

# Oregon Agriculture and the Economy: An Update

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Bruce Sorte  
Community Economist

Paul Lewin  
Doctoral Candidate

Pamela Opfer  
Analyst

Department of Agricultural and Resource Economics  
Oregon State University

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*“Farms of all sizes, shapes, and forms add to the fabric of Oregon agriculture. All are important and we want all to be successful as stewards, businesses, and community citizens.”*

– Katy Coba, Director, Oregon Department of Agriculture

## Introduction

As many industries continue to struggle in Oregon, many parts of the agricultural industry, with some notable exceptions (such as nursery crops and grass seed), provide some stability for the state’s economy. In 2009, the most recent period for which we have complete datasets, agriculture was responsible for or connected to more than 15 percent of all economic activity in Oregon. Although the number of farms and overall land in farming is decreasing, agriculture in 2009 is credited with adding more than \$22 billion to Oregon’s net state product.

Global competition and policy debates over the use of natural resources may make it more difficult to predict future market conditions. Nonetheless, globalization has provided market opportunities for many producers, and farmers and ranchers have adjusted their management practices to address sustainability concerns while still increasing output and product quality.

The USDA has initiated a nationwide “know your farmer, know your food” campaign that educates the public about buying local and supports farmers’ efforts to know their customers. Developing a stronger relationship between agricultural producers and consumers provides more accountability for the whole agricultural industry. It also develops customers who are willing to pay a premium price for local food, which increases the economic effects of the industry by keeping food dollars in Oregon.

While consumers have benefited from changes that have allowed them to spend ever-smaller portions of their income for agricultural products, producers have struggled to maintain sufficient profit margins while using sustainable production processes. According to the 2007 Census of Agriculture, almost two-thirds of Oregon farms reported net losses. Production costs continue to increase, particularly fuel and fertilizer prices, and the labor market has become quite policy-dependent.

Policies that support and regulate agriculture play a large role in these changes. Particularly during this economic recession and slow recovery, policy makers have increased their consideration of an industry’s economic contribution as they make decisions. Economists typically measure economic impacts in terms of sales, jobs, or value of added contributions to the economy.

This report provides economic measures based on sales, employment, and value added. In this analysis we:

- Profile agriculture
- Estimate agriculture's "economic footprint"
- Calculate the extent to which Oregon's economy depends on agriculture or agriculture's economic impacts
- Discuss the implications of these findings

It is important to remember that the metrics in the various tables and figures throughout this report represent different ways of describing agriculture. While they can be considered together for a comprehensive summary of agriculture, the individual metrics should not be added together. They are based on economic calculations and an economic model that provide useful, though not precise, estimates.

This report is an update. It follows the format of, updates the information in, and includes some of the narrative from *Oregon Agriculture and the Economy* (SR 1080, OSU Extension Service) by Bruce Sorte and Bruce Weber in 2008.

# Farm and Ranch Production

We define agriculture broadly to include activities necessary to cultivate, harvest, process, and market biologically based products that originate on farms and ranches. This section describes primary agricultural production, including fishing. Processing and other aspects of the agricultural industry are discussed in the next section.



Photo by Terry Tallman

The United States has formally gathered information to describe agriculture since the first Decennial Census in 1790 (when 94.9 percent of people lived in rural areas). When the 2010 Decennial Census is released, the percentage of people living in nonmetro or rural counties is expected to be close to 20 percent. The first Census of Agriculture (Ag Census) was taken as part of the 1840 Decennial Census. The Ag Census is completed every 5 years, and portions of it are updated every year.

The types of data collected in each census have become more extensive over time. Definitions and data-gathering techniques have changed regularly to match the diversification of the agricultural industry.

For this report, we have used the most recent complete Ag Census (2007, issued in 2009) and any partial updates that have been completed since 2009. We use the Census definition of farms as "...agricultural places that produce and sell, or would normally sell, \$1,000 or more of agricultural products [per year]."

**Table 1.—Oregon farm profiles (1997, 2002, 2007).**

Category	1997	2002	2007
Total land in agriculture (acres)	17,658,213	17,200,000	16,399,647
Total ag land and buildings value (\$000)	17,744,663	20,383,264	31,002,186
Average value/acre (\$)	1,005	1,185	1,802
Number of farms	39,975	40,033	38,553
Average farm size (acres)	442	430	425
Market value of farm sales (\$000)	3,890,848	3,798,435	4,761,206
<i>Minus</i> – Purchased inputs (\$000)	1,738,004	1,802,943	2,175,885
<i>Minus</i> – Net government payments to farmers–taxes (\$000)	44,715	14,935	75,024
Gross value added (\$000)	2,108,129	1,980,557	2,510,297
<i>Minus</i> – Capital consumption (\$000)	340,608	370,910	468,081
Net value added (\$000)	1,767,521	1,609,647	2,042,216
<i>Minus</i> – Payments for labor, landlords, & lenders (\$000)	1,101,280	1,114,051	1,179,453
Net farm income (\$000)	666,241	495,596	862,763
Average gross sales/acre (\$)	220	221	290
Average net income/farm (\$)	16,666	12,380	22,379
Average net income/acre (\$)	38	29	53

Sources: U.S. Department of Agriculture, *1997 Census of Agriculture* (1999), *2002 Census of Agriculture* (2004), and *2007 Census of Agriculture* (2009).

“Purchased inputs” refers to the cost required for material goods such as fuel, machinery, and seed. The “payments for labor, landlords, & lenders” category is separate in order to distinguish between payments to people and purchases of goods. “Capital consumption” estimates the value of the input made by capital items. It represents the cost of replacing the portion of capital items consumed in the production process or destroyed during a year *at current prices*.<sup>1</sup>

The operational costs needed to maintain a farm on an annual basis increased by 27.2 percent between 1997 and 2007.

As Table 1 indicates, Oregon agricultural acreage decreased 7.13 percent between 1997 and 2007, the number of farms declined by 3.56 percent, and the average size of a farm declined by 3.85 percent. This is a continuing trend, as farms larger than 50 acres have decreased in number and total acreage. The decline has been slowed by Oregon’s land use laws and to some degree by the increase in the number of adaptive farms of fewer than 50 acres. Adaptive farms are typically smaller farms that produce a variety of outputs.

A 2005 USDA study showed that small farming operations or adaptive farms tend to have average gross sales per acre that are about twice as high as the overall average. Their average age of operator is lower than for farmers in general, and the number of their off-farm work days tends to decline over time.<sup>2</sup>Nationally, vineyards, nursery and tree products, vegetables and melons, floriculture, other noncitrus fruit, and tree-nut farming were more likely than other types of farming to follow this trend. In Oregon, adaptive farms have tended to produce a variety of vegetable crops, berries, and some flower or nursery crops. While Oregon’s land use laws have protected agricultural acreage from conversion to other purposes, they may have also constrained the development of adaptive farms.<sup>3</sup>

Throughout this report, we summarize agricultural statistics to report information concisely for all of Oregon. Combining information from an industry as diverse as agriculture and a state as varied as Oregon leaves out some important distinctions that must be remembered as we evaluate the economic impacts of agriculture. To illustrate these distinctions, consider five counties that represent areas from the Pacific Ocean to the Idaho border. Table 2 profiles the differences in farms and agricultural production in Tillamook, Sherman, Malheur, Umatilla, and Marion counties.




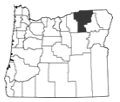
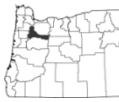
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<sup>1</sup> *Farm Income and Costs: Glossary*. September 2010. USDA Economic Research Service Briefing Rooms. [http://www.ers.usda.gov/briefing/farmincome/glossary/def\\_pexp.htm](http://www.ers.usda.gov/briefing/farmincome/glossary/def_pexp.htm)

<sup>2</sup> Newton, Doris J. 2005. Small Farms Can Grow Into Large Enterprises. *Amber Waves*, Vol. 3, Issue 2. U.S. Department of Agriculture, Economic Research Service. <http://www.ers.usda.gov/Amberwaves/April05/Findings/SmallFarmsCanGrow.htm>

<sup>3</sup> Sorte, Bruce, George Clough, Mary Corp, Donald Horneck, Clive Kaiser, and Randall Mills. 2009. *Minimum Parcel Size for Viable Adaptive Farms in Umatilla County: An Economic Analysis*. Oregon State University Extension Service, OSU Rural Studies Program, Corvallis, Oregon.

**Table 2.—Profile of farms in five Oregon counties (2007).**

	 Tillamook	 Sherman	 Malheur	 Umatilla	 Marion
Number of farms	302	208	1,250	1,658	2,670
Land in farms (acres)	37,780	514,004	1,170,664	1,447,321	307,647
Land in farms (%)	4.43	96.65	18.42	69.99	40.26
Average farm size	125	2,471	937	873	115
Market value of land and buildings (\$000)	780,085	1,551,001	1,028,826	1,010,148	795,988
Average value per/acre (\$)	6,236	628	1,099	1,157	6,908
Total net farm income from operations (\$000)	30,657	19,011	50,386	90,323	129,228
Average net income/farm (\$000)	101,512	91,398	40,309	54,477	48,400
Average net income/acre (\$)	811	37	43	62	420
Average income/acre divided by average value/acre (%)	13.01	5.89	3.92	5.39	6.08
Jobs directly employed in farm production (%)	7.3	30.6	17.3	11.3	4.1

Sources: U.S. Department of Agriculture, *2007 Census of Agriculture—County Data* (February 2009) and Minnesota Implan Group, Inc. *IMPLAN 2009 Data*.

Table 3 displays a profile of organic agriculture in Oregon for 2002 and 2007. The Census of Agriculture did not collect some information on organic agriculture in 2002 and did not collect any information on organic agriculture in 1997. Since 2002, the number of farms in organic production has almost doubled; their percentage of the total number of farms has increased from 1.3 to 2.4 percent. The market value of organic farm sales has also increased since 2002.

**Table 3.—Organic agriculture (2002 and 2007).**

Category	2002	2007
Total land used for organic production (acres)	N/A	92,405
% of total farmland	N/A	0.6
Number of farms in organic production	515	933
% of total number of farms	1.3	2.4
Land being converted to organic production (acres)	N/A	16,175
Farms being converted to organic production	N/A	470
Market value of organic farm sales (\$000)	9,933	88,379
% of total market value of farm sales	0.3	1.9

Sources: U.S. Department of Agriculture, *2007 Census of Agriculture*, Table 43 (February 2009) and *2002 Census of Agriculture*, Table 2 (June 2004).

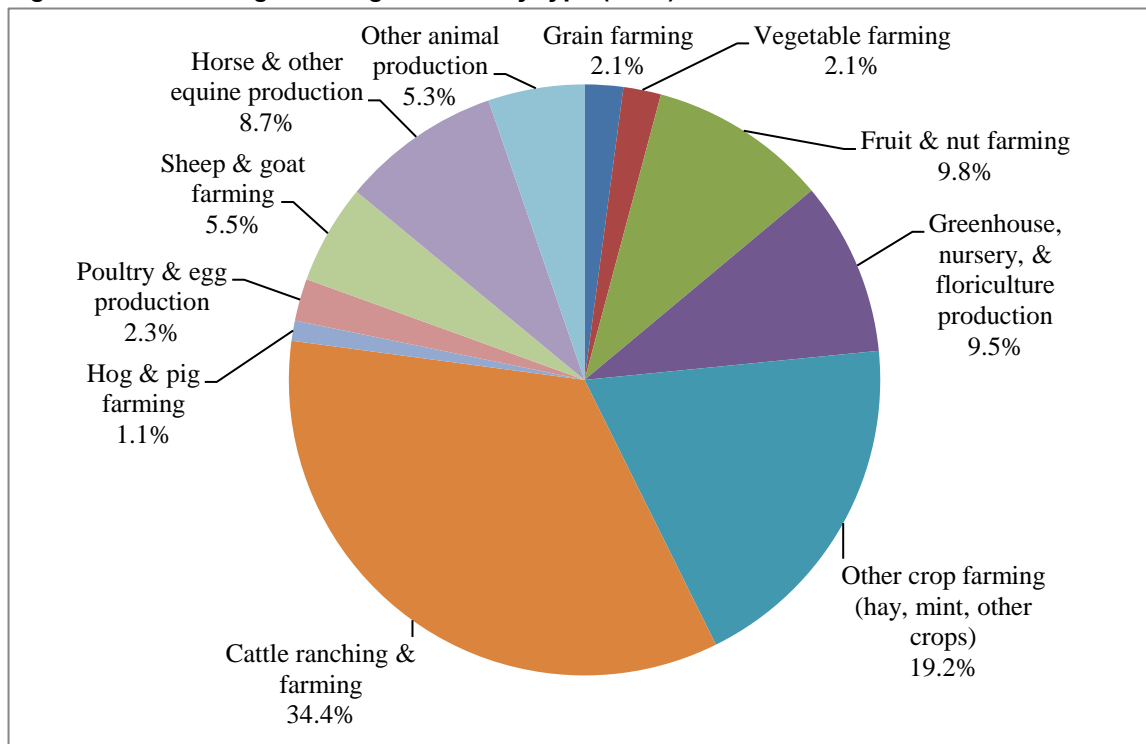
Farms are classified by type in Table 4 and are shown graphically in Figure 1 following the recently implemented North American Industrial Classification System (NAICS).

**Table 4.—Number of Oregon farms by type (2007).**

Type	Units	Share (%)
Grain farming	811	2.1
Vegetable farming	794	2.1
Fruit & nut farming	3,766	9.8
Greenhouse, nursery, & floriculture production	3,662	9.5
Other crop farming (hay, mint, other crops)	7,417	19.2
Cattle ranching & farming	13,281	34.4
Hog & pig farming	425	1.1
Poultry & egg production	891	2.3
Sheep & goat farming	2,103	5.5
Horse & other equine production	3,370	8.7
Other animal production	2,033	5.3
<b>Total</b>	<b>38,553</b>	<b>100.0</b>

Source: U.S. Department of Agriculture, *2007 Census of Agriculture*, Table 46 (February 2009).

**Figure 1.—Percentage of Oregon farms by type (2007).**



Source: U.S. Department of Agriculture, *2007 Census of Agriculture*, Table 46 (February 2009).



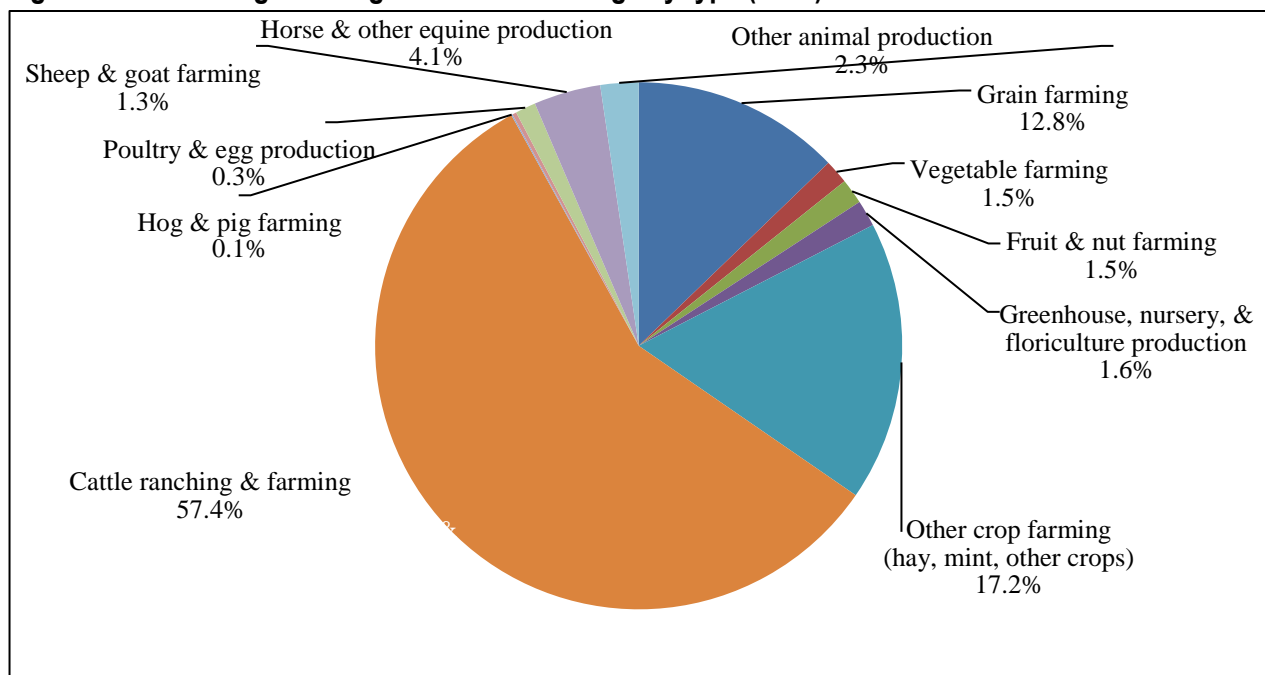
There are 61.44 million acres in Oregon, about 16.5 million (27 percent) of which are reported within operating farms and ranches. Table 5 details acreage by use, and Figure 2 displays those proportions graphically. As seen in Tables 4 and 5, cattle ranching and farming operations, which are about one-third of the farms by type, occupy the highest number of acres, at just under 10 million (almost 60 percent). Most of the cattle ranches and farms are in arid portions of the state, where acreage requirements to sustain cattle are higher. Livestock production provides one of the few alternatives to utilize those arid acres for food production, and management costs have increased as ranchers try to keep their use of the range sustainable.

**Table 5.—Oregon farmland acreage by type (2007).**

Type	Acres	Share (%)
Grain farming	2,097,777	12.8
Vegetable farming	242,192	1.5
Fruit & nut farming	253,189	1.5
Greenhouse, nursery, & floriculture production	264,844	1.6
Other crop farming (hay, mint, other crops)	2,815,956	17.2
Cattle ranching & farming	9,409,053	57.4
Hog & pig farming	12,975	0.1
Poultry & egg production	41,530	0.3
Sheep & goat farming	205,664	1.3
Horse & other equine production	673,445	4.1
Other animal production	383,022	2.3
<b>Total</b>	<b>16,399,647</b>	<b>100.0</b>

Source: U.S. Department of Agriculture, *2007 Census of Agriculture*, Table 46 (February 2009).

**Figure 2.—Percentage of Oregon farmland acreage by type (2007).**

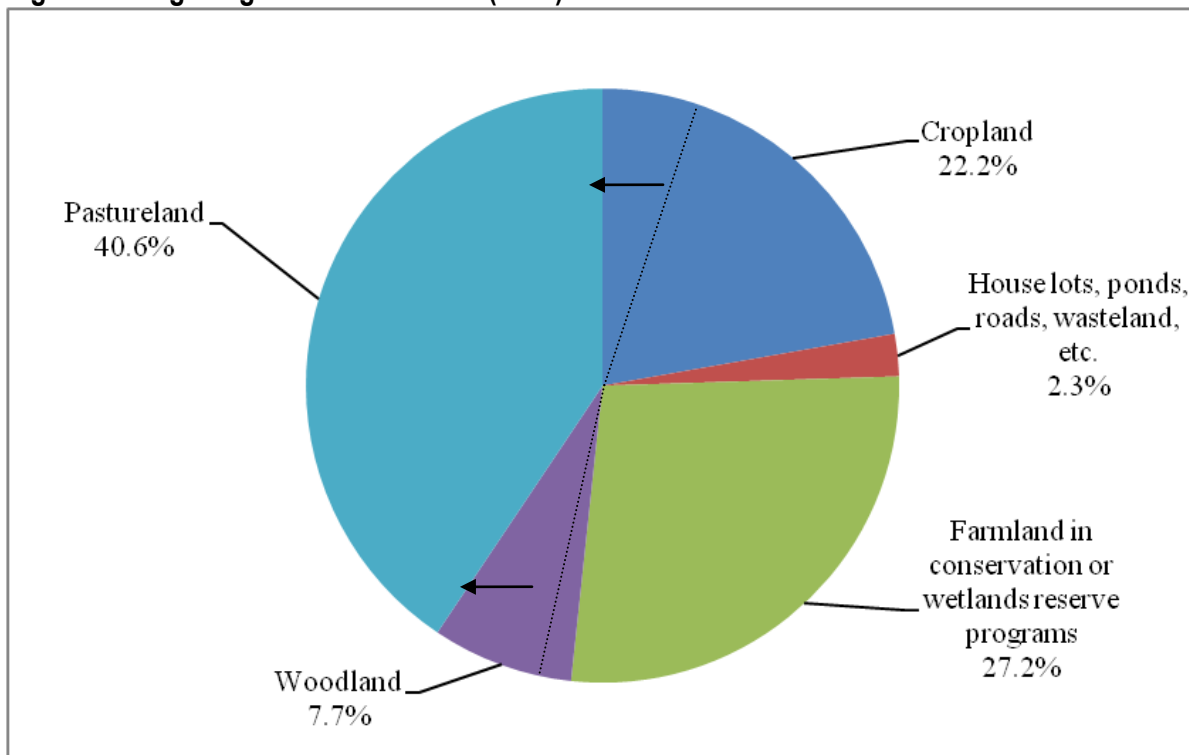


Source: U.S. Department of Agriculture, *2007 Census of Agriculture*, Table 46 (February 2009).

If agricultural land uses that are in farming and ranching operations and all other uses are further aggregated (Figure 3), the 22.5 million potential agricultural acres include 5.01 million acres (22.2 percent) classified as cropland, 1.73 million acres (7.7 percent) as woodland, 9.15 million acres (40.6 percent) as pastureland, 0.51 million acres (2.3 percent) for structures and facilities, and 6.13 million acres (27.2 percent) in conservation or wetlands reserve programs.

Note that 1.85 million acres classified as cropland and woodland are used as pasture some of the time, so the total use for pasture is approximately 10.9 million acres (48.8 percent), as illustrated by the dotted lines and arrows in Figure 3. It is significant to note that more farmland in Oregon is currently dedicated to conservation and wetland reserves (27.2 percent) than is used in the production of cultivated crops (22.2 percent).

**Figure 3. Oregon agricultural land use (2007).**



Source: U.S. Department of Agriculture, Economic Research Service, *State Facts Sheets: Oregon, July 2010*.  
Note: Dotted lines and arrows indicate land that is used for pasture as well as cropland or woodland.

## Farmgate Sales

Farmgate sales are estimated on an annual basis by the OSU Oregon Agricultural Information Network (OAIN) using a number of databases, including information from about 70 local Oregon State University Extension Service agents in all 36 counties. The OAIN includes estimates from Extension agents in its database to distinguish and compare OAIN and Agricultural Census data.



Photo by Terry Tallman

The estimates that follow are from 2005 (the data year when this report was last published in 2008), 2008, and 2009. Farmgate sales of crops in 2009 were \$2.95 billion and accounted for 69.7 percent of total sales. Livestock farmgate sales were \$1.24 billion and accounted for 29.3 percent of total sales.

The almost \$600 million of reduction in Oregon agriculture's farmgate sales between 2008 and 2009 is significant, yet 2008 was not a typical year in terms of prices, especially for grain crops. The more appropriate comparison is between 2005 and 2009, which reflects normal fluctuations and shows 8 of 14 sectors increasing modestly.

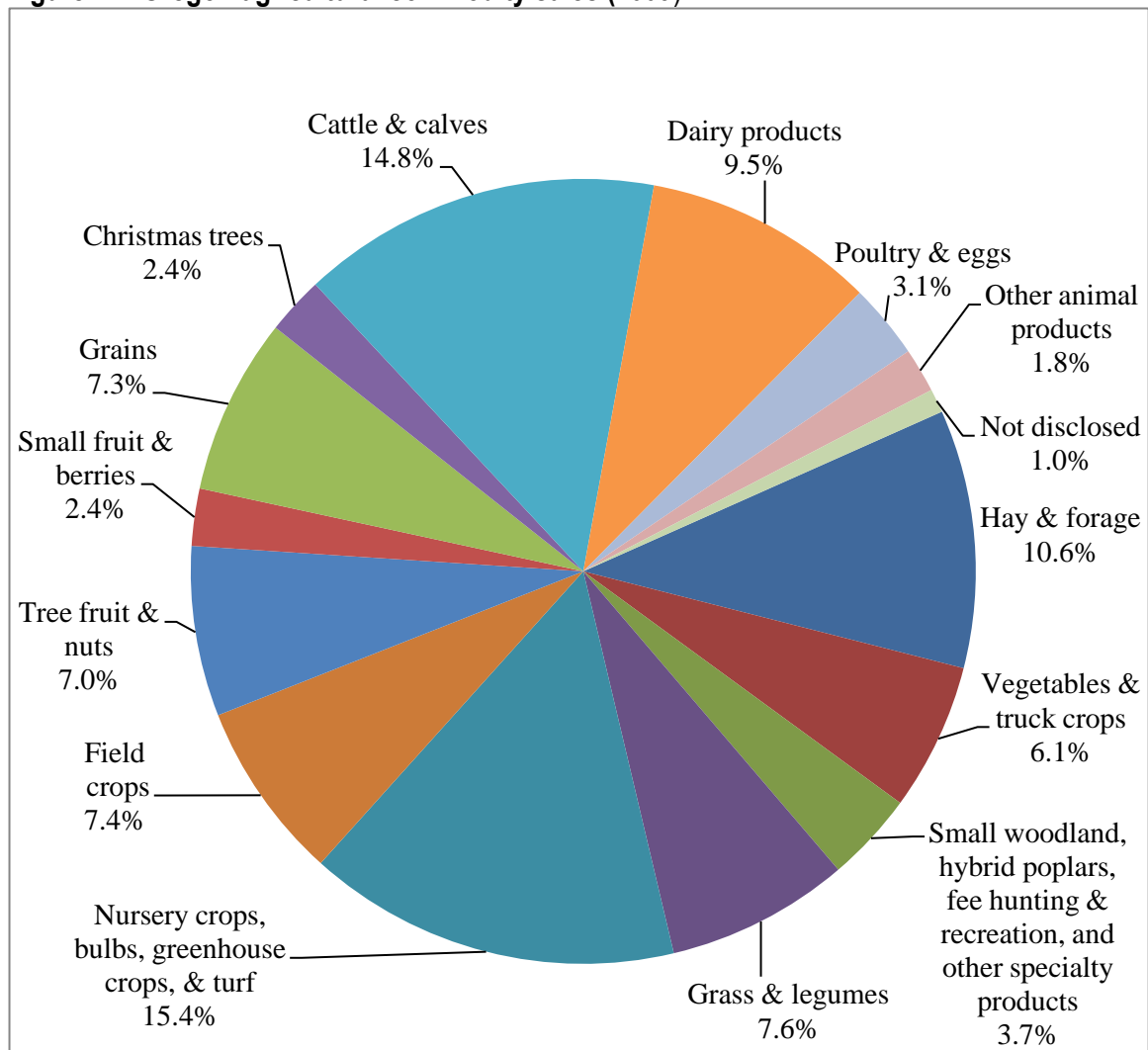
**Table 6.—Change in Oregon agricultural commodity sales (2005, 2008, and 2009).**

<b>Commodity group</b>	<b>2005</b>	<b>2008</b>	<b>2009</b>	<b>Change 2005–2009 (%)</b>	<b>Change 2008–2009 (%)</b>	<b>Share of 2009 total sales (%)</b>
Hay & forage	258,202	462,391	450,300	74.4	-2.6	10.6
Vegetables & truck crops	261,644	247,431	257,178	-1.7	3.9	6.1
Small woodland, hybrid poplars, fee hunting & recreation, and other specialty products	375,500	205,288	156,594	-58.3	-23.7	3.7
Grass & legumes	373,490	508,710	319,674	-14.4	-37.2	7.6
Nursery crops, bulbs, greenhouse crops, & turf	776,410	723,924	650,576	-16.2	-10.1	15.4
Field crops	203,105	282,027	311,879	53.6	10.6	7.4
Tree fruit & nuts	244,486	311,824	296,584	21.3	-4.9	7.0
Small fruit & berries	97,205	170,224	99,815	2.7	-41.4	2.4
Grains	198,829	372,511	307,847	54.8	-17.4	7.3
Christmas trees	126,436	119,074	100,870	-20.2	-15.3	2.4
<b>All crops</b>	<b>2,915,307</b>	<b>3,403,404</b>	<b>2,951,317</b>	<b>1.2</b>	<b>-13.3</b>	<b>69.7</b>
Cattle & calves	619,491	663,955	628,385	1.4	-5.4	14.8
Dairy products	340,062	500,555	404,297	18.9	-19.2	9.5
Poultry & eggs	97,276	125,781	130,688	34.3	3.9	3.1
Other animal products	92,333	75,964	77,509	-16.1	2.0	1.8
<b>All livestock and poultry</b>	<b>1,149,162</b>	<b>1,366,255</b>	<b>1,240,879</b>	<b>8.0</b>	<b>-9.2</b>	<b>29.3</b>
Not disclosed	—	52,650	41,389	—	-21.4	1.0
<b>Total sales</b>	<b>4,064,469</b>	<b>4,822,309</b>	<b>4,233,585</b>	<b>4.2</b>	<b>-12.2</b>	<b>100.0</b>

Source: Oregon State University Extension Service. *2009 Oregon County and State Agricultural Estimates*, Special Report 790-09(August 2010).

In 2005, nursery crops, bulbs, greenhouse crops, and turf were 19.1 percent of the total, but by 2009 they had declined to 15.4 percent. Grains were 4.9 percent in 2005 and increased to 7.3 percent in 2009. The dairy products sector continues to increase its share of the total, from 8.4 percent in 2005 to 9.5 percent in 2009.

**Figure 4.—Oregon agricultural commodity sales (2009).**



Source: Oregon State University Extension Service. *2009 Oregon County and State Agricultural Estimates*, Special Report 790-09(August 2010).

# Processing

Crops and livestock produced on farms and fish harvested from the ocean provide the basic inputs for a large processing industry in Oregon. For clarity of presentation, we used the sectoring system of the basic IMPLAN (*Impact PLANning*) input/output model. We aggregated 41 processing sectors into 21 sectors in Table 7 and sorted them in descending order by employment (full- and part-time jobs). We have included all processing sectors that do or could use agricultural inputs.



Photo by Peter Truitt

Most of the processing sectors are modest in size, and some may not currently use significant amounts of Oregon agricultural inputs. Yet, they traditionally have been considered part of the agricultural processing industry, and changing markets or policies may lead them to again become significant users of Oregon agricultural inputs.

Five sectors make up 62.3 percent of processing sales in Oregon: frozen food manufacturing (\$1.9 billion); dairy (\$1.9 billion); fruit and vegetable canning, pickling, and drying (\$1.6 billion); breweries, wineries, and distilleries (\$1.3 billion); and bakery goods, pasta, and tortilla manufacturing (\$906 million).

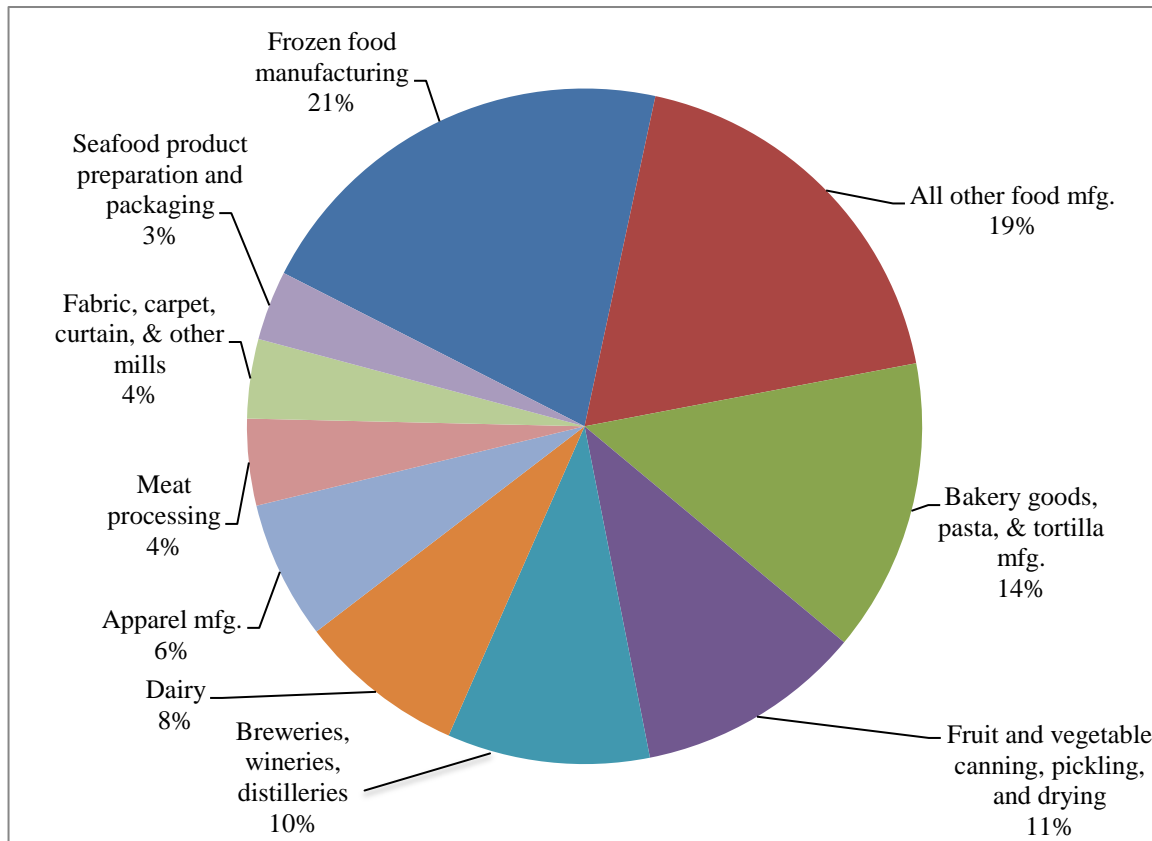
**Table 7.—Oregon agricultural processing in food, fiber, and related products (2009).**

Industry	Output—Sales (\$000)	Employment (full-& part-time jobs)	Value added (\$000)
Frozen food manufacturing	1,947,207	6,533	338,424
Bakery goods, pasta, & tortilla manufacturing	906,036	4,396	261,064
Fruit and vegetable canning, pickling, and drying	1,607,029	3,397	260,150
Breweries, wineries, distilleries	1,341,146	3,036	339,139
Dairy	1,900,613	2,508	246,204
Apparel manufacturing	255,073	2,072	67,310
All other food manufacturing	482,055	1,586	84,892
Meat processing	573,204	1,298	59,091
Fabric, carpet, curtain, & other mills	180,303	1,190	58,433
Seafood product preparation and packaging	306,384	1,044	36,249
Soft drink and ice manufacturing	510,130	769	56,084
Coffee and tea manufacturing	432,163	642	59,833
Leather tanning, finishing, & product manufacturing	110,917	584	49,787
Confectionery manufacturing	149,263	441	24,737
Snack food manufacturing	301,473	427	74,696
Breakfast cereal manufacturing	272,853	364	75,725
Food milling	403,805	325	49,430
Flavoring syrup, dressings, sauces & spices mfg.	226,297	325	48,873
Animal food manufacturing	302,358	272	30,730
Fats and oils refining and blending	123,240	55	9,420
Beet sugar manufacturing	24,065	47	2,525
<b>Total</b>	<b>12,355,613</b>	<b>31,308</b>	<b>2,232,797</b>

Source: Minnesota Implan Group, Inc. *IMPLAN 2009 Data*.

In Figure 5, we show all food processing sectors with more than 1,000 jobs. All remaining sectors with fewer than 1,000 jobs are grouped under “all other food manufacturing” and expressed as a percentage of total food processing employment. Food processing jobs vary within and between sectors from very seasonal part-time jobs to year-round, full-time jobs. Five sectors together account for 64 percent of all jobs in agricultural processing: frozen food manufacturing (21 percent); bakery goods, pasta, and tortilla manufacturing (14 percent); fruit and vegetable canning, pickling, and drying (11 percent); breweries, wineries, distilleries (10 percent); and dairy (8 percent).

**Figure 5.—Oregon agricultural processing: sectors with more than 1,000 jobs as percentage of total agricultural processing employment.**



Source: Minnesota Implan Group, Inc. *IMPLAN 2009 Data*.

## Agricultural Support Services, Wholesale Trade, Transportation and Warehousing, Retail Trade, and Food Services and Drinking Places



Photo by Andrea Johnson

Three major sectors provide producers and processors with specialized services, an extensive distribution and marketing network, and multiple modes of transportation to get agricultural products to markets. Those sectors are agricultural support services (e.g., well drilling, disease advice, and custom applications, etc.); wholesale trade; and transportation (truck, rail, air, and water) and warehousing. Two large sectors—retail trade (food and beverage) and food services and drinking places—add additional value to products as they sell and serve them to consumers.

These industries' economic relationships to agriculture are not regularly reported. Economic discussions typically focus on producer prices for a specific industrial sector. However, large portions of the wholesale trade, transportation and warehousing, retail trade, and food services and drinking places sectors complete the critical links to bring agricultural products and services to the consumer. These industries form an important forward link to the end user or consumer. Those links/expenditures are added to producer prices to establish the final retail prices that consumers pay.

We used IMPLAN and USDA Economic Research Service (ERS) estimates of the margins added by wholesale and retail trade to estimate those forward linkages. We used ERS estimates of the costs comprising the food dollar to assign values to transportation and warehousing. Food services and drinking places are an addition to these forward linkages that were not included in prior reports.

There is an increasing emphasis on local products in restaurants and drinking establishments. "Spending on food away from home was 48.6 percent of the \$1,182.0 billion (\$1.182 trillion) in total (U.S.) food expenditures in 2009..."<sup>4</sup> Including the food services and drinking places sector provides a much more complete picture of the economic activity that is tied to agriculture.

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<sup>4</sup> Clauson, Annette and Ephraim Leibtag. 2009. *Food CPI and Expenditures*. USDA Economic Research Service Briefing Rooms. <http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/>



Table 8 brings together all seven parts of the agricultural industry: production, processing, agricultural support services, wholesale trade, transportation and warehousing, retail trade, and food services and drinking places. It provides the output (sales), employment (full- and part-time jobs), and value-added expenditures (employee compensation, proprietor income, special business taxes, and leases and rents) for each part of the industry to give a summary of the economic activity of the agricultural industry in Oregon. The production, processing, agricultural support services, and food services and beverage places have both backward (supply) linkages and forward linkages. These linkages are tightly integrated as intermediate goods among those sectors; thus, they have been aggregated for presentation. Forward linkages to wholesale trade, transportation and warehousing, and retail trade can be more accurately distinguished, and are reported separately.

**Table 8.—Oregon agricultural output, employment, and value added (2009).**

<b>Aggregated sector</b>	<b>Output—Sales (\$000)</b>	<b>Employment (full- &amp; part-time jobs)</b>	<b>Value added (\$000)</b>
Production	4,321,666	54,120	1,607,990
Processing	12,355,613	31,308	2,232,797
Ag. support services	238,105	7,762	182,820
Wholesale trade	2,568,297	12,958	1,689,559
Transportation & warehousing	743,518	4,859	356,620
Retail trade	980,933	16,369	828,492
Food services & drinking places	7,696,380	133,365	4,026,638
<b>Total agriculture</b>	<b>28,904,512</b>	<b>260,742</b>	<b>10,924,917</b>
<b>Total all Oregon sectors</b>	<b>278,803,857</b>	<b>2,177,594</b>	<b>153,024,613</b>
Portion agriculture (%)	10.4	12.0	7.1

## Economic Footprint

The direct expenditures and employment profiled in Table 8 are associated with a number of other expenditures and jobs in the Oregon economy. Each of the listed agricultural sectors purchases a wide range of inputs from suppliers. These purchases are the *indirect expenditures* associated with the agricultural industry. Another type of expenditure includes those that members of households make when they receive their salaries or other income from businesses directly or indirectly related to agriculture. These are *induced expenditures*, including purchases for food, medical services, retail goods, and many others.

While all of these linked industries do not necessarily depend on exports from the agricultural industry, they are likely to be disrupted if the agricultural industry experiences an economic shock, such as a serious drop in prices and/or drop in production.

The output, employment, and value-added measures of these direct, indirect, and induced expenditures are the “economic footprint” of the agriculture industry in Oregon. They are summarized in Table 9.

**Table 9.—Oregon agriculture’s economic footprint (2009).**

<b>Aggregated sector</b>	<b>Output—Sales (\$000)</b>	<b>Employment (full- &amp; part-time jobs)</b>	<b>Value added (\$000)</b>
Production	5,745,810	62,885	2,622,376
Processing	20,541,299	98,815	6,991,892
Ag. support services	501,025	9,847	325,967
Food services & drinking places	14,610,626	188,036	7,944,652
<i>Subtotal—Production, processing, ag. support services, and food services &amp; drinking places</i>	<i>41,398,759</i>	<i>359,583</i>	<i>17,884,887</i>
Wholesale trade	4,636,806	30,368	2,928,210
Transportation & warehousing	1,418,687	10,873	759,378
Retail trade—Food and beverage	1,641,518	22,067	1,223,297
<b>Total agriculture</b>	<b>49,095,771</b>	<b>422,891</b>	<b>22,795,773</b>
<b>Total all Oregon sectors</b>	<b>278,803,857</b>	<b>2,177,594</b>	<b>153,024,613</b>
Portion agriculture (%)	17.6%	19.4%	14.9%

We assumed that exports of agricultural goods and services would be at wholesale prices, so no retail trade component or margin is included for exports. Since the linkages were particularly difficult to attribute uniquely to one sector among production, processing, agricultural support services, and food services and beverage places, they are again combined in Table 9.

# Oregon's Economic Dependence on Agriculture

Determining what “drives” the Oregon economy, or the extent to which each major industrial sector is critical to that economy, can be estimated in a number of ways. One approach, called export base theory, suggests that economies are primarily dependent on the goods and services they can export to bring in outside money to maintain growth and economic vitality. The IMPLAN model we used for this report is an input/output model that relies on export base theory. We used it to calculate how a change in demand from outside Oregon (*exogenous demand*) can cause economic changes in Oregon.

These changes (known as *responding*) are often called the *ripple effect*. An estimate of the size of the responding caused by a change in exogenous demand as it ripples through the economy is called the *multiplier*. In addition to the goods and services that are currently exported from Oregon, the economy also depends on transfer payments, such as Social Security, and on dividend and interest payments from investments initiated in the past. Table 10 shows the exogenous demand for goods and services related to the major parts of agriculture in Oregon.

**Table 10.—Exogenous demand for Oregon agriculture (2009).**

<b>Aggregated sector</b>	<b>Total (\$000)</b>	<b>Share (%)</b>
Production	2,686,808	2.95
Processing	7,448,031	8.17
Ag. support services	48,323	0.05
Food services & drinking places	934,845	1.03
Wholesale trade	520,527	0.57
Transportation & warehousing	156,202	0.17
Retail trade	184,636	0.20
<b>Total agriculture</b>	<b>11,979,372</b>	<b>13.14</b>
<b>Total all Oregon sectors</b>	<b>91,159,458</b>	<b>100.00</b>

We estimated the impacts of the exogenous demand for agriculture throughout the Oregon economy and summarized those impacts in Table 11. The amounts in Table 11 are smaller than those in Table 9 because Table 9 shows all of the expenditures in the Oregon economy that are related to agriculture, both inside Oregon (local sales and intermediate goods) and outside Oregon (exports).

As mentioned above, any changes to an economic footprint (Table 9) can disrupt an economy in the short run. However, according to export base theory, structural changes (e.g., long-term expansion or contraction of the economy due to a positive or negative economic shock respectively) are likely only if exports are affected, causing an economic impact (Table 11).

**Table 11.—Summary of Oregon agricultural economic impacts (2009).**

<b>Aggregated sector</b>	<b>Output—Sales (\$000)</b>	<b>Employment (full-&amp; part-time jobs)</b>	<b>Value added (\$000)</b>
Production	4,884,028	52,128	2,143,749
Processing	14,666,472	71,612	5,016,120
Ag. support services	101,683	1,999	66,155
Food services & drinking places	1,774,688	22,840	965,002
<i>Subtotal—Production, processing, ag. support services, and food services &amp; drinking places</i>	<i>21,426,871</i>	<i>148,578</i>	<i>8,191,027</i>
Wholesale trade	939,760	6,155	593,472
Transportation & warehousing	296,560	2,049	156,800
Retail trade	308,974	4,154	230,255
<b>Total agriculture</b>	<b>22,972,165</b>	<b>160,936</b>	<b>9,171,553</b>
<b>Total all Oregon sectors</b>	<b>278,803,857</b>	<b>2,177,594</b>	<b>153,024,613</b>
Portion agriculture (%)	8.2	7.4	6.0

In Table 12 (pages 19–20), we provide a more detailed summary of the economic impacts measured by value added or the net local increase in production, including employee compensation, proprietor income, other property income (rents and leases), and indirect business taxes. The columns in Table 12 show the economic impacts of each agricultural sector on itself, on other agricultural sectors, and on nonagricultural sectors. The sectors are aggregated consistent with the NAICS two-digit level.

**Table 12.—Oregon agricultural value-added economic impacts, 2009 (\$000).**

	Production				Processing									Ag. support services	Food services & drinking places	Wholesale trade	Transportation & warehousing	Retail stores—Food and beverage
	Greenhouse & nursery	Crops	Livestock	Other—Comm. fishing, forest farm, etc.	Feed	Grain product incl. cook oil & sugar	Frozen & canned foods	Dairy	Meat & seafood	Baked goods & snacks	Beverages	All other food	Cloth & leather					
Greenhouse & nursery	386,043	1,500	332	37	9	89	876	225	103	2,748	302	5,710	71	570	278	140	39	172
Crops	749	444,307	21,643	93	1,117	9,446	64,949	3,435	2,283	5,933	41,355	10,293	174	59	1,303	312	94	122
Livestock	279	874	138,209	30	32	67	4,028	29,890	15,811	533	190	2,190	96	67	741	94	28	37
Commercial fishing & hunting	21	24	13	103,111	4	6	251	15	1,249	13	19	9	7	2	117	14	4	6
Feed	50	123	7,656	7	7,425	13	386	2,701	457	75	42	144	13	31	257	35	6	9
Grains & sugar	119	137	489	26	195	84,747	4,322	526	71	4,478	1,032	1,471	41	15	386	80	23	32
Frozen & canned foods	278	316	131	58	11	438	500,866	328	166	983	373	800	95	32	1,502	189	55	74
Dairy	311	347	150	68	14	98	4,129	132,374	112	599	287	1,028	107	36	2,069	212	61	83
Meat & seafood	102	115	122	24	71	47	3,780	105	55,292	102	94	111	73	12	847	69	20	27
Baked goods & snacks	453	507	205	105	14	178	1,398	546	162	179,833	414	563	154	52	2,357	305	89	121
Beverages	620	685	361	127	66	189	3,563	547	224	387	243,946	365	212	71	3,678	422	123	165
All other food	162	181	87	33	15	147	11,630	1,633	181	679	1,306	88,263	57	18	1,213	111	32	43
Cloth & leather	143	401	115	53	14	105	463	137	65	156	187	85	126,987	30	198	176	33	50
Ag. support services	17,750	86,622	16,388	29	162	1,344	11,630	3,757	1,635	1,283	8,239	2,542	78	37,148	360	89	33	38
Forestry	86	294	102	40	9	146	1,110	283	79	250	395	750	140	15	376	97	83	24
Mining	324	1,930	501	40	21	176	1,029	365	162	199	424	167	74	20	285	98	56	33
Utilities	7,860	20,562	8,817	837	611	7,203	44,361	13,519	6,648	8,025	12,257	6,965	3,174	632	12,300	3,731	1,035	1,348
Construction	2,926	5,900	2,463	676	201	2,159	12,678	4,126	2,204	2,756	4,102	2,279	1,071	236	4,436	1,769	1,079	644
Manufacturing (other than ag.)	6,609	21,488	6,512	1,236	453	6,654	61,876	16,245	4,781	11,037	43,366	10,700	5,535	865	13,526	6,009	2,328	1,253
Wholesale trade	23,523	49,315	38,067	5,098	4,930	47,066	279,348	77,293	31,776	43,034	103,638	37,678	22,111	2,211	41,769	365,750	4,517	4,219

Table 12 continues on page 20

**Table 12.(contd.)—Oregon agricultural value-added economic impacts, 2009 (\$000).**

	Production				Processing									Ag. support services	Food services & drinking places	Wholesale trade	Transportation & warehousing	Retail stores—Food and beverage
	Greenhouse & nursery	Crops	Livestock	Other—Comm. fishing, forest farm, etc.	Feed	Grain product incl. cook oil & sugar	Frozen & canned foods	Dairy	Meat & seafood	Baked goods & snacks	Beverages	All other food	Cloth & leather					
Transportation & warehousing	9,256	28,305	19,634	2,350	2,293	21,958	102,945	38,726	15,893	17,856	36,081	15,679	7,365	917	15,053	16,741	85,654	3,127
Retail trade	28,506	32,368	12,835	5,912	862	8,708	67,199	19,952	9,832	16,848	26,242	11,928	9,977	3,205	35,496	18,958	6,079	163,448
Information	7,488	11,482	5,215	1,491	503	5,038	40,754	12,009	6,465	10,343	17,002	7,923	5,431	780	19,782	11,061	2,436	2,951
Finance & insurance	27,461	58,451	28,391	5,360	1,266	12,724	86,665	29,395	15,592	20,811	33,244	17,526	10,892	2,821	43,177	24,608	9,914	7,885
Real estate & rental	58,693	137,929	58,904	10,676	2,582	25,230	167,403	55,122	29,972	43,260	71,783	35,399	23,419	5,775	102,659	45,354	13,899	17,112
Professional, scientific, & tech. services	14,194	30,425	13,357	2,999	1,181	12,624	93,206	29,726	17,739	30,012	40,116	21,657	16,885	1,861	35,562	21,665	5,297	4,828
Management of companies	9,890	21,677	10,182	1,946	1,616	18,415	160,575	40,204	20,980	44,488	56,963	30,320	16,791	1,126	34,771	23,558	6,727	3,950
Administrative & waste services	908	2,131	910	175	64	714	5,843	2,330	1,025	1,650	1,916	1,379	531	89	2,952	892	595	306
Educational services (private)	3,774	5,088	2,056	3,402	111	1,085	8,365	2,380	1,310	2,084	3,269	1,493	1,168	453	4,131	2,430	704	994
Health & social services	35,164	38,376	15,242	7,057	1,037	10,097	79,935	22,693	11,803	20,396	31,255	14,239	11,671	4,026	40,882	23,297	6,862	9,263
Arts, recreation, & entertainment	2,732	3,317	1,473	516	114	1,093	8,163	2,479	1,334	2,147	3,259	1,585	1,120	288	5,689	2,239	644	758
Accommodation & food services	10,682	13,422	5,679	2,100	409	3,889	29,418	9,133	5,050	7,906	11,670	5,817	4,392	1,177	505,405	8,102	2,232	2,926
Other services	9,648	13,320	5,463	1,887	476	4,834	35,732	11,077	6,008	8,301	12,620	6,631	4,028	1,084	16,823	8,580	2,506	2,710
Government	4,867	13,839	5,340	964	356	3,780	24,611	8,286	3,787	5,042	8,427	4,231	2,226	458	15,023	6,479	3,600	1,563
<b>Total</b>	<b>671,669</b>	<b>1,045,756</b>	<b>427,043</b>	<b>158,560</b>	<b>28,242</b>	<b>290,504</b>	<b>1,923,491</b>	<b>571,561</b>	<b>270,253</b>	<b>494,243</b>	<b>815,813</b>	<b>347,920</b>	<b>276,167</b>	<b>66,182</b>	<b>965,402</b>	<b>593,666</b>	<b>156,886</b>	<b>230,320</b>

## Implications for Agriculture and Oregon

Oregon agriculture has diversified into markets that are growing very fast and are often based as much on discretionary expenditures as on basic needs. These markets offer the potential to revitalize an industry that is slowly being recognized as having an increasing role in Oregon's economic future.

India's population will soon exceed China's. China, India, and many Asian countries are developing middle classes that demand the high-quality agricultural products that Oregon produces—from beef to oysters to wheat. India's middle class will soon exceed the size of the U.S. middle class.

U.S. consumer preferences for locally produced food are growing, and Oregon has the technology—thanks to a continuing investment in agricultural research—to show consumers where in Oregon the melon they eat for breakfast or the salmon they barbeque for dinner was raised, harvested, and processed.

Oregon is a leader in alternative energy, and most of the places from which that energy can be generated are on agricultural land. These two land uses are compatible, and the predictable lease or power income generated by dedicating a small amount of land to solar collectors or wind turbines can give agricultural producers the resources and security needed to try new crops and management practices. Local tax revenues generated by alternative energy developments also provide revenues to many rural counties that have struggled economically since the 1980s. Biomass may hold the potential to substitute for coal, perhaps directly as a feedstock, and for other energy sources.

For the first time in this long series of reports, we have included food services and drinking places. Almost half of consumers' food expenditures are for food purchased away from home. The very strong linkages from farmgate to restaurant plate need to be understood and could markedly increase the demand for Oregon agricultural products. Consumers are making that connection by seeking out restaurants and bars that highlight local produce, beef, cheese, hazelnuts, microbrew, wine, etc.

Decision makers can reinforce development of these markets through relatively low-cost incentive programs, customized land use regulations to encourage adaptive farming, support for research such as the innovative genetic tracking of salmon runs, and efforts to tailor regulations to the needs of producers that are neighbors and multigenerational Oregon businesses.

Still, economists must recognize the reality that markets are uncertain and sometimes disappointing. Many Oregon agricultural sectors have differentiated their products and have benefited during economic upswings. For example, when people have time and money to play golf or to build and landscape new or existing homes, Oregon's grass seed and nursery crop industries prosper. Conversely, however, those parts of the agricultural industry are vulnerable to downturns in the economy. This point has been confirmed by the initial release of 2010



Photo by Leslie Carnes

agricultural sales estimates. Hopefully, these fluctuations will not discourage agricultural producers from forging ahead to diversify and differentiate their products in order to play to an ever-growing market and increasing profit margin.

Another factor is the continued U.S. dependence on overseas petrochemicals. The price of oil is rising again, instability in the Middle East is growing, and demand for petrochemicals is increasing at an unsustainable rate due to the growth of the Asian Tigers. Ten years ago, the U.S. imported 35 percent of its nitrogen-based fertilizer, while today the percentage is 70 percent, due to the increasing price of U.S. natural gas, from which ammonia and then nitrogen are produced. There are alternatives. One is to strengthen the current tentative development of controlled-release fertilizers. By finding ways to optimize plant nutrient use and minimize losses to the air and water, the returns can be immense, not only for the agricultural industry, but also for the environment.

Agriculture is deeply engrained in Americans' values, and for centuries they have supported it with both private and public dollars. The next 5 years could be the most stressful in terms of public support for agriculture. A significant portion of Oregon agriculture relies on public sector expertise and payments to quickly address problems, suggest more efficient methods of production, stabilize prices, purchase ecological services through the CRP program, and even out the peaks and valleys of a global marketplace. Volatility in the policy arena will be a challenge for agriculture.

While alternative energy development has been helpful, only a small portion of its potential benefits have been realized by rural communities. These projects have been partially paid for with Oregon tax dollars or through forgone revenues. Nonetheless, like much natural resource development in the past, most of the value-added benefits are being shipped outside Oregon to enable places such as Los Angeles to have green industry development and meet their "20 percent by 2020" goal. If even a modest portion of the energy generated in Oregon from wind turbines, solar collectors, or biomass projects had to be used within Oregon, the impact would far exceed the current level of contribution from this development.

"Opportunities and challenges" is perhaps a cliché, yet it is a phrase that certainly fits Oregon agriculture today. Fortunately, the opportunities side of the equation is growing faster than the challenges side. One of Oregon's most difficult problems today is how to employ semiskilled workers who want to learn skills on the job. Agriculture holds great potential to contribute to the solution, as long as the entrepreneurs and policy makers who recognize agriculture's role as an economic engine in the past continue to acknowledge its even greater potential for the future.



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