

Agriculture & *the*



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*The Agricultural Research Foundation (Corvallis, Oregon)
provided financial support for the printing of this publication
and for some of the research on which it is based.*

Agriculture has drawn upon Oregon's natural resource base to help fuel the state's economy for more than 150 years.



Settlers found a diversity of climates and soils that accommodated the agricultural specializations they brought with them: vegetables, fruits, grains, livestock, hay, dairy, and nursery stock. Over time, Oregon agriculture has expanded and diversified in response to market opportunities, competition, and growing conditions.

As the agricultural industry has matured, so too has the overall Oregon economy. Statewide employment, income, and output reflect an increasingly diversified economy in which the relative importance of the agricultural sector has diminished. Agriculture retains a highly visible heritage, one associated with familiar icons such as tractors, livestock, and open fields. But industrialization and economic diversity have distanced many Oregonians from the state's rural, agrarian past. Many urban residents, especially, view agriculture as something apart from their day-to-day activities. As a result, policy makers often struggle with issues that

involve agriculture, such as land use, water quality, seasonal workers, farming practices, and food safety. How do decisions about these and other factors influence the agricultural industry and, in turn, what effect does this industry have on Oregon in general?

Oregon agriculture has evolved as a series of individual commodity sectors rather than as an integrated industry. The technology, resource requirements, and markets of the wheat sector, for example, bear little resemblance to other agricultural sectors such as beef cattle, pears, or nursery crops. Much of our understanding of the agricultural economy is based on the year-to-year changes reported in individual crop sectors. As a result, the relationship between the agricultural industry and the overall state economy is often misrepresented.

This report provides a deeper look at the structural interrelationships within the agricultural industry and at how

agriculture fits into the overall Oregon economy. The first section of the report examines the size and diversity of agricultural production and processing in Oregon. The second section examines Oregon's agricultural economic base and provides an economic-base analysis of the contribution that agriculture and agribusiness make to the Oregon economy. This analysis estimates the extent to which output and employment in the Oregon economy depend on agriculture and agribusiness.

Agriculture in Oregon

A reference definition of the agricultural industry is an important starting point for assessing the industry's economic impact. Misunderstandings of agriculture's contribution to the general economy arise because of different definitions. To portray agriculture as the whole of all food- and fiber-related activities in the economy describes a very large industry. Food manufacturers, wholesalers, shippers, supermarkets, restaurants, and clothing stores all count as part of agriculture in this "big picture" scenario.

Alternatively, to consider the industry as strictly farm-level crop and livestock production describes a much smaller industry, in which the common denominator is land use. While farming and ranching are the most readily apparent features of the agricultural industry, these activities primarily

produce basic raw materials and so do not fully represent the industry's economic influences. The overall agriculture industry can be conceptualized as a flow of resources and activities that delivers food, fiber, and related goods to the consumer. Agriculture is the critical first step in this flow, one primarily concerned with basic production and processing.

In assessing Oregon agriculture, it seems appropriate to focus on economic activity derived from the crops and livestock actually produced or processed in the state. Agricultural products imported into the state—particularly in final form—may contribute to Oregon's broadly defined "food" industry. Imported foods and the merchandising activities that accompany this trade, however, typically are not the result of agricultural production in the state. For example, oranges grown in California and shipped to Oregon add primarily to the California economy. The economic contribution of California oranges to the Oregon economy is limited to that value added in Oregon—wages, earnings, and profit—through the secondary processing (if any), distribution, and retailing of the oranges.



A working definition of the agricultural industry

The contribution of the state's agricultural sector can be viewed as that economic production and employment associated with crops and livestock produced in Oregon. Also, much of the food manufacturing and processing in Oregon depends directly on commodities produced in the state or uses

imported agricultural commodities for processing in conjunction with local product. Conversely, it is likely that many commodities or institutions in the *food industry*—such as California oranges or fast-food restaurants—will exist in Oregon whether or not a single acre of Oregon land is farmed. Thus, many food-related sectors are not considered an explicit component of Oregon's agricultural industry.

Table 1.—Oregon agricultural profile.

CATEGORY	1997	1992
Total land in agriculture (acres)	17,449,293	17,609,497
Total ag land and buildings value (000)	\$16,316,362	\$11,823,647
Average value/acre	\$960	\$633
Number of farms	34,030	31,892
Average farm size (acres)	513	552
Total net cash return (000)	\$727,810	\$398,979
Average net return/farm	\$21,384	\$12,510
Average net return/acre	\$42	\$23
Market value of products sold (000)	\$2,969,194	\$2,292,973
Average gross sales/acre	\$170	\$130
NUMBER OF FARMS BY TYPE*	1997 UNITS	SHARE (%)
Grain farming	1,587	4.7
Vegetable farming	842	2.5
Fruit & nut farming	3,336	9.8
Greenhouse, nursery, & floriculture production	3,572	10.5
Other crop farming (grass seed, hay, mint, other crops)	5,511	16.2
Cattle ranching & feedlots	13,617	40.0
Hog & pig farming	415	1.2
Poultry & egg production	304	0.9
Sheep & goat farming	1,488	4.4
Other animal production (horses, mink, aquaculture, other specialties)	3,358	9.9
Total number of farms**	34,030	100.0

Source: U. S. Department of Agriculture, *1997 Census of Agriculture, Oregon State and County Data*, Vol. 1, Part 37, March 1999.

* The types are distinct farm operating units in categories specified by the North American Industry Classification System (NAICS).

** Data may not sum to 100% due to rounding.

The key distinction here is between *dependence* and *association*. The most tangible economic activity attributable to agriculture in Oregon is that which depends on crop and livestock production in the state. There is a much larger sphere of direct and indirect association among the interrelated sectors of the agriculture, food, and fiber industries. Such associations, however, do not constitute causal economic impacts.

The same distinction—dependence versus association—is also important in understanding the relationships to many business sectors indirectly associated with Oregon agriculture. In transportation, for example, certain functions closely relate to agricultural production, such as hauling potatoes from the farm to a processing facility. Other transportation, such as intracity movement of bread between a wholesaler and grocer, is not as clearly dependent on the Oregon agricultural sector, especially on decisions about basic crop production, processing, and use. (In fact, most bread

sold in Oregon comes from wheat grown outside the state.) Transportation, utilities, finance, and trade businesses serve many different industries and typically are not dependent on any one of them. As a result, these business sectors are treated as their own industries separate from agriculture or the food industry.

We define agriculture as activities engaged directly in agricultural production and processing. They include:

- Three agricultural production sectors—livestock, crops, and nurseries
- Agricultural services
- Three agricultural processing sectors—meat and dairy processing, other food processing, and feed processing
- An agribusiness sector that produces equipment used in agricultural production and processing

Table 2.—Oregon agricultural acreage by farm use, 1997.

FARMLAND USE	ACRES	SHARE (%)
Pasture (all types)	11,854,809	67.9
Harvested cropland		
Grains	1,149,010	6.6
Hays & silage	1,096,030	6.3
Grass & legume seeds	479,958	2.8
Field crops	182,320	1.0
Tree fruits & nuts	78,193	0.4
Small fruits & berries	20,854	0.1
Vegetables	148,043	0.8
Specialty (nursery, Christmas trees)	105,098	0.6
Other (woodlands, house lots, reserves, etc.)	2,334,978	13.4
Total acreage*	17,449,293	100.0

Source: Crop acreage as reported by the OSU Extension Service, *1998 Oregon County and State Agricultural Estimates*, Special Report 790, rev. April 1999. Pasture, specialty crops, and other farmland use acreage from the U.S. Department of Agriculture, *1997 Census of Agriculture, Oregon State and County Data*, Vol. 1, Part 3, March 1999.

*Data may not sum to 100% due to rounding.

Characteristics of Oregon's farming and ranching industry

Several defining characteristics of Oregon's farm-level agricultural industry are summarized in Tables 1, 2, and 3.

AGRICULTURAL PROFILE The Oregon agricultural profile shown in Table 1 (page 3) portrays basic land-use patterns and farm demographics. Data are adapted in part from the USDA's 1997 Census of Agriculture and so do not capture more recent developments in the Oregon industry. The Census of Agriculture contains the most comprehensive set of state-level data about land use and tenure, but the census is conducted only about every 5 years.

The U.S. Department of Agriculture defines a farm as an enterprise with at least \$1,000 in annual agricultural product sales. The 34,000 farms reported in 1997 include many small or part-time agricultural entrepreneurs; about 62 percent reported sales of farm products amounting to less than \$10,000 a year.

ACREAGE Table 2 provides a more detailed accounting of agricultural land usage by farming activity. The nearly 17.5 million acres of Oregon land classified as agricultural usage in the 1997 Census of Agriculture include cropland, pastureland, certain woodlands, and other miscellaneous uses including rural residences. All agricultural-use acreage accounts for about 28 percent of the total Oregon land area. Of total agricultural land, 68 percent is categorized as pasture or grazing land, and 19 percent is harvested cropland. A significant portion of Oregon lands classified as agricultural is also contained in woodlands, cover crops, reserves, house lots, and other miscellaneous uses.

REVENUES GENERATED Farm gate sales or receipts are a traditional measure of economic activity in the agricultural industry. Measures of a category's importance based on gross sales are sensitive to the categorization scheme and level of aggregation. Aggregating individual grass seed varieties, for example, results in that category's having much greater revenues than any single-variety category.

Oregon's 1997 gross farm gate receipts from agriculture approached \$3 billion, as shown in Table 3 (page 7). Gross sales are calculated as price times quantity; the figure does not express profits or net income. The sales statistics are a basis for comparison among commodity groups and for judging year-to-year changes in economic conditions. During the past 10 years, total farm gate receipts have increased by about 1 percent annually in real terms (i.e., adjusted for inflation).

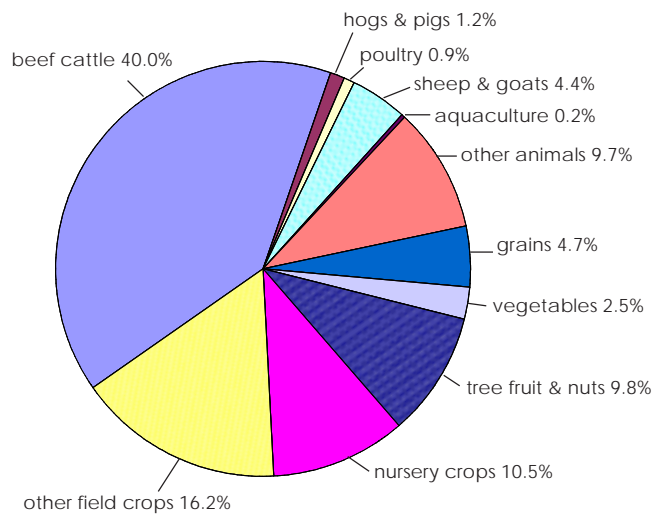


Figure 1a.—Comparison of Oregon agriculture by farm type.*

*Data may not sum to 100% due to rounding.

COMPARISONS BY FARM TYPE, ACREAGE, AND GROSS RECEIPTS Summarizing from Tables 1, 2 and 3, Figures 1a–c illustrate the relative proportions of Oregon production agriculture by farm type, crop acreage, and sales revenue. Differences in measurement criteria preclude simple standardization by crop across all three categories, but some generalizations are evident from Figure 1. Neither the number of farms by farm type (Figure 1a, page 5) nor the acreage devoted to a

farm use (Figure 1b) are directly proportional to the contributions to revenues. For example, about 55 percent of all Oregon farms are livestock producers, and pastureland constitutes two-thirds of total agricultural acreage by use, yet agricultural sales arising from all livestock account for only about 25 percent of total state farm gate receipts (Figure 1c).

A little more than 75 percent of gross farm sales receipts in 1997 came from crop production, though harvested crop acreage (exclusive of pastureland) amounted to less than 20 percent of total farmland. Nursery and greenhouse crops generated about 17 percent of total farm gate receipts, the largest share of any commodity group, while accounting for less than 1 percent of total farmland acreage in Oregon.

These summary statistics provide a broad perspective of farming and ranching in Oregon, but caution is needed in interpreting the statistics or in drawing conclusions about individual farms. Simple averages based on the number of farms, acreages, or sales volume may produce a misleading characterization of the state’s agricultural production sector.

SALES BY FARM SIZE Another revealing characteristic of Oregon agriculture is the distribution of farm sales among farms and ranches. A relatively few large-scale farms produce most of the crop and livestock output as measured by gross sales. As shown in Figure 2, the largest operations constitute only 3.5 percent of all farms and ranches but account for about 63 percent of total farm gate receipts (commodity sales). In contrast, the smallest operations—about 62 percent of all Oregon farms and ranches—have combined gross sales of only about 2 percent of total sales volume.

By conventional measures of industry organization, however, Oregon agriculture is still relatively unconcentrated. More than 1,000 farms are represented

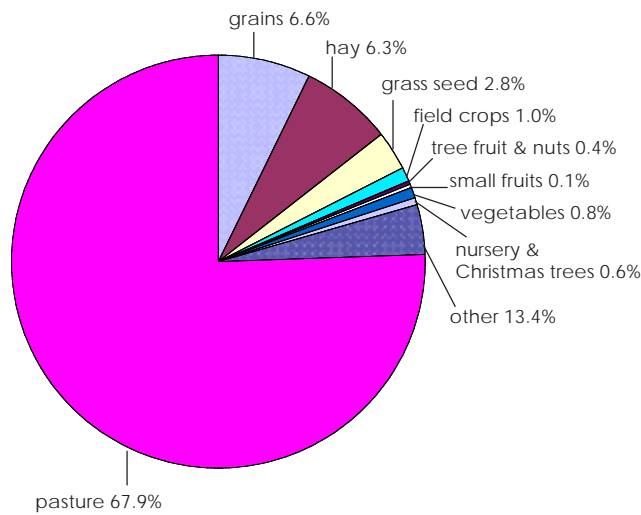


Figure 1b.—Comparison of Oregon agriculture by acreage.*

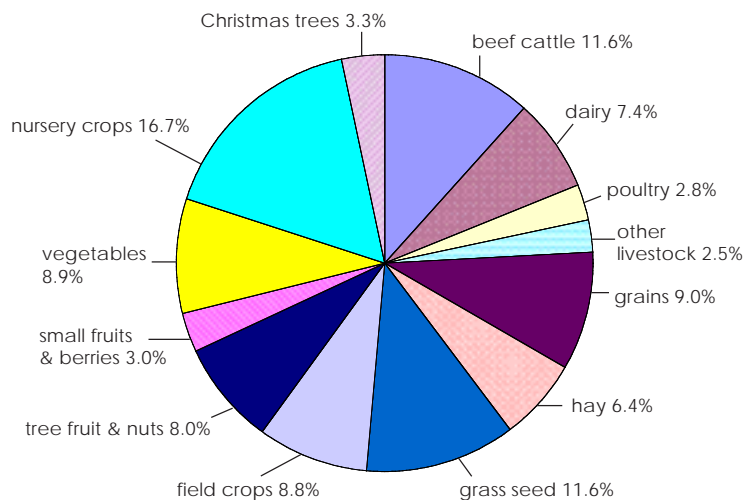


Figure 1c.—Comparison of Oregon agriculture by gross receipts.*

*Data may not sum to 100% due to rounding.

in the “greater than \$500,000” sales category. According to the 1997 Census of Agriculture, the largest 14 farms combined accounted for only 10 percent of total sales of agricultural commodities in the state, the largest 89 farms accounted for 25 percent of sales, and the largest 607 accounted for 50 percent of sales. The same proportions apply to agricultural costs; that is, the largest Oregon farms also incur the majority of production expenditures.

INDUSTRY DIVERSIFICATION Oregon agriculture is highly diversified. The OSU Extension Service reports 125 individual agricultural commodities produced in the state; they fall into the broad categories shown in Tables 1, 2, and 3. The five highest-value individual commodities accounted for about 51 percent of total Oregon production value in 1997, and the top 10 commodities accounted for 61 percent. By comparison, the five largest commodity sectors accounted for more than 90 percent of farm production value in typical midwestern farm states such as Iowa, Illinois, and Nebraska (Table 4, page 8).

This measure of diversification illustrates that Oregon agriculture is not inordinately dependent on any particular farm commodity sector or sectors. A poor economic year in one sector may be offset by above-average returns in several others. Adverse weather that damages some crops may be the basis for bumper yields in others. As a result, the state agricultural economy has been somewhat resilient to annual economic fluctuations in individual sectors. There is some agricultural specialization within the state’s geographical regions, however, and the regional economies are more sensitive to variations in output and market conditions, particularly in the nonirrigated areas of Oregon where production alternatives are limited.

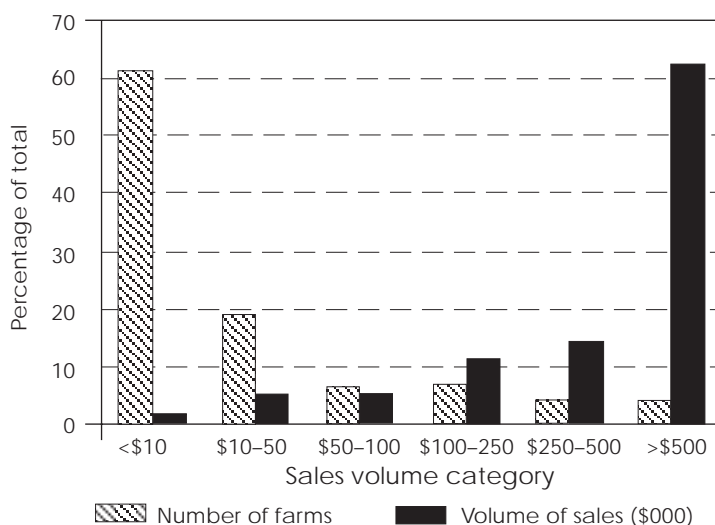


Figure 2.—Distribution of Oregon farm numbers and sales by sales volume, 1997.

Source: Data adapted from U.S. Department of Agriculture, *1997 Census of Agriculture, Oregon State and County Data*, Vol. 1, Part 37, March 1999.

Table 3.—Oregon agricultural sales by commodity, 1997.

COMMODITY	SALES (\$000)	SHARE (%)
Grains	267,537	9.0
Hay & silage	189,826	6.4
Grass & legume seeds	343,191	11.6
Field crops	260,147	8.8
Tree fruit & nuts	235,243	8.0
Small fruits & berries	90,030	3.0
Vegetables	263,463	8.9
Nursery & greenhouse crops	493,160	16.7
Christmas trees	96,847	3.3
Beef cattle & calves	342,835	11.6
Dairy products	218,073	7.4
Poultry & eggs	81,704	2.8
Other livestock products	75,284	2.5
Total farm gate receipts*	2,957,340	100.0

Source: OSU Extension Service, *1998 Oregon County and State Agricultural Estimates*. Special Report 790, rev. April 1999.

*Data may not sum to 100% due to rounding.



Table 4.—Diversification of agricultural production: Concentration of top five commodity sectors by production value in selected states, 1997.

OREGON		IOWA		ILLINOIS		NEBRASKA		U.S. TOTAL	
Rank	Share (%)								
1	nursery 15.0	corn 29.4	corn 37.9	beef cattle 43.4	beef cattle 17.3				
2	beef cattle 11.6	soybeans 25.6	soybeans 33.4	corn 26.1	dairy 10.1				
3	hay 9.2	hogs 23.0	hogs 10.9	soybeans 10.4	corn 9.8				
4	wheat 8.1	beef cattle 12.8	beef cattle 5.5	hogs 8.2	soybeans 8.8				
5	dairy 7.0	dairy 4.1	dairy 3.3	wheat 2.4	broilers 6.8				
Top 5 share 50.9		94.9		91.0		90.5		52.8	

Source: U.S. Department of Agriculture Economic Research Service. *State Fact Sheets, Top 5 Agricultural Commodities*, 1997.

CATEGORIZING AGRICULTURE BY COMPETITIVE STRATEGY Farmers' crop and livestock output decisions depend to varying degrees on land, growing conditions, capital requirements, operating costs, product value, and market expectations. Ongoing changes in technology and market conditions create a dynamic, often risky environment leading to different economic incentives and strategies for different sectors. Based on these variables, Oregon agricultural production can be divided loosely into three groupings: traditional, recreational, and value-added farming.

Traditional Oregon farms such as grains, hay, field crops, and large-scale cattle grazing enterprises face high fixed costs in land and/or equipment, so larger farm acreage is necessary for efficiency. The primary outputs for these operations are basic raw product commodities. Producers tend to be "price takers" and to operate on relatively low per-unit margins. Their success often depends on attaining the lowest cost of production.

At the other extreme is recreational or hobby farming, which lends itself to

small-scale operations in terms of both acreage and costs. They are characterized by relatively easy entry, lower managerial input, and modest startup costs. Typical farms in this category are small herds of beef cattle, specialty livestock, and produce for local markets. Typically, farm operators also work off the farm to provide financial support as necessary.

A third category of value-added agricultural enterprises capitalizes on higher-value, higher-margin products—which typically have higher per-unit costs as well. Examples are nurseries, wine grapes, processed dairy products, and fresh fruits and vegetables. Product differentiation is possible in this sector to the extent that distinguishing characteristics such as quality, reputation, or entry barriers exist. Products often are consumer oriented, exploit value-added opportunities in the market channel, or capitalize on product differentiation. Some high-value agricultural enterprises are suited to small-scale operation, such as organic farming or specialty crops.

This grouping of agricultural operations does not adequately reflect all farm situations; there is overlap between traditional and value-added farming in several sectors such as processed vegetables or proprietary grass seed. The categorization is intended to provide a perspective on the industry apart from parameters based strictly on commodity or farm size.¹

Oregon's agricultural diversity precludes a simple stereotype of farming and ranching in the state. Whereas the majority of agricultural producers in the Midwest have overlapping interests in two or three common commodities, allegiances among Oregon farmers and ranchers are spread thinly over a much larger number of sectors. This dilutes the Oregon industry's collective economic and political presence.

Agricultural processing: The food and kindred products industry

As Oregon's agricultural industry is defined (page 3), the economic linkages in agriculture extend logically to the processing and manufacturing associated with the basic agricultural commodities produced in the state.

Food processing and manufacturing sectors can be categorized by, for example, the type of products, employment, payroll, number of firms, total output, and value added. The Standard Industrial Classification (SIC) codes of the U.S. Department of Commerce offer one system for describing this segment of Oregon's agricultural industry.² SIC 20 covers manufactured food and kindred products. This includes the state's agricultural commodities processed in the state as well as some food and kindred products imported from other areas and processed in Oregon.

Table 5 (page 11) ranks Oregon's food and kindred products industry by annual payroll, giving one perspective on the relative importance of the various components of this industry.³ Frozen fruits and vegetables processing (SIC 2037) is the dominant sector, accounting for 25 percent of total payroll in SIC 20 in 1997 and nearly 30 percent of total

¹ This categorization is based on work by Ralph Heimlich and Charles Barnard. For a more detailed discussion, see Audiric, Ivonne, ed. 1997. *Rural Sustainable Development in America*. New York: John Wiley and Sons.

² The U.S. Department of Commerce is revising industry categorizations. The Standard Industrial Classifications will be replaced by the North American Industry Classification System (NAICS), and SIC 20 will become NAICS 311.

³ Table 5 is based on data reported in *1997 Oregon Covered Employment and Payrolls by Industry and County* prepared by the Oregon Employment Department. As such, these data include only workers covered by unemployment insurance, which may exclude some small food-manufacturing firms.

workers employed. If fruit and vegetable processing activities in all related fruit and vegetable sectors are combined (SIC 203), the segment accounts for just over 40 percent of SIC 20 employment in Oregon. Proportional contributions to the \$650 million in total 1997 SIC 20 payroll by major food manufacturing sectors are shown in Figure 3.

Other significant food processing sectors at the three-digit SIC level include:

- Bakery products (14 percent of total SIC 20 employment)
- Beverages and spirits (10 percent)
- Meat processing (7 percent)
- Dairy (7 percent)
- Grain milling (5 percent)
- Seafood processing (4 percent)

Within these SIC categories, some segments have questionable connections to Oregon's agricultural production base. Manufacturing roasted coffee, for example, depends on raw commodities produced outside the state. However, to the extent that these processing activities utilize the manufacturing infrastructure, or provide single-source offerings

of many products including Oregon-based agricultural products, linkages to the state's agricultural economy can be established.

Oregon employment in SIC 20 remained relatively stable during the late 1990s—in the range of 24,000 to 26,000 workers annually—although there is considerable seasonality in the sector. This employment has accounted for 10 to 12 percent of total manufacturing employment in Oregon. Of the manufacturing industries, food and kindred processing ranks third in total Oregon employment behind SIC 24, lumber and wood products (53,000 annual employment) and SIC 36, electric and electronic equipment (34,000 annual employment).

More than 75 percent of food and kindred products manufacturing is in the Willamette Valley. Multnomah County alone accounts for 28 percent of the state's total payroll in the industry. Food processing employment is significant in many other areas of Oregon, including dairy processing in the Tillamook region and vegetable processing in the Umatilla Basin.

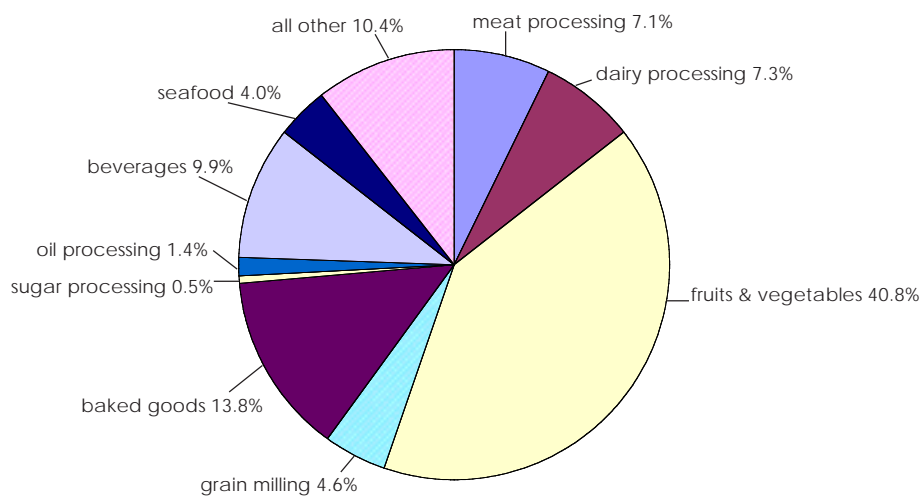


Figure 3.—Oregon 1997 food and kindred products employment payroll by major sector.*

*Data may not sum to 100% due to rounding.

Table 5.—SIC 20 food and kindred products manufacturing sector, Oregon, 1997. Major sectors ranked by annual payroll.

SIC CLASSIFICATION	REPORTING UNITS	AVERAGE EMPLOYMENT	PAYROLL (\$ MILLIONS)	
2037	Frozen fruits & vegetables	31	7,504	168.1
2051	Bread, cakes, & related	56	2,177	63.0
2033	Canned fruits & vegetables	30	1,877	48.3
2099	Other food & kindred products	60	1,945	47.5
2026	Fluid milk	16	973	32.9
2086	Bottled & canned soft drinks	13	848	27.6
2092	Fresh & frozen fish	30	1,585	26.0
2052	Cookies & crackers	9	628	25.8
2082	Malt beverages	22	716	22.8
2035	Pickles, sauces, & dressings	18	946	22.7
2013	Sausage & prepared meats	24	947	21.8
2034	Dehydrated fruits, vegetables, & soups	9	572	18.1
2015	Poultry processing	5	670	15.0
2048	Prepared feeds	18	413	13.6
2095	Roasted coffee	13	325	12.5
2011	Meat packing plants	23	424	9.6
2084	Wines, brandy, & spirits	52	519	9.4
2022	Cheese processing	4	386	9.0
2045	Prepared flour & mixes	6	334	9.0
2038	Other frozen specialties	10	215	7.6
2041	Flour & grain mill products	5	192	7.3
2096	Potato chips & similar snacks	3	275	6.8
2079	Edible fats & oils	4	202	6.1
2024	Ice cream & frozen desserts	5	187	5.5
2087	Flavoring extracts & syrups	6	123	4.5
2077	Animal fats & oils	6	90	2.8
2064	Candy & confectionery	21	159	1.9
2091	Canned & cured seafood	5	58	1.3
2068	Salted & roasted nuts	3	47	1.1
2053	Frozen bakery products	3	56	1.0
2097	Manufactured ice	10	59	0.7
2098	Macaroni & spaghetti	3	15	0.2
20	All food & kindred products	523	25,467	649.7

Source: Oregon Employment Department, *1997 Oregon Covered Employment and Payrolls by Industry and County*. Data include only workers covered by unemployment insurance, which may exclude some small food manufacturers.

Agriculture's contribution to the Oregon economy

One view of an economy like Oregon's is that it's driven by *exogenous demand*; that is, money that flows into the state from outside, primarily as goods and services are exported outside the state. This is *export base theory*, which asserts that all economic activity in the state can be attributed to the respending of these incoming dollars.

Though the primary source of exogenous demand is exports, there are other important sources: federal government spending and federal grants to state and local government; business investments made by non-Oregon firms and households; government transfer payments to households and businesses (primarily Social Security and retirement payments to households); and wages, salaries, and other income earned by Oregonians outside the state.

According to export base theory, the contribution of a given economic sector (or type of exogenous demand such as federal spending) can be estimated if we know the dollar amount of exogenous demand in that sector and the economic linkages between that sector (or activity) and other sectors in the economy; that is, if we know how much each sector buys from other Oregon firms, households, and governments.

In this section, we examine the sources of exogenous demand for eight agricultural sectors and the links between them and other sectors of the economy. We draw on a model of the Oregon economy (a social accounting matrix, or SAM)⁴ for 1993.

There have been important changes in the economy since 1993. While the basic economic structure of agriculture did not change fundamentally over the decade, the rest of the economy diversified and grew more rapidly. For example, Oregon earnings from farming, agricultural services, and food processing were essentially the same in 1993 and 1997 (they declined 0.6 percent). Total Oregon earnings, however, grew by 33 percent, so that the share of agricultural earnings to total earnings declined from 4.2 percent to 3.1 percent during the 4-year period. The following estimates of agriculture's impact in 1993, therefore, overstate this sector's current contribution to Oregon's economy.

⁴ A social accounting matrix (SAM) is a table showing industry sales to and purchases from other industries in an economy, along with transactions involving the income and expenditures of households and governments. For a technical explanation of SAMs and the analysis underlying this report, see Waters, E.C. et al., "The Role of Agriculture in Oregon's Economic Base: Findings from a Social Accounting Matrix," *Journal of Agricultural and Resource Economics*, 24(1):266-280, July 1999.



Table 6.—Exogenous demand for Oregon agriculture, 1993.

SECTOR	TOTAL (\$ MILLIONS)	SHARE (%)
Agricultural production		
Livestock	512	0.8
Crops	931	1.4
Nurseries	263	0.4
Agricultural services	136	0.2
Food processing		
Meat & dairy processing	208	0.3
Other food processing	2,911	4.3
Livestock feed processing	143	0.2
Agribusiness	64	0.1
Agricultural export transportation	156	0.2
Agricultural export wholesale	226	0.3
Agricultural subtotal	5,551	8.2
Oregon total*	67,269	100.0

*Data may not sum to totals shown due to rounding.

Oregon's agricultural export base

There are three sources of exogenous demand for Oregon's agricultural goods and services: domestic and foreign exports, government payments and purchases, and changes in inventory and business investment. Table 6 contains estimates from the 1993 SAM of exogenous demand for each agricultural sector of the Oregon economy.

Domestic and foreign exports are the principal source of exogenous demand, contributing almost 99 percent of Oregon's exogenous demand in the state's eight agricultural sectors. The agricultural processing sectors (meat and dairy, other food processing, and feed processing) are the bulk of Oregon's agricultural exports to domestic and foreign markets. Exports of crops, livestock, and nursery products also contribute significantly to Oregon's export base, providing most of the rest of Oregon's agricultural exports.

Together, Oregon's eight agricultural sectors generated more than \$5.5 billion in exogenous demand, contributing 8.2 percent of the state's total export base in 1993.

Agriculture's linkages in the Oregon economy

Oregon's eight agricultural sectors have important economic linkages with other industries, households, and state and local governments in Oregon. Each new dollar brought into the economy through the various sources of exogenous demand either is spent to purchase inputs for production, or becomes household income which then is respent, saved, or taxed, or is paid directly to governments. About half this spending and income stays in Oregon initially.

A social accounting matrix can be used to analyze how much of the total output or jobs in the state depends on exogenous demand in each sector, given the economic linkages of each sector with every other sector in the economy.



Because of the interrelationships, a sector such as crops, which does not directly purchase anything from the logging or the meat- and dairy-processing industries, can indirectly generate output and jobs in those sectors. This happens because some of the sectors the crop sector does purchase from, and some of the households that receive income from the crops sector, make purchases from the logging and the meat- and dairy-processing sectors.

Table 7 shows the estimate of sales in each sector generated directly and indirectly by exogenous demand from each agricultural sector in 1993. For example, the \$931 million exogenous demand in the crops sector (from Table 6, page 13) indirectly generated more than \$11 million in sales in meat and dairy processing even though, as noted, the crops sector made no purchases directly from that sector. When direct and indirect effects are taken into account, the \$931 million exogenous demand from the crops sector generated \$942 million in crop sales, \$114 million in construction, \$101 million in the transportation sector, \$919 million in Oregon household income, and \$171 million in state and local taxes.

Table 8 (page 16) shows the number of jobs generated in 1993 in each sector of the economy directly and indirectly by exogenous demand in each of the eight agricultural sectors. Again using the example of the crops sector, the \$931 million exogenous demand from the crops sector (Table 6) directly and indirectly generated more than 36,000 jobs in Oregon. More than 17,000 of them were in the crops sector. More than 1,000 jobs were created in each of a number of other sectors: agricultural services; transportation; wholesale trade; retail trade; eating, drinking, and lodging; business services; health services; other services; and state and local governments.

The usual measure of an industry's contribution to regional employment is the number of people employed in the industry. In Oregon's economy (Table 9, page 18; sectoral employment), retail trade (12 percent), other services (9.6 percent), and business services (9.2 percent) were the top three sectors in 1993, followed by eating, drinking, and lodging (6.9 percent) and state and local government education sector (public schools, colleges, and universities) with 6.8 percent of regional employment. Using this measure, 5.9 percent of Oregon's employment is in the eight sectors that constitute the agricultural industry.

Under an export base view of the economy, however, any sector's contribution to a regional economy is determined by the exogenous demand of that sector and the subsequent responding. The contribution of that industry to the region's employment is the number of employees in all industries whose jobs are dependent, directly or indirectly (through interindustry linkages), on the exports of that industry.

(continued on page 17)

Table 7.—Dollar impacts of Oregon agriculture, 1993.*

	1 LIVESTOCK	11 CROPS	23 NURSERIES	26 AGRICULTURAL SERVICES	58 MEAT & DAIRY	66 OTHER FOOD	78 FEED	202 AGRIBUSINESS
1 Livestock**	541	6	1	3	56	12	1	0
11 Crops	8	942	1	0	1	209	2	0
23 Nurseries	2	6	277	8	0	4	0	0
24 Logging	0	2	0	0	0	3	0	0
25 Fishing	0	0	0	0	0	0	0	0
26 Agricultural services	13	30	4	136	1	9	0	0
28 Mining	0	0	0	0	0	1	0	0
48 Construction	51	114	35	18	15	225	6	5
58 Meat & dairy	5	11	4	2	239	37	2	0
66 Other food	5	9	3	2	5	3,011	6	0
78 Feed	2	0	0	0	0	0	144	0
97 Seafood	0	0	0	0	0	0	0	0
108 Other manufacturing	14	31	10	5	8	171	5	4
134 Wood products	2	10	2	1	1	14	0	0
161 Pulp & paper	0	4	0	0	4	58	0	0
202 Agribusiness	3	9	2	2	0	3	1	73
339 High-tech	4	8	3	1	1	17	0	1
433 Transportation	37	101	31	4	7	229	8	3
441 Communications	6	15	5	2	3	59	1	1
443 Utilities	10	21	8	3	4	69	2	2
447 Wholesale	30	86	32	8	22	331	6	4
448 Retail	34	81	27	13	9	128	3	3
454 Eating, drinking, & lodging	16	37	12	6	4	63	2	1
456 Finance	17	35	11	5	5	67	2	1
459 Insurance & real estate	36	79	22	10	9	121	3	2
464 Other services	31	73	24	14	9	130	4	3
469 Business services	24	55	17	10	9	165	4	3
490 Health services	37	83	28	14	10	133	4	3
510 Government enterprises	5	11	3	2	2	22	1	0
519 Federal government industries	0	0	0	0	0	0	0	0
522 State & local education	18	45	12	5	5	71	2	1
523 State & local noneducation	16	41	11	4	4	65	2	1
525 Other	7	16	5	2	2	23	1	0
Household income	390	919	308	151	104	1,460	39	30
State & local taxes	69	171	46	19	18	268	7	5
Savings	21	49	17	8	5	75	2	2

*\$ millions

**Agricultural industry sectors shown in bold.

Table 8.—Employment impacts of Oregon agriculture, 1993.*

	1 LIVESTOCK	11 CROPS	23 NURSERIES	26 AGRICULTURAL SERVICES	58 MEAT & DAIRY	66 OTHER FOOD	78 FEED	202 AGRIBUSINESS
1 Livestock**	13,414	152	32	64	1,387	290	14	3
11 Crops	152	17,743	22	9	26	3,942	32	2
23 Nurseries	38	135	6,655	193	5	102	1	1
24 Logging	2	8	1	1	1	18	0	0
25 Fishing	1	1	0	0	0	3	0	0
26 Agricultural services	604	1,415	196	6,416	68	421	6	3
28 Mining	1	2	1	0	0	6	0	2
48 Construction	429	962	297	148	126	1,893	46	46
58 Meat & dairy	18	42	14	7	892	139	9	1
66 Other food	27	50	17	8	24	15,952	32	2
78 Feed	6	0	0	0	1	0	413	0
97 Seafood	0	1	0	0	0	2	1	0
108 Other manufacturing	102	237	72	37	57	1,289	37	29
134 Wood products	17	70	12	6	6	103	2	3
161 Pulp & paper	2	16	1	1	15	246	1	1
202 Agribusiness	19	53	11	13	2	16	5	429
339 High-tech	26	57	18	8	8	119	3	3
433 Transportation	430	1,175	362	52	82	2,655	87	39
441 Communications	41	93	30	14	22	381	7	7
443 Utilities	32	70	27	10	14	224	5	5
447 Wholesale	546	1,553	586	136	393	6,007	101	66
448 Retail	1,160	2,723	910	445	309	4,325	116	89
454 Eating, drinking, & lodging	571	1,333	442	215	156	2,263	60	47
456 Finance	155	322	100	46	42	606	17	12
459 Insurance & real estate	322	702	191	91	77	1,068	27	21
464 Other services	730	1,718	560	329	208	3,081	83	61
469 Business services	562	1,302	413	229	223	3,902	85	77
490 Health services	656	1,481	495	243	172	2,374	64	49
510 Government enterprises	66	151	48	25	21	311	8	7
519 Federal government industries	0	0	0	0	0	0	0	0
522 State & local education	713	1,777	478	193	185	2,789	76	52
523 State and local noneducation	485	1210	326	131	126	1,899	52	36
525 Other	91	214	72	35	24	337	9	7
***Total 143,613	21,418	36,768	12,388	9,106	4,675	56,760	1,397	1,100

*Numbers of jobs

**Agricultural industry sectors shown in bold.

***Data may not sum to totals shown due to rounding.

Table 9 summarizes the contribution of each component of Oregon's economic base to total employment in Oregon as estimated in our SAM. Extraregional income to households (including government transfers and dividends) emerges as the most important generator of jobs in the Oregon economy, providing the source of almost 20 percent of Oregon jobs in 1993 (Figure 4).

A large share of Oregon household income (about 25 percent) originates outside the region. Over half of it is from the federal government, primarily Social Security and retirement income. Federal sources also include salaries of federal employees (but not public assistance payments, which are treated as payments to state or local government that then are transferred to households). The other half of extraregional household income includes dividends, interest, and rental income to households from sources outside the state as well as wages and salaries earned by Oregon residents who commute to other states.

The agricultural sectors together contributed more than 143,000 jobs to Oregon's economy in 1993, 8.4 percent of total jobs. Other traditional export sectors were very significant generators of jobs. The lumber and wood products sectors (logging, wood products, and pulp and paper products) generated 11 percent, and high-technology manufacturing generated 5 percent of all jobs. Other manufacturing (besides natural resources and high-tech) generated 13 percent of all jobs.

The exports of some nontraditional sectors were also significant. The three services sectors generated 9 percent of jobs, and federal transfers and extraregional income payments to state and local governments generated more than 6 percent of the state's jobs.

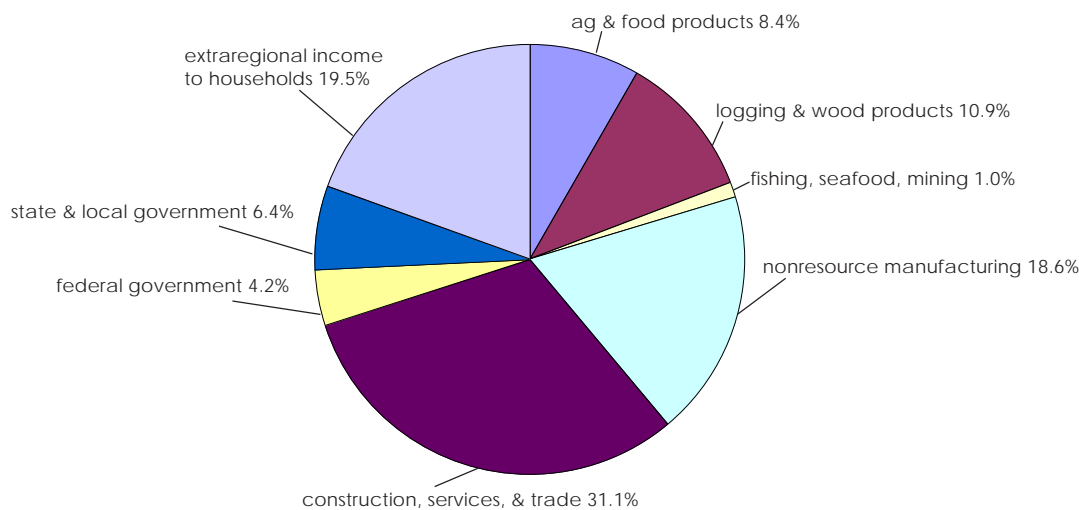


Figure 4.—Oregon's export-base-dependent employment, 1993.*

*Data may not sum to 100% due to rounding.

Table 9.—Oregon's export-base-dependent employment, 1993.

SECTOR*	SECTORAL EMPLOYMENT		EXPORT-DEPENDENT EMPLOYMENT	
	NUMBER OF JOBS	SHARE (%)	NUMBER OF JOBS	DEPENDENCY INDEX (%)
Livestock	21,560	1.3	21,418	1.3
Crops	25,615	1.5	36,768	2.1
Nurseries & greenhouses	8,706	0.5	12,388	0.7
Logging	14,208	0.8	30,399	1.8
Commercial fishing	1,139	0.1	2,017	0.1
Agricultural services	20,987	1.2	9,106	0.5
Mining	2,129	0.1	10,395	0.6
Construction	108,027	6.3	119,203	7.0
Meat & dairy processing	4,034	0.2	4,675	0.3
Other food processing	19,548	1.1	56,760	3.3
Livestock feed processing	432	0.0	1,397	0.1
Seafood processing	1,979	0.1	4,761	0.3
Other manufacturing	103,430	6.0	229,338	13.4
Wood products	42,663	2.5	122,217	7.1
Pulp & paper products	9,066	0.5	33,882	2.0
Agribusiness	891	0.1	1,100	0.1
Hi-tech manufacturing	35,569	2.1	88,681	5.2
Transportation	53,744	3.1	35,147	2.1
Communication	11,949	0.7	13,184	0.8
Utilities	10,384	0.6	20,025	1.2
Wholesale trade	89,655	5.2	0	0.0
Retail trade	204,792	12.0	41,563	2.4
Eating, drinking, & lodging	117,875	6.9	38,927	2.3
Finance, insurance, & real estate	107,434	6.3	108,512	6.3
Other services	163,907	9.6	72,431	4.2
Business services	158,165	9.2	64,382	3.8
Health services	112,021	6.5	18,440	1.1
Government enterprise	15,328	0.9	8,374	0.5
Federal government industry	38,215	2.2	62,937	3.7
State & local government industry (education)	116,550	6.8	0	0.0
State & local government industry (noneducation)	79,370	4.6	0	0.0
Other	13,668	0.8	0	0.0
Households			334,412	19.5
State & local government revenues			110,199	6.4
**Total	1,713,040	100	1,713,040	100.0

*Agricultural industry sectors shown in bold.

**Data may not sum to 100% due to rounding.

Implications for Oregon's economy

The Oregon economy is more diversified than most people think. The natural-resource-based sectors such as agriculture and forestry no longer dominate the economic fortunes of the state. In turn, the diversification afforded by the growth of other manufacturing and nonmanufacturing industries provides a cushion to absorb cyclical changes in the economy.

More than one-quarter of the jobs in the state depend on federal decisions about transfer payments to individuals and to state and local government and on income from productive activities that take place outside Oregon. Federal decisions about Social Security cost-of-living increases and state and local governments are key determinants of Oregon jobs. The performance of non-Oregon businesses affects the dividends and rent Oregonians earn.

The Oregon *agricultural* economy also is more diversified than many believe. There are few common denominators that apply equally to all segments of the state's agricultural industry, given the variations in commodities grown and in producing regions within the state. There also is a significant difference between large commercial farming operations and a group of much more numerous, relatively small part-time farms and ranches. Thus, it is difficult to characterize a "typical" Oregon farm or to say how economic policies might



affect *all* of agriculture. The impacts of agriculture at the county and local level may be much different from those averaged across the state as a whole. Rural economies tend to be less diversified and often are much more dependent on agriculture.

Agricultural jobs are about equally dependent on direct commodity exports (livestock, crops, and nursery products) and on export of processed agricultural goods (meat and dairy, other foods, and feed). Nursery and greenhouse products have emerged as an important part of the state's evolving agricultural economy as high-value and differentiated crops displace traditional farming enterprises, particularly in urbanized areas.

The diversity of agriculture in Oregon requires an equally diverse infrastructure to support the production, processing, and marketing of this output. The private and public cost of maintaining infrastructure support in agriculture can be significant; and the greater the diversity, the greater the infrastructure requirements. The production of major crops typically employs multiple infrastructure systems, but producers of

unique or minor crops may be highly dependent on specific processors, production inputs, or markets. The loss of critical links in this infrastructure—a processor or a pesticide, for example—can lead to that subsector’s abrupt decline.

International market conditions and trade policy are important drivers of the Oregon agricultural economy. Significant portions of crop sales are to foreign markets, and the growth potential of crop and livestock exports depends both

on the health of foreign economies and on the outcomes of foreign trade agreements. Product diversity in the agricultural sector offers some protection against adverse economic conditions in specific markets. Maintaining or expanding the economic contributions of this industry will require that Oregon’s agricultural exports remain competitive both domestically and globally.

For further information

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On the Web

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<http://www.oea.das.state.or.us/> Oregon Department of Administrative Services, Office of Economic Analysis home page. Access the official Oregon economic and revenue forecast.

<http://www.nass.usda.gov/census/> U.S. Department of Agriculture, Census of Agriculture home page. Access the 1997 and 1994 Census of Agriculture database.

<http://niip.wsu.edu/> Washington State University, Northwest Income Indicators Project home page. Access the extensive Regional Economic Information System (REIS) database developed by the Department of Commerce Bureau of Economic Analysis.

<http://www.oda.state.or.us/oass/oass.html> U.S. Department of Agriculture, Oregon Agricultural Statistics Service home page.

<http://www.oda.state.or.us/oda.html> Oregon Department of Agriculture home page.



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Published March 2000.
