



An analysis of the market structure for Montana barley and potential outlets
by Duane L Fedje

A THESIS Submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree
of Master of Science in Agricultural Economics
Montana State University
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Abstract:

The purpose of this study is to describe and analyze the present and potential market structure for Montana barley production. This study should offer some leads to other researchers, policy makers, and individual operators.

Part I introduces the problem and objective of the research. It also indicates the area and limitations of the study and the hypothesis formulated from the objectives.

Part II outlines the existing market structure for barley for the crop year 1955 by areas. The producer outlets used in this study were: (1) the barley taken over by the government through CCC loans, (2) the barley sold to grain elevators and feed dealers, (3) the barley fed on the farm where it was produced or sold directly to truckers or feeders and (4) the quantity of barley used for seed for the 1955 barley crop. The implications of the present market outlets to producers were analyzed and a description was made of the movements of "cash barley" based on empirical investigation.

Part III contains an analysis of the potential market outlets for barley. Assumptions were made with respect to the quantity of barley which could be utilized through the expansion of livestock feedings.

The potential production of malting barley was analyzed, based on research by the Montana Agricultural Experiment Station. Other outlets for feed barley were discussed briefly. The future production of barley in Montana was estimated at two levels and budgets were set up to describe the expansions necessary to balance supply and demand.

Part IV is a summary of the research and the conclusions indicate the extent to which the hypothesis was supported. Further research as a result of this study is pointed out in Part IV.

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DUANE L. FEDJE

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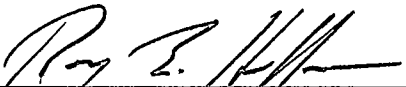
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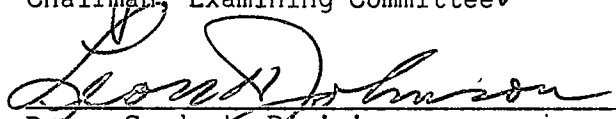
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Head, Major Department



Chairman, Examining Committee



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Any errors or omissions in this study are the responsibility of the author.

ABSTRACT

The purpose of this study is to describe and analyze the present and potential market structure for Montana barley production. This study should offer some leads to other researchers, policy makers, and individual operators.

Part I introduces the problem and objective of the research. It also indicates the area and limitations of the study and the hypothesis formulated from the objectives.

Part II outlines the existing market structure for barley for the crop year 1955 by areas. The producer outlets used in this study were: (1) the barley taken over by the government through CCC loans, (2) the barley sold to grain elevators and feed dealers, (3) the barley fed on the farm where it was produced or sold directly to truckers or feeders, and (4) the quantity of barley used for seed for the 1955 barley crop. The implications of the present market outlets to producers were analyzed and a description was made of the movements of "cash barley" based on empirical investigation.

Part III contains an analysis of the potential market outlets for barley. Assumptions were made with respect to the quantity of barley which could be utilized through the expansion of livestock feedings. The potential production of malting barley was analyzed, based on research by the Montana Agricultural Experiment Station. Other outlets for feed barley were discussed briefly. The future production of barley in Montana was estimated at two levels and budgets were set up to describe the expansions necessary to balance supply and demand.

Part IV is a summary of the research and the conclusions indicate the extent to which the hypothesis was supported. Further research as a result of this study is pointed out in Part IV.

PART I

INTRODUCTION

The Problem

Problem Situation

Barley marketing had never posed a serious problem, in Montana, up to the time of government control of wheat production. The markets developed and expanded to meet the needs of the producers prior to government control. In 1954 acreage allotments were introduced in the control of wheat production and over a million acres of Montana cropland was necessarily diverted into other uses.

Farmers are faced with the problem of selecting the alternative crop for diverted acres which will assure a maximum stabilized income. A study was made with reference to these alternatives in Montana in 1948. Sixty wheat farmers and fifty-four wheat-livestock farmers were interviewed. Nearly all of the wheat farmers suggested barley as the cash crop that would be the best alternative crop for wheatland. Some of the wheat-livestock farmers listed barley for sale as the best. Eighty-six percent suggested more feed, grass, and hay for livestock.^{1/} Another study in Oregon also confirms the assumption that barley is the best alternative diverted acres. The other alternatives listed in the study were summerfallow, idle land, and establishing a livestock enterprise or expanding a livestock enterprise with facilities available to the farmer.^{2/} Four reasons were listed for choosing barley as the best

^{1/} O. L. Mimms, "Diverted Acres in the West," Proceedings of the Western Farm Economics Association, Twenty-third Annual Meeting, June 1950. p. 32.

^{2/} W. B. Back and J. Nairn, Alternatives for Using a Half Million Diverted Acres in Columbia Basin Counties of Oregon, Agricultural Experiment Station, Oregon State College, Circular 552, October 1955.

alternative. They were: (1) price relationships, (2) tillage practices are similar to those for wheat, (3) barley is less risky than other alternatives and (4) barley is better adapted to the climate and produces relatively higher yields than other grains.

Wheat farmers in Montana are confronted with a large percentage of total investment in machinery and equipment which gives them a high fixed cost. To enable farmers to utilize this equipment at the least cost per acre it would be most profitable to produce a cash crop. This cash crop logically is barley.

All barley produced in Montana is classified as feed barley. The history or trend of barley production is shown graphically in Figure 1. Total acreages were used rather than bushels because this would be a more definite indication of the intent of producers and would not vary as greatly as total bushels during years of high precipitation or drought. Planted and harvested acres were plotted to indicate the acres which were abandoned or used for hay. The high percentage of abandoned acres during the 1930's is due primarily to the drought. The history of barley production may be broken down into three periods as follows:

1. 1922-1941. During this period there was a gradual increase up to 1926, then a sharp increase until 1929-1930 when production hit its peak during this period. In 1931 and 1932 there was a drop in planted acres, followed by a leveling off in production up to the latter part of the period when there was a slight increase. The peak production during the period from 1927-1930 was due to above normal rainfall and a favorable price

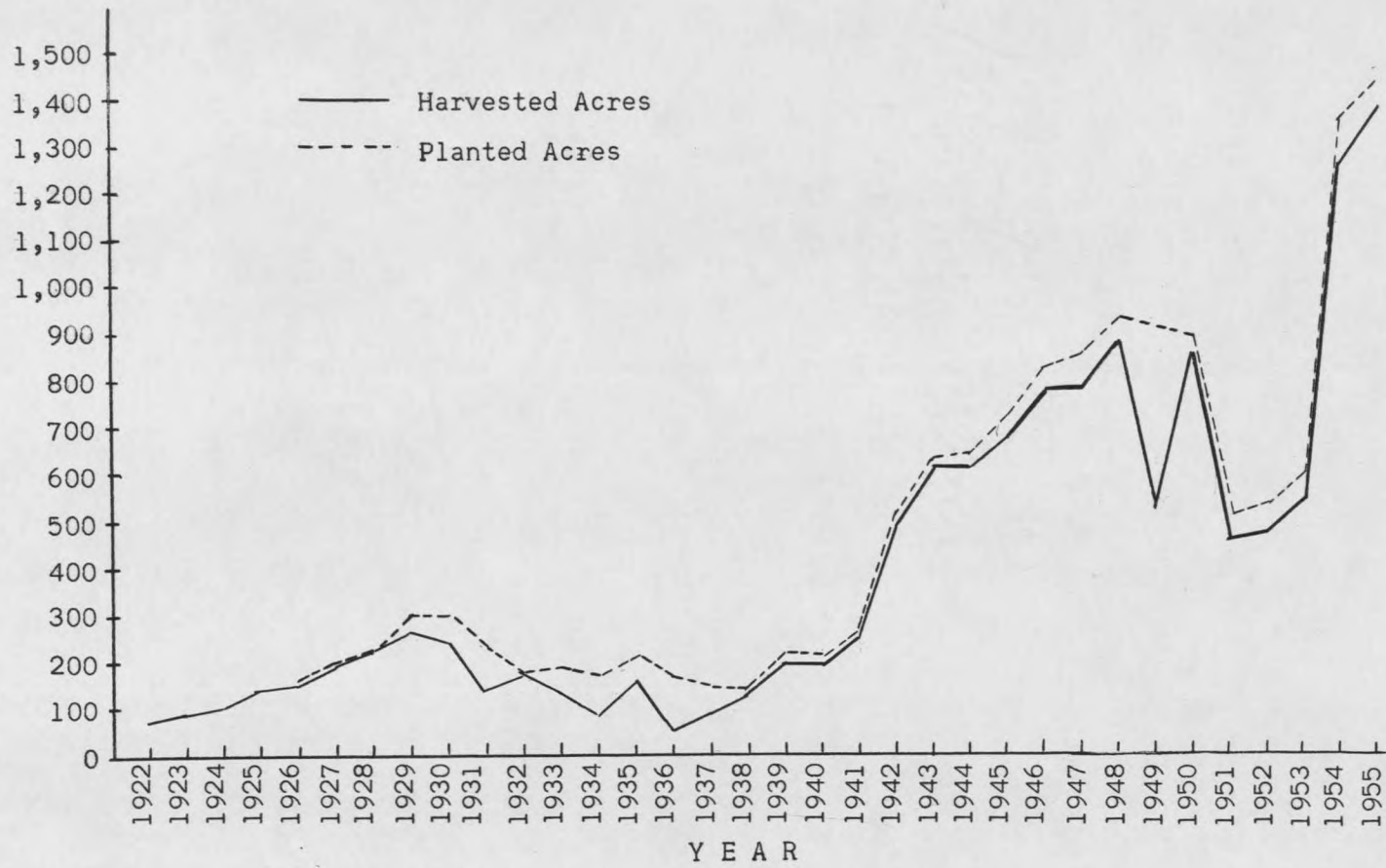


Figure 1. History of Barley Production in Montana

ratio for barley to wheat. The drop in harvested acres in the 1930's may be attributed to the drought and depression.

2. 1942-1953. In 1942 the barley acreage more than doubled the 1941 acreage and continued to increase until 1948 when it hit its peak for this period. The increase in production of barley in the early 1940's may be credited largely to two factors:^{3/}
 - (a) the development of the new variety of barley, Compana,
 - (b) the "moral suasion" of the War Food Administration for increased production of barley as a feed grain. Another factor which has some effect on production of barley was that this period of increased demand was also accompanied by years of relatively high precipitation, and many farmers would recrop land by planting barley on land which would otherwise have been summerfallowed following a wheat crop.
3. 1954-1955. In 1954 there was an increase over 1953 of 233 percent in barley production and a continuing increase in 1955 but not as great. This was the increase which gives rise to the present situation and is due largely to the acreage restrictions on wheat production.

Montana is presently confronted with the problem of inadequate market outlets for barley, because of this rapid shift to the production of feed barley as a cash crop in 1954. Because the production of barley expanded slowly except in response to an increased demand, such as the

^{3/} S. C. Litzenberger, Compana and Glacier Barley, Agricultural Experiment Station, Montana State College, Bulletin 422, April 1944, p. 3.

moral suasion during the war, the market for barley expanded to meet the needs of producers. Demand called forth production, thus outlets were established before the physical production. In 1954, demand did not induce production, but rather the diverted acres which would otherwise lay idle if not put to use in the production of a cash crop.

Data were obtained from the State Agricultural Stabilization and Conservation office, which further substantiates the assumption that market outlets prior to 1954, were adequate to handle the supply (Figure 2). The data only cover the period of years from 1948-1955. They are incomplete because they are only for those loans granted by the Commodity Credit Corporation for barley and do not indicate the amount of barley which was redeemed by the producers. The figures are only approximate, but show the trend of the market.

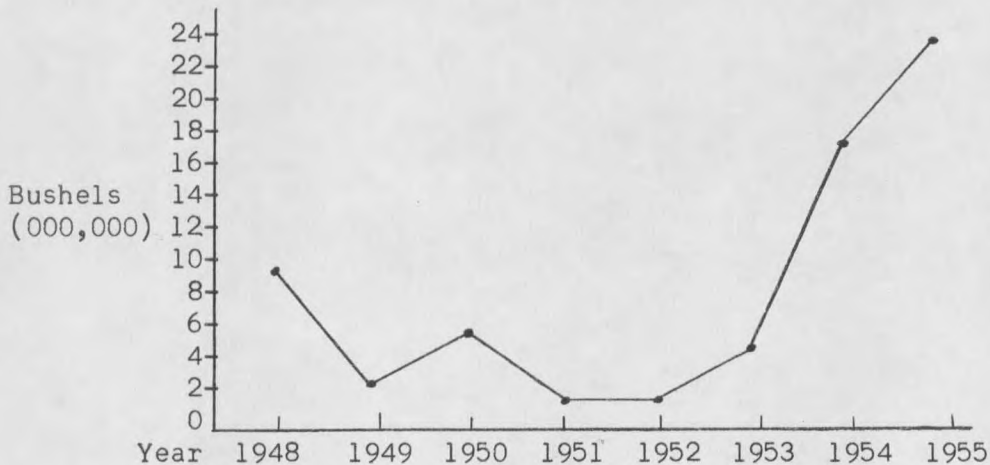


Figure 2. Total CCC Loans for Barley in Montana

It is estimated that the greater portion of the loans made by CCC to producers prior to 1954 were redeemed by producer and the barley moved

through normal channels. At the present time data are not available on the quantity of barley that has been redeemed by producers, but it is expected to be a substantially smaller share of the total placed under loan, than was the case before 1954.

Research Problem

This study is concerned with the economic implications involved in the present and potential market and market structure for Montana barley. Factors which affect the operation of the present market will be described and analyzed. Assumptions will be made in regard to the potential market for barley.

Objectives of the Study

1. To describe and analyze the functions of existing marketing mechanisms and economic implications involved. Analysis of producer and elevator outlets will be based on both primary and secondary data.
2. To estimate and analyze the potential market for Montana barley and economic implications involved.
 - a. Potential market for barley through increased feeding of livestock.
 - b. Potential market for malting barley production in Montana.
 - c. Other market outlets.

Hypothesis

The present market for Montana barley is undeveloped. The existing market outlets can be expanded to handle this increase in production

through: (1) increased livestock feeding, (2) increased production of malting barley and (3) new and expanded market outlets.

Area and Limitations of the Study

The Area

The area under consideration will be the entire State of Montana. It has been divided into two areas on the basis of the type of agriculture (Figure 3). Area I will include the Yellowstone Valley and the territory to the south of it. It will continue west to include Gallatin County and the boundary line will continue northwest to include the counties Lewis and Clark and Flathead and all the area to their south and west. The area is characterized by livestock feeding, ranching and irrigated crops. Area II will include the central, north central, and north-eastern districts of the State. It is predominantly a cash grain area with a smaller portion of livestock grazing. It is a dryland farming area with some irrigation in the western part and along the Missouri and Milk Rivers.

The Limitations

This study will be concerned with the movements of barley and market structure for barley in Montana. It becomes necessary to point out the following limitations when working with a broad study of this nature: (1) the time available for the research, (2) the numerous assumptions in regard to the factors of the market and inaccuracies of personal estimates in addition to the errors of random sampling, (3) the analysis will be made on the basis of an average of expectations and not in terms

MONTANA

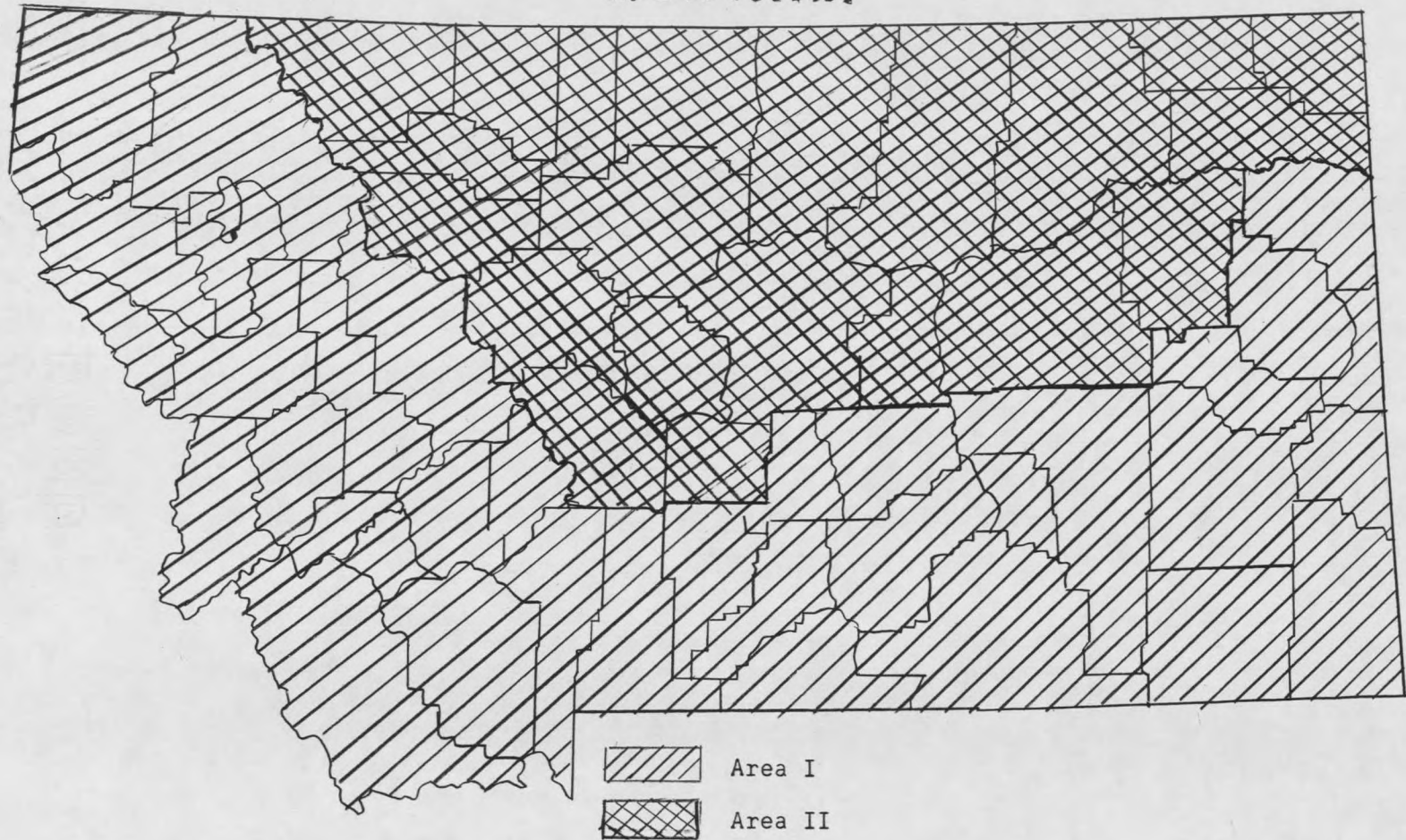


Figure 3. Location of Area I and Area II

of certainty and (4) the lack of literature presently available dealing with marketing Montana barley.

Procedure^{4/}

The Sample

A list of all elevators and feed dealers was obtained from the State Department of Agriculture. A county or counties were selected randomly as sample units and the actual sample was also selected randomly from the sample units. Twenty-eight elevators were selected from Area I and 52 elevators were selected from Area II. The questionnaire used was designed to gather data for all feed grains, mixed feeds and hay, but only the barley is treated in this study. The data were obtained by personal interview with the elevator operator or feed dealer. The data were analyzed in tabular form from the sample and related back to the universe. The data obtained concerned the marketing of the 1955 crop.

Secondary data obtained from Commodity Credit Corporation, and the State Agricultural Statistician, were used in the analysis of the disappearance of the 1955 production. The analysis of the present market structure for Montana barley will be based on inductive reasoning from the empirical investigation and secondary data.

Part III of the study will consider the potential market structure. The increased feeding aspect will rest upon assumptions derived from secondary data. It will be the goal of this section to give the farmer

^{4/} The study of Montana barley marketing is part of a regional research project on the economics of marketing hay and feed in the West.

and feeder a picture of the feasibility of finishing livestock. Barley will be compared to corn on a feed value basis. Assumptions will be made in regard to the factors involved, such as cost of transportation and prices.

The second section of Part III deals with the potential market for malting barley in the State. It will also be based on secondary data and will include the history, area of production, estimates of expected price and needed price.

Other new and expanded outlets will be presented briefly from secondary data. A theoretical market structure will be developed for Montana from the above analysis which will properly handle expected production of barley in Montana.

PART II

THE PRESENT MARKET STRUCTURE

Producer Outlets

Marketing Structure

Barley producers in Montana disposed of their 1955 production through four major outlets: (1) CCC (Commodity Credit Corporation), (2) grain elevators and feed dealers, (3) used as feed on the farm or interfarm sales and (4) seed for 1956 crop. These outlets represent the existing market for Montana barley producers.

The total production for Montana in 1955 was 40,620,000 bushels. The relative importance of different producer outlets for the 1955 crop is depicted in Figure 4. The CCC is the largest outlet for barley with producers placing well over one-half of their crop under loan. The volume of barley moving to grain elevators and feed dealers, commonly called "cash barley", and the quantity used at home for feed or interfarm sales was approximately the same. State averages hide wide differences in market practices found in various parts of the State. Figure 5 demonstrates differences found between an area primarily dryland (Area II) and an area with considerable irrigation farming (Area I).

Area I

Area I has a total production of 9,678,000 bushels. The major outlet for barley producers in this area as indicated in Figure 5 is the classification of "fed barley" (65%). "Fed barley" will be used in this study to represent the barley which is fed on the farm or ranch where it was produced, or the barley that is sold directly from the farm to feeders

or other farmers (interfarm sales). As was stated in Part I, a high percentage of the cattle finished in Montana are found in this area. Little accurate data can be found on "fed barley". The figure used represents a residual of the production within the area minus the outlets: "cash barley", "CCC" and "seed".

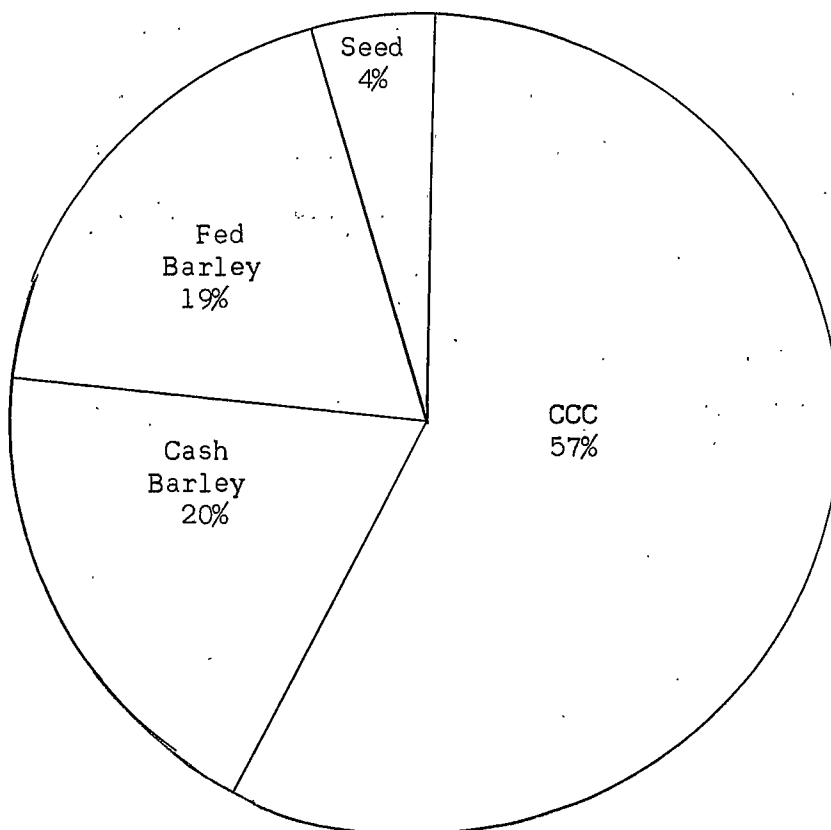


Figure 4. Producer Outlets for Barley in Montana, 1955.

The majority of "fed barley" is estimated to be fed on the farm where it was produced. Barley producers are aware of feeding livestock as a supplementary enterprise and the possibility of realizing greater profits by marketing their barley through finished livestock. Interfarm sales or direct sales by producers to feeders are also becoming more common.

A few reasons are: (1) interfarm sales may mean cheaper feed to the feeder, as the marketing agencies will not be involved as middlemen and (2) convenience to producers if buyers go directly to the farm and furnishes transportation for his purchases; feeders also find it convenient to purchase barley direct from producers.

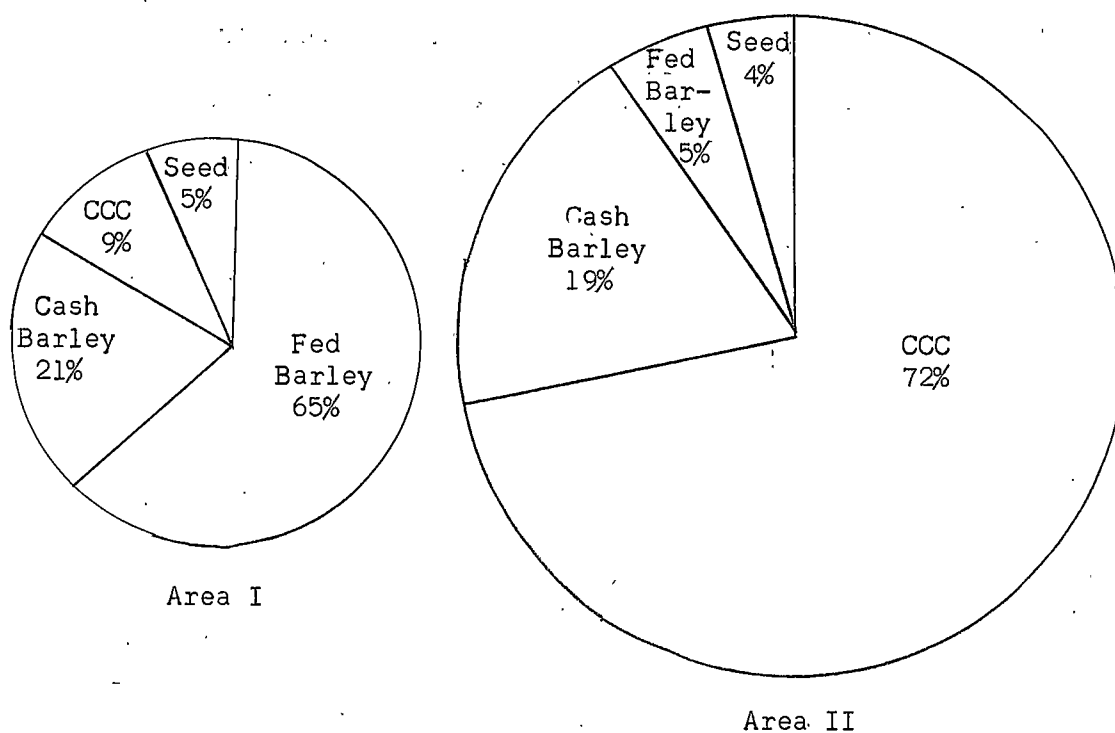


Figure 5. Producer Outlets by Areas in Montana, in 1955.

The producer outlet which ranked second in importance in this area was "cash barley". "Cash barley" throughout this study will refer to the barley actually purchased and sold by grain elevators and feed dealers.

Based on empirical investigation, 2 million bushels of barley moved through this channel in Area I in 1955.

Figure 5 indicates the quantity or proportion of barley taken over by the government through CCC non-recourse loans. In Area I only 9 percent, or approximately 850,000 bushels, were actually delivered to the government. This will give the reader an indication of the market for barley in that area. Area I obviously developed a market or found uses for at least 90 percent of the production within that area. The implications of government support prices will be discussed in more detail later in this study (see section under CCC). The proportion of barley indicated as "seed", Figure 5, for this area was calculated on the basis of the acreage seeded to barley in 1956.

Area II

The proportions of barley going to the four producer outlets in Area II differ substantially from those listed in Area I (see Figure 5). Total production in the area totaled 30,940,200 bushels. The major portion of barley, approximately 22 million bushels, was taken over by the government through CCC non-recourse loans.

"Cash barley" or barley sold to grain elevators again ranked second in Area II. Nineteen percent of the barley produced in this area was marketed through this category. Figures 6, 7 and 8 will illustrate that all barley was sold to the elevators from producers within a radius of 50 miles or less and all barley was produced in Montana. This substantiates an assumption that Area II is a surplus area with no deficit market

areas. Much of the "cash barley" in this area was the result of producers not being able to meet the requirement necessary to comply with the government support program or crop loan program.

Of the producer outlets in Area II, "fed barley" or barley used at home for feed ranked third. Approximately 1,460,000 bushels of barley was utilized in this manner. The quantity here is a residual figure and is quite representative of Area II as considerably less cattle were on feed in this area than in Area I. The proportion of barley used as seed was calculated on the basis of acreage seeded to barley in 1956.

Price Determination

Local Demand

Ninety-five percent of the elevator operators and feed dealers interviewed in Area I indicated they or their head offices established the price they paid for barley on the basis of a local demand situation. A local demand market area will be defined as an area in which the most important price determining factor is the relationship between the quantity of barley supplied by producers, truckers and elevators and the quantity of barley that truckers, feeders, ranchers and other elevators will demand from that market area. Elevator operators who purchase barley on a local demand basis usually have the grain bulletin card available but will seldom use this alone as a basis for price determination.^{5/}

^{5/} The grain bulletin card daily reports central market prices. Closing market prices are wired to several points in the production area where the card is printed and mailed to elevator operators who receive it within 24 hours of the market close.

Straight Card Price

Elevator operators in Area II indicate that 90 percent of the grain elevators and feed dealers determine the price of barley on the basis of a central market price minus transportation. The grain bulletin card is the main source of the Minneapolis and Duluth prices. This is in contrast to 5 percent of the operators in Area I determining price in this manner. Approximately 10 percent of the elevator operators in Area II use local demand as the most important price determining factor. This does not mean that an elevator operator who indicates he purchases barley on a straight marketing card price will always ship the barley he purchases to the central market, but only that the price he pays for and sells barley corresponds to that central market price minus the cost of transportation to the central market.

Implications of Price Determination

The price of barley is usually higher within a local demand area than the central market price minus transportation cost, and in deficit areas the local demand area will usually be higher than the government support price in that area. This becomes more realistic when consideration is made of local buyers within market areas. The local buyers will attempt to offer a price for barley that will at least equal the cost of barley from other sources. Many times local buyers will overbid a central market price minus transportation and/or the loan price to retain that barley which they demand in their specific market areas.

The majority of the grain elevators and feed dealers who purchase barley on a local demand basis are in a better position to purchase the barley on the basis of its future use, in comparison to Area II. The buyers in Area I have a knowledge of the existing outlets such as feed mixing, sale to feeders, and truckers, and can base the purchase price on a more certain selling price. In many cases the demand precedes the supply.

Pricing problems arise in Area II as a result of insufficient knowledge and experience by grain buyers and the variability of the demand for this high quality feed barley at the central markets. In some instances elevator operators will buy barley at premium prices because the barley has excellent color, high test weight, and high protein. If the buyer is dependent upon a central market and ships the barley to the central market (Minneapolis), and if the demand happens to be low at that time, the local grain buyer would not receive a premium price for the barley. Situations also occur in which the barley is purchased at feed barley prices and sold at premium prices in the central market. However, barley produced in Montana at the present time is considered to be a high quality feed barley and only in special situations does the demand rise enough to command a premium price.^{6/} Elevator operators who purchase barley

^{6/} Little is known of the volume of Compaña utilized for malting. A Montana brewery is set up for malting Compaña barley, but the production is based on a longer germination period.

in Area II will usually pay a straight feed barley price, to insure a margin of profit, because of this uncertainty of the demand for high quality barley at the central market.

The West Coast market for "cash barley" is also important. Some have said that a few grain elevators purchase barley on the basis of the Minneapolis market and sell the barley on the West Coast market (usually 5 to 6 cents higher) thus giving the marketing agency a profit of which the producers are not aware. Within the State of Montana, the location of the elevator is important because an elevator in the western or central-western part of the State will have a lower purchase price because of higher transportation costs to Minneapolis and a higher selling price because of lower transportation costs to the West Coast market.

Commodity Credit Corporation

Figures 4 and 5 illustrate the importance of CCC as a producer outlet for the 1955 barley production. Over 23 million bushels of barley were taken over by the government in the State of Montana, of which all except approximately 850,000 bushels originated in Area II. For this reason it becomes necessary to point out the essentials of this program and the implications involved.

The United States Department of Agriculture, through the CCC and the Agricultural Stabilization and Conservation program, enables farmers to participate in crop loan and price support programs. Under a price support program, price minimums or "floors" are established. Support is achieved through loans, or agreements to purchase. The price support

on barley is presently permissive at the discretion of the Secretary of Agriculture.

Crop loans are made on barley in approved storage by local credit institutions. County Agricultural Stabilization and Conservation Committees, as agents of CCC, inspect the stored barley and the facilities used and if acceptable, guarantee the loan to the lender. Loans are made without recourse to the borrower; the Corporation is willing to discount the note for the lender, or to accept the commodity as settlement of the farmer's obligation. For farmers who cannot meet the storage requirements for loans, or who do not desire to retain title to their commodity, the CCC offers price supports in the form of "agreements to purchase", at the stated prices which are at comparable levels to the loan value. Price supports and crop loans are available to all farmers producing barley in Montana, providing they have complied with the provisions of the program in effect at that time.^{7/}

One problem which becomes evident is that of storage facilities. Adequate storage facilities for barley is a major problem faced by all who handle barley. Storage of wheat takes precedence over barley in their competition for space. For the crop year 1955, 72 percent of the barley taken over by the government was through farm stored loans, 11 percent through warehouse stored loans, and 17 percent through purchase agreement for barley largely held in farm storage. This indicates that unless the producer has storage facilities or can locate adequate storage

^{7/} United States Department of Agriculture, Agricultural Programs of the United States, Washington, D. C., November, 1952, p. 52-54.

facilities for his barley production, he will not be in a position to participate in a crop loan or price support program.

Elevator Outlets

Movements of Cash Barley

Grain elevators and feed dealers in Montana handled an estimated 7,953,800 bushels of barley of the 1955 barley production. This does not include barley handled for CCC. This is only about 20 percent of that year's production. Elevators and dealers in Area I handled 2,006,600 bushels and in Area II, 5,947,200 bushels.

Figure 6 indicates the proportion of barley purchased by grain elevators and feed dealers from producers. In Area I, 81 percent of the barley was purchased directly from local producers, with 11 percent purchased from truckers and 8 percent from other elevators. This indicates that some market areas are deficit and barley must move in from surplus areas. Elevators and feed dealers in Area II purchased all barley direct from producers.

All "cash barley" purchased in Area I originated in Montana with the exception of approximately 13 percent which was purchased from producers in North Dakota (Figure 7). The movement of North Dakota barley into Area I may be accounted for by three major reasons: (1) the North Dakota producers are within the Sidney-Fairview market area, (2) the North Dakota producers in this region are largely feed barley producers and (3) the Sidney-Fairview area has a local demand price structure. All barley

purchased by grain elevators and feed dealers in Area II originated in Montana.

The distance barley moves to the initial market or purchasing elevator is also an indication of surplus or deficit areas. Within

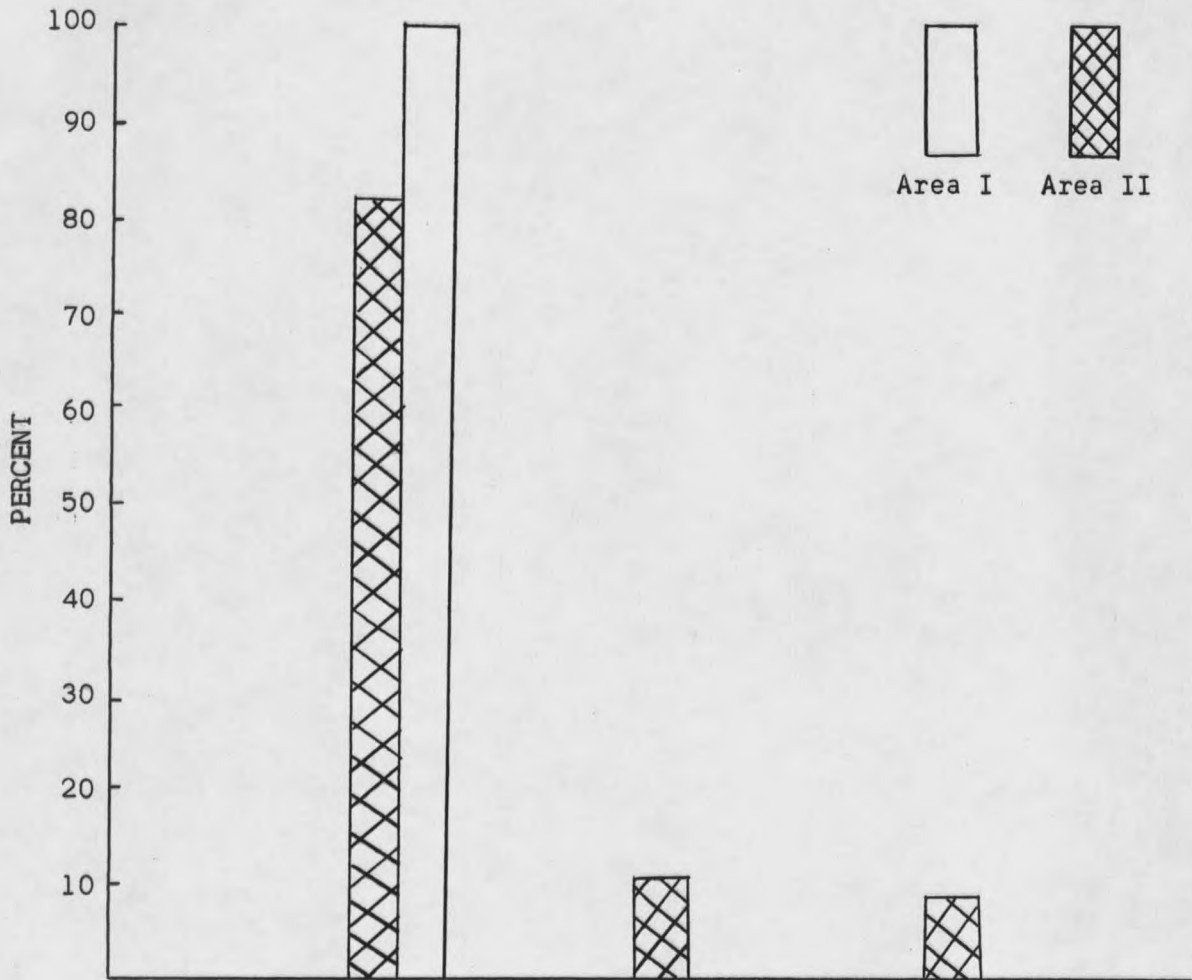


Figure 6. Type of Seller of Barley to Grain Elevators in Montana.

Area I, 80 percent of the "cash barley" was purchased by elevators and feed dealers within a radius of 50 miles or less. Of the remaining 20 percent, 5 percent moves 50 to 100 miles and 15 percent moves 100 to 250 miles (Figure 8). Any movement of under 50 miles for purposes of this study will be classified as a market area or a movement within a market

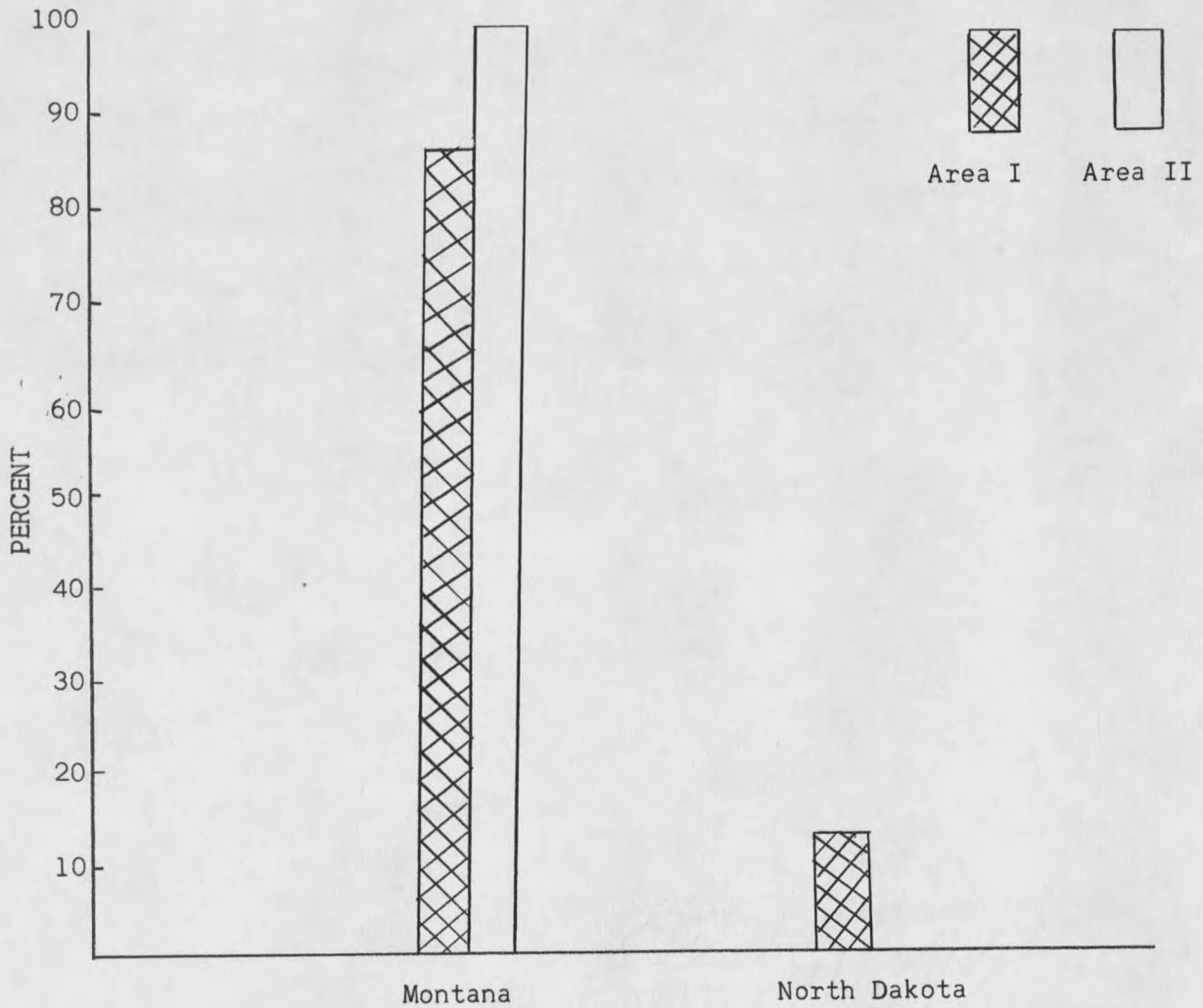


Figure 7. State of Origin of Barley Purchased by Montana Grain Elevators and Feed Dealers.

area. For this reason, about 20 percent of the "cash barley" purchased by elevators and feed dealers in Area I moved into deficit areas. Yellowstone County elevators and feed dealers purchased the majority of this 20 percent proportion with some movement into other feeding areas along the Yellowstone Valley and in the western part of the State. All "cash barley" in Area II moved less than 50 miles from producers to elevators.

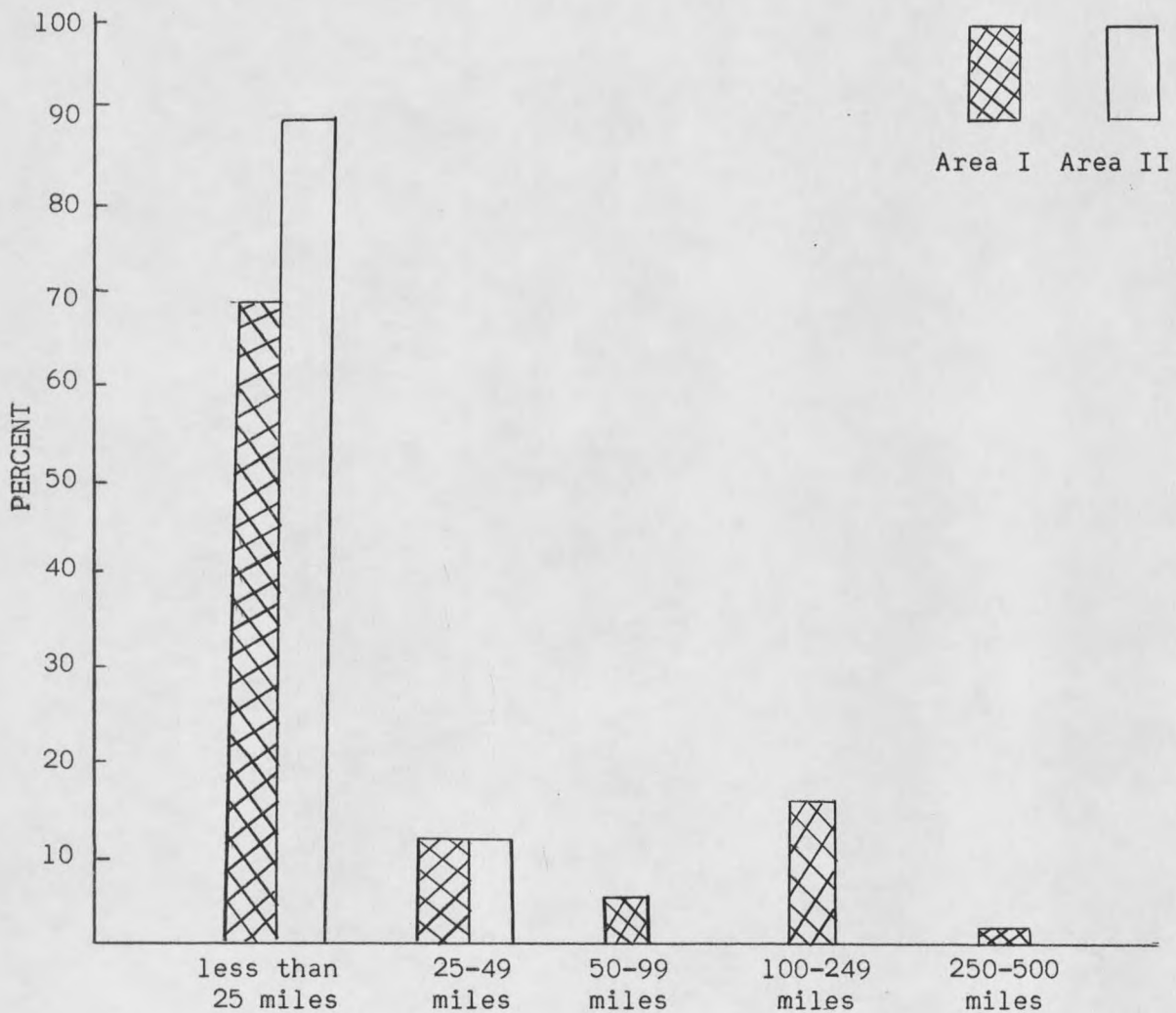


Figure 8. Distance "Cash Barley" Moves to Market.

The elevators in Area I, in which local demand was the major price determining factor, sold only 7 percent of the "cash barley" to terminal elevators (Figure 9). Elevator operators in Area II, where the central market prices were basic for local price determination, sold 76 percent of its barley to terminal elevators. Another great difference was sales to feeders. Area I elevators sold 58 percent of their "cash barley" in

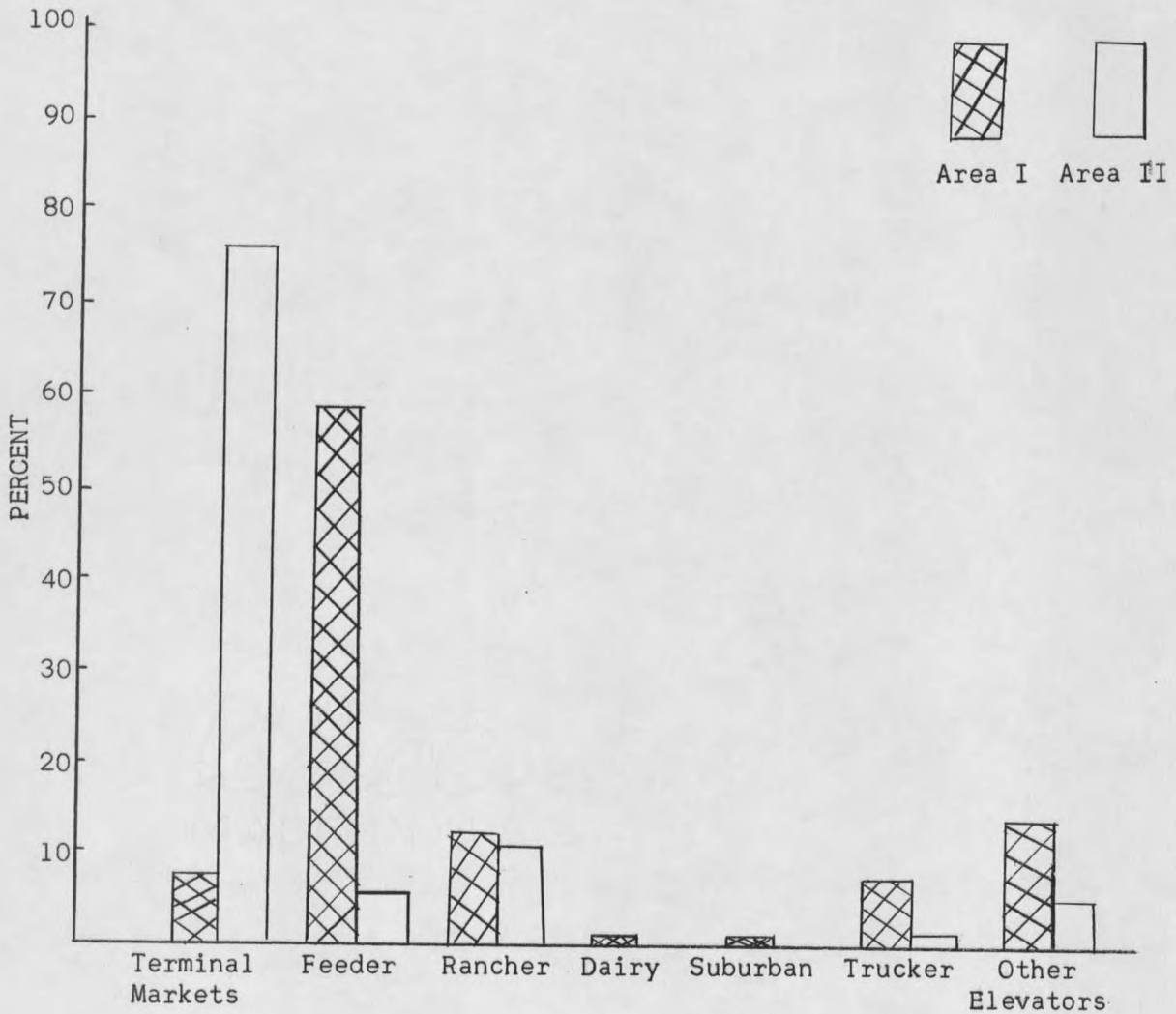


Figure 9. Type of Buyer of "Cash Barley" from Country Elevators.

that area to local feeders, and Area II elevators sold only 6 percent to local feeders. It is important to point out that elevators in Area I sell as much barley to truckers as they do to terminal elevators and twice that amount to other elevators. Elevators in Area II sell only 17 percent of the "cash barley" in that area to ranchers (11 percent) and feeders (6 percent), of which over one-half is to feeders and

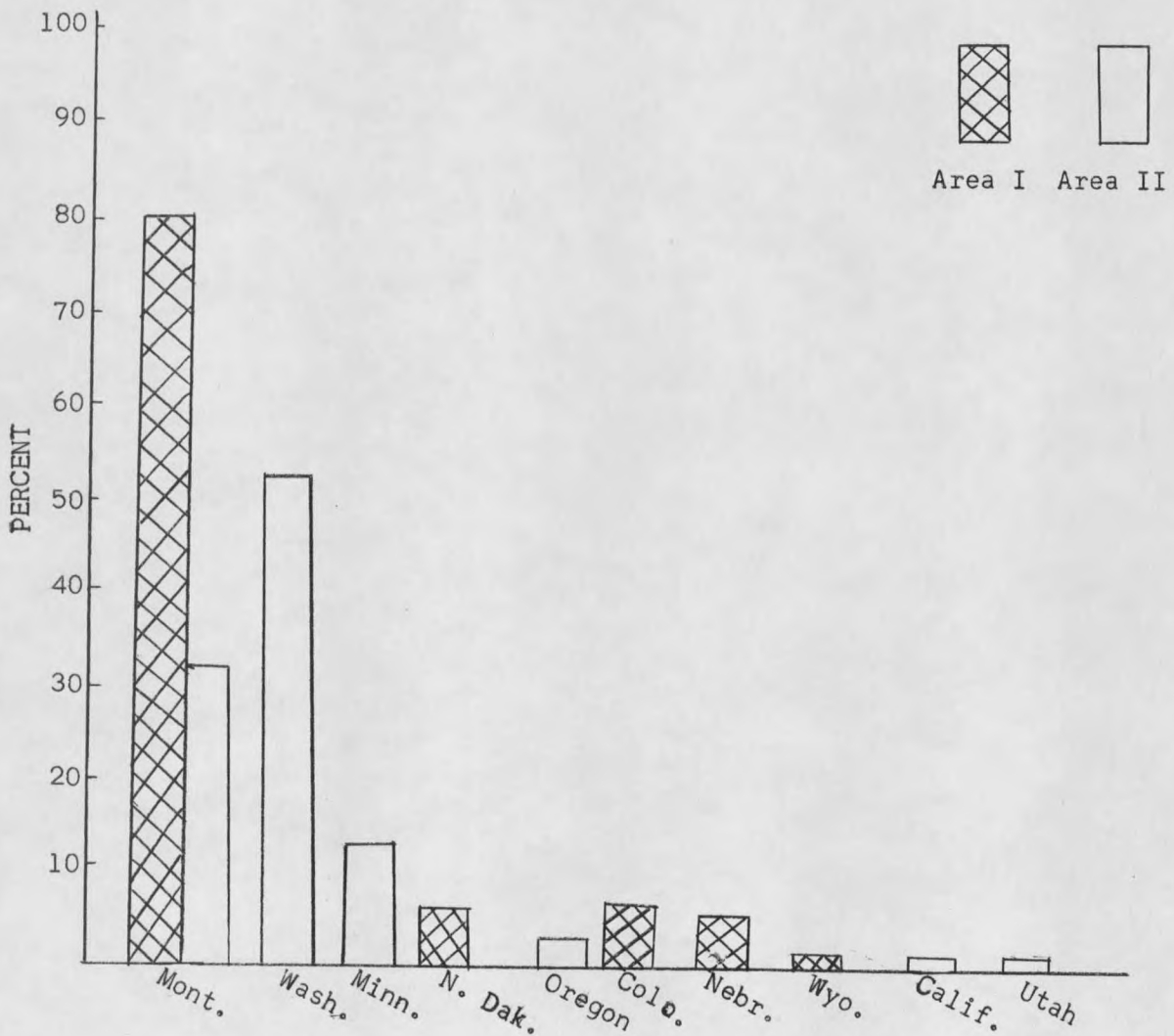


Figure 10. State of Destination of "Cash Barley".

rancher-feeder combinations in the western counties of Pondera, Teton and Cascade. The majority of the sales in Area I go to feeders in the Yellowstone Valley. The classification of suburban refers to owners of poultry, horses or other livestock in or near town and their purchases were of minor importance.

Area I retains 80 percent of the "cash barley" in Montana, and approximately 20 percent moves to feeders and markets in North Dakota, Colorado, Nebraska, Wyoming, Washington, and Minnesota (Figure 10). Area II again has a situation quite unlike Area I. Only 32 percent of this area's total "cash barley" is retained in Montana (of which 11 percent moved to in-state terminal elevators), 52 percent moved to the West and 13 percent to a central market in Minnesota (Minneapolis).

A factor which depicts the activities of the market is the distance barley moves from grain elevators to buyers. Sixty-two percent of the barley in Area I moved less than 25 miles and another 16 percent moved 25 to 50 miles. Twelve percent of the barley moved over 250 miles and only 3 percent of that 12 percent moved over 500 miles. Area II follows a rather logical pattern from Figure 10 to Figure 11, because Figure 10 indicates 68 percent of the "cash barley" moved into Washington, Minnesota and Oregon, and Figure 11 indicates 68 percent of the "cash barley" moved over 500 miles. Only 16 percent of the "cash barley" moved less than 50 miles, the majority moving to central markets east and west, 64 percent moved 500 to 1,000 miles, and 4 percent moved over 1,000 miles. This definitely indicates a lack of local or state markets for Area II and also an area high in surplus.

Shipments into elevators (Figure 12) are over 99 percent by truck corresponding to the source of barley. Shipments out of the elevators are more interesting (Figure 13). Elevators in Area I ship 18 percent of their "cash barley" out-of-state by truck, whereas elevators in Area II do not ship any "cash barley" out-of-state by truck. The quantity of barley which moved out of grain elevators by truck and was destined

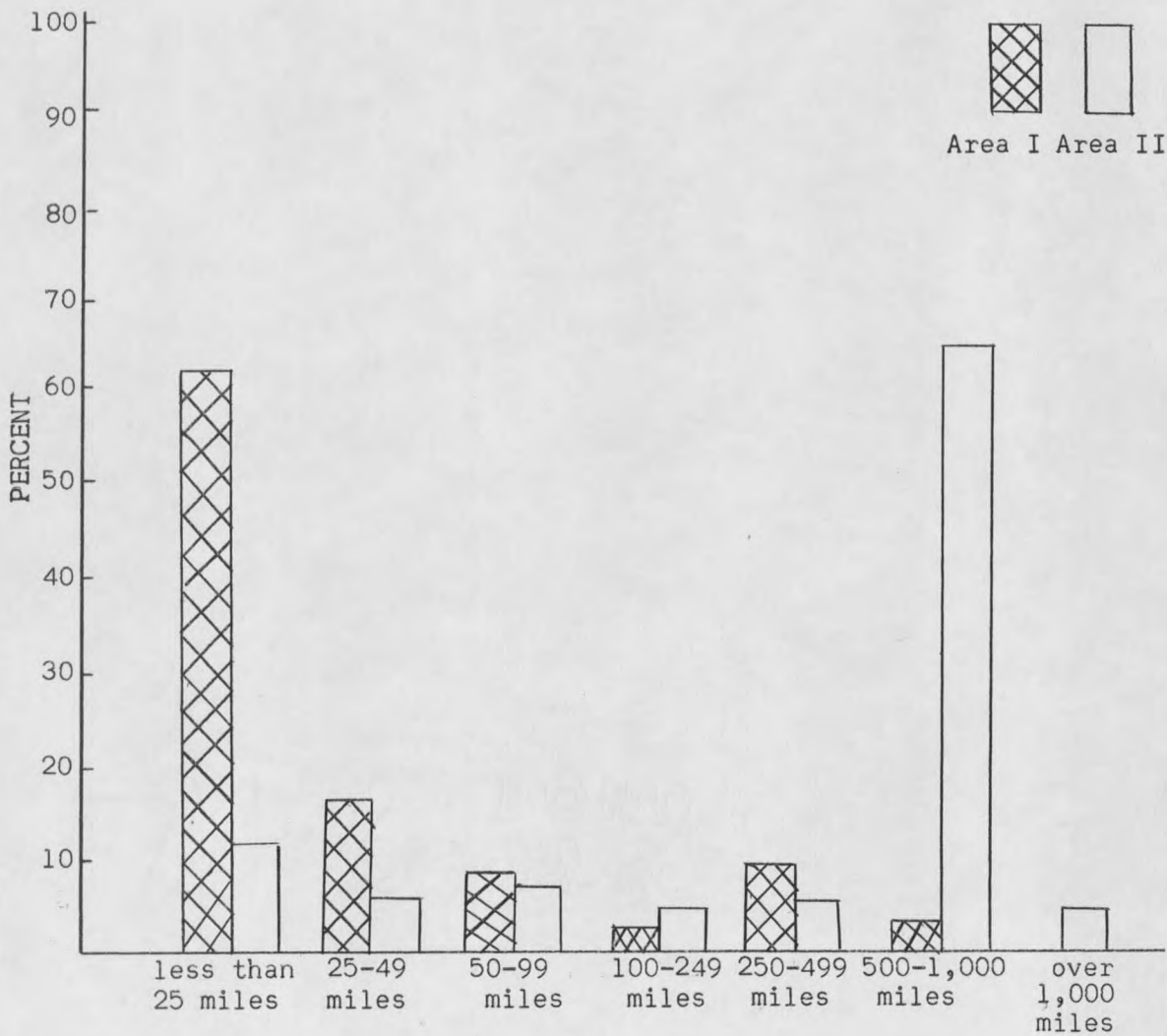


Figure 11. Distance "Cash Barley" Moves to Destination.

to stay in Montana was 69 percent in Area I and only 26 percent in Area II. Movements out-of-state of "cash barley" by rail amounted to only 1 percent in Area I and 68 percent in Area II. Shipments by rail within the State of Montana amounted to 12 percent in Area I and 6 percent in Area II. The shipments by rail within the State may have been to terminal or subterminal elevators for feed mixing or feed. Another important

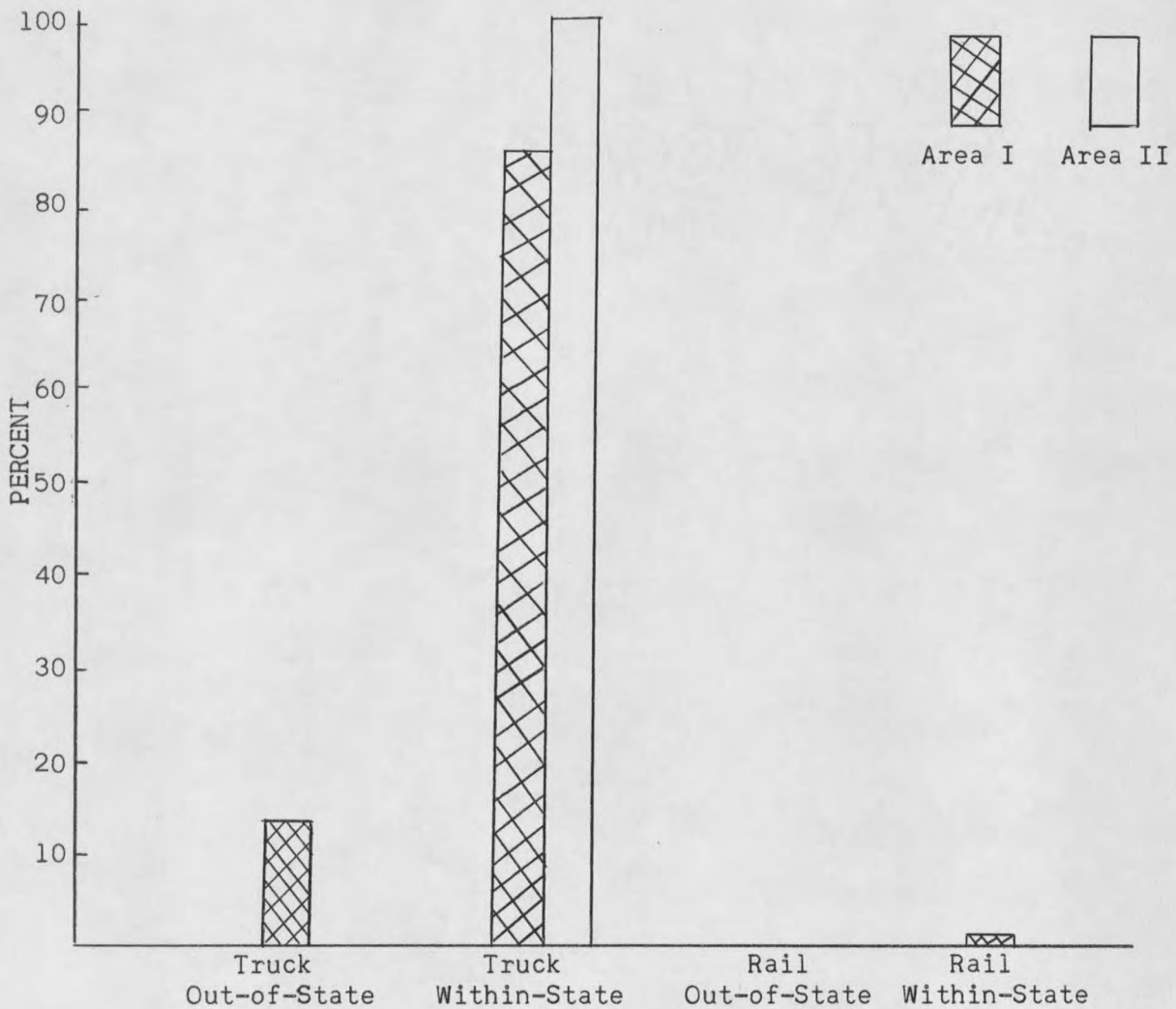


Figure 12. Shipments of "Cash Barley" into the Elevator.

implication to be pointed out here is that Area I was dependent upon rail transportation for 1 percent of the movement into the elevators and only 13 percent for movements out of the elevator. Area II was not dependent upon rail transportation movements into the elevator and relied on rail

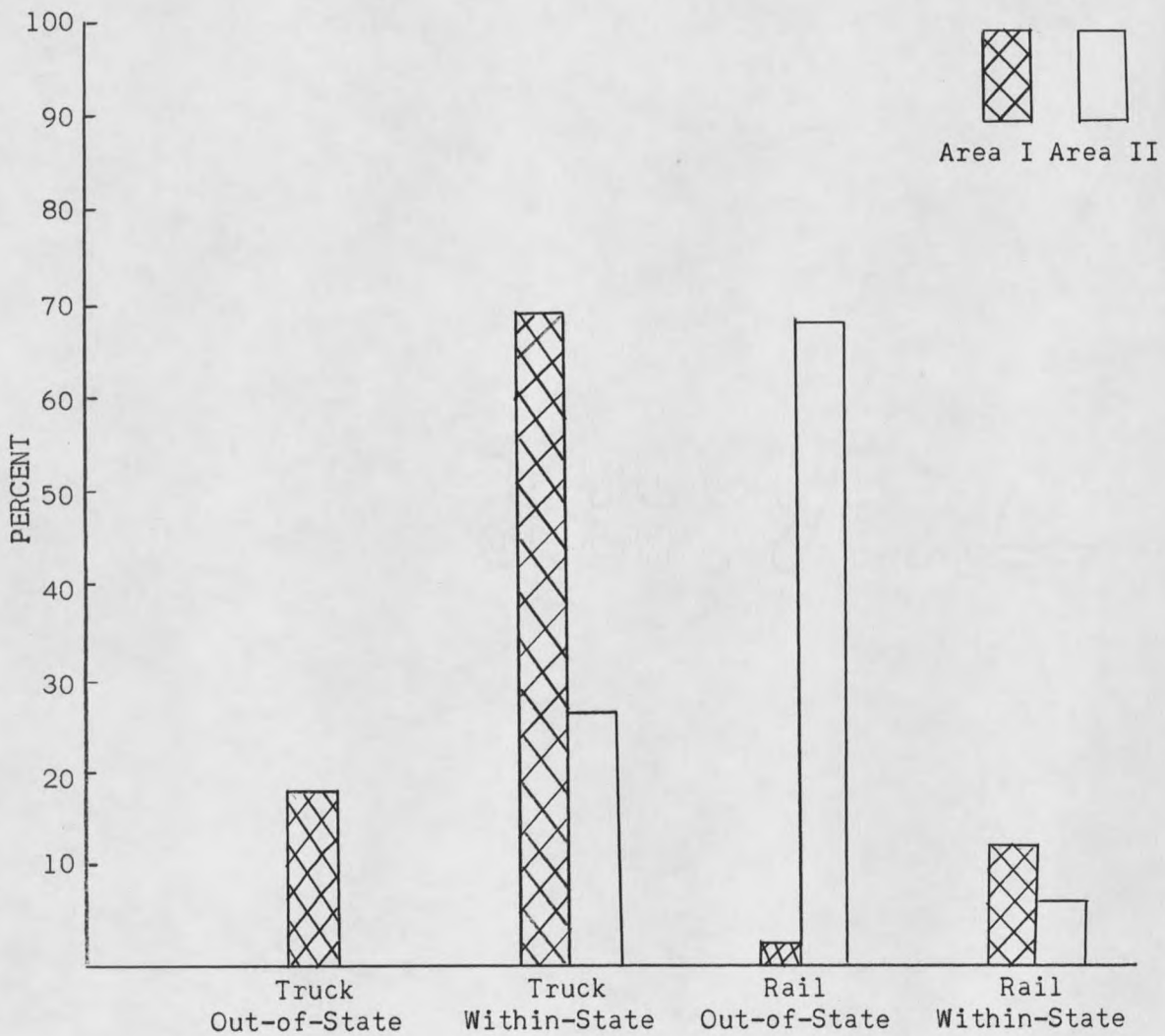


Figure 13. Movements of "Cash Barley" Out of Elevators.

transportation for 74 percent of the "cash barley" leaving the elevator in 1955.

Implications of Present Market

By now the sharp contrast between Area I and Area II is more evident. Area I moves little "cash barley" out of the State or even market areas within the area and Area II is dependent upon central markets or out-of-state markets for over two-thirds of its "cash barley". How then can we account for this difference? Movements of barley through the normal cash grain marketing channels, or the free market, must be the best indication of an area's market structure.

The type of agriculture within the area is a significant factor in the field of barley marketing. Area I which is high in irrigated agriculture and production of livestock, has an active market for feed barley. Area I is composed of several local market areas which have not unified prices. Prices paid for barley vary considerably between market areas. Newspapers and market reports give producers and potential buyers information concerning central market prices, but little or no information is available concerning the local demand situation within a market area. However, as described in the section concerning price determination, the local market areas seemed to retain a price for barley usually higher or at least equal to the central market price minus transportation. It seems realistic that the barley market could be improved through better dissemination of the barley market information between local market areas within Area I and even to reach into some of the high surplus areas in Area II.

Situations have existed in which elevators and feed dealers in a surplus market area offer a central market price minus transportation, and elevators and feed dealers in a deficit local demand market area, within 100 miles of the surplus area, offer a price about 20 cents per bushel higher. Opposing a market area integration of this nature in Montana is the cost of the market information. Would it be up to the producer, market agencies or the government to bear this added marketing cost?

Grain elevators and feed dealers concentrate in maximizing the marketing dollar for barley as this is a primary enterprise in Area I. They are interested in developing new markets and expanding existing markets for this "cash barley"; however, again we have a conflict. Feeders are attempting to reduce the price they pay for barley which they demand. Little information is available in regard to the prices paid by these feeders for barley purchased direct from producers. It is estimated that possibly the volume of barley used for feeding from the category "fed barley" (6,282,000 bushels) in Area I, as a result of interfarm sales would equal approximately 2 million bushels or that volume handled by grain elevators and feed dealers (2,006,600 bushels) in that area. If feeders purchase barley from elevators and feed dealers, they would be sure of the exact grade and quality, and the marketing cost for this service would be primarily a predetermined mark-up over purchase price. Because of the volume of barley sold direct to feeders from producers, it is assumed that feeders can determine the quality of the barley they purchase, and the feeders do not feel they need the additional marketing services rendered by marketing agencies.

Area II, on the other hand, is predominantly a cash grain area high in the production of wheat. Feed barley, produced as a cash crop, has a tendency to become a supplementary enterprise to the producers and grain elevators. Firms engaged in marketing this barley will not attempt to maximize returns should this conflict with the maximization of the returns from wheat. Grain elevators in this area are more consistent in regard to prices paid for barley because of their common dependency upon central markets for outlets for their "cash barley". This does not make a good market situation, however, because of the overproduction or supply of feed barley in relation to the demand at central markets. The price of "cash barley" which must move to a central market was consistently lower in Area II than the loan price in that same area. There are exceptions to the above in cases where premiums are paid for a high quality, high test weight, feed barley.

Transportation is rapidly becoming a factor of major importance to Montana barley marketing. Studies are needed to determine the economic feasibility of moving barley from surplus areas to deficit market areas, based on existing price differentials between market areas in the State. Trade will occur between two regions if the price differences between them for goods in demand are greater than or at least equal to the cost of movement between regions, under conditions of pure competition.^{8/} If

^{8/} E. T. Grether, "A Theoretical Approach to the Analysis of Marketing," Theory in Marketing, ed. by Reavis Cox and Wroe Alderson (Chicago: Richard D. Irwin, Inc., 1950), p. 118.

this is so then the determination of the costs of transportation should improve the present market by benefits to: (1) producers in surplus areas, (2) feeders or buyers in deficit areas, (3) marketing agencies and firms involved in feed mixing and (4) transportation agencies.

PART III

POTENTIAL MARKET STRUCTURE

Introduction

The State of Montana produced a surplus of barley in 1955. The proportion of the barley crop classified as surplus is the quantity of barley taken over by the government through CCC loans. It is estimated that the majority of CCC barley moved to the West Coast for storage or future export.^{9/} This excess quantity of barley is not the result of a fall in demand, for rather an increase in supply resulting from the required restrictions on wheat acreage and the subsequent increase in barley production. Since this excess barley was not the result of an effective demand, it becomes the burden of agricultural producers and governmental agencies to reduce such a surplus in the future. Their goal is to retain or increase the net profit or revenue to Montana agriculture by creating a demand for the barley. The interest by marketing firms is indicated by their research and optimism in feed mixing, livestock feeding, and encouragement of the development of desirable varieties of malting barley.

Expansion of Livestock Feeding

Montana is in a favorable position for expansion of livestock feeding for several reasons:

1. It has a surplus production of barley.
2. The Pacific Coast is deficit in the production of slaughter livestock. This deficit is due largely to a rapid increase in population in recent years.

^{9/} Approximately 11,400,000 bushels moved by rail into terminal markets in Washington and Oregon from July, 1954 through June, 1955.

3. Montana produces large numbers of feeder and stocker cattle which move out of the State each year.
4. Montana is deficit in the production of slaughter hogs, and Montana slaughter plants represent a ready market for quality hogs produced in the State.

Many cash grain farmers are in a favorable position to enter into beef or hog feeding as a supplementary enterprise. This entry into hog or beef feeding would tend to offset a reduction in income due to acreage restrictions on wheat production. Many cash grain farmers have the opportunity to enter into a small scale feeding operation with little or no additional hired labor and only a small investment in buildings and equipment.

Beef Feeding Potential

A previous study has indicated a shift towards the east of the "line of east-west movement" for western slaughter cattle (Figure 14).^{10/} This indicates western packers and buyers are moving towards the east to purchase their slaughter cattle as a result of a rapid increase in population. Another factor of importance is that western packers do not require as high a degree of finish on slaughter cattle as midwestern packers.

^{10/} Western Livestock Marketing Research Technical Committee, Shifts in the Trade in Western Slaughter Livestock, United States Department of Agriculture, Agricultural Information Bulletin No. 14, (Washington: Government Printing Office, 1950), p. 44.

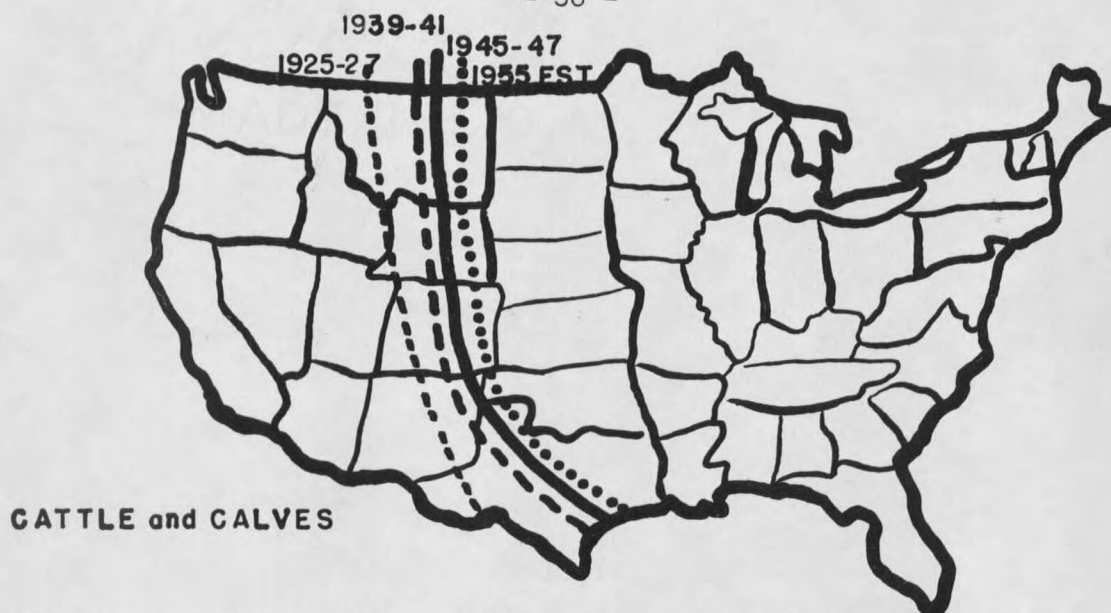


Figure 14. Line of East-West Movement -- Approximate Geographic Boundary to Which Western Packers Must Come Inland to Buy the Live-stock Slaughtered in the Twelve Western States.

In 1955 Montana produced a surplus of 598 million pounds (live weight) of beef cattle.^{11/} However, the above surplus is a surplus of net marketing over slaughter in 1955 and is an indication of feeder and stocker cattle leaving the State, of which the majority moves east to the Corn Belt for finishing. If the expansion of beef feeding is economically feasible in Montana, Montana feeders or potential Montana feeders should have little difficulty to obtain high quality feeder cattle and calves within the State.

The cost of the feed in the basic ration will be one of the determining factors in considering the economic feasibility of finishing beef

^{11/} United States Department of Agriculture, *The Livestock and Meat Situation*, AMS, (Washington: Government Printing Office, LSM-85, August 17, 1956), p. 26.

in Montana compared to finishing beef in the Corn Belt. The feeding value of barley compared to corn is also very important, and in general this study will consider barley to be 88 percent the feeding value of corn for fattening beef cattle. Figure 15 indicates the relative price of a bushel of corn to a bushel of barley to acquire an equal feeding value for finishing beef.^{12/} Data were obtained to indicate the selling price per bushel of barley to the producer in Bozeman, Montana, and the selling price per bushel of corn to the producer in Omaha, Nebraska for February, 1956 and February, 1957. In February, 1956 the local demand price of barley was 86 cents per bushel in Bozeman and the price of corn

FEED GRAIN SUBSTITUTION SCALE

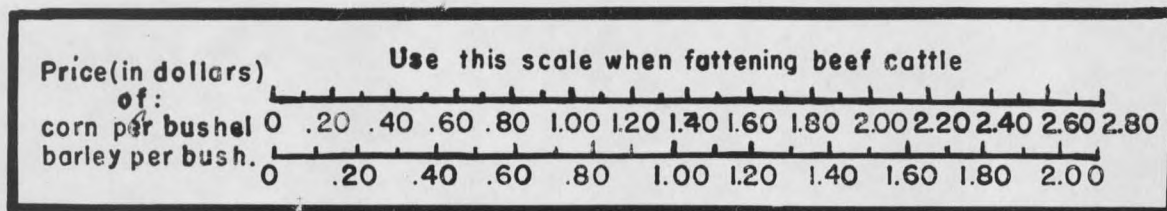


Figure 15. Corn - Barley Substitution Scale for Fattening Beef Cattle.

was \$1.35 per bushel in Omaha. Figure 15 indicates it would have been more profitable to feed barley by a margin of 16 cents per bushel. If barley sold for \$1.02 per bushel the relative prices of barley to corn would have given beef feeders an equal feeding value per dollar of feed. The local price paid by grain elevators and feed dealers in Bozeman for

^{12/} Leonard W. Schruben and R. E. Clifton, Grain Substitution in Feeding Livestock, Agricultural Experiment Station, Kansas State College, Circular 299, July, 1953.

February, 1957 was 96 cents per bushel compared to the corn market in Omaha of \$1.25 per bushel at the same time. Figure 15 indicates that corn has the advantage, in terms of feed cost, by a margin of 2 cents. However, the local demand price exceeded the central market price by 16 cents in 1956 and 19 cents in 1957 in Bozeman. Because the straight card price predominates as a price determining factor in Area II it is assumed a favorable margin existed both years for beef feeding within Area II. Another factor of importance is that the demand for finished beef is increasing more rapidly in the West, thereby providing western feeders a ready market. Also the cost of transportation and loss in shrinkage to the West Coast would be less from Montana than from the Midwest to the Coast.

Morrison compares the average composition and digestible nutrients of the two feeds as follows:^{13/}

<u>One bushel feed barley high quality</u>	<u>One bushel corn dent No. 2</u>
35.1 Total digestible nutrients	44.8 Total digestible nutrients
5.2 Digestible protein	3.7 Digestible protein
43.3 Total dry matter	47.6 Total dry matter

Therefore, for rations low in protein, barley is superior to corn to balance the ration. Other factors are of course important but the above are of major importance in determining the relative feeding value per bushel of barley compared to corn.

The increase in demand for barley by the expansion of beef feeding will be calculated as follows: Assume that cattle feeders feed a ration

^{13/} Frank B. Morrison, Feeds and Feeding, (Ithaca: The Morrison Publishing Co., 1956), 22nd Ed., pp. 1044, 1048.

consisting of 75 percent barley.^{14/} Under this general assumption a feeder would utilize 450 pounds of barley for every 100 pounds gain. The beef feeders are estimated to attempt to average approximately 300 pounds gain per head before marketing. (Yearling steers and heifers are most common in Montana feed lots.)

The number of feeder cattle and calves on feed January 1, 1957 was 68,000 head.^{15/} It is estimated that this figure is approximately 75 percent of the total on feed for commercial slaughter during the entire year. This would indicate a total of 90,000 head on feed in Montana for commercial slaughter, plus approximately 24,000 fed for on-the-farm slaughter, a total of 114,000 head. The potential increase in barley use would be as follows:

1. Ten percent increase would increase beef feeding by 11,400 head. Assuming 1350 pounds of barley per head, the total increase in barley utilization would be 320,000 bushels.
2. A 100 percent increase in beef feeding would result in 3,200,000 bushels.
3. A 200 percent increase in beef feeding would result in 6,400,000 bushels.

Hog Feeding Potential

Montana does not produce a sufficient quantity of slaughter hogs to supply the existing markets within the State. The Agricultural Marketing

^{14/} Some feeders are making very good gains on a straight barley ration.

^{15/} United States Department of Agriculture and Montana Department of Agriculture, "Montana Crop and Livestock Reporting Service," January 18, 1957.

Service indicates that Montana slaughter houses and meat packers depended upon markets in the Midwest for approximately 100,000 head of slaughter hogs in 1955.^{16/} The same study also indicates that for the same year all of the eleven western states were deficit in the production of slaughter hogs with the exception of Wyoming. The State of Washington relies on Midwest and other out-of-state markets for approximately 600,000 head. Hogs produced in western Montana at the present time find a ready market in Washington and Oregon. The "line of east-west movement" also substantiates the above statements (Figure 16).^{17/} Another factor important to the consideration of the economic feasibility of the expansion of hog production in Montana is the type of pork desired by retail markets. In recent years consumers have indicated their desire for a lean type hog. Canada has produced high quality barley fed lean pork for some time and presently enjoys a premium market in some areas of the United States.

Costs and feeding values of barley in comparison with corn must again be considered in determining the economic feasibility of fattening hogs in Montana compared to fattening hogs in the Corn Belt. Barley has a feeding value of 91 percent of the feeding value of corn for fattening hogs. Figure 17 indicates the relative prices of a bushel of corn and a

^{16/} United States Department of Agriculture, The Livestock and Meat Situation, op. cit., p. 26.

^{17/} Western Livestock Marketing Research Technical Committee, op. cit., p. 44.

bushel of barley to acquire an equal feeding value.^{18/} The prices used in the analysis of the potential beef feeding will also be applied to the hog feeding analysis. The price of barley February, 1956 was 86 cents in Bozeman and the price of corn in Omaha was \$1.35 per bushel. The corn-barley substitution chart (Figure 17) indicates a 19 cent margin per bushel for barley. In February, 1957 the price of barley was 96 cents per bushel and corn was \$1.25 per bushel. Based on the corn-barley

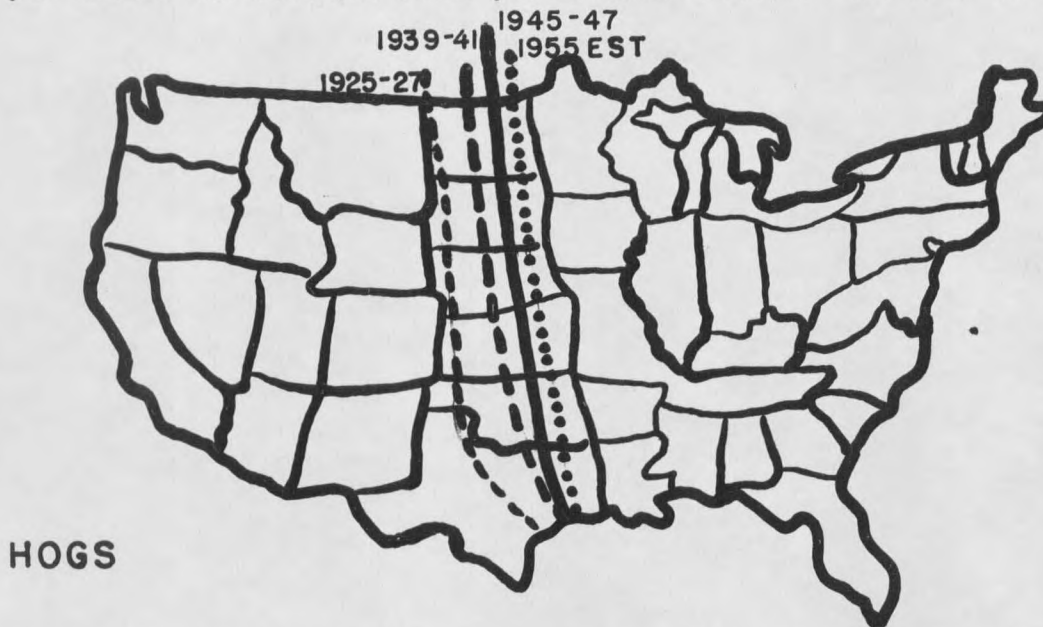


Figure 16. Line of East-West Movement -- Approximate Geographic Boundary to Which Western Packers Must Come Inland to Buy the Livestock Slaughtered in the Twelve Western States.

substitution chart the relative prices for the two grains happen to be equal in terms of feeding value in 1957. If cost of feed was the only factor involved in making a decision of feeding hogs barley in Bozeman or corn in Omaha there would be no difference. However, because of the

^{18/} Leonard W. Schruben and R. E. Clifton, *op. cit.*

deficit in the West, Montana hog feeders would have a larger net profit as a result of less transportation to the West Coast or to in-state markets existing in Montana. The local demand price for barley exceeded the central market price minus transportation by 16 cents in 1956 and 19 cents in 1957. This indicates that feeders of swine in Area II would have a greater advantage than feeders in Bozeman.

F E E D G R A I N S U B S T I T U T I O N S C A L E

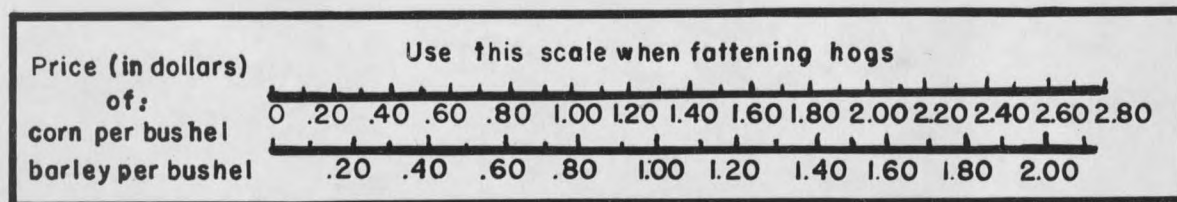


Figure 17. Corn-Barley Substitution Scale for Fattening Hogs.

Recent studies by state experiment stations throughout the Midwest and West have indicated that hogs do very well on a feed with a range of 50 to 90 percent barley in the ration. Assuming 350 pounds of barley can be utilized for every 100 pounds gain of pork and estimating that hog feeders would put on approximately 175 pounds gain per hog, swine feeders could utilize approximately 600 pounds of barley per hog.

In 1955, Montana hog producers and feeders sold approximately 151,000 head of hogs to commercial slaughter and approximately 44,000 head were utilized in on-the-farm slaughter or a total production of hogs of 195,000. Slaughter houses and meat packers relied on midwest hog markets to supply

approximately 100,000 head. The following rates of increase in hog feeding will result in the following increase in barley use:

1. If Montana hog producers increased hog feeding by 50 percent to make up the deficit in 1955, they would utilize approximately 1,250,000 bushels.
2. A 100 percent increase in hog feeding would increase barley use 2,500,000 bushels.
3. If hog feeding increased 200 percent (approximately 600,000 head total), hog feeders would require 5,000,000 bushels of barley.

Empirical evidence based on personal interview substantiates the feasibility of the expansion in the hog feeding industry in Montana. For example: (1) Packers in Montana feel that barley and other surplus feed grains are equally as good a feed as corn for the production of top quality hogs. (2) Most retail outlets prefer buying their pork products from in-state packers whenever possible because of the time of delivery from out-of-state packers is too long and they feel that in most cases the product of in-state slaughter plants is of equal quality. However, in-state packers go out-of-state for their quality hogs in many cases. (3) A larger production of hogs in Montana would improve the marketing structure, putting the producer in a better position, with more likelihood of premiums being paid for top quality lean type hogs.

Lamb Feeding

Montana ranks fifth in sheep numbers at the present time. In 1955 this State produced a surplus of 80 million pounds live weight of sheep

and lambs over in-state commercial slaughter. The number of sheep and lambs on feed January 1, 1957 was 115,000 head -- 37 percent less than the previous year. The reason for the decrease in feeding was based on a feed shortage in the eastern counties of the State.

Experiments made on feeding feeder lambs have established a basis for feeding barley at the rate of 30 to 50 percent of the ration. Therefore, it can be assumed that feeders can utilize approximately 180 pounds of barley per head. Because Montana produces a surplus of feeder lambs, it can be assumed that feeders could increase the number of sheep on feed to 200,000 head within a short time. Assuming one-half of the lamb feeders supplemented the ration with barley (100,000 head), they would require approximately 375,000 bushels of barley. If feeders increased feeder lamb production by 50 percent or if all the present feeders fed barley in the feeding rations (assuming 200,000 head) the increase in demand for barley would amount to 750,000 bushels.

Other Outlets of Feed Barley

Barley has been utilized as a supplement for wintering beef cattle by many Montana ranchers. The quantity of barley required by ranchers for this purpose is dependent on the condition and quantity of hay available and also on the condition of the wintering range. Barley can be used to supplement straw or low quality hay for a few weeks, but this type of ration generally still lacks protein and carotene, essential for a balanced maintenance ration. Because of the importance of protein in the ration, high protein barley should command a premium as a feed. Further

market analysis might contribute to information that would bring these premiums to reality.

In recent years some ranchers have had barley pelleted with high protein supplements for range feeding. This use may increase, but it is difficult to estimate the extent of increase.

The feed manufacturing industry has increased rapidly since 1954. Experiments by the larger feed companies have results in the development of mixed feeds of all types with barley as the basic feed of the mix. Little data are available concerning the present volume or the potential of this outlet, but that if the recent increase continues in the future (3 to 4 years), it is assumed that an additional 2 million bushels of barley may be utilized. Processed feeds, containing a high proportion of barley are now in a position to compete more effectively with corn and other concentrates shipped into the State.

Movements out of the State by truck will be expected to increase slightly, with increased feeding throughout the West. The development of a more active and mature market for feed barley within Montana will expand outlets to neighboring states. Marketing cost studies are needed to improve the present market structure. Transportation cost data within Montana and also to neighboring states are essential to a more accurate analysis of this potential outlet. It is assumed that the expansion of the potential outlets (1) feed-mixing, (2) movements to neighboring states, and (3) wintering range cattle, will increase by a quantity of approximately 3 million bushels in the future.

Malting Barley Potential

The production of malting barley opens a new market outlet to Montana barley producers. Prior to 1954 producers and marketing agencies were concerned with feed barley. At the present time the Malting Barley Improvement Association has granted funds to the Montana State College Experiment Station for research in the field of malting barley. The objective of the research is to develop and test new and improved varieties of two-row malting barley.

Hannchen and Hanna are the two varieties presently considered to be high quality two-row malting barley by maltsters and brewers. However, because of the low yield of the varieties mentioned above, research has been expanded in developing other varieties. Tests of Betzes barley have indicated it may be a highly desirable variety of two-row malting barley.^{19/} Betzes has yielded as well as or better than Compana (feed barley). The limiting factor of malting barley production is the protein content of the grain. Premiums would be expected to be reduced as the protein content rises over 13 percent. In most cases the protein content of Betzes barley can be retained below 12 percent by proper land selection by the producers. This may complement the income to farmers as they would be able to seed malting barley on the land producing low protein grain in the past, and seed wheat on the land which is normally considered to produce grain of high protein content.

^{19/} R. F. Eslick and D. J. Davis, Report on the Quality of Commercial Samples of Betzes Barley Raised in Pondera County in 1956, Montana Agricultural Experiment Station, Mimeographed Leaflet 18, February 19, 1957.

Approximately 8 to 10 million bushels of western barley are used for malting each year, of which two to two and one-half million bushels were used by western maltsters and brewers, the remainder, mostly two-row, being shipped East.^{20/} It seems feasible that Montana producers could easily compete for the market for this type of malting barley, especially that quantity moving from the West Coast to eastern markets.

Several factors must be considered when analyzing a new outlet of this nature. Barley producers might receive a premium price for their production of malting barley. Producers would also have to use more care in seed selection and the type of land used for this production. Harvesting would require more care because of the undesirability of cracked or damaged kernels for malting purposes. The best areas of production would be irrigated areas, but recent tests have indicated Betzes barley is also a satisfactory malting barley on dryland if the protein content can be kept down.

Sufficient seed of Betzes barley is expected to be available to plant about 10,000 acres in 1957. A high proportion of this seed will be made available through the Pondera County Malting Barley Growers Association. With time an association of this nature will develop a better knowledge of the production and marketing problems associated with producing malting barley. Also if the majority of the barley produced within a market

^{20/} John H. Parker, The Annual Barley Usage of the Malting and Brewing Industries, presented at Western Barley Conference, Spokane, Washington, March 14, 1955, p. 4.

area is of the malting type, producers will be in a better position to receive premiums and the chances for success will be greatly improved.

Assuming Betzes barley is accepted as a high quality two-row malting barley 10,000 acres may be diverted from feed barley production to malting barley production in 1957 and 100,000 acres could be diverted to malting barley production within two or three years. Total production of malting barley in the future could be about 3,100,000 bushels, assuming 75,000 irrigated acres yielding 36 bushels per acre and 25,000 dry-land acres yielding 24 bushels per acre.

Future Barley Production and Outlets in Montana

The expected production of barley in Montana for future years is very difficult to estimate. Government policies are expected to have a great influence on producers and buyers. However, some analysis of future production and market outlets may be useful.

In 1957 farmers in Montana were allowed 50 percent of the allotted acreage for wheat production to be carried in acreage reserve. The acreage set aside for acreage reserve cannot be used for the production of a crop, but may be summerfallowed. Many farmers in Montana follow a one-half summerfallow, one-half crop farming practice. Therefore, in many cases farmers may designate acres for acreage reserve which would have ordinarily required summerfallow, thus leaving land suitable for cropping open for the production of some other crop not under acreage restriction. This crop may well be barley. At the present time barley is under the government price support program and no one knows how long this commodity will remain under price support. In 1956 producers were

authorized to seed three acres of durum for every acre of wheat allotment. This alleviated, to some extent, the pressure for a higher acreage devoted to barley production in 1956.^{21/} No definite policy has been established for the crop year 1957, but it is expected that durum will be considered the same as wheat and no special encouragement will be offered durum producers.

One alternative to the future (2 to 3 years) production of barley may be for the government to impose acreage controls. If Montana were restricted to 1 million acres of barley by government controls, a hypothetical market structure could be established. Yield will be assumed to be 24 bushels per acre for 900,000 acres of dryland production and 36 bushels per acre for 100,000 acres of irrigated production with a total production of 25,200,000 bushels. The outlets may be as follows:

17,500,000 bushels existing market ^{22/}
3,100,000 bushels malting barley
2,500,000 bushels 100 percent increase in hog feeding
1,600,000 bushels 50 percent increase in beef feeding
375,000 bushels 50 percent increase in feeder lambs
<u>125,000</u> bushels increase in other outlets of feed barley
25,200,000 bushels total market outlets
25,200,000 bushels total production

Another alternative estimate of future barley production may be to disregard any government controls on barley production. Under this

^{21/} 1956 barley production was estimated at approximately 1,100,000 acres, considerably less than the 1955 production.

^{22/} Part II indicated that for the crop year 1955, markets existed or producers found outlets for approximately 17,500,000 bushels through the outlets "cash barley", "fed barley", and "seed".

alternative, because of acreage reserve for wheat, production of barley may jump to an all-time peak of 2 million acres. However, after this initial peak barley production should drop back to vary between a range of from one to one and one-half million acres.. If it is assumed that Montana producers devoted approximately 1,300,000 acres to the production of barley, they would have diverted enough acres from the production of wheat to barley to stabilize the cash grain agricultural production in Montana.^{23/} The total production resulting from this acreage would be 32,400,000 bushels (assuming the same yield per acre as above). The outlets may be as follows:

17,500,000 bushels	existing market
3,100,000 bushels	malting barley
5,000,000 bushels	200 percent increase in hog feeding
3,200,000 bushels	100 percent increase in cattle feeding
3,000,000 bushels	increase in feed manufacturing and others
375,000 bushels	50 percent increase in lamb feeding
<u>225,000</u> bushels	increase in seed over 1955
32,400,000 bushels	total market outlets
32,400,000 bushels	total production

The above market structure indicates if barley producers expanded barley production to 1,400,000 acres cattle feeding could increase 200 percent over the present level, utilizing an additional 3,200,000 bushels. The analysis is only for the State of Montana and includes an estimate

^{23/} In 1954 acreage restrictions were imposed on wheat production in an attempt to equate the supply of wheat to the demand for wheat. It is here assumed that the diverted acres, as a result of the increase in barley production, plus the acreage diverted to hay and forage crops as a result of increased beef and hog feeding, would give Montana a reduction in wheat production proportional to its share of the national wheat reduction to equate supply and demand. Increased hog and beef feeding plus increased production of malting barley would equate the supply to demand for barley. Thus we may assume a balanced or stable cash grain agriculture in Montana.

of the additional quantity that may move into neighboring states as a result of increased feeding in the West. Excluded from the analysis is the quantity of barley demanded for export and the potential demand for barley as a result of research in the utilization of barley for new industrial uses.

PART IV

SUMMARY AND CONCLUSIONS

Summary

The analysis of the 1955 market structure for Montana barley indicated a surplus or excess production of approximately 23 million bushels. For that crop year this surplus was taken over by the government through CCC non-recourse loans. Producers sold approximately 8 million bushels to grain elevators and feed dealers. About 7 3/4 million bushels of barley were fed on the farm on which it was produced or was sold direct to feeders or truckers.

Producers in Area I had an advantage of a more active market for "cash barley" as a result of feeders and livestock producers in that area. The implications of price variation between local market areas within Area I indicated a lack of communications or uniformity between buyers and sellers in the various market areas. Approximately 6,280,000 bushels of barley in Area I was either fed on the farm on which it was produced, or was sold directly to feeders or truckers. Producers found outlets for all but about 850,000 bushels which was taken over by CCC.

Producers in Area II relied more heavily on the government crop loan program. Actual take-over by CCC amounted to approximately 22,260,000 bushels. Grain elevators and feed dealers purchase about 6 million bushels, but relied heavily on central markets for outlets. Producers in general received lower prices for "cash barley" in areas dependent upon central markets than those dependent on local demand for price determination. Less barley was fed on the farm where it was produced or

was sold directly to truckers or feeders in Area II as a result of less livestock feeding in this area.

The analysis of a potential market structure for Montana barley was based on new and expanded market outlets. The analysis of the economic feasibility of feeding hogs and beef was based primarily on the comparison of the feeding value and market price of corn in Omaha, Nebraska to the feeding value and market price of barley in Bozeman, Montana. The market for slaughter livestock in the West was analyzed briefly, and based on recent reports, the West Coast was assumed to be a ready market for the various levels of increase in livestock feeding.

The new market outlet for malting barley was analyzed based on studies of the yield and the qualities of the barley as a malting variety. The new malting variety, Betzes, developed by the Montana Experiment Station, may prove to be the best alternatives for farmers concerned with the production of barley as a cash crop on acres diverted from wheat production.

Conclusion

The conclusions of this study are general. Government policies are expected to have a great deal to do with the potential production of barley in Montana in the immediate future. It is important to realize that since the government has this importance, it will also assume the responsibility of taking over some of the surplus or excess production. However, from the standpoint of society, the surplus must at some future time be consumed or disposed of, and therefore, the solution to the

problem of this nature is to develop a demand for the commodity in surplus. It must also be realized that increases in livestock feeding or the production of malting barley will not increase sufficiently in the next year or two to alleviate the situation, but rather the long-run goal must be to equate an increased demand to a future production.

Based on the hypothetical market structures established in Part III it is possible for existing and potential market outlets to handle the increased barley production through: (1) increased livestock feeding, (2) production of malting barley and (3) increase in other new and expanded outlets. Certain limitations must be pointed out: (1) the cost of barley must remain less than, or approximately equal to, the cost of corn with respect to their relative feeding value, (2) that the malting barley market will accept the Montana produced variety of malting barley, (3) that the demand for slaughter livestock in the West remain as great or greater in the future and (4) that the present marketing procedure will become more effective.

Further Research

The limits of this research problem are very broad and include many phases of barley marketing which require further research. Cost studies of marketing agencies involved in marketing barley would greatly improve the present market structure. Cost studies on transportation of barley from surplus to deficit areas and to feeding areas out-of-state, would benefit producers and potential buyers. Studies concerning the marketing of malting barley may be very timely and useful to Montana barley producers.

Further research is presently needed to determine more accurately the feasibility of finishing livestock on barley in Montana. Another area of research is a cost study of feed manufacturing and the utilization of barley as the basic feed in the mix.

APPENDIX

TABLE I. MARKET STRUCTURE FOR MONTANA BARLEY - 1955.

Area	Outlets			
	CCC Bushels	Cash Barley Bushels	Fed Barley Bushels	Seed Bushels
Area I	846,790	2,006,600	6,281,970	544,440
Area II	22,259,570	5,947,200	1,460,470	1,272,960
Total State	23,106,360	7,953,800	7,742,440	1,817,400
	Percent	Percent	Percent	Percent
Area I	8.7	20.7	64.8	5.6
Area II	71.9	19.2	4.7	4.1
Total State	56.9	19.6	19.0	4.4

TABLE II. TYPE OF SELLER OF BARLEY TO GRAIN ELEVATORS IN MONTANA.

Area	Producer	Trucker	Other Dealers
	Bushels	Bushels	Bushels
Area I	1,632,700	214,600	159,300
Area II	5,947,200		
Total State	7,579,900	214,600	159,300
	Percent	Percent	Percent
Area I	81	11	8
Area II	100		
Total State	95	3	2

TABLE III. STATE OF ORIGIN OF BARLEY PURCHASED BY MONTANA GRAIN ELEVATORS AND FEED DEALERS

Area	Montana	North Dakota
	Bushels	Bushels
Area I	1,746,600	260,000
Area II	5,947,200	
Total State	7,693,800	260,000
	Percent	Percent
Area I	87	13
Area II	100	
Total State	97	3

TABLE IV. DISTANCE CASH BARLEY MOVES TO MARKET.

Area	Miles				
	Under 25 Bushels	25-49 Bushels	50-99 Bushels	100-249 Bushels	250-500 Bushels
Area I	1,391,500	211,900	91,400	302,300	9,500
Area II	5,314,300	632,900			
Total State	6,705,800	844,800	91,400	302,300	9,500
	Percent	Percent	Percent	Percent	Percent
Area I	69	11	5	15	Less than 1
Area II	89	11			
Total State	84	11	1	4	Less than 1

TABLE V. TYPE OF BUYERS OF CASH BARLEY FROM COUNTRY ELEVATORS.

Area	Terminal Market	Feeder	Rancher	Dairy	Suburban	Trucker	Other Elevators
	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels
Area I	139,100	1,163,700	249,600	16,800	17,400	144,000	275,900
Area II	4,542,200	348,500	655,500	32,800	2,400	86,600	269,300
Total State	4,681,300	1,522,200	905,100	49,600	19,800	230,600	545,200
	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Area I	7	58	12	1	1	7	14
Area II	76	6	11	Less than 1	Less than 1	1	5
Total State	59	19	11	Less than 1	Less than 1	3	7

TABLE VI. STATE OF DESTINATION OF CASH BARLEY.

Area	Montana	Wash.	Minn.	N. Dak.	Oregon	Colo.	Neb.	Wyoming	Calif.	Utah
	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels
Area I	1,613,300	23,000	7,100	114,200		123,400	88,800	36,800		
Area II	1,908,600	3,091,900	775,500		157,000				9,000	5,200
Total State	3,521,900	2,114,900	782,600	114,200	157,000	123,400	88,800	36,800	9,000	5,200
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Area I	80	1	1	6		6	5	1		
Area II	32	52	13		3				1	1
Total State	44	39	10	1	2	2	1	1	1	1

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TABLE VII. DISTANCE CASH BARLEY MOVES TO DESTINATION.

Area	Miles						
	Under 25 Bushels	25-49 Bushels	50-99 Bushels	100-249 Bushels	250-499 Bushels	500-1,000 Bushels	Over 1,000 Bushels
Area I	1,244,400	325,100	257,900	29,300	184,300	65,500	
Area II	683,300	312,100	416,000	223,600	273,700	3,798,800	239,800
Total State	1,927,700	637,200	573,900	252,900	458,000	3,864,300	239,800
	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Area I	62	16	8	2	9	3	
Area II	11	5	7	4	5	64	4
Total State	24	8	7	3	6	49	3

TABLE VIII. MOVEMENTS OF BARLEY BY TRUCK OR RAIL INTO AND OUT OF ELEVATORS.

Area	Movements into Elevator				Movements Out of Elevator			
	Truck		Rail		Truck		Rail	
	Out-of-State	Within State	Out-of-State	Within State	Out-of-State	Within State	Out-of-State	Within State
	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels
Area I	260,000	1,725,500		21,100	370,300	1,378,200	23,000	235,100
Area II		5,947,200				1,538,100	4,054,000	354,900
Total State	260,000	7,672,700		21,100	370,300	2,916,300	4,077,200	590,000
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Area I	13	86		1	18	69	1	12
Area II		100				26	68	6
Total State	3	97		71	5	37	51	7

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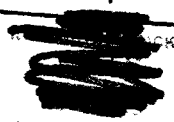
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