

TRANSPORTING AND MARKETING IDAHO'S WHEATS AND BARLEYS

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Published and distributed by the
Idaho Agricultural Experiment Station
Gary A. Lee, Director
University of Idaho College of Agriculture
Moscow, Idaho 83843

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Transporting and Marketing Idaho's Wheats and Barleys

Neil Meyer and Wesley Harris*

Executive Summary

Completion of the upper Snake locks and dams and the initiation of 25-car rail rates have had significant effects on the flow of Idaho's wheats and barleys. The objective of this research was to find out where wheat and barley were being transported and the mode used for transport.

Idaho soft white wheat is an export crop. Ninety-five percent was transported to the lower Columbia River, 25 percent by truck-barge, 8 percent by single car rail and 68 percent by 25-car-unit trains.

Barley is divided into two classes: malt and feed. Each has a distinct market. Feed barley is used largely in Idaho's livestock industry, while malting barley has been shipped out of state to malters. Feed barley is usually transported by truck, while malting barley moves by rail to Wisconsin, Colorado and Washington.

Introduction

Idaho benefits from a good climate and a diverse geography that provides favorable conditions for its strong production of wheat and barley. In 1984, Idaho produced nearly 170 million bushels of wheat and barley that made up nearly 21 percent of Idaho's agricultural cash revenues — more than \$402 million (USDA Idaho Agricultural Statistics 1982-1985). This significant production moves through several distinct export and domestic markets depending on the type and variety of crop.

Idaho soft white wheat is normally an export crop, with a small percentage of production being used domestically (Sargent 1978). The domestic market (which consists mainly of seed, pastry flour and oriental noodles) has remained fairly constant while the export markets have had substantial changes over the last decade. To accommodate the expanding exports, the transportation system has undergone changes that have

given Idaho wheat producers better ability to participate in and receive economic benefits from export markets.

Barley is divided between two distinct markets — one for feed barley and the other for malting barley. A large state as well as regional (Pacific Northwest) domestic market exists for Idaho feed barley since Idaho's largest source of agricultural revenue is livestock (USDA 1982 and 1985). Malting barley has a strong market consisting of breweries and distilleries throughout the U.S. This market has had a 3 percent annual increase, which has been attributed to the increase in the U.S. population at or above the minimum drinking age, and an increase in per capita consumption of beverages requiring malt (Wesenberg et al. 1978).

Objectives

This study's objectives were to:

1. Describe the production of wheat and barley in Idaho;
2. Identify the transportation mode, cost and destination of Idaho wheat, feed barley and malting barley;
3. Identify export demand and possible factors influencing export demand;
4. Identify areas for further research that could help the profitability of wheat and barley production and marketing.

Method and Study Area

Primary data for this publication are from personal interviews with Idaho grain elevator companies during May, June and July, 1982. One hundred grain elevator companies were randomly selected and contacted for personal interviews from the 1981 membership directory of the Idaho Feed and Grain Association, Inc., and from lists of licensed and bonded warehouses and elevators in Idaho. Forty five of the 100 companies contacted participated in the survey. These 45 companies handled 44 percent of the soft wheat produced and 42 percent of the barley produced (61 percent of the malting barley and 29 percent of the feed barley) in Idaho during 1981.

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The questionnaire, administered by personal interviews, was directed at information in two areas. The first area dealt with the grain elevator company itself in terms of storage capacity and ability to load 25-car unit trains. The second area was concerned with the transportation of the wheat and barley to and from the facility, the mode of transportation, destination and the cost of transportation. This publication deals with the second area.

Production

Wheat and barley are two of Idaho's most widely grown crops. Since 1974, there has been a strong growth in the production and total value of Idaho's wheats and barleys (Table 1). Idaho wheat is usually characterized by winter and spring varieties of soft white wheat (although some red wheat is grown in the extreme northern and southeastern parts of Idaho). Table 2 shows the percentages of Idaho wheat harvested in terms of spring and winter varieties. Idaho barleys are mainly spring varieties identified by their final use, namely animal feed and malting. Table 3 shows the percentages of Idaho barley planted according to malting and feed varieties.

Wheat and barley are grown in similar fashions (Janick et al. 1974). Both are normally planted as parts of rotations with each other, some types of legumes (peas, lentils, beans, alfalfa) and potatoes. Field preparations consist of some type of cultivation and the application of a nitrogen fertilizer, along with or previous to seeding. The planting and harvesting times vary according to the variety of wheat or barley, as well as growing season variations and type of grain, as shown in Table 4. After planting, the wheat and barley pesticides are applied and crops irrigated according to plant requirements and management practices. In 1981, nearly 43 percent of Idaho's harvested wheat acreage and 31 percent of the harvested barley acreage were irrigated production (USDA 1982).

Although cultural practices are quite similar between wheat and barley, special management considerations

must be given to malting barleys in order to meet maltster's requirements. To meet these requirements, producers must:

1. Plant proper varieties and maintain good management practices;
2. Harvest the barley with a minimum of damage, when the kernels are fully ripened and plump, and at the correct protein level;

Table 2. Percentage of Idaho wheat harvested according to spring and winter wheat varieties.

	Spring	Winter
	(%)	(%)
1979	42	58
1980	41	59
1981	36	64

Source: USDA, Idaho Agricultural Statistics 1982-1985.

Table 3. Percentage of barley acreage planted according to malt and feed barley.

	Malting	Feed	Other
	(%)	(%)	(%)
1979	45	45	10
1980	51	45	4
1981	46	47	7

Source: USDA, Idaho Agricultural Statistics 1982-1985.

Table 4. Usual planting and harvesting dates for Idaho wheat and barley.

Crop	Usual planting dates	Usual harvesting dates
Barley:		
Spring	Mar. 25 - May 25	Aug. 10 - Sept. 20
Wheat:		
Winter	Sept. 10 - Nov. 1	Aug. 5 - Sept. 5
Spring	Mar. 20 - May 25	Aug. 10 - Sept. 15

Source: USDA 1984.

Table 1. Idaho production and value of wheats and barleys, 1974-1983.

Year	Production (1,000 bu)			Value (\$1,000)	
	Wheats*	Malting barley	Feed barley	Wheats	Barleys
1974	61,860	15,523	7,603	246,026	91,238
1975	63,220	21,000	14,700	214,672	97,440
1976	72,850	25,536	20,216	178,913	110,124
1977	57,900	24,299	20,680	152,616	98,747
1978	75,370	30,987	24,663	235,154	127,745
1979	74,140	24,691	24,691	260,369	135,529
1980	96,030	30,069	26,532	351,049	172,163
1981	89,780	29,039	29,671	325,185	167,295
1982	94,200	32,789	35,024	354,833	184,810
1983	91,710	26,916	33,481	317,475	187,103

*Indicates both red and white wheats.

3. Deliver the barley without other grains, wild oats, garlic, weevils, ergot or any other foreign materials (Wesenberg 1978).

Marketing

In the last 10 to 15 years substantial changes have occurred in the marketing of Idaho's wheats and barleys. Because of these changes, a producer must consider several marketing alternatives to maximize returns. Changes such as the construction of subterminals to load unit trains and barges, the abandonment of many rail lines and the use of greater capacity trucks and roads have enabled or forced many producers to pursue markets not accessible or feasible in the past. The following section describes the marketing changes that have occurred and the survey results for the marketing of Idaho's wheats and barleys.

According to Turnbull and Sargent (1978), previous to 1972 most Idaho wheat was shipped to one of four markets — Portland, Seattle, Ogden or Los Angeles (Los Angeles, Portland and Seattle were considered export markets, while Ogden was mainly for milling). With the advent of increased export markets during 1972-75, the closer Seattle and Portland markets became the more prominent shipping destinations. During this period, rail was the main form of shipment from Idaho storage facilities.

In 1975, with the completion of the system of dams and locks on the Columbia and Snake rivers, the entire transportation system underwent substantial changes. Barges were able to travel upriver to Lewiston, Idaho, providing a cheaper method of transport than previously available (Abbott and Jones 1979). The large market share shipped by rail shifted toward a truck-barge system, and the wheat previously going to Seattle started to be shipped to Portland because of the cheaper river system.

In 1980, the marketing system again changed with the implementation of the Staggers Act concerning the deregulation of the trucking and rail industries (Johnson 1981). After the enactment of the Staggers Act, several factors came into prominence: railroads started 25-unit car rates from Idaho to Portland (subject to restrictions such as a maximum of 24 hours loading period at one location). Later 3- and 5-car unit rates were added, waterway user fees were increased, costs increased for barge transportation and energy costs increased (causing more expensive trucking rates and longer trains) (Casavant, Dooley and Meyer 1983).

With the start of 25-car unit train rates, the railroad was able to capture a larger portion of the transportation market. The railroads offered substantial rate reduction (up to a 40 cents per bushel difference between single car and 25-car unit rates) on the 25-car unit trains, enabling the grain storage companies capable of loading 25-car trains to offer higher prices to producers. The effect was two fold: producers started taking larger

amounts of wheat directly to these loading facilities (instead of local elevators) in larger trucks to obtain a higher price and therefore higher revenue (Calkins and Meyer 1985); and according to this study's survey, the truck-barge transportation market share for wheat to Portland decreased.

The survey results accounted for 40 million bushels (44 percent of the 1981 production) of Idaho red and white wheat. The white wheat made up 68 percent of the sample, while red wheat comprised the other 32 percent. For this analysis, the two wheats were divided into shipments from northern and southern Idaho in order to obtain more accurate figures for costs, mode and destination of transportation.

More than 99 percent of the white wheat accounted for was transported to Portland, while less than 1 percent went to Ogden and Los Angeles. Twenty-one percent of the white wheat transported to Portland was shipped from northern Idaho using truck-barge (57 percent) and rail (43 percent). The remaining 79 percent transported to Portland was from southern Idaho by means of truck-barge (23 percent), single car rate trains (4 percent) and 25-car unit rate trains (72 percent).

The survey results indicated that 85 percent of the red wheat accounted for was transported to Portland. Of that 85 percent, more than 99 percent was transported from southern Idaho (9 percent by truck/truck-barge, 4 percent by single car rate trains and 87 percent by unit train rates), and the remaining .4 percent was transported from northern Idaho. All of the 11 percent of the red wheat transported to Los Angeles was from southern Idaho (17 percent by truck and 83 percent by rail). Ogden was the destination for the remaining 4 percent, with 76 percent delivered from northern Idaho (12 percent by truck, 88 percent by rail), and 24 percent delivered from southern Idaho (80 percent by truck, 20 percent by rail).

The average cost for shipment to Portland from southern Idaho was determined from the survey as follows: truck/truck-barge — \$1.48 per cwt (\$.89 per bu); single car rate — \$2.03 per cwt (\$1.22 per bu); and 25-car unit train rates of \$1.86 per cwt (\$1.12 per bu).¹ The truck/truck-barge rates from southern Idaho to Portland were comparatively cheaper since some of the truck shipments were backhauls. Although the truck rates were cheaper, the supply of trucks was mainly limited to those trucking firms seeking backhauls to the Portland or Seattle region.

The average transportation cost from northern Idaho to Portland was \$.58 per cwt (\$.35 per bu) for truck-barge and \$.52 per cwt (\$.31 per bu) for rail. The average transportation costs to other destinations were not calculated because they were either not indicated in the survey, or only one observation was available.

¹Twenty five car unit train rates were obtained from a personal interview with a Union Pacific representative in Boise, Idaho, on May 27, 1982.

The marketing of the two barleys has been quite different from the marketing of wheat. Both have a considerable domestic market, a small export market and, perhaps most importantly, each has different markets of its own. These two distinct markets occur because feed barley cannot be substituted for malting barley (although malting barley can be substituted for feed barley).

Feed barley has a considerable market in the Northwest because of the sizeable livestock industries. Livestock production accounted for more than 44 percent (\$165 million) of total receipts for Idaho farm marketings in 1981 (USDA 1982 and 1985) and therefore provided a ready market for feed grains, including feed barley.

The results of the survey showed that 29 percent of the feed barley produced in Idaho during 1981 was accounted for. During the course of the survey, many grain merchandisers suggested that a large amount of feed barley actually bypassed them and was marketed directly to users. A 1982 mail survey by Calkins and Meyer (1985) addressed the subject of Idaho grain producers' direct and nondirect marketings. Of the feed barley accounted for, the Calkins-Meyer survey results showed that 43.4 percent of southern Idaho feed barley (1,857,228 bu) and 19 percent of northern Idaho feed barley (463,165 bu) was marketed directly to users or subterminals. This would indicate a significant amount of feed barley was not accounted for, since users such as feed manufacturers and feedlots comprised less than 27 percent of the sample population.

This study also showed that of the 8.7 million bushels of feed barley accounted for: 86 percent remained in Idaho, .5 percent was transported to eastern Washington, 2 percent was marketed to northern California, .3 percent went to Ogden and the remaining 11 percent was marketed to Portland, presumably for export.

The majority of the feed barley that stayed in Idaho was transported by trucks (97 percent), with the rest transported intrastate by rail. Eighty percent of the feed barley transported to eastern Washington was sent by train, while the remaining 20 percent went by truck. Of the barley to northern California, 50 percent went by rail and 50 percent by truck, while the amount to Ogden was 40 percent by truck and 60 percent by rail. Seventy-six percent of the barley transported to Portland went by truck, while 24 percent went by rail.

Almost all Idaho grown malting barley is marketed out of state to distillers, breweries and exporters, since none of these processors were operating in Idaho at the time of the survey. Malting barley must be shipped great distances to reach these markets; therefore, transportation is a major marketing concern. Storage also plays an important role in the marketing of malting barley for three reasons:

1. The malting barley must be separated from feed barley.

2. It provides an orderly and desired flow of malting barley.
3. Finally, storage ensures a required 4 month period of kernel dormancy (Heid and Leath 1978).

The survey accounted for 61 percent (17.8 million bu) of the 1981 Idaho malting barley production. Of the 61 percent detected: 46 percent was shipped to Milwaukee, Wisconsin; 24 percent went to Golden, Colorado; and 30 percent was transported to the Portland-Vancouver area (of the 30 percent marketed to the Portland-Vancouver area, a percentage would undoubtedly be exported. Unfortunately, this was not distinguishable in the survey results). Rail shipment was the prevalent mode of transportation with 100 percent of the shipments going to Milwaukee by rail, 83 percent to Golden and 97 percent to Portland-Vancouver by rail.

Although the malting barley was mostly transported by rail, none of the barley was shipped by 25-unit train rates. Malting barley is almost entirely shipped by rail to its various destinations by single car rates. Most of the malting barley going east (Golden and Milwaukee) is transported in 25- and 50-car trains, but no unit train rates were given for east-bound trains. The barley to Portland is by single car or 3-car rates, since few subterminals allow large amounts of the lower valued barley (compared to wheat) to accumulate (Abbott and Jones 1979).

Exports

Exports have been a recent topic of great concern to both Idaho and the United States. On the national level, exports have been a growing concern in light of the largest trade deficit on record and an extremely strong U.S. dollar — which has been blamed for the trade deficit. In Idaho, exports provide the largest market for the state's soft white and red wheats, and additional markets for the barleys. Although the feed barleys and red wheat are important to Idaho's agricultural economy, the principal export is soft white wheat. The following section describes the export of Pacific Northwest soft white wheat and some of the factors which might determine export demand.

Soft white wheat possesses a soft texture and low protein content, which make it undesirable for the production of bread flour. These characteristics (soft texture and low protein) are desirable in other baked goods which give soft white wheat a separate export market from hard wheats. The U.S. and soft white wheat importers use the soft wheat in the production of steamed and baked buns, noodles, crackers, biscuits, wafers, pastries, cakes, pretzels, ice cream cones and cereals [Yamazaki and Greenwood (eds.) 1981].

Exports have been the single most important market for Idaho and PNW soft white wheat. According to figures from Grain Market News (USDA 1974-1985), the export market was fluctuating but increasing until

1979 when exports rose substantially. They peaked in 1980 and have since decreased (Fig. 1). Previous to 1980, eight countries (Bangladesh, Indonesia, India, Japan, Korea, Pakistan, Philippines and Iran) and one group of Asian countries (Bangkok, Hong Kong, Malaysia, Okinawa, Singapore and Thailand) imported more than 93 percent of PNW soft white wheat exports. Since 1980, these countries have purchased 60 to 80 percent of the export, while other importers such as Taiwan and Egypt have accounted for another 10 to 30 percent.

In terms of U.S. exports, the high trade deficit and the high value of the dollar have been receiving a large amount of media attention lately. The high value of the dollar compared to other currencies (the exchange rate) has been associated with low demand for U.S. exports, and therefore the trade balance, as was the low value of the dollar compared with high export demand in the late 1970s. Several have been quick to conclude that this indicates a strong relationship between export demand and exchange rates. Recent econometric studies have concluded that while this relationship is an important consideration, other factors are also important determinants of export demand (Batten and Belongia 1984). Henneberry and Henneberry (1985) point out that factors of inflation, general economic growth and income must also be considered in the U.S. and importing countries.

PNW soft white wheat exports appear to support these recent studies. Fig. 1 shows the weighted relative exchange rate using a geometric average (Board of Governors of the Federal Reserve System 1978) of the largest nine importers of PNW soft white wheat for the years 1974 to 1983 and the total export volume in each year. As the graph indicates, there is not an exceptionally

strong relationship between exchange rates and export demand. A simple correlation between the two indicates a positive relationship. However, when the export volume is lagged one year, the correlation between the two increases from .4861 to -.5834 and becomes negative, which is consistent with the hypotheses. This suggests that the effects of changes in the exchange rate are not realized instantaneously in terms of exports but require a time period in which to affect export volume.

Because of the relative importance of soft white wheat to the Idaho agricultural economy, and the limits of this study in terms of time and money, further study is needed in the area of Idaho soft white wheat export. Further research could indicate the relative factors affecting Idaho wheat exports and could also estimate the elasticities of demand for projected exports.

Economic Importance to Idaho

Wheat and barley have been two of the most important crops to the Idaho agricultural economy. In 1981, the gross value of the two crops was estimated to be more than \$496 million, while the two comprised 19 percent (\$402,580,000) of the total cash receipts from farm marketing. These receipts are known as direct expenditures for the wheat and barley.

Wheat and barley also generate revenue beyond the initial marketing revenue. Producers generally purchase goods, supplies, labor and services with the marketing revenue, in addition to paying rents, taxes and utilities on the local and state levels. The producer's marketing revenue to these firms and agencies is subsequently employed to purchase labor, supplies, services, taxes, utilities and so on. The purchases by the producers and the secondary companies and persons are known as indirect effects. The effect of wheat and barley marketing revenue moving through an economy and generating further economic activity is known as a multiplier effect (the sum of direct and indirect effects).

Marousek (1979) estimated an income multiplier of 1.34 for a large farm's output in the Jerome-Wendell area of southern Idaho; while Sarquis (1982) estimated a much higher multiplier of 2.40 for field crops in Stanislaus County, CA. Based on these estimations (and the assumption of a comparable multiplier for Idaho field crops) wheat and barley contributed between \$539 and \$966 million of economic activity in Idaho's 1981 economy.

Summary

The transportation of Idaho's wheat has undergone dynamic changes in the last 10 to 15 years because of the completion of the locks and dams on the Columbia River and the establishment of 25-car unit train rates after 1980.²

²To better understand the current state of shipping Idaho's grains, a survey was conducted of Idaho warehouses and elevators in 1982.

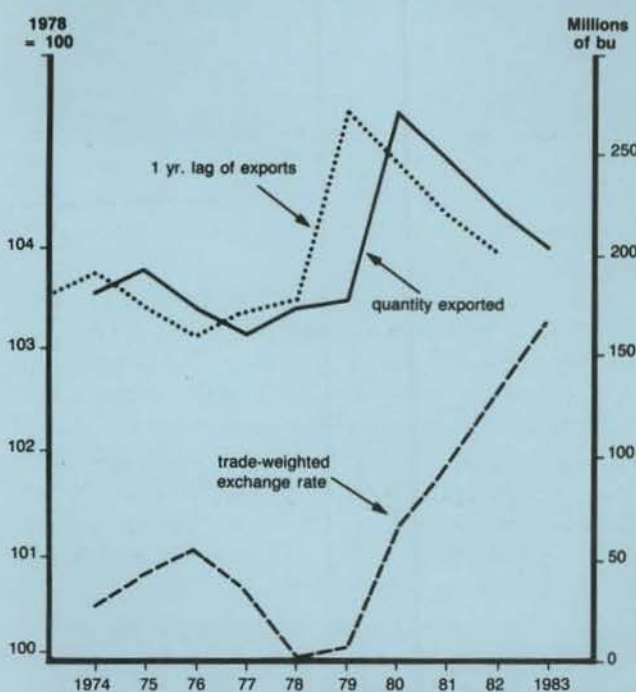


Fig. 1. PNW soft white wheat exports and nominal exchange rate.

The survey results indicated that 95 percent of Idaho's soft white wheat was transported to Portland (24 percent by truck-barge, 8 percent by single car rail rates and 68 percent by 25-car unit trains).

Idaho's malting barley was transported to out-of-state malters, breweries and exporters. Sixty-one percent of Idaho's 1981 malting barley production was transported to the following destinations: 46 percent (of the 61 percent) to Milwaukee, WI; 24 percent (of the 61 percent) to Golden, CO and 30 percent (of the 61 percent) to the Portland-Vancouver area (for breweries and export). Rail was the prevalent mode of transportation with 100 percent of the malting barley to Milwaukee going by rail, 83 percent by rail to Golden and 97 percent to the Portland-Vancouver area by rail.

Idaho feed barley has a considerable Northwest regional market because of the sizable local livestock industry. The survey results indicated only 29 percent of the 1981 production was accounted for in commercial channels. The results of a mail survey by Calkins and Meyer (1985) showed 43.4 percent of southern Idaho's and 19 percent of northern Idaho's feed barley was transported directly to users and subterminals. The study could not account for these amounts. According to the survey results, 86 percent of Idaho's feed barley remained in Idaho (97 percent transported by truck), while 11 percent was transported to Portland — presumably for export (76 percent by truck).

Exports provide the major market for Idaho's soft white wheat and provide additional markets for the barleys and red wheat. PNW soft white wheat exports fluctuated moderately during the 1970s, rose in 1979 until exports peaked in 1980 and have since decreased. It has been suggested that several foreign and domestic factors influence export demand including: inflation, economic growth, income and exchange rates. Further research is needed to determine the factors influencing PNW soft white wheat exports.

Wheat and barley marketing revenues contributed more than \$496 million (19 percent) to Idaho's total farm marketing receipts in 1982. These receipts were employed in direct and indirect expenditures that contributed to Idaho's economy. Assuming a range of multipliers (1.34 to 2.40), wheat and barley contributed between \$539 and \$966 million annually to Idaho's economy in 1982.

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