

**THE ROLE OF AGRICULTURE AND OTHER
NATURAL RESOURCE-BASE INDUSTRIES IN
IDAHO'S ECONOMY**

by

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EXECUTIVE SUMMARY

In this bulletin the roles of key natural resource-based industries in Idaho's economy are evaluated. These sectors include agriculture, food processing, timber, recreation, and mining. The analysis indicates that agriculture is Idaho's leading natural resource-based industry, accounting for over 21.0 percent of Idaho's gross regional product. Food processing is next with 14.9 percent and timber is third with 11.9 percent. Tourism comprises 3.4 percent, and mining comprises 2.2 percent.

However, the picture changes with geographic focus. Timber in north Idaho accounts for 44.5 percent of the gross regional product, agriculture 8.4 percent, tourism 6.7 percent, and mining 4.7 percent. Agriculture, meanwhile, is the dominant natural resource-based industry throughout southern Idaho. In southwest Idaho, agriculture accounts for 14.6 percent of the gross regional product, food processing 11.7 percent, timber 4.9 percent, and tourism, 2.4 percent. Magic Valley is the most agriculturally-dependent region in the state with production agriculture accounting for 45.3 percent of all regional product, food processing 32.1 percent, tourism 2.9 percent, and mining 0.3 percent. Finally, in southeast Idaho agriculture and food processing account for 26.5 percent and 20.8 percent respectively of gross regional product, timber accounts for 4.3 percent, and tourism accounts for 2.6 percent.

Understanding the role of natural resources in Idaho's economy is important to effective land and resource management. The work reported here represents the descriptive tip of a much larger economic impact assessment and policy analysis tool being developed in the University of Idaho's College of Agriculture, and College of Forestry, Wildlife and Range Sciences. The work is important in tracking changes in Idaho's economy, and in estimating the economic impact of the many natural resource decisions facing Idaho. With this modeling in place, Idaho will be able to make those resource decisions in the manner that makes the most of Idaho's precious natural resource endowment.

INTRODUCTION

How important is agriculture in Idaho's economy? In this bulletin we address this question, also considering the importance of three other key natural resource-based Idaho industries, timber, tourism and mining. To assess the relative importance of Idaho's natural resource-based industries, we first must decide how it is that the economic importance of an industry can be measured. We consider several measures, including physical output, sales, and income generated. We settle on a broad measure of income called value-added¹. The sum of all value added in Idaho equals Idaho's gross state product, roughly the state equivalent of gross national product.

Our analysis is completed with the assistance of an economic model that takes into account the many interconnections that characterize the Idaho economy. The model enables us to track not only the value-added by a particular industry itself, but all the value-added in industries tied to that industry, through the maze of economic supply linkages. We close by suggesting some extensions of this type of analysis, focusing particularly on its extension to include spatial features of the Idaho economy.

THE OUTPUT OF IDAHO AGRICULTURE

How can agriculture be measured so as to indicate its economic importance? Table 1 shows one readily available measure, physical output. As indicated in Table 1, Idaho is an important national producer of several agricultural products, including in particular potatoes -- Idaho is the nation's leading producer of potatoes. But physical output just hints at the contribution of agriculture to Idaho's economy.

Gross sales is another common measure of output. Table 2 provides gross agricultural sales computed as gross output times price. In terms of gross sales, cattle production is Idaho's leading

¹ Value Added is defined as the sum of all before tax profits and proprietary income, allowances for depreciation, and wages paid to labor, including contributions for social insurance. Value added is roughly equivalent to the businessman's notion of revenues less cost of goods sold, or net cash flow, plus wages paid to labor.

agricultural industry , with wheat the leader in northern Idaho, and potatoes the leader in southeastern Idaho. Output rankings as indicated in Table 2 can vary from year to year due to volatility of agricultural prices. For example, in 1990 the value of potato production exceeded that of livestock, due primarily to peak potato production and favorable prices.

How does agriculture stack up against other Idaho industry? For these comparisons gross sales does not work very well. Consider an example, the sale of an agriculture commodity, say some auctioned steer cattle, with the sale of a non-agricultural item, say a new automobile. An Idaho auto dealer that sells a new auto for \$17,000 may have a mark-up of 15% (U.S. Dept of Commerce), which means that 85% of the sale leaves the state for Detroit, Europe, or Japan. Through his efforts in ordering, preparing, displaying and selling the new auto, the auto dealer adds value equal to his markup: \$2,550 on a 15% markup.

Contrast the auto dealer with the livestock producer. In the fall, the livestock operator auctions his steer calves and surplus heifers. There are expenses, for feed and range, for veterinary services, and for transportation and equipment. On sales of \$17,000, such expenses may add up to \$9,000, or 50+% of gross sales, (Smathers, et al, 1990). The remaining \$8,000 is value the livestock operator and his employees added to these inputs. Thus, though both livestock operator and auto dealer have sales of \$17,000, the livestock operator generates \$8,000 in new income, or value-added, compared to the auto dealer's \$2,550.

Value-added then is a measure to use in assessing the economic role of various industries. However, there is still more value-added to link to industry. Our livestock operator had over \$9,000 in non-labor expenses. On sales of \$17,000, the livestock operator spends over \$6,000 on barley, alfalfa and range fees, \$400 in veterinary fees, \$1,500 for transportation and equipment expenses, and \$700 in auction and other marketing fees. Since these activities serve livestock production, their sales and associated value-added, can be added to that of the livestock operator as well. Moreover, the alfalfa supplier purchases inputs of seed, fertilizers, irrigation supplies, equipment and fuels. And his suppliers purchase inputs, and so on. At each step value is added, and this value-added is also appropriately linked to livestock production.

The linkages extend still further. Our livestock operator, and his employees, spend a portion of their incomes on the necessities and enjoyments of life. Jobs and income are thus created, and value is added in a host of consumer industries, in barber shops, grocery stores, the theater, and others. And at each step taxes are paid to local, state, and federal governments thereby financing a portion of state and local government operation, supporting teachers, police, fireman, and so on, and value is added there as well. The sum of all this value-added, in all these different parts of the economy, constitutes the economic role of the livestock sector.

AN ECONOMIC MODEL OF IDAHO

Tracking the value-added interrelationships that link the various industries of the economy requires an economic model. Our model, developed through this project, recognizes that there are, broadly speaking, two types of industries, region-building and region-filling. Region-building industries produce goods that leave the state, or otherwise serve non-residents. These industries bring dollars to the state's economy from outside. Region-filling industries, in contrast, serve the needs of the region's residents. Region-filling industries capture and circulate income brought to the State by region-building industries.

In reality, most industries are partly region-building, and partly region-filling. Our economic model estimates the portion of each industry's value-added that falls into one of these categories, estimating the contribution of industry by linking region-filling value-added to region-building value-added.

IDAHO VALUE ADDED LINKED TO AGRICULTURE AND OTHER NATURAL RESOURCE-BASED INDUSTRIES

The sum of all Idaho value-added equals Idaho's gross state product, approximately \$13.65 billion in 1987. Our economic model links Idaho's gross state product to Idaho's region-building industries, Table 3. Agriculture is Idaho's leading natural resource-based industry, accounting for \$2.87 billion, or 21% of Idaho's gross state product. Food processing is next, accounting for

over \$2.0 billion, or 14.9% of the Gross State Product. Production agriculture and food processing combined account for over a third ($35.9\% = 21.0\% + 14.9\%$) of Idaho's gross state product.

Timber, which includes harvest and wood processing, is Idaho's third leading natural resource-based industry, accounting for \$1.6 billion, or 11.9% of all Idaho's gross state product². Tourism, defined here as traditional tourism, out-of-state and out-of-region recreation and leisure travel, plus in- region recreation and leisure travelers, is Idaho's fourth leading natural resource-based industry. Our figures for recreation and leisure travel are derived with the help of the 1987 Idaho Tourism and Leisure Travel Study, of the University of Idaho, Department of Resource Recreation and Tourism (see also: Robison and Harris 1991). Figure 1 shows the information of Table 3 against the backdrop of a map of Idaho.

Idaho is a geographically diverse state with several distinct and in many ways independent subregional economies. It is therefore useful to report the information of Table 3 on a finer, subregional basis. Table 4 reflects Idaho's four principal economic subregions, northern Idaho, southwestern Idaho, Magic Valley, and southeastern Idaho. Figure 2 displays the multicounty definitions of these four subregions, and also shows the information of Table 4. Timber dominates the economic landscape of northern Idaho, accounting for 44.5% of the region's gross product. Agriculture, however, is the dominant natural resource-based industry throughout southern Idaho. Agriculture is particularly important in Magic Valley where it accounts for over 45.3% of the region's gross product. If we include Magic Valley food processors, whose location is obviously dictated by proximity to inputs, the region's dependence on agriculture rises to 77.4% ($45.3\% + 32.1\%$).

² Our definition of the timber industry includes loggers, sawmills, specialty product mills and pulp mills. A substantial quantity of federal government employment is natural resource related and many would add to the timber industry a portion of US Forest Service employment, particularly the timber staff. Furthermore, where federal timber is involved, recognition could also be given to timber's unique fiscal role in local government. In particular, payments in lieu of taxes might be linked to timber, as well as all the employment and income in local government that these payments provide. We recognize the merit of these arguments and look forward at some future time of incorporating the public sectors more formally into our economic model.

In southeastern Idaho agriculture accounts for 26.5%, and food processing 20.8% of the region's gross product. In southwestern Idaho agriculture accounts for 14.6%, and food processing 11.7% of the region's gross product. Clearly agriculture is an important part of the Idaho economy.

THE IMPACT OF AGRICULTURE AND OTHER RURAL INDUSTRY ON IDAHO'S URBAN PLACES

Trade in regional economies follows a hierarchical pattern, with large communities supplying consumer and business goods and services to smaller communities, who often supply consumer and business goods and services to still smaller communities. Boise, for example, provides goods and services not only for Boise residents, but also for consumers and businesses all over southwestern Idaho and southeaster Oregon as well. Boise thus occupies the top of southwestern Idaho's trade hierarchy.

Hierarchical trade has important implications for the wealth generating effect of agriculture and other natural resource-based industries. Idaho agriculture generates income in rural places. Rural consumers and businessmen exchange a large portion of their income for goods and services of urban places, thus generating income in urban places. Idaho's rural industries, primarily agriculture and other natural resource-based, create income and wealth not only in rural places, but in urban places as well. This feature of the state's economy is all too easily overlooked by urban residents. In a follow-up study, to be titled "The Role of Rural Industry in Idaho's Urban Places," we will specifically examine rural production, and assess the importance of this to the economic health and well-being of Idaho's urban places.

SUMMARY AND CONCLUSIONS

In this bulletin we have examined the role of agriculture, and other natural resource-based industries, in the Idaho economy. After considering various measures of economic activity, we

settled on value-added as the most appropriate for disclosing agriculture's economic role. The sum of value added in all Idaho industry equals Idaho's gross state product.

To explain the economic role of the natural resource-based industry in Idaho, an economic model of Idaho has been developed. Our model indicates not only the value directly added by an industry, but all the value-added in industries linked to that industry as well. Considering all these economic links, agriculture is Idaho's leading natural resource-based industry, accounting for over 21% of all of Idaho gross state product. Food processing is Idaho's second leading natural-resource-based industry, accounting for an additional 14.9% of the gross state product. Combined, production agriculture and food processing thus explain nearly 35.9% of gross state product.

Agriculture is even more important in certain subregions of the state. In Magic Valley, production agriculture and food processing combined explain over 77% of that region's gross product. Only in northern Idaho does agriculture come in second place among natural resource-based industries. In northern Idaho, timber and timber processing are number one, accounting for nearly 44.5% of that region's gross product.

Agriculture, and other natural resource-based activities, occur, of course, in rural areas. In an economic trade sense, these rural areas are dominated by Idaho's urban places. In a follow-up to the present study, our Idaho economic model will be applied to an assessment of the role of rural natural resource-based industries in Idaho's urban economies.

Much as the private businessman needs to know his sources of income, and understand the functioning of his business, so too do decision makers in and out of government need to know the state's sources of income, and understand the functioning of the state economy. Our research provides a step in that direction. This information will prove useful to decision makers as they grapple with Idaho's many difficult natural resource management issues. The importance of Idaho's natural resource-based industry cannot be understated. Timber, agriculture, and food processing together account for almost half of the State's gross product, and that does not include the federal government's resource-based links (for example, Forest Service timber management

staff and range and agriculture personnel, wildlife and recreation, and others). Regional policy issues that affect any or all of these sectors, such as the salmon issue, water, exports, and public grazing, could have a potentially substantial impact on the economy of Idaho.

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TABLE 1

IDAHO'S RANK IN THE NATION'S AGRICULTURE - 1987

<u>Commodity</u>	<u>Idaho Production</u>	<u>Unit</u>	<u>National Rank</u>
Potatoes	99.71	Mil. Cwt.	1
Hops	4.025	Mil. lbs	3
Barley	61.5	Mil Bu.	3
Mint	782	1,000 lbs	3
Sugarbeets	4.277	Mil. Tons	3
Plums & Prunes	6200	Tons	4
Onions	4.62	Mil. Cwt.	4
Dry Beans	2.812	Mil. Cwt.	5
Cherries	2100	Tons	6
Sweet corn .	166430	Tons	6
Sheep & Lambs	324	1,000 head	11
Wheat	85.5	Mil Bu.	11
Apples	140	Mil. lbs.	11
Wool	2.778	Mil. lbs	11
Hay	4.503	Mil. tons	13
Milk Products	2375	Mil. Lbs.	15
Oats	2.7	Mil. Bu.	22
Cattle	1.57	Mil. Head	24
Corn	7.556	Mil. Bu.	34

Source: 1988 Idaho Agricultural Statistics

TABLE 2

MARKET VALUE OF IDAHO'S AGRICULTURAL PRODUCTION AND RANKING BY REGION

Commodity	State	SW		Magic		No.		East		
	of Idaho	Idaho	Idaho	Valley	Valley	Idaho	Idaho	Idaho	Idaho	
	Market	Market	Market	Market	Market	Market	Market	Market	Market	
	Value	Value	Value	Value	Value	Value	Value	Value	Value	
	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	
	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	
Cattle	828,044	1	382,721	1	225,277	1	29,262	3	190,784	2
Potatoes	365,186	2	26,553	6	104,168	3	325	13	234,140	1
Milk Products	256,111	3	78,271	2	112,355	2	3,949	9	61,536	6
Hay	245,391	4	59,068	4	76,308	4	12,393	4	97,622	3
Wheat	216,205	5	16,000	7	48,592	6	62,683	1	88,930	4
Sugarbeets	151,456	6	61,861	3	75,248	5	0	-	14,347	7
Barley	113,160	7	5,474	15	24,653	4	16,505	3	66,528	5
Sheep	63,039	8	42,725	5	10,817	9	641	11	8,856	8
Dry Beans	44,489	9	8,720	11	35,130	7	639	12	0	-
Dry Peas	13,895	10	0	-	1,905	12	11,065	5	925	10
Remainder	87,380		57,783		12,400		13,826		3,371	
Total	2,384,356		739,176		726,853		151,288		767,039	

Source: 1987 Census of Agriculture and Idaho Agric. Statistics

TABLE 3

IDAHO'S LEADING NATURAL RESOURCE - BASED INDUSTRIES

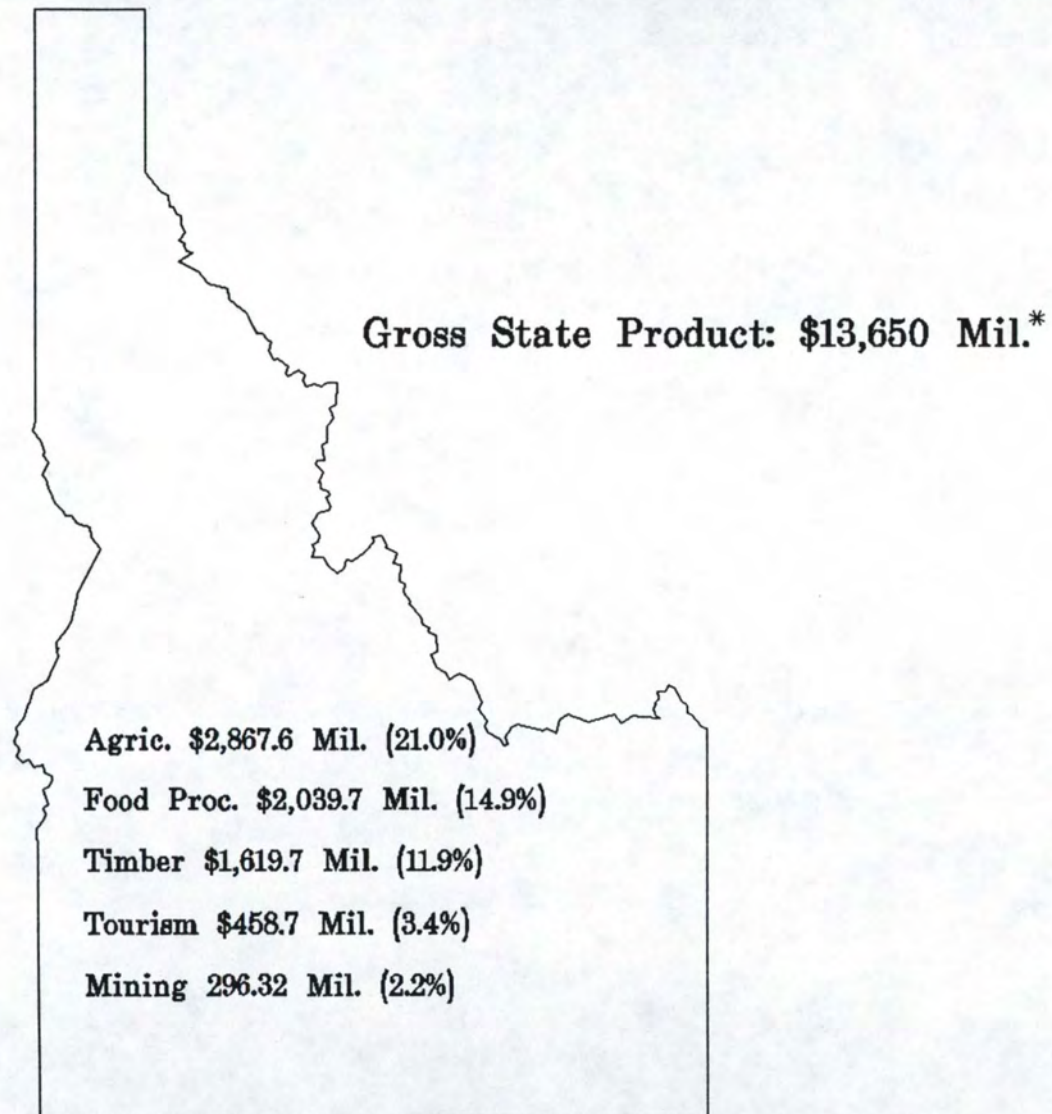
INDUSTRY	LINKED TO GROSS STATE PRODUCT	
	1987 DOL.	% OF TOTAL
AGRICULTURE	\$2,867 Mil.	21.0%
FOOD PROCESSING	\$2,039 Mil.	14.9%
TIMBER	\$1,620 Mil.	11.9%
TOURISM	\$459 Mil.	3.4%
MINING	\$297 Mil.	2.2%
OTHER	6,368Mil.	46.7%
GROSS STATE PRODUCT	\$13,650 MIL.	100.0%

TABLE 4

LEADING NATURAL RESOURCE-BASED INDUSTRY BY SUBREGION

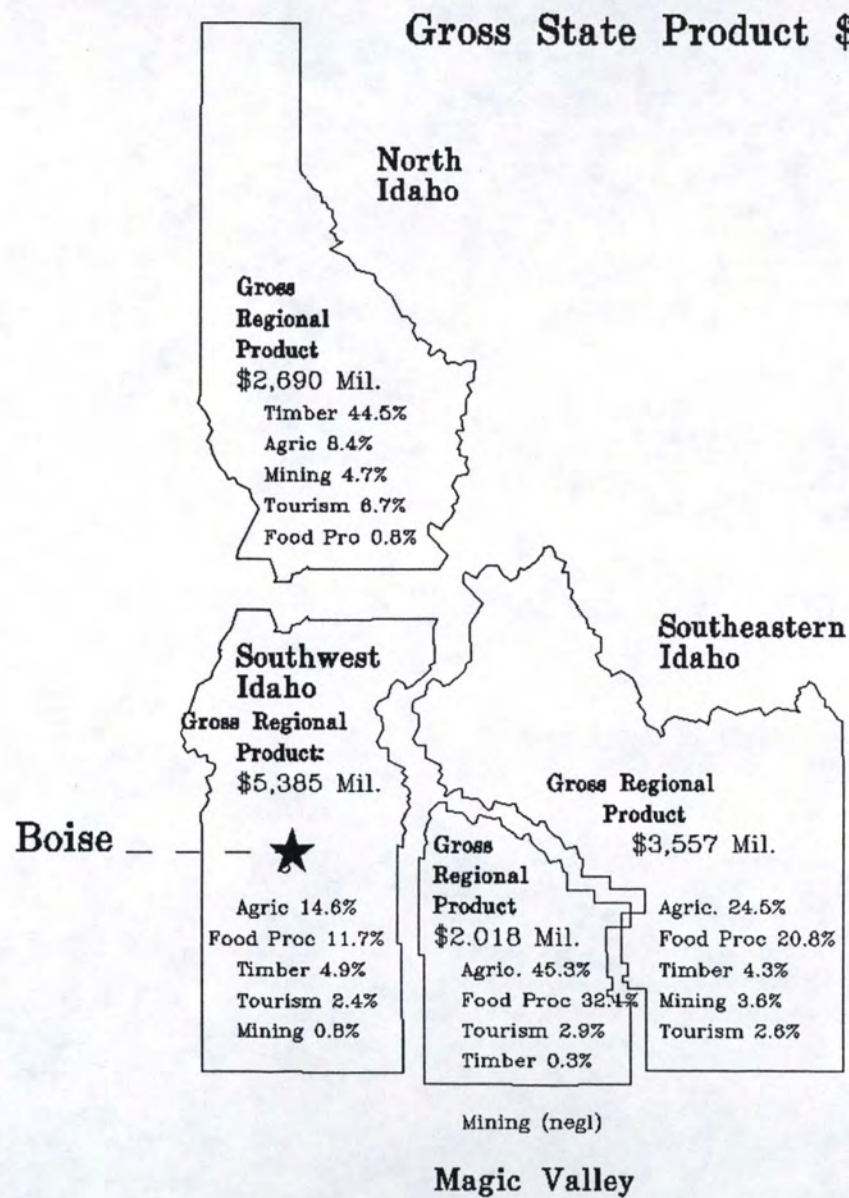
INDUSTRY	NORTH IDAHO		SOUTH WESTERN IDAHO		MAGIC VALLEY		SOUTH EASTERN IDAHO	
	\$MIL	%	\$MIL	%	\$MIL	%	\$MIL	%
AGRIC.	\$225	8.4%	\$786	14.6%	\$914	45.3%	\$942	26.5%
FOOD PROC.	\$21	0.8%	\$630	11.7%	\$648	32.1%	\$741	20.8%
TIMBER	\$1,197	44.5%	\$264	4.9%	\$6	0.3%	\$153	4.3%
TOURISM	\$180	6.7%	\$129	2.4%	\$59	2.9%	\$91	2.5%
MINING	\$127	4.7%	\$42	0.8%	negl.	0%	\$128	3.6%
OTHER	\$939	34.9%	\$3,535	65.7%	\$392	19.4%	\$1,502	42.2%
TOTAL	\$2,690	100%	\$5,385	100%	\$2,018	100%	\$3,557	100%

**Figure 1 - Percent of Idaho's Gross State Product
Linked to Key Natural Resource-Based Industries**



* Based on the Economy of 1987

Figure 2 - Percent of Gross Product Linked to Key Natural Resource-Based Industries in the Four Regions of Idaho



* Based on the Economy of 1987