

Wheat and Barley Profile

Wheat and barley are important agricultural crops in Idaho, serving as crucial rotational crops in the southern agricultural districts of Idaho and as the principle crops under production in North Idaho. Eastern Idaho produces the largest share of both Idaho's barley and wheat.

Idaho Wheat Facts

In Idaho, wheat is second only to potatoes in cash crop receipts. More foods are made with wheat than any other cereal grain. Due to irrigation, Idaho has some of the highest yields per acre of any state.

Idaho is one of the few places in the world where 5 classes of wheat can be grown. Soft white wheat, both spring and winter, is the predominate wheat in Idaho and is grown on nearly 60% of Idaho's wheat acres. It is used primarily for cakes, cookies, crackers, flat breads, breakfast foods and pancakes. Hard red wheat, both spring and winter, is grown on over 35% of acres and is primarily used for breads, rolls and other leavened food products. Durum wheat is used in all pasta products including macaroni, spaghetti and similar foods. Hard white wheat is primarily used in Asian-style noodles and increasingly, in domestic food products made with whole wheat. Idaho wheat has the quality attributes end-users want.

Nearly 60% of all wheat produced in Idaho is exported to countries around the world in Asia, Latin America and the Middle East. The value of exports to foreign markets totaled \$191 million in 2004.

Idaho wheat also has other uses. When wheat is priced close to barley or corn it can be economically fed to livestock. Wheat straw, as a co-product with the grain, has many uses, such as bedding material. However, in the future wheat straw has the potential to be used for making ethanol and building products.

Idaho Barley Facts

Idaho barley production is the most diverse and versatile in North America. The state produces two-row and six-row malting types, feed and new food barleys. Consistently high quality and reliable yields attracted malting and brewing companies to the state more than 30 years ago, and these companies now operate the largest malting barley contracting program in the U.S.

Idaho feed barley typically is high yielding with excellent test weight and protein and is consumed mainly in state by Idaho's large dairy and cattle feeding operations. About 10 percent of the state's barley moves into feed barley export channels, mainly to Asia. A recent focus has been on developing specialty feed barleys, like low phytate barley which are well suited for fish and swine diets.

Although food barleys represent only a small fraction (2-3%) of U.S. consumption today, we expect that number will climb as a result of a health claim approved by the U.S. FDA that barley helps lower cholesterol and reduce the risk of coronary heart disease (approved Dec. 2005). The first-of-its-kind barley fractionation plant is being constructed in the southwestern region of the state, which will extract beta-glucan fiber for food uses and protein for fish feed.

Measuring Economic Activity

Economies are built on what economists call basic business activity/industry. Basic business activity in a local economy includes sales and related activity (wages paid, taxes paid, profits made) by firms that sell their products outside the economy (export). Common basic (exporting) firms in an economy are farms and manufacturing firms that produce goods and services that are consumed by people from outside the region. These are often referred to as direct impacts of the basic business activity.

Non-exporting (non-basic) firms in an economy provide goods and services to basic firms, the people who are employed by basic firms, and other non-basic goods and services providers and their employees; thus recirculating dollars generated within a region. Common non-basic firms are retail stores, service firms, and firms that supply inputs to basic firms. These are often referred to as spin-off impacts of basic economic activity.

Total impacts of basic industry include direct plus spin-off impacts of basic economic activity. Total impacts are often stated as direct impacts times a multiplier equal to $(1 + J)$, where J is equal to spin-off impacts divided by direct impacts.

Measuring Economic Activity...

A modified IMPLAN input/output model was employed to build the economic base models for the defined economies — the state of Idaho and the four agricultural districts. The basic economic activities assessed in this study are the wheat and barley industries. The impact of forward linked industries are not included unless those industries would not otherwise exist without wheat and barley production being in the state. Thus, malting and flour milling are included in the impact assessment, but bakeries and brewers are not.

For the purposes of this analysis, five measures of economic activity are used to report estimated economic impacts (direct *and* spin-off) of wheat and barley. These are sales, value-added, earnings, number of jobs, and taxes.

Total Sales measures the estimated additional gross sales in the defined economy attributed to the basic activity being evaluated (the wheat and barley industries). Total sales include sales from the basic activity as well as spin-off sales impacts. Total sales is a good measure of the total transactions occurring within an economy during a given period of time. However, this measure is not the best measure of economic output because of "double counting". Total sales include intermediate sales in production, which get counted over and over again as productive activity moves from raw materials to final goods and services sold to the public. For example, the dollar sales value of barley paid to producers is counted twice as barley moves from farms through malt processing.

Value-added measures additional economic output resulting from the basic activity. Total value-added for the state is the regional equivalent of Gross Domestic Product (GDP), which is used to measure output at the national level. Intermediate sales and the resulting double-counting are removed in this measure. Thus a simple formula for value-added is Indirect Business Taxes + Earnings (Employee Compensation + Proprietor Income) + Other Property Type Income.

Earnings measures wage and salary income accruing to employees as well as the income to proprietors. If a new basic activity is introduced to the economy, earnings to proprietors and employees in the economy will rise.

The number of jobs measures the actual jobs in the economy. If a new basic activity is introduced to the economy, jobs are created. New employment opportunities are due directly to the new basic activity and new employment in supporting industries.

Indirect business taxes include all taxes except personal and corporate income taxes paid by businesses and households (primarily property, sales, and excise taxes). Indirect business taxes are expected to rise when new basic activity is introduced to the economy.

Data Sources:

Minnesota IMPLAN Group
Idaho Agricultural Statistics, 2005
Food and Agricultural Policy Research Institute, Policy Database, 2006
Idaho Wheat Commission, Patricia Dailey
Idaho Barley Commission, Kelly Olson

The authors — Steven Peterson, Research Economist, College of Business and Economics; Lindy Widner, Economic Research Analyst, Department of Agricultural Economics and Rural Sociology; James Nelson, Professor, Department of Agricultural Economics and Rural Sociology.

Funding for this study was provided by the Idaho Wheat Commission, the Idaho Barley Commission, and the University of Idaho, College of Agricultural and Life Sciences, Department of Agricultural Economics and Rural Sociology.



Published and distributed by the Idaho Agricultural Experiment Station, Gregory A. Bohach, Director, University of Idaho College of Agricultural and Life Sciences, Moscow, Idaho 83844-2337. The University of Idaho provides equal opportunity in education and employment on the basis of race, color, national origin, religion, sex, sexual orientation, age, disability, or status as a disabled veteran or Vietnam-era veteran, as required by state and federal laws.

Economic Impacts of Wheat and Barley in Idaho

Steven Peterson, Lindy Widner, and James Nelson

The wheat and barley industries play an important role in Idaho's economy. Idaho farmers generated nearly \$500 million in cash receipts from sales of wheat and barley in 2004, accounting for over 11% of all agricultural receipts in Idaho. Idaho producers also received an estimated \$100 million of additional revenue from government payments. Production of these grains creates jobs and income, not only in the production process, but also in transportation, storage, and input supply industries (agrochemical companies, equipment dealers, etc.). Further positive economic impacts are generated by the flour milling and malt processing that occur in the state.

Highlights*

- ♦ **Wheat and barley generate \$597.9 million of revenue to Idaho farmers**
- ♦ **Wheat and barley generate over \$ 1 billion in sales**
- ♦ **Jobs generated by the wheat and barley industries: 13,334**
- ♦ **Indirect business taxes: \$37.6 million**

Wheat production generates:

- ♦ Farm Revenues: \$393 million
- ♦ Impacts on Idaho's Economy:
 - *Total Sales: \$639 million
 - *Value-Added: \$327 million
 - *Earnings: \$201 million
 - *Indirect Taxes: \$24 million
 - *Jobs: 8,592

Barley production generates:

- ♦ Farm Revenues: \$205 million
- ♦ Impacts on Idaho's Economy:
 - *Total Sales: \$372 million
 - *Value-Added: \$177 million
 - *Earnings: \$115 million
 - *Indirect Taxes: \$14 million
 - *Jobs: 4,742

* All numbers are annual estimates of economic activity attributable to Idaho's Wheat and Barley Industries.

Wheat and Barley Industry Size

Wheat and barley are important industries in Idaho's economy even if the spin-off activities they generate are not counted. Total farm revenues from wheat and barley in 2004 were nearly \$600 million (cash receipts + direct and countercyclical payments + loan deficiency payments). Table 1 presents Idaho farm revenues from barley and wheat by district and in total.

Table 1. Estimated Total Farm Revenues from Wheat and Barley Production

		Cash	Government	Total
		Receipts	Payments	Revenues
		\$1,000		
Wheat	State	\$ 332,091	\$ 61,026	\$ 393,117
	North	\$ 103,438	\$ 19,008	\$ 122,446
	Southwest	\$ 25,696	\$ 4,722	\$ 30,418
	Southcentral	\$ 67,228	\$ 12,354	\$ 79,582
	East	\$ 135,729	\$ 24,942	\$ 160,671
Barley	State	\$ 163,537	\$ 41,262	\$ 204,799
	North	\$ 12,525	\$ 3,160	\$ 15,685
	Southwest	\$ 2,461	\$ 621	\$ 3,082
	Southcentral	\$ 51,605	\$ 13,020	\$ 64,625
	East	\$ 96,946	\$ 24,461	\$ 121,407

Direct economic activity of wheat and barley production measures the size of the industry, and excludes the spin-off impacts. Estimated direct economic activities of wheat and barley production in Idaho are presented in Table 2. Wheat and barley producers pay over \$16 million in indirect business taxes. In the case of wheat and barley production, indirect business taxes are composed almost entirely of property taxes because of agriculture's exemption from sales taxes and some excise taxes - the other major components of indirect business taxes. (See definitions of the economic activity measures on the back panel.)

Table 2. Estimated Direct Economic Activity of Wheat and Barley Production - Measures of Industry Size

	Jobs	Sales	Value-	Earnings	Taxes
			Added		
<i>Millions of Dollars</i>					
Total Wheat and Barley Production Economic Activity	8,798	\$ 597.9	\$ 274.4	\$ 167.6	\$ 16.2
Wheat Production Activity	5,785	\$ 393.1	\$ 180.4	\$ 110.2	\$ 10.7
Barley Production Activity	3,014	\$ 204.8	\$ 94.0	\$ 57.4	\$ 5.5

The direct economic activity presented above estimates the size of the wheat and barley industries. However, to measure the total contribution of the wheat and barley industries to Idaho's economy, an economic impact* assessment must be completed. Total impacts on an economy include the direct economic activity of the basic industry *plus* the spin-off economic activity generated in support of that industry.

To estimate the economic impact of the wheat and barley industries on the state and local economies, economic base models were developed for Idaho and for each of the four agricultural districts. Estimated impacts are measured and reported for the state and each district in terms of sales, value-added, jobs, earnings, and indirect business taxes.

* Impacts are the economic activity occurring within the defined economy that are attributable to basic economic activity such as wheat or barley production. See discussion on *Measuring Economic Activity* for a more detailed discussion of the modeling process.

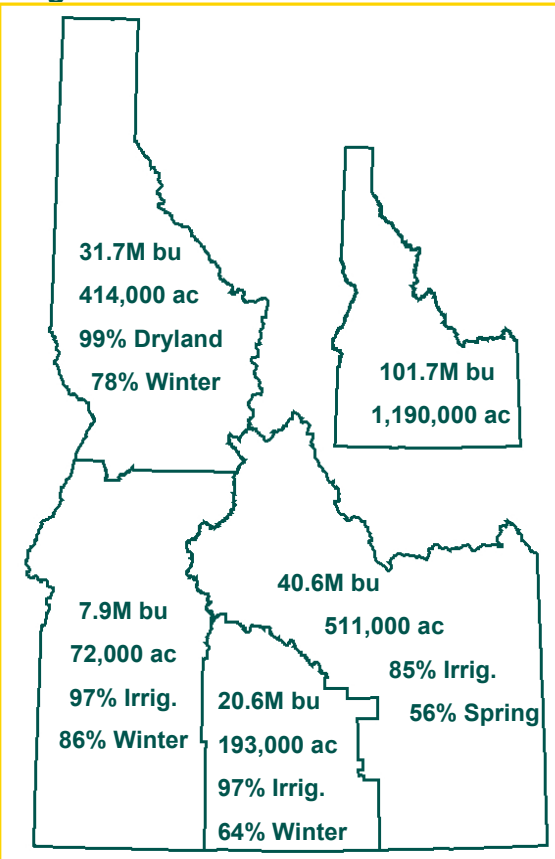
Estimated Impacts of the Wheat Industry

In 2004, Idaho farmers produced over 101.7 million bushels of wheat, generating \$393 million of farm revenues. Over half of Idaho's wheat acreage is under dryland production, accounting for nearly 38 percent of Idaho's total wheat production (measured in bushels). Exports out-of-state (either to domestic consumers in other states or as foreign exports) account for nearly 82 percent of Idaho wheat disappearance, with the remainder absorbed in-state as feed, seed, or raw product for the local flour milling operation. Figure 1 presents the characteristics and distribution of wheat production among the districts.

In addition to wheat production, flour milling is also part of the wheat industry. Pendleton Flour Mills, LLC in Blackfoot, Idaho produces over 570 million pounds of flour each year from 12 million bushels of wheat, 9 million of which are sourced from Idaho.

Table 3 presents estimated impacts of wheat production and processing. Impacts of wheat production were estimated for each of the agricultural districts and for the state as a whole.* The impacts of flour milling — an important linkage in the wheat marketing chain — were also estimated for the state economy, with the bulk of the impacts from the milling part of the wheat industry accruing in the Eastern district, where the mill is located, and in the adjacent Southcentral district. In 2004, about 1.2 million acres of wheat were harvested. Each acre of wheat contributed about \$259[†] of value-added (the regional equivalent to Gross State Product) to the Idaho economy on average.

Figure 1. Idaho Wheat Production



NOTE: The percent of irrigated production is measured in terms of bushels produced.

Table 3. Estimated Total Economic Impacts of Wheat

Region	Jobs	Sales	Value-	Earnings	Taxes
			Added		
<i>Millions of Dollars</i>					
State of Idaho	8,592	\$ 639.1	\$ 327.6	\$ 201.0	\$ 23.9
Wheat Production	8,275	\$ 594.1	\$ 308.8	\$ 190.6	\$ 22.6
Flour Milling	318	\$ 45.0	\$ 18.8	\$ 10.4	\$ 1.3
North (production only)	2,606	\$ 190.2	\$ 98.7	\$ 59.1	\$ 6.7
Southwest (production only)	726	\$ 44.8	\$ 23.2	\$ 14.3	\$ 1.7
Southcentral (production only)	1,209	\$ 104.9	\$ 53.8	\$ 32.9	\$ 3.9
East (production only)	3,512	\$ 228.4	\$ 118.4	\$ 75.0	\$ 8.6

* The state impacts are greater than the sum of the economic impacts by district for wheat. The state economic model has larger economic multipliers than the regional economic models because there are fewer leakages out of the economy at the state level.

† Note that impacts generated within an economy are driven by the export of products out of the economy, which introduces new money. Thus, this average holds only as long as the ratio of exports compared to production holds.

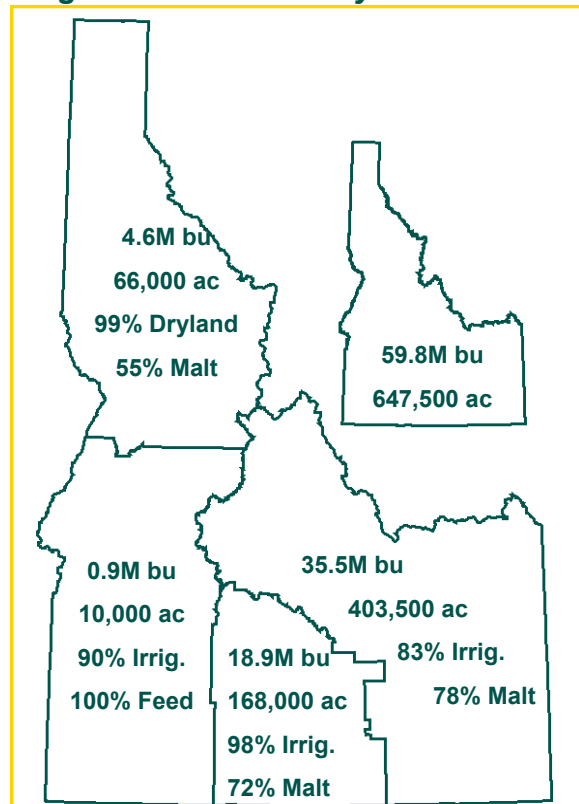
Estimated Impacts of the Barley Industry

Idaho farmers produced about 60 million bushels of barley in 2004, generating almost \$205 million of farm revenues (including government payments). Idaho producers are known worldwide for their high quality and reliable production of barley. Barley is becoming an increasingly important crop to Idaho producers as the malting industry continues to grow, providing a more profitable market for Idaho's high quality barley. The characteristics and distribution of barley production among the districts are presented in Figure 2.

Since 2003, malt processing capacity in Idaho has more than doubled. Three companies located in Idaho Falls and Pocatello operate malting facilities in Idaho: Anheuser Busch/ Bush Agricultural Resources, Inc., Grupo Modelo, and Great Western Malting, Co. Combined they produce around 28 million bushels of malt annually. Coors Brewing Company also maintains a presence in Idaho, contracting for Idaho barley and maintaining a grain handling facility and research farm in Burley.

Table 4 presents estimated impacts of barley production and processing. Impacts of barley production were estimated for each of the agricultural districts and for the state as a whole. Impacts of malt processing — an important linkage in the barley marketing chain — were also estimated for the state as a whole, with the bulk of the impacts accruing in the Eastern and Southcentral districts. In 2004, about 647,500 acres of barley were harvested. Each acre of barley contributed about \$236[†] of value-added (the regional equivalent to Gross State Product) to the Idaho economy on average.

Figure 2. Idaho Barley Production



NOTE: The percent of barley production that is utilized by the malt processing industry is denoted by % Malt.

Table 4. Estimated Total Economic Impacts of Barley

Region	Jobs	Sales	Value-	Earnings	Taxes
			Added		
<i>Millions of Dollars</i>					
State of Idaho	4,742	\$ 371.5	\$ 177.4	\$ 115.1	\$ 13.8
Barley Production	4,311	\$ 309.5	\$ 153.1	\$ 99.3	\$ 11.8
Malt Processing	431	\$ 62.0	\$ 24.3	\$ 15.8	\$ 2.0
North (production only)	306	\$ 22.3	\$ 11.6	\$ 6.9	\$ 0.8
Southwest (production only)	76	\$ 4.7	\$ 2.4	\$ 1.5	\$ 0.2
Southcentral (production only)	1,051	\$ 91.3	\$ 46.8	\$ 28.7	\$ 3.4
East (production only)	2,736	\$ 177.9	\$ 92.3	\$ 58.5	\$ 6.7

† Note that barley generated slightly less value-added per acre harvested as compared to wheat because proportionately more of Idaho's barley remains in-state to supply local cattle feeding operations. No new money is introduced to the economy by sales of feed barley to local feeding operations. Again, this average will only hold as long as the ratio of exports compared to production holds.