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Wheat and Feed Grains in the Great Plains and Northwest: Supply Response and Resource Use

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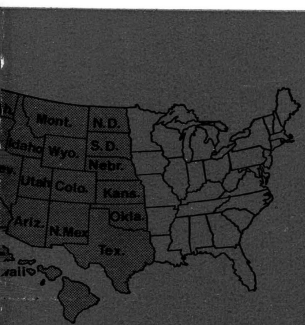

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Authors were aided in preparation of the report by a manuscript committee composed of Odell L. Walker, Oklahoma State University; Norman K. Whittlesey, Washington State University, and by Roy E. Hatch and Ronald D. Krenz, FPED, ERS, Oklahoma, and Washington, D.C., respectively. Particular thanks are due Dr. Krenz for preparation

of the methodological sections. Those other than committee members who contributed to the aggregative stage of the wheat-feed grain phase are P. W. Barkley, Washington State University, formerly of Colorado Agricultural Experiment Station; T. A. Hoff, formerly of Montana Agricultural Experiment Station; and R. F. Brokken, Oregon; M. H. Ericksen and C. W. Nauheim, Kansas; J. R. Martin, Texas; R. R. Paul, North Dakota; L. C. Rude, Montana; H. G. Sitler, Colorado; and E. O. Ullrich, Jr., South Dakota, all with FPED, ERS, USDA. Also, thanks are due Stanley G. Daberkow, Duane L. Marquis and Duane W. Krajnik, former students and graduate students, University of Nebraska, who assisted in the details of aggregation.

Other contributions to Regional Projects GP-5 and W-54 are recognized in the listing of publications and research theses in Appendix A.

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PREFACE

The study upon which this publication is based is part of Regional Research Project GP-5, "Economic Problems in the Production and Marketing of Great Plains Wheat," and Regional Research Project W-54, "Appraisal of Opportunities for adjusting Farming to Prospective Markets." The wheat-feed grain phase reported in this publication is a contribution of the Production Subcommittee of Regional Project GP-5, and of the Idaho, Oregon and Washington Agricultural Experiment Stations of Regional Project W-54.

The Resource Economics Committee, sponsored by the Great Plains Agricultural Council and The Farm Foundation, was helpful in the development of the GP-5 Regional Project. Also, the Great Plains Wheat Marketing and Development Association provided encouragement and some financial support in the project development.

The Western Farm Management Research Committee of the Western Agricultural Economics Research Council, sponsored by the Western Agricultural Experiment Stations and The Farm Foundation, was helpful in the development of the W-54 Regional Project.

Objectives and procedures of the Production Subcommittee of GP-5 were closely coordinated with those of the W-54 Technical Committee, with the following overall purposes:

1. To determine individual farm-supply response for alternative product-price relationships and price levels with emphasis on wheat, feed grains, cotton, and livestock.

2. To estimate aggregate subregional and regional supply functions for major commodities.

3. To provide guides for optimum farm organizations and adjustments and attendant adjustments by farm-related businesses and institutions in the Great Plains and Western States.

This report is supplemented by a companion publication describing study areas and including programmed results by state parts of subregions.[2] Papers reporting additional phases of research under the GP-5, W-54 Regional Projects were presented at the GP-5, W-54 Symposium held at Colorado State University, August 1968.[3]

SUMMARY

The primary objectives of this study are to estimate and analyze aggregate supply functions for wheat and feed grains in major producing areas of the Great Plains and Northwest under estimated 1970 production conditions.

This study places emphasis on production and supply. An implicit assumption upon which this study is based is that the equilibrium price of wheat can and does move independently from feed grain prices. The production adjustments of the region and subregions in relation to changing product price relationships form the scope of the analysis.

Representative farms are developed for 107 resource situations in 38 study areas.

Optimal farm organizations for the individual representative farms are obtained by means of linear programming and results are aggregated. The results are aggregated into ten subregions and the region. Basic assumptions are similar across all study areas.

Capital, both investment and operating, is assumed unlimited at a charge.

Labor is available for hire to supplement resident labor.

Representative farmers are not allowed to purchase concentrates for intensive cattle feeding operations.

The irrigation resource base is largely excluded, especially where the relationship between irrigation and wheat production is remote.

Results of parametric programming of representative farms are aggregated over a range of wheat prices from $1 to $3.50 per bushel, and at feed grain price levels of 93¢, $1.07 and $1.34 corn price per bushel.

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[2] Lagrone, W. F., Hatch, Roy E., and Helmers, Glenn A., "Wheat and Feed Grains in the Great Plains and Northwest: Study Area Descriptions and State Statistical Summaries." Great Plains Agricultural Council Pub. No. 38, Nebr. Agr. Expt. Sta. Res. Bul. No. 237, 1970.

[3] "Economic Analysis of Adjustments in Wheat and Feed Grain Production in the Great Plains and Western States," Proceedings, GP-5, W-54 Regional Committee Symposium, Fort Collins, Colo., Aug. 6–8, 1968. Great Plains Agricultural Council Pub. No. 36, Colo. Agr. Expt. Sta. Gen. Ser. No. 892, 1969.

The transportation differentials between terminal markets and study areas places all study areas on a comparable relationship to Kansas City base prices for wheat and feed grains. Programmed results are aggregated at 25¢ wheat price intervals.

A large segment of the region's land resources and 90% (90 million acres) of the region's cropland are analyzed. Sixty-five percent of the nation's 1964 combined production of Hard Winter, Hard Spring, Durum and Western White was grown in the region. The results of this study suggest that the development of supply functions by aggregating representative farms yield important relationships regarding:

1. The capacity of the area's resource base.
2. Overall production response to changing price relationships.
3. Area advantage and capacity for adjustment.

The nature of assumptions is of paramount importance to accurate results from a model of this type. The study also suggests that separation of wheat by class is vital for adjustment analysis.

United States' projected production at a $1.25 wheat price and the medium feed grain price level is approximately 1,200 million bushels of wheat, assuming projected production of Eastern Soft wheat on the basis of past average wheat production relationships:

	Projected ($1.25 wheat, $1.07 corn)	
	Production	Market outlets[a]
	Mil. bu.	Mil. bu.
Hard red winter	500	781
Hard red spring and Durum	303	270
Western white	166	149
Eastern soft	231[b]	260
Total United States	1,200	1,460[c]

[a] Market outlets by class of wheat based on distribution of utilization by class of wheat for 10-year period, 1958-59—1967-68.

[b] Projected production of Eastern Soft wheat estimated on basis of relationship to total wheat production for 10-year period, 1958-59—1967-68.

[c] Table 2, Brandow, George E., "The Commercial Farm Problem," Leaflet No. 2, *People and Income in Rural America—What are the Choices?*, North Carolina State University, 1968.

This compares with Brandow's estimate of a market outlet for 1,460 million bushels of wheat at an average United States' farm price of $1.25 per bushel.

At the price combination of $1.25 wheat and the medium feed grain price level, programmed regional feed grain production increases 87% above 1964 production.

Since the region accounted for only slightly more than 10% of United States' production of feed grains, and since a 33% greater national production over 1964 is estimated to be required for expected market outlets, the Great Plains and Northwest may be in near equi-

librium, in terms of utilization and past shares of national production, at these prices.

Programmed results at average 1964 to 1968 wheat and feed grain prices, $1.75 wheat (market price plus certificate value) and the medium feed grain price level, indicate general regional overcapacity of combined wheat and feed grain acreage of roughly 25 million acres (assuming that 1964 acreages and production were in balance with demand).

At these price conditions, this study demonstrates that larger acreages of wheat and smaller acreages of feed grains would have been grown had producers not been affected by production control programs.

While relatively large flexibility in wheat and feed grain production is evident for the entire study region, differences in capacity for production adjustment exist between subregions. Areas of the Northern Plains and Northwest have less potential for substitution of feed grains for wheat than areas of the Southern and Central Plains.

At all feed grain price levels, the availability of hybrid grain sorghums improves the relative competitive position of feed grains compared with wheat, particularly in the Central and Southern Great Plains, subregions 5, 6, 7 and 8.

Overall supply elasticity of production for Hard Winter wheat is greater than supply elasticities for Hard Spring, Durum and Western White. The elasticities are directly related to the degree of feed grain competition with major differences by class of wheat producing areas.

The supply elasticity differences between classes of wheat are important with respect to demand and utilization.

Shifts in demand for Spring, White and Durum wheat have relatively greater influence on prices than demand shifts for Winter wheat due to the elasticities of these supply functions.

In response to changing wheat prices, the greatest relative change in wheat production occurs for Winter wheat compared to Spring, Durum and White wheats.

Twenty-five cent changes in wheat prices lead to between roughly $300–350 million regional changes in net returns (returns to land, operator labor, unallocable fixed costs, and management), over the most relevant range of wheat prices. Feed grain prices are also of importance to net returns, particularly at lower wheat prices ($1.50 and below).

The analysis of net return demonstrates that widely varying wheat and feed grain production levels are consistent with the maintenance of net returns. Considering the region as a whole, wide restructuring of output does not appear to involve major sacrifices in net returns.

In contrast, a considerable variation between subregions exists with respect to income adjustment to varying wheat and feed grain prices. Areas of the Northern Plains and Northwest which lack the

competitive feed grain enterprises are much more dependent on wheat prices in the maintenance of net returns than areas of the Southern and Central Plains.

Subtracting charges for operator labor and overhead allow land return residuals to be estimated. The net land returns capitalized, at 4%, indicate that 25¢ changes in wheat prices lead to regional land value changes of approximately $60 per acre.

Capital and labor requirements decline under increasing wheat prices and increase as feed grains and livestock occupy more important roles in production.

Regional capital requirements (nonland investment and operating capital) range from $2.3 to 2.9 billion.

Total labor requirements range from 197 to 239 million hours.

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INTRODUCTION AND OBJECTIVES

The Great Plains and the Northwest produce high proportions of the Nation's Hard Red Winter, Hard Red Spring, Durum and Western White wheat. Of less relative importance in these regions are feed grains, flax, soybeans, peas and other crops. Livestock production is also a significant enterprise in the agricultural economies of the Great Plains and western United States.

A number of economic forces have influenced the agricultural economies of these regions.

One major force contributing to these changes has been changing product demands. Over time, demands for wheat, feed grains, other crops and livestock have not increased in the same relative magnitude. Generally the demand for wheat-derived food products has declined relative to livestock products. Derived demands for wheat, livestock and feed grains are reflective of these changing demands. Furthermore, the demands for all types of wheat have not increased uniformly.

The changing nature of demands for crops and livestock produced in the Great Plains and the Northwest poses questions regarding the adjustment capacity of individual farms and producing areas. Since all producing units in this study region do not have the same adjustment characteristics, diverse patterns of economic change result.

Thus, some wheat producing regions have been under greater economic pressure than others to modify their production mixes. Similar changes are observed in respect to net returns.

Farms and areas which undergo production adjustment with minimum effects on net returns are affected far differently from farms and regions heavily dependent on one agricultural enterprise.

Demand is not stressed in this study except in its relation to changing product prices. Estimated production adjustments to changing product price combinations form the basis of this study. These product price changes are assumed to result from changing demand relationships.

Another force which has strongly influenced regional production in

the Great Plains and western United States has been technology. Irrigation, fertilizer, varietal improvement, tillage methods and other factors have advanced the production potential of these wheat producing areas. Yet these technological strides have been far from uniform across all farms and areas.

Some areas have been more strongly influenced than others with consequential effects on comparative advantages and supply characteristics. This study of supply analysis is done at a point in time (1970) with the production aspects of the areas compared. Implications arise regarding interregional competition, and this study can be used as a base with which to compare future studies of supply potential and area change.

Over time other economic forces have affected regional production in these wheat producing regions. Changing transportation arrangements, resource levels and government programs all have had ramification on production. In order to understand the impact of these forces on the production economy, supply aspects must be quantified.

The basic objective of the research reported here is to estimate supply response with varying product prices for wheat and feed grains. Within a framework of representative farm income maximization, changing product price relationships lead to supply adjustments which are aggregated and expressed as normative supply functions.

Another objective is to analyze the resource use and net returns with varying prices for wheat and feed grains. The analysis of resources considers changes in overall levels of resources demanded in response to changing wheat and feed grain prices. Similarly, the analysis of net returns examines differences in net returns in response to changing product prices.

Another purpose of the research reported here is for use in studying comparative production advantage and probable trends. Area differences in supply functions and adjustment paths lead to implications regarding the changing production structure of the Great Plains and Northwest.

The broad area of governmental policy and programs is heavily dependent upon supply analyses of this nature.

Of importance here is the general question of the overall capacity of the resource base in the study region in terms of total production.

Of equal importance is the information from such a study which bears on levels of competing agricultural products produced at given prices.

Implications arise from this information with respect to the utilization and disposition of agricultural products. Too, study of regional differences in adjustment capacity is vital when changing policy directions and specific programs are contemplated.

RESEARCH MODEL

Procedure

Farming opportunities differ widely in the wheat areas of the Great Plains and Northwest. Within this study area four major classes of wheat are produced. These are:

Hard Winter.
Hard Spring.
Western White.
Durum.

The alternative uses of farm resources differ between and within these wheat producing areas.

Optimal farm production plans were developed through linear programming independently for representative resource situations in all the major wheat producing areas. The procedures and assumptions of analysis were sufficiently uniform among the various geographic areas to allow for aggregation of the individual results at the area, subregional and regional levels.

The linear programming solutions for individual farms are based on the assumption that the individual farm operator will make adjustments in enterprise selection to maximize his long-run returns to his land, labor and capital given the various price assumptions.

Time Horizon

The time horizon, or length-of-run represented in any linear programming study of this type, is reflected in the nature of the restraints, the cost items considered to be fixed or variable, the level of technology assumed and the date to which input prices and farm numbers are projected.

This study was based on a length of run which would approximate a farmer in 1965 looking at adjustments which could be made by 1970. Hence, input prices were projected to 1970, number of farms (used in aggregating results) were projected to 1970 and intermediate-term investments, such as machinery, livestock and buildings, were permitted. Investments in land alternatives were omitted in the basic solutions to facilitate aggregation procedures.

Level of Technology

All production coefficients were based on average technology on the area farms expected to prevail in 1970. Projections to 1970 were based on past trends in yields and uses of inputs and on the basis of considerable advice and counseling from physical and biological scientists.

In general, this level of technology represents efficiency levels and practices which were present in 1965 on some better managed farms but are expected to be in general practice by 1970.

Capital and Labor Availability

In the programming models, capital was assumed to be available without limit at a 7% interest rate. This implies that no capital limitations would occur as long as the productive enterprises return expected market rates of interest on capital for the period of use. This applies to all specified inputs except land.

Operator and family labor that was estimated to have no off-farm opportunities was assumed available at a zero cost. Operator or family labor which had off-farm opportunity was available at a cost equal to the expected 1970 hired wage rate. Additional labor could be hired at this same wage rate. The distinction as to off-farm opportunities could result in pricing operator labor at zero for one season and at the hired wage rate for a different season. However, this may represent the pertinent alternatives.

Government Commodity Programs

No price support or commodity programs were assumed to exist for the situations examined. However, these results can prove quite useful in estimating supply response to government programs. The supply schedules should indicate if allotments would be restrictive and what price levels are needed to bring forth various levels of production.

Input Prices

Prices used in this study for purchased inputs were based on linear projections to 1970 of national price indexes for the period 1950 to 1963 (Table 1). The local average 1961–63 price for the selected input was adjusted by the ratio of the projected national 1970 price to the

Table 1. Indexes of United States average prices paid for selected production items with projections to 1970 (1957–59 = 100).[a]

Item	Motor supplies	Motor vehicles	Farm machinery	Building and fencing material	Fertilizer	Wage rates	Feed	Soybean oil meal (44% protein)	Cottonseed meal (41% protein)
1950–63 average	99[b]	94	96	98[b]	100	96	106	110	117
1961–63 average	101	105	101	101	100	113	101	114	112
Projected—1970	107	125	133	110	101	137	86	97	103

[a] Sources: *The Farm Cost Situation*, 1964; Outlook Issue, ERS, USDA, Nov. 1963; and *Agricultural Prices*, U.S. Department of Agriculture, SRS, May 1964.

[b] The base period used for motor supplies and building and fencing material was 1954 to 1963 instead of 1950 to 1963.

national average 1961–63 price. Then the method preserves the local price differentials projected to 1970.

The projections in Table 1 for "feed" apply only to selected items of purchased concentrates.

Seed costs were not based on national price projections but cost allocations for use of home-grown seed, cleaning and treatment, as well as purchase of hybrid seed, were projected by individual researchers for their respective study areas. Also, price quantities and costs of farm chemicals were projected by individual researchers.

Product Prices

In the analysis the wheat price was varied from zero to $3.50 per bushel to ensure that maximum wheat production was obtained. This procedure was repeated for each of three feed grain prices while all other product prices were held constant. The results allow comparison of returns from wheat with alternative crops over a wide variety both of price levels and price ratios.

To aggregate the individual farm results by areas and regions, some system of area price differentials for wheat and feed grains is needed. The method used was one of selecting a series of terminal markets and assigning each study area to a terminal market. Differentials between terminals were established on the basis of historical differentials, and the differentials between the terminal market and the respective study area were based on estimated transportation costs.

In this study, production was not allowed to shift to different terminal markets as would be true as geographic production patterns shift. To allow this shift would necessitate a spatial equilibrium model with transportation and production costs on the one hand facing demand schedules by terminal markets on the other.

Table 2. Terminal cash market price relationships for three general levels of feed grain prices.

Feed grain price level	Grain	Market					
		Kansas City	Portland	San Francisco	Fort Worth	Minne-apolis	Denver
		Dollars per bushel					
	Corn	.93	...	1.23	...	.87	.99
Low	Barley	.78	.88	.91	...	.74	.83
	Milo	.86	...	1.11	.97	...	.92
	Corn	1.07	...	1.39	...	1.01	1.13
Medium	Barley	.90	1.00	1.03	...	.86	.95
	Milo	.98	...	1.25	1.09	...	1.04
	Corn	1.34	...	1.70	...	1.28	1.40
High	Barley	1.13	1.23	1.26	...	1.09	1.18
	Milo	1.23	...	1.53	1.34	...	1.29

Table 3. Assumed terminal market wheat prices.[a]

Kansas City	Minneapolis		Fort Worth	Portland			
No. 2 hard and dark hard winter	Dark northern spring	No. 2 hard amber durum	No. 1 hard winter	No. 1 soft white	No. 1 red winter hard (ord.)	No. 1 hard red winter (12%)	No. 1 dark northern spring (13–14%)
Dollars per bushel							
1.00	1.13	1.18	1.21	1.02	1.08	1.11	1.20
1.25	1.42	1.47	1.51	1.28	1.34	1.38	1.50
1.50	1.70	1.76	1.81	1.54	1.61	1.66	1.80
1.75	1.98	2.06	2.11	1.79	1.88	1.93	2.09
2.00	2.27	2.35	2.42	2.05	2.15	2.21	2.39
2.25	2.55	2.64	2.72	2.30	2.42	2.49	2.69
2.50	2.83	2.94	3.02	2.56	2.69	2.76	2.99
2.75	3.12	3.23	3.32	2.82	2.96	3.04	3.29
3.00	3.40	3.53	3.62	3.07	3.23	3.32	3.59
3.25	3.68	3.82	3.92	3.33	3.50	3.59	3.89
3.50	3.97	4.11	4.23	3.58	3.76	3.87	4.19

[a] Proportionate relationship between Kansas City and other markets based on 1954–63 average.

The first step in setting feed grain and wheat prices was to choose one basic feed grain and one central terminal market. For this purpose the cash price of No. 2 corn at Kansas City was used as the base. The prices of feed grains and wheat at this market approximate the U.S. average. A substantial market exists for all the grains.

Given the base prices for the Kansas City market, historical differentials between Kansas City and other terminal markets were estimated for major feed grains. Local (per farm) prices for both feed grains and wheat were based on cash terminal prices minus transportation costs. This process results in the price assumptions given in Table 2 for three feed grain price levels and in Table 3 for wheat.

All livestock prices were based on a price of $24 per hundredweight for good grade slaughter steers at Omaha. Prices were adjusted to the study areas for type of livestock, grade, seasonal differences and location. Prices for crops other than wheat and feed grains were held constant at one level for all wheat and feed grain price levels.

Production Activities

Input-output budgets were prepared for each crop and livestock alternative using the above described procedures. These budgets were prepared by the individual researchers for their respective areas and then checked by subcommittees for comparability. These input-output budgets were retained and many of them are available in published form (see appendix of related publications).

The crop production alternatives offered in the analysis generally

were limited to those found on farms in the respective study areas at the time the study was initiated. This means that no new or "exotic" enterprises were included.

In some areas land resources were "subtracted out" for such specialty crops as sugar beets, potatoes, safflower, sunflower, broom corn, etc. These crops are minor in acreages and it generally was assumed that the same acreage will continue to be grown or that these enterprises would not substantially affect wheat and feed grain production.

Not all of the usual farm livestock enterprises were offered in the programming model. In general the procedure was to include only those livestock alternatives which were expected to affect the supply response of wheat on the representative farms.

Livestock enterprises included were those primarily dependent upon farm-produced pasture and forages. Situations which called for purchase of feed grains for high-concentrate consuming beef or hogs were omitted. Such omission was felt justified on the basis that exclusion of these alternatives would give better estimates of the expected price response of wheat and feed grains than if these livestock enterprises were included.

Study Areas

The criteria used to delineate the 38 study areas in parts of 11 states were based primarily on differences in adjustment alternatives. In most cases climate and soil variations resulted in different yields, cropping alternatives and tillage practices.

In each of the study areas, U.S. Census of Agriculture, Agricultural Stabilization and Conservation Service and other secondary data were used to determine estimates of total farmland, total cropland and number of farms. In some cases these data were also used for "subtracting out" land resources devoted to specialty crops and other land not included in the resource base for aggregation purposes.

Within each study area, representative resource situations (type and/or size of farm) were delineated on the basis of factors such as size of farm, soil capability, topography, development of irrigation and adjustment opportunities. Consequently, the number of resource situations varied considerably among areas.

Data used to develop the representative farms, and relative weights were obtained from records and soil surveys of the Soil Conservation Service, Agricultural Stabilization and Conservation Service, Statistical Reporting Service, U.S. Census of Agriculture and recent farm management surveys.

The optimal production plans determined for each representative farm were multiplied by the appropriate weight and summed to develop aggregates for each study area. These aggregates were prepared

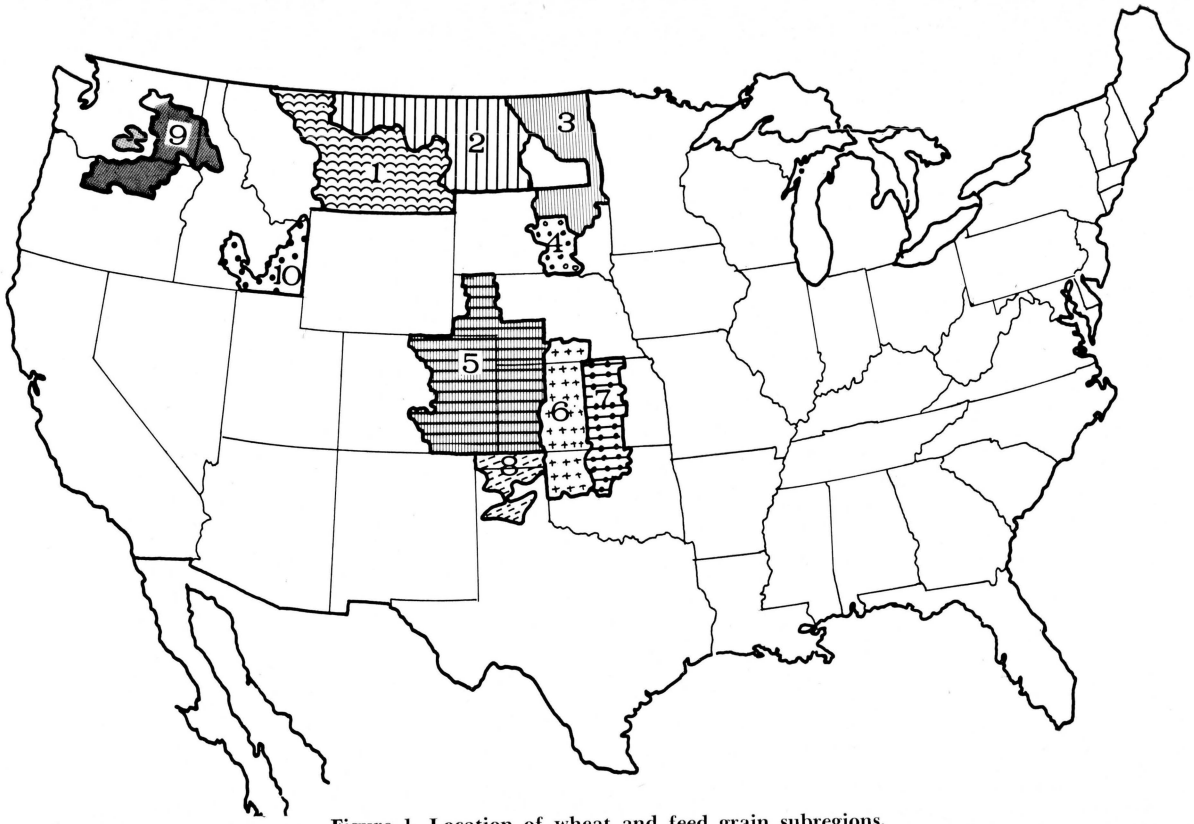

Figure 1. Location of wheat and feed grain subregions.

on the basis of projected 1970 farm numbers allowing some provision for changing size of farm.

In reporting results of the study, the 38 study areas were combined into 10 subregions (Figure 1). The bases for these combinations (across state lines in most instances) were the similarity of class of wheat and relative homogeneity of resources and production practices.[4]

Historical comparisons of total land, cropland and number of farms are presented in Table 4. These data indicate that from 67 to 100% of cropland in the subregions was represented by the farm resource situations chosen for programming and 90% of the cropland in the 10 subregions as a whole.

Based on 1964 totals, the study areas contained 62% of the national acreage and 62% of the production of Hard Winter, 70% of the acreage and 65% of the production of Hard Spring, 88% of the acreage and 89% of the production of Durum, and 71% of acreage and 70% of the production of Western White wheat (Table 5).

Other measures of the region's role in feed grain and wheat production are presented in Table 6.

ACREAGE AND PRODUCTION RESPONSE BY SUBREGION

This section contains an analysis, by subregion, of the effect of alternative wheat and feed grain prices on the acreage and production of wheat and feed grains and net beef production. In all cases the price mentioned is the Kansas City price. Subregions are referred to by number or name as identified in Figure 1.

Wheat and Feed Grain Acreage

The acreages of wheat and feed grains for the 10 subregions are presented in Tables 7 and 8. The discussion considers acreage response by wheat price and level of feed grain prices. In comparing wheat and feed grain acreage response to historical area acreages in the following discussion, it should again be pointed out that subregions vary in their coverage of cropland.

Low Feed Grain Prices

At the low feed-grain price level, two subregions, 1, Montana Winter Wheat, and 10, Southeastern Idaho, seed a *wheat* acreage

[4] A description and an historical acreage comparison for state study areas and results by state parts of subregions are included in a separate publication, "Wheat and Feed Grains in the Great Plains and Northwest: Study Area Descriptions and State Statistical Summaries," by W. F. Lagrone, Roy E. Hatch and Glenn A. Helmers; Great Plains Agricultural Council Pub. No. 38, Neb. Agr. Expt. Sta. Res. Bul. No. 237, 1970.

Table 4. Historical comparisons of total land, cropland and number of representative farms in 10 subregions (United States Census of Agriculture).

Subregions	Total land (1000 acres)			Cropland (1000 acres)				Number of farms		
						On rep. farms–1970				
	1954	1964	On rep. farms–1970	1954	1964	Total	% of 1964	1954	1964	Projected rep. farms 1970
1. Montana Winter Wheat	37497	38591	13253	8231	8561	8321	97	15643	14720	7201
2. Northern Plains Spring Wheat—Summer Fallow	32294	32906	22283	13648	13506	13490	100	26164	20419	18353
3. Northern Plains Spring Wheat—Flax	25390	24554	22149	18114	17860	16309	91	43156	33342	29250
4. South Dakota Mixed Spring and Winter Wheat	7505	7446	3759	2825	2837	1896	67	9032	7242	3864
5. Central Plains Winter Wheat—Summer Fallow	53087	53103	25618	23053	22778	17503	77	52333	40768	17729
6. Central Plains Transitional Winter Wheat	19749	19682	16709	10889	10550	9685	92	35333	27645	19875
7. Central Plains Continuous Winter Wheat	15188	15519	13857	9772	9700	9141	94	46703	36105	25991
8. Southern High Plains Winter Wheat—Sorghum	13095	12322	5458	5229	4995	4273	86	8982	6665	6337
9. Northwest White Wheat	11331	13873	12488	7764	8223	7930	96	12737	11022	9454
10. Southeastern Idaho Hard Winter Wheat	2103	1974	1974	1592	1651	1651	100	1674	1220	1066
Total 10 Subregions	217239	219970	137548	101117	100661	90199	90	251757	199148	139120

Table 5. Estimated acreage and production of four classes of wheat, 1964, in 10 subregions, 11 states and the United States.

Class of wheat	10 Subregions				11 States[a]				United States	
	Acreage		Production		Acreage		Production		Acreage	Production
	1000 acres planted	Percent of U.S. total	1000 bu. production	Percent of U.S. total	1000 acres planted	Percent of U.S. total	1000 bu. production	Percent of U.S. total	1000 acres planted	1000 bu. production
Hard Winter	20085	62	392449	62	29012	90	566658	89	32204	635000
Hard Spring	6098	59	117099	65	7723	89	153113	85	8702	180000
Durum	2207	88	59346	87	2500	99	67542	99	2519	68000
Western White	2579	71	98272	70	3130	86	117603	84	3620	140000
Total 4 Classes of Wheat	30969	66	667166	65	42365	90	904916	88	47045	1023000
Other Wheat	0	0	0	0	0	0	0	0	8627	260371
Total All Wheat	30969	56	667166	52	42365	76	904916	71	55672	1283371

[a] Texas, Oklahoma, Kansas, Colorado, Nebraska, South Dakota, North Dakota, Montana, Idaho, Washington and Oregon.
Source: Food Grain Statistics, Statistical Bulletin No. 423, USDA, ERS, April, 1968.
Wheat Situation, WS-206, USDA, ERS, November 1968.
State Acreage by Class of Wheat, Statistical Bulletin No. 369, USDA, July 1966.
Agricultural Statistics, 1966, USDA.

Table 6. Estimated acreage and production of four types of feed grains, 1964, in 10 subregions, 11 states and the United States.

Feed grain	10 Subregions					11 States[a]					United States		
	Acreage		Production			Acreage		Production			Acreage	Production	
	Harvested 1000 acres	Percent of U.S. total	Production 1000 bu.	Corn Equivalents[b] 1000 bu.	Percent of U.S. total	Harvested 1000 acres	Percent of U.S. total	Production 1000 bu.	Corn equivalents[b] 1000 bu.	Percent of U.S. total	Harvested 1000 acres	Production 1000 bu.	Corn equivalents[b] 1000 bu.
Corn	2366	4	100787	100787	3	9126	16	399625	399626	12	55369	3484253	3484253
Grain Sorghum	4684	40	163587	160314	33	11120	95	439202	430418	90	11742	489796	480000
Barley	5480	53	185420	155750	48	7512	73	254200	213528	66	10277	386059	324290
Oats	3739	19	142855	71428	17	7388	37	256300	128150	30	19759	852257	426128
Total 4 Feed Grains	16269	17	...	488279	10	35146	36	...	1171722	25	97147	...	4714671

[a] Montana, North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas, Washington, Oregon and Idaho.
[b] Corn equivalent per bushel basis: Corn, 1.00; Grain Sorghum, 0.98; Barley, 0.84; Oats, 0.50.
Source: Feed Statistics through 1966, Statistical Bulletin No. 410, USDA, September 1967.

Table 7. Acreage of wheat for specified assumed wheat prices, with historical comparison, 10 subregions.

Subregions	Acreage 1953	Acreage 1964	Feed grain price level[a]	Assumed Kansas City wheat prices ($/bu.) 1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
				1000 acres							
1. Montana Winter Wheat	3675	2320	L	3201	3740	4343	4526	4550	4550	4550	4550
			M	3201	3740	4343	4526	4550	4550	4550	4550
			H	360	1350	3492	4526	4550	4550	4550	4550
2. Northern Plains Spring Wheat—Summer Fallow	6461	3905	L	2163	7701	10568	10786	10840	11529	11587	11606
			M	1667	7701	10568	10786	10840	11529	11587	11606
			H	629	5314	10568	10786	10840	11529	11587	11606
3. Northern Plains Spring Wheat—Flax	6367	3937	L	2886	6464	9465	12580	13618	14008	14394	14526
			M	106	5884	9397	12605	13618	14010	14396	14526
			H	118	179	6993	11885	13650	14011	14409	14527
4. South Dakota Mixed Spring and Winter Wheat	653	380	L	314	710	826	905	907	909	910	944
			M	180	551	838	903	907	909	910	944
			H	145	332	394	544	763	908	908	944
5. Central Plains Winter Wheat—Summer Fallow	9495	7262	L	3870	5849	8128	9218	10380	10582	10654	11119
			M	2672	4429	6968	8478	9917	10582	10653	11113
			H	1132	2017	3412	5322	8369	9514	9834	11092
6. Central Plains Transitional Winter Wheat	5989	4220	L	900	7366	7774	8275	8472	8616	8616	8926
			M	619	2468	7551	7841	8472	8616	8616	8926
			H	0	329	923	7429	7710	8534	8616	8926
7. Central Plains Continuous Winter Wheat	6637	4524	L	267	7652	8089	8691	8867	8867	8867	8876
			M	25	1669	8089	8369	8572	8685	8685	8724
			H	0	28	1701	8369	8572	8685	8685	8726
8. Southern High Plains Winter Wheat—Sorghum	1180	1370	L	1234	1917	1970	2645	3602	3757	3838	3848
			M	614	1275	1827	1970	3058	3757	3838	3848
			H	536	636	1130	1680	1939	2206	3270	3843
9. Northwest White Wheat	4878	2574	L	2306	3276	3548	3668	3693	3692	3693	3720
			M	1373	3040	3427	3668	3693	3693	3693	3720
			H	1341	1613	2423	3282	3693	3693	3693	3720
10. Southeastern Idaho Hard Winter Wheat	1163	477	L	719	768	799	819	833	844	852	872
			M	684	768	799	819	833	844	852	872
			H	665	665	799	819	833	844	852	872
Total 10 Subregions	46498	30969	L	17860	45443	55510	62113	65762	67355	67961	68987
			M	11141	31525	53807	59965	64460	67175	67780	68829
			H	4926	12463	31835	54642	60919	64474	66404	68806

[a] Low feed grain price, Kansas City corn = $0.93/bushel
Medium feed grain price, Kansas City corn = $1.07/bushel

greater than the 1964 actual seeded acreage at a wheat price of $1 per bushel (Table 7).

Three other subregions, 4, 8 and 9, seed wheat acreages only slightly below the 1964 acreage.

With an increase in wheat price from $1 to $1.25 per bushel all subregions except one, Central Plains Winter Wheat-Summer Fallow, exceed the 1964 seeded acreage; and in only two others, Northwest White Wheat and Southeastern Idaho, is the seeded acreage below the 1953 actual acreage.

With an increase in the base price of wheat from $1.25 to $1.50 per bushel, 90% or more of the maximum acreage at any wheat price is seeded in subregions 1, 2, 7, 9 and 10.

However, in subregions 5, 9 and 10 the acreage is less than 1953 actual seedings. In subregions 9 and 10 the wheat acreage is less than the 1953 actual at all wheat price levels from $1 to $3.50 per bushel.

In subregion 8 the actual acreage of wheat seeded in 1964 was greater than in 1953.

At the low feed grain price level and a wheat price of $1 per bushel, subregions 1, 2, 3 and 4 in the Northern Plains plant less *feed grain* than in either 1953 or 1964.

However, in all other subregions the acreage of feed grains planted is greater than in either 1953 or 1964 with the largest acreages relative to historical figures in Central Plains subregions 5, 6 and 7.

In subregion 3, flax and soybeans are important at the lower price levels for wheat and feed grains. With an increase of wheat price from $1 to $1.25 per bushel the acreage of feed grains is significantly reduced, with only three subregions, 5, 8 and 10, maintaining a feed grain acreage as high as in 1953 or 1964.

With a further increase in wheat price to $1.50 per bushel, only subregion 8, with a considerable irrigation acreage in the Southern High Plains, maintains a feed grain acreage as large as in 1953 and 1964.

Medium Feed Grain Prices

At the medium feed grain price level and $1 per bushel for wheat the acreage of *wheat* is considerably less than at the low feed grain price level.

At a wheat base price of $1.25 per bushel the 1964 historical acreage is exceeded in an additional four subregions, 2, 3, 4 and 9; and, in subregions 1 and 2, the 1953 wheat acreage is also exceeded.

With an increase in wheat prices from $1.25 to $1.50 per bushel, 90% or more of the maximum acreage at any wheat price is seeded in subregions 1, 2, 7, 9 and 10 with little difference in wheat acreage due to feed grain price level.

Table 8. Acreage of feed grains at specified assumed wheat prices, with historical comparison, 10 subregions.

Subregion	Acreage 1953	Acreage 1964	Feed grain price level	Assumed Kansas City wheat prices ($/bu.) 1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
				1000 acres							
1. Montana Winter Wheat	662	1201	L	0	0	0	0	0	0	0	0
			M	0	0	0	0	0	0	0	0
			H	3983	2992	851	0	0	0	0	0
2. Northern Plains Spring Wheat—Summer Fallow	1119	1723	L	701	332	284	284	281	49	44	25
			M	701	332	284	284	281	49	44	25
			H	6755	4308	284	284	281	49	44	25
3. Northern Plains Spring Wheat—Flax	4234	4024	L	2854	1426	1086	758	331	330	331	308
			M	6682	2259	1132	783	917	330	335	308
			H	11798	11751	5614	2433	1084	1046	1067	916
4. South Dakota Mixed Spring and Winter Wheat	1510	863	L	181	56	35	47	48	50	51	46
			M	714	371	46	47	48	50	51	46
			H	1198	1092	997	779	341	53	54	46
5. Central Plains Winter Wheat—Summer Fallow	3085	3304	L	7069	4160	1989	1116	723	619	619	640
			M	8851	6333	3660	2196	1166	619	619	639
			H	11467	10262	8420	5678	2913	2101	1610	681
6. Central Plains Transitional Winter Wheat	1833	1445	L	6485	927	623	447	447	447	447	226
			M	7164	6037	927	788	447	447	447	226
			H	9146	8634	7834	1356	1096	610	447	226
7. Central Plains Continuous Winter Wheat	1601	1805	L	7035	334	320	0	0	0	0	0
			M	7777	6395	320	320	276	184	184	152
			H	8480	8451	6904	320	276	184	184	152
8. Southern High Plains Winter Wheat—Sorghum	1317	876	L	2326	1680	1611	935	0	0	0	0
			M	2967	2326	1774	1615	550	0	6	0
			H	3123	2995	2505	1935	1685	1634	569	6
9. Northwest White Wheat	148	794	L	1816	393	0	0	0	0	0	0
			M	2444	1059	384	143	0	0	0	0
			H	2476	2204	1268	1721	396	0	0	0
10. Southeastern Idaho Hard Winter Wheat	84	234	L	239	189	158	138	124	113	105	85
			M	273	189	158	138	124	113	105	85
			H	292	292	158	138	124	113	105	85
Total 10 Subregions	15593	16269	L	28706	9497	6106	3725	1954	1608	1597	1330
			M	37572	25301	8685	6314	3809	1792	1790	1481
			H	58718	52981	34835	14644	8196	5790	4080	2137

However, in subregion 5 an acreage less than the 1964 figure is seeded.

At a $1 per bushel price for wheat and the medium feed grain price level, *feed grain* acreages are increased significantly compared with the low feed grain price level in all subregions except subregions 1 and 2.

In addition to the above, only subregion 4 has feed acreages less than in either 1953 or 1964.

With an increase in price of wheat from $1 to $1.25 per bushel, feed grain acreage is reduced with the greatest percentage reduction occurring in subregion 3.

An increase in wheat price from $1.25 to $1.50 per bushel results in further reduction but both the 1953 and 1964 historical acreage is exceeded in subregions 5 and 8. In subregion 8, a $2 price for wheat is required to reduce feed grain acreage below the 1953 and 1964 acreages.

High Feed Grain Prices

At the high feed grain price level and $1 per bushel for wheat, only in subregion 10 is the *wheat* acreage as large as that seeded in 1964.

With an increase in wheat price from $1 to $1.25 per bushel, subregion 2 joins subregion 10 with a wheat acreage greater than the 1964 actual acreage.

With a further wheat price increase from $1.25 to $1.50 per bushel, subregions 1, 3, and 4 also exceed the 1964 acreage and in subregions 2 and 3, the 1953 seeded acreage is also exceeded.

At the wheat price of $1.75 per bushel the 1964 seeded acreage is exceeded in all subregions except subregion 5. At a price of $2 per bushel, both the 1953 and 1964 acreage is exceeded in all subregions except subregions 5, 9 and 10.

As mentioned before, cropping restraints in subregions 9 and 10 result in a maximum wheat acreage less than in 1953.

At a wheat price of $2.25 per bushel, 90% or more of the maximum wheat acreage is seeded except in subregions 5 and 8.

At a wheat price of $1 per bushel and the high feed grain price level, *feed grain* acreages are increased considerably compared with the medium feed grain price level, with the greatest relative increases occurring in subregions 1 and 2.

With an increase in the price of wheat from $1 to $1.25 per bushel, there is a significant decrease in feed grains in subregions 1 and 2 but only minor decreases in the other subregions.

A wheat price of $1.50 per bushel further reduces feed grains but acreages are considerably greater than the 1953 and 1964 actual acreages in subregions 3, 5, 6, 7, 8 and 9. Even at a wheat price of $1.75 larger feed grain acreage relative to 1953 and 1964 are maintained in subregions 5, 8 and 9.

Location of Wheat Acreage

In both 1953 and 1964 subregion 5 had more than 20% of all wheat acreage in the 10 subregions. However, as the wheat and feed grain prices are varied, this percentage is maintained at only the wheat price of $1 per bushel (Appendix Table 1). As wheat prices are increased, a greater proportion of the total acreage is concentrated in subregions 2 and 3.

Similarly, there is some reduction in proportion of the total wheat acreage at higher prices in subregions 1, 9 and 10 with negligible changes in subregions 4, 6, 7 and 8.

As with absolute acreages of wheat, the percentage of cropland on representative farms in wheat increases greatly with increases in the price of wheat (Appendix Table 2).

Other Cropland Uses

Cropland use distributions by three feed grain price levels are presented in Appendix Tables 3, 4 and 5.

Apart from wheat and feed grain acreages previously discussed, other cropland uses in six subregions are influenced significantly by assumptions with respect to rotational requirements for summer-fallow and yield relationships between continuous cropping and cropping after summer-fallow.

Requirements for summer-fallow per acre of wheat and/or feed grains are highest in subregions 1, 4, 9 and 10.

In subregion 1, a small acreage of forage and tame pasture is grown at the lower wheat prices.

In subregion 9, about 5% of the cropland is devoted to other crops, primarily peas, with only a slight reduction in acreage as wheat prices are increased.

In subregion 10, cropland uses are limited to wheat, feed grain (barley) and summer-fallow.

In all three subregions, there is little change in other cropland use by feed grain price level.

In subregion 5, summer-fallow requires a somewhat smaller percentage of cropland than in the above three subregions, particularly at high feed grain price levels and low wheat prices.

Forage and tame pasture acreages supplement native range in beef cattle production, with greater emphasis at lower wheat prices and the low and medium feed grain price level.

In subregion 2, continuous wheat becomes profitable at a price of $1.50 per bushel in the western North Dakota part of the subregion and summer-fallow requirements decline sharply. At the two lowest wheat prices and the low and medium feed grain price levels, large acreages of forage and tame pastures are used in beef cattle production.

In subregion 4, summer-fallow is closely associated with the acreage seeded to wheat. Also, large acreages of forage, tame pasture, and reseeded cropland are used in beef cattle production at the lowest wheat prices and the low and medium feed grain price levels.

In subregion 3 large acreages of cropland are used for special crops, principally flax and soybeans, and for forage and tame pastures at low prices for wheat and feed grains.

In subregion 6 and subregion 8 summer-fallow is of limited importance. In subregion 7 no summer-fallow is included in optimum organizations. In all three subregions, forage, tame pasture, and reseeded cropland acreages are used in beef cattle production with relatively greater importance at lower wheat prices and feed grain price levels.

Production Response

The production of wheat, feed grains and net beef production for assumed Kansas City wheat prices and feed grain price levels are presented in Tables 9, 10 and 11. Feed grain production is converted to bushels of corn equivalents. The production response by subregions is similar to those discussed under acreage response for wheat and feed grains. Net beef production includes the production of calves and cull cow beef sold plus the net increase in weight obtained from stockers purchased and later sold primarily as long yearlings or two-year olds. The net production of beef is greater at both lower wheat prices and lower feed grain price levels. The more significant differences occur in the Northern Plains, subregions 2, 3 and 4. Since livestock feeding was not a permissible activity on the representative farms, forage based livestock were important as an income producer at the lower price conditions.

REGIONAL AGGREGATIONS

For each of the selected wheat prices and three feed grain price levels, aggregate acreage and production of wheat and feed grains, other cropland uses, and net production of beef cattle were developed by adding these items for the 10 subregions.

Wheat and Feed Grain Acreage

At the low feed grain price levels, total *wheat acreage* exceeds 1964 and is only slightly less than the 1953 seeded acreage at a wheat price of $1.25 per bushel (Table 12). At a price of $1.75 per bushel, wheat acreage is double the 1964 acreage and one and one-third times the 1953 acreage. This acreage is about 90% of the wheat acreage at the highest wheat price.

Table 9. Production of wheat for specified assumed wheat prices, 10 subregions.

Subregions	Feed grain price level	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 bu.							
1. Montana Winter Wheat	L	78411	85664	98069	100883	101364	101364	101364	101364
	M	78411	85664	98069	100883	101364	101364	101364	101364
	H	8856	24115	98069	100883	101364	101364	101364	101364
2. Northern Plains Spring Wheat—Summer Fallow	L	30295	101080	138489	141323	142035	150298	150728	150979
	M	21921	101080	138489	141323	142035	150298	150728	150979
	H	8256	69992	138489	141323	142035	150298	150728	150979
3. Northern Plains Spring Wheat—Flax	L	59645	125701	165135	218101	230349	234972	242249	244278
	M	1603	110934	164159	218489	229118	234905	242211	244278
	H	1990	3024	102455	205833	228726	233623	241113	242942
4. South Dakota Mixed Spring and Winter Wheat	L	6057	18569	21313	23196	23250	23296	23308	23596
	M	4536	14226	21601	23150	23250	23296	23308	23596
	H	3609	7848	9704	13295	19156	23257	23268	23596
5. Central Plains Winter Wheat—Summer Fallow	L	68634	109157	163127	188347	200374	203295	203919	207343
	M	36803	95370	125777	162063	190309	203299	203956	207037
	H	16329	31896	58452	96666	142016	167142	175038	206853
6. Central Plains Transitional Winter Wheat	L	19664	122718	131098	140560	142644	144143	144143	148686
	M	13934	44224	125567	129984	142644	144143	144143	148686
	H	0	6961	19621	123642	127871	140852	144143	148686
7. Central Plains Continuous Winter Wheat	L	7228	196541	206453	221210	223960	223960	223960	224227
	M	688	41143	206453	212872	216341	219256	219256	220340
	H	0	758	41662	212872	216341	219256	219256	220340
8. Southern High Plains Winter Wheat—Sorghum	L	17239	39349	39975	81974	118140	119427	120068	120132
	M	7963	17575	36350	48294	100944	119427	120068	120132
	H	6802	8150	15995	33207	48914	51315	102708	120104
9. Northwest White Wheat	L	82110	125403	139874	143898	145216	145216	145216	145677
	M	49690	116414	133378	143898	145216	145216	145216	145677
	H	48930	57302	91827	125721	145216	145216	145216	145677
10. Southeastern Idaho Hard Winter Wheat	L	14561	15074	15316	15444	15521	15570	15603	15677
	M	14120	15074	15316	15444	15521	15570	15603	15677
	H	13884	13884	15316	15444	15521	15570	15603	15677
Total 10 Subregions	L	383844	939256	1118849	1274936	1342852	1361541	1370558	1381959
	M	229669	641704	1065159	1196400	1306742	1356774	1365853	1377766
	H	108656	223930	591590	1068886	1187160	1247893	1318437	1376218

Table 10. Production of feed grain for specified assumed wheat prices, 10 subregions.

Subregions	Feed grain price level	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 bu. (corn equivalents)							
1. Montana Winter Wheat	L	0	0	0	0	0	0	0	0
	M	0	0	0	0	0	0	0	0
	H	105861	87317	24843	0	0	0	0	0
2. Northern Plains Spring Wheat—Summer Fallow	L	10648	4955	4186	4186	4141	743	661	374
	M	10648	4955	4186	4186	4141	743	661	374
	H	106635	63197	4186	4186	4141	743	661	374
3. Northern Plains Spring Wheat—Flax	L	54473	28487	21267	14727	6757	6523	6335	6430
	M	152488	55968	22334	15020	29011	6523	6450	6430
	H	276276	275323	129513	72739	34154	32276	32531	32211
4. South Dakota Mixed Spring and Winter Wheat	L	3162	493	557	744	746	782	783	601
	M	21544	11688	757	744	746	782	783	601
	H	33373	31211	29141	23031	11497	797	799	601
5. Central Plains Winter Wheat—Summer Fallow	L	224176	159138	77117	33465	15384	11009	11009	7606
	M	255159	210361	148342	89835	34731	11009	10980	11860
	H	301116	281883	247852	195629	129625	88626	63095	12105
6. Central Plains Transitional Winter Wheat	L	176631	33488	22705	13687	13687	13717	13717	6933
	M	191632	154920	33488	30233	13687	13717	13717	6933
	H	228514	217638	196763	43930	36939	21210	13717	6933
7. Central Plains Continuous Winter Wheat	L	251302	12027	11577	0	0	0	0	0
	M	273206	230040	11575	11575	11601	7672	7672	0
	H	292523	291748	245661	11577	11601	7672	7672	6383
8. Southern High Plains Winter Wheat—Sorghum	L	171134	140025	138350	77947	0	0	0	0
	M	204372	192877	168032	162620	54606	0	108	0
	H	206925	204838	194542	174083	164307	163016	64232	108
9. Northwest White Wheat	L	79967	20747	0	0	0	0	0	0
	M	97028	48243	20343	7591	0	0	0	0
	H	97628	90712	57388	63906	20895	0	0	0
10. Southeastern Idaho Hard Winter Wheat	L	5688	4767	4042	3496	3079	2751	2490	1814
	M	6134	4767	4042	3496	3079	2751	2490	1814
	H	6314	6314	4042	3496	3079	2751	2490	1814
Total 10 Subregions	L	977181	404127	279801	148252	43794	35525	34995	23758
	M	1212211	913819	413099	325300	151602	43197	42861	28012
	H	1655165	1550181	1133931	592577	416238	317091	185197	60529

Table 11. Net beef production for specified assumed wheat prices, 10 subregions.

Subregions	Feed grain price level	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 cwt.							
1. Montana Winter Wheat	L	634	610	569	569	570	570	570	570
	M	634	610	569	569	570	570	570	570
	H	610	610	569	569	570	570	570	570
2. Northern Plains Spring Wheat—Summer Fallow	L	933	783	614	566	560	455	445	445
	M	927	783	614	566	560	455	445	445
	H	664	713	614	566	560	455	445	445
3. Northern Plains Spring Wheat—Flax	L	8508	7887	6675	5159	3503	3506	3513	3293
	M	6250	7926	6632	5810	3588	3867	3322	3293
	H	4994	4873	4544	4630	3588	4219	3509	3261
4. South Dakota Mixed Spring and Winter Wheat	L	2327	1200	907	794	749	742	742	654
	M	1702	1206	826	798	749	742	742	654
	H	1031	781	772	741	741	715	715	627
5. Central Plains Winter Wheat—Summer Fallow	L	4660	4712	4944	4680	4299	4023	3925	3490
	M	4329	4385	4576	4783	4652	4016	3826	3389
	H	3629	3712	4005	4287	4283	4284	4190	3388
6. Central Plains Transitional Winter Wheat	L	6350	6615	6469	6380	6177	5797	5797	4947
	M	6135	6344	6473	6380	6177	5797	5797	4947
	H	5797	5847	6112	6068	6163	5797	5797	4947
7. Central Plains Continuous Winter Wheat	L	6273	6252	6330	6235	5663	5663	5663	5471
	M	5602	6148	6330	6229	5995	5639	5639	5422
	H	5574	5577	6180	6229	5995	5639	5639	5428
8. Southern High Plains Winter Wheat—Sorghum	L	1270	1147	1169	997	1818	1680	1612	1609
	M	1319	1305	1215	1223	1101	1680	1607	1609
	H	1260	1298	1258	1212	1209	1026	731	1608
9. Northwest White Wheat	L	0	0	0	0	0	0	0	0
	M	0	0	0	0	0	0	0	0
	H	0	0	0	0	0	0	0	0
10. Southeastern Idaho Hard Winter Wheat	L	0	0	0	0	0	0	0	0
	M	0	0	0	0	0	0	0	0
	H	0	0	0	0	0	0	0	0
Total 10 Subregions	L	30955	29206	27677	25378	23339	22436	22267	20479
	M	26898	28707	27235	26358	23392	22766	21948	20329
	H	23559	23411	24054	24302	23109	22705	21596	20274

Table 12. Cropland use distribution by feed grain price levels for specified assumed wheat prices, total of 10 subregions.

Feed grain price level	Cropland use	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 acres							
Low	Wheat	17860	45443	55510	62113	65762	67355	67961	68987
	Feed grain	28706	9497	6106	3725	1954	1608	1597	1330
	Summer fallow	23652	22919	19389	18907	19037	18580	18458	18109
	Forage	5758	4730	3251	2359	1499	1253	1140	717
	Tame pasture	7633	3293	1984	1151	431	144	31	0
	Reseeded cropland	1422	656	390	331	327	327	327	327
	Special crops	5043	3549	3450	1546	903	614	573	556
	Total cropland use	90074	90087	90080	90132	89913	89881	90087	90026
Medium	Wheat	11141	31525	53807	59965	64460	67175	67780	68829
	Feed grain	37572	25301	8685	6314	3809	1792	1790	1481
	Summer fallow	23193	21253	18679	18528	18456	18538	18426	18118
	Forage	4906	4603	3238	2351	1534	1292	1168	713
	Tame pasture	6366	3126	1871	1101	426	144	26	0
	Reseeded cropland	1222	554	345	331	327	327	327	327
	Special crops	5626	3728	3455	1528	903	612	572	556
	Total cropland use	90026	90090	90080	90118	89915	89880	90089	90024
High	Wheat	4926	12463	31835	54642	60919	64474	66404	68806
	Feed grain	58718	52981	34835	14644	8196	5790	4080	2137
	Summer fallow	17415	16065	16707	16315	17717	17304	17393	17462
	Forage	2925	2904	2630	2161	1525	1320	1172	740
	Tame pasture	2192	1892	932	738	423	54	20	0
	Reseeded cropland	399	327	327	327	327	327	327	327
	Special crops	3389	3363	2718	1260	815	611	562	555
	Total cropland use	89964	89995	89984	90087	89922	89880	89958	90027
	Cropland available	90199	90199	90199	90199	90199	90199	90199	90199

At the low feed grain price level, total feed grain acreage exceeds both 1964 and 1953 at a wheat price of $1 per bushel. As the price of wheat increases, feed grain acreage is significantly reduced. For example, the acreage at a wheat price of $1.75 per bushel is less than 25% of the 1964 and 1953 totals.

At the medium feed grain price level, total *wheat acreage* is slightly more than 1964 but considerably less than 1953 at a wheat price of $1.25 per bushel. At a wheat price of $1.50 or more, wheat acreages, in general, are only slightly less at the medium feed grain price than at the low feed grain price level. At the medium feed grain price level, total *feed grain* acreage is considerably greater than 1964 and 1953 acreages at wheat prices of $1 and $1.25 per bushel. At wheat prices of $1.50 or more, feed grain acreage is greatly reduced.

At the high feed grain price level, total *wheat acreage* is slightly more than the 1964 acreage at a base wheat price of $1.50 per bushel. At a base wheat price of $1.75, the wheat acreage is about 118% of the 1953 acreage. At high feed grain price levels, total *feed grain* acreages are much greater than the 1964 and 1953 acreages at the three lower wheat prices and more than 90% of historical acreages at a wheat price of $1.75 per bushel.

Comparison between programmed acreages of wheat and feed grains and historical acreages can be made to determine individual crop and general area cropland overcapacity. Ninety percent of the study region's 1964 cropland is included in the analysis. However, it is estimated that 95% of the 1964 wheat acreage in the 10 subregions was grown on representative farms used in the analysis.

Product price movements in recent years have centered on the medium feed grain price level and a $1.75 per bushel wheat price (including government payments).[5] Aggregate programmed wheat acreage of nearly 60 million acres at this price combination far exceeds historical *area* wheat acreages of 31 and 46.5 million acres in 1964 and 1953, respectively, even considering differences in assumptions regarding cropland resources.

At this same base product price, total programmed feed grain acreage is six million acres compared to a historical *area* acreage of 16 million acres in both 1964 and 1953. Hence, at the base price combination programmed wheat acreage is far greater than historical acreage and programmed feed grain acreage is moderately smaller than historical feed grain acreage.

A number of factors may account for this difference. It could be hypothesized that technological application lags account for part of this difference. That is, portions of the study region have experienced a greater growth in feed grain technology (primarily grain sorghum)

[5] The choice and substantiation of this price combination as a base price paralleling recent product prices is explained more fully in the Net Returns section.

compared to wheat. Lags in the acceptance of this technology may account for historical feed grain acreage smaller than that indicated by profit maximizing farm organizational plans.

Governmental acreage control programs may also account for these differences. *At the base price* wheat acreages far exceeding disposal potential would be indicated, accompanied by a relatively small feed grain acreage. Thus, large restriction on wheat acreage and substitution of feed grain acreage in control programs would account for the divergence.

Some indication of the general regional cropland "overcapacity" can be determined by summing wheat and feed grain acreages and comparing programmed acreages to historical acreages. This comparison can again be made at the base price level of $1.75 wheat and the medium feed grain price level.[6] At this base price, a combined programmed acreage of wheat and feed grains of 66.3 million acres results. Regional historical combined acreages for 1964 and 1953 are 47.2 and 62.1 million acres. Estimated overall cropland overcapacity of the study region ranges from 10.4 to 24.6 million acres, depending upon historical comparisons considered.

Other Cropland Uses

About 90 million acres of cropland are utilized in the 10 subregions. In addition to wheat and feed grains, summer-fallow is a major user of cropland in the Great Plains and the Northwest (Table 12). Although the acreage in summer-fallow generally decreases as the wheat price is increased, minor variations in this pattern are due to greater profitability of rotations including wheat and summer-fallow at wheat prices greater than $1.75 per bushel.

Summer-fallow acreage for each specific wheat price is only slightly lower at the medium feed grain price level than at the low feed grain price level. At the high feed grain price level, summer-fallow acreage is reduced because of increased continuous cropping and less emphasis on summer-fallow in rotations.

At the two lowest wheat prices and the low and medium feed grain price levels, large acreages of forage, tame pasture and reseeded cropland are used in extensive beef cattle production. At the high feed grain price level, a considerable part of this acreage is converted to feed grains. Large acreages of special crops, principally flax and soybeans, are grown at the two lowest wheat prices and the low and medium feed grain price levels.

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[6] For overall cropland capacity comparisons the question of "which" product price combination to use is not crucial since in a large part other similar product price combinations result in programmed wheat and feed grain acreages combined of roughly the same magnitude.

Production

The enormous productive capacity of the Great Plains and Northwest with respect to wheat and feed grains is indicated by a comparison between actual 1964 production and aggregate production for all 10 subregions at specified price relationships for wheat and feed grains and no control program for crops (Table 13).

At a price of $1 per bushel, wheat production is less than in 1964 at all feed grain price levels. At a price of $1.25 per bushel, wheat production is 141, 96 and 34% of the 1964 production at the low, medium and high feed grain price levels respectively. At a price of $1.50 per bushel, wheat production is considerably greater at both the low and medium levels but only 89% of 1964 at the high feed grain price level. At a base price of $1.75 per bushel, wheat production is much greater than 1964 at all feed grain price levels.

Comparing 1964 production with the base price combination, $1.75 wheat and medium feed grain price level, the programmed wheat production is 1,196 million bushels, 529 million bushels or 79% more than in 1964.

However, this production requires an increase in seeded acreage of 94% over that seeded in 1964. This reduction in yield compared with 1964 is the result of bringing less productive land into wheat production. Conversely, 67% of 1964 feed grain production (in corn equivalents) is produced on 39% of the 1964 acreage under the programming assumptions of $1.75 wheat and the medium feed grain price level. This increase in yield is the result of a greater concentration of the programmed feed grain acreage in the higher yielding (in corn equivalents) grain sorghum areas of the Central and Southern Great Plains than in 1964 when barley in the Northern Plains and the Northwest was of greater relative importance.

In general, feed grain production response is opposite to that of wheat with greatest production at low wheat prices and the medium and high feed grain price levels. At wheat prices of $1 and $1.25 per bushel, feed grain production is more than three times 1964 at the high feed grain price level. At only one price comparison, $1.75 wheat and the high feed grain price level, is production of both wheat and feed grains greater than 1964; wheat, 160%, and feed grains, 122% of 1964. Also, the average programmed wheat yield at this wheat price-feed grain price level is less and the average feed grain yield is higher than 1964 because less productive land is brought into wheat production, and there is somewhat greater concentration of feed grain acreage in the grain sorghum producing subregions than in 1964.

Since net beef production in Table 13 includes production from forage based cattle only, historical production comparisons are unavailable.

Table 13. Production of wheat, feed grain and beef at specified assumed wheat prices, with historical comparison, total of 10 subregions.

	Historical production		Feed grain price level	Assumed Kansas City wheat price ($/bu.)							
	1953	1964		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
	Million bushels			Million bushels							
Wheat Production	633	667	L	383	939	1,118	1,275	1,343	1,361	1,370	1,383
			M	230	641	1,065	1,196	1,307	1,357	1,365	1,379
			H	109	224	592	1,069	1,187	1,248	1,318	1,376
Feed Grain Production[a]	304	488	L	977	404	280	148	44	36	35	24
			M	1,212	914	413	325	152	43	43	28
			H	1,655	1,550	1,134	593	416	317	185	61
				1,000 cwt.							
Net Beef Production	N.A.	N.A.	L	30,955	29,206	27,677	25,378	23,339	22,436	22,267	20,479
			M	26,898	28,707	27,235	26,358	23,392	22,766	21,948	20,329
			H	23,559	23,411	24,054	24,302	23,109	22,705	21,596	20,274

[a] Bushels of corn equivalents: Corn, 1.00; grain sorghum, 0.98; barley, 0.84; oats, 0.50.

In general, beef production is greatest at the lower wheat prices and low and medium feed grain price levels. At the low feed grain price level, beef production decreases throughout the wheat price range of $1 to $3.50 per bushel.

At the medium and high feed grain price levels, there are some increases in beef production at wheat prices above $1 per bushel due to a combination of rotational requirements and the use of wheat for winter and early spring grazing in the Central and Southern Plains.

At the base price combination, $1.75 wheat and the medium feed grain price level, beef production is actually higher than at the low feed grain price level, mainly because of reasons previously stated.

The stability of forage based beef production as a result of native range plus wheat pasture on wheat farms in the Great Plains and Northwest is indicated by the fact that beef production at the highest wheat price is at least 65% of the production at the lowest wheat price, $1 per bushel, and the low feed grain price level.

SUPPLY RESPONSE OF WHEAT BY CLASS

The programmed aggregate wheat production is interpreted as the quantity of wheat that would be forthcoming at the various wheat-feed grain price relationships, given the underlying assumptions. The acreage and supply response is divided into three classes, Hard Winter, Hard Spring and Durum, and Western White (Table 14). In Figures 2 and 3, the differences in the acreage and supply response by wheat class are most apparent.

In appraising acreage response by class of wheat, the 1964 acreage of Hard Winter wheat is met at a price between $1 and $1.25 (about $1.20 from Fig. 2) at the low; between $1.25 and $1.50 (about $1.41 from Fig. 2) at the medium; and $1.50 and $1.75 per bushel (about $1.70 from Fig. 2) at the high feed grain price levels.

Although 89% of the 1964 acreage of Western White wheat is met at a base price of $1 an approximate price of $1.10 per bushel (from Fig. 2) is required to reach 100% of the 1964 acreage at the low feed grain price level.

At the medium feed grain price level, the 1964 acreage is met at a price between $1 and $1.25 (about $1.20 from Fig. 2); at the high feed grain price level, the 1964 wheat acreage is met at a price between $1.50 and $1.75 per bushel (about $1.60 from Fig. 2).

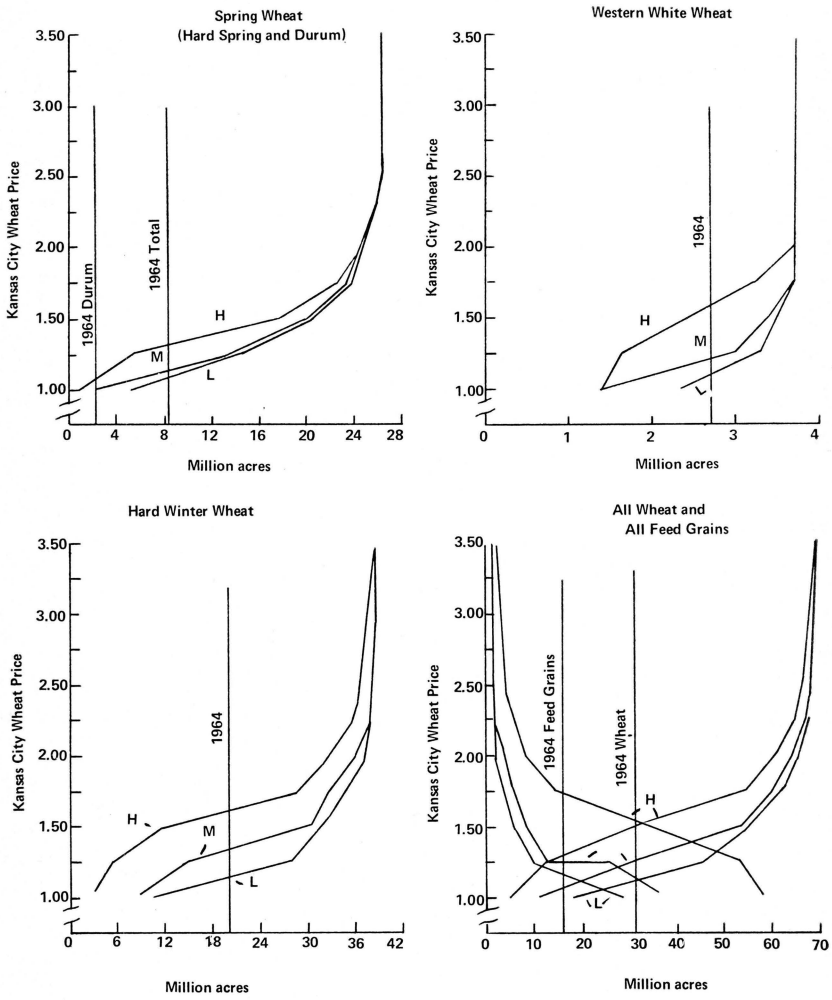
If these relationships are properly interpreted from Fig. 2, the results imply that the 1964 Western White wheat acreage can be maintained at the medium feed grain price level (corn price of $1.07 per bushel) with only a 10¢ increase compared with a 40¢ per bushel increase in price required to maintain the 1964 Western White acreage at the high feed grain price level (corn price of $1.34 per bushel).

Since there was no reasonable way to identify separate Durum

Table 14. Estimated acreage and production of wheat by class for specified assumed wheat prices, with historical comparisons, 10 subregions.

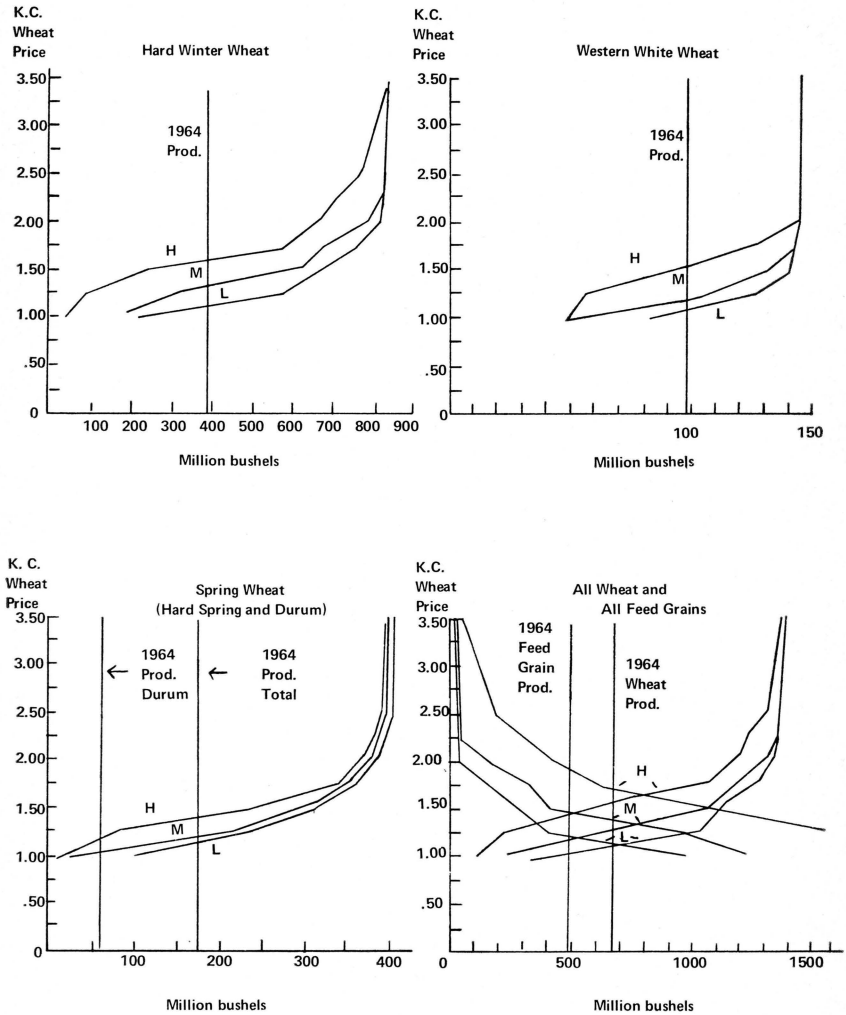
Class of wheat	Historical 1964	Feed grain price level	Assumed Kansas City wheat price ($/bu.)							
			1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
	1000 acres		1000 acres							
Hard Winter	20,085	L	10,381	27,722	31,603	34,722	37,253	37,766	37,928	38,862
		M	7,952	14,769	30,216	32,691	36,093	37,727	37,887	38,752
		H	2,807	5,285	11,766	28,571	32,571	35,045	36,519	38,747
Hard Spring and Durum	8,305	L	5,173	14,445	20,359	23,723	24,816	25,896	26,340	26,405
Hard Spring	(6,098)	M	1,816	13,716	20,164	23,606	24,676	25,755	26,200	26,357
Durum	(2,207)	H	778	5,565	17,646	22,789	24,655	25,736	26,192	26,337
Western White	2,579	L	2,306	3,276	3,548	3,668	3,693	3,693	3,693	3,720
		M	1,373	3,040	3,427	3,668	3,693	3,693	3,693	3,720
		H	1,341	1,613	2,423	3,282	3,693	3,693	3,693	3,720
Total	30,969	L	17,860	45,443	55,510	62,113	65,762	67,355	67,961	68,987
		M	11,141	31,525	53,807	59,965	64,460	67,175	67,780	68,829
		H	4,926	12,463	31,835	54,642	60,919	64,474	66,404	68,806
	Million bushels		Million bushels							
Hard Winter	393	L	209	580	667	762	816	822	823	832
		M	155	310	624	687	785	821	822	832
		H	49	92	257	593	667	714	776	831
Hard Spring and Durum	176	L	92	234	312	369	382	394	402	405
Hard Spring	(117)	M	25	215	308	365	377	391	398	401
Durum	(59)	H	11	75	243	350	375	389	397	399
Western White	98	L	82	125	140	144	145	145	145	146
		M	50	116	133	144	145	145	145	146
		H	49	57	92	126	145	145	145	146
Total	667	L	383	939	1,119	1,275	1,343	1,361	1,370	1,383
		M	230	641	1,065	1,196	1,307	1,357	1,365	1,379
		H	109	224	592	1,069	1,187	1,248	1,318	1,376

Source: Food Grain Statistics, Stat. Bul. 423, ERS, USDA, April 1968. Wheat Situation, WS-206, ERS, USDA, Nov. 1968; State Acreage by Class of Wheat, Stat. Bul. 369, USDA, July, 1966; Agricultural Statistics, 1966, USDA.



L Low feed grain price, Kansas City corn = $0.93/bushel
M Medium feed grain price, Kansas City corn = $1.07/bushel
H High feed grain price, Kansas City corn = $1.34/bushel

Figure 2.—Acreage Response by Class of Wheat, 10 Subregions



L Low feed grain price, Kansas City corn = $0.93/bushel
M Medium feed grain price, Kansas City corn = $1.07/bushel
H High feed grain price, Kansas City corn = $1.34/bushel

Figure 3.—Production Response by Class of Wheat, 10 Subregions

and Hard Spring activities in the adapted subregions, the two spring wheats are considered together within a total acreage response framework. At the low feed grain price level (corn price of 93¢ per bushel), an acreage equivalent to the 1964 Durum plus 49% of the Hard Spring wheat acreage is attained at a wheat price of $1 per bushel. An acreage equal to the 1964 total for both Durum and Hard Spring wheat is reached at a wheat price between $1 and $1.25 per bushel (about $1.05 from Fig. 2).

At the medium feed grain price level, the 1964 total for both Durum and Hard Spring is reached at a wheat price between $1 and $1.25 ($1.15 from Fig. 2).

At the high feed grain price level, the 1964 total for both Durum and Hard Spring acreage is reached at a wheat price between $1.25 and $1.50 per bushel (about $1.30 from Fig. 2).

Therefore, 1964 acreages of both Durum and Hard Spring are met within a wheat price range of 25¢ per bushel ($1.05 at the low and $1.30 at the high feed grain price level). This compares with a wheat price range of 50¢ per bushel for Hard Winter and Western White wheat. This again emphasizes the relative greater importance of Hard Spring and Durum wheat as production alternatives in the Northern Plains.

The supply response is more elastic at lower prices for both Spring (Hard Spring and Durum) and Western White wheat than for Hard Winter wheat. Also, the relatively small difference in supply response of Spring wheat by feed grain price level is clearly indicated.

At the low and medium feed grain price levels, supply elasticity of Spring wheat and Western White wheat is greatest between $1 and $1.25 per bushel. For Hard Winter wheat, supply elasticity is greatest between $1 and $1.25 per bushel at the low feed grain price level, between $1.25 and $1.50 per bushel at the medium feed grain price level and between $1.50 and $1.75 per bushel at the high feed grain price level.

At the high feed grain price level, the Spring wheat supply elasticity is greatest between $1 and $1.25 per bushel although the greatest absolute change in wheat supply occurs at a price between $1.25 and $1.50. At the high feed grain price level, the Western White wheat supply elasticity is greatest between $1.25 and $1.50 per bushel but with about the same absolute change in supply between $1.50 and $1.75 per bushel.

Considering the entire wheat price range the overall acreage and production supply elasticity is greatest for Hard Red Winter wheat. Western White wheat has the most inelastic supply response function with Spring wheat in an intermediate position. These differences are particularly apparent at wheat prices above $2 reflecting again the differences in organizational adjustment between class of wheat producing areas.

Within the most "relevant" range of wheat prices ($1 to $1.75 per bushel) and the medium feed grain price level, acreage and production (supply) are closely correlated for each wheat class although yields per acre appear to increase between $1 and $1.25 per bushel; to decrease slightly or remain about the same between $1.25 and $1.50; and to remain about the same between $1.50 and $1.75 per bushel.

Also, we can compare the total wheat supply with the total production of all feed grains (in bushels of corn equivalents) by price of wheat and level of feed grain price. As expected, the nature of the supply response for feed grains is roughly the reverse of those for wheat. In terms of bushels of corn equivalents and bushels of wheat at the high feed grain price level, the point of equal production is reached at a price of about $1.63 per bushel for wheat and a production level of 850 million bushels. At the medium feed grain price level equal wheat and feed grain production (in bushels) is attained at a wheat price of about $1.31 per bushel. At the low feed grain price level, production is equal in bushels at a wheat price of about $1.12 per bushel.

Comparing total production of wheat in the 10 subregions with historical production, wheat production at a price of $1 per bushel is considerably less than 1964 at all feed grain price levels and at a price of $1.25 per bushel 1964 production is exceeded only at the low feed grain price. However, production at the medium feed grain price level (and $1.25 wheat) is 95% of 1964. At a price of $1.50 per bushel wheat production is considerably greater than 1964 at both the low and medium feed grain price levels but less than 1964, 88%, at the high feed grain price level.

In a predictive sense, several limitations apply to conditionally normative supply response models (profit maximizing) as used in this study. Some farm operators may not make most profitable adjustments because of factors such as lack of capital, age and goals, availability of labor, and opportunities for off-farm employment. Time required for major adjustments in farm enterprises is inadequately considered.

In summary, the supply response represents the potential production of wheat rather than the probable production of wheat at prices indicated. However, less deviation between potential and probable supplies of wheat are likely in the price range of $1.25 to $1.75 per bushel for wheat where results appear most reasonable in the light of past cropland use and production changes.

UTILIZATION AND PROJECTED PRODUCTION OF WHEAT BY CLASS

Historical production and utilization data indicate the heavy dependence of Hard Winter and Western White wheats on exports compared with Hard Spring and Durum wheats. During the 10-year

period, 1958-68, exports accounted for more than 6 for Hard Winter and for more than 8 out of each 10 bushels produced for Western White wheat, Table 15. Also, the 10-year data indicate that utilization exceeded production by 41 million bushels annually, 410 million bushels or 4% over the entire period. Slightly less than three-fourths of the excess of utilization over production occurred in Hard Winter although the percentage reduction was greater for Hard Spring.

Preliminary data for 1967–68 indicate that production exceeded utilization by 92 million bushels which is more than twice the annual average excess of utilization over production during the 10-year period. The surplus was greater for Hard Winter in absolute terms but the percentage surplus was slightly greater for Hard Spring.

In both the 10-year and 1967–68 periods, Durum wheat had a deficit of production compared with utilization. If we consider all data, Table 15, Durum wheat appears to have the most favorable, Hard Spring second most favorable, and Western White wheat the least favorable comparison of utilization with production.

It probably is true that wheat prices have been "managed" to a greater extent than those of any other commodity by both exporting and importing countries. To secure the "world" or the "equilibrium" price for wheat is far more difficult than for a commodity primarily used domestically or produced in a limited location or locations.

If we project production of wheat by class on the basis of results in the 10 subregions for selected wheat prices and the medium feed grain price level, total wheat production for the four classes is 969 million bushels at a price of $1.25 per bushel, or 89% of the 10-year average utilization.[7] Hard Winter wheat is considerably less and Hard Spring and Durum and Western White somewhat more, except 1965–66 utilization of Hard Spring and Durum, compared with historical utilization and production.

If the price of wheat is raised to $1.50 per bushel, the projected supply of all four classes is considerably greater than historical utilization and production with the greatest relative increase in supply of Hard Winter wheat.

If the price of wheat is raised from $1.50 to $1.75 per bushel, supply of the four classes of wheat is increased further by 12% with about the same relative increase for each class. The total supply at $1.75 per bushel is 168% of the 10-year average utilization and 132% of the utilization in 1965–66, the highest during any year of the 10-year period.

[7] Great Plains Regional Research Project GP-5 included objectives to consider the domestic and international aspects of wheat quality, demand and price. Due to numerous factors, these objectives were not accomplished by the marketing subcommittee. The production subcommittee considered wheat supply as influenced by variable wheat and feed grain prices in the study areas.

Table 15. Estimated production and utilization by class of wheat, selected years, United States.[a]

Item	10-yr. average 1958–59—1967–68		1964–65		1965–66		1967–68		Projected wheat supply[b] Medium feed grain price level Assumed K. C. wheat price		
									1.25	1.50	1.75
	Mil. bu.	Pct. of Prod.	Mil. bu.	Pct. of Prod.	Mil. bu.	Pct. of Prod.	Mil. bu.	Pct. of Prod.	Mil. bu.	Mil. bu.	Mil. bu.
Hard Red Winter											
Total production	678	100	635	100	673	100	711	100	500	1,006	1,108
Exports	430	63	498	78	595	88	369	52	...	...	...
Domestic disappearance	277	41	275	43	343	51	278	39	...	...	...
Total utilization	707	104	773	121	938	139	647	91	...	...	...
Surplus or deficit	–29	–4	–138	–21	–265	–39	+64	+9	...	...	...
Hard Red Spring											
Total production	184	100	180	100	209	100	236	100	...	...	...
Exports	56	30	25	14	86	41	73	31	...	...	...
Domestic disappearance	138	75	136	75	138	66	136	58	...	...	...
Total utilization	194	105	161	89	224	107	209	89	...	...	...
Surplus or deficit	–10	–5	+19	+11	–15	–7	+27	+11	...	...	...
Durum											
Total production	48	100	68	100	70	100	63	100	...	...	...
Exports	18	38	10	15	34	49	31	49	...	...	...
Domestic disappearance	31	64	31	45	50	71	38	60	...	...	...
Total utilization	49	102	41	60	84	120	69	109	...	...	...
Surplus or deficit	–1	–2	+27	+40	–14	–20	–6	–9	...	...	...

Table 15. Estimated production and utilization by class of wheat, selected years, United States[a] *(continued).*

Item	10-yr. average 1958–59—1967–68		1964–65		1965–66		1967–68		Projected wheat supply[b] Medium feed grain price level Assumed K. C. wheat price 1.25	1.50	1.75
	Mil. bu.	Pct. of Prod.	Mil. bu.	Pct. of Prod.	Mil. bu.	Pct. of Prod.	Mil. bu.	Pct. of Prod.	Mil. bu.	Mil. bu.	Mil. bu.
H.R. Spring and Durum											
Total production	232	100	248	100	279	100	299	100	303	434	514
Exports	74	32	35	14	120	43	104	35	...	...	...
Domestic disappearance	169	73	167	67	188	67	174	58	...	...	...
Total utilization	243	105	202	81	308	110	278	93	...	...	...
Surplus or deficit	–11	–5	+46	+19	–29	–10	+21	+7	...	...	...
Western White											
Total production	134	100	140	100	150	100	190	100	166	190	206
Exports	109	81	100	71	100	67	147	77	...	...	...
Domestic disappearance	26	19	36	26	41	27	36	19	...	...	...
Total utilization	135	100	136	97	141	94	183	96	...	...	...
Surplus or deficit	–1	0	+4	+3	+9	+6	+7	+4	...	...	...
Total Four Classes											
Total production	1,044	100	1,023	100	1,102	100	1,200	100	969	1,630	1,828
Exports	613	59	633	62	815	74	620	52	...	...	...
Domestic disappearance	472	45	478	47	572	52	488	40	...	...	...
Total utilization	1,085	104	1,111	109	1,387	126	1,108	92	...	...	...
Surplus or deficit	–41	–4	–88	–9	–285	–26	+92	+8	...	...	...

[a] Source: Table 28, Wheat Situation, WS-206, ERS, USDA, November 1968.

[b] Assumed United States' production for Winter Wheat is 161%; for Hard Spring and Durum, 129%; and for Western White, 143% of the total for the 10 subregions (applicable study areas).

Although not all 1964 wheat acreage is covered within the resource base on representative farms in the 38 individual study areas (aggregated to 10 subregions), this minor underestimate is likely balanced by the probability that adjustments are overestimated on nonstudy cropland and in nonstudy areas which may have more enterprises and closer competitive enterprises to wheat than in the major wheat areas which were studied.

Implications for United States Commercial Agriculture

A recent estimate of market outlets for major farm products foresees a market outlet for 1,460 million bushels of wheat at an average United States farm price of $1.25 per bushel which is about equivalent to a cash price of $1.25 at the Kansas City terminal market.

If we assume that Eastern Soft wheat, Soft Red Winter, and Soft White (which was not directly considered in this study) have the same relationship to total wheat production as during the 10-year period, 1958–59—1967–68, American farmers would produce about 1,200 million bushels at a price of $1.25 per bushel, and the medium feed grain price level, or about 260 million less than the Brandow estimate of market outlets for all wheat (see page 6).

Although Brandow gives no description of the demand function for wheat, and wheat demand explanations by others are incomplete—particularly with respect to demand by major class of wheat—we can conjecture that the price of wheat would be higher than $1.25 per bushel and that market outlets would be more than 1,200 million bushels but less than 1,460 million bushels at the higher wheat price, given a general accuracy and stability of the other Bandow assumptions.

Even though market outlets based on 1958–59—1967–68 utilization conditions indicate production compared with outlets would be much less for Hard Red Winter wheat, there is sufficient substitutability for the 260 million deficit in total wheat to be reasonably accurate. However, the results point up again the greater competitiveness of feed grains with wheat in the Hard Red Winter wheat areas.

PRODUCTION AND UTILIZATION BY TYPE OF FEED GRAIN

Historical production and utilization data indicate a general greater domestic use of feed grains compared to wheat. Only barley and corn had a significant amount of food and industrial products included in domestic use, amounting to 27% for barley, mostly for malting, and almost 10% for domestic use of corn during the five-year period, 1962–66 (Table 16).

During the five-year period, utilization of feed grains has been greater than supply with utilization averaging 5% greater than pro-

Table 16. Estimated production and utilization by type of feed grain, selected years, United States.[a]

Item	Average 1962–66		Year beginning October						Programmed production, 10 subrgns medium feed grain price level assumed K. C. wheat price		
			1964–65		1967–68[b]		1968–69[c]		1.25	1.50	1.75
	Mil. bu.	Pct. of Prod.	Mil. bu.	Pct. of Prod.	Mil. bu.	Pct. of Prod.	Mil. bu.	Pct. of Prod.	Pct.[d]	Pct.[d]	Pct.[d]
Corn											
Total production	3,862	100	3,484	100	4,760	100	4,375	100	...	...	...
Exports	532	14	570	16	634	13	620	14	...	...	...
Domestic use	3,497	90	3,305	95	3,804	80	3,852	88	...	...	...
Total utilization	4,029	104	3,875	111	4,438	93	4,472	102	...	...	...
Surplus or deficit	–167	–4	–391	–11	+322	+7	–97	–2	...	...	...
Sorghum grain											
Total production	595	100	490	100	756	100	739	100	...	...	...
Exports	176	30	148	30	166	22	125	17	...	...	...
Domestic use	502	84	425	87	542	72	606	82	...	...	...
Total utilization	678	114	573	117	708	94	731	99	...	...	...
Surplus or deficit	–83	–14	–83	–17	+48	+6	+8	+1	...	...	...
Oats											
Total production	912	100	852	100	789	100	930	100	...	...	...
Exports	18	2	5	1	10	1	10	1	...	...	...
Domestic use	899	99	886	104	782	99	869	94	...	...	...
Total utilization	917	101	891	105	792	100	879	95	...	...	...
Surplus or deficit	–5	–1	–39	–5	–3	–0	+51	+5	...	...	...
Barley											
Total production	398	100	386	100	373	100	418	100	...	...	...
Exports	64	16	61	16	31	8	20	5	...	...	...
Domestic use	343	86	369	95	335	90	383	91	...	...	...
Total utilization	407	102	430	111	366	98	403	96	...	...	...
Surplus or deficit	–9	–2	–44	–11	+7	+2	+15	+4	...	...	...
Total Four Feed Grains[e]											
Total Production	5,235	100	4,714	100	6,208	100	5,915	100	187	85	67
Exports	767	15	768	16	828	13	764	13	...	...	...
Domestic use	4,727	90	4,474	95	5,008	81	5,201	88	...	...	...
Total utilization	5,494	105	5,242	111	5,836	94	5,965	101	...	...	...
Surplus or deficit	–259	–5	–528	–11	+372	+6	–50	–1	...	...	...

[a] Source: Table 5, Feed Situation, FDS-227, ERS, USDA, February 1969. [b] Preliminary. [c] Preliminary; utilization based on indications in Jan. 1969. [d] Percent of 1964 production in 10 subregions. [e] Corn equivalents: Corn, 1.00; grain sorghum, 0.98; oats, 0.50; barley, 0.84.

duction (in corn equivalents), an annual deficit of 259 million bushels or about 1,295 million bushels of corn equivalents over the five years.

Implications for United States Commercial Agriculture

Since the 10 subregions accounted for only slightly more than 10% of United States' production of feed grains (in corn equivalents) in 1964, (see Table 6), it is more difficult to project the effect of changes on U.S. totals than for wheat production. However, if feed grain production in the 10 subregions are increased 87% above 1964 (at $1.25 wheat and the medium feed grain price level), the increase is equivalent to 9% of 1964 U.S. production in corn equivalents.

If feed grain production in the 10 subregions is 85% of 1964 (at $1.50 wheat) the decrease is equivalent to less than 2% of 1964 production.

If feed grain production in the 10 subregions is 67% of 1964 (at $1.75 wheat), the decrease would be equivalent to 3.4% of 1964 U.S. production (in corn equivalents). Although not great compared to total U.S. feed grain production, policy implications of these changes should be considered.

Based on Brandow's expected production at an average price of $1.10 for corn, U.S. production would increase 46% above 1964 production (in tons) which compares with an increase in the 10 subregions of 87% above 1964.[8]

Since the Corn Belt is not included in this analysis, there is no completely satisfactory way to indicate the Great Plains and Northwest impact on national feed grain production. However, an increase of 87% in the Great Plains and Northwest appears compatible with an increase of 46% in national feed grain production with no production controls, primarily because of present greater intensity of feed grain production in the Corn Belt.

If, as is indicated in the discussion of the "Utilization and Projected Production of Wheat," wheat production is likely to be greater than 1,200 million but less than 1,460 million bushels with no production controls, the production of feed grains is likely to be less than indicated at the medium feed grain price level. Since Brandow indicates that expected market outlets for U.S. livestock products would require 33% more feed grains than were produced in 1964, the projected production for wheat and feed grains in the Great Plains and Northwest may be in near equilibrium in terms of utilization and past shares of national production, compared with other feed grain areas.

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[8] Table 2, Brandow, George E., "The Commercial Farm Problem," Leaflet No. 2 *People and Income in Rural America—What are the Choices?*, North Carolina State University, Raleigh, 1968.

Brandow uses livestock production for surplus residuals under the assumption of a U.S. agriculture with no production controls but an average U.S. price of $1.10 for corn ($1.07 at Kansas City is comparable). Under current conditions of specialization and increasing concentration of livestock feeding, it appears unlikely that livestock feeders will continue to produce without reductions in feed grain prices. In a policy sense, feed grain surplus problems are more easily handled through storage, etc., than are surpluses of livestock products.

NET RETURNS

The effect of varying wheat prices and three feed grain price levels on net returns are examined in this section. The programmed residuals aggregated for the entire study area represent returns to land resources comprising over 137 million acres of farmland and over 90 million acres of cropland.

The programmed net returns aggregated for each subregion and for the entire study area are presented in Table 17. The net returns presented in Table 17 represent residuals above direct variable and allocable fixed costs of production. Therefore, the net returns can be viewed as net returns to operator labor, land, overhead (unallocable fixed costs) and management.

The mix of resources analyzed varied by subregion, however, and generally only those resources employed in dryland crop production and extensive livestock operations were studied. Resources not programmed, hence not contributing to net returns, are those employed in intensive livestock operations and irrigated crop production (irrigation is included in only a limited number of subregions).

The time framework of this analysis is of intermediate run. Nonland fixed costs allocable to individual activities are included as a cost of production in the programming of representative farms. However, no fixed charges for land and overhead are placed on land disposal activities.

The inclusion of allocable fixed costs in addition to affecting enterprise choice, also affects the net returns function compared to the shorter-run assumption where all fixed costs are held separate in the decision-making process.

From a shortrun viewpoint, the net returns in Table 17 underestimate the effect of varying product prices since some fixed cost payments can be postponed. But in a longrun framework the returns presented in this section overestimate changes in net returns from changing product prices since unallocated fixed costs must be met in the longrun as producers make adjustments. Furthermore, this analysis is static; that is, the effects of changing net returns on fixed resource prices (primarily land) are not accounted for. Although these effects are important with respect to longrun equilibrium and while these

Table 17. Net returns to operator labor, land and overhead at specified assumed wheat prices, 10 subregions.

Subregion	Feed grain price level	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 dollars							
1. Montana Winter Wheat	L	9111	36581	63789	91802	119807	147841	175875	288013
	M	18675	36581	63789	91802	119807	147841	175875	288013
	H	25699	38666	63789	91802	119807	147841	175875	288013
2. Northern Plains Spring Wheat—Summer Fallow	L	34858	55454	90205	130766	171044	204665	252917	358230
	M	35297	55454	90205	130766	171044	204665	252917	358230
	H	53597	61751	90205	130766	171044	204665	252917	358230
3. Northern Plains Spring Wheat—Flax	L	151754	174282	213715	269695	334504	399563	465618	572907
	M	165098	175389	213788	270033	335365	400172	466200	593458
	H	216441	216676	225787	278624	343036	410729	476419	598993
4. South Dakota Mixed Spring and Winter Wheat	L	16777	20264	25505	31408	36902	43602	49664	73954
	M	18465	20850	25532	31441	37512	43628	49695	73977
	H	26745	27892	30251	33095	37718	43681	49761	74042
5. Central Plains Winter Wheat—Summer Fallow	L	153696	177837	213195	257166	304995	355095	405933	609985
	M	185369	200639	227672	264645	308331	356418	407060	634475
	H	259412	266062	278318	299397	330463	369226	412509	646453
6. Central Plains Transitional Winter Wheat	L	118528	140682	172443	207540	243699	279933	317041	467749
	M	142474	147900	175504	208088	243913	280602	317708	468130
	H	196437	197151	200736	215609	248333	283277	319765	468880
7. Central Plains Continuous Winter Wheat	L	168976	188206	240506	295275	353876	410988	468576	658774
	M	202692	205867	241037	296345	354820	411147	468734	658938
	H	272177	275868	279501	298223	355531	412131	469718	700737
8. Southern High Plains Winter Wheat—Sorghum	L	93818	100116	112033	124616	160816	196414	232514	377840
	M	117513	122325	130733	143332	162340	196414	232514	377840
	H	170427	172546	176307	183701	200652	215714	238472	377846
9. Northwest White Wheat	L	71151	94828	111438	166153	205182	241742	279705	434095
	M	85731	107793	114362	166153	205182	241742	279705	434095
	H	112483	125355	138862	168044	205182	241742	279705	434095
10. Southeastern Idaho Hard Winter Wheat	L	6672	10319	14173	18111	22115	26186	30258	46676
	M	7526	11000	14751	18610	22555	26561	30613	46936
	H	9195	12794	15857	19568	23398	27314	31295	47432
Total 10 Subregions	L	825341	998569	1257002	1592532	1952940	2306029	2678101	3908223
	M	978840	1083798	1297373	1621215	1960869	2309190	2681021	3934092
	H	1342613	1394761	1499613	1718829	2035164	2356320	2706436	3994721

effects "dampen" the net returns function, they are not considered in this analysis. This is especially obvious at extreme ends of the product price spectrum.

For relevant policy discussions regarding effects of changing product prices, acreages, production levels and other factors, both shortrun and longrun influences must be considered. The intermediate-run analysis employed in this study attempts to "bridge" the longrun and shortrun influences of changing product prices on net returns to resources.

Some advantage is realized by utilizing an intermediate time period assumption with respect to the analysis of net returns in supply analyses studies. One advantage is that on an aggregate basis the level of programmed net returns may more closely represent reality since allocable fixed cost investment exhibits stability in aggregate under varying product price situations; that is, while fixed cost investment decisions can be delayed for individual producers, this tendency is not as apparent for the entire industry. Furthermore, allocable fixed resource costs are not influenced by product prices as are other fixed resources.

Since allocable fixed production costs are included in enterprise costs, changes in organization are reflective of differing investment and depreciation costs between enterprises. That is, where vast farm organizational changes are brought about by changing price relationships, a large share of the changing fixed cost requirements brought about by the organizational change are included in the decision-making framework. This is particularly important where producers are heavily engaged in a specialized enterprise; i.e., wheat and additional investment would be necessary to produce feed grains or another crop enterprise.

Aggregate Returns

Total aggregate net returns at the high, medium and low feed grain price levels and varying wheat prices are presented in Table 17 for each subregion and for the entire study area. For purposes of discussion, a wheat price of $1.75 and the medium feed grain price level is used as a relevant base representing recent price conditions in the study area.[9]

[9] The medium feed grain price level and $1.75 wheat price is approximately comparable to recent (1964–68) price conditions (including certificate payment on wheat) in the subregions. Furthermore, a comparison of net returns per acre in Appendix Table 7 is made to adjusted net returns determined for comparable representative farms from the USDA "Farm Costs and Returns" farms for 1965–67. The USDA "Farm Costs and Returns" farms analyzed are: (1) Spring Wheat-Fallow, (2) Spring Wheat-Small Grain-Livestock, (3) Spring Wheat-Corn-Livestock, (4) Winter Wheat, (5) Winter Wheat-Grain Sorghum and (6) Wheat-Fallow. These farms represent subregions or more exactly, in some cases, state parts of subregions 2, 3, 3, 5, 8 and 9 respectively. The net returns of the USDA "Farm Costs and Returns" farms are adjusted by including an overhead cost of $1,000 per farm and charging

Net returns at the base price combination are $1.621 billion. The effect of a 25¢ decline in wheat price from the base price is to reduce net returns to $1.297 billion—a decline of $324 million. Similarly a 25¢ increase in the wheat price results in a $340 million increase in net returns from $1.621 to $1.961 billion. Similar changes in net returns are observed at the low feed grain price level with less of an impact noted at the high feed grain price level where wheat plays a lesser role in the farm organizational patterns.

Under changing price conditions the programmed net returns are responsive to changing farm organizations. Moving to higher wheat prices increases net returns through: (1) the effect of higher wheat prices on wheat produced, and (2) greater relative production of wheat compared to other crop and livestock products. The opposite situation is revealed when moving to lower wheat prices. For example, considering a reduction of the wheat price from $1.75 to $1.50 at the medium feed grain price level, total net returns decline by $324 million. A decline in the value of wheat marketings of about $490 million is offset by increased marketings of feed grains, other crops and beef production of roughly $90, $60 and $20 million, respectively.

With respect to the entire region, substantial differences in farm organizational mixes may or may not lead to substantial changes in net returns. Large differences in farm organizational mixes which do not lead to large changes in net returns arise when the relative prices of wheat and feed grains change.

Again, using the base prices of $1.75 wheat and the medium feed grain price level, the effect of a change in relative prices of wheat and feed grains can be observed. Assuming a decline in the wheat price of $1.50 and an increase in the feed grain price level, net returns decline to a level of less than $1.5 billion, a relatively minor decrease in net returns of $121 million.

These results suggest that if equilibrium price conditions change as a result of changing demands for wheat and feed grains, and if these changes result in relative increases in the price of feed grains compared to wheat, the farm organizational pattern can accommodate change in the region with minimum income changes in net returns.

In terms of ease of adjustment while maintaining net returns, a potential is more likely for increasing the production of wheat relative to feed grains. Given the strong competitiveness of wheat in farm organizations, an increase in wheat prices to $2 and a decrease in

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capital employed at 6% to arrive at comparable net returns between the two groups of farms. The adjusted net returns of the USDA farms are compared to subregion or state parts of subregional per acre returns from Appendix Table 7. While the representative farms in this comparison vary in their mix of cropland and pastureland and also with respect to other factors, the net returns per acre of the USDA "Farm Costs and Returns" farms center roughly on the medium feed grain price level and $1.75 wheat price returns in Appendix Table 7.

the feed grain prices to the low level leads to an increase in net returns to $1.953 billion.

The changes in farm organization resulting from the changing price relationships previously discussed are presented in Table 18. The 1953 and 1964 wheat and feed grain acreages in the region are presented to give an indication of the "desired" mix of wheat and feed grains.

The overcapacity of wheat and feed grain production potential compared to 1964 acreages can be seen. Holding the general overcapacity question aside, the wide latitude of potential of restructuring the agricultural output consistent with income maintenance within the region is shown. Whether this be done through the process of relative price changes in response to shifting supply-demand equilibrium, control programs, or other market and supply mechanisms, potentially large changes in the region's output are apparent. A more critical question revolves around the changes in net returns in individual subregions in response to such a restructuring output. Later discussion will observe subregional responses of net returns to changing product price relationships.

The overall effect on net returns of increasing wheat prices for the entire region is greater at the low feed grain price level than at higher feed grain price levels. At lower feed grain price levels, a greater relative production of wheat compared to feed grain occurs, hence, increasing wheat prices are more influential at these lower feed grain levels. The consideration, therefore, of changes in wheat prices cannot be analyzed apart from organizational changes and the level of feed grain prices considered.

Table 18. Programmed wheat and feed grain acreages under four product price assumptions and 1953 and 1964 study area acreages of wheat and feed grains.

Kansas City wheat price ($/bu.)	1.25	1.50	1.75	2.00
Feed grain price level[a]	Medium	High	Medium	Low
Programmed feed grain acreage (000 acres)	25,301	34,835	6,314	1,954
Programmed wheat acreage (000 acres)	31,525	31,835	59,965	65,762
Programmed net returns (billion dollars)	1,084	1,500	1,621	1,953
1964 feed grain acreage (000 acres)	...	...	16,269	...
1953 feed grain acreage (000 acres)	...	...	15,593	...
1964 wheat acreage (000 acres)	...	...	30,969	...
1953 wheat acreage (000 acres)	...	...	46,498	...

[a] Low feed grain price, Kansas City corn = $0.93/bushel
Medium feed grain price, Kansas City corn = $1.07/bushel
High feed grain price, Kansas City corn = $1.34/bushel

Returns by Geographic Subregions

The differential impact of varying wheat and feed grain price level combinations on net returns are observed in Table 17 by subregion. Subregions 1, 2, 3, 10 (the Northern Plains producing areas) and 9 (the Western White area) are most dependent on wheat prices in the

maintenance of net returns. Subregion 8, the southern winter wheat producing area, is at the opposite extreme, heavily dependent on feed grain prices. Subregions 4, 5, 6 and 7 represent intermediate dependences on wheat prices in the maintenance of net returns. Subregions 4, 5, 6 and 7 represent, for the most part, the large hard red winter wheat producing area.

The circumstances surrounding the limited dependence of subregion 8 on wheat prices reflects to a great extent a large irrigation resource base. Potentially, wide variations with respect to wheat and feed grain production are possible in subregion 8. The northern and western wheat producing areas indicate the opposite; that is, heavy dependence on wheat production with substitution by feed grains coming with a relatively large sacrifice in net returns.

Again, in the intermediate group is the central winter wheat producing areas which would undergo substitution with feed grains at a moderate loss in net returns. These substitution processes can be viewed by observing changes in net returns from the base of $1.75 wheat and the medium feed grain price level to $1.50 wheat and the high feed grain price level. Those subregions which can adjust through increased feed grain production show relatively less decline in returns than others where limited substitution of feed grain for wheat takes place.

These subregional adjustment potentials pose complex and important policy considerations. Changing demand functions between wheat and feed grains, and between types of wheat as they are reflected in changing price conditions between subregions, suggest wide changes in net returns. Changing production levels of wheat and feed grains do affect area returns since subregions differ widely in their adjustment potential.

The programmed residuals discussed above are presented on a per farm basis in Appendix Table 6 as an average for each subregion and for the region. Total aggregates from Table 17 were divided by the number of representative farms for each subregion. Since a varying number of representative farms by type, size, and resource mix were programmed, the identity of per farm returns in Appendix Table 6 refers to averages across subregions. However, as a basis for comparison between subregions and as an indication of the general level of returns on a per farm basis, the net returns in Appendix Table 6 are useful. At a given product price, differences between subregions with respect to average per farm net returns reflect most importantly differences in productivity between subregions. To a lesser degree, differences between per farm returns reflect differences in conformity of representative farm analysis between subregions. As with the aggregate returns, subregional capacity for adjustment to changing wheat and feed grain prices are indicated.

The aggregate programmed residuals are presented in Appendix Table 7 on a per acre of farmland basis. Of particular importance here are differences between subregions with respect to the intensities of land use. Per acre net returns are based on total net returns relative to total land in farms. Differences between subregions in adjustment to changing price conditions again follow basically the type of wheat-producing areas previously discussed.

Estimated Returns by Land

Total estimated net returns to land for the region and for each subregion are presented in Appendix Table 8. Returns to land are estimated by subtracting $2 per hour for operator labor and a $1,000 overhead charge per representative farm from total net returns from Table 17.[10] The arbitrary assumption is made that residual returns are allocated to land. The problems of arbitrary assumptions of this nature are more serious at the opposite ends of the product price spectrums than at the price conditions centering on recent price movements.

The effect of removing an operator labor charge and an overhead charge acts to reduce net returns in Table 17. Since operator labor changes relatively little in the varying organizations and since overhead is fixed regardless of organization, the *changes* in net returns to land in Appendix 8 resemble closely the *changes* in total net returns in Table 17.

The estimated derived net returns to land are presented on a per acre of farm land basis in Table 19. Subregional differences again are observable with the northern and western areas most affected by changing wheat prices. The southern and central subregions are least affected by changing wheat prices.

Land values are derived from net returns to land by using a capitalization rate of 4%. Derived land values are shown in Table 20 at a $1.50, $1.75 and $2 wheat price and the low, medium and high feed grain price level. Current land values can be approximated through use of a 4% rate for valuation purposes. Over the region a 25¢ change in wheat price results in roughly a $60-per-acre change in land value assuming adjustments in net returns are reflected back to land valuation.

CAPITAL USE

Aggregate capital requirements for production in response to changing product prices for each subregion and for the region are presented

[10] A charge of $4,000 was made on representative farms in the Texas state part of subregion 8 due to the nature of the assumptions regarding costs of irrigation development to place all areas on a comparable basis.

in Table 21. Capital requirements generally decline under increasing wheat prices. The levels of capital range from $2.3 billion to $2.9 billion. Capital requirements refer to both nonland investment and operating capital. Capital was considered unlimited and could be borrowed at 7%.

Capital employment varies under varying price conditions for several reasons. One factor is the changing intensity of use of cropland. The independent action of this factor leads to greater capital requirements as cropland is utilized more intensively.

Another factor influencing capital use is the relative dependence of various farm organizational patterns on livestock. Livestock operations are relatively high capital-using enterprises. At relatively low wheat prices livestock operations are more dominant in the farm organization than at higher wheat prices. Hence, higher wheat prices act to reduce capital use from this factor.

Finally, the mix of feed grains, wheat and other crops in the farm organization affects aggregate capital use. Generally, wheat production requires less capital than feed grains and other crops. Therefore, increasing wheat prices act to reduce capital requirements.

There are some differences between subregions with respect to capital requirements under the price conditions studied. The variation between subregions is dependent on the change in farm organizational patterns. Subregions 2, 3 and 4 indicate large declines in capital use as wheat prices increase. This decline results from large increases in wheat production, a large reduction in feed grain production, and a large reduction in beef production as wheat prices rise. In contrast, subregion 1 indicates an increase in capital requirements as wheat prices rise which can be accounted for through increased intensity of production on cropland. Between these extremes fall the other subregions which undergo less characteristic changes in capital requirements as wheat and feed grain prices change.

An assumption of this analysis is that capital is unlimited and that farm organizational changes can be accomplished without capital requirements acting as an impediment. In a longer-term study, this assumption is less crucial than under shortrun analyses. This analysis does identify subregions which require large adjustments in capital requirements as price conditions change. These subregions are identified as those of potentially large beef production and a high relative potential for feed grain production. Product price combinations which lead to greater capital requirements are those of greater relative beef and feed grain prices compared to wheat. Hence, changing equilibrium product prices or changing acreage programs suggest areas where capital needs will substantially change. In the shortrun and where large increases in capital are required, potential capital problems may arise.

Table 19. Estimated net returns per acre to land at specified assumed wheat prices, 10 subregions.

Subregion	Feed grain price level	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		Dollars per acre							
1. Montana Winter Wheat	L	−1.23	0.46	2.53	4.62	6.74	8.86	10.97	19.44
	M	−0.51	0.46	2.53	4.62	6.74	8.86	10.97	19.44
	H	−0.19	0.63	2.53	4.62	6.74	8.86	10.97	19.44
2. Northern Plains Spring Wheat—Summer Fallow	L	−1.48	−1.07	0.83	2.62	4.43	6.25	8.46	13.19
	M	−1.47	−1.07	0.83	2.62	4.44	6.26	8.47	13.19
	H	−0.72	−0.58	0.83	2.62	4.44	6.26	8.47	13.19
3. Northern Plains Spring Wheat—Flax	L	0.36	1.49	3.58	6.60	9.99	12.96	15.99	21.89
	M	1.29	1.54	3.58	6.63	9.91	12.96	15.99	21.91
	H	3.90	3.90	4.41	7.06	10.26	13.28	16.31	22.02
4. South Dakota Mixed Spring and Winter Wheat	L	−1.06	1.12	2.87	4.57	6.04	7.84	9.45	16.05
	M	−0.44	0.94	2.93	4.56	6.20	7.84	9.46	16.06
	H	1.84	2.50	3.59	4.44	5.98	7.84	9.46	16.08
5. Central Plains Winter Wheat—Summer Fallow	L	2.65	3.92	5.31	7.08	9.05	11.06	13.09	21.21
	M	3.83	4.68	5.86	7.32	9.11	11.11	13.13	22.16
	H	6.73	7.10	7.64	8.61	9.96	11.49	13.27	22.63
6. Central Plains Transitional Winter Wheat	L	1.81	3.37	5.32	7.40	9.58	11.86	14.08	23.50
	M	3.24	3.47	5.45	7.43	9.59	11.90	14.12	23.53
	H	6.35	6.47	6.27	7.91	9.85	12.03	14.24	23.57
7. Central Plains Continuous Winter Wheat	L	5.34	6.67	10.49	14.51	18.86	22.98	27.14	40.95
	M	7.91	7.86	10.53	14.53	18.75	22.98	27.14	40.96
	H	12.95	13.21	13.37	14.67	18.80	23.05	27.21	43.98
8. Southern High Plains Winter Wheat—Sorghum	L	8.96	10.11	12.28	14.58	21.21	27.76	34.38	61.00
	M	13.24	14.18	15.72	18.01	21.49	27.76	34.38	61.00
	H	22.96	23.32	24.08	25.42	28.53	31.30	35.47	61.00
9. Northwest White Wheat	L	3.99	5.90	7.24	11.61	14.74	17.67	20.71	33.07
	M	5.16	6.93	7.47	11.61	14.74	17.67	20.71	33.07
	H	7.30	8.33	9.42	11.77	14.74	17.67	20.71	33.07
10. Southeastern Idaho Hard Winter Wheat	L	1.20	3.06	5.02	7.02	9.05	11.11	13.18	21.51
	M	1.62	3.40	5.31	7.27	9.28	11.31	13.36	21.64
	H	2.46	4.31	5.87	7.76	9.89	11.69	13.71	21.89
10 Subregions	L	1.66	2.93	4.94	7.47	10.20	12.85	15.58	24.63
	M	2.83	3.47	5.23	7.67	10.21	12.87	15.59	24.82
	H	5.48	5.85	6.67	8.36	10.73	13.16	15.74	25.24

Table 20. Capitalized land values (four percent) at specified wheat prices and feed grain price levels, 10 subregions.

Subregion	1.50			1.75			2.00		
	L	M	H	L	M	H	L	M	H
	Dollars per acre								
1. Montana Winter Wheat	63	63	63	116	116	116	169	169	169
2. Northern Plains Spring Wheat—Summer Fallow	21	21	21	66	66	66	111	111	111
3. Northern Plains Spring Wheat—Flax	90	90	110	165	166	177	250	248	257
4. South Dakota Mixed Spring and Winter Wheat	72	73	90	114	114	111	151	155	150
5. Central Plains Winter Wheat—Summer Fallow	133	147	191	177	183	215	226	228	249
6. Central Plains Transitional Winter Wheat	133	136	168	185	186	198	240	240	246
7. Central Plains Continuous Winter Wheat	252	263	334	362	363	367	472	469	470
8. Southern High Plains Winter Wheat—Sorghum	307	393	602	365	450	636	530	537	713
9. Northwest White Wheat	181	187	236	290	290	294	369	369	369
10. Southeast Idaho Hard Winter Wheat	126	133	147	176	182	194	226	232	247
10 Subregions	124	131	167	187	192	209	255	255	268

Table 21. Capital use for specified assumed wheat prices, 10 subregions.

Subregion	Feed grain price level	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 dollars							
1. Montana Winter Wheat	L	73433	81914	79224	81427	82386	82386	82386	82386
	M	52703	81914	79224	81427	82386	82386	82386	82386
	H	66047	72923	79224	81427	82386	82386	82386	82386
2. Northern Plains Spring Wheat—Summer Fallow	L	503417	491729	428545	431075	430398	372892	367320	368436
	M	501441	491729	428545	431075	430398	372892	367320	368436
	H	431704	461726	428545	431075	430398	372892	367320	368436
3. Northern Plains Spring Wheat—Flax	L	1000443	996630	977410	885991	783212	787229	786245	769132
	M	877191	982623	973109	880278	815035	789021	788095	769132
	H	871378	819326	845781	854773	820901	827431	825698	803544
4. South Dakota Mixed Spring and Winter Wheat	L	184059	119591	103285	96851	95753	95378	95454	88828
	M	152989	123106	98777	97219	95753	95378	95454	88828
	H	125531	108243	107342	105163	98195	95206	95282	88453
5. Central Plains Winter Wheat—Summer Fallow	L	361529	329380	330035	320735	311623	304550	300100	281808
	M	356220	337922	327239	329146	321629	304488	296990	278626
	H	362381	341701	342825	325324	317794	318197	311885	279077
6. Central Plains Transitional Winter Wheat	L	286508	296772	292954	298704	294321	286550	286550	262494
	M	280362	285787	294042	292078	294321	286550	286550	262494
	H	290579	282353	279143	282360	286346	287678	286550	262494
7. Central Plains Continuous Winter Wheat	L	270509	298744	300406	300188	287919	287919	287919	283904
	M	249233	274733	300406	299126	294373	287252	287252	282907
	H	246924	246995	273628	299126	294373	287252	287252	282907
8. Southern High Plains Winter Wheat—Sorghum	L	120198	115908	116420	98985	101501	98387	96815	96687
	M	128763	126881	124341	121037	94769	98387	96711	96687
	H	127745	128636	125939	124107	120005	115877	98649	96667
9. Northwest White Wheat	L	44966	50817	51169	55183	55236	55236	55236	56176
	M	44516	47361	50817	55183	55236	55236	55236	56176
	H	44346	45453	48884	50948	55236	55236	55236	56176
10. Southeastern Idaho Hard Winter Wheat	L	8806	8783	8768	8759	8752	8747	8744	8734
	M	8822	8783	8768	8759	8752	8747	8744	8734
	H	8832	8831	8768	8759	8752	8747	8744	8734
Total 10 Subregions	L	2853868	2790268	2688216	2577898	2451101	2379274	2366769	2298585
	M	2652240	2760839	2685268	2595328	2492652	2380337	2364738	2294406
	H	2575467	2516187	2540079	2563062	2514386	2450902	2419002	2328874

LABOR REQUIREMENTS

The total labor requirements for optimum production combinations aggregated for each subregion and for the region are presented in Table 22. Labor requirement functions are dependent upon the intensity of land use, the mix of feed grains, wheat and other crops, and the importance of livestock. Greater emphasis on land-use intensity, feed grains and livestock enterprises all act to increase labor requirements. Opposite conditions act to decrease labor requirements.

Varying intensities of the forces are observed between subregions. Only in subregions 1 and 8 (at the low feed grain price level) are there significant increases in labor requirements as wheat prices advance. Generally, increasing wheat prices are seen to lower labor requirements through the effect of wheat commanding a larger relative role in the production pattern with its corresponding lower labor requirements relative to other enterprises.

The labor aggregates in Table 22 represent labor requirements for optimum production combinations. In programming the representative farms, labor restrictions were placed on resident and hired labor levels. Hired labor was utilized particularly for critical time periods. The labor requirements suggest that labor demands presently undergoing adjustment due to changing technology can be modified, depending on product price movements. Higher wheat prices result in reduced labor requirements while higher feed grain or livestock prices relative to wheat tend to maintain need for present labor supplies. While these effects do not appear to be dramatic, they suggest some directions that should be considered in viewing potential labor adjustments in the region. Furthermore, these forces as they relate to changing labor use between subregions are vital to the analysis of subregional change and development.

The portion of the total labor requirements represented by resident labor is presented in Appendix Table 9 for each subregion and for the region. The breakdown into resident and hired labor rests upon critical assumptions regarding the programming of representative farms. Programming and aggregate representative farms of one size act to mask the effect of farm size on the mix of hired and resident labor.

Given a mix of farm sizes, larger farms hire full-time hired labor in addition to part-time labor. Smaller farm sizes generally confine their labor hiring activities to part-time labor needs. Hence, representative farms of one size cannot be expected to yield labor mix relationships growing out of farm size economies. Furthermore, the choice of farm size and resident labor restrictions has a crucial effect on the resultant aggregate mix of hired and resident labor requirement. For these reasons, less confidence can be placed in the breakdown of type of labor compared to overall requirements.

Table 22. Total labor for specified assumed wheat prices, 10 subregions.

Subregion	Feed grain price level	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 hours							
1. Montana Winter Wheat	L	9124	11620	11512	11678	11610	11610	11610	11610
	M	9124	11620	11512	11678	11610	11610	11610	11610
	H	10509	11554	11512	11678	11610	11610	11610	11610
2. Northern Plains Spring Wheat—Summer Fallow	L	26145	31470	27556	27886	27892	24065	23596	23514
	M	26223	31470	27556	27886	27775	23948	23479	23514
	H	26416	29265	27556	27886	27775	23948	23479	23514
3. Northern Plains Spring Wheat—Flax	L	59946	58222	54727	49049	43759	43411	42821	41036
	M	56393	58230	54677	48873	45085	43667	43075	41066
	H	53036	53071	52015	48382	45498	45438	44722	42617
4. South Dakota Mixed Spring and Winter Wheat	L	8456	6104	5427	5192	5170	5142	5137	4874
	M	8174	6717	5320	5219	5170	5142	5137	4874
	H	8080	7314	6548	6323	5697	5166	5160	4873
5. Central Plains Winter Wheat—Summer Fallow	L	41770	37231	36531	35223	33976	33304	32745	29931
	M	42657	38855	37597	36617	35301	33301	32439	29636
	H	43019	41505	40281	38416	36187	35992	34840	29603
6. Central Plains Transitional Winter Wheat	L	34734	32913	32610	32744	32607	31756	31756	28550
	M	35070	35645	32934	32747	32607	31756	31756	28550
	H	37612	36961	36569	32491	32664	31988	31756	28550
7. Central Plains Continuous Winter Wheat	L	35410	35138	34587	34490	33280	33280	33280	32698
	M	34050	35636	34587	34532	34519	33347	33347	32690
	H	33450	33453	35029	34532	34519	33347	33347	32690
8. Southern High Plains Winter Wheat—Sorghum	L	14394	14044	14044	15867	16382	16289	16242	16239
	M	16375	16171	16141	17516	17184	16289	16241	16239
	H	16438	16432	16226	16099	17678	17545	17608	16240
9. Northwest White Wheat	L	6952	6834	6730	6819	6794	6794	6799	6836
	M	6965	6911	6834	6819	6794	6794	6799	6835
	H	6958	6965	6957	6826	6794	6794	6799	6836
10. Southeastern Idaho Hard Winter Wheat	L	2006	1991	1982	1976	1971	1968	1966	1960
	M	2016	1991	1982	1976	1971	1968	1966	1960
	H	2022	2022	1982	1976	1971	1968	1966	1960
Total 10 Subregions	L	238937	235567	225706	229024	213441	207619	205952	197248
	M	237047	243246	229140	223863	218016	207822	205849	196975
	H	237540	238542	234675	224609	220393	213796	211287	198493

The bulk of changing labor requirements from changes in enterprise combinations is made up of changes in resident labor levels. Hence, given the strong assumption regarding the size of farms studied, changing labor requirements are seen to have their greatest influence on the intensity of resident labor requirements.

APPENDIX A

A. Publications and Theses

I. PUBLICATIONS RESULTING FROM THE WHEAT-FEED GRAIN PHASE OF GP-5, W-54

1. Anderson, Dale O. and Rodney R. Paul, "A Method for Measuring the Impact of Agricultural Programs on Resource Adjustment and Aggregate Wheat Supply," Symposium Proceedings, Jt. GP-5, W-54 Technical Committees, Great Plains Agricultural Council Pub. No. 36, Ft. Collins, Colo., Aug. 6-8, 1968; 1969.
2. Bailey, Warren and Ronald O. Aines, "How Wheat Farmers Would Adjust to Different Programs," Production Research Report No. 52, Economic Research Service, USDA, Washington, D. C., May 1961.
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4. Brant, William L. and Odell L. Walker, "Extending the Representative Farm Concept in Farm Management Education," *Journal of Farm Economics*, Vol. 49 No. 5, December 1967.
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6. Butcher, W. R., H. A. Gilbert and O. L. Brough, "Production Control Alternatives: Their Effect on Washington Wheat Farms," Washington Agr. Expt. Sta. Bul. 656, December 1964.
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12. Connor, Larry J. and Odell L. Walker, "Potential Longrun Adjustments for Oklahoma Panhandle Farms," Oklahoma Agr. Expt. Sta. Tech. Bul. T-114, Jan. 1965.

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14. Davis, Lynn H., "Maximizing Incomes From Circle Valley Farms, Piute County, Utah," Utah Agr. Expt. Sta. Resources Series 30, May 1966.
15. Davis, Lynn H., "Maximizing Incomes from Sevier County Farms," Utah Expt. Sta. Bul. 451, March 1965.
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17. Davis, Lynn H. and Duane R. Price, "Economics of Crop Production and Irrigation Water Pumping, Milford Area, Utah," Utah Agr. Expt. Sta. Resources Series 38, 1967.
18. Esmay, James L., "Efficient Resource Combinations on Dryland Farms in Southeastern Idaho," Idaho Agr. Expt. Sta. Bul. 355, April 1961.
19. Fischer, John L., "Budgets Show Possible Effects of 1964 Wheat Program Choices on Individual Farm Incomes," *Montana Farmer Stockman*, April 1963.
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26. Krenz, R. D., "Selected Characteristics of North Dakota Farms," North Dakota Agr. Expt. Sta. Agricultural Economics Report No. 38, 1964.
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28. Krenz, Ronald D., "Wheat Farmers and Wheat Programs," Wyoming Agr. Expt. Sta. Mimeo Cir. 176, August 1962.
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38. Long, Roger B., "Supply Responses to Dryland Wheat and Barley Farms in Southeastern Idaho to Alternative Market Prices—1970," Idaho Agr. Expt. Sta. Bul. 490, Univ. of Idaho. March 1968.
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APPENDIX B

B. Appendix Tables

Appendix Table 1. Distribution of wheat acreage among 10 subregions for specified assumed wheat prices and with historical comparisons.

Subregion	Percent of historical acreage		Feed grain price level[a]	Assumed Kansas City wheat price ($/bu.)							
	1953	1964		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
				Percent							
1. Montana Winter Wheat	8.4	7.5	L	17.9	8.2	7.8	7.3	6.9	6.8	6.7	6.6
			M	28.7	11.9	8.1	7.5	7.1	6.8	6.7	6.6
			H	7.3	10.8	11.0	8.3	7.5	7.1	6.8	6.6
2. Northern Plains Spring Wheat—Summer Fallow	14.7	12.6	L	12.1	16.9	19.0	17.4	16.5	17.1	17.0	16.8
			M	15.0	24.4	19.6	18.0	16.8	17.2	17.1	16.8
			H	12.8	42.6	33.2	19.7	17.8	17.9	17.4	16.8
3. Northern Plains Spring Wheat—Flax	14.5	12.7	L	16.2	14.2	17.1	20.2	20.7	20.8	21.2	21.0
			M	1.0	18.7	17.5	21.0	21.1	20.8	21.2	21.0
			H	2.4	1.5	22.0	21.7	22.4	21.7	21.7	21.0
4. South Dakota Mixed Spring and Winter Wheat	1.5	1.2	L	1.8	1.6	1.5	1.5	1.4	1.3	1.3	1.4
			M	1.6	1.8	1.6	1.5	1.4	1.4	1.3	1.4
			H	2.9	2.7	1.2	1.0	1.3	1.4	1.4	1.4
5. Central Plains Winter Wheat—Summer Fallow	21.6	23.5	L	21.7	12.9	14.7	14.8	15.8	15.7	15.8	16.1
			M	24.0	14.1	12.9	14.1	15.5	15.7	15.7	16.1
			H	23.0	16.2	10.7	9.8	13.7	14.8	14.8	16.1
6. Central Plains Transitional Winter Wheat	13.0	13.6	L	5.0	16.2	14.0	13.3	12.9	12.8	12.7	12.9
			M	5.6	7.8	14.0	13.1	13.1	12.8	12.7	13.0
			H	0	2.6	2.9	13.6	12.7	13.2	13.0	13.0
7. Central Plains Continuous Winter Wheat	13.5	14.7	L	1.5	16.8	14.6	14.0	13.5	13.2	13.0	12.9
			M	0.2	5.3	15.0	14.0	13.3	12.9	12.8	12.8
			H	0	0.2	5.3	15.3	14.1	13.5	13.1	12.8

Appendix Table 1. Distribution of wheat acreage among 10 subregions for specified assumed wheat prices and with historical comparisons *(continued)*.

Subregion	Percent of historical acreage		Feed grain price level[a]	Assumed Kansas City wheat price ($/bu.)							
	1953	1964		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
				Percent							
8. Southern High Plains Winter Wheat—Sorghum	2.7	4.4	L	6.9	4.2	3.5	4.3	5.5	5.6	5.6	5.6
			M	5.5	4.0	3.4	3.3	4.7	5.6	4.7	5.6
			H	10.9	5.2	3.6	3.1	3.1	3.4	4.9	5.6
9. Northwest White Wheat	8.2	8.3	L	12.9	7.2	6.4	5.9	5.6	5.5	5.4	5.4
			M	12.3	9.6	6.4	6.1	5.7	5.5	5.4	5.4
			H	27.2	12.9	7.6	6.0	6.0	5.7	5.6	5.4
10. Southeastern Idaho Hard Winter Wheat	1.9	1.5	L	4.0	1.8	1.4	1.3	1.2	1.2	1.3	1.3
			M	6.1	2.4	1.5	1.4	1.3	1.3	1.4	1.3
			H	13.5	5.3	2.5	1.5	1.4	1.3	1.3	1.3
TOTAL	100.0	100.0		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
TOTAL ACREAGE 10 Subregions	43956	30969	L	17860	45443	55509	62112	65762	67354	67960	68987
			M	11141	31525	53815	59964	64460	67174	67779	68829
			H	4926	12463	31835	54642	60919	64473	66403	68806

[a] Low feed grain price, Kansas City corn = $0.93/bushel
Medium feed grain price, Kansas City corn = $1.07/bushel
High feed grain price, Kansas City corn = $1.34/bushel

Appendix Table 2. Percentage of cropland on representative farm in wheat for specified assumed wheat prices with historical area comparison, 10 subregions.

Subregion	Percent of area cropland 1953	Percent of area cropland 1964	Feed grain price level	Assumed Kansas City wheat price ($/bu.) 1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
				Percent							
1. Montana Winter Wheat	44.6	27.1	L	38.5	44.9	52.2	54.4	54.7	54.7	54.7	54.7
			M	38.5	44.9	52.2	54.4	54.7	54.7	54.7	54.7
			H	4.3	16.2	42.0	54.4	54.7	54.7	54.7	54.7
2. Northern Plains Spring Wheat—Summer Fallow	47.3	28.9	L	16.0	57.1	78.3	79.9	80.3	85.5	85.9	86.0
			M	12.4	57.1	78.3	79.9	80.3	85.5	85.9	86.0
			H	4.7	39.4	78.3	79.9	80.3	85.3	85.9	86.0
3. Northern Plains Spring Wheat—Flax	35.1	22.0	L	17.7	39.6	58.0	77.1	83.5	85.6	88.2	89.1
			M	0.6	36.1	57.6	77.3	83.5	85.9	88.3	89.1
			H	0.7	1.1	42.9	72.9	83.7	85.9	88.3	89.1
4. South Dakota Mixed Spring and Winter Wheat—Flax	23.1	13.4	L	15.7	35.6	41.4	45.3	45.4	45.5	45.6	47.3
			M	9.0	27.6	42.0	45.2	45.4	45.5	45.6	47.3
			H	7.3	16.6	19.7	27.3	38.2	45.5	45.5	47.3
5. Central Plains Winter Wheat—Summer Fallow	41.2	31.9	L	22.0	32.7	45.4	51.5	58.0	59.2	59.6	62.2
			M	14.9	24.8	39.0	47.4	55.4	59.2	59.6	62.1
			H	6.3	11.3	19.1	29.8	46.8	53.2	55.0	62.0
6. Central Plains Transitional Winter Wheat	55.0	40.0	L	9.3	76.1	80.3	85.4	87.5	89.0	89.0	92.2
			M	6.4	25.5	80.0	81.0	87.0	89.0	89.0	92.2
			H	0	3.4	9.5	76.7	79.6	88.1	89.0	92.2
7. Central Plains Continuous Winter Wheat	67.9	46.6	L	2.9	83.7	88.5	95.1	97.0	97.0	97.0	97.0
			M	0.3	18.3	88.5	91.6	93.8	95.0	95.0	96.5
			H	0	0.3	18.6	91.6	93.8	95.0	95.0	96.6
8. Southern High Plains Winter Wheat—Sorghum	22.6	27.4	L	31.2	47.2	48.4	64.2	86.6	90.3	92.2	92.4
			M	14.4	32.2	45.1	46.1	73.9	90.3	92.2	92.4
			H	12.5	14.9	28.8	41.7	47.7	54.0	78.9	92.3
9. Northwest White Wheat	62.8	31.3	L	29.1	41.3	44.7	46.2	46.6	46.6	46.6	46.9
			M	17.3	38.3	43.3	46.2	46.6	46.6	46.6	46.9
			H	16.9	20.3	30.6	41.4	46.6	46.6	46.6	46.9
10. Southeastern Idaho Hard Winter Wheat	73.1	33.6	L	44.5	47.6	49.5	50.7	51.6	52.3	52.8	54.0
			M	42.4	47.6	49.5	50.7	51.6	52.3	52.8	54.0
			H	41.2	41.2	49.5	50.7	51.6	52.3	52.8	54.0
Average 10 Subregions	46.0	30.8	L	20.0	50.6	58.7	65.0	69.1	70.6	71.2	72.2
			M	15.6	35.2	57.6	66.4	67.2	70.4	71.0	72.1
			H	9.4	13.8	33.9	60.5	62.3	66.1	69.2	72.1

Appendix Table 3. Cropland use distribution at the low feed grain price level for specified assumed wheat prices, 10 subregions.[a]

Subregions	Cropland use	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 acres							
1. Montana Winter Wheat	Wheat	3201	3740	4343	4526	4550	4550	4550	4550
	Summer Fallow	4832	4378	3904	3745	3770	3770	3770	3770
	Forage	82	81	74	49	0	0	0	0
	Tame Pasture	206	122	0	0	0	0	0	0
	Total Cropland Use	8321	8321	8321	8320	8320	8320	8320	8320
	Cropland Available	8321	8321	8321	8321	8321	8321	8321	8321
2. Northern Plains Spring Wheat—Summer Fallow	Wheat	2163	7701	10568	10786	10840	11529	11587	11606
	Feed Grain	701	332	284	284	281	49	44	25
	Summer Fallow	4779	3513	1845	1930	2223	1825	1859	1859
	Forage	1773	1300	651	456	112	53	0	0
	Tame Pasture	4074	644	142	34	34	34	0	0
	Total Cropland Use	13490	13490	13490	13490	13490	13490	13490	13490
	Cropland Available	13490	13490	13490	13490	13490	13490	13490	13490
3. Northern Plains Spring Wheat—Flax	Wheat	2886	6464	9465	12580	13618	14008	14394	14526
	Feed Grain	2854	1426	1086	758	331	330	331	308
	Summer Fallow	2367	2219	665	593	1093	1115	982	968
	Forage	1685	1707	1389	805	430	272	263	127
	Tame Pasture	2046	1530	830	360	0	0	0	0
	Special Crop	4342	2847	2753	1149	555	266	225	208
	Total Cropland Use	16180	16193	16188	16245	16027	15991	16195	16137
	Cropland Available	16309	16309	16309	16309	16309	16309	16309	16309
4. South Dakota Mixed Spring and Winter Wheat	Wheat	314	710	826	905	907	909	910	944
	Feed Grain	181	56	35	47	48	50	51	46
	Summer Fallow	309	704	803	873	875	877	877	883
	Forage	269	96	58	59	61	58	56	23
	Tame Pasture	216	48	7	7	3	0	0	0
	Reseeded Cropland	498	174	63	4	0	0	0	0
	Special Crops	107	108	103	0	0	0	0	0
	Total Cropland Use	1894	1896	1895	1895	1894	1894	1894	1896
	Cropland Available	1896	1896	1896	1896	1896	1896	1896	1896

Appendix Table 3. Cropland use distribution at the low feed grain price level for specified assumed wheat prices, 10 subregions[a] *(continued).*

Subregions	Cropland use	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 acres							
5. Central Plains Winter Wheat—Summer Fallow	Wheat	3870	5849	8128	9218	10380	10582	10654	11119
	Feed Grain	7069	4160	1989	1116	723	619	619	640
	Summer Fallow	5707	6877	6741	6621	5907	5824	5801	5465
	Forage	803	587	519	513	463	451	404	279
	Tame Pasture	55	31	124	32	26	26	26	0
	Total Cropland Use	17504	17504	17501	17500	17499	17502	17504	17503
	Cropland Available	17503	17503	17503	17503	17503	17503	17503	17503
6. Central Plains Transitional Winter Wheat	Wheat	900	7366	7774	8275	8472	8616	8616	8926
	Feed Grain	6485	927	623	447	447	447	447	226
	Summer Fallow	1225	341	423	245	245	245	245	267
	Forage	321	336	341	271	271	256	256	143
	Tame Pasture	284	441	405	326	129	0	0	0
	Reseeded Cropland	474	278	123	123	123	123	123	123
	Total Cropland Use	9689	9689	9689	9687	9687	9687	9687	9685
	Cropland Available	9685	9685	9685	9685	9685	9685	9685	9685
7. Central Plains Continuous Winter Wheat	Wheat	267	7652	8089	8691	8867	8867	8867	8876
	Feed Grain	7035	334	320	0	0	0	0	0
	Forage	725	522	111	111	95	95	95	85
	Tame Pasture	539	255	244	159	0	0	0	0
	Reseeded Cropland	379	181	181	181	181	181	181	181
	Special Crops	197	197	197	0	0	0	0	0
	Total Cropland Use	9142	9141	9142	9142	9143	9143	9143	9142
	Cropland Available	9141	9141	9141	9141	9141	9141	9141	9141

Appendix Table 3. Cropland use distribution at the low feed grain price level for specified assumed wheat prices, 10 subregions[a] *(continued)*.

Subregions	Cropland use	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 acres							
8. Southern High Plains Winter Wheat—Sorghum	Wheat	1234	1917	1970	2645	3602	3757	3838	3848
	Feed Grain	2326	1680	1611	935	0	0	0	0
	Summer Fallow	395	395	395	395	395	395	395	395
	Forage	34	35	42	41	13	14	12	6
	Tame Pasture	213	222	232	233	239	84	5	0
	Reseeded Cropland	71	23	23	23	23	23	23	23
	Total Cropland Use	4273	4272	4273	4272	4272	4273	4273	4272
	Cropland Available	4273	4273	4273	4273	4273	4273	4273	4273
9. Northwest White Wheat	Wheat	2306	3276	3548	3668	3693	3693	3693	3720
	Feed Grain	1816	393	0	0	0	0	0	0
	Summer Fallow	3345	3798	3919	3811	3835	3835	3835	3808
	Forage	66	66	66	54	54	54	54	54
	Special Crops	397	397	397	397	348	348	348	348
	Total Cropland Use	7930	7930	7930	7930	7930	7930	7930	7930
	Cropland Available	7930	7930	7930	7930	7930	7930	7930	7930
10. Southeast Idaho Hard Winter Wheat	Wheat	719	768	799	819	833	844	852	872
	Feed Grain	239	189	158	138	124	113	105	85
	Summer Fallow	693	694	694	694	694	694	694	694
	Total Cropland Use	1651	1651	1651	1651	1651	1651	1651	1651
	Cropland Available	1651	1651	1651	1651	1651	1651	1651	1651
10 Subregions	Wheat	17860	45443	55510	62113	65762	67355	67961	68987
	Feed Grain	28706	9497	6106	3725	1954	1608	1597	1330
	Summer Fallow	23652	22919	19389	18907	19037	18580	18458	18109
	Forage	5758	4730	3251	2359	1499	1253	1140	717
	Tame Pasture	7633	3293	1984	1151	431	144	31	0
	Reseeded Cropland	1422	656	390	331	327	327	327	327
	Special Crops	5043	3549	3450	1546	903	614	573	556
	Total Cropland Use	90074	90087	90080	90132	89913	89881	90087	90026
	Cropland Available	90199	90199	90199	90199	90199	90199	90199	90199

[a] Total cropland use in excess of cropland available is due to rounding.

Appendix Table 4. Cropland use distribution at the medium feed grain price level for specified assumed wheat prices, 10 subregions.[a]

Subregions	Cropland use	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 acres							
1. Montana Winter Wheat	Wheat	3201	3740	4343	4526	4550	4550	4550	4550
	Summer Fallow	4832	4378	3904	3745	3770	3770	3770	3770
	Forage	82	81	74	49	0	0	0	0
	Tame Pasture	206	122	0	0	0	0	0	0
	Total Cropland Use	8321	8321	8321	8320	8320	8320	8320	8320
	Cropland Available	8321	8321	8321	8321	8321	8321	8321	8321
2. Northern Plains Spring Wheat—Summer Fallow	Wheat	1667	7701	10568	10786	10840	11529	11587	11606
	Feed Grain	701	332	284	284	281	49	44	25
	Summer Fallow	5430	3513	1845	1930	2223	1825	1859	1859
	Forage	1745	1300	651	456	112	53	0	0
	Tame Pasture	3947	644	142	34	34	34	0	0
	Total Cropland Use	13490	13490	13490	13490	13490	13490	13490	13490
	Cropland Available	13490	13490	13490	13490	13490	13490	13490	13490
3. Northern Plains Spring Wheat—Flax	Wheat	106	5884	9397	12605	13618	14010	14396	14526
	Feed Grain	6682	2259	1132	783	917	330	335	308
	Summer Fallow	1848	1932	702	615	508	1082	946	968
	Forage	1235	1647	1379	780	430	304	294	127
	Tame Pasture	1308	1445	818	313	0	0	0	0
	Special Crops	4952	3026	2758	1131	555	264	224	208
	Total Cropland Use	16131	16193	16186	16227	16028	15990	16195	16137
	Cropland Available	16309	16309	16309	16309	16309	16309	16309	16309
4. South Dakota Mixed Spring and Winter Wheat	Wheat	180	551	838	903	907	909	910	944
	Feed Grain	714	371	46	47	48	50	51	46
	Summer Fallow	177	547	814	827	875	877	877	883
	Forage	180	97	65	60	61	58	56	23
	Tame Pasture	91	60	11	8	3	0	0	0
	Reseeded Cropland	473	161	18	4	0	0	0	0
	Special Crops	80	108	103	0	0	0	0	0
	Total Cropland Use	1895	1895	1895	1894	1894	1894	1894	1896
	Cropland Available	1896	1896	1896	1896	1896	1896	1896	1896

Appendix Table 4. Cropland use distribution at the medium feed grain price level for specified assumed wheat prices, 10 subregions[a] *(continued).*

Subregions	Cropland use	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 acres							
5. Central Plains Winter Wheat—Summer Fallow	Wheat	2672	4429	6967	8478	9917	10582	10653	11113
	Feed Grain	8850	6333	3660	2196	1166	619	618	639
	Summer Fallow	5128	6085	6328	6268	5911	5812	5805	5474
	Forage	798	627	516	527	480	460	404	277
	Tame Pasture	55	31	32	32	26	26	26	0
	Total Cropland Use	17503	17505	17503	17501	17500	17499	17506	17503
	Cropland Available	17503	17503	17503	17503	17503	17503	17503	17503
6. Central Plains Transitional Winter Wheat	Wheat	619	2468	7551	7841	8472	8616	8616	8929
	Feed Grain	7164	6037	927	788	447	447	447	226
	Summer Fallow	1039	341	341	341	245	245	245	267
	Forage	305	306	341	271	271	256	256	143
	Tame Pasture	242	350	405	326	129	0	0	0
	Reseeded Cropland	320	189	123	123	123	123	123	123
	Total Cropland Use	9689	9691	9688	9690	9688	9687	9687	9688
	Cropland Available	9685	9685	9685	9685	9685	9685	9685	9685
7. Central Plains Continuous Winter Wheat	Wheat	25	1669	8089	8369	8572	8685	8685	8724
	Feed Grain	7777	6395	320	320	276	184	184	152
	Forage	466	444	111	113	113	93	93	83
	Tame Pasture	337	255	244	159	0	0	0	0
	Reseeded Cropland	340	181	181	181	181	181	181	181
	Special Crops	197	197	197	0	0	0	0	0
	Total Cropland Use	9142	9141	9142	9142	9142	9143	9143	9140
	Cropland Available	9141	9141	9141	9141	9141	9141	9141	9141

Appendix Table 4. Cropland use distribution at the medium feed grain price level for specified assumed wheat prices, 10 subregions[a] *(continued)*.

Subregions	Cropland use	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 acres							
8. Southern High Plains Winter Wheat—Sorghum	Wheat	614	1275	1827	1970	3058	3757	3838	3848
	Feed Grain	2967	2326	1774	1615	550	0	6	0
	Summer Fallow	395	395	395	395	395	395	395	395
	Forage	29	35	35	41	13	14	11	6
	Tame Pasture	180	219	219	229	234	84	0	0
	Reseeded Cropland	89	23	23	23	23	23	23	23
	Total Cropland Use	4274	4273	4273	4273	4273	4273	4273	4272
	Cropland Available	4273	4273	4273	4273	4273	4273	4273	4273
9. Northwest White Wheat	Wheat	1373	3040	3427	3668	3693	3693	3693	3720
	Feed Grain	2444	1059	384	143	0	0	0	0
	Summer Fallow	3650	3368	3656	3668	3835	3835	3835	3808
	Forage	66	66	66	54	54	54	54	54
	Special Crops	397	397	397	397	348	348	348	348
	Total Cropland Use	7930	7930	7930	7930	7930	7930	7930	7930
	Cropland Available	7930	7930	7930	7930	7930	7930	7930	7930
10. Southeast Idaho Hard Winter Wheat	Wheat	684	768	799	819	833	844	852	872
	Feed Grain	273	189	158	138	124	113	105	85
	Summer Fallow	694	694	694	694	694	694	694	694
	Total Cropland Use	1651	1651	1651	1651	1651	1651	1651	1651
	Cropland Available	1651	1651	1651	1651	1651	1651	1651	1651
10 Subregions	Wheat	11141	31525	53807	59965	64460	67175	67780	68829
	Feed Grain	37572	25301	8685	6314	3809	1792	1790	1481
	Summer Fallow	23193	21253	18679	18528	18456	18538	18426	18118
	Forage	4906	4603	3238	2351	1534	1292	1168	713
	Tame Pasture	6366	3126	1871	1101	426	144	26	0
	Reseeded Cropland	1222	554	345	331	327	327	327	327
	Special Crops	5626	3728	3455	1528	903	612	572	556
	Total Cropland Use	90026	90090	90080	90118	89915	89880	90089	90024
	Cropland Available	90199	90199	90199	90199	90199	90199	90199	90199

[a] Total cropland use in excess of cropland available due to rounding.

Appendix Table 5. Cropland use distribution at the high feed grain price level for specified assumed wheat prices, 10 subregions.[a]

Subregions	Cropland use	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 acres							
1. Montana Winter Wheat	Wheat	360	1350	3492	4526	4550	4550	4550	4550
	Feed Grain	3983	2992	851	0	0	0	0	0
	Summer Fallow	3775	3775	3904	3745	3770	3770	3770	3770
	Forage	81	81	74	49	0	0	0	0
	Tame Pasture	122	122	0	0	0	0	0	0
	Total Cropland Use	8321	8320	8321	8320	8320	8320	8320	8320
	Cropland Available	8321	8321	8321	8321	8321	8321	8321	8321
2. Northern Plains Spring Wheat—Summer Fallow	Wheat	629	5314	10568	10786	10840	11529	11587	11606
	Feed Grain	6755	4308	284	284	281	49	44	25
	Summer Fallow	4382	2359	1948	1930	2223	1825	1859	1859
	Forage	850	824	651	456	112	53	0	0
	Tame Pasture	874	685	39	34	34	34	0	0
	Total Cropland Use	13490	13490	13490	13490	13490	13490	13490	13490
	Cropland Available	13490	13490	13490	13490	13490	13490	13490	13490
3. Northern Plains Spring Wheat—Flax	Wheat	118	179	6993	11885	13650	14011	14409	14527
	Feed Grain	11798	11751	5614	2433	1084	1046	1067	916
	Summer Fallow	187	187	180	294	384	339	218	333
	Forage	691	742	764	563	444	331	286	154
	Tame Pasture	320	310	244	156	0	0	0	0
	Special Crops	2959	2932	2290	863	467	263	214	207
	Total Cropland Use	16073	16101	16085	16194	16029	15990	16194	16137
	Cropland Available	16309	16309	16309	16309	16309	16309	16309	16309
4. South Dakota Mixed Spring and Winter Wheat	Wheat	145	332	394	544	763	908	908	944
	Feed Grain	1198	1092	997	779	341	53	54	46
	Summer Fallow	145	331	394	513	732	876	877	883
	Forage	135	80	69	59	59	58	56	23
	Tame Pasture	166	26	11	0	0	0	0	0
	Reseeded Cropland	72	0	0	0	0	0	0	0
	Special Crops	33	34	31	0	0	0	0	0
	Total Cropland Use	1894	1895	1896	1895	1895	1895	1895	1896
	Cropland Available	1896	1896	1896	1896	1896	1896	1896	1896

Appendix Table 5. Cropland use distribution at the high feed grain price level for specified assumed wheat prices, 10 subregions[a] *(continued).*

Subregions	Cropland use	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 acres							
5. Central Plains Winter Wheat–Summer Fallow	Wheat	1132	2017	3412	5322	8369	9514	9834	11092
	Feed Grain	11467	10262	8420	5678	2913	2101	1610	681
	Summer Fallow	4187	4511	5075	5927	5739	5407	5500	5453
	Forage	686	685	587	560	466	466	418	277
	Tame Pasture	31	31	10	14	14	14	14	0
	Total Cropland Use	17503	17506	17504	17501	17501	17502	17376	17503
	Cropland Available	17503	17503	17503	17503	17503	17503	17503	17503
6. Central Plains Transitional Winter Wheat	Wheat	0	329	923	7429	7710	8534	8616	8926
	Feed Grain	9146	8634	7834	1356	1096	610	447	226
	Summer Fallow	0	163	341	341	341	163	245	267
	Forage	275	275	275	271	271	256	256	143
	Tame Pasture	142	162	195	171	150	0	0	0
	Reseeded Cropland	123	123	123	123	123	123	123	123
	Total Cropland Use	9686	9686	9691	9691	9691	9686	9687	9688
	Cropland Available	9685	9685	9685	9685	9685	9685	9685	9685
7. Central Plains Continuous Winter Wheat	Wheat	0	28	1701	8369	8572	8685	8685	8726
	Feed Grain	8480	8451	6904	320	276	184	184	152
	Forage	113	113	113	113	113	93	93	83
	Tame Pasture	369	370	244	159	0	0	0	0
	Reseeded Cropland	181	181	181	181	181	181	181	181
	Total Cropland Use	9143	9143	9143	9142	9142	9143	9143	9142
	Cropland Available	9141	9141	9141	9141	9141	9141	9141	9141
8. Southern High Plains Winter Wheat–Sorghum	Wheat	536	636	1130	1680	1939	2206	3270	3843
	Feed Grain	3123	2995	2505	1935	1685	1634	569	6
	Summer Fallow	395	395	395	395	395	395	395	395
	Forage	28	38	31	36	6	9	9	6
	Tame Pasture	168	186	189	204	225	6	6	0
	Reseeded Cropland	23	23	23	23	23	23	23	23
	Total Cropland Use	4273	4273	4273	4273	4273	4273	4272	4273
	Cropland Available	4273	4273	4273	4273	4273	4273	4273	4273

Appendix Table 5. Cropland use distribution at the high feed grain price level for specified assumed wheat prices, 10 subregions[a] *(continued).*

Subregions	Cropland use	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 acres							
9. Northwest White Wheat	Wheat	1341	1613	2423	3282	3693	3693	3693	3720
	Feed Grain	2476	2204	1268	1721	396	0	0	0
	Summer Fallow	3650	3650	3776	2476	3439	3835	3835	3808
	Forage	66	66	66	54	54	54	54	54
	Special Crops	397	397	397	397	348	348	348	348
	Total Cropland Use	7930	7930	7930	7930	7930	7930	7930	7930
	Cropland Available	7930	7930	7930	7930	7930	7930	7930	7930
10. Southeast Idaho Hard Winter Wheat	Wheat	665	665	799	819	833	844	852	872
	Feed Grain	292	292	158	138	124	113	105	85
	Summer Fallow	694	694	694	694	694	694	694	694
	Total Cropland Use	1651	1651	1651	1651	1651	1651	1651	1651
	Cropland Available	1651	1651	1651	1651	1651	1651	1651	1651
10 Subregions	Wheat	4926	12463	31835	54642	60919	64474	66404	68806
	Feed Grain	58718	52981	34835	14644	8196	5790	4080	2137
	Summer Fallow	17415	16065	16707	16315	17717	17304	17393	17462
	Forage	2925	2904	2630	2161	1525	1320	1172	740
	Tame Pasture	2192	1892	932	738	423	54	20	0
	Reseeded Cropland	399	327	327	327	327	327	327	327
	Special Crops	3389	3363	2718	1260	815	611	562	555
	Total Cropland Use	89964	89995	89984	90087	89922	89880	89958	90027
	Cropland Available	90199	90199	90199	90199	90199	90199	90199	90199

[a] Total cropland use in excess of cropland available due to rounding.

Appendix Table 6. Net returns per representative farm to operator labor, land, overhead and management for specified assumed wheat prices, 10 subregions.

Subregion	Feed grain price level	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		Dollars/representative farm							
1. Montana Winter Wheat	L	1265	5080	8858	12748	16637	20531	24438	39967
	M	2593	5080	8858	12748	16637	20531	24438	39967
	H	3569	5370	8858	12748	16637	20531	24438	39967
2. Northern Plains Spring Wheat—Summer Fallow	L	1899	3022	4915	7125	9320	11152	13781	19519
	M	1923	3022	4915	7125	9320	11152	13781	19519
	H	2920	3365	4915	7125	9320	11152	13781	19519
3. Northern Plains Spring Wheat—Flax	L	5188	5958	7306	9220	11436	13660	15919	20270
	M	5644	5996	7309	9232	11465	13681	15938	20289
	H	7400	7408	7719	9526	11728	14042	16288	20478
4. South Dakota Mixed Spring and Winter Wheat	L	4342	5244	6601	8128	9550	11284	12853	19139
	M	4779	5396	6608	8137	9708	11291	12861	19145
	H	6921	7218	7829	8565	9761	11305	12878	19162
5. Central Plains Winter Wheat—Summer Fallow	L	8669	10031	12025	14505	17203	20029	22897	34406
	M	10456	11317	12842	14927	17391	20103	22960	35786
	H	14632	15007	15699	16887	18640	20826	23268	36463
6. Central Plains Transitional Winter Wheat	L	5966	7078	8676	10442	12261	14085	15952	23534
	M	7168	7441	8830	10470	12272	14188	15985	23553
	H	9884	9919	10100	10848	12495	14250	16089	23591

Appendix Table 6. Net returns per representative farm to operator labor, land, overhead and management for specified assumed wheat prices, 10 subregions *(continued)*.

Subregion	Feed grain price level	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		Dollars/representative farm							
7. Central Plains Continuous Winter Wheat	L	6501	7241	9253	11388	13615	15812	18028	25346
	M	7799	7921	9274	11402	13652	15818	18034	25353
	H	10472	10614	10754	11474	13679	15856	18071	26961
8. Southern High Plains Winter Wheat—Sorghum	L	14805	15799	17679	19665	25377	30995	36691	59624
	M	18544	19303	20630	22618	25618	30995	36691	59624
	H	26894	27228	27822	28988	31663	34040	37632	59626
9. Northwest White Wheat	L	7526	10030	11787	17575	21703	25570	29586	45916
	M	9068	11402	12097	17575	21703	25570	29586	45916
	H	11898	13259	14688	17775	21703	25570	29586	45916
10. Southeastern Idaho Hard Winter Wheat	L	6259	9680	13295	16990	20746	24565	28385	43786
	M	7060	10319	13838	17458	21159	24917	28718	44030
	H	8626	12002	14875	18356	21949	25623	29357	44495
Total 10 Subregions	L	5933	7178	9179	11452	14038	16576	19250	28092
	M	7036	7790	9326	11653	14095	16598	19271	28278
	H	9651	10026	10779	12355	14629	16929	19454	28714

Appendix Table 7. Net returns per acre to operator labor, land, overhead and management for specified assumed wheat prices, 10 subregions.

Subregion	Feed grain price level	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		Dollars/acre							
1. Montana Winter Wheat	L	.69	2.76	4.81	6.93	9.04	11.15	13.27	21.73
	M	1.41	2.76	4.81	6.93	9.04	11.15	13.27	21.73
	H	1.94	2.92	4.81	6.93	9.04	11.15	13.27	21.73
2. Northern Plains Spring Wheat—Summer Fallow	L	1.56	2.49	4.05	5.87	7.68	9.19	11.35	16.08
	M	1.58	2.49	4.05	5.87	7.68	9.19	11.35	16.08
	H	2.41	2.77	4.05	5.87	7.68	9.19	11.35	16.08
3. Northern Plains Spring Wheat—Flax	L	6.85	7.87	9.65	12.18	15.10	18.04	21.02	26.77
	M	7.45	7.92	9.65	12.19	15.14	18.07	21.05	26.79
	H	9.77	9.78	10.19	12.58	15.49	18.54	21.51	27.04
4. South Dakota Mixed Spring and Winter Wheat	L	4.46	5.39	6.78	8.35	9.82	11.60	13.21	19.67
	M	4.91	5.55	6.79	8.36	9.98	11.61	13.22	19.68
	H	7.11	7.42	8.05	8.80	10.03	11.62	13.24	19.70
5. Central Plains Winter Wheat—Summer Fallow	L	6.00	6.94	8.32	10.04	11.91	13.86	15.85	23.81
	M	7.24	7.83	8.89	10.33	12.04	13.91	15.89	24.77
	H	10.13	10.39	10.87	11.69	12.90	14.41	16.10	25.24
6. Central Plains Transitional Winter Wheat	L	7.09	8.42	10.32	12.42	14.59	16.75	18.97	27.99
	M	8.53	8.85	10.50	12.45	14.60	16.79	19.01	28.02
	H	11.76	11.80	12.01	12.90	14.86	16.95	19.14	28.06

Appendix Table 7. Net returns per acre to operator labor, land, overhead and management for specified assumed wheat prices, 10 subregions *(continued)*.

Subregion	Feed grain price level	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		Dollars/acre							
7. Central Plains Continuous Winter Wheat	L	12.20	13.58	17.36	21.36	25.54	29.66	33.82	47.54
	M	14.63	14.86	17.40	21.39	25.61	29.67	33.83	47.56
	H	19.64	19.91	20.17	21.52	25.66	29.74	33.90	50.57
8. Southern High Plains Winter Wheat—Sorghum	L	17.19	18.34	20.53	22.83	29.46	35.99	42.60	69.23
	M	21.53	22.41	23.95	26.26	29.74	35.99	42.60	69.23
	H	31.23	31.61	32.30	33.66	36.76	39.52	43.69	69.23
9. Northwest White Wheat	L	5.70	7.59	8.92	13.31	16.43	19.36	22.40	34.76
	M	6.87	8.63	9.16	13.31	16.43	19.36	22.40	34.76
	H	9.01	10.04	11.12	13.46	16.43	19.36	22.40	34.76
10. Southeastern Idaho Hard Winter Wheat	L	3.38	5.23	7.18	9.18	11.20	13.27	15.33	23.65
	M	3.81	5.57	7.47	9.43	11.43	13.46	15.51	23.78
	H	4.66	6.48	8.03	9.91	11.85	13.84	15.85	24.03
10 Subregions	L	6.00	7.26	9.14	11.58	14.20	16.76	19.47	28.41
	M	7.12	7.88	9.43	11.79	14.26	16.79	19.49	28.60
	H	9.76	10.14	10.90	12.50	14.80	17.13	19.68	29.04

Appendix Table 8. Estimated net returns to land[a] at specified assumed wheat prices, 10 subregions.

Subregions	Feed grain price level	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 dollars							
1. Montana Winter Wheat	L	−16338	6138	33564	61245	89386	117420	145454	257592
	M	− 6774	6138	33564	61245	89386	117420	145454	257592
	H	− 2520	8357	33564	61245	89386	117420	145454	257592
2. Northern Plains Spring Wheat—Summer Fallow	L	−33073	−23807	18418	58439	98705	139234	188462	293939
	M	−32808	−23807	18418	58439	98939	139468	188696	293939
	H	−16080	−13006	18418	58439	98939	139468	188696	293939
3. Northern Plains Spring Wheat—Flax	L	7932	32886	79185	146093	221200	286955	354182	484749
	M	28650	34087	79196	146783	219409	287052	354256	485240
	H	86283	86448	97589	156290	226254	294067	361181	487673
4. South Dakota Mixed Spring and Winter Wheat	L	−3973	4192	10787	17160	22698	29454	35526	60342
	M	−1663	3552	11028	17139	23308	29480	35557	60365
	H	6929	9400	13481	16707	22460	29485	35577	60432
5. Central Plains Winter Wheat—Summer Fallow	L	67991	100288	136082	181423	231910	283372	335326	543198
	M	98102	119966	150189	187606	233288	284691	336415	567628
	H	172365	181799	195619	220488	255040	294275	339830	579586
6. Central Plains Transitional Winter Wheat	L	30181	56347	88808	123641	160074	198102	235210	392694
	M	54165	57921	91125	124181	160288	198771	235877	393075
	H	106178	108134	112275	132124	164504	200980	237934	393825

Appendix Table 8. Estimated net returns to land[a] at specified assumed wheat priecs, 10 subregions *(continued)*.

Subregions	Feed grain price level	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 dollars							
7. Central Plains Continuous Winter Wheat	L	74049	92355	145341	201006	261325	318437	376025	567387
	M	109585	108952	145872	201376	259791	318462	376049	567567
	H	179406	183089	185250	203254	260502	319446	377033	609366
8. Southern High Plains Winter Wheat—Sorghum	L	48897	55181	67014	79597	115779	151537	187621	332949
	M	72248	77396	85804	98347	117311	151537	187617	332949
	H	125290	127279	131424	138766	155711	170825	193583	332947
9. Northwest White Wheat	L	49879	73718	90452	145043	184108	220668	258631	412985
	M	64443	86577	93256	145043	184108	220668	258631	412985
	H	91205	104067	117572	146954	184108	220668	258631	412985
10. Southeastern Idaho Hard Winter Wheat	L	2360	6037	9909	13859	17873	21932	26022	42456
	M	3194	6718	10487	14358	18313	22325	26377	42716
	H	4863	8512	11593	15316	19156	23078	27059	43212
Total 10 Subregions	L	227905	403335	679560	1027504	1403058	1767111	2142459	3388291
	M	389142	477500	718939	1054485	1404141	1769874	2144929	3414056
	H	753919	804079	916785	1149583	1476060	1809712	2164978	3471557

[a] Operator labor charged at $2 per hour in all areas and overhead charged at $1000 per representative farm in all areas except the Texas state part of subregion 8 where $4000 per representative farm was charged.

Appendix Table 9. Resident labor for specified assumed wheat prices, 10 subregions.

Subregions	Feed grain price level	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 hours							
1. Montana Winter Wheat	L	9124	11621	11512	11678	11610	11610	11610	11610
	M	9124	11621	11512	11678	11610	11610	11610	11610
	H	10509	11554	11512	11678	11610	11610	11610	11610
2. Northern Plains Spring Wheat—Summer Fallow	L	24789	30454	26717	26987	26993	23539	23051	22969
	M	24876	30454	26717	26987	26876	23422	22934	22969
	H	25662	28202	26717	26987	26876	23422	22934	22969
3. Northern Plains Spring Wheat—Flax	L	57286	56073	52640	47176	42027	41679	41093	39454
	M	53599	56026	52671	47000	43353	41935	41347	39484
	H	50454	50489	49474	46542	43766	43706	42994	41035
4. South Dakota Mixed Spring and Winter Wheat	L	8443	6104	5427	5192	5170	5142	5137	4874
	M	8132	6717	5320	5219	5170	5142	5137	4874
	H	7976	7314	6453	6262	5697	5166	5160	4873
5. Central Plains Winter Wheat—Summer Fallow	L	33988	29910	29692	29002	27678	26997	26439	24529
	M	34769	31472	29877	29655	28657	26999	26458	24559
	H	34659	33267	32485	30590	28847	28611	27475	24569
6. Central Plains Transitional Winter Wheat	L	34236	32230	31880	32012	31875	30978	30978	27590
	M	34217	35052	32252	32016	31875	30978	30978	27590
	H	35192	34571	34293	31805	31977	31211	30978	27590

Appendix Table 9. Resident labor for specified assumed wheat prices, 10 subregions *(continued)*.

Subregions	Feed grain price level	Assumed Kansas City wheat price ($/bu.)							
		1.00	1.25	1.50	1.75	2.00	2.25	2.50	3.50
		1000 hours							
7. Central Plains Continuous Winter Wheat	L	34468	34930	34587	34489	33280	33280	33280	32698
	M	33558	35462	34587	34489	34519	33347	33347	32690
	H	33390	33394	34130	34489	34519	33347	33347	32690
8. Southern High Plains Winter Wheat—Sorghum	L	12137	12144	12186	12186	12195	12115	12123	12122
	M	12309	12141	12141	12184	12191	12115	12125	12122
	H	12245	12310	12118	12144	12147	12121	12121	12126
9. Northwest White Wheat	L	5909	5828	5766	5829	5810	5810	5810	5828
	M	5917	5881	5826	5829	5810	5810	5810	5828
	H	5912	5917	5918	5818	5810	5810	5810	5828
10. Southeast Idaho Hard Winter Wheat	L	1623	1608	1599	1593	1588	1585	1585	1577
	M	1633	1608	1599	1593	1588	1585	1585	1577
	H	1633	1608	1599	1593	1588	1585	1585	1577
Total 10 Subregions	L	222003	220902	212006	206144	198226	192735	191106	183251
	M	218134	226434	212502	206650	201649	192943	191331	183303
	H	217632	218626	214699	207908	202837	196589	194014	184867