seed grass based on seed purity, inert matter, and absence of weeds.

As markets have become more segmented, and with the challenges of competing in the "mainstream" marketing sector, an increasing number of growers of all types of commodities (particularly fruits, vegetables, dairy, and meats) are finding niche markets through certification programs

that enhance market entry and add value to the product. Further, even some of the traditional food wholesale and retail entities are requiring certification for a variety of reasons, including food safety and product traceability.

Many programs have been developed to meet the variety of consumer interests in production processes and location, processor interests in product traceability and phytosanitary production conditions, and environmental interests in land and resource management. A few of the better-known certification programs in Oregon include Oregon Tilth (organic), Salmon Safe (focus on land management/water impacts), Food Alliance (broad sustainability verification), the Oregon Department of Agriculture's Good Agricultural Practices/Good Handling Practices (GAP/GHP) microbial sanitation certification program for fresh fruits and vegetables, and the Low Input Viticulture and Enology (LIVE) program for wine grape production.

A total of 2,613,000 acres were enrolled in these five certification programs in Oregon in 2005-06. This included organic at 49,000 acres; ODA GAP/GHP at 24,000 acres; LIVE at 5,000 acres; Salmon Safe at 40,000 acres; Food Alliance at 2,500,000 acres (of which 20,400 are in fruit and vegetable production, with the remainder in pasture and rangeland for lamb and beef operations).

Certified acreage under these programs amounts to roughly 15 percent of total acres in agriculture production in Oregon. About 95,000 acres of this total is in crop production, or approximately 2.7 percent of all harvested crop acreage (grains, seeds, hay, fruits and vegetables). The certified pasture or rangeland represents slightly more than 25 percent of all grazing lands in the state—a significant trend.

Breaking the crop acreage down, about 20-22 percent of fruit or vegetable acreage is certified, with about 3 percent as organic, another 3 percent to 4 percent as Salmon Safe, 7 percent under

Program name	Acres	Percent of eligible or applicable production
Organic	49,000 total; est. 8,000 in fruit or vegetable crops, 5,000 in grains, 3,000 in other crops and uses, and 33,000 in pasture or grazing acreage.	3 percent of fruits/veg. production; 0.5 percent of grain production; 0.35 percent of grazing/pasture lands.
ODA GAP/GHP	24,000 fresh fruits or vegetables	8 percent of fruit or vegetable crop production acreage.
LIVE	2,410 certified vineyard acres; 6,106 certified farm acres.	21 percent of wine acreage.
Salmon Safe	40,000 varied crop production or conservation acreage, of which about 4,200 is vineyard acreage	0.06 percent of crop land acreage; 30 percent of wine acreage.
Food Alliance	20,400 fruit or vegetable acreage 2.48 million pasture or rangeland	7 percent of fruit or vegetable crop acreage 25 percent of grazing lands

Food Alliance, and 8 percent with the Oregon Department of Agriculture's (GAP/GHP) Program.

Certification programs are growing, but cropland enrolled still represents a fraction of cultivated farmland in Oregon (2.7 percent), although fruit and vegetable production is increasing in acreage with about one-fifth in some sort of certification. Livestock operations are less labor intensive and present a broader appeal, as evidenced by one-fourth of all pasture and grazing lands enrolled.

Growers who export to Europe are increasingly required to meet EuropGap or other certification requirements in order to move product into certain European markets. Given the sensitivity in some European countries to GMOs (genetically-modified organisms) or crops genetically derived to have herbicide tolerance or pest resistance, a certification to designate commodities as "non-GMO" may also be an incentive in certain markets. Some of the certification programs available to Oregon growers require non-GMO compliance, others do not because other markets are tolerant of GMO crops. (See later section on GMO for more details.)

Many certification programs require extra effort and cost for growers to meet specified standards. The incentive for growers to incur the effort and cost is market access and, ideally, higher prices for their products—but this is not always the case. While trends indicate that certification for a variety of programs and purposes will continue, it is unclear how integrated this will become with the broader production and retailing of food and non-food products, particularly as market premiums disappear with more production. The practices may become standardized and certifications may have less meaning, or at least less financial reward. At present, however, demand is still building.

Adopting New Technologies

Growers adopt new technology for a variety of reasons. They face continual cost and competitive pressures that force them to look for efficiencies and new ways of growing and harvesting crops. Information and public interest about resource management is evolving, and equipment is evolving to match. Changing product demand and how food is processed can also influence how crops are grown.

Following, are a few examples of technology being employed on Oregon farms.

"We remain committed to environmental stewardship including: protection and enhancement of water and soil resources; conservation of nutrients; IPM and reduction and elimination of pesticide usage; wildlife habitat conservation; safe and fair working practices and continuous improvement. But we also MUST substitute capital for labor at a much faster pace. Oregon has one of the highest minimum wage rates in the world… The GPS and satellite guided tractors are an example of our technology focus. We are using these guidance systems for precision farming, again trying to eliminate labor and energy costs. Harvesting equipment is another example. Competition is fierce so we must remain on the cutting edge of technology, product quality and food safety….

-Karla Chambers, Stahlbush Island Farms

- GPS/GIS technology used for crop and field imagery and mapping, guidance systems in tractors and harvesting equipment, and variable rate application of fertilizers.
- Spot application of chemicals through infrared identification of weeds.

Photos courtesy of American Onion/Hale & Levy Farms

- High efficiency irrigation (water distribution) and pumping technologies (energy conservation).
- Renewable energy technologies and opportunities for different farming methods or new uses of resources.
- New forms of harvesting equipment designed to minimize labor requirements.
- Biotechnology.
- Radio frequency identification.

Radio Frequency Identification, or RFID technology, is made up of tags—essentially wireless bar codes that store a variety of information about the product—and radio frequency scanners that read the tags. Through RFID, commodities can be tracked from supplier to distribution to point of sale for the purpose of identification and quality control.

RFID has been around for about five years, but is now becoming more popular because the technology has been standardized to allow growers, distribution chains and retailers to use the same data formats. Larger retailers, like Wal-Mart, are now requiring RFID as an entrance point into their market for some products. Consequently, if growers want to work with these retailers, they need to adopt and know how to use the technology.

With RFID, the place of origin, variety, and harvest date of fruits and vegetables can be tracked. RFID technology can also monitor temperatures inside a shipping crate to determine if the product was subjected to extreme hot or

cold conditions that may affect its quality.

Challenges in Marketing

Oregon isn't a high-volume leader in any but a handful of crops, such as hazelnuts, grass seed and Christmas trees. However, it is world-renowned as a producer of unique, varied, and high-quality riches, such as the Bing cherry, the pears of Hood River, the Brooks prune, or the mythic Marshall strawberry.

There was a time during Oregon's agricultural history that simply offering these gems to the consumer was enough of a marketing plan. Oregon set the bar for quality, and the world came to us. In the post war era and well into the 1970s it was a prosperous time for row crop and fruit producers. Rich soils, skilled growers, and superior quality supported hundreds of processing plants, all providing products that sold themselves without the need to differentiate, brand, or promote.

However, as the Greek philosopher Heraclitus stated so well, "Nothing endures but change."

Soon, other production areas noticed Oregon's success and began aggressive programs to compete in both exports and brand notoriety. The California strawberry is a good example—research began to produce better taste and yields. Were these competing products as good as our Hoods, Marshalls, or Totems? No, but their plentiful yield gained a price advantage, and the growing season was much longer than in Oregon. It would be surprising to most consumers to learn that in the 1950s, Oregon actually led California in the production of strawberries.

Additionally, the boon in exports during the 1970s and 1980s led to greater national expansion of farming programs and inflation of land values. The higher value of the US dollar, led by the rising economy in the state and the nation during the 1990s, further depressed export values. This can be demonstrated by showing the value of Oregon wheat exports, which dropped from $270 million in 1997 to $97 million in 1999. As the dollar eventually softened against world markets due to the dot-com technology bust, export values began to pick up again in 2002.

These swings in dollar value, market demand, and resulting export fluctuations directly impact Oregon's agriculture producers. One might question, why try to compete internationally? Why not focus on providing for our own built-in consumers, the Oregonian?

The answer lies in limits on consumption: at a population of just 3,641,056 (2005 US Census) Oregon comes in at 28th in US state populations. Our population per square mile is 35.5, compared with the US average of over 90 people per square mile. All of those wide-open spaces and natural resources are a bit of two-edged sword—we produce a bountiful harvest that can't possibly be consumed within our state. So the pattern has been to look outside our state's borders once local

demand has been satisfied. (See chart on Oregon's self sufficiency.)

So how does Oregon agriculture compete?

There are basically two approaches to marketing food products in the developed markets outside of Oregon, such as the US, Europe, and Japan.

The first approach is volume-oriented and time-dictated, dependent upon low-cost, year-round availability and low transportation costs. In this track, source of origin isn't nearly as important as availability and cost. For example, mandarin oranges sourced from Morocco, Korea, or California may be displayed side-by-side at a Costco during the holiday season, and most consumers either don't notice or don't care where the mandarin oranges came from.

Growing seasons in certain locations can be extended by expanded plantings in higher or lower elevations. Controlled atmosphere storage and sophisticated packaging can allow for longer shelf life. Lower labor costs in developing countries in Latin America and China also compete against producers in developed production regions, like Oregon, that pay higher wages and withstand greater regulatory "overhead."

Competing in this arena is not—for the most part—Oregon's best strategy, although much of agriculture is still in this position, including significant portions of production of potatoes, onions, pears, wheat, grass seed and others. However, Oregon's high cost basis makes it difficult to compete with other regions that enjoy abundant low-cost hand labor, longer growing seasons, and low-cost value-added packing and processing. Transportation factors, however, are beginning to mitigate some of the expense of long-mileage shipment from other areas—but it also affects Oregon's out-bound exports.

The second approach to marketing agricultural products is premium

Chart 3.3—Production and consumption, Oregon, in pounds, 2004

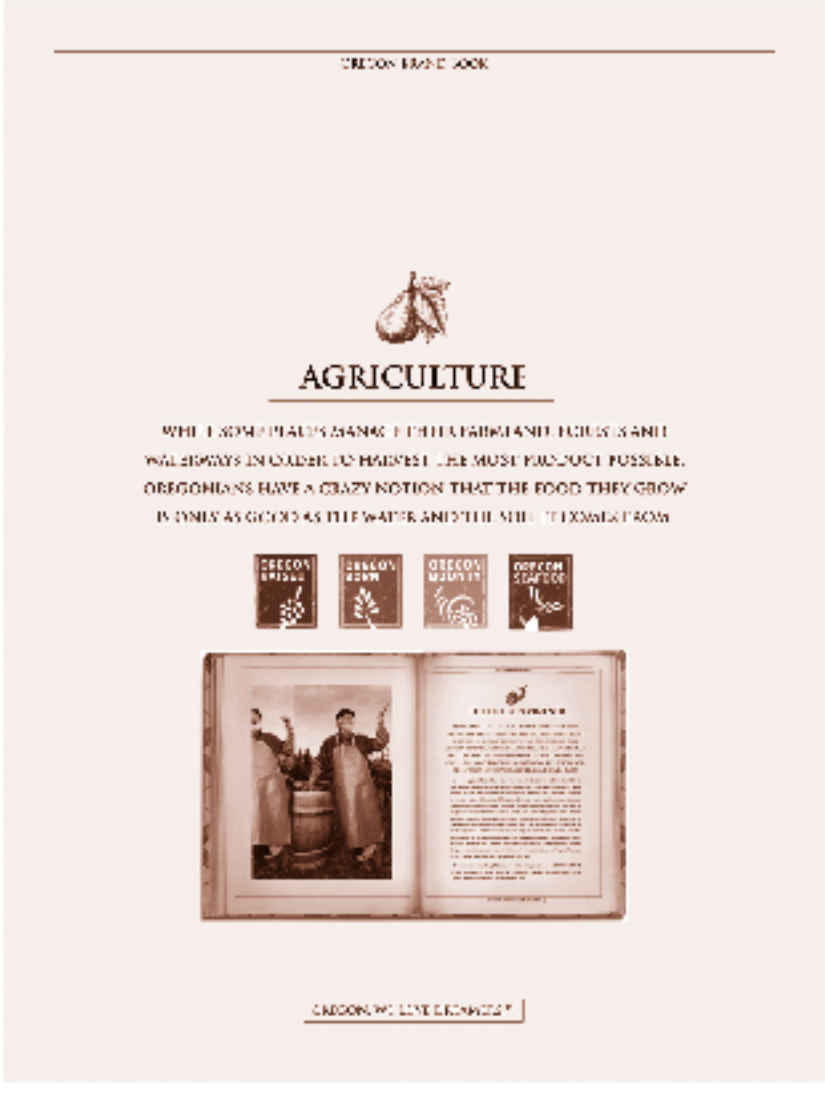
Commodity	Production in Oregon	Consumption in Oregon	Percent satisfied with local production
Pork	24,180,000	182,354,340	13.3%
Lamb	975,000	4,034,008	24.2%
Beef	73,970,000	235,735,080	31.4%
Grapes, wine[1]	38,800,000	108,409,476	35.8%
Lettuce	30,576,000	79,265,025	38.6%
Salmon	5,922,086	7,949,789	74.5%
Pink shrimp	12,206,890	15,046,920	81.1%
Apples	160,000,000	181,996,080	87.9%
Albacore tuna	10,594,609	11,822,580	89.6%
Strawberries	36,288,000	25,078,200	144.7%
Caneberries	2,930,000	1,074,780	272.6%
Milk[2]	2,384,416,000	789,671,970	302.0%
Potatoes	2,214,800,000	481,877,690	596.2%
Wheat	3,358,800,000	481,143,180	698.1%
Blueberries	13,400,000	1,791,300	748.1%
Green peas	82,800,000	10,389,540	797.0%
Sweet corn	519,820,000	61,978,980	838.7%
Dungeness crab	23,756,000	2,181,803	1,088.8%
Snap beans	230,640,000	20,062,560	1149.6%
Onions	1,190,112,000	77,615,869	1533.3%
Pears	420,000,000	20,062,560	2093.5%
Sweet cherries	84,000,000	3,582,600	2344.7%
Hazelnuts	75,000,000	233,933	32060.4%

1. based on conversion of 150 gallons = 1 ton = 2,000 pounds.
2. includes milk and cream, cottage cheese, and American cheese.

quality, rather than commodity-driven products. While most Oregon products measure up to quality standards and exceed those of other areas, being competitive requires building more value into the process. It involves more sophisticated marketing techniques, diversity in product offerings, attention to record-keeping and documentation, certification programs, and up-to-date technology in production, processing, and packaging. This second track is much less sensitive to price and availability, and more dependent on specific product attributes such as where it is produced (location brand identity), how it is produced, and how it is used and consumed in a given market. In other words, this marketing plan involves a story, and telling the Oregon agricultural story is a natural. The Oregon Bounty and Brand Oregon marketing efforts are great examples of this.

Popular culture, current health concerns, and gourmet trends have all converged with Oregon's prime positioning to take advantage of this marketing track. The "romantic" nature of our state's image resonates both nationally and internationally. The state still has an enduring cache as a beautiful and unspoiled corner of the "Great West." Our products are synonymous with quality and rarity. In places as remote from our state as Penang, Malaysia, Christmas trees are advertised with large banners stating, "We Sell Oregon Christmas Trees."

"Natural" and the related association with organic labeling is currently one marketing tool driving a segment of consumers. "Local" identification, whether it is truly local, regional or national, is another desired factor in restaurant menus and grocery shelving. Think—how many times has a consumer recently gone to a fine restaurant where the origin of a menu item, not just the cooking description, is narrated either verbally or in print? The Oregon identification can be an advantage. In a recent international poll, Oregon ranks number 11 of all US states in recognition and key positive attributes to overseas consumers and travelers.



Oregon's product diversity and appealing image provides a vivid and appealing palette for consumer marketing. Following, is the list of the state's top ten fruit, vegetable, and nut crops, by dollar value in 2005, as provided by the National Agricultural Statistics Service.

1. Potatoes
2. Onions
3. Pears
4. Hazelnuts
5. Wine grapes
6. Cherries
7. Blackberries
8. Blueberries
9. Sweet corn
10. Snap peas.

Many of these exact products have been widely touted for their health benefits in countless magazine and newspaper articles. And as for their culinary appeal, a French Impressionist artist couldn't paint a more visually appealing image of offerings.

These are some of the opportunities present in the quality-driven, product-differentiated marketing approach. A growing number of Oregon farmers, ranchers, vintners, processors, retailers, and food services have moved away from the commodity-driven track and are finding success in employing a diversified marketing strategy. The unifying and common theme for all is the ability to tell the story of the product—where it comes from, how it is produced, and what makes it valuable and desirable. Resources— public and private— as well as a long-term commitment to this strategy are required.

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.

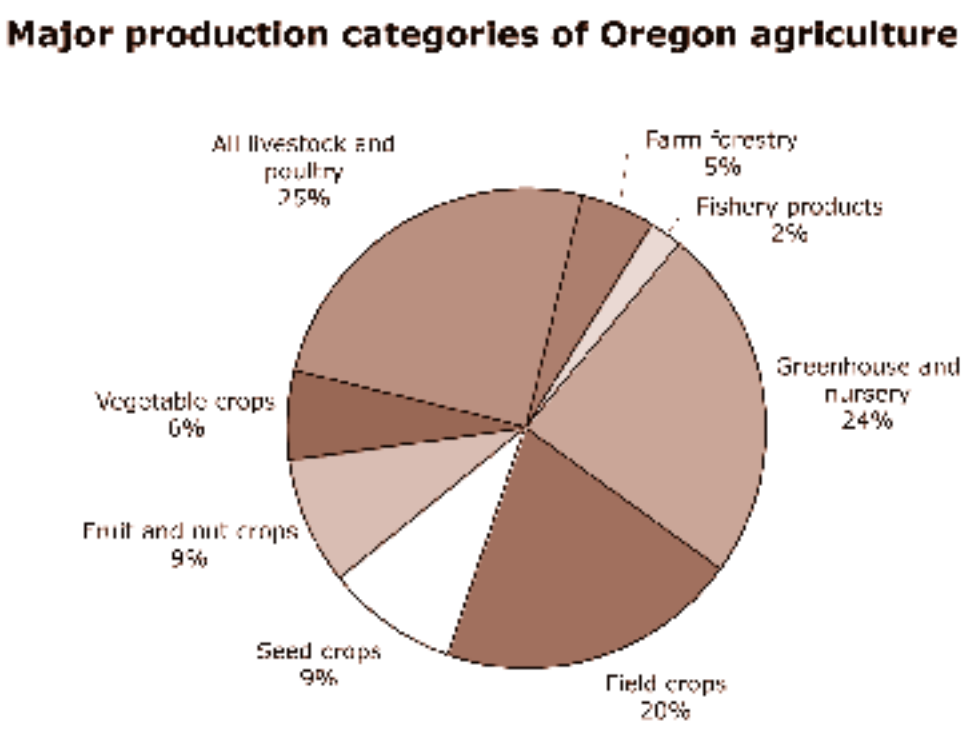


Figure 4.1. Source: USDA/ Oregon Agricultural Statistics Services, 2005.

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 2003 (1,000 dollars)	2004 (1,000 dollars)	2005 (1,000 dollars)	2005 as % of all commodities (Percent)
Value by commodity group					
All commodities		3,689,108	4,178,893	4,306,222	100.00
All farm production (less fishery)		3,616,5[illegible]	4,085,1[illegible]	4,195,126	97.44
All crops		2,595,580	2,806,304	2,847,297	66.[illegible]
Greenhouse, nursery and tree farms		9[illegible]	988,226	[illegible]	23.42
Field crops		682,011	846,304	[illegible]	18.64
Seed crops		311,5[illegible]	[illegible]	[illegible]	9.[illegible]
[illegible] crops		[illegible]	[illegible]	[illegible]	[illegible]
Vegetable crops		267,[illegible]	[illegible]	[illegible]	6.[illegible]
All livestock and poultry products		[illegible]	1,0[illegible]	[illegible]	[illegible]
Forest products, farm		168,781	256,169	235,30[illegible]	6.57
Fishery [illegible]		72,591	93,7[illegible]	110,096	[illegible]
Top 50 commodities					
Greenhouse and nursery products	1	[illegible]	[illegible]	8[illegible]	20.[illegible]
Cattle and calves	2	[illegible]	503,169	533,056	12.38
Grass seed, all	3	3[illegible]	350,782	370,501	8.[illegible]
Milk	4	272,125	368,200	378,283	8.99
Hay, all	5	312,303	371,892	355,100	8.25
Wheat, all	6	197,330	206,339	182,034	4.32
Potatoes, all	7	112,624	101,241	128,836	2.[illegible]
Christmas trees	8	145,411	1[illegible]	12[illegible]	2.94
Onions, all	9	85,2[illegible]	[illegible]	94,135	[illegible]
Pears, all	10	[illegible]	[illegible]	63,016	1.46
[illegible]	11	[illegible]	[illegible]	[illegible]	1.41
[illegible]	12	[illegible]	[illegible]	[illegible]	1.1[illegible]
Crab landings, Dungeness	13	25,578	38,2[illegible]	49,625	1.1[illegible]
Grapes	14	36,240	32,20[illegible]	42,000	0.98
Cherries, all	15	44,5[illegible]	40,810	37,300	0.87
Blackberries	16	28,[illegible]	24,[illegible]	28,[illegible]	0.66
Blueberries	17	20,[illegible]	22,418	[illegible]	[illegible]
Mint for oil	18	[illegible]	[illegible]	[illegible]	[illegible]
Sweet corn, all	19	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	20	27,[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	21	26,[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	22	[illegible]	25,[illegible]	[illegible]	[illegible]
[illegible]	23	[illegible]	[illegible]	[illegible]	[illegible]
Apples	24	23,[illegible]	26,[illegible]	21,[illegible]	0.4[illegible]
Hops	25	21,[illegible]	19,[illegible]	20,[illegible]	0.4[illegible]
Groundfish landings, all	26	17,[illegible]	16,[illegible]	18,471	0.4[illegible]
[illegible]	27	[illegible]	11,[illegible]	18,[illegible]	0.42
[illegible]	28	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	29	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	30	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	31	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	32	[illegible]	[illegible]	12,5[illegible]	[illegible]
[illegible]	33	11,117	11,066	12,0[illegible]	0.28
Garlic	34	10,[illegible]	[illegible]	[illegible]	0.2[illegible]
Sugarbeets	35	10,[illegible]	14,[illegible]	[illegible]	0.2[illegible]
[illegible]	36	8,[illegible]	10,[illegible]	[illegible]	0.2[illegible]
Salmon	37	8,[illegible]	[illegible]	[illegible]	0.24
[illegible]	38	8,[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	39	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	40	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	41	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	42	[illegible]	[illegible]	[illegible]	[illegible]
Watermelons	43	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	44	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	45	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	46	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	47	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	48	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	49	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	50	[illegible]	[illegible]	[illegible]	[illegible]
Other commodities					
Other vegetable crops		[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.

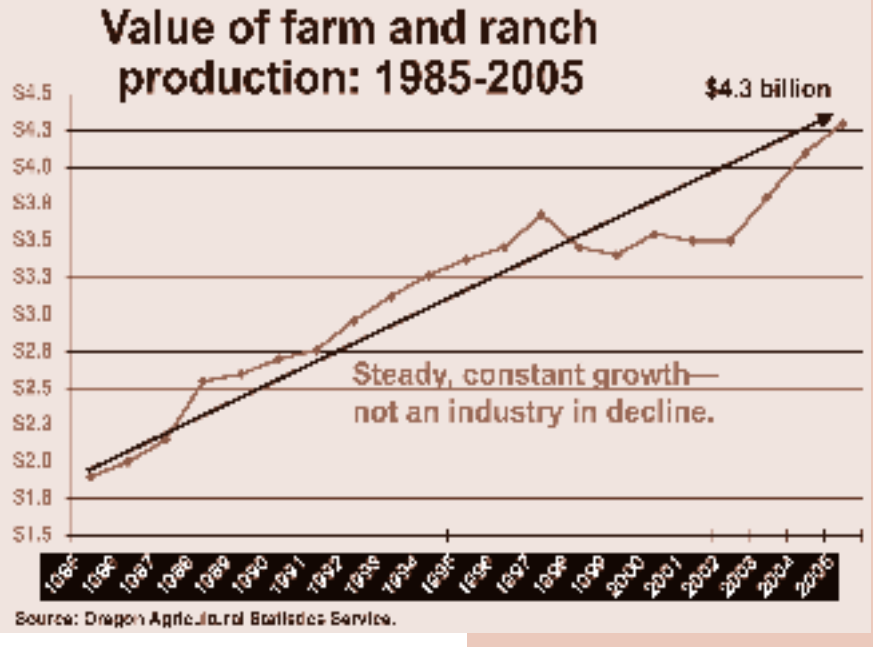
Farm cash receipts—actual sales from farm crops and livestock or other products in a given calendar year.

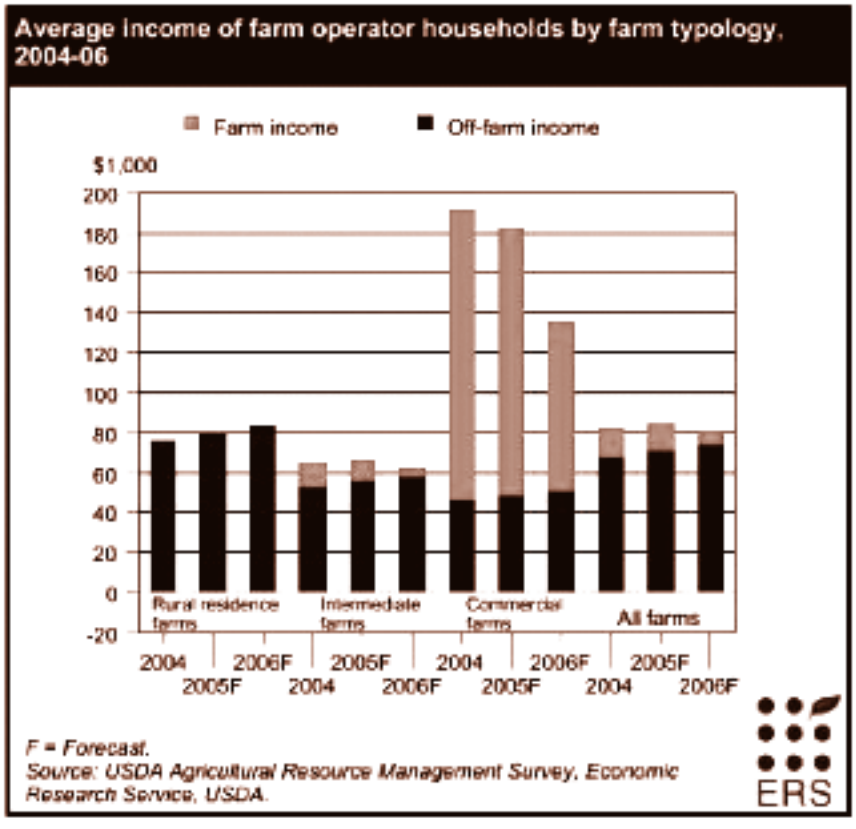
Gross farm income—includes farm cash receipts and other sources of farm income, such as custom harvesting or other equipment services for other growers, custom seed cleaning for other growers, government payments, farm forest sales (managed as timber, not farm commodity production), etc.

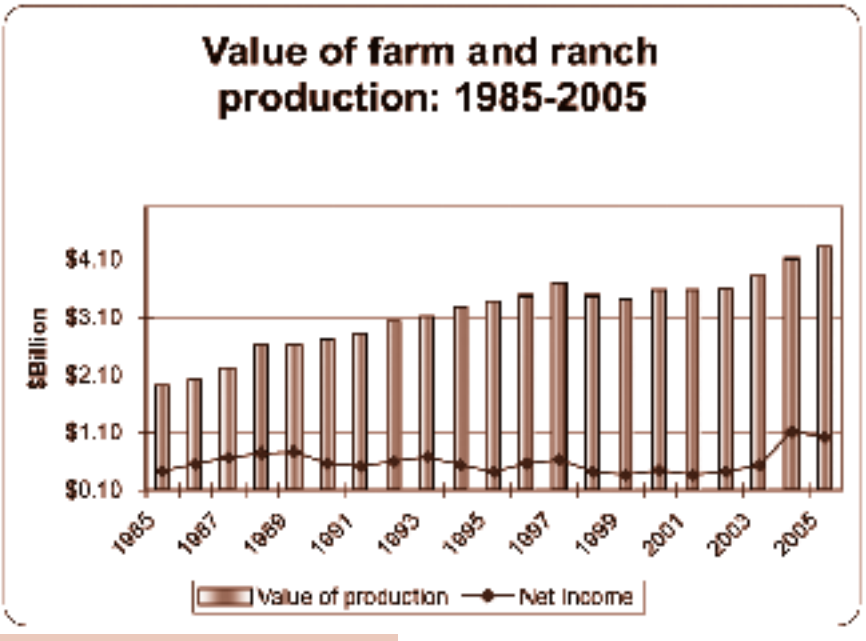
Net farm income—Computed as gross farm income less purchased inputs (fuels, feeds, fertilizers, seeds, electricity, marketing and storage costs, etc.), and subtracting payments to employees, land rental costs, interest on loans, land taxes and farm vehicle registration fees.

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

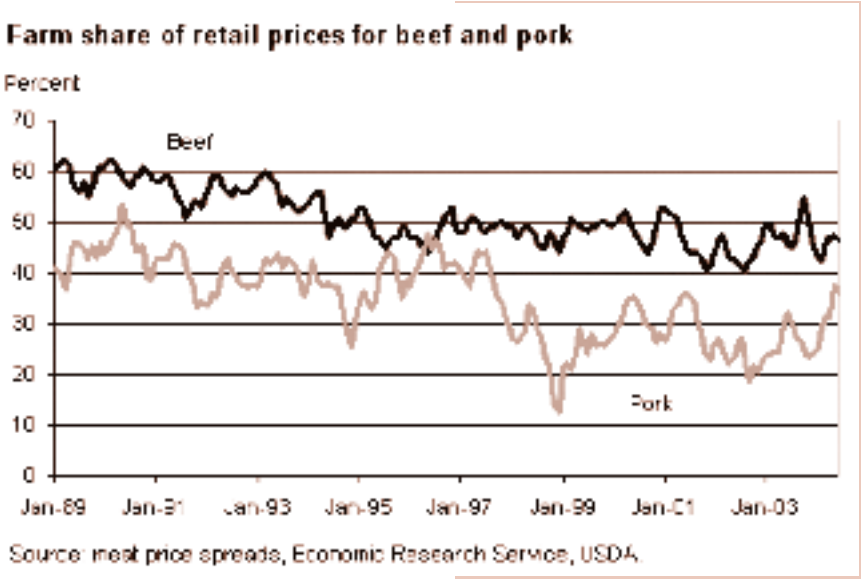
cutting back on inputs, the cost relationship moderated some to 81 cents of costs to $1.00 output, leaving 19 cents net.

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.

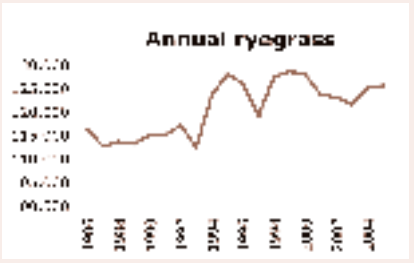
Hence, the saying: "Farmers are cash poor and asset rich." Over time, land and equipment is where equity is invested. There is very little cash that isn't obligated either to the business for land and equipment payments, operating expenses, or to the family for living expenses and those inevitable taxes.

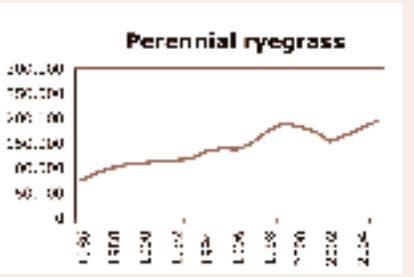
While it is true that productivity increases have cushioned the rise in input costs and have added revenue through volume, farmers still face another challenge—an increasingly concentrated wholesale and retail market. As buyers become more concentrated, with fewer competing buyers, prices to growers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

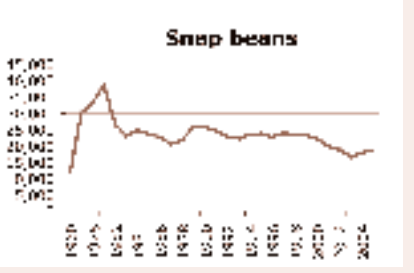


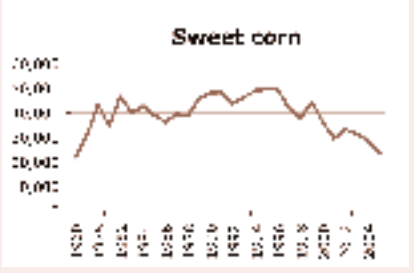
In virtually every category of production, the farmer's share of the retail food dollar has retreated over time. The following chart depicts this trend in meat prices over the past decade. For all meats, growers receive about 31 cents of each retail dollar. The share of retail expenditures on wheat and 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.

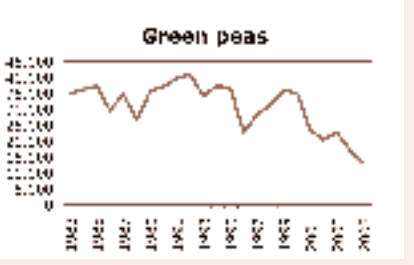
The rest of the consumer dollar pays for transactions after the food leaves the farm, such as processing, packaging, labor, transportation, wholesale and retail margins and profits.

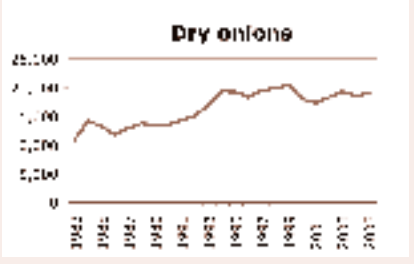


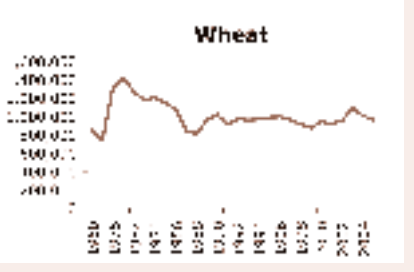


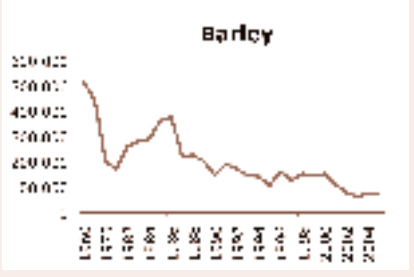


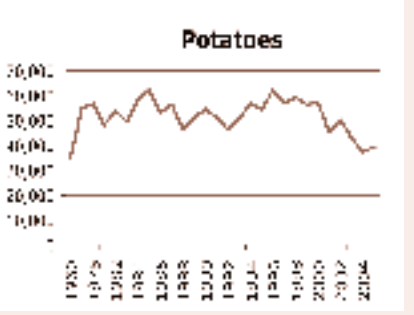


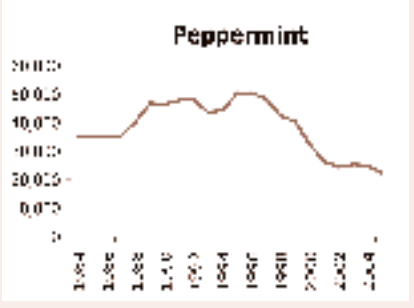


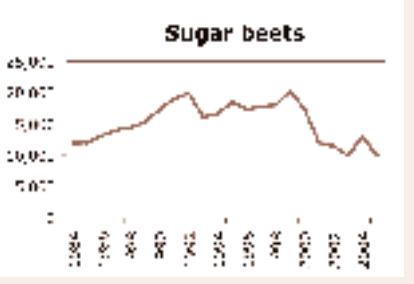












Acres in production

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,

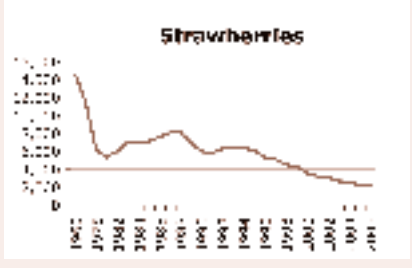
has increased from 5.85 million to 7.99 million, due to denser plantings, particularly in apples.

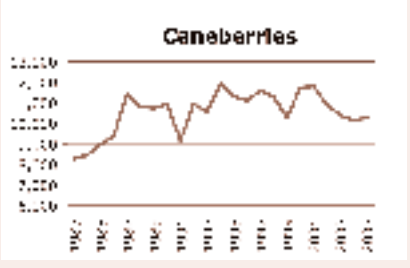
Apple trees per acre have gone from 189 to between 480 and 560, depending on which year is examined for recent plantings (2000 to the present). Pear plantings have increased from roughly 150 trees per acre to over 300 in some varieties. Sweet cherry densities have increased from about 95 trees per acre 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.

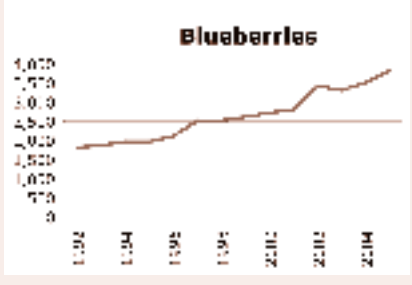
Despite acreage reduction, apple production is about equivalent to early 1980 levels. Acreage has declined by 50 percent from 10,000 acres to 5,000 acres, but improved varieties and yields, along with concentrated densities, have kept utilized production in the general area of 160 million to 180 million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

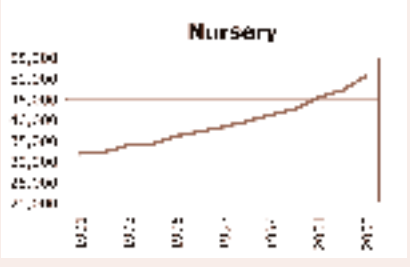
Sweet cherry acreage has increased from 12,790 in 1986 to 14,100 acres in 2006, with most of the increase in Wasco and Hood River counties. Utilized production swings significantly from year to year, peaking at 52,000 tons in 1992 and hitting a low of 29,000 tons in 2002. Utilization was back up to 42,000 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.

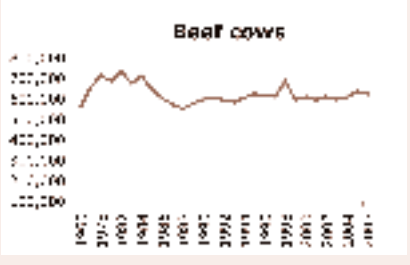
Bartlett pear utilization is slightly lower than 20 years ago, but other pear varieties have stayed relatively level. All other tree fruit production has declined significantly (peaches, tart cherries, prunes and plums).

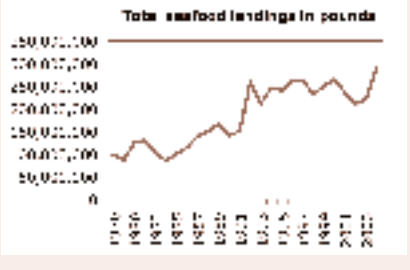












The preservation of a maximum amount of the limited supply of agricultural land is necessary to the conservation of the state's economic resources and the preservation of such land in large blocks is necessary in maintaining the agricultural economy of the state and for the assurance of the adequate,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

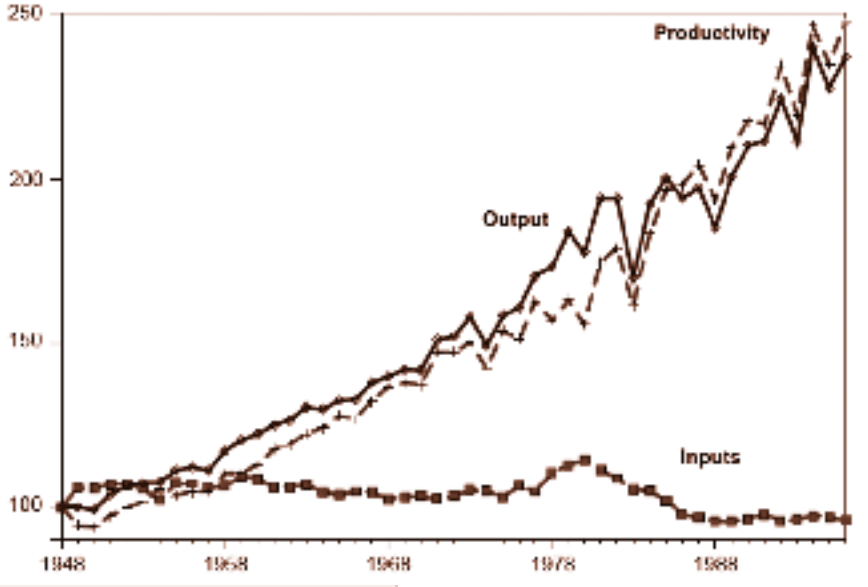


Chart 4.7: Growth in agriculture productivity, output, and inputs, 1948-1996

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

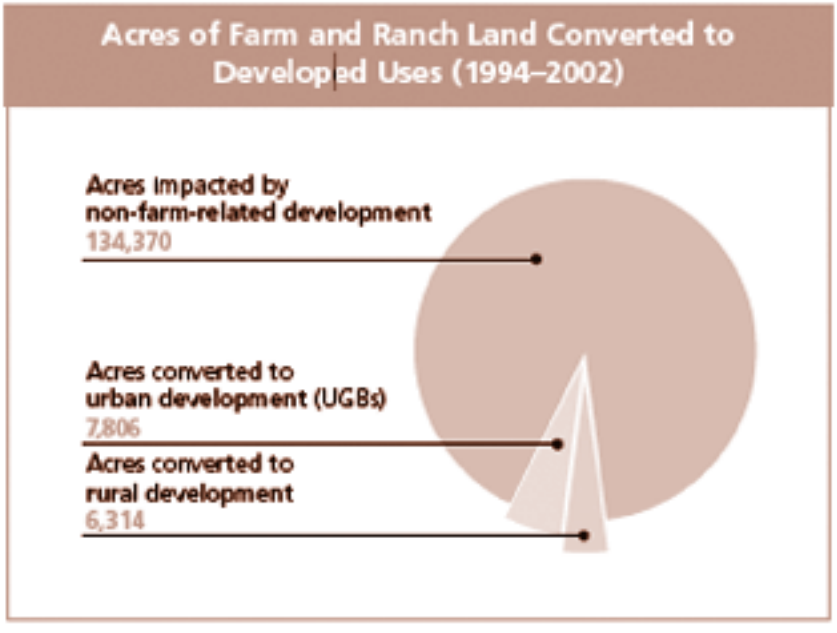
development replaces working ranches, ranchers and wildlife are driven out and displaced.

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.)

Agriculture's contributions to Oregon

Oregon exports and traded sector economy

A traded sector brings in new dollars to the state's economy through exporting of products, thus stimulating additional economic activity and multipliers throughout other business sectors.

More than 80 percent of Oregon's agriculture production leaves the state (over $3.8 billion in raw product and processed food products), with about half of that going overseas ($1.8 billion). The amount of additional employment and economic activity provided by these exports at Oregon ports and other locations, through production, warehousing, transportation, and other associated activities is significant.

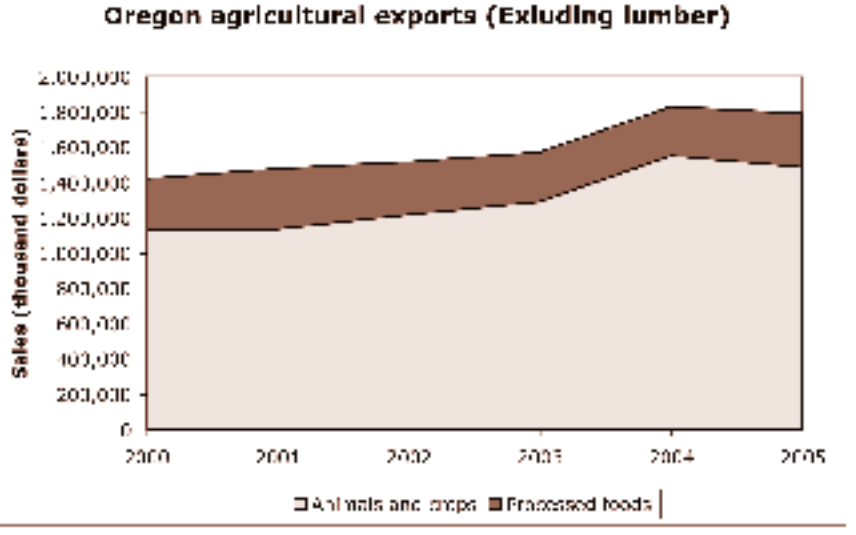
Oregon's agricultural exports, including raw and processed foods, have fluctuated with the value of the dollar, world trade policy, and overseas competition. The trend, however, has generally been upward.

The 1970s and 1980s marked the peak export era for US agriculture, which led to fence-row to fence-row production and inflated land values. This crested in the latter 1980s and early 1990s with a fall out of demand and corresponding depreciation of land, calling of loans, and a depression-like effect on the industry.

While Oregon's economy picked up in the 1990s, along with the US economy, the dollar value increased as well. This again hurt agriculture along with other exporting industries. The value of Oregon wheat exports dropped from $270 million in 1997 to $97 million in 1999.

The dollar eventually softened with the dot-com bust, and exports began to pick up again in 2002, more so in 2003 and 2004. Competition in global trade and costlier shipping slowed ag exports in 2005.

In addition to agricultural exports originating in Oregon, the Columbia River System and western rail lines feeding the Port of Portland make it the number



Top 10 agriculture and food export destinations account for 85 percent of total agriculture and food exports.

one wheat exporting port in the nation. Large volumes of corn and soybeans also move through the Port of Portland, amounting to an additional $1 billion in export value per year of cargo loaded from Oregon for overseas destinations.

Agricultural goods are the largest category of product exported through the Port of Portland.

2005 Oregon food and agriculture exports, by country of destination

Description	Percent	Air value	Ship value	Ground value	Total value
1. Japan	31.7%	$ 7,700,193	$ 687,714,897	$ 106,017	$ 695,521,107
2. Canada	14.5%	$ 1,599,533	$ 47,512	$ 316,847,801	$ 318,494,846
3. Korea	10.1%	$ 1,263,647	$ 221,643,575	$ 5,009	$ 222,912,231
4. Philippines	7.1%	$ 7,796	$ 156,229,012	$ 8,988	$ 156,245,796
5. Taiwan	6.8%	$ 95,334	$ 149,215,338	$ 0	$ 149,310,672
6. Egypt	4.4%	$ 71,175	$ 95,964,884	$ 0	$ 96,036,059
7. China	4.3%	$ 137,281	$ 95,311,015	$ 56,536	$ 95,504,832
8. Rep. Yemen	2.6%	$ 0	$ 57,135,009	$ 0	$ 57,135,009
9. Mexico	2.0%	$ 86,800	$ 337,885	$ 42,895,612	$ 43,320,297
10. Great Britain	1.9%	$ 826,306	$ 20,734,006	$ 21,149,355	$ 42,709,667

2005 Oregon food and agriculture exports, by product

Description	Percent	Air value	Ship value	Ground value	Total value
1. Cereals	52.4%	$ 0	$ 1,151,186,771	$ 451,751	$ 1,151,638,522
2. Wood	16.5%	$ 1,107,410	$ 200,986,932	$ 161,122,594	$ 363,216,936
3. Oil seeds	9.4%	$ 3,252,353	$ 181,134,534	$ 22,121,611	$ 206,508,498
4. Fruits and nuts	3.6%	$ 3,940,143	$ 50,371,130	$ 24,772,062	$ 79,083,335
5. Proc. fruits/vegs	3.3%	$ 279,031	$ 46,034,582	$ 25,937,159	$ 72,250,772
6. Vegetables	2.7%	$ 7,235,493	$ 25,762,138	$ 26,947,496	$ 59,945,127
7. Seafood	1.9%	$ 519,544	$ 35,393,717	$ 6,280,429	$ 42,193,690
8. Live plants	1.7%	$ 1,377,192	$ 1,585,487	$ 34,450,094	$ 37,412,773
9. Prepared meats	1.6%	$ 155,488	$ 10,986,712	$ 24,401,203	$ 35,543,403
10. Cereal/milk prod.	1.4%	$ 197,783	$ 15,837,265	$ 14,323,119	$30,358,167

Oregon origin totals

2004 total value=$905 million

2005 total value=$885 billion

Source: USDA

From Oregon origin	
1. Wheat	$171.4 million
2. Vegetables	$158.3 million
3. Seeds	$111.2 million
4. Fruit and proc. Fruit	$106.4 million
5. Grass straw/forage	$65.2 million
6. Nursery products	$35.5 million
7. Tree nuts.	$32.0 million
8. Dairy Products	$17.6 million
9. Christmas Trees	$14.5 million
10. Animal feeds	$12.1 million

More than 40 percent of the state's production leaves through Oregon ports to destinations in Asia, Europe, and other export markets. Midwestern commodities find their way to many countries for livestock feed and food processing.

The charts (at left) show all natural resource products exported through Oregon ports. The oil seeds (soy) are from the Midwest; likewise, much of the cereal is wheat and corn from the Midwest.
Grand total: $ 2,197,350,971

Japan

Japan has been and will endure as the shining star in Oregon's export universe. Since the late 1940s, ODA and Oregon agriculture have cultivated Japan's market and have developed long-lasting, important trade relations. In fact, more Oregon agricultural products are sold to Japan than are purchased in Oregon.

Japan has higher per capita income than the US and is less than 50 percent self sufficient in food production. These two factors, along with a preference for high-quality products, position Japan as an ideal market for Oregon agricultural products.

In addition, all of Japan's major "trading companies" have offices in Oregon that serve as important trade portals for Oregon producers. Many Oregon producers rely on these trading companies to handle the myriad of details in the export and distribution of products to the Japanese market. No other export destination has this kind of organized trading structure.

Japan is a key importer of wheat, processed vegetables such as French fries and sweet corn, fresh fruit like cherries and blueberries, onions, hay and straw, seafood, and high-value processed products like wines and gourmet items. It is likely that Japan will continue to predominate the export market landscape in the foreseeable future.

Canada

Canada is critically important for a number of Oregon agricultural products. Its geographic proximity and efficient transportation system combine to make it Oregon's second largest export market. Canada's market basket tends to include processed food products and fresh fruit and vegetables. Ornamental nursery products and trees are another important export product. The North American Free Trade Agreement (NAFTA) has eased access for some products into Canada, but dairy and poultry products still suffer from restrictive tariffs and quotas.

South Korea

It is easy to think of Korea as a mini-Japan, but that characterization would be incorrect. Korea has enjoyed one of the world's fastest growing economies and has rapidly moved from a poor developing country to a market with exceptional per capita income. Korea is an important destination for grain, intermediate food ingredients, hay and straw, seafood, and higher value products like wines and specialty foods. Like Japan, it is less than 50 percent self sufficient in

food production, so the long-range outlook for export of both basic and specialty food products to Korea looks favorable.

Taiwan

Taiwan is Oregon's fifth leading agricultural export market and, like Korea, has seen a rapidly expanding economy and a relatively high per capita income. Increasingly, Taiwan finds itself in the shadow of much larger China. In real terms, however, it is still 50 percent greater than all of China in terms of purchases of Oregon agricultural products. Its range of purchases is much greater as well. Wheat, processed vegetables, tree fruits, and seafoods are all important Oregon export products to Taiwan.

China

With a population of 1.3 billion, China represents the 800-pound gorilla of potential consumer demand but, in reality, is a much smaller factor for Oregon agriculture. While Oregon dominates the Chinese market with grass seed exports, other agricultural products are relatively small in comparison to the size of the marketplace. However, there has been significant growth in the export of intermediate food ingredients (for reprocessing and re-export to the EU and the US), hazelnuts, and seafood products. Export of Oregon wheat has been problematic due to non-tariff barriers, despite the fact that China is among the world's largest wheat importers and exporters. China has also discovered the benefit of Oregon's nursery products to control greenhouse gases and desertification in rapidly growing municipalities.

Mexico

The third NAFTA country, Mexico is a significant export market with considerable upside for Oregon—if phytosanitary trade barriers can be worked out. Mexico is an important buyer of Oregon apples, pears, and Christmas trees. However, fresh potatoes are constrained by an artificial barrier that limits shipment to only the northern-most 200 kilometers (120 miles) of Mexico. This is due to concerns from the Mexican government about plant pests and diseases from Oregon being introduced to their country.

The European Union (EU)

The EU, with over 300 million high-income consumers, is a rich market—but it is also highly protected by tariffs, quotas, and generous price support programs that keep its smaller, inefficient producers competitive in world markets. This notwithstanding, the EU represents an important market for some products like pears, cherries, hazelnuts, and niche products like fresh blueberries, dried peppermint for tea, and wild mushrooms. The market would probably have better promise for Oregon if tariffs and quotas were reduced below the average 18 percent currently in effect.

Concessionary markets

One doesn't normally think of Yemen, the Philippines or Egypt

as important markets for Oregon agricultural products, but they and other so called "concessionary" markets are significant export customers. In these concessionary markets, USDA has export programs to support the sale of US commodity crops like wheat. Under these programs, the export sale is supported by a system that can include price concessions, favorable loan rates, or other programs underwritten by the USDA farm program to make it easier for developing and poor countries to purchase US farm commodities.

The Importance of Value-Added Processing

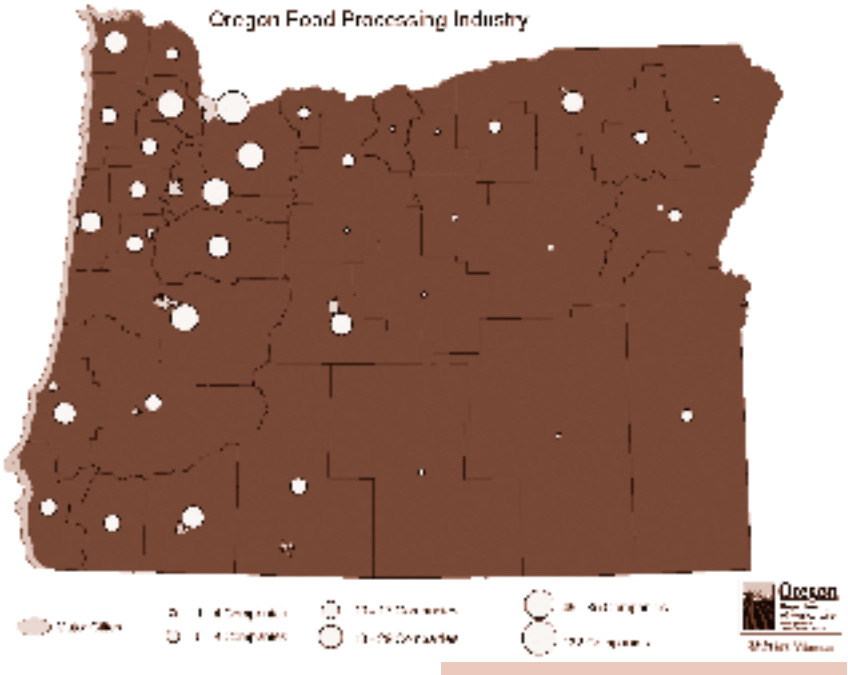
Agriculture can be compared to the hub of a wheel, with spokes radiating from its center. The spokes represent economic ripples, adding value throughout the economy.

Farmers annually purchase more than $3 billion of goods and services that go into the production of crops and livestock. All the economic stimulus, jobs, and associated services derived from this are significant throughout urban and rural areas of the economy.

Following harvest, goods are transported to warehouses, food processors, distributors, or directly to market. The movement of perishable goods is a critical stage and requires timely modes of transportation at competitive rates. Again, the jobs and economic stimulus is significant.

Food processing is the most visible next step in the process, adding more than $2 billion in value to the farm products. Over 23,000 jobs are involved at larger processing facilities. There are also thousands of smaller ventures in domestic kitchens and bakeries that employ the entrepreneur and up to five or six employees, in many cases.

Some of Oregon's agricultural products become ingredients for further processing; others are simply washed, bagged or boxed, and shipped to market. Processing, packaging, branding, and marketing to local and export markets creates more value from Oregon's rich agricultural base. Witness the rise in the wine industry. Who doesn't know about Oregon's famous cheese and ice creams produced on Oregon's coast and other regions of the state? From potatoes to French



This graphic depicts the relative number of food processor around the state. It confirms the important connection between Oregon's production throughout the state and subsequent food processing in urban counties.

Table 1. Oregon farm and ranch commodity sales and value-added by processing, by commodity groups, 2005 ($X1,000)

		Value-added by processing [1]				
Commodity groups	Income received by producers	Payroll	Packaging materials	Other [2]	Total	Total processed value
Livestock						
Meat animals	656,595	7,366	11,431	34,615	53,412	710,007
Dairy products	340,062	70,123	27,488	197,956	295,567	635,629
Poultry and eggs	97,527	75,520	22,599	36,628	134,747	232,274
Other livestock and products	55,220	2,587	94	2,101	4,782	60,002
Total livestock	1,149,404	155,596	61,612	271,300	488,508	1,637,912
Crops						
Grain and hay	456,841	35,948	17,371	80,961	134,280	591,121
Fruit and nuts	343,490	140,702	50,650	206,652	398,004	741,494
Vegetables	377,945	242,102	143,851	310,035	695,988	1,073,933
Nursery and greenhouse	853,507	40,789	7,481	76,577	124,847	978,354
Christmas trees	126,436	15,669	-	12,615	28,284	154,720
Grass seed	255,707	31,424	14,841	30,747	77,012	332,719
Other crops	298,403	94,400	18,087	48,390	160,877	459,280
Total crops	**2,712,329**	**601,034**	**252,281**	**765,977**	**1,619,292**	**4,331,621**
All commodities	**3,861,733**	**756,630**	**313,893**	**1,037,277**	**2,107,800**	**5,969,533**

1. Includes all the activities performed by processors or first handlers, such as meat packers, canners, freezers—or simply cleaning, grading, and sacking as in the case of grass seed. It also includes delivery when generally practiced and costs associated with selling the product. It does not include wholesaling and retailing.
2. Includes all items not previously accounted for, such as depreciation, utilities, repairs, insurance, supplies, licenses, rent, taxes, bad-debt loss, and profit or margin to the processing firm.

fries, hundreds of examples exist that create jobs and economic development, and add value to Oregon's natural resources.

The value-added to Oregon's agricultural production once it leaves the farm is estimated at $2.1 billion, representing a 52 percent increase in value. This compares to $1.3 billion in value added in 1994 with 49 percent of value added to production.

The top commodity to which the most value is added in dollar amount is milk and dairy products, followed by potatoes, farm forest products, wine grapes, nursery products, broilers, onions, hay, and winter pears. The top commodities to which value was added over a decade earlier were, in order, potatoes, farm forestry, dairy, pears, sweet corn, snap beans, dry onions, sweet cherries, nursery crops, and grass seed.

Table 2. Top 15 Oregon agricultural commodities, ranked by farm gate sales and value-added, 2005.

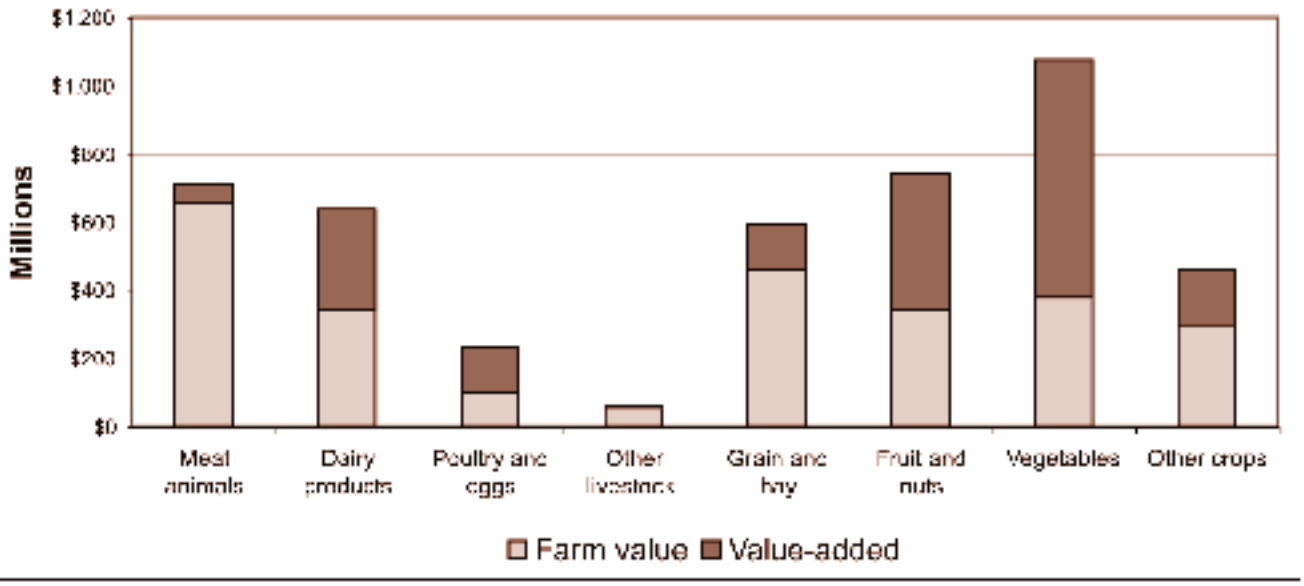
Rank	Commodity ranked by farm gate sales value	Estimated farm gate sales	Commodity ranked by value-added	Estimated value-added
1	Nursery, Greenhouse & Specialty Ornamental Crops	$853,507,000	Milk	$295,567,000
2	Cattle and calves	619,491,000	Potatoes	217,087,000
3	Milk	340,062,000	Farm forest products	158,185,000
4	Farm forest products	285,431,000	Wine grapes	135,786,000
5	Hay	218,015,000	Nursery, Greenhouse & Specialty Ornamental Crops	124,847,000
6	Wheat	171,248,000	Broilers	121,262,000
7	Perennial ryegrass	146,510,000	Onions	104,266,000
8	Christmas trees	126,436,000	Hay	78,486,000
9	Potatoes	116,301,000	Winter pears	59,169,000
10	Tall fescue	109,197,000	Cattle and calves	48,632,000
11	Onions	73,406,000	Hazelnuts	46,916,000
12	Winter pears	55,936,000	Wheat	34,591,000
13	Broilers	46,663,000	Perennial ryegrass	28,672,000
14	Hazelnuts	39,536,000	Christmas trees	28,284,000
15	Wine grapes	36,699,000	Tall fescue	23,762,000
Group total		**$3,238,438,000**	**Group total**	**$1,505,512,000**
% of Oregon total		**80%**	**% of Oregon total**	**71%**

Table 3. Top 10 Oregon agricultural commodities ranked by percentage value-added to farm value

Rank	Commodity	2005 Farm value	Value-added	% Value-added
1	Wine grapes	$36,699,000	$135,786,000	370%
2	Snap beans	$22,832,000	$63,552,000	278%
3	Sweet corn	$16,415,000	$38,061,000	232%
4	Potatoes	$116,301,000	$217,087,000	187%
5	Onions	$73,406,000	$104,266,000	142%
6	Bartlett pears	$25,096,000	$32,087,000	128%
7	Hazelnuts	$39,536,000	$46,916,000	119%
8	Winter pears	$55,936,000	$59,169,000	106%
9	Blueberries	$23,442,000	$19,655,000	84%
10	Nursery, greenhouse	$853,507,000	$124,847,000	15%
	Group subtotal	$1,263,170,000	$841,426,000	66.6%
All commodities		**$4,066,320,000**	**$2,122,892,000**	**52.2%**
Group % of total		**31.1%**	**39.6%**	

Value-added statistics provided by OSU, Agricultural and Resource Economics / Extension Service

Farm value and value-added by processors and by commodity group, 2005.



As a percentage of value added (incremental value), the change over the past decade is even more dramatic. In 1994, the top products ranked by percentage value added were beets, squash, cucumbers, wine grapes, green peas, carrots, snap beans, sweet corn, plums/prunes, and broccoli. In 2005, the leading value added products by percent value added are: wine grapes, snap beans, sweet corn, potatoes, onions, bartlett pears, hazelnuts, winter pears, blueberries, and nursery products.

The shift from vegetable processing in the Willamette Valley to grapes, hazelnuts, blue berries and nursery is significant. Snap beans and sweet corn are the only two vegetable crops that remain in the top ten. Potatoes and onions still reign in Eastern Oregon for value added processing.

Oregon's footprint on urban and rural economies

Agriculture production exists in every county of Oregon, urban and rural. Many of the top producing counties in the state are considered urban counties in the Willamette Valley—partly because that is where some of the best soils in the state exist. Six of the top 10 counties by sales are in the urban counties in the Willamette Valley.

According to research conducted by Oregon State University, there are more than 150,000 jobs supported by agriculture throughout the economy. The sectors with the most significant impact (based on processing value-added and exports bringing in new dollars to the state) include potatoes, dairy, pears, sweet corn and snap beans, wine grapes, dry onions, and sweet cherries.

Related industry sector jobs

Because jobs often are categorized and reported by official state and federal publications in ways that cloud the connections to agriculture, members of the public don't always see the relationship between their own employment, the agriculture industry, and the rest of the economy. Here is a brief listing of some of the occupations associated with the agriculture industry—occupations that have a link in providing food, fiber, flora (nursery/plants, etc.), feed (for animals), and fuel for all of society.

Scientists, engineers and related professionals

Agriscience, with its related occupations of engineering, biochemistry genetics and physiology, is the fastest growing area within the agricultural industry. This is agriculture's cutting edge.

- Agricultural engineer
- Landscape architect
- Rangeland scientist
- Animal scientist
- Microbiologist
- Research technician
- Biochemist
- Molecular biologist
- Resource economist
- Cell biologist
- Natural resources scientist
- Soil scientist
- Entomologist
- Nutritionist
- Statistician
- Environmental scientist
- Para-vet/animal health technician
- Toxicologist
- Food engineer
- Pathologist
- Veterinarian
- Food scientist
- Physiologist
- Waste management specialist
- Forest scientist
- Plant scientist
- Water quality specialist
- Geneticist
- Quality assurance specialist
- Weed scientist
- Wildlife specialist

County rank by agricultural sales (2005)

1.	Marion	$540 million
2.	Clackamas	$362 million
3.	Washington	$275 million
4.	Umatilla	$275 million
5.	Yamhill	$264 million
6.	Linn	$248 million
7.	Morrow	$233 million
8.	Malheur	$206 million
9.	Klamath	$201 million
10.	Polk	$130 million

Source: Oregon Agricultural Statistics Service and OSU Extension Service

We get a very different picture of the importance and impact of agriculture when comparing counties based on agricultural income (sales) per capita.

County rank by agricultural sales per capita (2005)

1.	Morrow	$19,539
2.	Gilliam	$14,469
3.	Sherman	$13,862
4.	Harney	$8,929
5.	Wheeler	$7,412
6.	Lake	$7,393
7.	Malheur	$6,491
8.	Wallowa	$6,104
9.	Tillamook	$4,240
10.	Grant	$3,934

Abraham Lincoln stated, in a speech he made in 1959

"…no other human occupation opens so wide a field for the profitable and agreeable combination of labor with cultivated thought, as agriculture. I know of nothing so pleasant to the mind, as the discovery of anything which is at once new and valuable—nothing which so lightens and sweetens toil, as the hopeful pursuit of such discovery. And how vast, and how varied a field is agriculture, for such discovery. … Every blade of grass is a study; and to produce two, where there was but one, is both a profit and a pleasure. And not grass alone; but soils, seeds, and seasons—hedges, ditches, and fences, draining, droughts, and irrigation—plowing, hoeing, and harrowing—reaping, mowing, and threshing—saving crops, pests of crops, diseases of crops, and what will prevent or cure them—implements, utensils, and machines, their relative merits, and [how] to improve them—hogs, horses, and cattle—sheep, goats, and poultry—trees, shrubs, fruits, plants, and flowers—the thousand things of which these are specimens—each a world of study within itself."

Agricultural marketing, merchandising and sales

There are many demands for agricultural products today. Consumers expect to walk into supermarkets and find the shelves overflowing with choices. These and related occupations keep the shelves full.

- Account executive
- Florist
- Marketing manager
- Advertising manager
- Food broker
- Purchasing manager
- Commodity broker
- Grain merchandiser
- Retail food sales
- Consumer information
- Insurance agent
- Export sales manager market analyst
- Grocery stocking clerk

Education and communications

These occupations provide the next generation of professionals with the skills to do their jobs, and to convey to the public the critical information about agriculture.

- Professors in agriculture and related sciences
- High school teacher/FFA advisor
- Agriculture personnel specialist
- Computer software
- Design for agricultural publications
- Illustrator
- Agricultural public relations representative
- Cooperative extension agent
- Information specialist
- Agricultural radio/television broadcaster
- Farm organization staff

Managers and financial specialists

In order for today's agricultural industry to operate, it must have management and financial specialists. From the local bank's agricultural loan officer to USDA economists, this is an area that demands both agricultural and business skills.

- Accountant
- Agricultural economist
- Insurance agency manager
- Appraiser
- Financial analyst
- Insurance risk manager
- Auditor
- Food service manager
- Policy analyst
- Agricultural banker
- Customer service manager
- Government programs
- Retail manager
- Wholesale manager

Social service professionals

Like most other industries, an increasing number of social professionals are related to the agriculture, food, and rural development sectors.

- Career counselor
- Food inspector
- Peace Corps
- Community development
- Labor relations
- Regional planner
- Conservation officer
- Naturalist
- Regulatory agent
- Consumer counselor
- Nutrition counselor
- Rural sociologist
- Dietitian
- Outdoor recreation specialist

- Youth program director
- Park manager

Source: Agriculture in the Classroom

More about these occupations, how they connect to our economy, and educational resources to incorporate these into classroom settings can be found from the Oregon Agriculture in the Classroom program. This organization is a 501(c)(3), non-profit entity. The purpose of the AITC foundation is to help children grow in their knowledge of agriculture and natural resources for the benefit of Oregonians today and in the future. Agriculture is more than just food. It's forestry and horticulture, bioengineering, renewable energy, and other natural resource topics. It's food science and processing, international trade, ag lending, marketing, new technologies, and many other related careers and segments of the industry.

- http://AITC.oregonstate.edu

Environmental Progress and Contributions

Conservation acreage

Oregon growers have enrolled more than 540,000 acres in the Conservation Reserve Program (CRP). This federal acreage "retirement" program places marginally productive agricultural lands, or those subject to erosion and environmentally-sensitive habitats, into long-term rental agreements for habitat and native plant restoration, planting of trees, and other erosion control efforts. Another 20,000 acres of agricultural lands are enrolled in the Conservation Reserve Enhancement Program (CREP), which focuses on streamside restoration and fish habitat. Several thousand more acres are involved in wetland restoration.

These and other efforts by Oregon farmers and ranchers—and the benefits to Oregon's environment—are outlined in more detail below.

Soil erosion improvements over time

Soil erosion rates from rain and runoff declined 35 percent on cropped acreage between 1982 and 1997. The total soil savings from reduced sheet and rill erosion on all agricultural lands amounted to 8.1 million tons per year.

Much of the reduction in Oregon was due to the adoption of conservation cropping systems that left more residue on the surface and to the installation of physical erosion treatment measures, such as terraces.

Another significant reason for lower erosion rates was highly erodible and environmentally-sensitive cropland being converted to permanent vegetative cover through enrollment in the voluntary Conservation Reserve Program (CRP). Estimated erosion rates were dramatically reduced on cultivated croplands enrolled in CRP.

These cultivated croplands, which were eroding at an average rate of 7.2 tons per acre per year in 1982 before they were enrolled in CRP,

were eroding at an average rate of 0.4 tons per acre per year in 1997, after establishment of permanent cover. This is a 94 percent decrease in the erosion rate. Statewide results for all agricultural lands indicate that these CRP lands accounted for 37 percent of the total tons of erosion reduction from 1982 to 1997 in Oregon. In 2006, there were 541,000 acres of Oregon land enrolled in CRP.

Agricultural plastic recycling

Oregon has a unique success story in Agri-Plas, Inc., the only agricultural plastic recycling center in the nation that collects all types of plastic—types that other recyclers won't touch, like high-density polyethylene (HDPE) pots, pesticide containers, and styrene trays. They also accept hoop house (greenhouse) film, five-gallon plastic buckets, 55-gallon drums, berry trays, and seed sacks. At least 50 nurseries send their agricultural plastic to Agri-Plas, but this alone creates 80,000 pounds of waste every week for the company to clean, chip, and resell.

Hundreds of other Oregon farms take used containers and plastic products to Agri-Plas for recycling. More than 25 million pounds per year are now processed, and Agri-Plas is looking to expand its facilities.

Agri-Plas, Inc. sells the clean plastic pellets it produces to a variety of manufacturers to be melted into new products. Polypropylene from old nursery pots is melted and blended into new plant containers, reducing the need for virgin material by 10 to 20 percent. Bailing twine formerly used to hold hay is refashioned into auto parts. The plastic film used to cover greenhouses—replaced every one to four years—is turned into plastic lumber.

It's a labor-intensive effort with low margins, but reflects the commitment of dedicated owners and industry efforts to make it work.

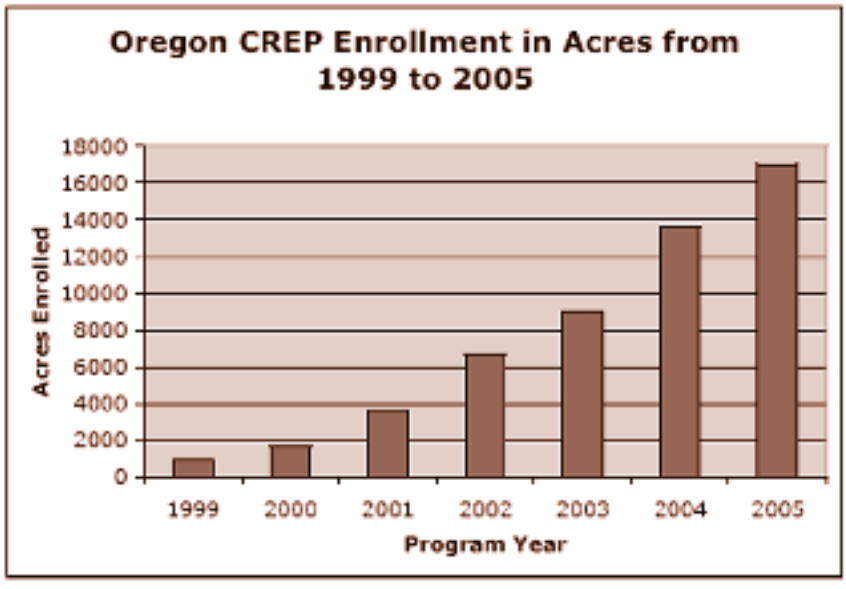
Water conservation/recycling

Container nurseries are big business in Oregon and part of the leading industry segment. Irrigation is a key component of container nursery operations, also serving as a method of delivering plant nutrients through irrigation water. Virtually all container nurseries have a water recycling system that is designed to capture and reuse irrigation water, eliminate runoff from the nursery property, and maximize water conservation and efficiency.

Several irrigation districts have systems that are designed to capture irrigation tailwater at the end of fields, feeding it back into the system and on to other farms. Most irrigation in Eastern Oregon is done with high-efficiency center pivot systems that use low pressure sprinklers, sophisticated soil and plant moisture sensing, remote satellite imagery, and computer-adjusted capacity to match plant needs.

Streamside vegetative management

In 1998, the State of Oregon developed an agreement with the US Department of Agriculture to expand the Conservation Reserve Enhancement Program (CREP) in Oregon. The goal of CREP is to enhance riparian areas on agricultural lands bordering streams that provide habitat for salmon, trout and other fish. As of September 30, 2005, Oregon had 626 approved CREP contracts. These contracts represent 17,024 acres and 1,404 stream bank miles, most of which are forested riparian buffers. 2006 contracts will push past 20,000 acres. Many projects include fencing the riparian areas from direct access by cattle, installing an off-stream watering facility, and installation of a pump with a fish screen to feed the watering facility. The riparian areas are planted with trees or other native habitat and woody species. Demand for the program is growing every year. The state and federal component involves cost-share funding to establish the project, rental rates for the land taken out of production, technical assistance, and monitoring.



Animal management

Oregon dairies are leading the nation in management of manure and wastewater. All dairies and other confined animal feeding operations (CAFO) in Oregon have a containment plan reviewed by the Oregon Department of Agriculture. These plans provide an outline for manure and nutrient management. All water used in the milking process for cleaning and handling wastes must be contained in storage facilities and spread in agronomic rates over cropland throughout the summer. The storage facilities must be able to accommodate heavy rainfall periods with zero runoff. These facilities are routinely inspected to ensure proper stewardship and that there is no impact on surrounding waterways.

An increasing number of dairies are investigating anaerobic digestion of wastewater and manure to address nutrient management, odor, and its potential for energy generation or other benefits. In Oregon, three anaerobic digesters are in operation or construction phase, and a few more are under development. However, the cost of a digester is significant—between $500,000 and $1 million, depending on the size of digester and the number of cows at the dairy. Additional research and policy incentives appear critical to adoption of digesters on more dairy farms.

Farmer Dave Goracke (left), USDA-NRCS fish biologist Kathryn Boyer (center), and ARS agronomist Jeffrey Steiner look at native wetland plants that have been established in a seasonal drainage next to a perennial ryegrass seed field. Photo by Peggy Greb.

Rangeland stewardship

Rangeland is a complex system of ecological and spatial parameters. Rangelands are commonly defined as those lands that are unsuitable for cultivation—including forestlands—characterized by native plant communities. These lands may be associated with grazing animals (both wild and domestic), and are managed by ecological rather than agronomic methods.
("Summary of Current Status and Health of Oregon's Rangelands," by Martin Vavra, OSU Agricultural Research Center in Burns, Oregon, 2001.)

Rangeland resources may include grazeable forage, wildlife habitat, water, and recreational benefits.
(Society for Range Management 1999.)

With this definition in mind, every eco-region within Oregon contains rangelands. Non-forested rangelands make up about 40 percent of the land area of Oregon. Inclusion of areas within the forested region, and using the broad definition above, would mean that more than half of Oregon might be classified as rangeland, much of it federally owned. The Bureau of Land Management oversees 15.7 million acres in Oregon, 13.5 million acres of which is rangeland. Additional rangelands are managed by the state, the USDA Forest Service, and, of course, private ranches.

A "Summary of Current Status and Health of Oregon's Rangelands" by Martin Vavra, Oregon State University, concludes:

- There has been a general improvement to upland ecological conditions compared to conditions during the early twentieth century.
- Lack of fire has increased the amount of sagebrush-dominated stands and encouraged juniper invasion, both beyond the historical range of variation.
- The major current risk to rangelands is the continuing invasion by exotic plant species, which have replaced native vegetation on about 2.8 million acres.
- Sufficient information exists to provide proper grazing use in most upland situations, yet improper grazing management in riparian areas is still a problem in some areas.
- Monitoring to measure success or failure of grazing programs and range rehabilitation projects is a challenge.
- Lack of consensus by disparate interests is impeding management for all beneficial uses.

However, Vavra notes progress: "There is a growing awareness that in order to be successful, restoration and management must be addressed within a landscape-scale framework. This is characterized by the formation of active watershed councils throughout the region. Under the framework of the Oregon Plan for Salmon and Watersheds, funds are available to these local groups through the Oregon Watershed Enhancement Board. A related activity, administered by the Oregon Department of Agriculture, is the development of Senate Bill 1010 basin plans with area farmers

and ranchers, for the purpose of addressing water quality issues. The Natural Resources Conservation Service is providing both technical and financial assistance to landowners through Farm Bill programs. Another ongoing effort is the West Program of the Oregon Cattlemen's Association, using the watershed concept to address ecological, economic, and social factors relative to sustainability. An interagency strategy to accelerate cooperative riparian restoration and management has been implemented by the BLM, Forest Service, and NRCS. This approach is designed to incorporate the elements proven successful in demonstration areas throughout the west, such as the Trout Creek Mountains in southeast Oregon."

Cropping systems

The grass seed production that occurs in Oregon's Willamette Valley replicates the native grass environment that originally existed.

Under the right circumstances, grass seed farmers in the valley manage their operations and help wildlife to thrive during the rainy fall and winter seasons, according to Agricultural Research Service (ARS) scientists and cooperators.

From October to May, the valley averages 37 inches of rain, which flows over the region's grass seed fields into seasonal channels. Western pond turtles, Chinook salmon, redside shiners, red-legged frogs, and many other aquatic creatures thrive in the vibrant channels, with nearby trees and brush supporting even more wildlife.

Case example of land mangement projects

Fred Wallender, a Union Soil and Water Conservation District director, and his son Tim, farm near La Grande, Oregon. The Wallenders have completed a variety of projects on their farm that benefit natural resources and their bottom line.

Installation of multiple watering troughs that are insulated to prevent freezing in cold weather provide a reliable water source for the Wallenders' cattle and calves. The troughs limit animals' access to Ladd Creek and its tributaries, letting streamside vegetation grow.

"We still graze the riparian area lightly and sometimes burn parts of it. We see a lot of new growth on the grasses and shrubs after the disturbance," Tim says. The result is a mix of willows, shrubs, and grasses that protect the streambanks from high flows, provide wildlife habitat, provide shade over the creek, which enhances water quality.

Distributed throughout the farm, the watering troughs allow rotation of winter feeding and birthing areas that result in spread of manure and nutrients evenly throughout the farm. The manure distribution is just one part of a soil building and nutrient management system that also includes soil testing and importing fiber matter from a local wood products facility.

After the animals winter in a particular area, Fred and Tim plant potatoes on that field the following spring. They follow the potatoes with a no-till planting of alfalfa. Potatoes and alfalfa are irrigated with pivot sprinklers. Fred and Tim recently upgraded to the pivots from a flood-irrigation system, which improves irrigation efficiency, conserves water, and prevents runoff to creeks. The Wallenders have worked closely with the Union Soil and Water Conservation District on several of these projects. The SWCD has helped secure grant funding from the Oregon Watershed Enhancement Board and the Environmental Quality Incentive Program for the troughs, sprinklers and other projects.

By Stephanie Page and Ken Diebel, ODA Natural Resources Division

Case example of water conservation projects

Tracey, Vickie, and Rocky Liskey farm in Klamath Falls basin in the middle of Oregon's high desert that requires irrigation on all production. Underlying the Liskeys' success are ongoing efforts to diversify and a strong commitment to natural resources stewardship.

The Liskey family has farmed and ranched on their land in the Lower Klamath Lake area since the 1930s. They produce grass and alfalfa hay on some of their fields and graze 300 cow-calf pairs. They have also diversified their operation to include nursery plants, and also lease out part of the property for fish and row crop production.

The Liskeys responded to the 2001 water crisis by implementing several water conservation and water quality improvement measures on their grazing and hay lands. Many of their fields used to have irrigation ditches running through them. The ditches were up to 40 feet wide and livestock had unlimited access to the ditches. Out of 400 acres, approximately 60 acres were lost in these ditches, There were also potential water quality concerns from the animal access.

The Liskeys worked with the Klamath Soil and Water Conservation District and UDA Natural Resources Conservation Service to fill in the ditches, fence off some of the laterals, and convert from a flood-irrigation system to a center pivot sprinklers. Pastures are cross-fenced into three paddocks and cows are rotated through with two weeks on each paddock followed by 4 weeks of rest.

"We have increased our electricity use by converting to pivot irrigation," Liskey says, "But more acreage is now usable for grazing because of the filled in ditches and the sprinkler system is much more efficient." Liskey, who serves on the Local Advisory Committee for the Lost River Agricultural Water Quality Management Area Plan and Rules, is also proud of the public and natural resource benefits of his irrigation system, having little to no run off from the pasture land.

Written by Ellen Hammond, Eric Moeggenberg, and Stephanie Page, ODA Natural Resources Division.

Soil and Water Conservation Districts (SWCD)

Oregon has 45 Soil and Water Conservation Districts (SWCDs) located throughout the state. SWCDs serve as local coordinators and provide assistance to landowners and managers interested in conservation and watershed enhancement. SWCDs help landowners identify, plan, and implement conservation measures that reduce soil erosion, protect and improve water quality, enhance wildlife habitat, and address other natural resource concerns.

Here's an example of one district's activities. Since 1988, Grant Soil and Water Conservation District (SWCD) has been improving conditions in the 389,000 acre basin. The district has completed stream bank stabilization, put in several miles of riparian protection fencing, and rebuilt diversion dams for fish passage. Grant SWCD spent the better part of $1 million on those efforts. More recently, the district is focusing on the cleanup of invasive plants throughout the region. The Grant SWCD has used a variety of grant sources to help clear juniper and invasive weeds from several ranches in the region. The efforts, referred to as the Upper South Fork John Day River Watershed Restoration Project, have cut 3,073 acres of juniper, and sprayed 4,448 acres of noxious weeds over the past three years. This treatment will provide information on water availability and flow functions as a result of project actions.

The social fabric of Oregon agriculture

Century farms

More than 1,000 farm and ranch operations in Oregon have been managed by the same families for over 100 years. These farms have achieved a feat that few other businesses can. Succession to new generations of producers is a challenge—the economics of agriculture have dictated that more families find off-farm jobs to support their living expenses, health insurance, etc. However, the commitment, tenacity, adaptation, and foresight necessary to hand the farm from one generation to the next is exhibited in these century farm operations.

More information on the Century Farm Program, honoring those who achieve this milestone, can be found online.

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

County fairs and festivals

Many of Oregon's distinct local festivals and county fairs originated and remain connected to agriculture. The Tulip Festival outside Woodburn and the Iris Festival outside Salem are just two examples of established operations that are recognized as important community events, enabling the public to get a closer look at agriculture. There's the Turkey-Rama in McMinnville (Yamhill County was once home to significant turkey production and processing), the St. Paul Rodeo, the Pendleton Roundup, the Mt. Angel Oktoberfest, and many more.

These events provide a sense of community, history, unique identity, and location.

- http://www.oregonfairs.org

Farm stands, farmers' markets, and roadside stands

The public's increasing desire to connect with the source of their food and to interact with farmers is driving a growing interest in farmers' markets, farm stands, u-pick operations, and other direct marketing ventures. These serve as important community connections.

- http://www.oregonfarmersmarkets.org

Agri-tourism and other recreational farm connections

The famous Fruit Loop Tour in Hood River showcases local orchards, farm goods, and unique processed foods. Similar tours in southern Oregon's Rogue Valley feature wines, pear orchards, and artisan cheese—all adding to the regional flavor of the famous Oregon Shakespeare Festival.

Other farms provide educational experiences for nearby schools. Still others are diversifying operations to include a fee hunting or fishing aspect. Others are emphasizing the natural amenities, wildlife, and environmental attributes for photographers, bird watchers, hikers, and related interests. There are pumpkin patches, corn mazes, harvest festivals, oyster and seafood festivals, wine tasting, and many more events that are uniquely Oregon.

The Agri-Business Council of Oregon maintains a list of many agri-tourism locations in Oregon. This is another way some producers are endeavoring to keep the farm viable and connect with the urban population.

- http://www.aglink.org
- http://www.traveloregon.com

Farm employment, worker availability, and cost

Some 11,000 farms in Oregon report hiring outside employees for some portion of farm work. However, about 1,700 farms incur over 75 percent of the cost of hiring workers. Like much of Oregon agriculture, production is concentrated and labor follows production.

The number of on-farm employees fluctuates from approximately 30,000 during the winter months to over 90,000 during peak harvest seasons. This does not include family members associated with the employees. Many of today's agricultural workers are regionally based in Oregon and a good portion work year-round in nurseries, dairies, and other sectors. It is estimated that 50 percent to 70 percent of the workers may be undocumented for legal residence in the US. However, because growers must accept any documentation presented to them that appears legal or face discrimination lawsuits, the workers are employed. Even with the ability to check Social Security numbers, it is difficult to determine legal status.

Oregon's on-farm employment wages have ranked near the top of all states in the country for the past decade. In fact, Oregon's total compensation paid to farm workers, estimated at more than $880 million in 2005, is the highest single cost category for growers, and ranks fifth of all US states. Contrast this with the fact that the number of employees on Oregon farms rank about 10th of all states, and the value of Oregon's total agricultural output ranks 26th of US states.

JAN JACKSON/For the Capital Press

QUICKER CUKE PICKER — Making short work of cucumber picking is one of 13 harvesters owned by Staffanson Harvest Company of Mount Vernon,Wash. In one pass through the field, the harvester cuts the vines, pulls them through a shaker and a roller to get the cucumbers off, shoots the vines back into the field and the cucumbers into the bin. It sells new for $250,000 and replaces 100 people.

Agriculture operates, for the most part, in a global marketplace. Oregon's cost of production, including wages, competes across international boundaries. The wage differential between Mexican and US agriculture is enormous. The daily wage for eight hours of farm work in Mexico was about $3.60 in US currency, compared

As noted in the Capital Press photo of the cucumber picker, mechanization is being accelerated due to labor costs and availability concerns. Similar machinery is available or being developed for asparagus, caneberries, wine grapes, and other crops. While fresh market produce—which brings a higher premium than products destined for processing—may retain more hand labor, much of the production will shift to mechanization in coming years as global forces continue to grind away at agriculture's ability to remain profitable.

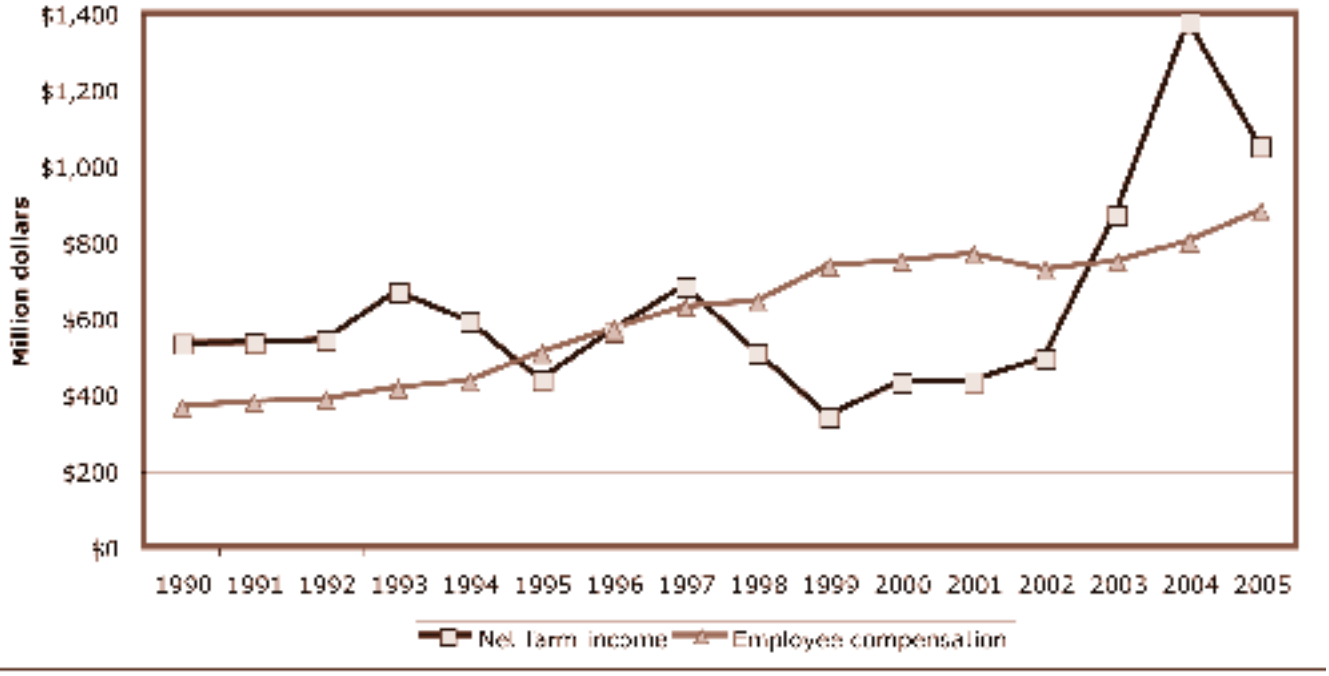
with the US average of $66.32 in October 2000, according to a USDA study. This disparity pulls workers into the US, many without going through proper immigration channels. Of course the cost of living in Mexico is lower than in the US, but the economic reality is that the input cost for production is much less south of the border, creating a growing disparity with Oregon. Even the neighboring state of Idaho, which uses the federal minimum wage, has a significant cost advantage for labor inputs.

Employment compensation

With the diversified production that exists in Oregon, there are multiple harvest schedules, methods, and marketing windows, usually restricted to a very short period of time based on the perishable nature of many crops, such as cherries, pears, apples, strawberries, blueberries, raspberries and other caneberries. Some of these crops end up in processed goods and can be harvested by machines. But the fresh market segment generally requires hand labor to meet higher quality standards. Other sectors of the industry, such as dairy and nursery production, are less perishable but still labor intensive.

Taken as a whole, employee compensation is the single largest expense for Oregon farmers. Total labor costs have risen from $367 million in 1990 to over $880 million in 2005, increasing every year but one (nominal dollars, not adjusted for inflation). Net farm income—what's left from the operation to growers after other

Net farm income vs. on-farm labor expenses in Oregon: 1990-2005



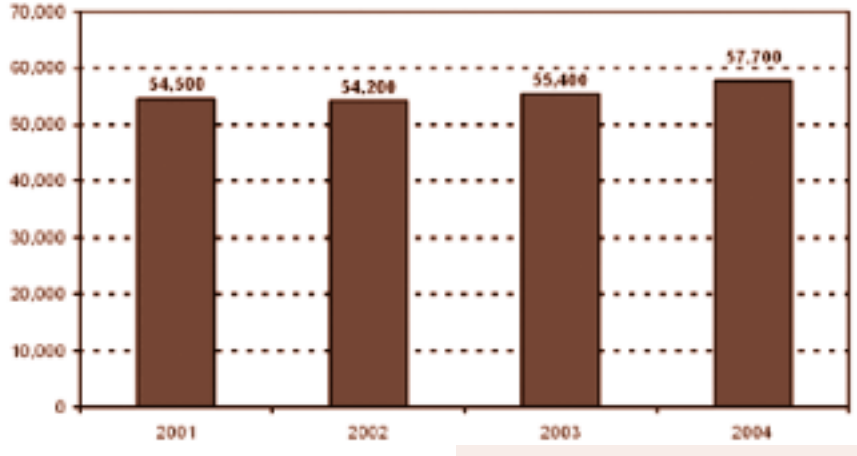
expenses are paid—have fluctuated significantly over this same period.

Labor compensation in total dollars (or as a percentage of net farm income) is virtually equal to net farm income over the past 15 years, with only one-half of 1 percent difference (0.55 percent) between the amounts—total net farm income was $9.8 billion in accumulated returns, and payment to labor was $9.78 billion. To state this another way, farm employees in aggregate have received virtually equal compensation over the past 15 years as have all farmers, in aggregate, over that same period. The returns or payments aren't evenly distributed among farm types or sizes of operation, and there are slightly more workers than there are farm operations (54,000 compared to 40,000 in 2002, latest Census of Agriculture data).

Year	Change in farm income	Change in employee compensation
1991	0.19%	3.56%
1992	1.29%	1.79%
1993	23.20%	8.04%
1994	-11.27%	3.87%
1995	-26.07%	17.28%
1996	29.61%	12.22%
1997	20.30%	10.14%
1998	-25.14%	2.11%
1999	-32.67%	14.61%
2000	26.00%	1.81%
2001	0.60%	2.39%
2002	13.33%	-5.35%
2003	76.49%	2.99%
2004	57.72%	7.00%
2005	-23.68%	9.83%

Labor compensation has increased from 15.8 percent of total farm costs in 1990 to 23.2 percent in 2005. The nursery sector is partially responsible, as its growth has led to an increased number of workers hired with the associated

Oregon Agricultural Employment is Looking Up
2001-2004* Annual Average Farm Employment

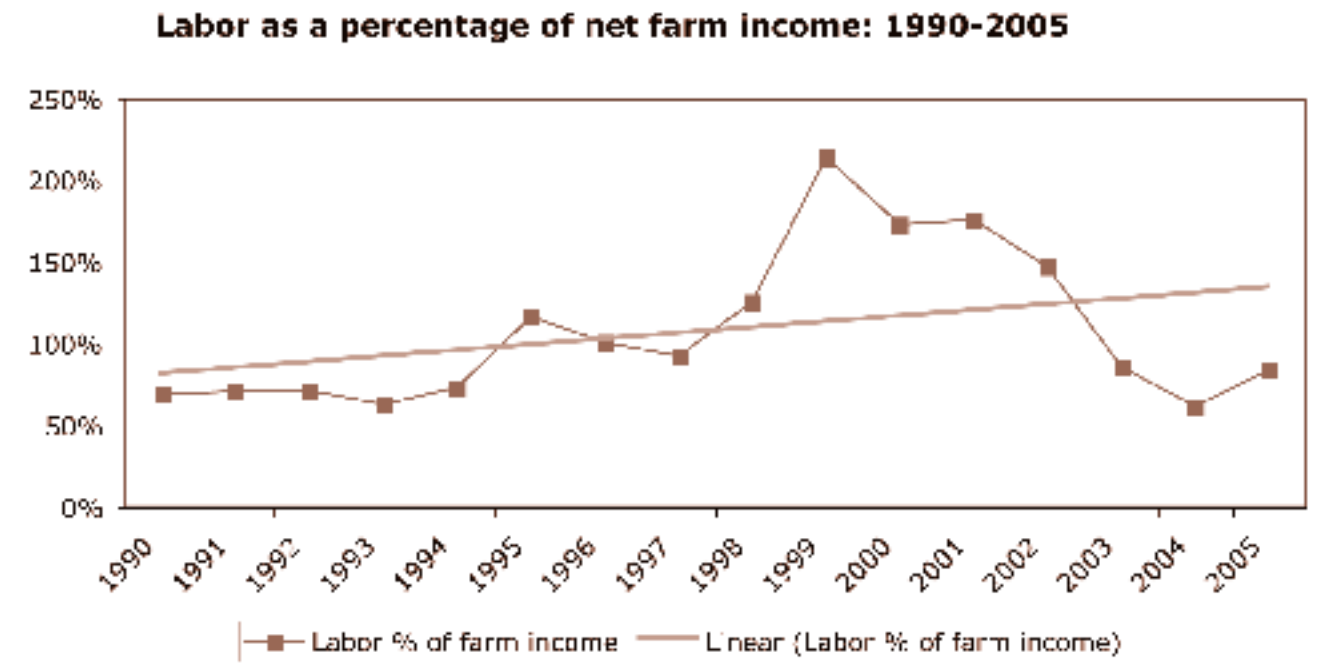


These estimates from the Oregon Employment Department show on-farm employment declining slightly in 2002, then increasing in 2003 and 2004.

Only one year in the past 15 (2002) did total farm employee compensation decline from the previous year. Some of this was due to a decline in on-farm worker numbers as shown in the graph (left) from the Oregon Employment Department.

Over the same period, net farm income declined five years out of 15 and was stagnant in others. The overall net income increase from 1990 to 2005 for growers doubled (197 percent). Over the same period, employee compensation increased 2.5 times (247 percent).

The destiny of farmers and farm employees are inextricably linked. But this relationship also exists in a global economy of market pressures, technological changes, weather dynamics, and trade agreements.



increases in compensation. The indexed minimum wage has also had an effect on compensation, as has an increasingly competitive market for labor (construction, landscaping, food service, hospitality, etc.), and more enforcement of border crossings.

As economic pressure continues to increase for overall employment costs, growers will continue to evaluate cropping options, mechanization and other technologies, and labor availability. The unfortunate reality is that agriculture competes in a dynamic global marketplace against other nations with lower labor costs. Segments of the industry that have some ability to pass costs along to consumers and less pressure from imports, such as nursery and greenhouse, have more flexibility related to employee compensation. Fruits, vegetables, and some livestock products are less able to pass costs along and face significant pressure from imports, making employee compensation a key issue in determining farm financial viability.

A final key issue that remains for the state is to resolve collective bargaining in agriculture. Secret ballot elections, open dialogue, and fair process are components imperative to resolving this issue.

Aging farm population and implications for land use

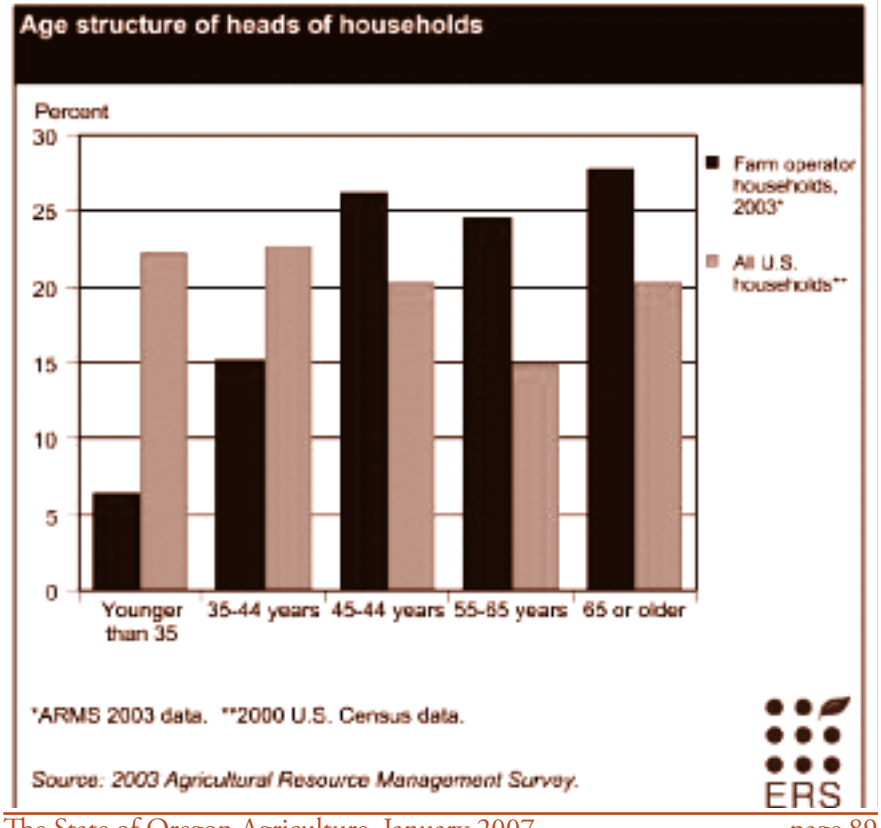
The steady climb in the average age of Oregon's farmers has been followed closely over the past few decades by policy makers and agricultural groups. At 54.9 years, Oregon farmers are the oldest on record. But for those who claim farming as their principal profession, the average age is even higher at 56.6 years.

About one-fifth of farm operators are 65 years of age or more and average 73.1 years. These growers own 25 percent of Oregon lands in agricultural production. Farmers over 55 who claim agriculture as their primary occupation own 41 percent of farmland. Absentee owners or others over 55 years of age who claim another occupation as primary own another 8.5 percent of Oregon's farmlands. Somewhere between 25-50 percent of Oregon's farmland will change hands in the next decade.

The average age of operators has been greater than 50 years since at least the 1974 Census of Agriculture. Part of the reason for the advanced age structure of farmers is because the farm is not just a place of business—it is the family home. About 15 percent of farm operators are "retired." Senior farmers adjust to farming in a variety of ways, such as operating their farms at a smaller scale or participating in the Conservation Reserve Program or other land retirement programs.

At the other end of the spectrum, the percentage of principal operators with average ages of less than 35 years has been declining since 1982, when it was 16 percent; in 2002 this group made up 5.8 percent of all farmers.

The age structure for non-farm US households is much different compared to US farm households. The proportion of US households in each major age category generally decreases as age increases; the opposite is true for farm operators.



Why is the age of farmers important?

If economic conditions and other incentives to encourage entrance into production agriculture do not exist, consolidation of farms will accelerate more quickly. Large corporate (non-family owned) farming has not yet moved into Oregon on a large scale, but the potential exists. The economics of farming are forcing operations to become larger, and fewer young people choose farming as a profession.

Many of the skills required to successfully operate a farm or ranch require years of learning and application. Animal health, genetics, feed production, sophisticated equipment operation and repair, crop production and plant biology, soil management, irrigation, proper chemical usage, construction skills, commodity storage and marketing, regulatory permits, employee management—these are just a few of the many abilities that are required for operators.

Additionally, agriculture operations produce crops or livestock that may require one to five or more years (or growing seasons) to reach maturity. The initial investment is substantial and biological production cannot be turned on and off like a factory power switch. Once the seed is in the ground or the cow is bred, it takes time, professional knowledge, and years of experience to get superior yields and quality products.

While it is true that technology and mechanization have enabled fewer producers to generate more product, Oregon still needs a new generation of farmers to care for the land, enhancing the economic, environmental, and social contributions the industry makes to the state. Because of the unique characteristics of the industry, young entrants are imperative due to the years of experience required to transfer institutional knowledge from an aging generation to a younger group of producers.

Few other industries face the same economic and structural barriers in attracting young owners/operators.

Potential hurdles include the vagaries of weather, reliance on a global marketplace, changing government policies, large financial requirements, little control over price of products, challenging physical labor, and uncertain returns.

Up to half of Oregon farmland will change hands in the next 10-15 years. It remains to be seen whether free market forces can create a balance that is in the best interest of the state and the nation to ensure a viable agricultural industry. Policy makers will need to consider whether they can, or should, provide any incentives, programs, or structures that encourage farming as a profession.

Many factors will influence the transition, including inheritance tax laws, environmental pressures, land prices, commodity prices, education and training programs throughout the education system (agricultural literacy curriculum in kindergarten through higher education is very limited), financing availability, and public attitudes about farming.

Oregon may be better off than other states in some respects. Farms reporting two or more operators—implying possible multi-generations—is higher than any other state at 53.4 percent. The US average is 37.7 percent. However, when looking at the generational make-up of these multi-partnerships, most operators are in the same age range, and most likely are siblings or other relatives of similar ages. The multi-generational farms are highest among those with sales over

$250,000 (40.2 percent) and fewest with farms having sales of less than $100,000 (17.2 percent). Whether this means growers have succession plans in place is unknown. ***USDA National Agricultural Statistics Service.***

- http://www.nass.usda.gov/census/census02/otheranalysis/demographicpaper022505.txt

Food policy

Increasing public interest in how food is produced, food safety issues, local sourcing of food, and understanding the food system have led to the formation of "Food Policy Councils" or similar organizations in several states.

In Oregon, local councils have formed in Portland, Eugene, Clatsop County, Tillamook, Salem, and other communities.

The stated purpose of a food policy council is to improve food systems, broadly defined to include food producers, processors, distributors, retailers, restaurateurs, hunger relief agencies, public health agencies, extension services, academic agriculture programs, departments of agriculture, food and farming organizations, institutional food purchasers, and household consumers.

The premise is that food policy councils can act as a forum to bring together a broad array of food-related public and private stakeholders to evaluate every stage of the food process from seed to table. Members of food policy councils represent the diversity of players involved in the food system, from farmers and processors to retailers, anti-hunger advocates, institutional food buyers, city planners, consumers and others.

These councils are often established by local or state governments—though some have formed through grassroots efforts. Agricultural organizations were somewhat wary of food policy councils in their formative stages, but more growers are now serving on the boards and actively involved in their efforts.

Governor Kulongoski has proposed a state-level Food Policy Council to assist local councils in their efforts. The mission of this effort would be to support and enhance an economically viable, socially beneficial, and environmentally sustainable food system in Oregon with the following goals.

- Create urban and rural partnerships.
- Improve access to fresh, nutritious foods.
- Eliminate hunger in Oregon.
- Increase purchases of local foods in the regions.
- Enhance agricultural viability.
- Expand food-related businesses and jobs.

Advocates of food policy councils argue that locally-sourced food has many benefits and should be supported. Food in the United States now travels between 1,500 and 2,500 miles, on average, from farm to table—as much as 25 percent farther than 20 years ago (Worldwatch Institute). Much of the purchase of food from afar is driven by cost. Many inputs are cheaper outside the US at this time, contributing to the trade

What determines the availability of local foods?

The supply of food is largely dependent on the price farmers receive for what they grow… if they are making a profit, they will continue to produce; if not, they may shift to other commodities or, in the long run, quit producing all together.

Other factors include physical resource availability and constraints—the quantity and quality of available land and water for agricultural use, and the availability and cost of inputs for production, such as seed, fertilizers, fuel, labor, etc.

The cost and availability of new technology, and adoption of such, (reliant on research and extension outreach) also affects what can be produced profitably in any location.

Access to local markets is also key. The interest and willingness of local restaurants, retail outlets, schools and other institutional entities to support local agriculture is important, as are the development of farmers' markets, roadside stands, and other non-traditional distribution methods.

deficit. Price is key to sales. Yet, when food is transported, there is a price to be paid in highway maintenance, use of nonrenewable and expensive resources, and the quality of land, air, and water.

It is important to keep in mind that not all food items needed in a locality can be produced locally due to climate, soil, land and water resources. Further, traded sectors bring in new dollars to the state, and Oregon agriculture ships over 80 percent of production out of the state to areas that buy the unique products produced here. Maintaining or increasing traded sector functions of the industry is as equally valid as increasing local demand for products.

Another argument in support of a viable and vibrant local agriculture, rather than a heavy reliance on "imported" products, is the potential threat to the food supply from natural or human-made disasters. This may even include being at the mercy of an energy crisis when long-distance transport fails. Part of the role of a food policy council is to work with appropriate agencies and organizations to ensure that communities have reasonable emergency plans for food distribution during natural disasters or other crises.

Supporters of food policy councils are also interested in addressing nutrition, health, and hunger (access to food) issues. Governor Kulongoski's stated objectives for a state-level food policy council include activities that support specific concepts.

1. Access to adequate, nutritious food for all Oregonians is a fundamental goal of state and local government, the food industry, and consumers.
2. Food security contributes to the health and wellbeing of residents while reducing the need for medical care and social services.
3. Food and agriculture are central to the economic health of Oregon.
4. Strong regional systems of food production, distribution, access, and reuse that protect our natural resources contribute significantly to the environmental and economic well-being of Oregon.
5. A healthy regional food system further supports the sustainability goals of Oregon, creating economic, social, and environmental benefits for current and future generations.
6. Food brings people together in celebrations of community and diversity, and is an important part of Oregon's culture.

Biotechnology

Biotechnology has taken on various meanings to different people for a variety of uses. In essence, biotechnology is the application of the principles of engineering and technology to the life sciences—bioengineering.

Biotechnology is a set of powerful tools that employ living organisms (or part of organisms) to make or modify products, improve plants or animals, or develop microorganisms for specific uses. Early biotechnology includes traditional animal and plant breeding techniques, and the use of yeast in making bread, beer, wine, and cheese. Modern biotechnology includes the industrial use of recombinant DNA, cell fusion, novel bioprocessing techniques, and bioremediation.

- http://www.wabio.com/industry/definition_biotech.htm

Biotechnology refers to the use of microorganisms such as bacteria, or biological substances such as enzymes, to perform industrial or manufacturing processes. Although biotechnology seems new, it has been around for quite some time and has been used to produce drugs and synthesize hormones, such as insulin, or produce antibiotics. Biotechnology has also been used to genetically alter bacteria for use with the cleanup of oils spills (bioremediation).

Another area of biotechnology doesn't use living organisms at all. Examples include DNA micro arrays used in genetics and radioactive tracers used in medicine.

If we look at modern biotechnology that is based on the technology of recombinant DNA and its different usages, we can classify biotechnology in different fields such as medical biotechnology; ecological biotechnology; bioprocess, pharmaceutical and industrial biotechnology; and farming biotechnology.

Biotechnology in agriculture is essentially the science of DNA or cellular combinations through the use of living organisms (cells, bacteria, yeast, and others) or their parts or products as tools (for example, genes and enzymes).

One subset of biotechnology application is the development of plant-made pharmaceuticals, or "biopharm." Biopharming is the production of pharmaceutical proteins or other materials in genetically engineered plants and animals. This specific topic has created significant policy discussions in Oregon.

No major GMO crops are currently grown in Oregon. The few crops that do present GMO traits are confined to only a few acres. These include canola and alfalfa in Eastern Oregon, along with a small acreage of potatoes. An herbicide-resistant bentgrass variety was tested in Central Oregon but has yet to receive USDA approval for release (there have been concerns about pollen drift and crossing with native species). This does not eliminate the potential, however, for future developments in research or scaleable application of this technology to other crops grown in Oregon, especially as the technology becomes more accepted by consumers here and abroad.

BioPharm Recommendations

In the fall of 2005, the Oregon Department of Agriculture and the Oregon Department of Human Services convened a joint committee to develop a consensus policy recommendation to the governor regarding biopharmaceuticals produced in human food or animal feed crops.

The committee was chaired by a member of the State Board of Agriculture, Jim Rue. The Dean of the College of Agriculture at Oregon State University, Thayne Dutson, was a member. Katy Coba, ODA director and Gail Shibley, administrator for the Office of Public Health Systems, Department of Human Services, served as ex-officio members.

The committee met several times during 2006. The committee concluded that a case-by-case regulatory approach, rather than a wholesale prescriptive or prohibitory approach, is warranted because of the enormous diversity in safety and benefits from different biopharm products. The committee did not endorse or reject all forms of biopharm technology.

The Oregon biopharmaceutical committee made the following recommendations.

- The committee considered a number of formal recommendation options for the governor of Oregon, ranging from a complete ban of biopharm crops to unqualified endorsement. The committee chose "endorsement, moderate scope" to indicate that it supports wisely chosen and carefully studied applications of biopharm technology in Oregon. The "endorsement" of biopharming was based on the recognition that this technology has the potential to prevent or treat disease of public health significance. The "moderate scope" choice option, however, reflected the committee's interest in substantial State of Oregon involvement in federal regulatory decisions about where and how biopharm crops may be grown in Oregon; how specific farmers, products, and markets for state products may be impacted; substantial concerns over safety and/or legal risks should biopharm versions of food or feed crops be grown outdoors; limited public information on the benefits and safety of specific products; and because of the complexity of this technology, the importance of communication to the public about benefits and risks. "Endorsement, moderate scope" does not imply that the committee categorically endorses biopharmaceutical products in food or feed crops nor does it categorically endorse outdoor field trials.

The following additional recommendations are designed to ensure that this kind of technology would be developed in a safe manner for humans and the environment.

- Collaborate with the United States Department of Agriculture's Biotechnology Regulatory Services (BRS) in the review and determination of applications to grow biopharmaceuticals

in Oregon, including a formal memorandum of understanding (MOU) or contractual agreement that provides the state with the location, crop used, anticipated planting date, intended plant made pharmaceutical, and FDA's preliminary opinion on product safety for biopharm food crops before a trial permit is granted. Authorize the directors of Agriculture and Public Health to modify, restrict or veto a permit for field trials in the state if deemed appropriate.

- Encourage the use of non-food crops or animal feed crops for biopharmaceutical applications intended for outdoor environments. If food crops are proposed, greenhouse production should be utilized, if possible.
- Require that, upon permit approval for outdoor growth of biopharmaceutical food crops, applicants post a bond or demonstrate financial responsibility to cover potential damages incurred from contamination or harm as a result of inadvertent release or the adventitious presence of the biopharmaceutical products in the food supply or environment. In addition, require an outline of possible mitigation actions and an emergency response plan to address potential contamination or harm.
- Establish a public communications plan for biopharmaceuticals.

Other biotechnology

In 2005, 33 notifications and permits for transgenic plants were submitted for review to the Oregon Department of Agriculture. These include field trials for canola, corn, creeping bentgrass, Kentucky bluegrass, poplar trees, soybeans, sugarbeets, and sweetgum, as well as agro-bacterium. The traits incorporated into these crops include resistance to insects, bacteria, nematodes, fungus, and herbicide sprays; agronomic properties for yield and stand improvement; heat tolerance; and other expressions. Forty-six permits or notifications were issued in 2004 and 36 in 2003.

While none of these crops or applications is produced in any commercial quantities at the present and all still require review and approval by the FDA, EPA, and USDA, it is clear that Oregon fields are a good research ground for biotechnology. Many crops commonly grown today would not be approved if subjected to the same scrutiny as biotechnology crops. Peanuts, for example, would not pass the allergen concerns.

The first US commercial acres of genetically-modified crops were planted in 1996 and now occupy millions of acres. Over 90 percent of soybeans, 75 percent of cotton and more than half of the corn in the United States is genetically enhanced, primarily for disease or pest resistance, or to accommodate herbicide applications to weeds without affecting the crop.

Initial reaction to biotech crops ranged from tagging the plants as "Frankenfood" and

highlighting the risks associated with bioengineered agricultural products, to claims that they would be the saving factor for developing nations and curing of diseases.

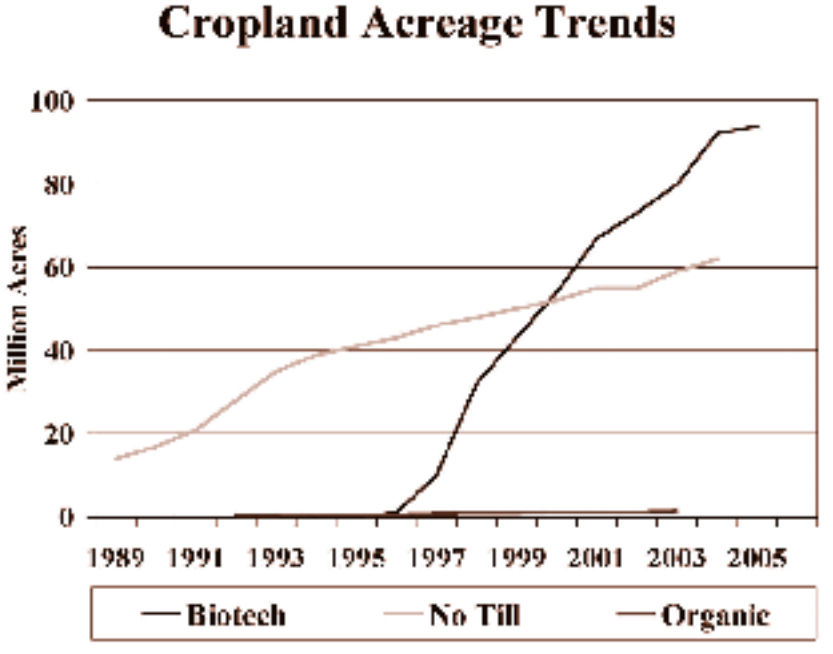
Now, 10 years after introduction, there is no scientific evidence of any significant negative environmental impacts or inability to coexist with other types of production, including conventional and organic. In fact, many growers have all three production systems on the same operation. Growers have learned the necessary practices for isolation distances, buffer zones, and production management in the major crops that have been under production for a decade.

Genetically engineered glyphosate-resistant crops allow direct application of the herbicide without causing damage to the crop. A concern about this technology is that glyphosate resistance is developing in certain weeds from the wide-scale use of this chemical in GMO crop production. For this reason, significant research is being directed toward strategic weed management under GMO cropping systems. However, this situation is not unique to GMO systems. Over time, repeated use of any one pesticide on conventional (non-GMO) crops can also lead to pest resistance. Growers have developed strategies such as crop rotation and varied weed control methods to avoid such problems.

The advantages of using GMO seed in production systems is evident by the rate at which this technology has been adopted by farmers in crops where it has been applied, primarily corn/maize, soybeans, cotton, and canola.

As noted by one observer: "They [biotech crops] have become conventional. Biotech is the changing face of agriculture..." ***(Frankenfood No More: The Bright Side of Genetically Modified Agriculture and the Future Ahead, Tina Butler, mongabay.com, May 15, 2005)***

A recent study concluded that the growth of biotech crop plantings have not impeded the development of the organic sector in North America. "The evidence to date shows that GM crops, which now account for the majority (60 percent) of total soybean, corn and canola grown in North America, have coexisted with conventional and organic crops without significant economic or commercial problems."



US adoption of various cropping methods, in acreage.

Source: CropLifeFoundation.org

Similar findings were evident in Spain and the UK. ***("Coexistence in North American agriculture: Can GM crops be grown with conventional and organic crops?" by Graham Brookes and Peter Barfoot, PG Economics Ltd, 2005.)***

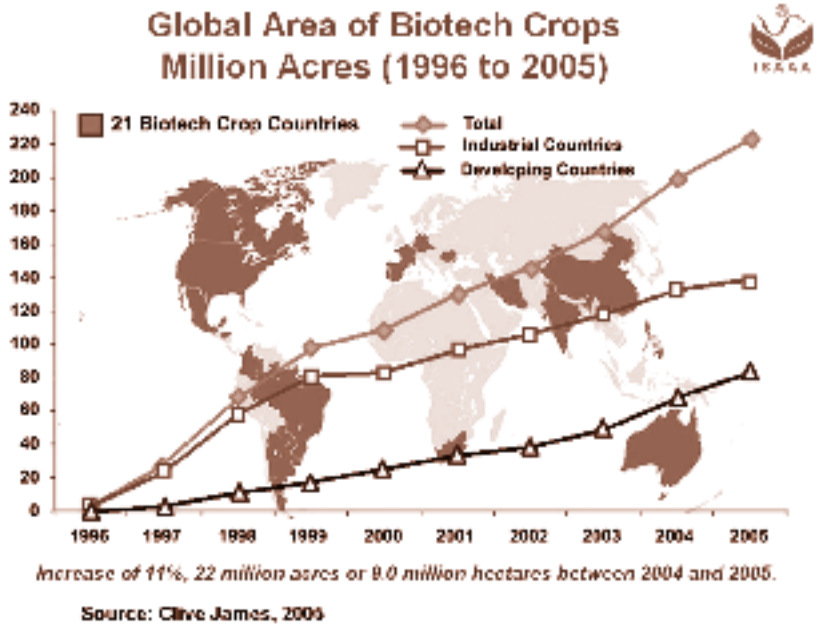
Biotech crops were planted in 18 countries in 2004. In the US and Canada, biotech crops accounted for 60 percent of the total plantings of soybeans, corn, and canola. Conventional varieties of these three crops had a 39.78 percent share, and the organic share was about 0.22 percent.

By 2010, it is projected that 15 million farmers will grow genetically modified crops on up to 375 million acres in 30 countries. It is arguable that no other technology in agriculture history has been adopted so widely in such a short period of time. Clearly, farmers see the benefit of biotechnology in farm production.

For example, Chinese farmers growing biotech cotton in 1999 reported that they sprayed 60 percent fewer times (eight times instead of the average 20), reducing their insecticide expenses by 82 percent. Their yields for 1999-2000 increased by an average of 10 percent.

Supporters of biotech crops also hold that such plants further protect the environment in the promotion of new farming techniques that preserve topsoil and use resources more effectively.

The main reason farmers till their soil is to control weeds that compete with their crops for space, nutrients, and water, and can interfere with harvesting equipment. Historically, farmers have plowed under emerged weeds before planting and tilled the soil in preparation for herbicides that prevent additional weeds from emerging. If herbicides failed due to weather conditions, farmers could use additional tillage as a rescue.



With herbicide-tolerant crops, farmers allow weeds to emerge with their crops. Then they apply herbicide over the top of their crop, removing the weeds without harming the crop, which has been modified through biotechnology to withstand the herbicide. This improvement in weed control gives increased confidence that weeds can be controlled economically without relying on tillage. It partially explains why no-till farming has been increasing significantly in crops where the technology is available. Many analyses have shown that conservation tillage provides economic benefits by saving time and reducing fuel and equipment costs.
(Conservation Technology Information Center)

Biotechnology has primarily focused on large-acreage crops such as corn, soybeans, and cotton.

These and other crops have increased acreage for ten consecutive years, with acreage increases of 15 percent in 2003, 20 percent in 2004, and 11 percent in 2005.

Animal health and other livestock issues

The health of Oregon's livestock industry is critical to the economic and social well-being of all Oregonians. The state's livestock production represents more than $1 billion in value to growers, including beef, dairy, eggs, sheep, goats, swine, equine, bees, and related products. The multiplier effect of this production is enormous across rural and urban economies.

If disease strike animals, it not only affects their well-being but, in some cases, can also impact humans. Growers take great effort to care for and provide proper nutrition and medical care to their animals and poultry.

Livestock producers, including domestic bird growers, have dealt with animal health and disease issues since animals were first domesticated. During the last century, researchers and veterinarians eradicated significant animal diseases. However, the struggle against animal disease continues today. Animal health and disease, like human health and disease, is constantly evolving and, in some disease cases, becoming more difficult to control.

Interest in personal health, combined with highly publicized human illness events connected to eating or handling animal products, has heightened grower and public concerns regarding animal health and diseases.

West Nile virus crossed the country in just a few years and currently presents risks in Oregon to unvaccinated horses and to

Safety precautions at county and state fairs

- ***Fair managers check all paperwork to ensure animals are legally cleared to be in Oregon by meeting health requirements.***
- ***All animals entering fairs are routinely checked by on-site veterinarians.***
- ***Poultry and other avian species are being watched closely because of concerns with avian influenza. ODA will be using bird gatherings to do surveillance work in 2006-07.***
- ***As part of a national surveillance plan, exhibitors with poultry and other domestic birds can expect an ODA technician to request permission for the birds be sampled and tested.***

It is important for exhibitors, and especially the fair-going public, to understand the high pathogenic H5N1 strain of avian influenza found in Asia and other parts of the world does not exist in the US today. It is not a pandemic virus and it does not spread easily from birds to humans. The surveillance effort is part of a larger undertaking, which includes a comprehensive monitoring of wild birds, to ensure the virus has not arrived.

In the past couple of years, special efforts have been made at Oregon county fairs to protect livestock against exotic newcastle disease in poultry, vesicular stomatitis in horses and cattle, a viral hemorrhagic disease in rabbits, and E. coli O157.

- ***Signs will be posted encouraging people to wash their hands after interacting with animals, especially if they are going to consume food. It is also recommended to keep food away from areas where livestock are kept.***

ODA staff provide animal disease preparedness training to Oregon Volunteer Emergency Response Team (OVERT) veterinarians.

some humans with compromised immune systems.

BSE or "mad cow" disease surfaced in many countries over the past several years, including the US and Canada, and seriously affected exports and imports of beef from various nations, despite the minimal risk associated with the small number of animals affected.

Avian influenza (AI), originating in China and spreading to other countries, has yet to reach the US. However, AI has alerted the agriculture and health communities to a potentially catastrophic virus that could affect millions of people if the barrier between bird and human is broached.

Producers of livestock and birds in the US have taken some of the strictest approaches possible in protecting their animals and the public. Many operations, including dairy, poultry, swine, and other livestock operations, require employees and any visitors to walk through a disinfectant shoe bath. Some require people to don protective clothing to prevent bringing pathogens onto livestock premises. Inspections and monitoring are on high alert. Federal, state, and local agencies nationwide are developing response plans for animals and humans in the event of an outbreak.

Methods for traceback of diseased animals is progressing at national and state levels through location/premise registration and animal tracking.

ODA's routine requirements helps stop the importation of unwanted animal diseases. A certificate of veterinary inspection and an Oregon import permit are mandatory for all animals coming in from other states.

Despite widespread media coverage of potential animal disease related issues, the US food system and animal-derived foods and related products remain the safest of anywhere in the world.

No matter how safe the farm or ranch, no matter how sanitary the processing facilities, no matter how fresh the meat at the store, if it isn't maintained at appropriate cold storage after purchase and heated to appropriate hot temperatures when cooked, all previous efforts are in vain and consumers place themselves at risk of harm.

Sanitary handling by consumers and food establishments, and proper chilling or cooking to appropriate temperatures remains one of the critical areas for ongoing education.

Wildlife Damage

Oregon ranchers lost 400 adult cattle and 4,100 calves to predators in 2005, with a value of more than $1.8 million. Mountain lions and bobcats took half of the adult cattle; one-quarter of the losses were to coyotes. For calves, over half of the losses were to coyotes and about one-third to mountain lions and bobcats.
(Oregon Agricultural Statistics Service, May 2006)

Wildlife damage cost Oregon farmers and ranchers $158 million in harm to crops, livestock, and structures, according to a 1997 survey conducted by the Oregon Agricultural Statistics Service. Of that total, production losses of $147.1 million occurred to crops and livestock production. Damage to structures totaled $4.5 million. The cost of veterinary care for injured livestock reached $214,000. And damage prevention expenses totaled $6.0 million.

According to the survey, 47 percent of the state's farms reported some type of wildlife damages.

- http://www.nass.usda.gov/Statistics_by_State/Oregon/Publications/Livestock_Report/wildlife.pdf

Damage to crops is the most significant impact from wildlife. This includes both commercial crops as well as hay, pasture, and other livestock feed. Crop damage amounted to $145.6 million. Deer, elk, geese and rodents caused the most damage to crops while predators, specifically coyotes, cougars and dogs, inflicted the most damage to livestock. Deer and elk were also responsible for about three-fourths of the damage to structures, mostly fences.

As an example, in 2006, elk damage to a Northeast Oregon potato field decreased the yield by 50 percent, as the animals dug up and ate the potatoes while tromping down the crop.

Rustlers

Yes, it still happens. Livestock thieves stole over 100 head of livestock in 2005. Use of permanent branding is still the best and widest used deterrent to cattle rustling.

Country of Origin

Many cow-calf ranchers support labeling of beef and other meat products by country of origin, just as is done for many other foods and manufactured goods. They believe consumers will choose domestic beef and other meats if given the choice over imported products.

The concept of mandatory labeling is opposed by meat processors and retailers who argue that meat is commingled, and that tracking origin and labeling would be too costly and problematic to implement. They favor a voluntary system for products that lend themselves to tracking. Congress passed a mandatory country of origin labeling program in 2003, but opposing interests were able to stop funding for enforcement of the program and delayed the implementation for several years.

Market Access

After one initial case of "mad cow disease," or BSE, documented in 2003 in a Washington state dairy animal, several foreign markets were shut to US beef exports. A second cow was found positive for BSE in Texas in 2005. Since then, eight cows in Canada have been identified positive for BSE, while at least 29 cows in Japan have been found with the disease. Ironically,

Japan was the number one export market for US beef and has banned US beef since 2003, although limited access has recently been granted.

USDA, FDA, and other federal agencies, along with state-level veterinary efforts, have increased surveillance and monitoring of ruminant-to-ruminant feed bans and susceptible cattle. The best present science and monitoring data indicate there is less than one infected cow per one million head of livestock. Present monitoring will keep such animals out of the human food chain and minimize any risks to the population.

Lack of processing facilities in Oregon

Aside from small-scale custom processing, there are no large animal processing facilities in Oregon. This means virtually all cattle are shipped out of state—to Idaho, Washington, or California—for processing, adding transportation costs and physical toll on animals to be shipped. This ends up eroding profitability for Oregon livestock producers.

Processing facilities are difficult to site and finance. Recent efforts to place such facilities in Oregon have met with resistance from local citizens or officials. A couple potential processing facility projects are still proposed, but no one is turning dirt in the near term.

Lack of rendering facilities

Oregon's last and only rendering facility that handles the disposal of dead livestock, including beef and dairy animals, horses, etc., closed in September 2006. There remains an immense challenge on how to handle disposal of dead animals and offal from small-scale custom processing facilities and meat shops. Burying, burning, composting, and taking animals to the dump all have challenges that are costly, limited in effectiveness, and present other concerns related to groundwater and potential disease.

Industry, state and local government officials, and other interested parties are meeting to evaluate options and ideas. But, this situation presents no easy alternatives and demonstrates that rendering may need to be a function of government.

Farm cooperatives and grower organizations

Federal legislation called the Capper-Volstead Act, passed in 1922, provides individual growers the legal ability to collectively pool their products, negotiating power, or marketing efforts with protection from anti-trust laws if they form a cooperative structure.

A recent effort at organizing the United Potato Growers of America typifies the interests of growers. As stated by Albert Wada, "Today, virtually every industry downstream from [agriculture] has consolidated and changed while we have been resistant… we are all subject to unmanaged supply, price risks, and lack of information. It is time we adjust to the globally competitive, consumer-driven economy by rationing our production and market management…. An industry that has excessive production capability selling to just a few customers is a recipe for economic loss of value to producers. Growers can independently do little to coordinate national production and markets."
(Spudman Magazine, April 2006). Many growers in Oregon have joined this organizational effort.

Oregon has had a mixed record with grower cooperatives over the years, having far fewer than mid-western states. Several cooperatives have gone out of business in recent years (primarily food processing cooperatives), taking millions of dollars of growers' equity with them.

Others remain successful, including widely known brand names such as Tillamook County Creamery, Pendleton Grain Growers, and NORPAC foods. Several regional cooperatives also have an Oregon presence, such as Land O' Lakes, Northwest Dairy Association, Farm Credit Services, and CHS.

Approximately 30 grower-owned cooperatives currently operate in Oregon, ranging from farm supply co-ops to bargaining organizations to processing facilities and lending institutions.

Small-scale organic growers have found that organizing into cooperatives enables them to pool their production and marketing, accessing larger contracts and market position.

Another new development in the cooperative arena is state-supervised price negotiation, also known as "state-action immunity." This process was authorized in Oregon by the 2001 Legislature. The process enables a grower organization organized under Capper-Volstead as a cooperative or bargaining association to meet with more than one buyer at a time. The oversight of a state agency, in

this case the Oregon Department of Agriculture, provides anti-trust protection to the buyers/dealers as well as the growers' organization.

Initially this process was applied to perennial ryegrass pricing, and involved the Perennial Ryegrass Bargaining Association and seed dealers who have contracts with this growers group. In 2003, the law was expanded to include seafood. Dungeness crab and shrimp harvesters have requested ODA to supervise pricing negotiations with dealers.

Cooperatives, and even "new age" organizations like LLCs, offer growers the ability to do things together they cannot do on their own with respect to marketing, bargaining, processing, and group purchasing. Cooperatives will remain an important form of business arrangement for Oregon's growers and ag-related businesses as global markets and trends change over time.

Opportunities in renewable energy

Oregon farms both consume energy and create feedstocks to generate energy and fuels. The concept of renewable fuels made from biomass and farm or forest-based feedstocks is not necessarily new, but technologies are improving and new opportunities are developing.

A 2003 report by the Council of State Governments indicates that: "Concerns about the environment, public health, energy security and price volatility continue to be motivating factors for the growth of renewable energy… renewable energy has the potential to benefit the entire country in these areas… In addition, locally produced renewable energy has the potential to spur development of supporting industries in construction, operation, maintenance, and other associated technological industries. …It has been estimated that tripling the country's use of biomass energy from farm residues and energy crops could produce approximately $20 billion in new income for farmers and rural communities. Wind energy has similar potential for rural communities, according to the US Department of Energy, which estimates that more than $1.2 billion in new income for farmers and 80,000 new jobs could be created by producing 5 percent of the country's electricity from wind energy by 2020. Additional tax revenue can be another boon of renewable energy development, due to the taxes from local energy production companies and from an increased worker base."

The 2002 Farm Bill, for the first time in history, contained an energy component that provided new grant assistance to agriculture for developing renewable energy systems. Much of the initial assistance has been directed to the Midwest where farmer-owned biofuel cooperatives are well underway in the development of ethanol and biodiesel facilities.

Oregon has the potential for a diverse approach to renewable energy given the diversity of agriculture. Indeed, nearly all concepts associated with renewable energy have a link to agriculture.

Wind farms

Wind farms are largely located in rural wheat fields and rangelands of Eastern Oregon. Farmers who lease land to power companies for placement of wind towers are benefiting economically. Some growers are trying to establish ownership of a few wind towers rather than merely leasing land to power companies, but the challenges and up-front costs are difficult.

Micro-hydro

Micro-hydro has many potential applications in existing irrigation networks, from piped systems which could accommodate a micro-power turbine, to off-stream irrigation canals that are non-fish bearing and could utilize a "run-of-the-river" water wheel technology for power generation. Much needs to be explored about the potential and uses for this technology. Legislative concepts will consider streamlining the permitting of these facilities.

Anaerobic digesters

Anaerobic digesters produce methane gas from livestock manure for use in power generation, heating, or fuel production, and are increasingly being evaluated and used by dairies. In Oregon, three are in operation and several more are under design and construction. Digesters are costly and require additional management, but they have many benefits, including odor reduction, pathogen reduction, nutrient management, and by-product generation for potential off-farm sales or on-farm use (compost, heat, electricity). An estimated 100 dairies in Oregon have more than 1,000 animals and are at the threshold of potential cost-effectiveness for development of an anaerobic digester.

US crude oil imports (thousand barrels/day)	YTD 04	Percent share
Canada	1,568	17.3%
Mexico	1,553	17.1%
Saudi Arabia	1,404	15.5%
Venezuela	1,312	14.5%
Iraq	614	6.8%
Angola	295	3.3%
United Kingdom	237	2.6%
Algeria	157	1.7%
Norway	178	2.0%
Kuwait	179	2.0%
Gabon	122	1.3%
Colombia	149	1.6%
Ecuador	163	1.8%
Equatorial Guinea	69	0.8%
Total imports	**9,068**	**100.0%**
Domestic production	6,045	
Total consumption	**15,113**	

Biofuels

The US produces about 40 percent of its present petroleum usage. Contrary to popular perception, most imports come from Canada, Mexico, Latin America, and Africa, which, combined, supply more fuel than the Middle East.

However, the tripling of petroleum prices in the past three years has created interest in alternatives. Market pressures, spurred by growth in China and India competing for oil, as well as natural disaster interruptions in production, are pushing record output of both biodiesel (made from oilseed crops) and ethanol

(made from plant starches and cellulose). Oilseeds, which provide an option for growers looking for rotational crops, and traditional agricultural biomass from currently grown crops, can serve as feedstock for biofuel production.

The diversity of agriculture in the Willamette Valley has presented conflicting interests between growers of specialty vegetable seeds and those who want to grow canola. These vegetable seed crops are in the same biological family (brassica). Canola, rapeseed, and mustard are some of the highest yielding oilseed crops and are of interest as to grass seed growers as potential rotational crops. Vegetable seed growers are worried that large canola oilseed production could present pest and disease pressures and affect export markets for vegetable seed.

The Oregon Department of Agriculture established a two-year rule to address these concerns by creating open/general production areas and protected areas. The open/general production areas have minimal requirements for oilseed production, requiring certified/treated seed and limitation of brassica production to two of five years on the same ground.

The protected districts limit brassicas for oilseed production but do allow growing canola/rapeseed for forage as long as it isn't allowed to flower. Production for certified seed is also allowed. In protected districts, certified/treated seed is required, as well as a limit of one in four years of production on the same property. An isolation distance of two to three miles is required. Fields must be identified or "pinned" at county extension offices. Secure transportation of seed is required so that seed is not spilled along roadways. Volunteer control is essential.

Oregon State University is conducting research to evaluate the risk of canola to other brassica crops, the yield potential of canola, the economics of production, and other potential oilseed crops that can be produced in the Willamette Valley. ODA will base future decisions regarding canola production on the outcome of this research (anticipated from 2006-2008).

Presently, there is little infrastructure available in Oregon to process oilseed into biodiesel, or biomass into ethanol. Pendleton Grain Growers, a grower-owned cooperative, has installed crushing capacity, as has another grower in Eastern Oregon and growers in Klamath Falls. Sequential Biofuels, a distributor of biodiesel, opened a waste-cooking oil-to-biodiesel processing facility in 2005—the only operating processor in the state, and is now using some Oregon grown canola oil.

Several other proposals are pending in various stages of planning, siting, and permitting, but none are in operation as of this publication. This limits the ability of growers to commit land to oilseed or biomass crops without a "home" or facility for processing. The escalating price of petroleum and related products is generating more interest in alternatives and making the economics look better as time goes on. Additional

incentives from state or federal legislation can assist in furthering project development.

As cellulosic conversion processes are fine-tuned and become economical in the next two to four years, Oregon's production of hybrid poplars may be another potential feedstock for ethanol production. There are presently more than 20,000 acres of hybrid poplars growing in Oregon. These are being grown for pulp or dimensional lumber, and milled for moldings and various other wood products. An estimated one million tons of ryegrass straw and a larger amount of wheat straw would also be available for cellulosic conversion to ethanol.

Many studies demonstrate the economic benefits to local economies of renewable energy development—including crop production receipts, jobs associated with facility construction and operation, local and regional sales of output products, an enhanced tax base, and displacement of imported products.

2007 Federal Farm Bill: How does Oregon benefit?

Farm Bill history

The most pervasive problem confronting agriculture in the US between the 1930s through 1960s was low commodity prices resulting in low farm income. During this period, farm income averaged only 51 percent of nonfarm income. Agriculture's production capacity expanded faster than demand. The chronic nature of this price-income problem led to extensive government involvement in agriculture, primarily intended to stabilize production and income related to "program crops"—wheat and feed grains, cotton, rice, tobacco, corn, and later soybeans.

In the early 1970s, widespread global weather and disease issues resulted in significant crop reductions and a tight food supply-demand situation around the world. US exports soared. Congress enacted new market-oriented farm policies to capitalize on the situation. Increased international demand, combined with inflationary pressures, resulted in higher domestic food prices. Consumers became concerned with food costs, food safety, and nutrition. Environmental groups questioned the long-term ability of domestic natural resources to supply export markets. Predictions of global food shortages due to exponential population growth were put forth by others.

Agricultural income began to ebb and flow with world demand for exports. Cash flow problems developed for many growers who had invested in land that had escalated in price, and who were paying high interest rates and inflationary input costs. Government policy responded in a lagged and often contradictory manner. Incentives and programs for all-out production and exports were partially negated by export embargoes imposed by both Republican and Democratic administrations. Producer attitudes became increasingly divided between those who preferred the government-dominated pricing policies of the past and those who favored a more volatile market-oriented approach. ("Agriculture and Food Policy," Knutson, Penn and Boehm, 1983).

The go-go production of the 1970s, coupled with inflated land values and input costs, resulted in a farm real estate bust in the early 1980s, leaving farmers unable to service their loans. Many growers went bankrupt and many community banks went under. Congress bailed out the Farm Credit System and rewrote federal farm finance and loan laws.

Farm bills, from 1990 to the present, straddle many interests, including conservation and natural resource management,

international trade agreements and obligations, agricultural price and income instability, nutrition and hunger programs, food safety issues and bioterrorism concerns, and renewable energy.

Connection to Oregon

Oregon has historically grown few of the crops that have been supported by federal farm bill programs, with the exception of wheat and some feed grains (barley, oats). In contrast, recent farm bills (1996 and 2002) have placed emphasis on conservation programs that have benefited a wider array of Oregon growers. Even so, less than one-tenth of 1 percent (0.01 percent) of total federal farm bill expenditures make their way to Oregon farmers. To state it another way, 51 percent of gross farm income nationally is from specialty crops (fruits, vegetables, nuts, greenhouse/nursery), yet 95 percent of federal dollars are paid to growers of five or six program crops.

Of the $70 million to $100 million in annual federal farm bill support that has come to Oregon in recent years, about half goes to wheat growers, and the other half for conservation purposes, i.e., growers who are involved in projects that address water quality, soil erosion, wetland restoration, animal manure management, etc.

Clearly, wheat growers have a vested interest in existing federal farm programs. Between 15 percent and 20 percent of their gross receipts, which amount to nearly all their net income in recent years, is reliant on farm program payments. Despite a tight world supply of wheat, international grain companies now operate on much lower levels of storage and "just in time" movement of grains, which has resulted in dampened wheat prices from historical stock supply ratios. Increased input costs have placed growers in a tight squeeze. Wheat acreage is responding in Oregon. Plantings of wheat in 2006 are down nearly 100,000 acres, or 10 percent from just two years ago, to 900,000 acres (dropping from 1,000,000 acres). Likewise, barley was planted on only 50,000 acres in 2006—the lowest total since 1892. Barley production in Oregon peaked in 1950 with over 614,000 acres. Average production during the 1990s was about 140,000 acres.

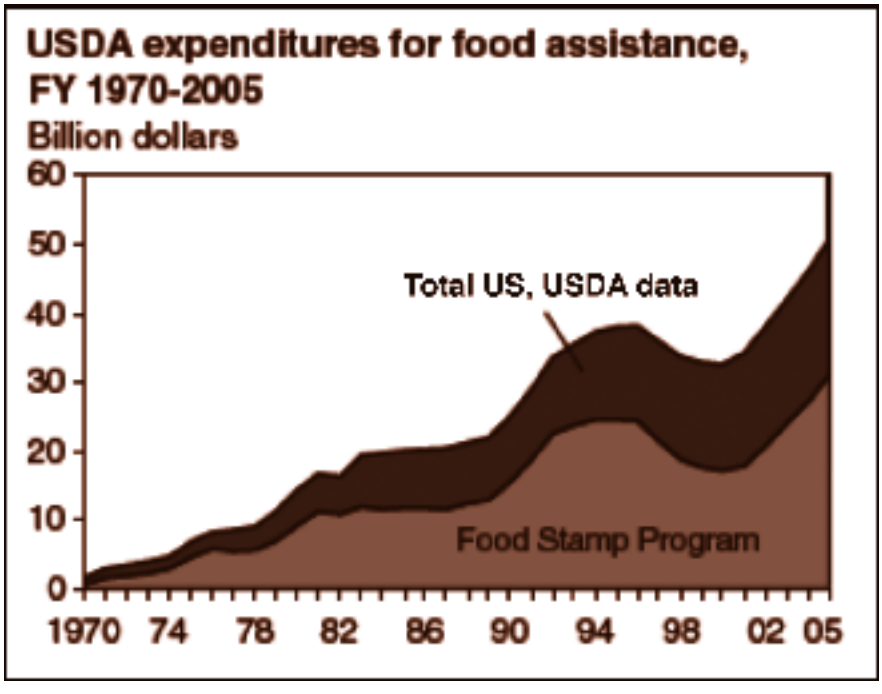
Profits and land values in grain producing areas are tied to federal programs and cannot be "turned on a dime," risking plunging land values and loan defaults. But incremental change is needed. The regional needs of the wheat and grain industry are historically tied to traditional farm bill price support programs. However, the majority of producers of Oregon's diverse agricultural commodities need assistance from federal policies and funding that can help with

- marketing, processing, product development and other value-added activities.

- crop production research and crop protection materials, including plant pest and disease control/prevention for "minor or specialty crops."
- crop insurance and risk management tools for specialty crops and livestock.
- export assistance and foreign market development.
- renewable energy development assistance, including crop research and infrastructure development that fits regional needs.
- research to address the rising costs of fuel, labor, fertilizers, and other inputs.
- transportation and shipping infrastructure concerns and costs.
- water storage and irrigation efficiencies.
- natural resource management and conservation support.

Not to be forgotten, the Farm Bill also funds 15 different food assistance programs, including food stamps, WIC (Women, Infants and Children), school lunch programs, and the reimbursement coupons for senior citizens to use at local farmers' markets. Sixty percent of USDA's budget is related to consumer food programs rather than agricultural production programs.

Some 500,000 Oregonians—one in every six—participate in a food program, mostly food stamps or school meals. The average monthly assistance in Oregon is $160 per household.



Conclusion

Farmers and ranchers interact with all of Oregon through the economic, environmental, and social benefits derived from Oregon agriculture.

The industry is diverse, complex, dynamic, and engaging. Simple and old-fashioned descriptions do not relate to modern farms.

It is a unique industry, highlighted by a wide range of farm sizes; operator age and succession challenges; local and international market demands; vagaries of weather, soils, pests, and, public policies; natural resource management issues; and intense economic pressures unfamiliar to other industries. In agriculture, inputs are bought at retail prices, output is sold at wholesale prices, and growers pay the freight both ways.

Regulations and public interest in agricultural resources have intensified over the past 25 years. In some arenas, growers and environmental interests are joining forces on projects of mutual benefit. In other arenas, the lines remain drawn and commonality (and common sense) seems far away.

As a society, we cannot live without agriculture—it is the occupation that supplies our sustenance and fibers for living. Yet, as time goes on, the gap widens between the actual day-to-day production, and the perceptions and demands of an increasingly urban consumer. Agricultural literacy, a necessity just 60 years ago and for thousands of years prior, is no longer taught in schools. Perhaps the time has come to re-incorporate some aspects into our education programs. Perhaps "Agriculture in the Classroom" needs a boost of public support and official benchmarks to measure knowledge of plant and soil science, livestock husbandry, gardening, agricultural economics, and other agricultural topics.

Public policies are lagging the challenges facing the industry. (See the "Top 20 issues facing the industry" section of this report.)

Each of the issues noted in the top 20 challenges presents opportunities for private-public partnerships, points out areas where innovative research is imperative, and demonstrates the need for connections between higher education, high tech, and natural resource-based industries.

This report serves as a starting point for important policy dialogue and collaboration.