PREFACE

This study was initiated by the senior author in early 1973 as a thesis research project for the Master of Science Degree in the Department of Agricultural Economics of the University of Missouri-Columbia. A major objective of the research was to examine factors influencing the expansion and/or contraction of the sugarbeet industry in the various U.S. producing areas. One of the issues to be examined was the effect relative production cost patterns had on the expansion and/or contraction of the industry in given geographic areas. After careful analysis of production cost data from major producing regions and sub-regions, it became clear that a host of other factors appeared more important than differing production costs in explaining why a given area's production was increasing or decreasing relative to other areas. While this was expected to be the case, useful secondary data were not available to provide an adequate basis for determining which of the many factors were important for any given area. It thus became evident that area on-site data collection would be necessary to obtain information unavailable from secondary sources.

Though a Cooperative Agreement between the University of Missouri and the USDA, ERS, Commodity Economics Division, funding was provided for the senior author's salary and travel expenses to all major U.S. sugarbeet producing areas. Information and data from these areas were obtained by the senior author during the late fall and early winter of 1973.

The first draft of the manuscript was completed and submitted to the USDA for review in February 1974. Both the review and revision processes took much longer than anticipated. In part, the long delay between the first draft and publication was due to an attempt to continuously update the manuscript to take into account the significant changes occuring in the U.S. and world sugar and agricultural economies between 1972 and 1976. Changes were occuring so rapidly and were of such a magnitude that updating and revision could not be successful without a major effort to collect new information and data. Because funding was not available for such an effort, a decision was made to publish the manuscript with relatively limited revisions. The reader should thus bear in mind that the analysis does not reflect all of the changes and events that have occured in the U.S. and international sugar and agricultural economies during the past couple of years. While this will be of concern to readers interested

in very recent events in the U.S. sugar and sugarbeet economies, it is believed that the data and analysis presented remain of considerable value to researchers and others interested in the U.S. sugarbeet industry.

The study could not have been done without the very excellent cooperation of industry respondents and experiment station and extension personnel in many states. The number of individuals, firms and institutions is too large to list, but appreciation is extended to all who assisted in providing data and information for the study. Appreciation is also extended to the many USDA economists who reviewed and made valuable comments on the manuscript in its various stages and especially to Robert W. Bohall, leader of the Fruits, Vegetables, Sugar and Ornamentals group of the CED, ERS for his capable guidance and assistance throughout the duration of the study and manuscript preparation.

The efforts of Rose Ragsdale in providing secretarial services in the numerous draft stages are also greatly appreciated. The authors are, of course, responsible for possible errors and deficiencies.

PHILIP F. WARNKEN
February, 1976
Columbia, Missouri

CHAPTER

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THE LOCATION OF SUGARBEET PRODUCTION IN THE U.S.

CHAPTER I

Introduction

This study, financed by a cooperative agreement betweeen the United States Department of Agriculture (USDA) and the University of Missouri, is intended to meet the double objective of providing a description of the United States sugarbeet industry in 1973, and forecasting areas in which production would tend to be located by 1980.

The need for a descriptive study of the sugarbeet industry became apparent during research undertaken at the University of Missouri-Columbia into the comparative costs of producing sugarbeets in different locations in the U.S. When contacted, university, extension, and sugar company personnel were all knowledgeable and helpful about conditions in their own area, but were, understandably, not very conversant with any other region. It was decided therefore to research and present in a readily available form a study which would describe the areas in which sugarbeets were being produced in 1973, and which would include production levels and trends over the last ten years, estimate costs of production in each area and emphasize the advantages or disadvantages of production in those areas.

Subsequent publication of a report produced for the Environmental Protection Agency (EPA) describing the probable impact on the sugarbeet industry of implementation of pollution control guidelines (9) removed the necessity of including much descriptive material concerning the sugar companies mentioned in this report. The EPA report includes copious descriptions of the locations, productive capacities, financial structures and viability of the U.S. sugarbeet processing firms (a parallel report (10) similarly describes the sugarcane refining industry), so the present study considers issues largely from the viewpoint of the sugarbeet growers. Therefore, the descriptive portions of this study focus primarily on the production, rather than the processing sector of the sugarbeet industry.

The second objective of the report is to answer the question: Where will U.S. sugarbeet production be located in 1980? Two approaches to the problem were suggested--the model building and the pragmatic. Several models of sections of the sugarbeet industry have been constructed, but predictions based on these models have frequently overlooked important, unquantifiable effects.

A study in Minnesota by Johnson, Jensen and Boisvert (94) concluded that in 1966 sugarbeet production was competitive with production of a range of other crops, and that the industry might reasonably be considered stable. Five years later, both sugarbeet factories in the area were closed allegedly owing to obsolescence and pollution problems. These closures did not invalidate the study, which has been vindicated by construction of a new plant in the area, but merely demonstrated that not all factors affecting the industry could be included in the report.

An economic study of the Montana sugarbeet industry by Cramer and Godfrey (99), in 1969, used a model-building approach, to conclude that, despite competition from the potato crop, expansion of the sugarbeet industry in the state was quite probable. The model was not able to consider a lack of enthusiasm on the part of Montana farmers for beet growing, which local economists feel led to the closure of a plant at Hardin, Montana, in 1971.

Having observed that the simplifications and restrictions required to prepare data for model input might cause some factors of importance to be omitted in determining future production levels, a more pragmatic approach was selected. This approach consisted of gathering on an area-by-area basis as much information as was available from various sources relating to past production levels, costs of production of sugarbeets and competing crops, and relative acreages of field crops to provide a statistical background to data collected in the second phase.

The second phase entailed traveling to all the sugarbeet producing areas, and interviewing as many personnel concerned with the industry as was feasible in the time period allowed. Those interviewed included university agricultural economists, extension staff, officers of grower associations, sugar company officials and sugarbeet growers. All were asked to state which, in their opinion, were the most important factors affecting the industry in their area. In setting up the project, a tentative list was made of those factors that might cause either growers or processors to alter their levels of production in an area. The list, which is not held to be complete, included over 120 items, and is included in Reference 15 as Appendix three. However, it was felt that of the multitude of influences acting in an area, some few would be of far greater significance than the others, and the personal interviews were designed to isolate these crucial factors.

Opinions based on all the data collected through the procedures outlined above could then be formed, and the final part of the report includes forecasts of the level of production in each area by 1980, or thereabouts. It must be emphasized that all those who gave information in the course of this study did so on a voluntary and informal basis. Sources are cited for cost and production level data, but otherwise, all opinions stated are not official statements from any organization.

This study is expected to be of interest to several sections of the community: To USDA and other federal officials as a background to policy decisions, to sugar company personnel and growers, as a perspective aid for university and extension workers, as background material for international economists and to consumer groups interested in sugar production and prices in the future.

CHAPTER II

THE BACKGROUND TO SUGAR[1]

It is not the intention in this report to include much discussion regarding the historical background of sugar marketing or present or past institutional regulations concerning the sugar industry in the United States, since these topics have been exhaustively covered elsewhere (3, 9, 17, 21, 26). However, a brief background discussion is necessary to set the context for the rest of the report.

In the U.S. sugar is used primarily as a human foodstuff with only relatively small amounts used in animal feeds or as a chemical feedstock. Sugar is regarded as a luxury item in low income countries, but in more affluent countries, as income rises, sugar usage tends to reach a limit. Annual consumption per head in the United States is slightly over 100 pounds. Estimates of price elasticity of demand for household use of sugar range from -0.16 to -0.24 (5) but household use only accounts for one quarter of domestic U.S. in liquid or processed food form, and price elasticities of demand for sugar ingested in this manner are not available.

Considerable controversy is apparent in nutritional circles concerning whether or not sugar is a necessary food. Professor John Yudkin (29) is a leading proponent of a school of thought which observes that the human body, if fed no sugar directly, will manufacture all required blood sugar from other food sources, and holds that the common excessive use of sugar in the diet is a contributary factor towards tooth decay, obesity and cardiac problems.

However, despite theoretical arguments against the excessive use of sugar in the diet, it must be noted that sugar might well be described as a low grade addictive substance. In the more developed countries only fear or vanity cause a reduction in personal sugar consumption--fear of heart trouble exacerbated by obesity, and a dislike of presenting a fat appearance. Otherwise, once a child has acquired a "sweet tooth," there is little likelihood of personal consumption reduction. Almost all segments of the food industry utilize sugar as an input, and it seems improbable that this industrial sector would lend support

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[1]Although there are many different types of sugars, this report is entirely concerned with that sugar known as sucrose, referred to here as "sugar."

to a campaign to ban sugar usage. A long-run population growth of about 1½ percent per annum in the continental United States, and a per capita consumption of 100 pounds implies a demand increase of around three million cwt. of sugar annually (1), assuming any increase in consumption due to rising income is offset by a swing to non-sugar sweeteners.

Sugar consumed in the continental United States is produced from sugarbeets (Beta vulgaris), or sugarcane (Saccharum officinarum). Viton (27) holds that the cost of production of well-administered, scientifically cultivated cane sugar is cheaper than that of beet sugar produced under similar management and technical conditions. However, it would be fair to add that, with the exception of Eastern European sugarbeet production, the level of technology applied to the sugarbeet industry is higher than that presently applied to sugarcane. Sturrock (16) found that the cost of producing sugarbeets in the United Kingdom had increased by 4 percent between 1954 and 1970, whereas that of sugarcane in Jamaica had risen by 86 percent. However, it should be added that the costs of sugarbeet production are now rising rapidly as further economies available from better fertilization, improved seed stock and mechanization are being exhausted.

A series of legislative measures starting in 1934 and finally resulting in the Sugar Act of 1971 had led to a surprisingly steady price of sugar on the domestic U.S. market by rigidly controlling the supply. In 1972, final production quotas were set as follows:

SOURCE	Amount (1,000 Tons)	Percent of Total Quota
Domestic Beets	3,450	29.3
Domestic Cane	1,643	13.9
Hawaiian and Puerto Rican Cane	1,266	10.7
Total Domestic Production	6,359	53.9
Total Imported Cane Sugar	5,441	46.1
Total all Production	11,800	100.0

Various measures have been available to the Secretary of Agriculture to ensure that these quotas were not exceeded (9, 24, 26). Of immediate relevance to this paper have been the Secretary's discretionary powers, to (a) limit the marketed production of companies producing refined beet sugar, and (b) limit the acreage of beets produced by individual growers (this last control was not applied to sugarbeets since 1966).

The control mechanism for the sugarbeet industry usually worked as follows. Marketing allocations for each company producing refined sugar were set by the Secretary of Agriculture, and the company, knowing approximately how much sugar it could market, then offered contracts to growers to grow a specific acreage or tonnage of beets. An association representing the growers bargained with the sugar company to establish a price structure. Although many variations on this theme existed, the usual contract was an agreement by the sugar company to pay the grower a certain price per ton of beets, depending on the sugar content of the crop and the price the processor received for sugar in the market. Growers who complied with governmental regulations regarding such subjects as employment conditions and production limits also received a government payment in proportion to the sugar content of the crop.

Some interesting features of this system were: First, a federal excise tax levied on refiners for all sugar manufactured in the U.S. for several years exceeded the total of governmental grower payments, the balance being paid into general treasury funds. Second, many companies began to contract to pay the grower according to the sugar content of his individual crop rather than the average for all beets supplied to the factory. Although some additional expenses were incurred for more extensive sampling, these have been more than offset by the additional receipts due to the higher sugar content as each grower responded to the stimulus to increase his payments. Third, it is cheaper to transport sugar than sugarbeets, so factories are located in production areas. Many sugarbeets are produced away from population centers, or on the West Coast, into which region Hawaiian cane sugar is also shipped. Many companies sell much of their sugar in the industrial Mid-West or Chicago markets, and the price the grower receives will ultimately depend on the marketing costs of the refined product. Thus, Eastern (Ohio and Michigan) growers are inherently in a better location than many in the West. The largest industrial sugar market in the world is located in Minnesota, Wisconsin, Illinois, Indiana and Ohio.

Beet sugar does not sell as well as cane sugar in retail outlets, although the two products are chemically identical. Consumer prejudice in favor of cane sugar is attributed to suggestions that in the past impurities were found in sugar made from beets, and that beets growing in the ground were inherently "dirtier" than free-standing cane. Also, brown sugars cannot be easily made from sugarbeets. Whatever the reasons are for the different product images, it can be noticed that cane sugar is almost always sold as such in the retail market, but beet sugar is sold as simply "pure sugar."

CHAPTER III

METHODOLOGY USED FOR THE STUDY

The body of this report consists of eight area studies, all alike in format. Each study starts with an introduction stating which geographic regions are considered to lie in each area, the sugar companies operating in the area, the factory locations, and environmental data detailing elevation, length of growing season and annual rainfall. The agricultural Stabilization and Conservation Service (ASCS) of the USDA has carried out highly detailed surveys of sugarbeet production costs across the United States, but to avoid disclosing the activities of any one firm by virtue of geographical location, has aggregated the data into eight major areas.

The eight areas considered in this paper correspond with the ASCS-defined areas. Since different sub-areas within any given area may possess significantly differing patterns of production, the second section of each report is concerned with describing the constituent parts of the ASCS areas, attempting to bring out the most important factors affecting the levels of production in each sub-area. Data for these sections were almost entirely collected during the personal interview stage of the research.

The "Summary and Projections" section of each area study comments on the statistical data assembled, reiterates the most important influences felt to be affecting the level of sugarbeet production in each sub-area in 1973, and presents an informal projection of future levels of production.

The "Statistical Background" section of each area study details (1) all the counties in a sub-area in which sugarbeets were produced between 1963 and 1972, inclusive, and (2) the 1968-1972 average sugar content of the crop in each sub-area, derived from data supplied by the sugar companies.

Next, each area study considers sugarbeet production costs. The first table in each area report presents the ASCS costs for each area, together with budgets relating to the various sub-areas. It must be understood that these budgets are estimates based on secondary data. Two problems had to be faced in gathering cost data. First, budgets were never provided in exactly the same format for more than one sub-area, and second, the research work had been carried out in several different years using different methodologies. Cost data were collected by contacting the Department of Agricultural Economics and Extension staff at the relevant universities. Sources are cited in the Bibliography (Appendix Three), which for this purpose is organized by state.

The difficulty of manipulating all the budgets to be entirely comparable was admitted. Many differences between areas and sub-areas would have been obscured had a standard method of calculation been imposed. In some locations land is rented, in others, owner-occupiers are the rule. Interest rates and the price of labor vary between states. 1/ Red River Valley land costs include a charge for a summer fallow period not occurring elsewhere, and the incidence of custom hiring varies between sub-areas. Even the charge for interest on operating capital may vary depending on how many months sugarbeet production is considered to take.

The general procedure for presenting cost of production studies in this report was to allocate all costs, unaltered, to a standard set of cost categories, and prorate harvest and haulage charges, if calculated on a per ton basis, to agree with average yields for the sub-area. Interest on operating capital and miscellaneous costs were charged at 4 percent 2/ and 1½ percent 3/ respectively of variable costs, if no other specific cost had been assigned. A blank in the table of production costs--such as that often occurring in the category of "Water-fixed cost"--does not mean that there is no cost for this operation, rather that the cost was included somewhere else in the budget provided, and could not be isolated.

Since the sugar companies and growers' associations produce their own confidential cost figures, the universities carry out such cost studies less frequently than for many other crops. Due to this shortage of data, it was necessary to use budgets for various years back to 1965. Since significant inflation has occurred over the last ten years, a means had to be found to convert all studies to a common year. The costs of production indices available in the yearly publication "Agricultural Statistics" proved to be the most convenient conversion factor, and 1972 was chosen as the base year, both since it was the most recent year for which indices were available, and because the ASCS cost studies referring to 1972 were also available. Table A list the categories and indices used to make these cost conversions.

1/ Operation's labor was charged at the local rate for hired labor, but no charge was made for management.

2/ i.e., 8 percent per annum, but for six months only.

3/ The most common rate used in the budgets supplied.

Application of the inflation indices converted all costs to a 1972 price basis. It was unfortunate that actual 1972 data for all production sub-areas were not available in the first place but, even acknowledging the inaccuracies engendered in the conversion process, it was felt that the completed tables provide at least some idea of locational production cost differences. The last operation performed in deriving the cost tables was to take the 1968-1972 average yield for a sub-area and multiply it by the 1968-1972 average sugar content of the crop, as supplied by the sugar companies, to give the yield of sugar per acre, and by further division arrive at the farmer cost of producing a ton of sugar. 4/

Each area report also presents outline budgets for competing crops in the second set of tables. These budgets were derived from a wide range of university and extension sources, listed by state in the Bibliography, and the inflation indices recorded above were applied to convert all costs to the 1972 basis if necessary. These budgets are presented merely in terms of fixed and variable costs, and the average yield level claimed in the budget. The yields shown in the third set of tables in each report are multiplied by 1972 and 1973 prices for the crop, as reported in the USDA Statistical Reporting Service (SRS), "Crop Values" bulletin, published in January 1974 (18), and the total costs subtracted from the gross returns to give a net returns figure for both years. Although data derived in this fashion cannot be entirely accurate for either crop year, since the source budgets were prepared by different researchers at different times using different methodologies, it is felt that the budgets do at least give an idea of which crops offer the most favorable returns compared to sugarbeets. Costs for 1973 have been assumed at 107 percent of 1972 total costs.

The fourth set of tables was derived from ASCS crop statistics. Each year the ASCS publishes a list of the number of farms, planted and harvested acreage, tons marketed and the value of production by county within state. The listing for 1973 is included in this report as Appendix I, so that the relative importance of each county can be seen. These county data were aggregated into the sub-areas previously specified and listed in the tables with further calculations performed to show the planted acreage per farm, the percentage

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4/ It is recognized that this approach is not entirely accurate in that it assumes a 100 percent efficiency in extracting sugar from beets. However, extraction efficiency ratios were not available either for individual mills or regions and thus there were no acceptable alternatives to this approach. The reader should be aware that the impact of this assumption is to understate per ton costs of sugar by perhaps 20 to 25 percent of the figure reported in the tables.

TABLE A

COST INFLATION INDICES: 1972 = BASE 1.00

	1964	1965	1966	1967	1968	1969	1970	1971
Labor, per hour	1.73	1.65	1.51	1.42	1.29	1.17	1.10	1.06
Machinery Usage, fuel, repairs, etc.	1.23	1.21	1.18	1.15	1.17	1.14	1.09	1.01
Fertilizer	1.04	1.03	1.04	1.04	1.06	1.11	1.06	1.02
Seed	1.35	1.31	1.33	1.31	1.23	1.21	1.15	1.07
Chemicals	1.16	1.15	1.14	1.14	1.14	1.14	1.11	1.09
Farm machinery prices and custom hire	1.48	1.44	1.38	1.33	1.27	1.21	1.15	1.07
Other production commodities	1.30	1.27	1.23	1.22	1.20	1.15	1.11	1.06
Taxes	1.90	1.79	1.65	1.52	1.38	1.23	1.13	1.06
Land Values								
Ohio	1.55	1.47	1.37	1.28	1.21	1.16	1.10	1.06
Michigan	1.64	1.59	1.49	1.37	1.28	1.19	1.15	1.10
Minnesota	1.51	1.46	1.38	1.29	1.21	1.12	1.07	1.05
North Dakota	1.51	1.43	1.33	1.25	1.17	1.08	1.06	1.03
Nebraska	1.56	1.48	1.37	1.27	1.18	1.13	1.10	1.09
Kansas	1.37	1.28	1.19	1.08	1.00	.97	.99	1.03
Texas	1.59	1.47	1.42	1.36	1.32	1.20	1.14	1.11
Montana	1.46	1.41	1.30	1.24	1.17	1.13	1.08	1.07
Idaho	1.42	1.38	1.31	1.24	1.17	1.15	1.10	1.05
Wyoming	1.50	1.45	1.38	1.31	1.25	1.19	1.13	1.19
Colorado	1.41	1.36	1.27	1.22	1.17	1.14	1.12	1.08
Arizona	1.13	1.10	1.07	1.05	1.03	1.03	1.04	1.06
Utah	1.33	1.29	1.22	1.18	1.16	1.13	1.09	1.05
Washington	1.47	1.40	1.33	1.24	1.15	1.08	1.04	1.05
Oregon	1.47	1.40	1.32	1.26	1.21	1.14	1.08	1.05
California	1.33	1.23	1.15	1.15	1.10	1.06	1.06	1.06

Source: "Agricultural Statistics, 1972", USDA.

of planted acres that were successfully harvested, and the yield per harvested acre. The yield per harvested acre and the levels of planted acreage over the ten years (1963-1972) are presented in the first and second set of graphs.

The fifth set of tables in each area report is designed to give an impression of importance of sugarbeet production in terms of land use. In most cases, the acreage of competing crops in those counties that produce sugarbeets has been listed but in some cases, county data were not available for all crops, so whole state data were recorded instead. The percentage of producing land sown to each crop is listed.

Chapter 12, "The Future," tests the hypothesis that production will tend to expand if sub-area costs are less than those for the ASCS area and forecasts 1980 levels of production.

CHAPTER IV

AREA ONE

Introduction

Production from northwest Ohio and southwest Michigan is included in ASCS Area One. There are eight factories in the area, that of Buckeye Sugar at Ottawa, Ohio, those of the Northern Ohio Sugar Company at Fremont and Findlay, Ohio, the Michigan Sugar Company plants at Caro, Croswell, Carrollton and Sebewaing, Michigan and the Monitor Sugar Company at Bay City, Michigan. Most of these plants are comparatively small and old by industry standards. No attempt has been made to deduce individual factory data from the ASCS county figures (Appendix One) since more than one factory may contract in the same county, and some 3,000 acres of beets from extreme southeastern Michigan are processed at Fremont, Ohio.

Elevations range between 600 and 800 feet above sea level and the growing season decreases moving northward, from 197 days in Ohio to 140 days in Michigan. Yearly average rainfall varies from 30-35 inches. Since sugarbeets are not grown under irrigated conditions drought periods often check crop growth.

Area Descriptions

1.1 Ohio

The two Northern Ohio Sugar Company plants in Ohio, at Fremont and Findlay, together with Buckeye Sugar's Ottawa plant, contracted for sugarbeets in seventeen counties in 1973. Buckeye, with a capacity of 1,700 tons per day, contracts exclusively in Allen, Defiance, Fulton and Van Wert Counties, shares with Findlay in Henry, Hancock and Putnam Counties, and shares with both Findlay and Fremont in Wood County. Findlay and Fremont both contract in Monroe County, Michigan, and Lucas County, Ohio. Findlay, rated at 1,550 tons per day, operates alone in Hardin and Wyandot Counties, and Fremont, 3,330 tons per day, is the sole contractor in Erie, Huron, Ottawa, Sandusky and Seneca Counties. Although the climate is similar in all areas, soil types range from sandy near Fremont to heavy land at Ottawa.

OHIO--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA ONE

Soil type becomes of some importance when the Ohio weather pattern is considered. The flat topography just south of the Great Lakes presents no barrier to cold polar air nor to warm tropical air, and severe storms are frequent. The northward latitudes create vulnerability to early winter storms. Some 10,000 acres of beets were frozen into the ground in 1972 (see Table 1.4), and the relative heaviness of the soil has a great effect in deciding how early the spring plowing can be undertaken. Average sugar content may rise by more than one percent when the crop is planted early. An example of the difficulty of predicting yield levels owing to uncertain weather occurred in 1973. Late spring rains caused planting problems so state planted acreage only reached about 31,000 acres, 13,000 down on the 1972 figure. An August drought reduced yields to around 13 tons per acre, some five tons per acre below yields in recent years (Table 1.4).

This sequence of bad weather conditions came at an unfortunate time for the Ohio sugarbeet industry. Yield had been averaging over eighteen tons per acre for eight years (see Graph 1.1), and planted acreage had been steadily increasing for ten years (Graph 1.2). Factory capacity in the area had been increased. Thick juice tanks 1/ were installed at Fremont, and the factories had even been converted to run on coal, oil or natural gas. By 1972, however, a problem for the industry, in addition to those supplied by the weather, had appeared. Returns from the competing crops made it difficult to contract beet acreage. The high value crops common in the Ohio sugarbeet producing areas include cucumbers for pickles, tomatoes for processing and cabbages (see Table 1.5), although cabbages are not common on the heavier soils of the Ottawa area. These enterprises normally return greater profits than do sugarbeets but the market is limited, the price is subject to fluctuation, and the crops demand high inputs of labor, capital and management. Thus, sugarbeets remain competitive on the grounds that they are easier to grow and return a steady profit. It should be remembered that although sugarbeet yields fluctuate owing to the vagaries of the weather, so will the yields of competing crops, thus the competitive position remains the same. However, Ohio grows enormous acreages (Table 1.5) of hay, corn, oats (replacing cabbages in the Ottawa area), soybeans and wheat, and the sudden increase in the price of these crops made them as attractive as sugarbeets.

1/ "Thick juice tanks" are large containers in which some of the raw sugar solution extracted from the beets early in the production process may be stored. After all the beets coming to the factory have been processed, the stored juice can be run through the relatively slow sugar manufacturing process, thus extending the factory operating period and spreading the fixed operation costs.

Given satisfactory weather conditions, the land is inherently very fertile. More land suitable for beet production is available further west in Wood County. Great Western has incurred a heavy investment in modernizing its factories, and most growers are located within 40 miles of a factory. Labor is available owing to the presence of other intensive crops, and, although chemical residues in the beet tops prohibit their stockfeed use, livestock farmers use the pulp and molasses by-products. One other advantage to production in Ohio is that half the population of the United States is located within 500 miles of Toledo, and proximity to market may well become an even greater advantage if transport charges increase substantially. The fairly high cost of production per ton of sugar is caused by high custom and land charges (Table 1.1).

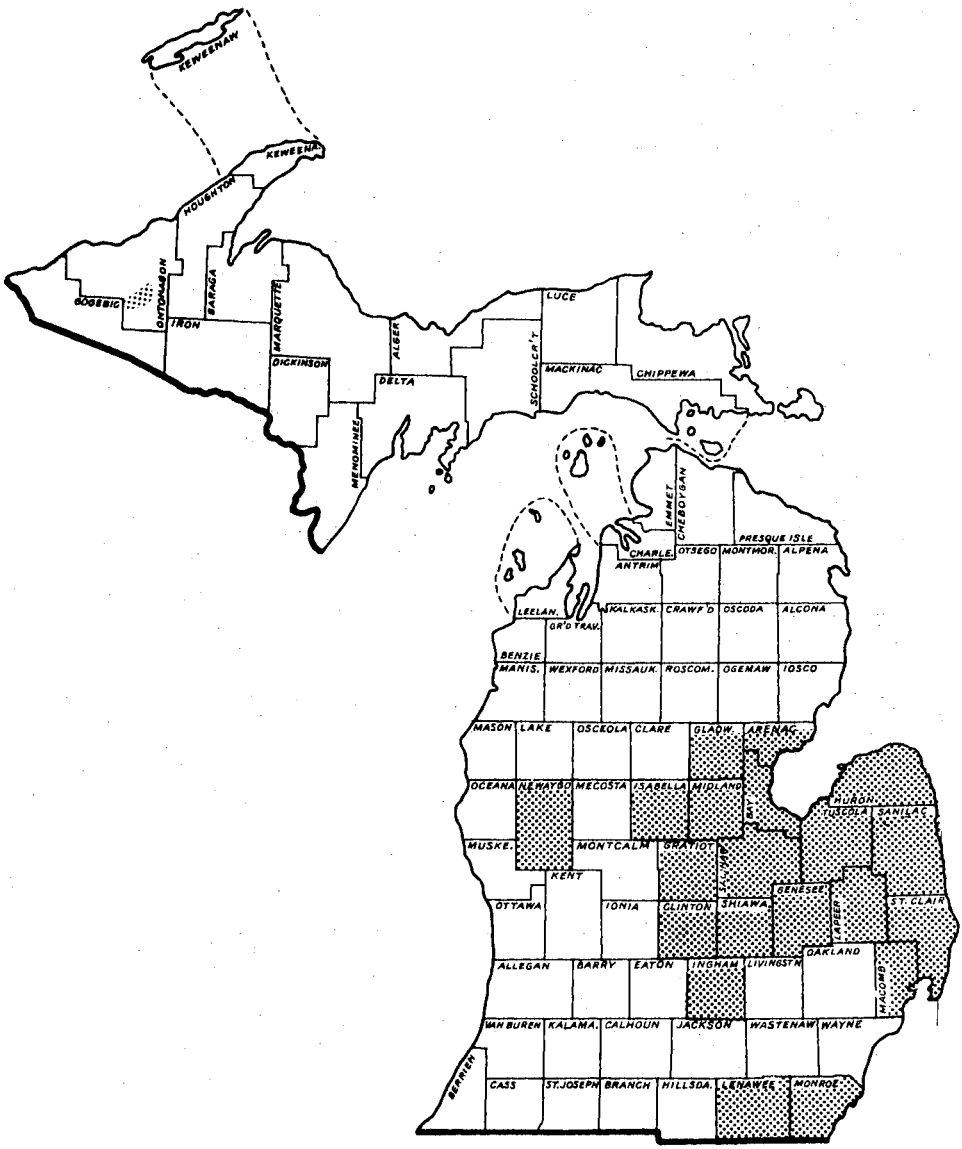
Until 1973, more growers in this area wished to grow beets than could be accomodated by the factories, and this history of competition for contracts acted as a deterrent in 1973 for growers wishing to leave the industry, for fear that reestablishment would be difficult. Considering the future, if the returns from beets remain uncompetitive in relation to grains and hay and bad weather is encountered again, then the industry may be forced to close down or contract substantially. However, expectations are that given reasonable luck, planted acreage should stabilize between 40,000 and 45,000 acres. Expansion beyond that point would require either a substantial investment in increased plant capacity, or construction of a new factory, neither of which seems likely at present.

1.2 Michigan

The Monitor Sugar Company factory at Bay City, Michigan, capacity 3,500 tons per day, usually contracts for some 30,000 acres in the Saginaw Bay area, whereas the Michigan Sugar Company's four plants are smaller, contracting for around 16,000 acres each. Carrollton and Sebewaing are rated at 2,100, Caro at 1,900, and Croswell at 1,400 tons per day. To keep all the factories running for approximately the same length of time, interplant shipments are made by truck. A significant yield differential exists within the state. Most areas average between 17.5 and 19 tons per acre, but the Croswell region only achieves 14.5 tons per acre owing to the poor drainage conditions found on the heavy soils there (Appendix One).

As in Ohio, the substantial acreage of vegetable crops should not be regarded as too great a competitor of sugarbeets because of the high input requirements. Although considerable acreages of corn, wheat, oats, soybeans, alfalfa and field beans are grown (Table 1.5) the costs and return figures provided suggest

MICHIGAN--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA ONE



that above average yields are necessary to make substantial profits. Recent price increases have helped the competitive position of field crops other than sugarbeets (Table 1.3), but the northerly latitudes reduce yields. Sugarbeets have been established for a long time (the factories were built before 1902) as a reliable crop with comparatively reasonable returns--yield per acre and acreage planted have generally risen over the last ten years (see Graphs 1.1 and 1.2).

Recently, two threats to the continued prosperity of the industry have appeared. The best sugarbeet land lies in a crescent pattern close to Saginaw Bay, and fertility tends to decrease as elevations and distance from the Bay increase. Interstate 75, running northward from Detroit through Flint and Saginaw to Sault Sainte Marie has created an industrial corridor which has begun to exert considerable pressure on the land resource. More land is available further west in Clinton and Gratiot Counties, but yields will be lower and transport costs higher.

The second threat is connected with the age and small size of the factories. The EPA report (9) on the economic impact of proposed pollution control guidelines is emphatic that the Michigan area would be very hard hit, to the point where factory closure would become economically necessary. However, the present United States energy problem appears to be having a tendency to relax the stringency of pollution control legislation and the guidelines may be altered prior to implementation. A sugar company official also stated that, rather than go out of business, capital for discharge modifications would be found. Possibly the growers might be persuaded to share part of the cost on a cooperative basis. In view of the success of the sugarbeet industry in the even more northerly Red River Valley (see ASCS Area Two description), it is also possible that one or two new plants might be constructed in Michigan and the old factories closed, but there is no sign at present of any new plants being in operation by 1980.

Forecasting the future level of Michigan production takes the same form as for Ohio. If the worst possible combination of adverse circumstances transpires, then the industry must contract or even close down, but expectations are for little change. Certainly, no significant expansion of output seems likely before 1980.

Summary and Projections

Perusal of Tables 1.1, 1.2 and 1.3 will suggest irrationality on the part of Ohio growers, who appear to operate at a loss. An industry representative suggested that the cost of production figures supplied (118) for the Ohio region were much too high, and 1972 total costs per acre were in fact around $180, allowing net returns of $100 per acre in Ohio and $85 in Michigan.

Assumption of these levels of returns with reference to Table 1.3 would result in sugarbeets having been competitive at 1972 price levels, but returning less than corn, soybeans and wheat at 1973 prices. Although returns from pickles and tomatoes often exceed those from sugarbeets, it is felt that a grower dissatisfied with sugarbeet returns would be more likely to shift to corn, wheat, or bean production for the reasons previously outlined.

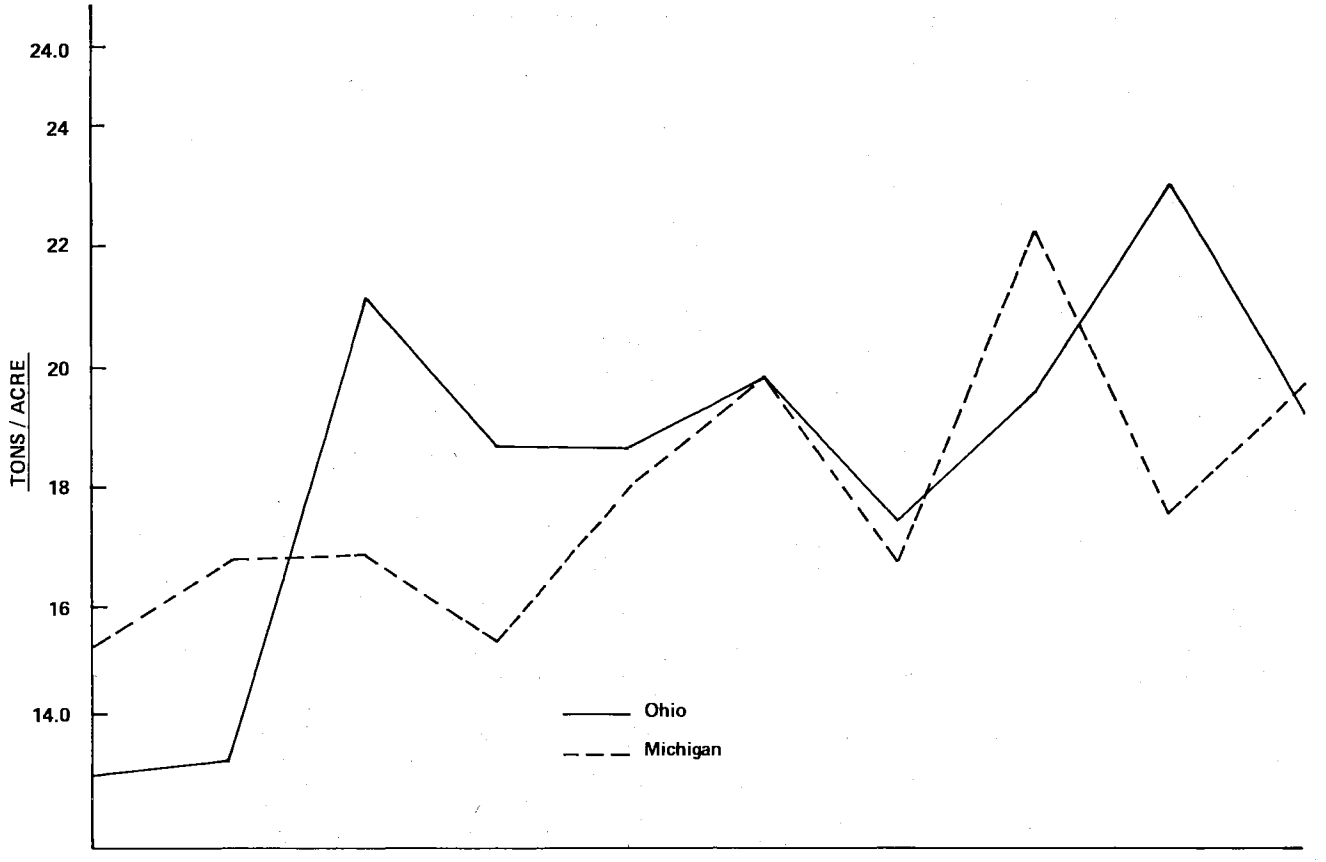
Planted acreage in both Ohio and Michigan has generally increased since 1963 (Graph 1.2), and Michigan yield levels are generally below those of Ohio (Graph 1.1) owing to the more northerly location. Fluctuations in yield are held to be due to the frequently adverse weather conditions. Ohio yields dropped to some 13 tons per acre in 1973.

To summarize, although the sugarbeet industry in Area One has seemed relatively healthy during the last ten years with yield per acre and planted acreages having generally risen, the events of the next two or three years will be crucial in determining the position of the industry in the early 1980's.

Problems are looming in three different areas. The recent increases in the prices of grains and hay have made these crops price competitive with sugarbeets, while being easier to grow. Rapid urbanization is threatening the land resource availability in Michigan and a reliable authority (9) considers that implementation of present pollution control guidelines will cause the Michigan factories to close.

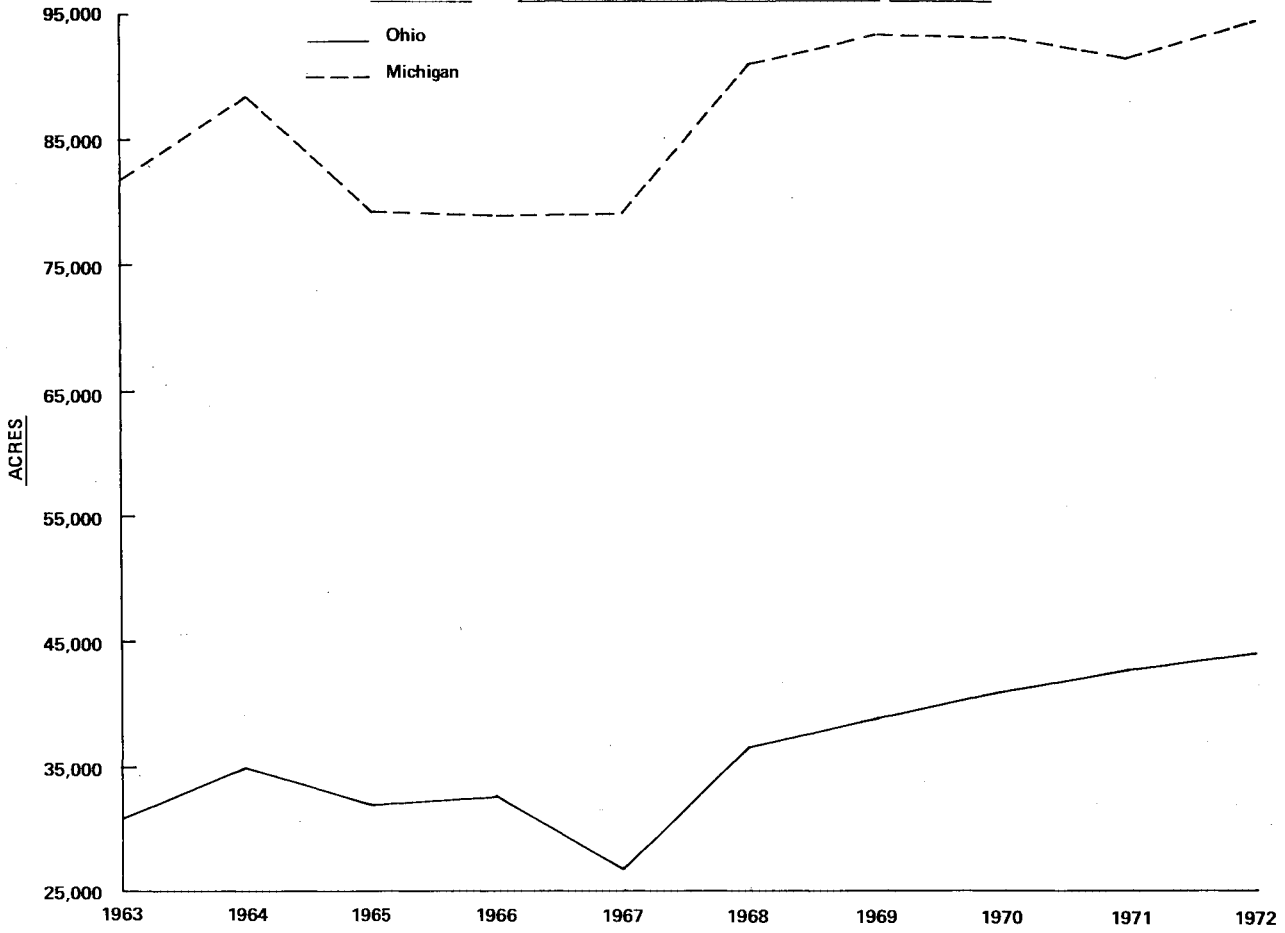
However, many people, both farmers and those in industry, have a strong interest in continuing sugarbeet production in the area, and it is expected that the problems can be overcome. An increase in the price of sugar relative to competitive crops should return beets to their former attractiveness. Not only are farmers loath to give up their history of growing for the sugar companies, but at least further north in the region, yields from competing crops are not particularly high. The gradual attrition of land in Michigan by urbanization is not expected to become serious for some ten years, and alternatives, although less desirable, growing areas are available further to the west. The Michigan sugar companies do not feel that proposed pollution control measures will force them to close, but consider rather that (a) a less severe level of control will be implemented, and (b) the cost of factory modifications will be borne, rather than face closure. The general feeling in the area at the end of 1973 was one of cautious optimism. It is possible that one or two plants may be forced to close. Ottawa and Croswell seem the most likely, but expectations are that production levels should suffer no more than a slight decrease.

GRAPH 1.1 YIELD OF SUGARBEETS - AREA ONE



Source: Table 1.4

GRAPH 1.2 PLANTED ACREAGE OF SUGARBEETS - AREA ONE



Source: Table 1.4

TABLE 1.1

1972 PER ACRE COST DATA FOR SUGARBEETS

(dollars)

	STUDY DATA		ASCS Data-Area 1 (1972 Cost Study)
	Ohio	Michigan	
Labor-own	21.95	7.70	38.90[1]
-custom and hand	35.64	34.91	17.17
Machine operations-own	11.08	7.85	11.99
-custom	88.65	38.63	37.95
Seed	6.15	2.54	2.71
Fertilizer	31.86	22.55	33.39
Chemicals	19.35	6.71	10.48
Water operating costs	. . .	. . .	. . .
Miscellaneous	3.36	1.97	15.61
Interest on operating capital	8.98	5.37	3.39
Total variable costs	227.02	128.13	171.59
Interest on land	68.83	51.26	37.26[2]
Interest on machinery investment	6.57	4.91	3.74
Machinery depreciation	8.85	11.17	14.27
Taxes and insurance	9.29	10.05	12.66
Water fixed costs	. . .	. . .	. . .
Total fixed costs	93.54	77.39	67.93
Total all costs	320.56	205.52	239.52
5 year average yield (tons/acre)	19.02	18.48	18.67
5 year average sugar content	15.14	14.38	15.09
Sugar yield (tons/acre)	2.88	2.66	1.95
Cost per ton of sugar	111.31	77.26	122.83

Sources-References 118, 87, 20, Table 1.4, Statistical Background (2)

[1]Includes farm maintenance labor.

[2]Paid and imputed interest on land and net rent.

TABLE 1.2

1972 PER ACRE COST AND YIELD DATA FOR SELECTED COMPETING CROPS

Crop	Variable Costs	Fixed Costs	Total Costs	Yield
State: OHIO, Region: Northwest				
Alfalfa hay	50.51	50.02	100.53	4.5 tons
Corn-Grain	81.32	37.83	119.15	119 bu.
Corn-Silage	82.76	59.77	142.53	19.5 tons
Clover/Mixed hay	66.12	34.03	100.15	3.6 tons
Oats	42.36	25.69	68.05	83 bu.
Pickles	551.01	76.50	627.51	8.0 tons
Soybeans	59.33	37.15	96.45	38 bu.
Tomatoes	613.61	79.14	692.75	20.0 tons
Wheat	45.54	42.10	87.64	64 bu.
Sugarbeets	227.02	93.54	320.56	19.02 tons
State: MICHIGAN, Region: Southwest				
Alfalfa Hay	35.90	69.83	105.73	3.0 tons
Field Beans	35.86	69.54	105.40	12.0 cwt.
Corn-Grain	50.24	71.87	122.11	100 bu.
Oats	31.43	67.81	99.24	80 bu.
Soybeans	32.80	67.62	100.42	30 bu.
Wheat	35.14	67.50	102.64	45 bu.
Sugarbeets	128.13	77.39	205.52	18.48 tons

Sources: References 118, 119, 120, 86, 87, Table 1.1

TABLE 1.3

PER ACRE NET RETURNS, 1972 AND ESTIMATED 1973

Crop	1972 Total Costs	1972 Price**	1972 Net Returns	1973 Total Costs*	1973 Price**	1973 Net Returns
State: OHIO, Region: Northwest						
Alfalfa Hay	100.53	30.00	34.47	107.58	37.00	58.92
Corn for Grain	119.15	1.78	92.67	127.49	2.61	183.10
Corn for Silage	142.53	. . .	. . .	152.51	. . .	. . .
Clover/Mixed Hay	100.15	30.00	7.85	107.16	37.00	26.04
Oats	68.05	0.82	0.01	72.81	1.15	22.64
Pickles	627.51	108.00	236.49	671.44	102.00	144.56
Soybeans	96.48	4.32	94.68	103.23	5.65	111.47
Tomatoes (process)	692.75	38.10	69.25	741.24	45.40	166.76
Wheat	87.64	2.03	42.28	93.77	4.10	168.63
Sugarbeets	320.56	14.68	(41.35)	343.00	N/A	. . .
State: MICHIGAN, Region: Southeast						
Alfalfa Hay	105.73	29.50	(17.23)	113.13	31.00	(20.13)
Field Beans	105.40	9.70	11.00	112.78	30.00	247.22
Corn for Grain	112.11	1.73	50.89	130.66	2.51	120.34
Oats	99.24	0.84	(23.64)	106.19	1.20	1.81
Soybeans	100.42	4.60	37.58	107.45	5.70	63.55
Wheat	102.64	2.42	6.26	109.82	4.68	100.78
Sugarbeets	205.52	14.39	60.41	219.91	N/A	. . .

*Estimated at 107 percent of 1972 Total Costs.

**Includes Government payments, when occurring.

Sources: Table 1.2, References 18, 86, 119

TABLE 1.4

SUGAR BEET PRODUCTION

Year	Number of Farms	Acres per Farm	Acres Planted	Acres Harvested	Percent Acres Harvested	Yield (tons/acre)	Tons Marketed
OHIO: Northwest							
1963	1051	29.3	30744	29161	95	13.1	380904
1964	1177	29.7	34961	30107	86	13.3	400474
1965	1091	29.2	31814	30068	95	20.2	606958
1966	1024	31.7	32478	31231	96	18.0	561411
1967	1011	26.4	26711	24498	94	18.0	448746
1968	1139	32.0	36455	36079	99	19.0	683816
1969	1048	37.1	38847	38045	98	16.9	644176
1970	970	42.1	40866	38122	96	18.8	734638
1971	956	44.4	42409	41353	98	21.9	903832
1972	878	49.8	43739	32554	74	18.5	600502
1973	638	48.6	30994	29589	95	12.6	373643
MICHIGAN: Southeast							
1963	2975	27.5	81701	78249	96	15.0	1175238
1964	3076	28.9	88830	84842	96	16.3	1386399
1965	2674	29.7	79307	69152	87	16.4	1135976
1966	2470	32.0	78957	76258	97	15.1	1148497
1967	2318	34.1	79037	72070	91	17.4	1256268
1968	2375	38.3	90946	89980	99	19.0	1708311
1969	2244	41.6	93255	92550	99	16.3	1503828
1970	2173	42.8	93071	90312	97	21.2	1913327
1971	2050	44.4	91018	82813	91	17.0	1407347
1972	1986	47.4	94164	86601	92	18.9	1636376
1973	1794	49.7	89209	87244	98	17.5	1524401

Sources-Statistical Background (1), Reference 22 (Appendix 1)

TABLE 1.5

HARVESTED ACREAGE OF COMPETING CROPS, BY STATE AND SUGARBEET PRODUCING COUNTIES

1972

Crop	OHIO		MICHIGAN	
	State	County	State	County
Alfalfa Hay	530000	210800	1310000	. . .
Asparagus--market	15000	. . .	800	. . .
Asparagus--process	. . .	. . .	13700	. . .
Barley	15000	. . .	21000	. . .
Dry Beans	. . .	. . .	615000	555000
Snap Beans--market	1300	. . .	2500	. . .
Snap Beans--process	. . .	. . .	14400	. . .
Cabbage	4600	. . .	4700	. . .
Cantalopes	1100	. . .	2300	. . .
Carrots	. . .	. . .	4500	. . .
Cauliflower	. . .	. . .	700	. . .
Celery	290	. . .	2300	. . .
Corn-grain	3090000	1029900	1722000	802500
Corn silage	186000	. . .	335000	187400
Corn sweet	14500	. . .	12200	. . .
Cucumbers--market	. . .	. . .	1900	. . .
Cucumbers--pickle	5500	. . .	26000	. . .
Other Hay	946000	see alfalfa	see alfalfa	. . .
Lettuce	900	. . .	1600	. . .
Mint	. . .	. . .	4900	. . .
Oats	367000	123000	320000	. . .
Onions	570	. . .	6400	. . .
Peppers	1200	. . .	1400	. . .
potatoes	12100	. . .	40300	. . .
Popcorn	16000	. . .	3300	. . .
Rye	8000	. . .	31000	. . .
Red Clover Seed	25000	. . .	15000	. . .
Soybeans	3010000	1369200	524000	365250
Tobacco	100 0	. . .	. . .	. . .
Tomatoes--market	1930	. . .	4100	. . .
Tomatoes--process	24300	. . .	4000	. . .
Wheat--winter	. . .	. . .	. . .	. . .
Wheat spring	1029000	430800	535000	294000
Sugarbeets	32554	32554		

Sources: References 86, 119.

(1) In both Ohio and Michigan, beets from different areas of a county may be sent to different factories, so no attempt has been made to allocate the state total between factories on a county basis. The following counties have produced sugarbeets over the last 10 years:

OHIO--Allen, Auglaize, Defiance, Erie, Fulton, Hancock, Hardin, Henry, Huron, Lucas, Mercer, Ottawa, Putnam, Sandusky, Seneca, Van Wert, Wood, Wyandot.

MICHIGAN--Arenac, Bay, Clinton, Genesee, Gladwin, Gratiot, Huron, Ingham, Isabella, Lapeer, Lenawee, Macomb, Midland, Monroe, Newaygo, Saginaw, St. Clair, Sanilac, Shiawassee, Tuscola.

(2) Sugar Content

Derived from sugar company records, the state 5-year average sugar percentages are taken as:

OHIO	15.14%
MICHIGAN	14.38%

CHAPTER V

AREA TWO

Introduction

ASCS Area Two includes production from all Minnesota, northern Iowa, northeastern South Dakota and eastern North Dakota. However, since production from South Dakota ceased after 1964, the area really consists of the Red River Valley region and the south Minnesota-northern Iowa region.

Average elevation is 850 feet. The frost-free period increases from 115 to 140 days moving southward from the northernmost counties and average summer temperature similarly ranges from 65 to 70 degrees Fahrenheit. Annual rainfall varies between 20 to 25 inches. Very few beets are grown under irrigation systems.

Area Descriptions

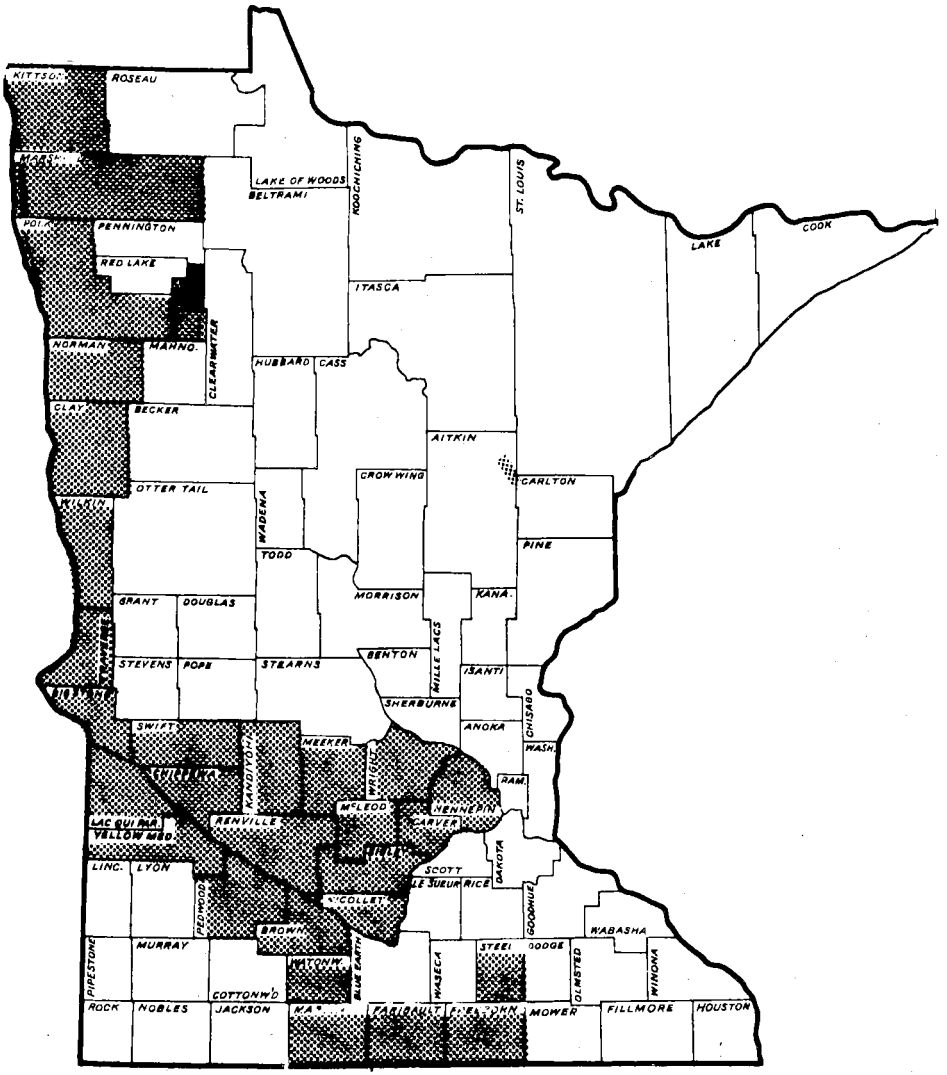
2.1 Southern Minnesota

The effects of the 1963 Cuban crisis came too late to save South Dakotan production, which ceased after 1964, but by 1968, 50,000 acres of beets were being raised on 300 farms in Minnesota, the largest acreages being grown in Renville, Swift and Chippewa Counties. American Crystal, then a private company, operated plants at Chaska, Minnesota and Mason City, Iowa.

Corn and soybeans were widely grown in the area at that time, but sugarbeets were considered a more profitable crop with less risk and were regarded with enthusiasm by local farmers. However, American Crystal seemed less enthusiastic, closing the Chaska plant after 1970 and the Mason City plant after 1972. The closures were attributed to plants' being old and relatively inefficient, coupled with increasing pressure from environmental agencies on pollution issues.

Area beet growers then formed the Southern Minnesota Beet Sugar Cooperative, solicited and acquired the necessary support, and commenced construction of a new processing plant at Renville, in Renville County, Minnesota. The new factory, due to come into production in the fall of 1975, is planned to be the largest of the new beet sugar factories under construction and should involve 300 farmers in the nine counties of Kandiyohi, Renville, Chippewa, Swift, Yellow Medicine, Redwood, Sibley, Lac qui Parle and Big Stone. Some 54,000 acres are expected to produce 850,000

MINNESOTA--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA TWO



tons of beets annually, i.e., an average of 180 acres per farm yielding 15.75 tons per acre (95). Annual cash flow generated is anticipated to exceed $30 million and projections for increased job opportunities, both farm and factory, are over 1,000. The plant is expected to cost $46 million and to slice 6,500 tons per day over a 130-day period.

An interesting point is that local opinion suggests that, with average 1973 prices of $2.36 and $5.70 for corn and soybeans respectively, very little grower support could have been expected had the cooperative construction of the plant been proposed in 1973 instead of 1970, since returns from sugarbeet production did not exceed those from corn and soybeans (see Table 2.3).

However, since the new factory is a cooperative venture, all contracted producers have a compulsory financial interest in the enterprise. It is estimated that each grower has invested, per acre, $25 in cash and $90 in long term notes. Thus, although growers may be less enthusiastic than they were three years ago, very few have been so convinced of future high corn and soybean prices that they have made the financial sacrifice required to withdraw from the venture.

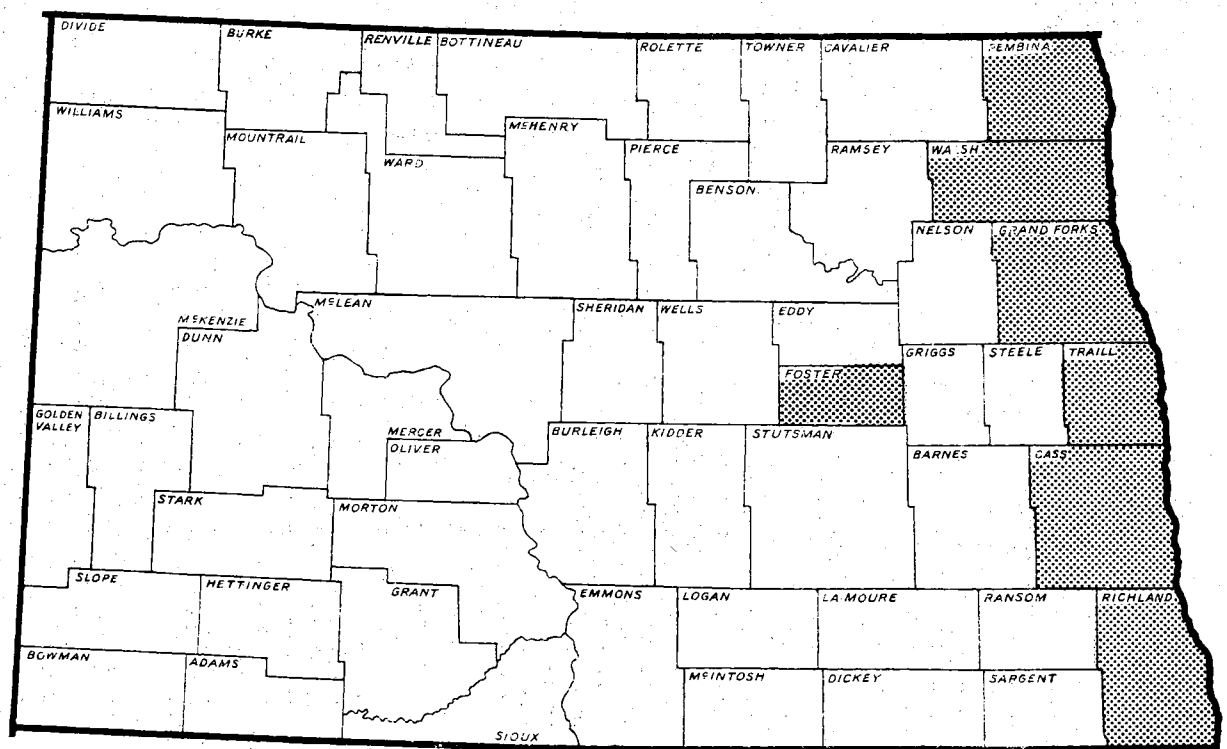
Former beet growers in the counties near to the old Mason City, Iowa, plant generally have sold their specialized beet growing equipment, since the 160 mile distance to the proposed Renville plant imposes a freight cost disadvantage. However, former growers located nearer to Renville seem not to have disposed of their equipment, and the cooperative (as of November 1973) had contracted 90 percent of the minimum acreage required for economic operation.

2.2 Red River Valley

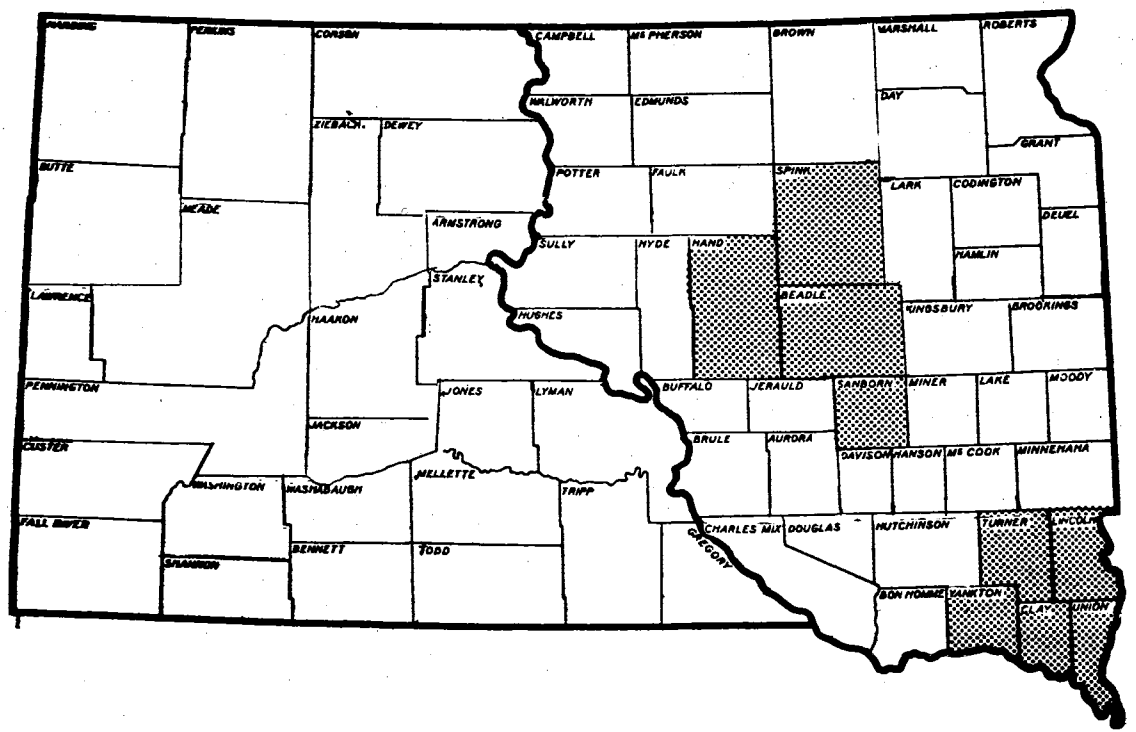
Turning to the Red River Valley, the future seems to be one of expansion and prosperity. The American Crystal cooperative operates plants at Moorhead, Crookston and East Grand Forks in Minnesota, and at Drayton in North Dakota. The Minn-Dak Farmers Cooperative is building a plant at Wahpeton, North Dakota and the Red River Valley Cooperative, Incorporated, at Hillsboro, North Dakota. It is hoped that both plants will be in production by the fall of 1974. American Crystal processed beets from 200,000 acres in 1973 (see Table 2.4 for previous years), and the two new plants are initially expected to deal with 50,000 acres each, slicing 5,000 tons per day.

The American Crystal Cooperative was formed largely from growers previously contracted to American Crystal when it was a private company, so the takeover was effected relatively smoothly, and the experience gained was instrumental in helping to form the other two cooperatives. Indeed, there seems to be hope for considerable collaboration between the three cooperative groups. For example, the

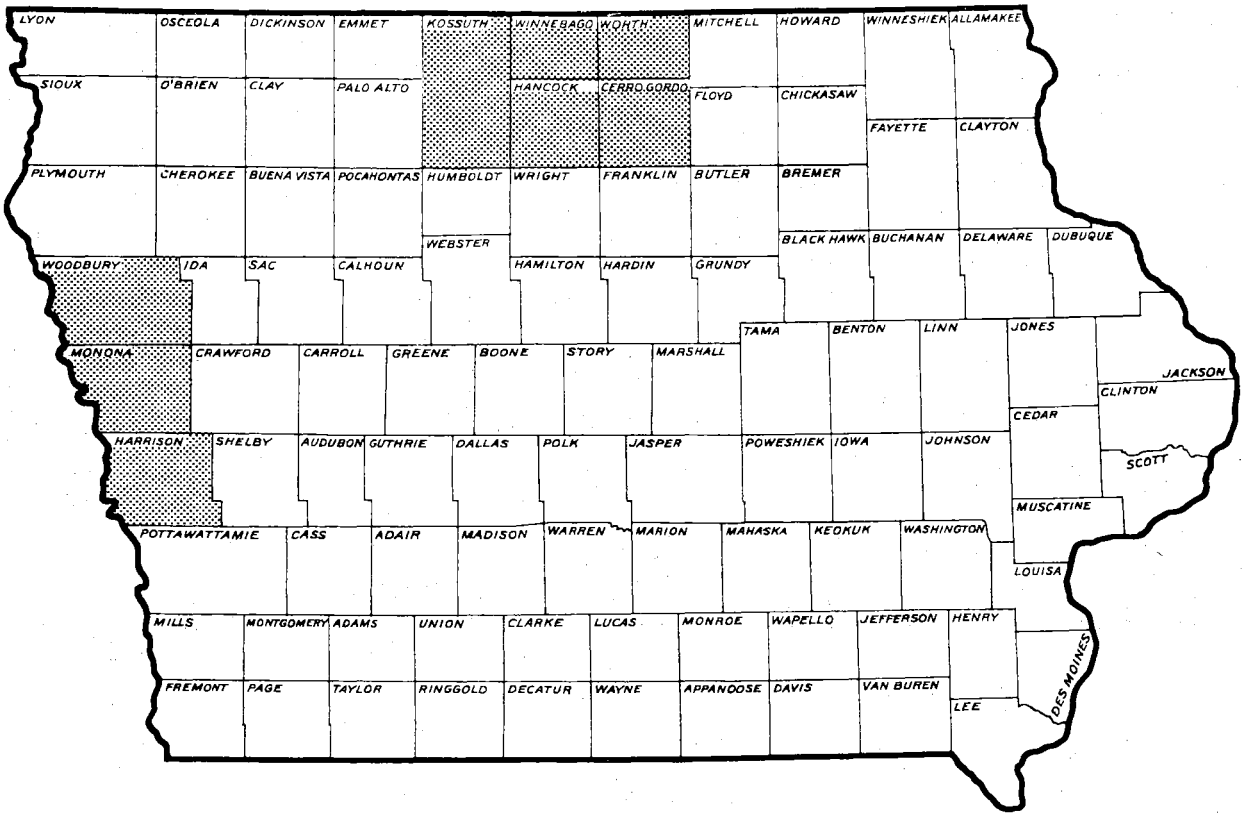
NORTH DAKOTA--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA TWO



SOUTH DAKOTA--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA TWO



IOWA--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA TWO



Hillsboro group has contracted some farmers located between American Crystal's growers at Drayton and East Grand Forks, but to save transport costs to Hillsboro, American Crystal may process extra Hillsboro beets at Drayton, in return for Hillsboro processing American Crystal's excess at Crookston. Although this scheme has not been finalized, its existence suggests a much higher degree of grower-processor cooperation than existed in the time of the private sugar companies.

Since all three cooperatives have not been long in operation, consolidation rather than expansion is expected in the next two or three years. However, thanks to a continuous modernization process, American Crystal's four plants should be easily adaptable to deal with up to 50 percent additional tonnage, and the new Wahpeton and Hillsboro plants have been designed to deal with up to 100,000 acres, at present yields, if necessary. Expansion is expected to take place after the initial consolidation phase. Therefore, by 1980, the six plants could be processing beets from 500,000 acres, assuming the continuation of present yields of some 13.5 tons per acre (see Table 2.1).

Constraints on such expansion are rather difficult to identify. There are four million acres of land suitable for beet production in the Valley, which would allow a maximum of one million acres for beet production, given a one in four rotation. If irrigation systems are not widely introduced, no water shortage is foreseen, nor is the labor supply expected to be a problem. Corn and beans are really only climatically suited to latitudes south of approximately Moorhead, north of which wheat is the main competitive crop and returns from wheat growing prior to 1973 were some $40 per acre below those from sugarbeets (Table 2.3). Only if returns from alternative crops, especially beans, corn and wheat (Table 2.3) remain consistently significantly higher than returns from beets, can large numbers of growers be expected to be discouraged from beet production, especially in view of the financial investment they are required to make in the cooperatives. Hillsboro growers, for example, are required to pay an initial $250 flat fee, and purchase stock for $256 per acre grown.

Yield per acre may be increased if irrigation systems now entering the valley become widespread. The traditional practice of summerfallow, designed to control weeds and conserve water, is gradually being relaxed, thus cutting costs to the growers. Although weed, insect and disease problems do exist, the northerly climate seems to have discouraged nematode infestation.

No construction plans for additional new plants are being discussed at present, although the Fergus Falls-Morris area has been considered. The six year minimum time period for planning, financing and construction would preclude a new plant's coming into production before 1980.

Summary and Projections

The disparity between the ASCS Area costs and those for the Red River Valley and South Minnesota sub-areas apparent in Table 2.1 can be explained by the high land charge in the Red River Valley due to the practice of summer-fallowing, and the higher sugarbeet yields in southern Minnesota increasing the yield of sugar per acre. Not withstanding the cheaper production costs in southern Minnesota, reference to Table 2.4 and Graph 2.2 shows that planted acreage in this region has been generally declining for 10 years, and was in fact, almost zero in 1973, after the last plant was closed.

Overall, three major factors combine to make ASCS Area Two the most likely of all areas to expand production. First, because of the severe climatic conditions encountered at such northerly latitudes, very few other crops can compete with the return from sugarbeets at 1972 prices (see Table 2.3) Even with higher prices in 1973 for competing crops, corn and soybeans are restricted to areas south of Fargo-Moorhead by virtue of climate (Table 2.5), and the practice of summer-fallowing small grains makes costs for these enterprises unusually high -- Table 2.3 shows a difference of $20 in net returns between summerfallowed and non-fallowed crops. The southern Minnesotan farmers will certainly be tempted away from sugarbeet production by the returns of over $125 per acre available from corn and soybeans in 1973 (Table 2.3), but sugarbeets have traditionally offered less price risk to the grower.

Second, three new factories are being erected in the area, so the companies concerned will be making a strong promotional effort to attract an extra 150,000 acres of production. Even in 1973, farmers responded to pressure to produce more beets: the cooperative bank financing American Crystal insisted the company contract for a larger acreage than normal, and the four factories had to work extremely hard to process the massive tonnage forthcoming from growers.

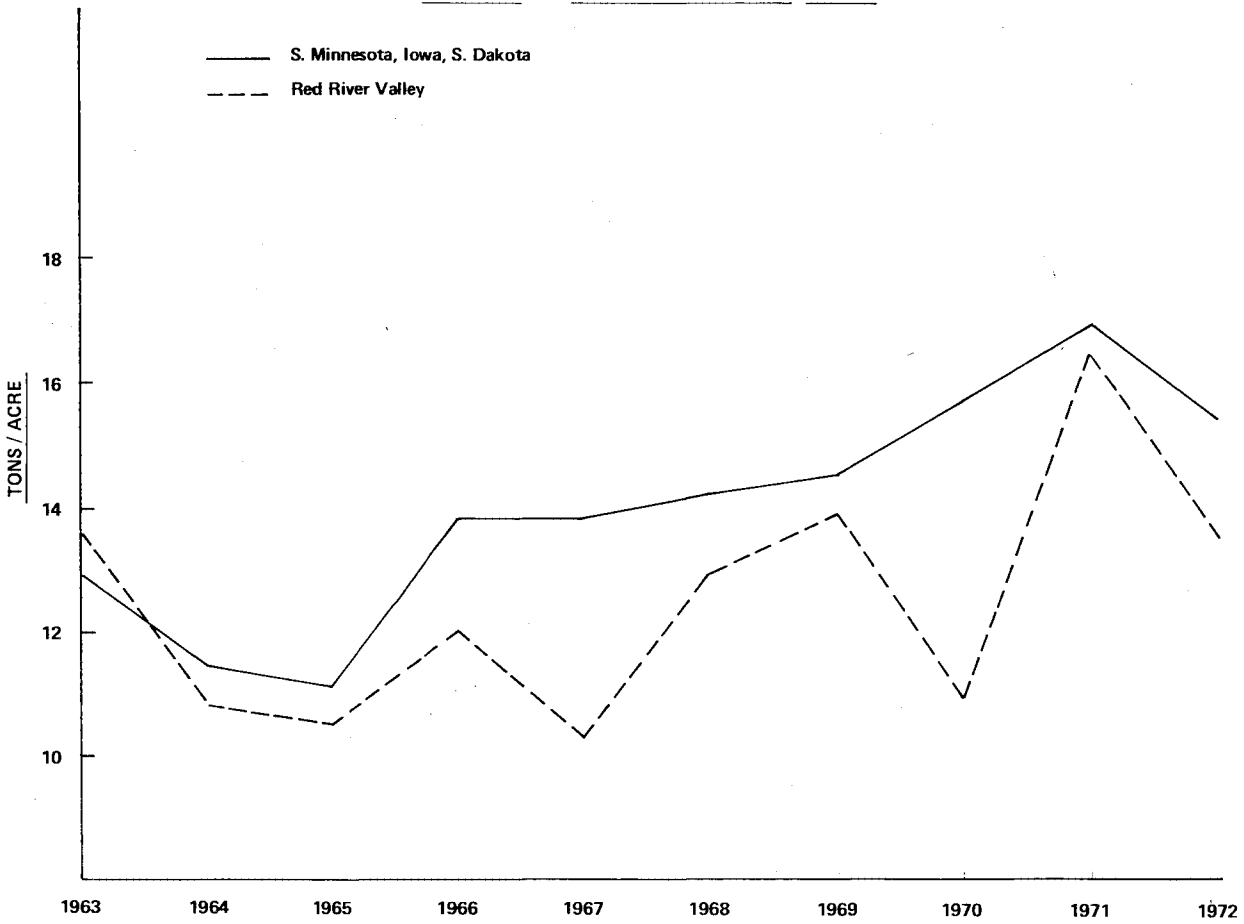
Third, and perhaps most important, when in production all seven factories will be owned by grower cooperatives. Heavy financial investment in a cooperative makes a grower much less likely to cease sugarbeet production, and cooperative management may be willing to accept a lower return on investment than private companies. The three new cooperatives have yet to earn significant revenue to offset the combined construction costs for the three plants of some $130 million, so conditions for beet production would need to be highly and continuously adverse before these ventures would wish to fold.

Another advantage of production in Area Two is the low freight cost to the Minneapolis-Illinois-Ohio industrial sugar market compared with costs incurred by more westerly located producers.

Red River Valley farmers have long been enthusiastic toward sugarbeet production and it could reasonably be expected

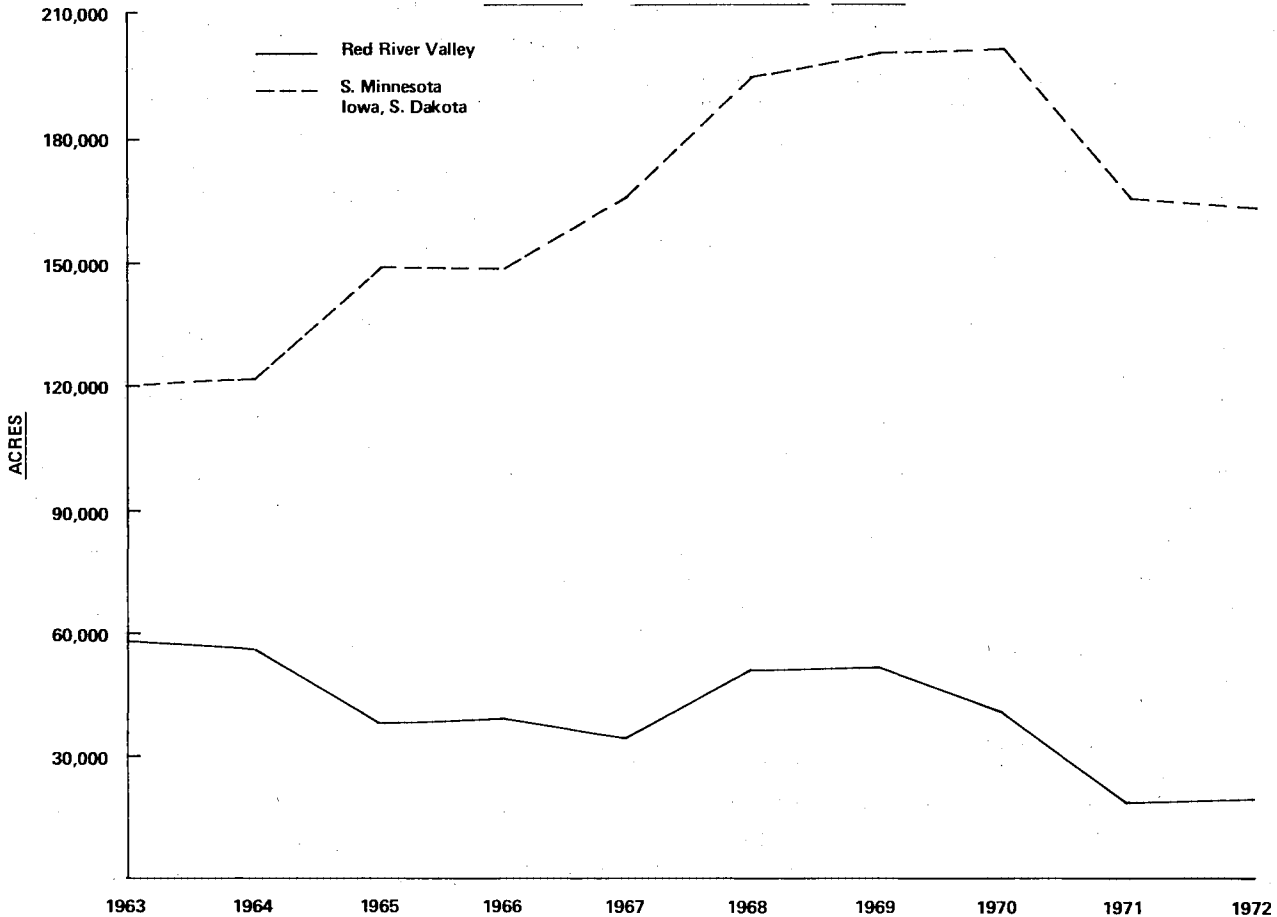
that 400,000 acres will be in production by 1980. Also, because of the lack of competing crops and 100 percent cooperative ownership of plants, the area is more likely than most to continue production if sugarbeets become a less favorable crop.

GRAPH 2.1 YIELD OF SUGARBEETS - AREA 2



Source: Table 2.4

GRAPH 2.2 ACREAGE PLANTED AREA 2



Source: Table 2.4

TABLE 2.1

1972 PER ACRE COST DATA FOR SUGARBEETS

(dollars)

	STUDY DATA		ASCS Data-Area 2
	Red River Valley	South Minnesota	(1972 Cost Study)
Labor-own	17.91	12.48	42.01[1]
custom and hand	30.00	30.22	28.26
Machine operations-own	19.76	10.05	18.60
-custom	2.56	15.67	4.81
Seed	3.43	3.87	4.49
Fertilizer	10.66	31.23	14.30
Chemicals	6.01	18.38	5.26
Water operating costs	. . .	. . .	. . .
Miscellaneous	1.53	1.91	18.78
Interest on operating capital	4.09	5.09	5.86
Total variable costs	95.95	128.90	142.37
Interest on land	41.67	18.51	24.93[2]
Interest on machinery investment	11.74	3.58	5.30
Machinery depreciation	12.82	4.41	24.40
Taxes and insurance	11.82	5.43	10.97
Water fixed costs	. . .	. . .	. . .
Total fixed costs	78.05	31.93	65.60
Total all costs	174.00	160.83	207.97
5 year average yield (tons/acre)	13.52	15.34	13.64
5 year average sugar content	15.27	15.05	15.10
Sugar yield (tons/acre)	2.06	2.31	1.48
Cost per ton of sugar	84.47	69.62	140.52

Sources: References 114, 91, 20, 22, Table 2.4, Statistical Background (2)

[1]Includes farm maintenance labor.

[2]Paid and imputed interest on land and net rent.

TABLE 2.2

1972 PER ACRE COST AND YIELD DATA FOR
SELECTED COMPETING CROPS

Crop	Variable Costs	Fixed Costs	Total Costs	Yield
State: Minnesota, Region: South Central				
Corn	67.82	34.26	102.08	110 bushels
Soybeans	33.52	30.50	64.02	34 bushels
Wheat	27.16	29.69	56.83	35 bushels
Oats	29.19	29.38	58.57	85 bushels
Sugarbeets	128.90	31.93	160.83	15.34 tons
Region: West				
Corn	58.98	23.69	82.67	90 bushels
Soybeans	20.00	19.68	39.68	25 bushels
Wheat	23.26	19.37	42.63	35 bushels
Oats	26.77	19.16	45.93	70 bushels
Flax	21.84	18.89	40.73	18 bushels
State: North Dakota, Region: Southeast				
Soybeans	22.06	27.94	50.00	22 bushels
Corn Grain	42.24	32.15	74.39	80 bushels
Wheat Fallow	17.81	52.17	69.98	31 bushels
Wheat Non-Fallow	17.38	29.25	46.69	29 bushels
Durum Fallow	20.31	52.17	72.48	34 bushels
Durum Non-Fallow	19.89	29.25	49.14	33 bushels
Barley Fallow	16.55	52.13	68.68	47 bushels
Barley Non-Fallow	16.25	29.20	45.45	45 bushels
Oats Non-Fallow	13.94	30.05	43.99	60 bushels
Flax Non-Fallow	11.56	27.54	39.10	12 bushels
Rye Non-Fallow	9.99	28.73	38.72	28 bushels
State: North Dakota, Region: Northeast				
Pinto Beans	32.71	28.75	61.46	12 cwt.
Corn Grain	31.62	26.27	57.89	57 bushels
Sunflowers (oilseed)	18.43	27.64	46.07	12.7 cwt.
Potatoes	88.62	70.06	158.68	120 cwt.
Wheat Fallow	18.38	51.99	70.37	32 bushels
Wheat Non-Fallow	16.94	28.35	45.29	30 bushels
Durum Fallow	20.66	51.99	72.65	33 bushels
Durum Non-Fallow	19.21	28.35	47.56	30 bushels
Barley Fallow	16.67	52.14	68.81	44 bushels
Barley Non-Fallow	16.24	28.38	44.62	44 bushels

Table 2.2 (Continued)

Crop	Variable Costs	Fixed Costs	Total Costs	Yield
State: North Dakota, Region: Northeast (Continued)				
Oats Non-Fallow	11.91	29.02	40.93	53 bushels
Flax Non-Fallow	10.19	26.89	37.08	11 bushels
Rye Non-Fallow	8.26	28.05	36.31	24 bushels
Region: Red River Valley				
Sugarbeets	95.95	78.05	174.00	13.52 tons

Sources: Table 2.1, References 91-94, 113-116.

TABLE 2.3

1972 AND ESTIMATED 1973 PER ACRE NET RETURNS
SELECTED COMPETING CROPS

Crop	1972 Total Costs	1972 Price**	1972 Net Returns	1973 Total Costs*	1973 Price**	1973 Net Returns
State: Minnesota, Region: South Central						
Corn	102.08	1.81	97.02	109.23	2.36	150.37
Soybeans	64.02	4.58	91.70	68.50	5.70	125.30
Wheat	56.83	2.30	23.67	60.81	4.25	87.94
Oats	58.27	0.70	0.93	62.67	1.05	26.58
Sugarbeets	160.83	17.97	114.83	172.09	N/A	. . .
Region: West						
Corn	82.67	1.81	80.23	88.46	2.36	123.94
Soybeans	39.68	4.58	74.82	42.46	5.70	100.04
Wheat	42.63	2.30	37.87	45.61	4.25	103.14
Oats	45.93	0.70	3.07	49.15	1.05	24.35
Flax	40.73	3.10	15.07	43.58	7.50	91.42
State: North Dakota, Region: Southeast						
Soybeans	50.00	4.25	43.50	53.50	5.50	67.50
Corn for grain	74.39	2.05	89.61	79.60	2.25	100.40
Wheat-fallow	69.98	2.37	3.49	74.88	4.27	57.49
Wheat-nonfallow	46.69	2.37	22.04	49.96	4.27	73.87
Durum-fallow	72.48	2.59	15.58	77.55	6.12	130.53
Durum-nonfallow	49.14	2.59	36.33	52.58	6.12	149.38
Barley-fallow	68.68	1.39	(3.35)	73.49	2.13	26.62
Barley-nonfallow	45.45	1.39	17.10	48.63	2.13	47.22
Oats	43.99	0.61	(7.39)	47.07	1.05	15.93
Flax	39.10	3.13	(1.54)	41.84	8.00	54.16
Rye	38.72	0.81	(16.04)	41.43	1.90	11.77
State: North Dakota, Region: Northeast						
Pinto Beans	61.46	7.00	22.54	65.76	19.00	162.24
Corn for Grain	57.89	2.05	58.96	61.94	2.25	66.31
Oilseed Sunflowers	46.07	4.98	17.18	49.29	N/A	. . .
Potatoes	158.68	2.75	171.32	169.79	3.25	220.21
Wheat-fallow	70.37	2.37	5.47	75.30	4.27	61.34
Wheat-nonfallow	45.29	2.37	25.81	48.46	4.27	79.64
Durum-fallow	72.65	2.59	12.82	77.74	6.12	124.22
Duran-nonfallow	47.56	2.59	30.14	50.89	6.12	132.71

Table 2.3 (Continued)

Crop	1972 Total Costs	1972 Price**	1972 Net Returns	1973 Total Costs*	1973 Price**	1973 Net Returns
State: North Dakota, Region: Northeast (continued)						
Barley-fallow	68.81	1.39	(7.65)	73.63	2.13	20.09
Barley-nonfallow	44.62	1.39	16.54	47.74	2.13	45.98
Oats	40.93	0.61	(8.60)	43.80	1.05	11.85
Flax	37.08	3.13	(2.65)	39.68	8.00	48.32
Rye	36.31	0.81	(16.87)	38.85	1.90	6.75
Sugarbeets	174.00	18.61	77.60	198.83	N/A	. . .

*Estimated at 107 percent of 1972 Total Costs

**Includes Government payments, if any

Sources: Table 2.2, References 18, 92, 113

TABLE 2.4

SUGAR BEET PRODUCTION

Year	Number of Farms	Acres per Farm	Acres Planted	Acres Harvested	Percent Acres Harvested	Yield (tons/acre)	Tons Marketed
Red River Valley							
1963	1291	93.3	120488	119171	99	13.6	1622384
1964	1301	94.1	122355	120721	99	10.8	1306030
1965	1780	83.7	148935	146735	99	10.5	1536055
1966	1770	83.6	148043	146953	99	12.0	1763832
1967	1649	101.3	167076	165375	99	10.3	1697440
1968	1642	118.9	195243	193027	99	12.9	2483370
1969	1622	124.5	201874	201034	100	13.9	2796882
1970	1609	126.3	203148	199084	98	10.9	2169319
1971	1551	106.7	165432	155884	94	16.4	2552139
1972	1535	107.1	164401	160689	98	13.5	2167330
South Minnesota							
1963	500	114.4	57224	54484	95	12.9	705254
1964	467	118.3	55259	53357	97	11.4	608724
1965	369	102.2	37713	36606	97	11.1	405681
1966	276	139.7	38562	37677	98	13.8	520725
1967	228	148.3	33820	32419	96	13.8	445666
1968	314	160.3	50336	49406	98	14.2	701009
1969	305	167.4	51065	50258	98	14.5	730618
1970	307	133.3	40929	38276	94	15.7	600138
1971	123	149.4	18373	17498	95	16.9	295886
1972	123	155.8	19168	18975	99	15.4	291717

Source: Reference 22 (Appendix 1), Statistical Background (1)

TABLE 2.5

1972 HARVESTED ACREAGES OF COMPETING CROPS
IN SUGARBEET COUNTIES

	Acres		
	Red River Valley		South Minnesota*
	North Dakota	Minnesota	
Corn for grain	108,800	35,500	2,192,400
Soybeans	186,900	106,900	1,823,800
Sunflowers	336,000	166,300	39,700
Potatoes	123,900	63,800	10,600
Spring Wheat-Fallow	584,500	N/A	N/A
Spring Wheat-Nonfallow	577,500	165,600	910,000
Durum Wheat-Fallow	56,100	N/A	N/A
Durum Wheat-Nonfallow	51,500	8,800	30,000
Barley-Fallow	193,500	N/A	N/A
Barley-Nonfallow	436,000	521,100	52,000
Oats	270,000	462,500	500,800
Flax	59,000	17,300	47,200
Rye	14,900	12,700	38,700
Sugarbeets	65,233	95,456	18,975

*Minnesota acreage only--ignores South Dakota and Iowa.

Sources: References 92, 113

(1) The sub-areas chosen consist of the following counties:

SOUTH MINNESOTA--Big Stone, Brown, Carver, Chippewa, Fairbault, Freeborn, Hennepin, Kandiyohi, Lac Qui Parle, McLeod, Martin, Meeker, Nicollet, Redwood, Renville, Sibley, Swift, Traverse, Waseca, Watonwan, Wright, Yellow Medicine.

IOWA--Cerro Gordo, Hancock, Harrison, Kossuth, Monona, Winnebago, Woodbury, Worth.

SOUTH DAKOTA--Beadle, Clay, Hand, Lincoln, Sanborn, Spink, Turner, Union, Yankton.

MINNESOTA--Kittson, Marshall, West Polk, Norman, Clay, Wilkin.

NORTH DAKOTA--Cass, Foster, Grande Forks, Pembina, Richland, Traill, Walsh.

(2) Sugar Percent

From data supplied by American Crystal, the 1968-1972 sugar contents are taken to be 15.27 for the Red River Valley and 15.05 for South Minnesota.

CHAPTER VI

AREA THREE

Introduction

ASCS Area Three now includes sugarbeet production from eastern Wyoming, Nebraska, northwest Kansas, and eastern and northeastern Colorado. Geographically, the southwestern corner of South Dakota should be included in the area, but since production from this area ceased after 1964, South Dakota data are not included in this study.

Lying just to the east of the Rocky Mountain range, elevations are high--northeastern Colorado ranges from 3,900 to 4,700 feet, eastern Wyoming stands at 4,100 feet, Nebraska around 4,000 feet, and northwest Kansas at 3,200 feet above sea level. Annual rainfall is low, with Colorado varying from 13 inches to 17 inches, Kansas with 17 inches, and Wyoming and Nebraska having 14 inches annually, so all beets are produced under irrigation systems. The length of the growing season depends on latitude and elevation, ranging from 135 days in southeastern Wyoming to 165 days in northwest Kansas.

Area Descriptions

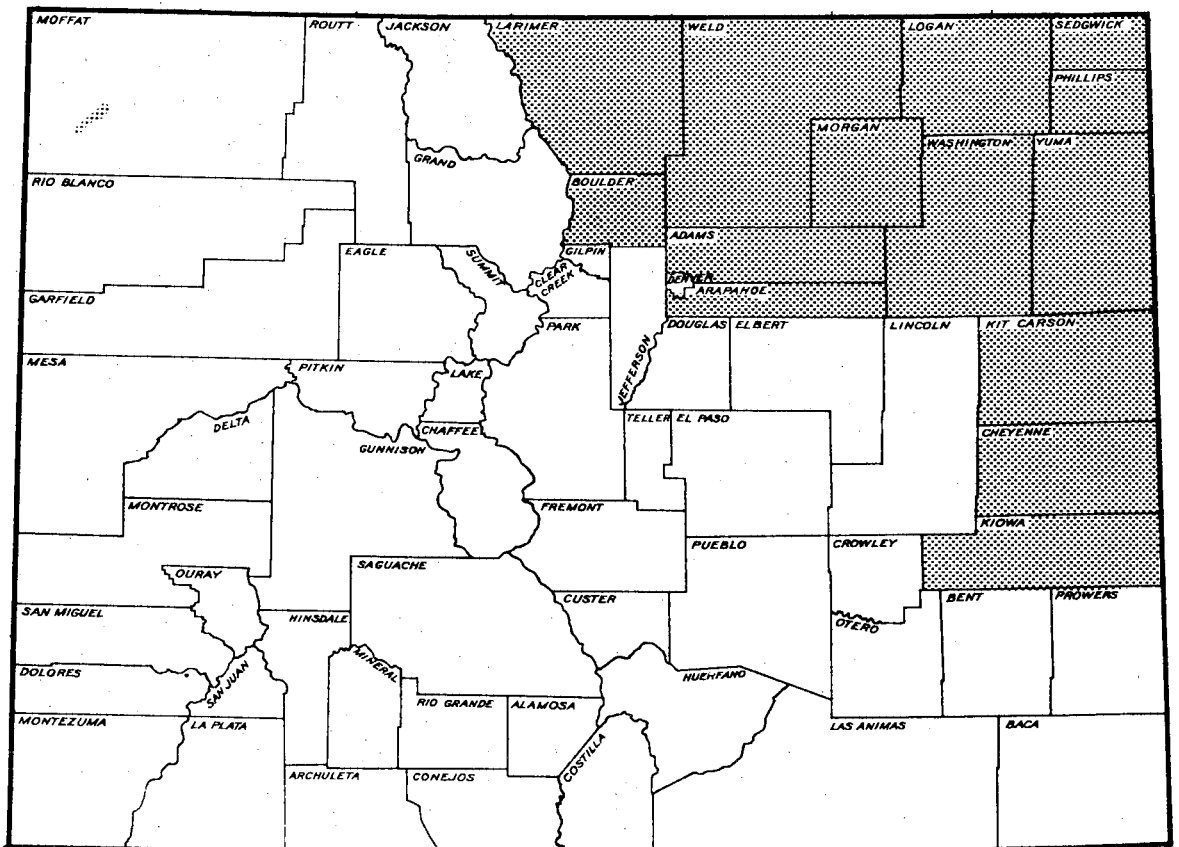
3.1 Colorado

ASCS Area Three includes three of the five Colorado production regions--the North Central, the South Platte Valley, and the High Plains. Sugarbeets are also produced in western and southeastern Colorado (see ASCS Area Four).

The North Central region of Colorado lies due north of Denver, and some 60,000 acres of sugarbeets were in production in 1972. The Great Western Sugar Company has factories at Loveland, Longmont, Brighton, Greeley and Eaton. The South Platte Valley stretches west-southwest from the northeast corner of the state; 42,000 acres are under production, and Great Western has factories at Fort Morgan, Sterling and Ovid. The High Plains region includes those counties surrounding Interstate 70 on the northeast border with Kansas. 37,000 acres are under production and the nearest factory is the Great Western plant at Goodland, Kansas. [1]

1/ See the statistical background section at the end of this chapter for a complete listing of the counties included in each production region.

COLORADO--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA THREE



Beets are not always processed at the local factory. The acreage in the North Central region has been declining steadily for the past 10 years, whereas High Plains production has increased with the opening of the Goodland factory and the introduction of center pivot irrigation systems, so there is a flow of beets from the High Plains region to the North Central area to keep the factories there operating economically. Also, many High Plains beets are processed at Goodland, and to further complicate the picture, some beets grown in extreme southwest Nebraska are also processed in Colorado. Allocation of beets between factories will vary from year to year, depending on yields and lifting conditions in each area, the general constraints on the logistics being to insure a smooth and optimal supply to each factory while minimizing freight costs by shipping to the nearest factory. However, shipping by rail may involve complications due to snowstorms, strikes, accidents and mislocation of railcars.

Great Western is the largest sugarbeet processor in the U. S. Its assets include 19 factories located in Colorado, Nebraska, Montana, Wyoming, and Ohio, 205 beet receiving stations, 5 bulk dry sugar distribution terminals in major cities, some office buildings, limestone reserves, research and grower service facilities, and even 58 miles of railroad track in northern Colorado.

In 1968, the Great Western Sugar Company was acquired by another organization--Great Western United. Local growers, doubtful that the takeover by United had been at all beneficial to themselves or the sugar company, formed the Great Western Producers' Cooperative in September 1971 with the intention of acquiring the company and assuring themselves of a marketing outlet conducted to their satisfaction.

Some 80 percent of Great Western Sugar's growers joined the cooperative, on a payment of $5 entrance fee and $1 per ton of beets sold. However, although a letter of intent had been signed the cooperative failed in its bid to purchase the company because of financing problems and disagreements over contract terms. Controlling interest in the company was subsequently transferred to another party by stock purchase.

In recent years, sugarbeets have become much less attractive to growers in north and northeast Colorado owing to three factors. First, the undeniable attractiveness of Colorado as a place to live has greatly increased the population, and of the 2.3 million people in the state, 1.9 million live close to Interstates 25 or 70, so urbanization pressure on land resources is intense. Second, the recent upsurge in grain prices (Table 3.3) coupled with the knowledge that grains are much less trouble to grow than are sugarbeets, has been a factor in reducing the beet acreage. Third, following the success of the Monfort operation, many feedlots are being developed in the area, and an increasing percentage are willing to offer growers forward contracts to insure their supply of feed. Thus the traditional advantages of sugarbeets in terms of a relatively high and stable price are less clear in this region. Fourth, the failure of the

cooperative to purchase Great Western leaves the future of production in the area in question. Certainly there seems little likelihood of much acreage increase since the capital or enthusiasm to finance a new plant is not apparent.

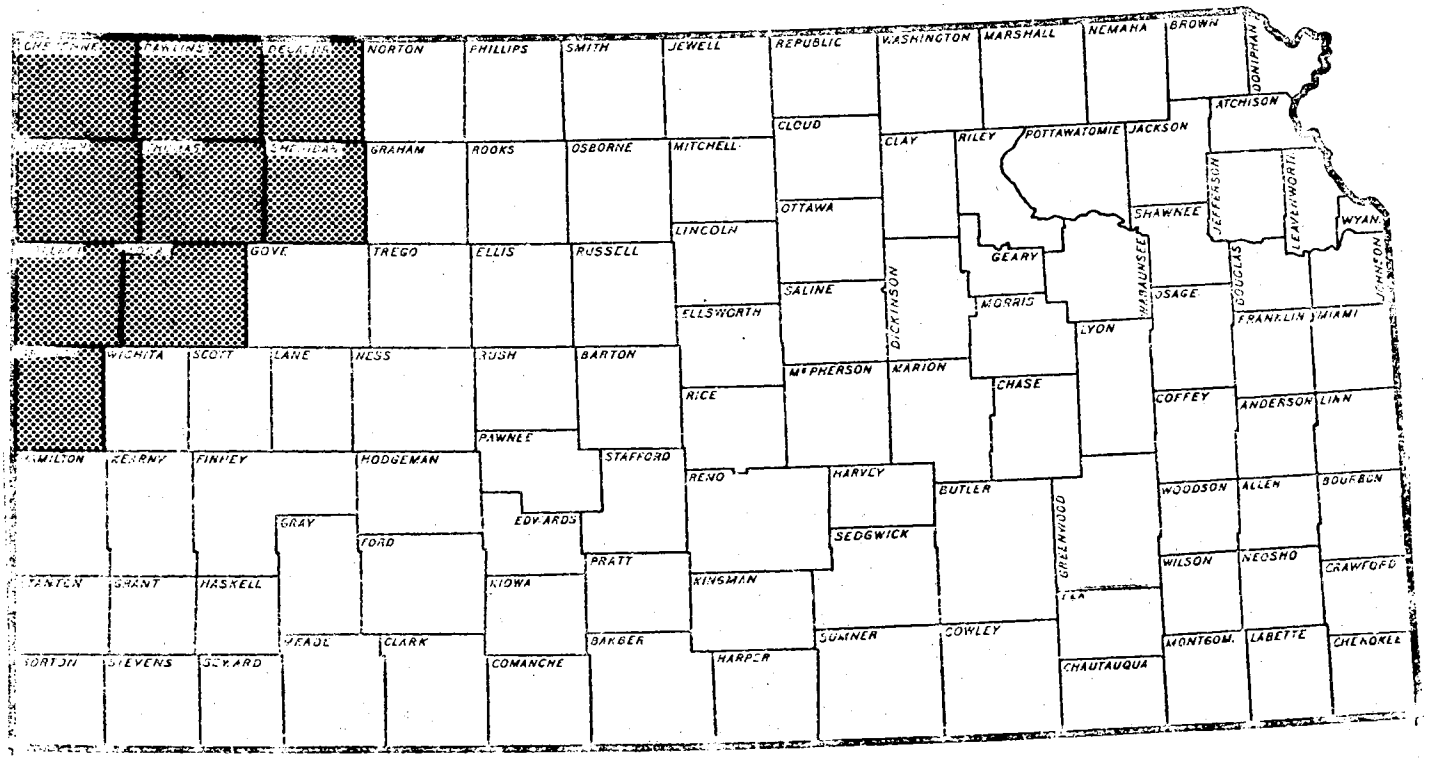
3.2 Northwest Kansas

The low rainfall in northwest Kansas made dryland farming a high risk operation in the past, so deep-well irrigation systems began to be installed during the 1960's, utilizing the large reserves of underground water beneath the western High Plains. Corn, sorghum, and wheat did not provide particularly high net returns per acre at that time, or even in 1972 (see Table 3.3), so vegetables and sugarbeets were considered as means of raising income to pay for the irrigation systems. Although vegetables can be grown very successfully in the area, long distances to urban centers impose transportation cost penalties. Sugarbeets, on the other hand, yield relatively well at an average of 16.75 tons per acre with a good sugar content of 15.7 percent and are processed locally. A beet factory was constructed for Great Western Sugar at Goodland, Kansas, and commenced operations in 1968. Kansas acreage reached and maintained a level of 26,000 acres planted annually (Graph 3.2) and some beets are also brought in from eastern Colorado and southwest Nebraska, depending on how Great Western allocates its crop between its various plants. The success of the venture to date is now imperilled by the rise in the prices of competing crops. Kansas farmers are unlikely to continue taking the trouble to raise sugarbeets if they expect the prices for wheat, corn and grain sorghum to maintain significantly higher levels than in the past. Table 3.3 shows reasonable returns in 1973 even from dryland grains. This is not to say that the area will cease beet production entirely, or that the factory will close down. Even if the Kansas acreage is reduced, the company should still be able to contract for a sufficient acreage nearby in Colorado and Nebraska to keep the Goodland factory running.

Northwest Kansas suffers from certain other problems. Nematode infestation has to be controlled by expensive soil fumigation or long beet-free rotations. Since the importation of Mexican field hands was banned, labor has been in short supply. Furthermore, a guaranteed market for competing feed grain crops is evolving through the establishment of cattle feedlots in the area.

To conclude, unless the price the grower receives for sugarbeets increases to make the enterprise more attractive in relation to competing crops, a small decrease in acreage can be expected. In the long run, the Goodland factory will probably process beets from about the same acreage although the company may have to go further afield to contract the crop. No new factories or production areas are expected.

KANSAS--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA THREE



3.3 Wyoming-Southeast

The Holly Sugar Company factory at Torrington, Wyoming, contracts for some 18,000 acres in southeastern Wyoming, and another 3,000 acres in Nebraska. However, the latter acreage is somewhat offset by Wyoming acreage under contract to Great Western's Nebraska factories. Furthermore, until 1973, beets produced from about 1,500 acres at Riverton, in Central Wyoming, were shipped to Torrington, but high freight costs have now forced growers in this area to direct production to Worland, or cease production entirely.

The Torrington factory opened in 1926, and since then, sugarbeets have been a stable crop in Wyoming for five reasons. First, the topography of the area, at the foot of the Rocky Mountain range, requires that irrigated crops be grown mainly in the flat river valleys. Second, the high altitude and northerly location reduce the potential yields of corn and grain sorghum. The largest acreage in the sugarbeet counties planted to any other crop is alfalfa. Third, low feed grain yields have restricted the entry of feedlots into the area, although nearly all Wyoming farms have livestock. Fourth, the sugarbeet tops are highly valued as a feed for stock, more so than in any other State. Fifth, Wyoming is not a highly industrialized state, and the sugarbeet industry is much appreciated in the small towns where the factories are located, since local employment is provided by the plant over the winter.

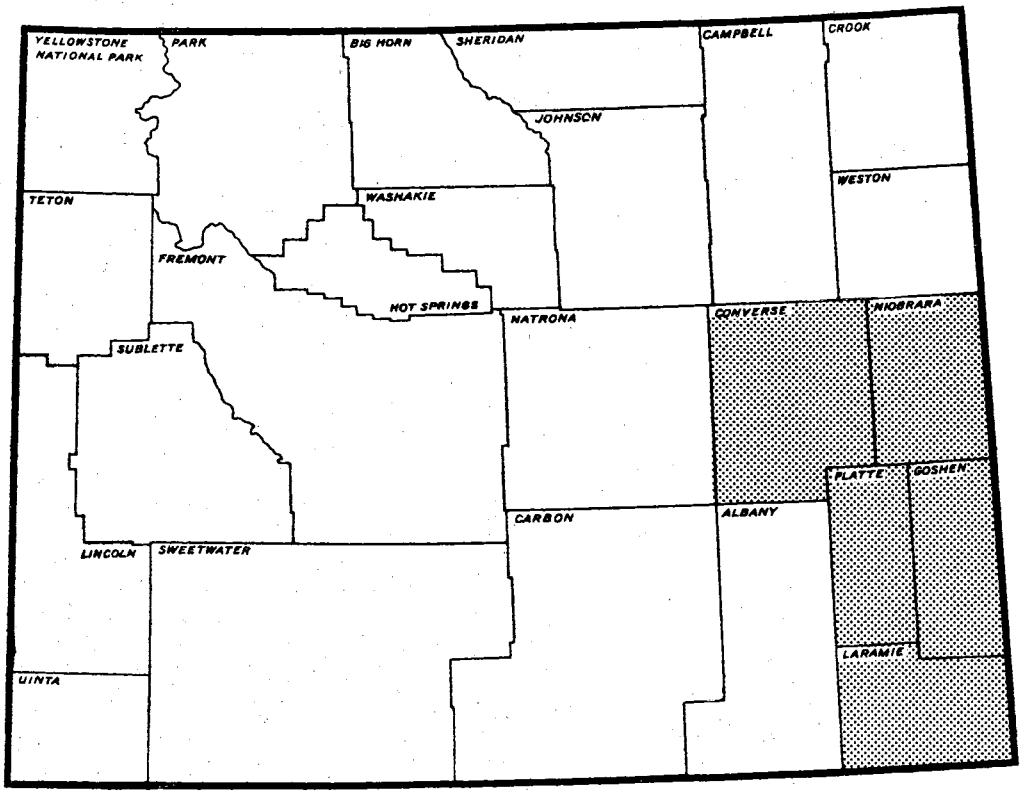
Thus, little change is expected in the levels of southeastern Wyoming production in the near future. There seems little enthusiasm or capital to spare to bring new areas into production, but existing areas are not expected to reduce production for the reasons outlined above.

3.4 Nebraska-Panhandle and Southwest

About 70 percent of Nebraska's beet acreage is produced in the Panhandle region around Scottsbluff (see Appendix One). Great Western has factories at Scottsbluff, Gering, Bayard and Mitchell (Great Western also contracts for 2,500 acres around Wheatland, Wyoming, but this acreage is offset by the 2,500 acres in Nebraska which are under contract to Holly's Torrington, Wyoming plant). The remaining 30 percent of the acreage, grown in the southwest, particularly in Chase and Keith counties, is usually processed at Great Western's factories in northeast Colorado, but may also be shipped to the Scottsbluff area or Goodland, Kansas, if the need arises.

Until very recently, sugarbeets were regarded as a stable, beneficial crop by area growers, fitting well into a beans-beets-alfalfa-corn rotation. As irrigation in the area increased, wheat and oats production tended to be relegated to the dryland areas and the higher return cash crops, including potatoes and onions, took over the irrigated land (see Table 3.5). Sugarbeets were also well regarded

WYOMING--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA THREE



since they were not badly affected by the severe hailstorms which are common in the area.

More recently, however, several factors have combined to lessen the enthusiasm for sugarbeets, although acreage is not yet severely diminished. First, a number of growers have switched to contracting with Holly Sugar in Wyoming. Second, the sugarbeet crop has recently been attacked by nematodes and Rhizoctinia, increasing costs per acre and lowering resistance to hail damage. Third, the prices for wheat, corn, sorghum, alfalfa and beans all rose sharply in 1973, (see Table 3.3), making these crops, which are easier to grow than sugarbeets, very enticing alternatives. Fourth, the livestock industry is moving into the area, creating a strong demand for corn silage.

Future levels of production in the area are difficult to predict. If sugarbeets remain at a price disadvantage relative to competing crops, then production levels will drop significantly. If the price of sugar rises and the prices of competing crops return to levels closer to those of 1972 prices than the peaks of 1973, then there seems no reason to believe that the acreage should drop below 85,000 acres planted annually.

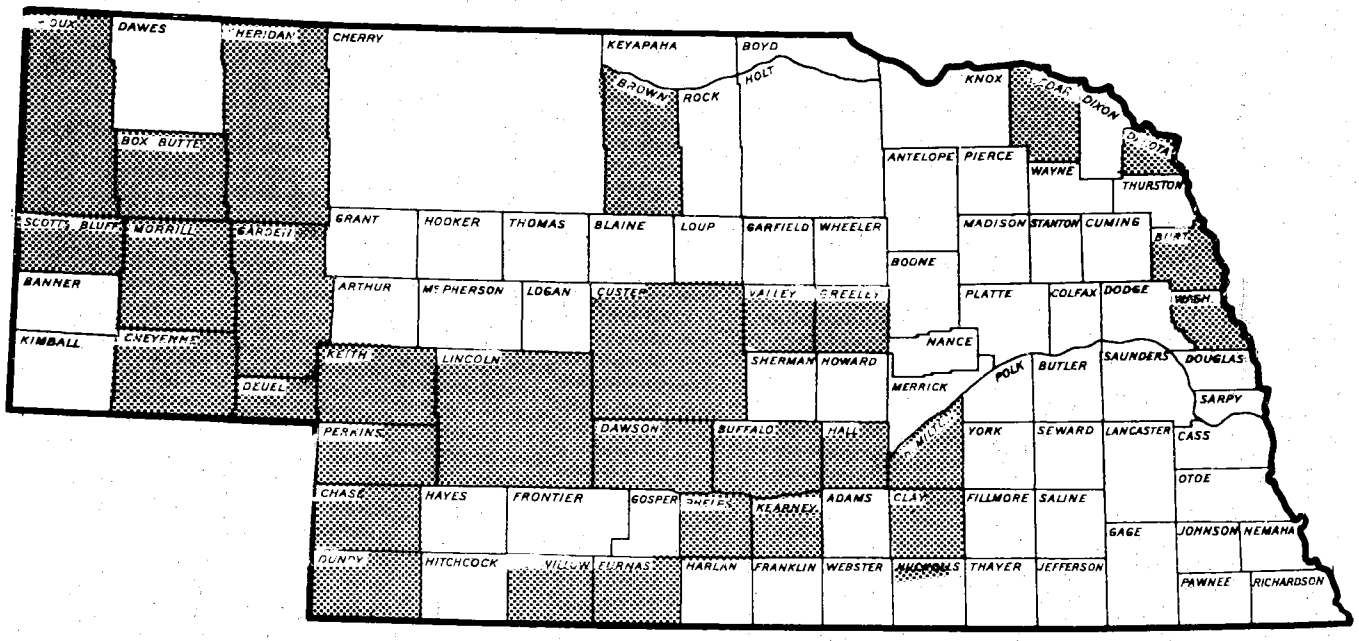
Summary and Projections

Low reported labor costs in Colorado and Kansas help to reduce costs below the ASCS area average (Table 3.1), but this effect is partly due to the Colorado and Kansas budgets ignoring labor requirements for feeding beet tops. The Wyoming budgets include such a charge, which results in a cost per ton of sugar higher than the ASCS average (which also included those areas not feeding beet tops). The Nebraska cost per ton of sugar is below the ASCS average mainly owing to above average yields per acre.

Although the cost and return data for competing crops reproduced in Table 3.3 are rather sparse, it can be seen that from 1972 to 1973, returns from corn increased to exceed those from sugarbeets, and returns from alfalfa and wheat increased to levels that, although below that of sugarbeets, made these crops attractive in terms of ease of growing. An enormous increase in bean prices is reflected in the net return figures, but prices are expected to fall. The returns from potatoes and onions seem tempting, but it must be remembered that these crops occupy comparatively small acreages. (Table 3.5)

Reference to Graphs 3.1(a) and (b) shows that despite quite wide year-to-year yield fluctuations corresponding with the percent successfully harvested (Table 3.4), per acre yields have generally increased since 1963. Planted acreage (Graph 3.2) has remained relatively constant in the South Platte Valley, Wyoming and Nebraska, has increased in northwest Kansas and the Colorado High Plains, and has decreased markedly in North Central Colorado.

NEBRASKA--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA THREE



In conclusion, the production of sugarbeets in Area Three seems in no way likely to expand greatly in the foreseeable future. The main question relates to what degree of contraction may occur. Production levels in Nebraska, Kansas and the Colorado High Plains will be affected mainly by the prices of competing crops. The areas are suitable for wheat, corn and feedgrain production, and the local feedlot industry is increasing. If returns from sugarbeet production do not become more attractive relative to other crops than they have been in 1973, a reduction in acreage planted must be expected in these areas. If sugarbeets do become more competitive, then production should continue at present levels. Any expansion in acreage would require an increase in the factory capacity, and it is unlikely that Great Western will make any sizeable investments for some while yet.

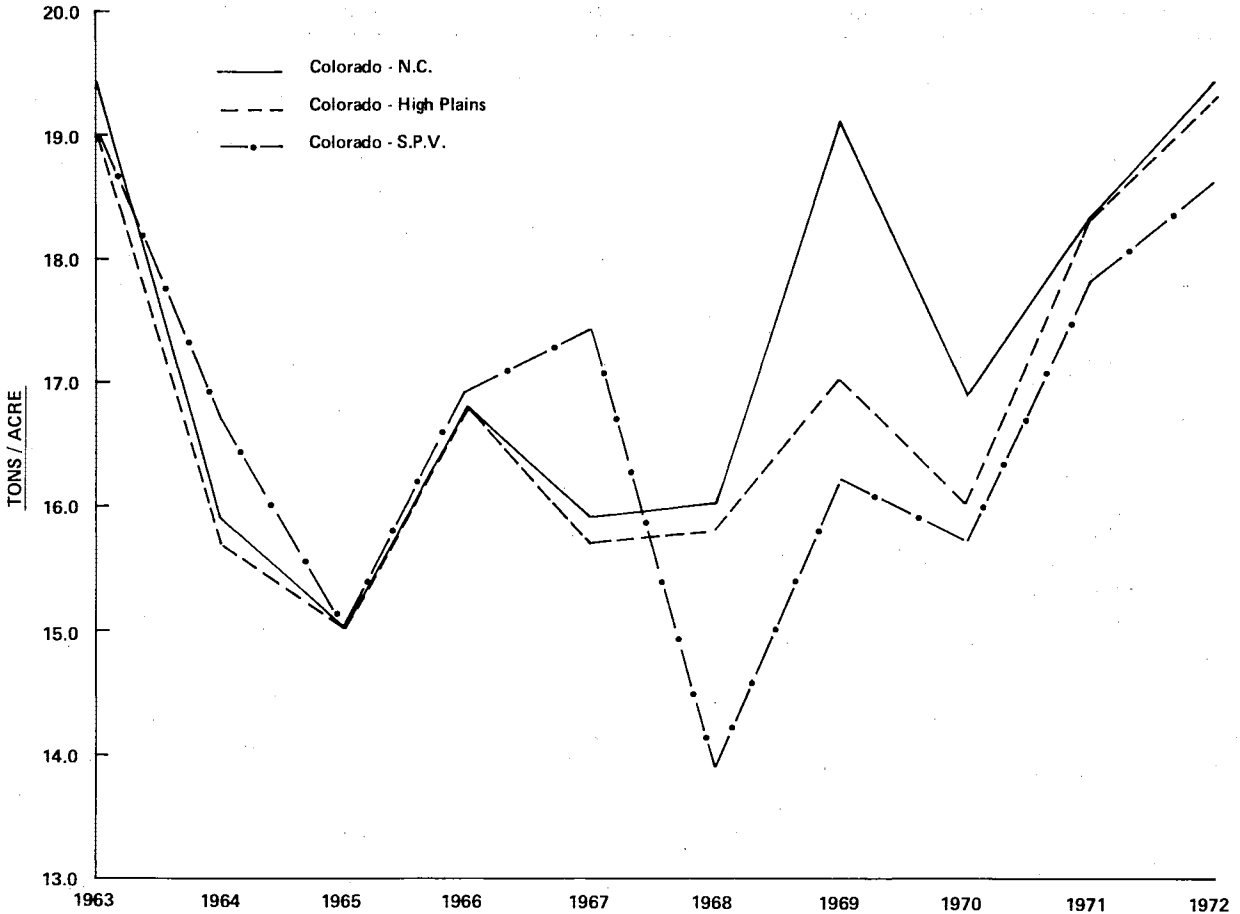
The level of production in eastern Wyoming is expected to remain fairly constant. The farmers like the crop, there are fewer competitive enterprises, and the factory is owned by Holly Sugar.

Production in north central and northeastern Colorado seems likely to decline in the future. Levels of production can at best be expected to stabilize at 1972 levels (Graph 3.2) only if returns from sugarbeet production increase substantially. Although Great Western, not unexpectedly, professes cautious optimism about continuing production in the area as a private company, it must be reported that there is little grower enthusiasm in the area for such a future. Some growers feel that past management of Great Western has not been entirely in their interests and it was felt that their only secure future lay with the cooperatives. It should be pointed out that Great Western growers in Montana, Wyoming, Nebraska, Kansas and Ohio seemed less dissatisfied than the Colorado growers, possibly owing to the softening effects of distance, but were still strongly in favor of the cooperative.

Apart from pressures from urbanization, competing crops, and poor grower-processor relations, pollution controls pose another threat to the industry in the area. Of the eight factories in the area, the newest was erected in 1926. The EPA report on the effects of pollution control guidelines (9) cites some factories in northern Colorado, along with some in Michigan, as being almost certain to close if present guidelines are implemented in 1977. There is a strong temptation to feel that two or three of the smaller factories may close, and production in the area stabilize at a lower level. The extreme alternatives are of production remaining at 1973 levels under good prices and cooperative management, or of Great Western remaining a private company, and going out of business in two years. Both seem unlikely, but are seriously held opinions in the area.

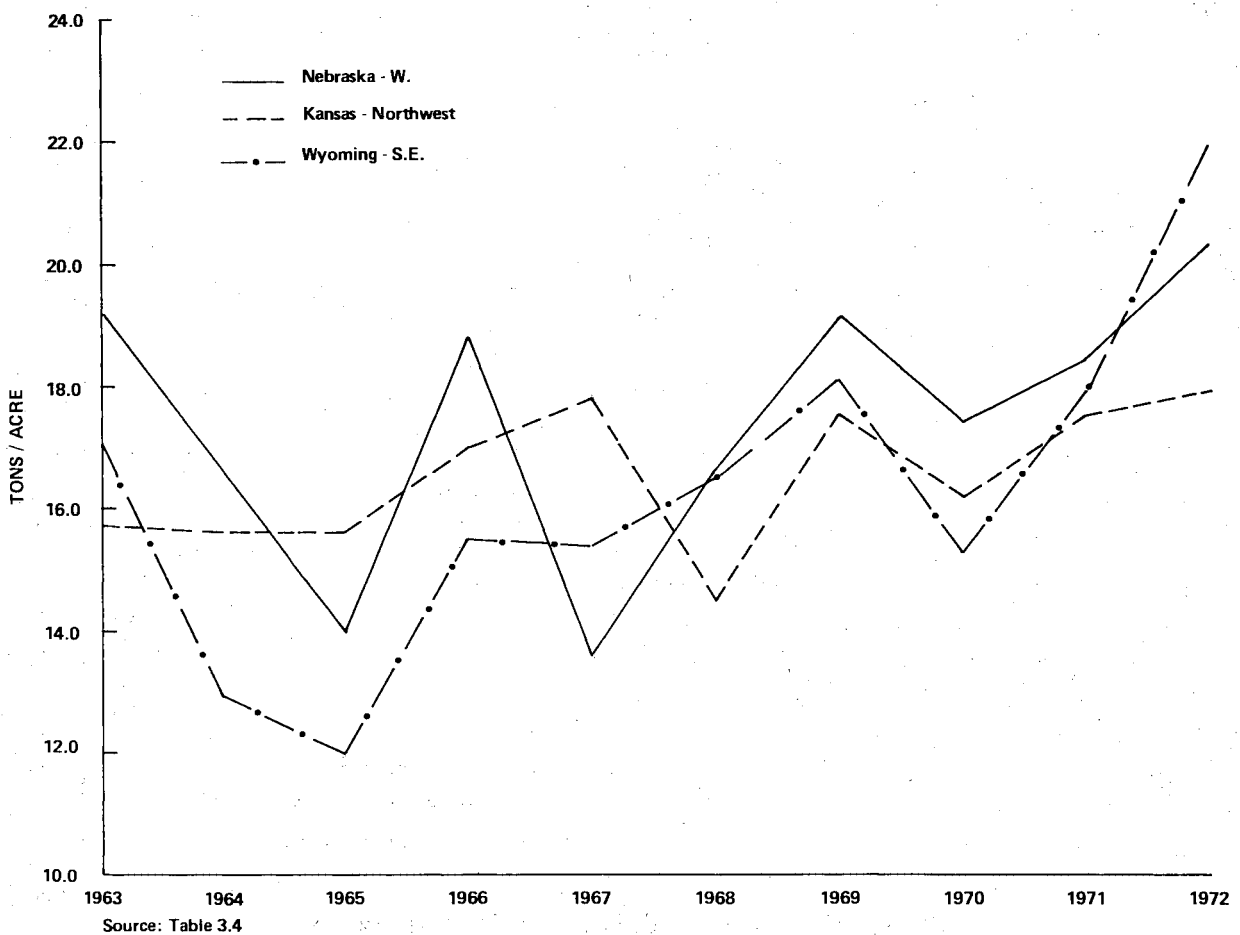
It should not necessarily be assumed that a successful takeover of Great Western by the producer's cooperative will guarantee a prosperous future. A change in present tax regulations for cooperatives could considerably reduce profits, and some difficulties must be expected when installing new management, both in running the company and in establishing grower-processor relations.

GRAPH 3.1 (a) YIELD OF SUGARBEETS - AREA 3 (COLORADO ONLY)



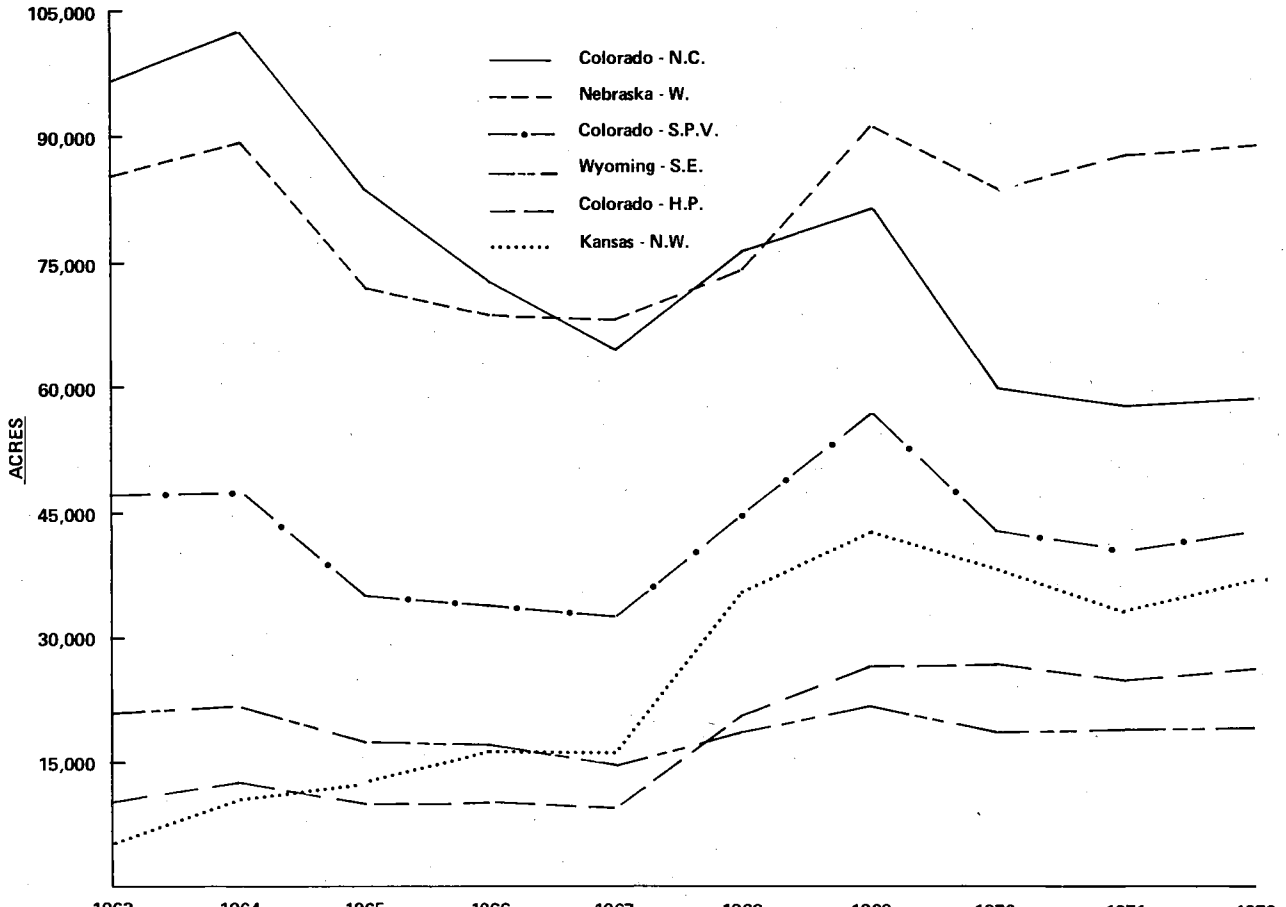
Source: Table 3.4

GRAPH 3.1 (b) YIELD OF SUGARBEETS - AREA 3 (NOT INCLUDING COLORADO)



Source: Table 3.4

GRAPH 3.2 ACREAGE PLANTED - AREA 3



Source: Table 3.4

TABLE 3.1

1972 PER ACRE COST DATA FOR SUGARBEETS
(dollars)

	Central Colorado	Valley Colorado	High Plains Kansas	Eastern Wyoming	Nebraska Panhandle	ASCS Area 3	ASCS Data-Area 3 (1972 Cost Study)
Labor-own	13.66	17.77	6.91	48.64	54.73	53.23	54.02[1]
-custom and hand	11.50	10.00	34.70	45.45	24.62	40.63	32.52
Machine operations-own	9.90	17.34	2.80	38.13	33.02	23.75	23.03
-custom	79.00	58.75	49.59	4.57	. . .	5.51	16.62
Seed	6.60	4.40	8.60	5.31	10.70	5.51	9.43
Fertilizer	18.90	26.75	25.27	26.03	17.77	23.23	23.00
Chemicals	5.60	5.60	18.08	13.27	11.01	2.95	6.71
Water operating costs	8.75	6.25	11.62	7.66	. . .	15.15	15.48
Miscellaneous	8.00	8.00	2.43	3.04	2.45	6.81	24.58
Interest on operating capital	6.78	6.50	6.49	8.12	6.52	8.36	5.18
Total variable costs	168.69	161.36	166.49	200.31	167.78	185.13	210.57
Interest on land	30.00	39.00	14.32	24.65	42.33	44.66	65.78[2]
Interest on machinery investment	8.13	21.16	3.07	14.58	13.93	10.15	5.96
Machinery depreciation			5.50	28.68	22.64	20.78	21.58
Taxes and insurance	6.00	8.50	4.69	10.76	12.11	13.95	11.40
Water fixed costs	12.50	5.00	22.18	43.25	6.96	. . .	
Total fixed costs	56.63	73.66	49.76	121.92	91.01	89.54	104.72
Total all costs	225.32	235.02	216.25	322.23	258.79	274.67	315.29
5 year average yield (tons/acre)	17.94	17.28	16.72	17.98	18.40	17.73	17.62
5 year average sugar content	15.97	15.27	15.65	16.70	16.51	16.06	15.61
Sugar yield (tons/acre)	2.87	2.64	2.62	3.00	3.04	2.85	2.10
Cost per ton of sugar	78.51	89.02	82.54	107.41	85.13	96.38	150.14

Sources: References 20, 60, 79, 143, 107, 108, Table 3.4, Statistical Background (2)

[1] Includes farm maintenance labor.
[2] Paid and imputed interest on land and net rent.

TABLE 3.2

1972 PER ACRE COST AND YIELD DATA FOR SELECTED COMPETING CROPS

Crop	Variable Cost	Fixed Costs	Total Costs	Yield
State: Colorado, Region: North Central				
Alfalfa (Est)	33.29	27.17	60.46	. . .
Alfalfa (Prod)	45.14	57.87	103.01	3.5 tons
Corn	67.02	60.00	127.02	109 bushels
Sugarbeets	168.69	56.63	225.32	17.94 tons
Region: South Platte				
Corn Silage	83.99	73.04	157.03	22 tons
Corn	68.07	65.67	133.74	111 bushels
Alfalfa (Est)	55.01	62.92	117.93	. . .
Alfalfa (Prod)	45.30	62.01	107.31	4 tons
Sugarbeets	161.36	73.66	235.02	17.28 tons
State: Kansas, Region: High Plains				
Dryland corn	56.08	35.99	92.07	120 bushels
Dryland sorghum	18.44	16.46	34.90	40 bushels
Winter Wheat	26.48	42.91	69.39	30 bushels
Sugarbeets	166.49	49.76	216.25	16.72 tons
State: Wyoming, Region: Southeast				
Alfalfa	44.97	37.71	82.68	3.9 tons
Field Beans	90.86	45.57	136.43	18.6 cwt.
Corn	55.91	37.59	93.50	114.5 bushels
Corn Silage	72.42	38.06	110.48	20.8 tons
Oats	49.52	39.46	88.98	75 bushels
Barley (Malt)	37.36	37.11	74.47	75 bushels
Potatoes	232.62	55.10	287.72	150 cwt.
State: Nebraksa, Region: Panhandle				
Alfalfa	54.89	73.42	128.31	4 tons
Dry Edible Beans	81.44	57.15	138.59	18 cwt.
Corn (Irrig.)	87.10	56.16	143.26	115 bushels
Wheat	21.50	27.44	48.94	35 bushels
Onions	462.82	49.09	511.91	250 cwt.
Potatoes	302.11	49.09	351.20	250 cwt.
Sugarbeets	167.78	91.01	258.79	18.40 tons

Sources: References 60, 74, 75, 77-79, 141-3, 109, Table 3.1

TABLE 3.3

1972 AND ESTIMATED 1973 PER ACRE NET RETURNS FOR SELECTED COMPETING CROPS

Crop	1972 Total Costs	1972 Price**	1972 Net Returns	1973 Total Costs*	1973 Price**	1973 Net Returns
State: Colorado, Region: North Central						
Alfalfa-established-irr.	60.46	. . .	. . .	. . .	. . .	. . .
Alfalfa-produce-irr.	103.01	40.00	36.99	110.22	45.00	47.28
Corn for grain--irr.	127.02	1.85	74.63	135.91	2.70	158.39
Sugarbeets-irr.	225.32	19.89	131.51	241.09	N/A	. . .
Region: South Platte						
Corn silage-irr.	157.03	. . .	. . .	168.02	. . .	. . .
Corn for grain-irr.	133.74	1.85	71.61	143.10	2.70	156.60
Alfalfa-established-irr.	117.93	. . .	. . .	126.19	. . .	. . .
Alfalfa-produce-irr.	107.31	40.00	52.69	114.82	45.00	65.18
Sugarbeets-irr.	235.02	19.89	108.68	251.47	N/A	. . .
State: Kansas, Region: High Plains						
Corn for grain-irr.	92.07	1.79	122.73	98.51	2.56	208.69
Sorghum grain-dry	34.90	1.67	31.90	37.34	2.31	55.06
Winter Wheat-dry	69.39	2.12	(5.79)	74.25	3.79	39.45
Sugarbeets-irr.	216.25	19.07	102.60	231.39	N/A	. . .
State: Wyoming, Region: Southwest						
Alfalfa-irr.	82.68	32.50	44.07	88.47	44.00	83.13
Field Beans-irr.	136.43	9.10	32.83	145.98	22.00	263.22
Corn for grain-irr.	93.50	1.94	128.63	100.05	3.01	244.60
Corn silage-irr.	110.48	. . .	. . .	118.21	. . .	. . .
Oats-irr.	88.98	0.83	(26.73)	95.21	1.30	2.29
Malting barley-irr.	74.47	1.23	17.78	79.68	2.13	80.07
Potatoes-irr.	287.72	2.85	139.78	307.86	3.25	179.64
Sugarbeets-irr.	322.23	20.16	40.25	344.79	N/A	. . .
State: Nebraska, Region: Panhandle						
Alfalfa hay-irr.	128.31	24.00	(32.31)	137.29	31.50	(11.29)
Dry Edible beans-irr.	138.59	10.70	54.01	148.29	20.00	211.71
Corn for grain-irr.	143.26	1.80	63.74	153.29	2.43	126.16
Wheat-dry	48.94	2.33	32.61	52.37	3.82	81.33
Onions-irr.	511.91	6.48	1108.09	547.74	7.36	1292.26
Potatoes-irr.	351.20	2.99	396.30	375.78	3.49	496.72
Sugarbeets-irr.	258.79	20.34	115.47	276.91	N/A	. . .

*Estimated at 107 percent of 1972 total costs
**Includes Government payments, if any
Sources: Table 3.2, References 18, 59, 73, 105, 140

TABLE 3.4

SUGARBEET PRODUCTION

Year	Number of Farms	Planted Acres per Farm	Acres Planted	Acres Harvested	Percent Harvested	Yield (tons/acre) Harvested	Tons Marketed
COLORADO: North Central							
1963	2098	46.1	96675	90679	94	19.5	1766943
1964	2053	50.0	102258	98010	96	15.9	1555500
1965	1778	47.0	83534	74844	90	15.0	1119990
1966	1563	47.1	73553	69584	95	16.8	1171593
1967	1352	47.8	64619	63329	98	15.9	1004860
1968	1394	54.5	76020	72935	96	16.0	1169037
1969	1356	60.1	81424	72349	89	19.1	1378844
1970	1034	57.7	59647	55060	92	16.9	930378
1971	934	61.8	47718	46732	98	18.3	1037928
1972	870	67.0	58257	56152	96	19.4	1089872
1973	688		47512	44268	93	15.8	699663
COLORADO: South Platte Valley							
1963	954	49.4	47082	45580	97	19.1	870661
1964	925	51.1	47261	44402	94	15.7	697094
1965	715	48.5	34681	31540	91	15.0	473208
1966	664	51.0	33829	32498	96	16.8	545595
1967	613	53.0	32464	30262	93	15.7	474272
1968	696	64.6	44944	42240	94	15.8	666195
1969	724	78.5	56799	48722	86	17.0	825897
1970	571	74.1	42310	37258	88	16.0	597565
1971	502	81.8	41054	35447	86	18.3	649094
1972	486	87.0	42259	37902	90	19.3	731683
1973	395	83.6	33031	29691	90	16.3	485103
COLORADO: High Plains							
1963	47	105.4	5093	5033	99	19.1	96115
1964	81	129.0	10452	10383	99	16.7	173523
1965	86	146.1	12567	10137	81	15.0	152106
1966	97	169.0	16393	15594	95	16.9	262758
1967	90	180.2	16214	16146	100	17.4	280787
1968	134	261.6	35055	32897	94	13.9	456221
1970	152	248.3	37737	36281	96	15.7	569847
1971	131	249.3	32658	30779	94	17.8	549125
1972	138	266.6	36789	28319	77	18.6	526373
1973	128	244.3	31271	29951	96	16.7	499649
KANSAS: Northwest							
1963	97	102.1	9901	9530	96	15.7	149107

Table 3.4 (Continued)

Yield	Number of Farms	Planted Acres Per Farm	Acres Planted	Acres Harvested	Percent Harvested	Yield (tons/acre) Harvested	Tons Marketed
1964	107	112.6	12053	11147	92	15.6	174255
1965	94	103.4	9718	9069	93	15.6	141407
1966	75	130.1	9755	9616	99	17.0	163472
1967	59	153.6	9060	8990	99	17.8	159555
1968	114	178.6	20358	19779	97	14.5	287491
1969	132	199.9	26381	26121	99	17.5	455769
1970	140	190.1	26710	25878	97	16.2	418783
1971	126	196.9	24809	23390	94	17.5	409183
1972	118	222.8	26286	24707	94	17.9	443276
1973	110	227.4	25015	24781	99	17.6	435519
WYOMING: Southeast							
1963	410	51.2	20971	20412	97	17.1	349311
1964	415	51.7	21468	20183	94	12.9	259677
1965	343	49.1	16845	15593	93	12.0	186628
1966	327	49.8	16275	13475	83	15.5	208587
1967	305	47.8	14574	14088	97	15.4	217235
1968	327	56.0	18306	17433	95	16.5	287838
1969	330	65.3	21535	20764	96	18.1	379670
1970	297	60.7	18041	16222	90	15.3	248105
1971	274	67.4	18460	17102	93	18.0	306914
1972	275	72.4	19902	18465	93	22.0	405495
1973	265	67.2	17798	16440	92	18.3	301163
NEBRASKA: Panhandle and Southwest							
1963	1678	50.7	85096	83564	93	19.2	1600245
1964	1712	52.1	89265	86452	97	16.6	1431477
1965	1460	49.2	71778	66540	93	14.0	927917
1966	1318	52.1	68628	65161	95	18.8	1222414
1967	1212	56.3	68185	62597	92	13.6	849246
1968	1218	61.1	74437	71741	96	16.8	1208093
1969	1244	73.2	91056	86586	95	19.1	1652229
1970	1177	71.3	83956	78197	93	17.4	1358054
1971	1135	77.2	87628	77169	88	18.4	1420951
1972	1099	80.7	88662	81622	92	20.3	1653573
1973	965	80.6	77734	73279	94	20.1	1469899

Source: Reference 22 (Appendix 1), Statistical Background (1)

TABLE 3.5

1972 HARVESTED ACREAGES OF COMPETING CROPS
IN SUGARBEET COUNTIES

	Colorado North Central	Colorado South Platte	Colorado High Plains	Kansas High Plains	Wyoming Southeast	Nebraska Panhandle
Wheat	383,300	624,500	590,000	1,240,000	186,800	1,373,560
Oats	36,450**	29,460**	8,670**	3,980	21,400	117,730
Barley	66,000	21,800	2,300	5,320	26,400	19,480
Corn	70,950	116,500	128,150	176,960	15,700	1,819,150
Corn silage	109,350**	38,900**	23,550**	38,200	21,600	197,500
Grain sorghum	12,400***	38,900***	111,000***	155,000	N/A	273,000
Alfalfa hay	141,300**	77,100	25,100**	38,800	86,600	644,700
Potatoes	9,650**	4,650**	600**	80	N/A	4,790
Dry edible beans	28,000	27,000	8,000	7,920	13,700	92,300
Sugarbeets	56,152	37,902	28,319	24,707	18,465	81,622

**1971 Planted Acreage

***1972 Planted Acreage

Sources: References 22, 59, 73, 105, 140

STATISTICAL BACKGROUND

(1) The sub-areas chosen include the following counties:

COLORADO--North Central--Adams, Arapahoe, Boulder, Larimer, Weld.

S. Platte Valley--Logan, Morgan, Phillips, Sedgwick, Washington.

High Plains--Cheyenne, Kiowa, Kit Carson, Yuma

KANSAS--Northwest--Cheyenne, Decatur, Greeley, Logan, Rawlins, Sheridan, Sherman, Thomas, Wallace.

WYOMING--Southeast--Converse, Goshen, Laramie, Niobrara, Platte.

NEBRASKA--Panhandle and Southwest--Box Butte, Brown, Buffalo, Burt, Cedar, Chase, Cheyenne, Clay, Custer, Dakota, Dawson, Deuel, Dundy, Fumas, Garden, Greeley, Hall, Hamilton, Kearney, Keith, Lincoln, Morrill, Perkins, Phelps, Red Willow, Scottsbluff, Sheridan, Sioux, Valley, Washington.

(2) Sugar Percent

From the records of the Great Western and Holly Sugar companies, the five-year average sugar contents are taken as follows:

COLORADO	North Central	15.97%
	S. Platte Valley	15.27%
COLORADO/ KANSAS	High Plains	15.65%
WYOMING	Southeast	16.70%
NEBRASKA	Panhandle	16.51%

CHAPTER VII

AREA FOUR

Introduction

ASCS Area Four includes production from western and southern Colorado, southwest Kansas, north Texas and eastern New Mexico. Holly Sugar owns a plant at Delta in western Colorado, drawing beets from four surrounding counties, and another at Hereford, Texas, processing beets from the west of the Texas Panhandle and part of New Mexico. Sugarbeets produced in the Arkansas River Valley in southeast Colorado, and the Garden City area of southwest Kansas are all processed at American Crystal's plant at Rocky Ford, Colorado. The Rio Grande area of south Colorado started production on 1,600 acres in Alamosa, Conejos, Rio Grande and Saguache Counties in 1964, but production had ceased by 1968. Harvested yields only averaged 7 tons per acre owing to severe hailstorm problems and the existence of a salt pan 16 inches below the soil surface. The sugarbeet plant, which originally grew near the sea, responds favorably to small amounts of sodium, but the concentrations in the Rio Grande area were too strong to allow the 7 foot main root to develop properly.

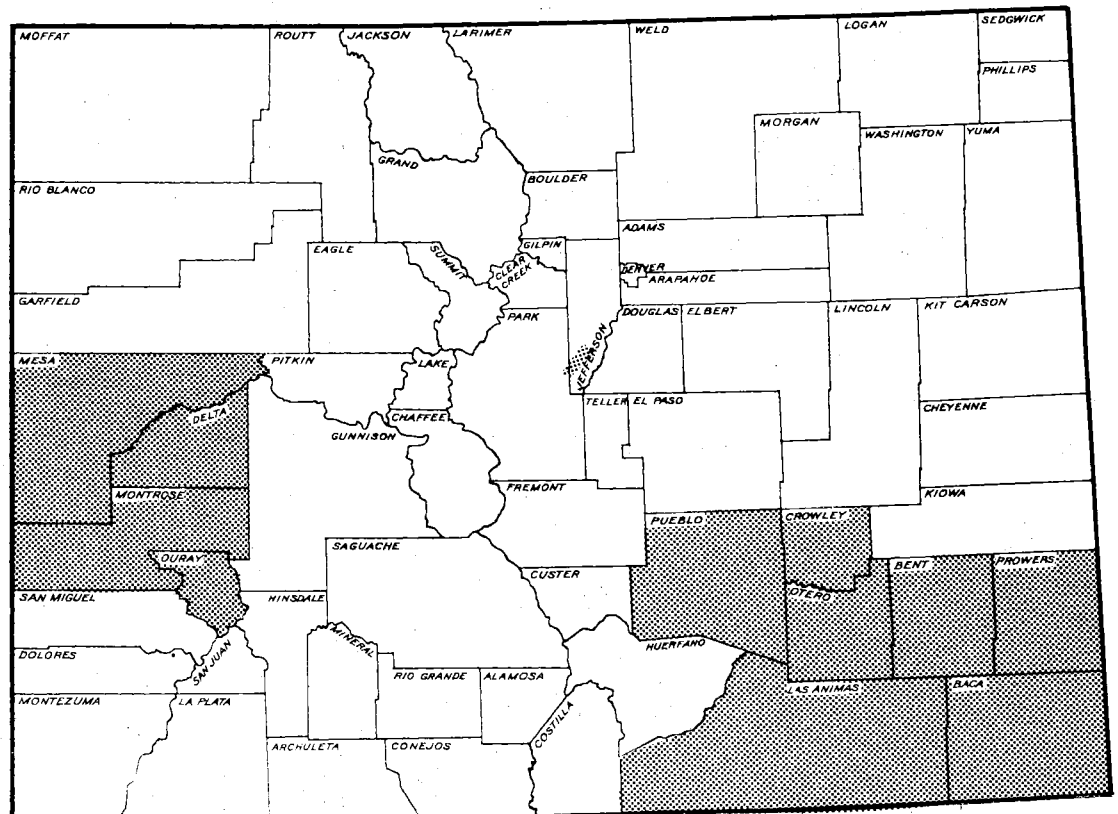
Elevations are fairly high. The Delta region averages 4,700 feet; the Arkansas River falls from 4,200 feet at Rocky Ford, Colorado, to 2,800 feet at Garden City, Kansas; and Hereford, Texas, lies around 4,000 feet above sea level. Growing season varies inversely with altitude and increases moving southward, from 147 days in the Delta region, to 164 days near Hereford. The average rainfall of 19 inches annually at Hereford and 20 inches at Garden City would seem to be reasonably high, but yearly amounts may differ widely from the average. Irrigation is absolutely necessary to reduce the risk of crop loss due to drought. The Rocky Ford and Delta regions also need to be irrigated, receiving on the average 12 inches and 8.5 inches annually.

Area Descriptions

4.1 Colorado--Delta Region

The Holly Sugar Company is known for having its processing plants widely dispersed geographically, and the Holly's Delta plant, located forty miles southeast of Grand Junction, Colorado, and three hundred miles from any other population center is the most isolated. The plant had attracted a remarkably consistent planted acreage

COLORADO--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA FOUR



until 1972. Although elevation is around 5,000 feet, the large amounts of sunlight in the clear air allow surprisingly high yields for most crops (Table 4.2) and the average yield of beets of over 20 tons per acre is the highest of any area in Colorado. However, the major competing crops in the region are alfalfa and pasture hay, barley, corn, and corn silage. The prices of all these commodities rose sharply in 1973 (see Table 4.3). The hay and feedgrains are sold to local livestock feeding enterprises and the malting barley is mainly contracted to Coor's Breweries of Golden, Colorado. Thus, guaranteed markets and high prices for competing crops in 1973-1974 have tended to depress the acreage of sugarbeets planted, and only 7,500 acres were planted in 1973. Small field sizes in the area make sugarbeets a difficult crop to handle.

Holly Sugar is widely reputed to have considered closing the Delta plant since production from at least 10,000 acres is needed to make the plant economically viable, and the distance sugar must be shipped to market is considerable. However, two recent developments have considerably improved prospects for future production in the area. First, there are firm plans to install a candy plant at Delta since capital is readily available from economic development agencies, and the altitude of 5,000 feet apparently is an important factor in cooking the candy. Second, although the vegetable canning industry moved out of the area in 1963, there is a strong likelihood of a cannery opening soon at Delta due to the recent enormous population increase in the mountain states and especailly Colorado. The proposed enterprises of peaches, apples, tomatoes and white corn should allow for year round production which together with the candy plant should be a great economic boon to the area. The Delta sugarbeet factory should also benefit since both the candy and canning industries are heavy consumers of sugar. Thus, there seems a very good chance that production in the area will climb back to and stabilize at 10 to 11,000 acres for some time to come.

4.2 Colorado--Arkansas River Valley

Production in the Valley has been declining for some while. Plants at Swink and Sugar City, Colorado, have closed in the last ten years as did the factory at Garden City, Kansas. The American Crystal factory at Rocky Ford, Colorado, now processes all the sugarbeets from the Arkansas River Valley of Colorado and southwest Kansas.

Production levels in the Valley are adversely affected by two factors. First, there is a shortage of irrigation water for the beets. Plenty of water flows down the river from the melting mountain snows but too early in the year to help the beet crop. Second, livestock production is estimated to have increased some 400 percent over the last

five years, bringing a strong demand for feed grains and alfalfa. Wheat, corn and beans are also important in the region, and the climate is sufficiently equable to allow production of onions, melons and pickles (see Table 4.5).

The American Crystal Cooperative, based in Fargo, North Dakota, leases the Rocky Ford plant to the Colo-Kan Sugar Company, Incorporated. This is a newly formed cooperative in the Arkansas River Valley.

Yields achieved by growers have been low for irrigated beets, averaging 16.6 tons per acre. Sugar content has also been low (14.30 percent), making costs per ton of sugar high compared to other regions in the area (Table 4.1).

4.3 Southwest Kansas

The old sugarbeet plant at Garden City was sold to Holly, who in turn resold it to American Crystal. Bad feelings arose between the growers and American Crystal due to the latter's unwillingness to purchase the 1969 crop which had a very low sugar content. Finally, the granting of an extra acreage allotment for Kansas to Goodland instead of Garden City resulted in the factory's becoming an uneconomic proposition and closure. Nearly all sugarbeets grown in southwest Kansas are now shipped 160 miles west to Rocky Ford, Colorado, the remainder going north to Goodland. Apart from high transportation costs, production in the area has also been affected by an increase in nematode attacks, hail and drought, labor problems (since the ban on importation of Mexican workers), and very strong competition from the new feedlot industry in the area.

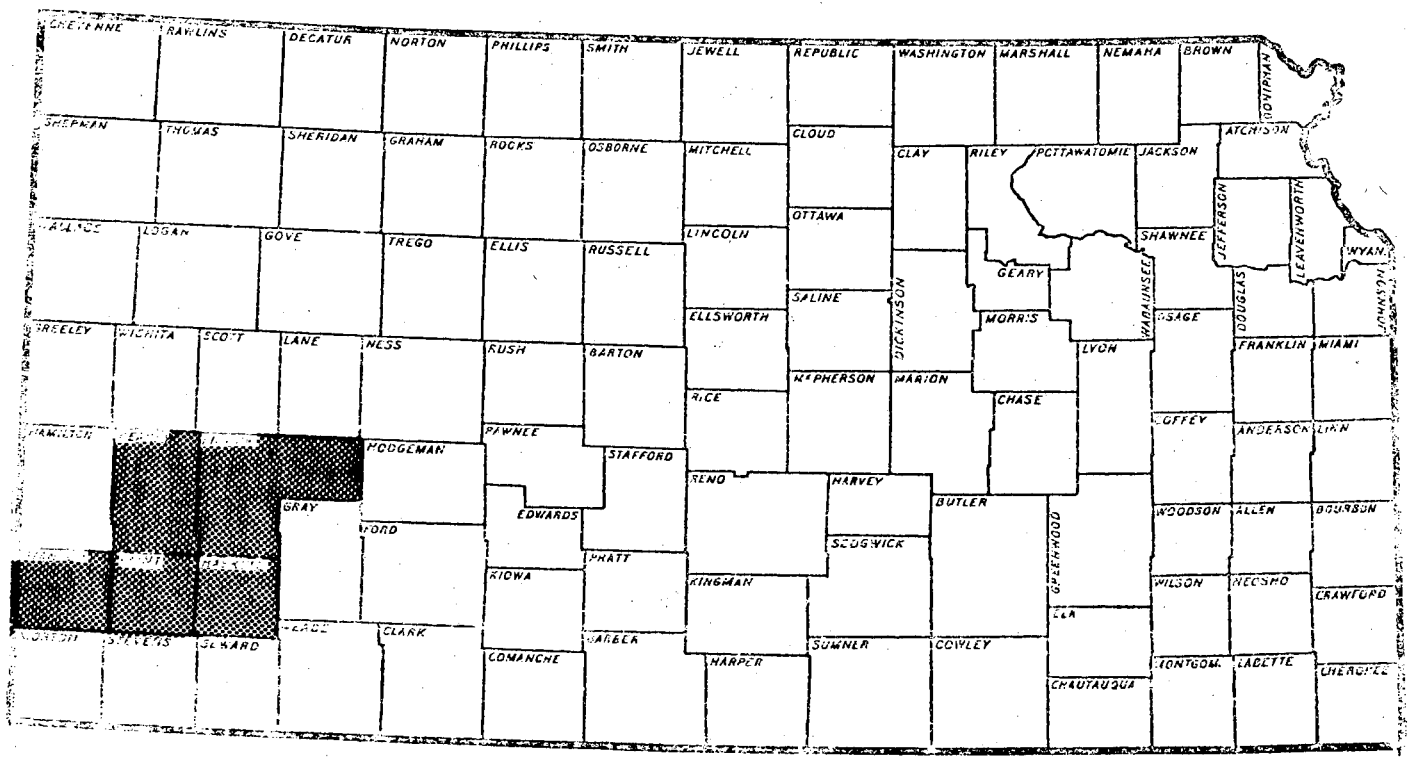
The emergence of the Colo-Kan beet growers cooperative, which leases the Rocky Ford factory from the American Crystal Cooperative has to some measure halted the decline in beet acreage. The cooperative may prove to be successful, but the demand for feedgrains in this area is believed to be increasing as fast as anywhere in the United States, Kansas farmers being quick to introduce profitable enterprises. Also, per acre returns from sugarbeets are low owing to poor yield and sugar content (Table 4.3), so the continuation of the sugarbeet industry in the area is seriously in question.

4.4 Texas--High Plains

Sugarbeet production in Texas is of quite recent origin. Although the initial indications for the industry appeared favorable, recently it has been passing through serious difficulties.

Irrigation systems powered by natural gas first began to be installed in the Panhandle area of Texas in the mid-1950's, and at the same time an influx occurred of highly competent expansionist-minded farmers looking for good new

KANSAS--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA FOUR

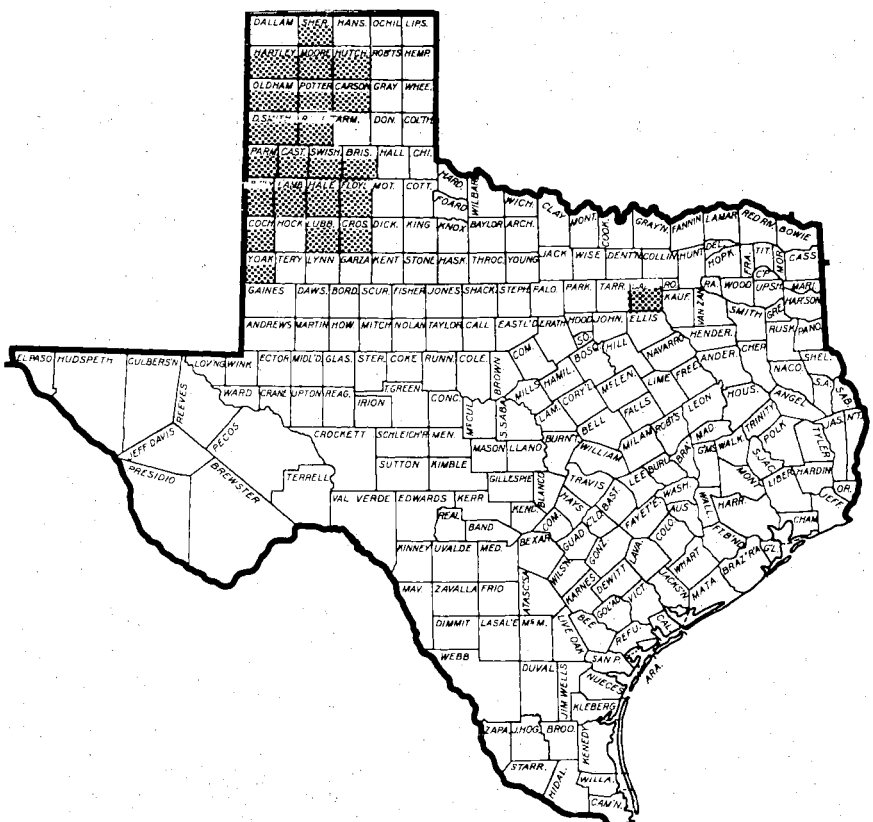


land. The soil in the area is a deep, level, firm brown clay with excellent waterholding capacity. The search by these farmers for high value crops led to successful negotiations with the Holly Sugar Company to open a plant in the area, and a factory commenced operations at Hereford, Texas, in 1964. Prior to 1964, some 3,000 acres were grown in extreme northern Texas and were shipped to Great Western factories in Colorado, but by 1965, 28,000 acres were contracted to Holly Sugar at Hereford. Enthusiasm for the crop led to an all-time high of 54,000 planted acres in 1969, of which some 10,000 acres were contracted to Great Western in Colorado. Up to 4,300 acres have been grown nearby in Curry County, New Mexico, although the 1972 total was only 617 acres.

Unfortunately, just when growers had acquired some confidence in the sugarbeet crop, the fall of 1969 was extremely wet, followed by a hard freeze, and only 42,000 acres were harvested. Not only were 12,000 acres abandoned, but the sugar content was badly affected by a build-up of nitrates applied to preceding crops. From 54,000 acres in 1969, planted acreage dropped by 22,000 in 1970, and by another 10,000 to reach 22,000 acres in 1971.

Holly Sugar and many farmers wished to protect their investment so an intensive program of research to increase yield and sugar content was carried out. The industry is recovering from the setback of 1969; the planted acreage reached 27,000 in 1973. Optimum contracted acreage for the factory, which has a processing season of 180 days owing to the installation of thick juice tanks, is 33,000. It was felt that this figure would have been reached in 1974 but for the sharp increase in the price of competitive crops. Typical rotations for sugarbeet farmers include grain sorghum, corn and wheat, and soybean production is on the increase (Table 4.5). However, yields of the grain crops are frequently reduced by bad weather, and sugarbeets have a relatively low cost of production, making net returns from sugarbeets more competitive than in southwest Kansas (Table 4.3). The 5-year average sugar content of 13.67 percent quoted in this report includes the 10 percent achieved in 1969. The more usual average of 15.5 percent, coupled with a 21 ton yield, would result in a very low cost of $66 per ton of sugar. Competition from potatoes, alfalfa, carrots and lettuce is lower than in other areas due to the shortage of the necessary water and labor. The only serious production problem for sugarbeets is damage from leaf spot disease, which can be controlled chemically. Otherwise, the future for sugarbeets in the area is much more promising than in 1970. Costs are fairly low, competitive crops pose less of a price threat than in many areas, and the water supply is expected to last another 20 years. Relations between the growers and the company are good, and confidence in the industry is being reestablished as yields and sugar content rise.

TEXAS--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA FOUR



There has also been some discussion of the feasibility of introducing sugarbeets in the Rio Grande area of Texas, but little development is expected for the next 5 years.

Summary and Projections

High yields and moderate costs allow the Delta and Texas costs per ton of sugar to be below the ASCS area average (see Table 4.1). If a 4-year average for Texas sugar content is used, omitting the low 1969 percentage, cost per ton of sugar drops to a very low $66. Arkansas River Valley costs are above average due essentially to low per acre yields.

Even in 1972, according to the data in Table 4.3, more than half the crops raised in the Arkansas River Valley yielded higher net returns than did sugarbeets, and the condition continued into 1973. Sugarbeets seem much more competitive in Texas.

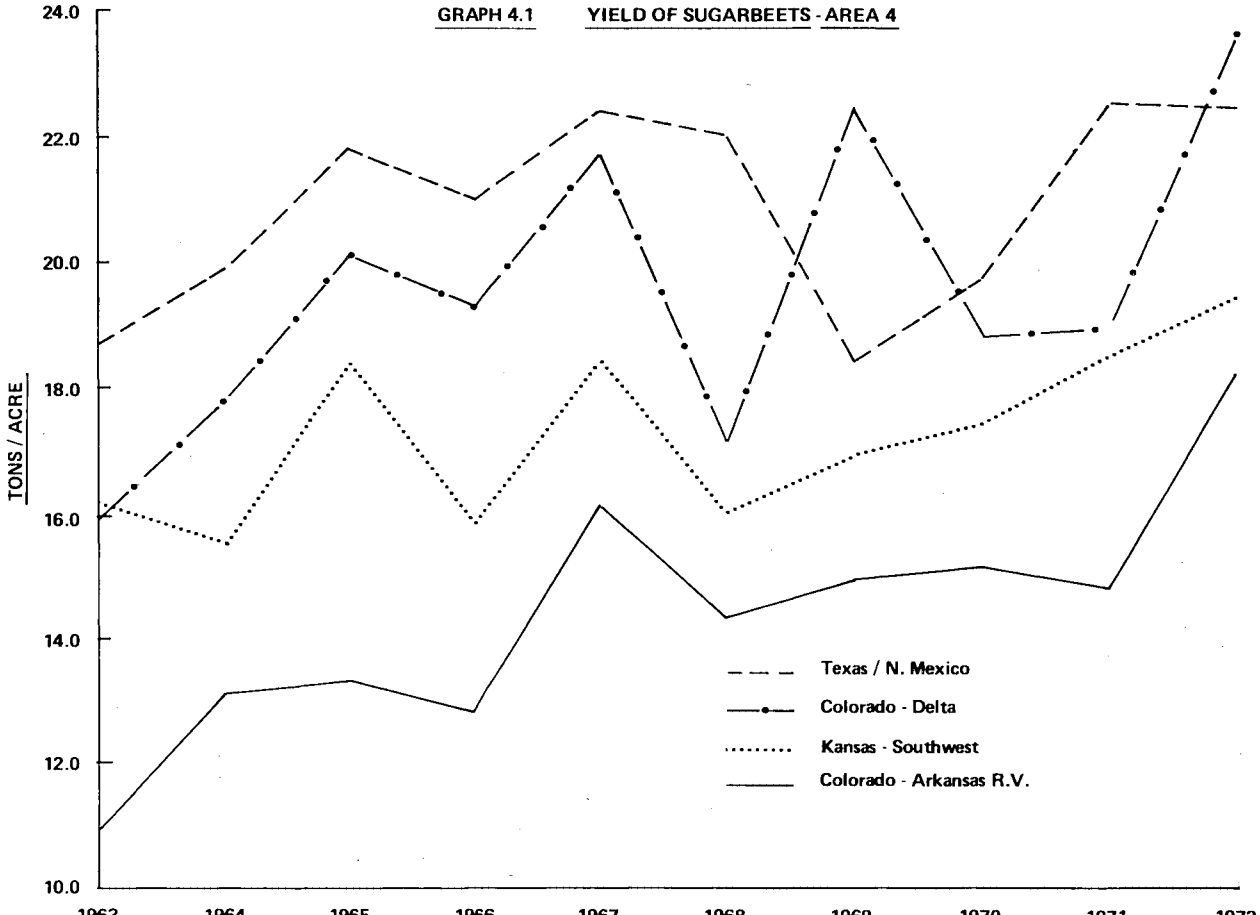
All four regions showed marked yield reduction in 1968/9 (Graph 4.1), but, although per acre yields have since risen, planted acreages had declined since 1968. The extreme fluctuation in Texas was partly due to the 10,000 acres in the north of the state that were contracted to Great Western for a short period.

Overall, there seems little likelihood of any significant expansion in sugarbeet production in Area Four over the next five years. If the plans for a candy factory and cannery at Delta, Colorado, materialize, production in this area will probably stabilize at between 10 and 11,000 acres. If sugar-consuming industries do not move into the area, there seems a reasonable likelihood that the pressure on the land resource from competing crops would cause the local sugarbeet industry to close.

Competition from other enterprises, especially feedlots, has already caused a marked reduction in production in southeast Colorado and southwest Kansas. The leasing of the Rocky Ford, Colorado, factory by a local grower's cooperative undoubtedly will lessen the decline in acreage, but the continued existence of the cooperative is based on the assumption of a sizable increase in the returns from sugarbeet production. Although this assumption may well be true, even a short-run continuation of relatively poor returns may cause the industry to close down in the region.

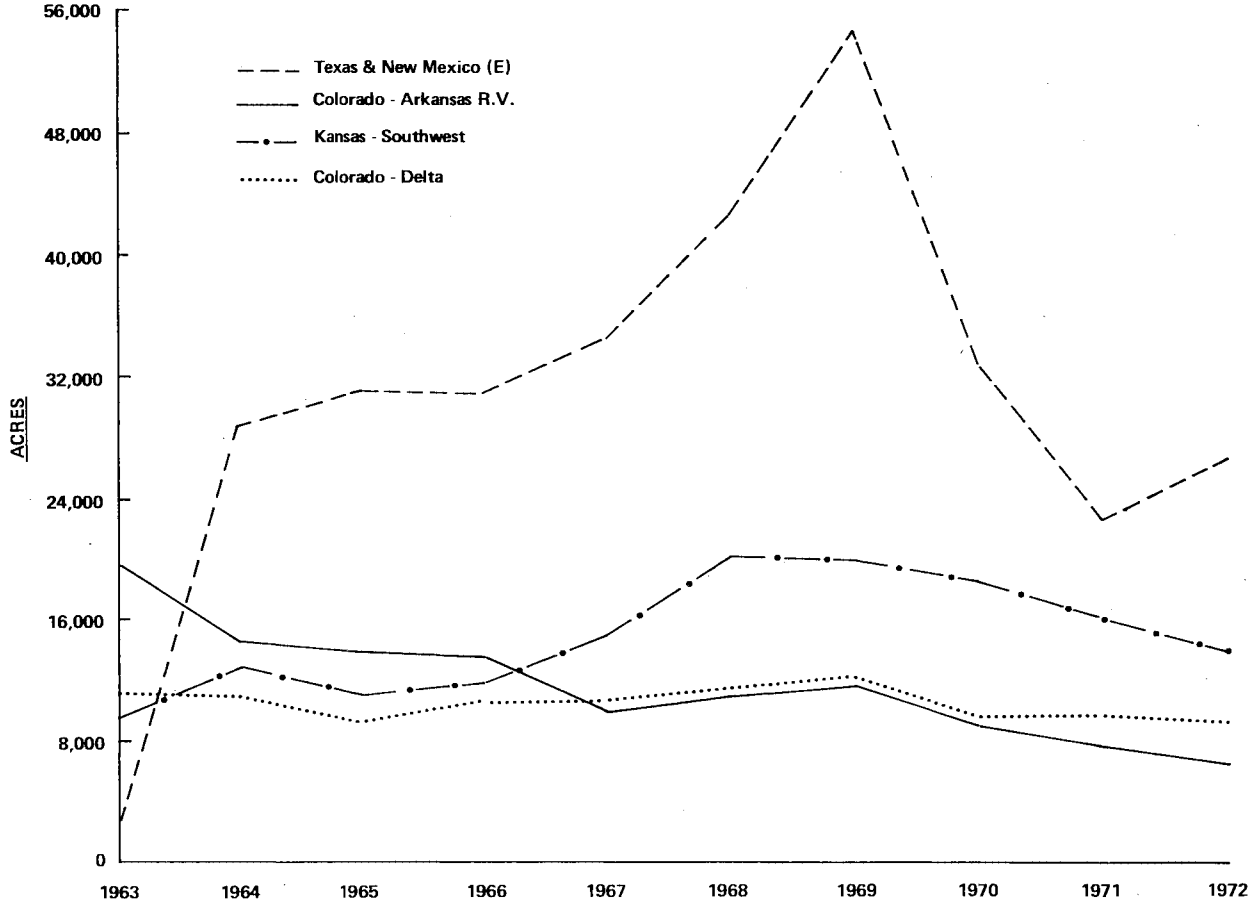
The picture in Texas is more promising. Marginal growers have tended to drop out, and the company and concerned local growers have made concerted and successful efforts to regain the acreage lost after 1969, increase yield, and improve sugar content. Moderate yields for alternative crops and the relatively low costs per ton of sugar produced help to reduce the pressure from competitive crops. Expectations are that the acreage planted will gradually rise to over 30,000 acres.

GRAPH 4.1 YIELD OF SUGARBEETS - AREA 4



Source: Table 4.4

GRAPH 4.2 ACREAGE PLANTED - AREA 4



Source: Table 4.4

TABLE 4.1

1972 PER ACRE COST DATA FOR SUGARBEETS
(dollars)

	STUDY DATA								ASCS Data-Area 4 (1972 Cost Study)
	Colorado Delta	Kansas Southwestern*		Texas High Plains		ASCS Area 4			
Labor-own	31.80	27.79		11.82		44.43			64.43
-custom and hand	24.62	42.57		13.50		34.52			32.43[1]
Machine operations-own	28.72[a)]	4.05		6.14		21.17			27.91
-custom	2.49	49.36		65.18		27.89			31.92
Seed	5.87	3.57		4.00		4.96			5.10
Fertilizer	41.19	22.26		7.60		20.47			17.34
Chemicals	10.59	13.68		19.70		10.58			5.11
Water operating costs	a)	12.06		13.89		22.48			22.34
Miscellaneous	8.80	2.64		2.61		22.68			23.33
Interest on operating capital	6.67	7.03		6.97		8.99			5.86
Total variable costs	160.75	185.01		151.41		218.17			235.77
Interest on land	34.20	20.00		31.88		32.43			27.97[2]
Interest on machinery investment	27.33	4.83		3.07		20.42			4.29
Machinery depreciation		8.64		5.50		12.78			17.46
Taxes and insurance	6.81	2.76		0.56		13.93			9.14
Water fixed costs	6.03	25.01		22.65		. . .			
Total fixed costs	74.37	61.24		63.66		79.56			58.84
Total all costs	235.12	246.25		215.07		297.73			294.61
5 year average yield (tons/acre)	20.14	16.55		21.02		19.13			19.27
5 year average sugar content	15.42	13.42**	14.30	13.67**	15.50	14.79**	15.14		13.75
Sugar yield (tons/acre)	3.11	2.22**	2.37	2.87**	3.26	2.83**	2.90		1.92
Cost per ton of sugar	75.60	110.92**	103.90	74.94**	66.00	105.20**	102.67		153.44

*Also represents Colorado-Arkansas River Valley.

**Includes low sugar percent in 1969.

Sources: References 20, 62, 76, 127, Table 4.4, Statistical Background (2)

[1]Includes farm maintenance labor.

[2]Paid and imputed interest on land and net rent.

TABLE 4.2

1972 PER ACRE COST AND YIELD DATA FOR
SELECTED COMPETING CROPS

Crop	Variable Costs	Fixed Costs	Total Costs	Yield
State: COLORADO, Region: Delta				
Barley-Malting--irr.	57.66	62.51	120.17	70 bushels
Beans-Pinto--irr.	71.02	63.84	134.86	3.44 tons
Corn-Silage--irr.	92.02	55.69	147.71	20 tons
Onions-irr.	453.63	75.50	529.13	320 cwt.
Sugarbeets-irr.	160.75	74.37	235.12	20.14 tons
State: COLORADO/KANSAS, Region: Arkansas River Valley				
Alfalfa-irr.	80.56	43.50	124.06	5 tons
Corn-irr.	68.43	42.25	110.68	125 bushels
Corn Silage-irr.	92.49	42.25	134.74	25 tons
Cantaloupes	326.77	69.44	396.21	95 cwt.
Pasture-irr.	69.25	60.95	130.20	3.5 tons
Pickles-irr.	139.94	41.85	181.79	6.4 cwt.
Sorghum-dry	12.93	7.50	20.43	30 bushels
Sorghum-irr.	49.76	34.17	83.93	120 bushels
Sorghum silage	59.33	13.45	72.78	14 tons
Soybeans-irr.	53.33	34.17	87.50	50 bushels
Tomatoes-can	424.29	69.21	493.50	17.4 cwt.
Wheat-dry	29.57	17.03	46.60	23 bushels
Sugarbeets-irr.	185.01	61.24	246.25	16.55 tons
State: TEXAS, Region: High Plains				
Alfalfa established--irr.	38.19	26.94	65.13	. . .
Alfalfa produce--irr.	43.67	44.37	88.04*	6 tons
Corn-irr.	83.53	45.61	129.14	110 bushels
Corn Silage-irr.	61.63	45.61	107.25	20 tons
Cotton Lint-dry	25.92	16.17	42.09	150 pounds
Cotton Lint-irr.	85.50	45.11	130.61	500 pounds
Pasture established-irr.	39.90	26.92	66.82	. . .
Pasture produce-irr.	42.03	44.37	86.40*	650 pounds
Pasture-Winter--irr.	47.52	42.41	89.93	550 pounds
Sorghum-dry	13.67	12.45	26.12	15 cwt.
Sorghum-irr.	66.39	45.61	112.00	65 cwt.
Sorghum Graze-dry	7.95	5.45	13.40	50 pounds

Table 4.2 (Continued)

	Variable Costs	Fixed Costs	Total Costs	Yield
State: TEXAS, Region: High Plains (continued)				
Sorghum Graze-irr.	39.59	43.07	82.66	405 pounds
Sorghum-Hay--dry	23.25	18.22	41.47	25 tons
Soybeans-irr.	49.56	45.52	95.08	35 bushels
Wheat-dry	14.25	14.73	28.98	15 bushels
Wheat-irr.	44.78	42.16	86.95	37 bushels
Wheat-Graze--dry	8.67	9.18	17.85	125 pounds
Wheat-Graze-irr.	42.57	43.29	83.52	460 pounds
Sugarbeets	151.41	63.66	215.07	21.02 tons

*Includes establishment costs.

Sources: References 62, 74-77, 127-128, Table 4.1.

TABLE 4.3

1972 AND ESTIMATED 1973 PER ACRE NET RETURNS FOR SELECTED COMPETING CROPS

	1972 Total Costs	1972 Price**	1972 Net Returns	1973 Total Costs*	1973 Price**	1973 Net Returns
State: COLORADO, Region: Delta						
Barley-Malting--irr.	120.17	2.15	30.33	128.58	2.33	34.52
Pinto Beans-irr.	134.86	88.40	169.24	144.30	N/A	. . .
Corn Silage-irr.	147.71	. . .	. . .	158.05	. . .	. . .
Onions-irr.	529.13	8.41	2162.07	566.17	7.80	1929.83
Sugarbeets-irr.	235.12	19.89	165.46	251.58	N/A	. . .
State: COLORADO/KANSAS, Region: Arkansas River Valley						
Alfalfa-irr.	124.06	33.25	42.19	132.74	42.50	79.76
Corn for Grain-irr.	110.68	1.82	116.82	118.43	2.63	210.32
Corn for Silage-irr.	134.74	. . .	. . .	144.17	. . .	. . .
Cantaloupes-irr.	396.21	6.05	178.54	423.94	4.64	16.86
Pasture-irr.	130.20	33.25	(13.82)	139.31	42.50	9.44
Pickles-irr.	181.79	91.50	403.81	194.52	112.00	522.28
Sorghum Grain-dry	20.43	2.13	43.47	21.86	2.59	55.84
Sorghum Grain-irr.	83.93	2.13	171.67	89.81	2.59	220.99
Sorghum Silage-irr.	72.78	. . .	. . .	77.87	. . .	. . .
Soybeans-irr	87.50	4.10	117.50	93.63	5.65	188.87
Canning Tomatoes-irr.	493.50	39.20	188.58	528.05	42.00	202.75
Wheat-dry	46.60	2.23	4.69	49.86	3.92	40.30
Sugarbeets-irr.	246.25	19.48	76.14	263.49	N/A	. . .
State: TEXAS, Region: High Plains						
Alfalfa established-irr.	65.13	. . .	. . .	69.69	. . .	. . .
Alfalfa produce-irr.	88.04	29.00	85.96	94.20	35.50	118.80
Corn for Grain-irr.	129.14	1.90	79.86	138.18	2.70	158.82
Corn for Silage-irr.	107.24	. . .	. . .	114.75	. . .	. . .
Cotton Lint-irr.	130.61	0.36	49.39	139.75	0.56	140.25
Cotton Lint-dry	42.09	0.36	11.91	45.04	0.56	38.96
Pasture established-irr.	66.82	. . .	. . .	71.50	. . .	. . .
Pasture produced-irr.	86.40	. . .	. . .	92.45	. . .	. . .
Pasture-winter-irr.	89.93	. . .	. . .	96.23	. . .	. . .
Grain Sorghum-dry	26.12	1.79	0.73	27.95	2.30	6.55
Grain Sorghum-irr.	112.00	1.79	4.35	119.84	2.30	29.66
Grazing Sorghum-dry	13.40	. . .	. . .	14.34	. . .	. . .
Grazing Sorghum-irr.	82.66	. . .	. . .	88.45	. . .	. . .

Table 4.3 (Continued)

	1972 Total Costs	1972 Price**	1972 Net Returns	1973 Total Costs*	1973 Price**	1973 Net Returns
Sorghum Hay-irr.	41.47	. . .	. . .	44.37	. . .	. . .
Soybeans-irr.	95.08	4.12	49.12	101.74	5.30	83.76
Wheat-dry	28.98	2.80	13.02	31.01	3.34	19.09
Wheat-irr.	86.95	2.80	16.65	93.04	3.34	30.54
Wheat for Grazing-dry	17.85	. . .	. . .	19.10	. . .	. . .
Wheat for Grazing-irr.	83.52	. . .	. . .	89.37	. . .	. . .
Sugarbeets	215.07	16.01	121.46	230.12	N/A	. . .

*Estimated at 107 percent of 1972 Total Costs.
**Includes government payments, if any.

Sources: Table 4.2, References 18, 59, 73, 129-132.

TABLE 4.4

SUGARBEET PRODUCTION

Year	Number of Farms	Planted Acres per Farm	Acres Planted	Acres Harvested	Percent Acres Harvested	Yield (tons/acre) Harvested	Tons Marketed
COLORADO: Delta Region							
1963	247	45.0	11115	11080	100	15.9	176080
1964	232	46.6	10803	10431	97	17.8	185854
1965	185	48.9	9037	8825	98	20.1	177600
1966	186	56.0	10411	9735	94	19.3	188279
1967	176	59.5	10473	10335	99	21.7	223851
1968	179	63.7	13394	11153	98	17.1	190369
1969	165	71.5	11802	11589	98	22.4	259788
1970	142	66.2	9395	9155	97	18.8	171872
1971	133	70.4	9362	9242	99	18.9	174431
1972	127	69.6	8839	8306	94	23.5	195067
1973	98	73.4	7192	7069	98	18.5	130437
COLORADO: Arkansas River Valley							
1963	474	41.2	19519	18004	92	10.9	196862
1964	374	38.6	14419	12572	87	13.1	164114
1965	311	44.2	13732	11341	83	13.3	150695
1966	262	51.2	13417	12656	94	12.8	161598
1967	178	54.8	9748	7905	81	16.1	127040
1968	150	72.0	10798	10288	95	14.3	146982
1969	150	75.7	11347	11192	99	14.9	166524
1970	107	81.9	8768	8045	92	15.1	121079
1971	85	86.8	7381	6877	93	14.8	101668
1972	75	81.1	6080	3856	63	18.2	70007
1973	50	63.7	3183	3167	99	14.4	45582
KANSAS: Southwest							
1963	91	103.9	9451	9276	98	16.2	150623
1964	105	120.7	12668	12247	97	15.5	190176
1965	105	104.2	10936	10228	94	18.4	187768
1966	99	117.7	11654	11441	98	15.8	180325
1967	87	153.3	14871	14091	95	18.4	259161
1968	104	188.8	19637	18829	96	16.0	301867
1969	98	197.8	19381	14114	73	16.9	239148
1970	94	193.3	18167	17531	96	17.4	305279
1971	94	166.7	15672	15211	97	18.5	281125
1972	82	165.0	13526	10369	77	19.4	200877
1973	42	235.9	9908	9345	94	18.9	176568

Table 4.4 (Continued)

Year	Number of Farms	Acres planted per Farm	Acres Planted	Acres Harvested	Percent Acres Harvested	Yield (tons/Acre) Harvested	Tons Marketed
TEXAS: High Plains and New Mexico							
1963	82	28.6	2347	2330	99	18.7	43634
1964	473	60.5	28596	28445	99	19.9	565658
1965	475	65.0	30896	30660	99	21.8	675254
1966	459	66.9	30709	30709	100	21.0	643353
1967	421	81.3	34220	33281	97	22.4	743982
1968	416	101.6	42255	40940	97	22.0	899429
1969	473	114.8	54320	41972	77	18.4	772387
1970	331	98.4	32553	31088	95	19.7	613596
1971	235	94.1	22111	20741	94	22.5	467370
1972	242	112.6	26115	23777	91	22.4	533262
1973	197	120.1	23663	21399	90	19.4	414828

Source: Reference 22 (Appendix 1)

TABLE 4.5

1972 HARVESTED ACREAGES OF COMPETING CROPS
IN SUGARBEET COUNTIES

	Colorado Delta Area	Colorado Arkansas River Valley	Kansas Southwest	Texas High Plains
Sugarbeets	8,306	3,856	10,369	23,160
Winter Wheat-Dryland	1,280	299,600	465,900	933,600
Winter Wheat-Irrigated	3,550	27,600	109,100	631,600
Corn	8,800	71,800	179,600	188,000
Soybeans-Irrigated	. . .	. . .	1,700	53,900
Grain Sorghum--Dryland	. . .	87,900	60,100	565,600
Grain Sorghum--Irrigated	800	141,900	127,900	1,228,900
Forage Sorghum	. . .	. . .	14,200	29,200
Sorghum Silage	. . .	. . .	9,700	. . .
Corn Silage	13,550*	31,200*	18,500	58,900
Alfalfa Hay	66,050*	147,100*	43,500	44,000
Permanent Pasture-Hay	29,000*	23,700*	660,000	33,500
Cotton	. . .	. . .	. . .	1,098,800
Onions	. . .	. . .	. . .	2,700
Potatoes	290*	600*	. . .	9,900
Cantaloupes/Melons	. . .	. . .	. . .	2,600
Pickling Cucumbers	. . .	. . .	. . .	800
Canning Tomatoes	. . .	. . .	. . .	400
Carrots	. . .	. . .	. . .	4,500
Lettuce	. . .	. . .	. . .	1,700
Barley	22,200	8,350	1,740	5,150
Dry Beans	6,700	13,000	. . .	. . .
Oats	4,100	1,600	180	2,200
Rye	. . .	. . .	770	11,900

*1971.

Sources: References 59, 73, 129-132.

STATISTICAL BACKGROUND

(1) The sub-areas chosen include the following counties:

COLORADO--Delta area--Delta, Mesa, Montrose, Ouray.
Arkansas River Valley--Baca, Bent, Crowley, Las Animas, Otero, Prowers, Pueblo.

KANSAS--Southwest--Finney, Grant, Haskell, Kearney, Stanton.

TEXAS--High Plains--Bailey, Briscoe, Carson, Castro, Cochran, Crosby, Dallas, Deaf Smith, Floyd, Hale, Hartley, Hutchinson, Lamb, Lubbock, Moore, Oldham, Parmer, Potter, Randall, Sherman, Swisher, Yoakum.

New Mexico--Curry, Union Counties.

(2) Sugar Content:

Five year average figures for sugar percentages, taken from company records are:

COLORADO--DELTA	15.42%
COLORADO/KANSAS-- ARKANSAS RIVER VALLEY*	13.42%
TEXAS--HIGH PLAINS**	13.67%

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*1969 was a bad year in the Valley, with sugar content of 9.9%. Including 1969 data in the five year average gives 13.42%. Substituting 1973 data for 1969 gives 14.30%.

**Repeating the same procedure for Texas gives 15.50%.

CHAPTER VIII

AREA FIVE

Introduction

ASCS Area Five includes production from nearly all Montana, central and western North Dakota, and the north central part of Wyoming. The four factories in the area include Great Western plants at Billings, Montana, and Lovell, Wyoming, and Holly Sugar plants at Worland, Wyoming, and Sidney, Montana. A few beets produced in Montana are processed in Wyoming, and vice versa.

The following table summarizes environmental data for the area:

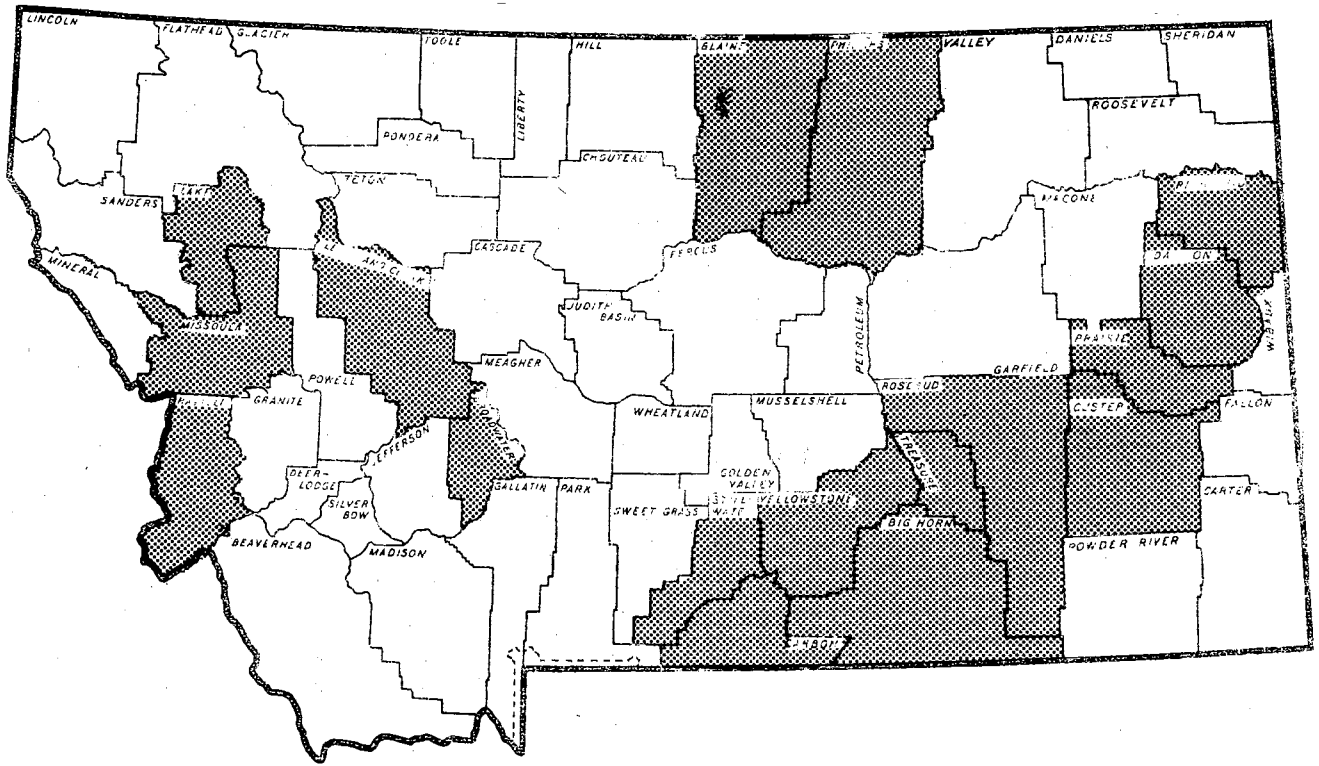
	Elevation (feet)	Growing Season (days)	Rainfall (Inches)
Montana-Missoula	3500	120	13
Townsend	3800	122	11
Billings/Hardin	3100	125	14
Chinook	2300	125	12
Sidney	1950	135	13
North Dakota-Western	1850	128	14
Central	1700	120	17
Wyoming-Worland	4050	138	8

All sugarbeets are produced under irrigated conditions.

5.1 Montana

In 1966, beets from seven production areas in three states were being processed at three factories in Montana. The Great Western factory at Billings received beets from the mid-Yellowstone Valley, the Chinook, Townsend, Missoula areas in Montana, and some from extreme north Wyoming. The Holly Sugar Company operated a plant at Hardin, also serving the mid-Yellowstone Valley, and their other plant at Sidney received beets from the extreme lower Yellowstone Valley and from Burleigh, Emmons, Kidder, McLean, Oliver, McKenzie and Williams Counties in North Dakota.

MONTANA--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA FIVE



By 1973, production in the Chinook and Missoula areas had almost completely ceased, the Townsend region produced less than 2,000 acres and the Hardin factory had closed. Increases in the rail rates were a major factor in discouraging production in the outlying areas, coupled with a steady increase in the profitability of alternate enterprises, such as wheat growing and stock raising.

The Holly plant at Hardin closed at the end of the 1970 season. The plant had been processing beets from an uneconomically small acreage for some time. Among the factors contributing to the closing were (a) the failure of the local growers to increase beet acreage despite warnings from the company of possible closure, and (b) the abortion of a planned irrigation project. Some growers in the area transferred their contracts with Holly to the Sidney plant, others negotiated new contracts with Great Western at Billings and tbe remainder ceased beet production altogether, typically transferring to corn production under the Federal feed grain program (see Tables 5.3 and 5.5).

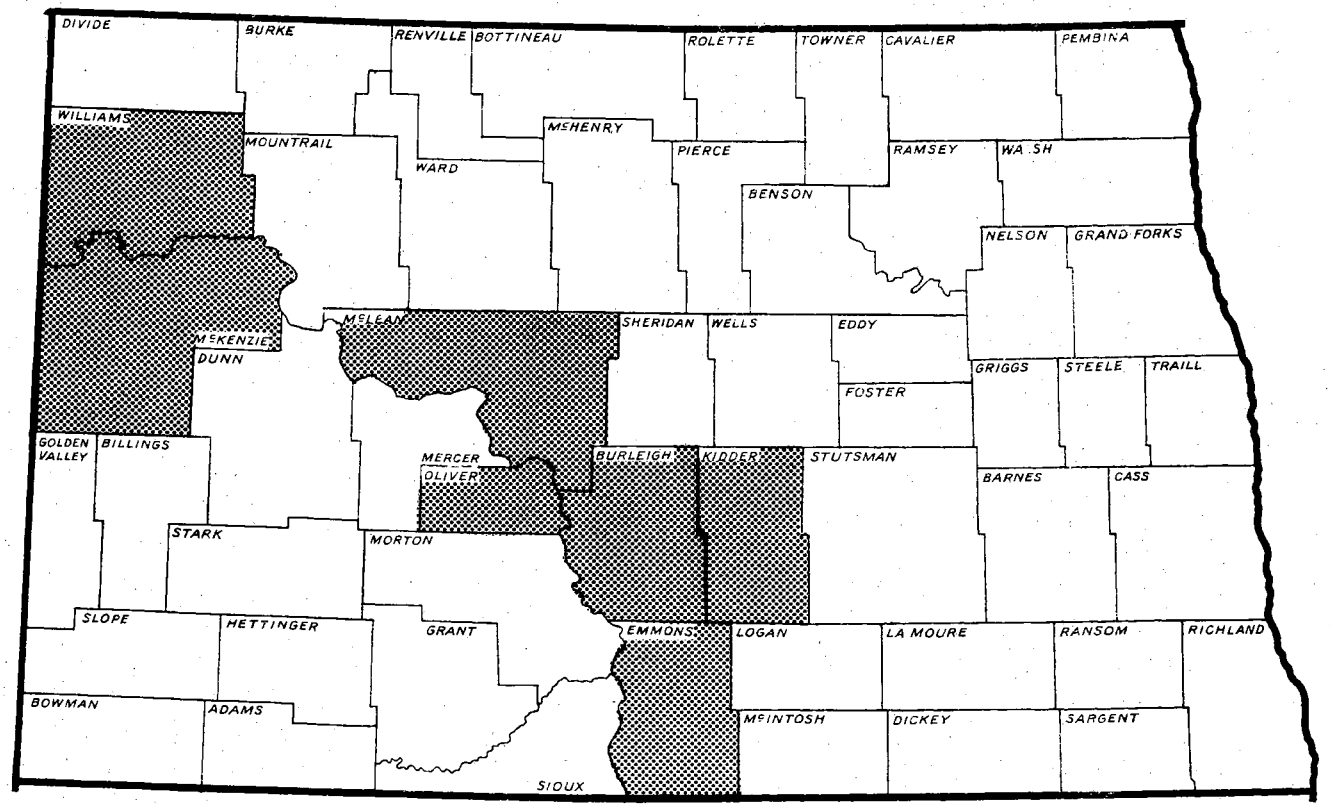
The future level of beet production in Montana depends on the fates of the Billings and Sidney factories. Although there are enormous acreages of potential sugarbeet land in the state, there seems to be no enthusiasm for bringing new areas into production. If rail rates for beets continue to rise, transportation costs to the existing factories from outlying areas will be prohibitive. Because of the long distances to market, most of Montana's exports of various commodities are carried by rail, so there are few haulage contractors in the beet producing areas. To make long hauls economically viable, large trucks would be required and local farmers would have little use for such vehicles during the remainder of the year.

Montana farmers are considered to be conservative, and few outside the present factory catchment area regard the $13 million beet crop as significant in relation to the $400 million and $800 million generated annually by dryland wheat and stock raising, respectively (Table 5.5). Thus, although there are no land or water constraints on beet production, in many areas of the state there seems to be no chance of motivating producers to participate to produce the 30,000 acres necessary to support a new factory.

The Billings factory is expected to continue production for some time to come, although some investment in updating plant facilities may be required. Despite the closure of the Hardin plant, enough acreage and tonnage is expected to be available from the mid-Yellowstone Valley and northern Wyoming to operate the Billings plant economically.

The future of the Holly plant at Sidney is less certain. A sizable proportion of beets in the catchment area are grown at some distance from the plant, making transportation costs high, and Holly is reputed to be having difficulty in attracting a satisfactory acreage to the plant. A repeat of the Hardin closure might occur if local growers do not choose to heed the warnings from Holly and fail to increase production.

NORTH DAKOTA--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA FIVE



5.2 North Dakota-Western

Production in McKenzie and Williams Counties in western North Dakota has varied between 7,000 and 10,000 acres annually since 1963 (Graph 5.2). All sugarbeets produced in this region are grown under irrigation and are processed just across the Montana border at Sidney. The average yield of around 16 tons per acre is generally 3 tons higher than that achieved further east in the Red River Valley, where irrigation is not used. With the exception of a difficult harvest in 1971, some 99 percent of the crop is usually harvested successfully (Table 5.4), and this low risk element has made sugarbeets an attractive crop on the better land in the area. Small grains, hay, flax and corn silage have been the major competing crops in the region, but the northerly location and short growing season reduces yields somewhat. Sugarbeets were not considered to be at such a price disadvantage relative to competing crops that established growers might cease production. Low yields from feed grains and long distances to market have discouraged the introduction of feedlots into the area, although there are many stock farms.

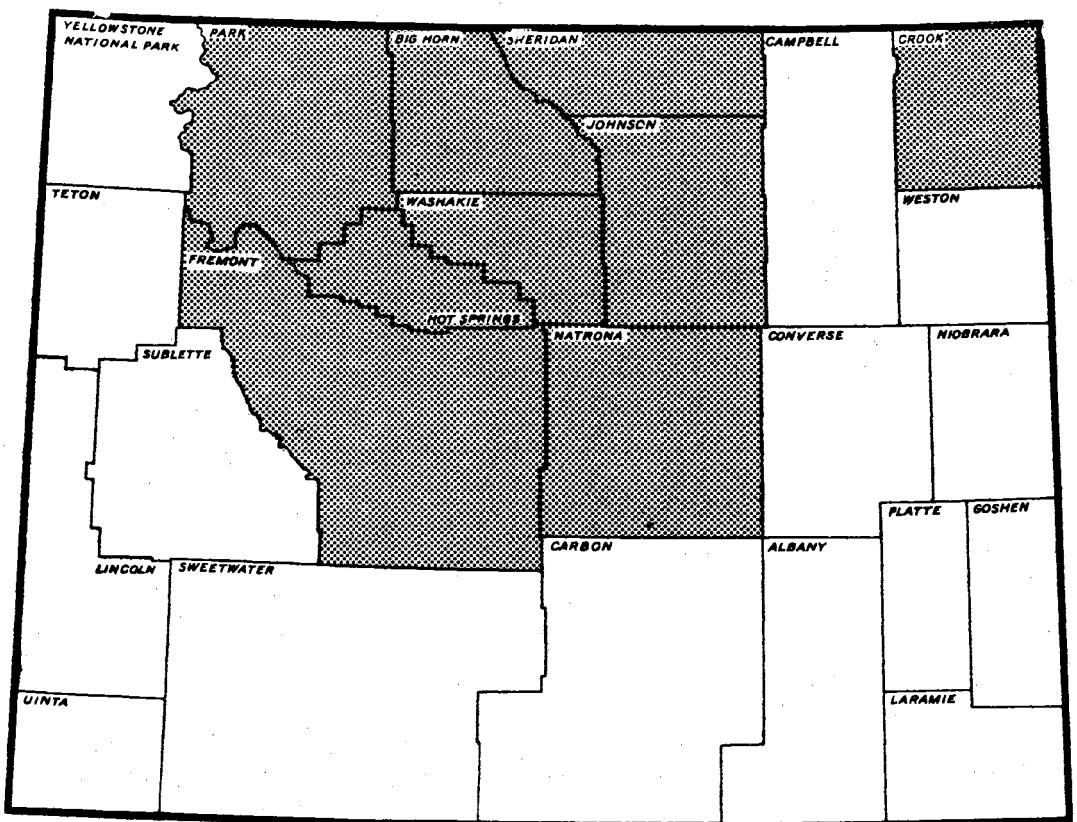
The presence of many livestock farmers is the raison d' etre of a small area of production in central North Dakota--some 500 to 1,000 acres are grown annually in Burleigh, McLean and Oliver Counties. Livestock farmers in this region are prepared to accept the high freight cost of shipping the sugarbeets to Sidney, Montana, in return for the stock feed value of the sugarbeet tops.

An area of east central North Dakota, stretching from Minot to Jamestown, is expected to come under irrigation from the Garrison Dam project in the early 1980's, and while it is conceivable that a new processing plant will be built in this area, it is considered highly unlikely that production would be able to start before 1985.

5.3 Wyoming-North Central

Sugarbeet production in north central Wyoming is affected by the same factors mentioned when discussing Area Three. Restrictions on availability of land suitable for high value cash crops, low yields of feed grains, few feedlots, the stock feed value of sugarbeet tops and the importance of the factories to the local economy all tend to keep the industry in the area. The planted acreage maintained a fairly steady level until a drop in 1972 (Graph 5.2), and there has been competition among farmers to accept contracts offered by the factories at Lovell and Worland. Yield per acre (Graphs 4.1 and 5.1) does not show such violent year-to-year oscillations as occur in southeast Wyoming. The 5-year average figures are very close at 17.98 tons per acre in the southeast and 18.14 tons per acre in the north despite a slightly shorter growing season.

WYOMING--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA FIVE



It is far from easy to state which areas supply which factories. Beets from the Riverton area used to be shipped down to Torrington, but the area has almost completely ceased production recently owing to increased freight costs. A few Holly growers transferred to Worland. The closure of Holly's plant at Hardin, Montana, caused a few Montana growers to ship to Worland, Wyoming, and Great Western may send some beets to Billings, Montana, or Lovell, Wyoming, to optimize factory inputs.

The only reason for production levels to drop significantly in Wyoming would be a sustained and severe reduction in the price competitiveness of the crop, which does not appear probably at present. However, there has been little serious talk of expanding production in the region.

Summary and Projections

The data indicating comparatively low returns from Wyoming sugarbeets (Table 5.3) are somewhat misleading, since the cost figures include the costs of feeding the beet tops, but the price figures do not include the feed value of the tops (note discussion in the summary section of Area Six). The Sidney and Billings areas have lower variable costs than the ASCS area average (Table 5.1), but include high machinery fixed costs, whereas the practice of custom hiring in the Hamilton region raises variable and total costs above the area average. However, only about 500 acres are in production in the Hamilton region at present, so the unwillingness of growers to purchase their own machinery is understandable. Table 5.3 demonstrates that corn, beans, potatoes and peas were competitive with sugarbeets in 1972. The 1973 price increases also made alfalfa and the small grains attractive alternatives. Cost data were not available for dryland wheat production in Montana or Wyoming.

Graphs 5.1 a) and b) show wide yield fluctuations from year-to-year in most regions, but yields have generally been increasing since 1965. The trend in acreage planted (Graph 5.2) has been fairly steady in the smaller regions: the closure of the Hardin plant reduced planted acreage in the north Wyoming and Billins/Hardin areas and did not appear to significantly increase the Sidney acreage.

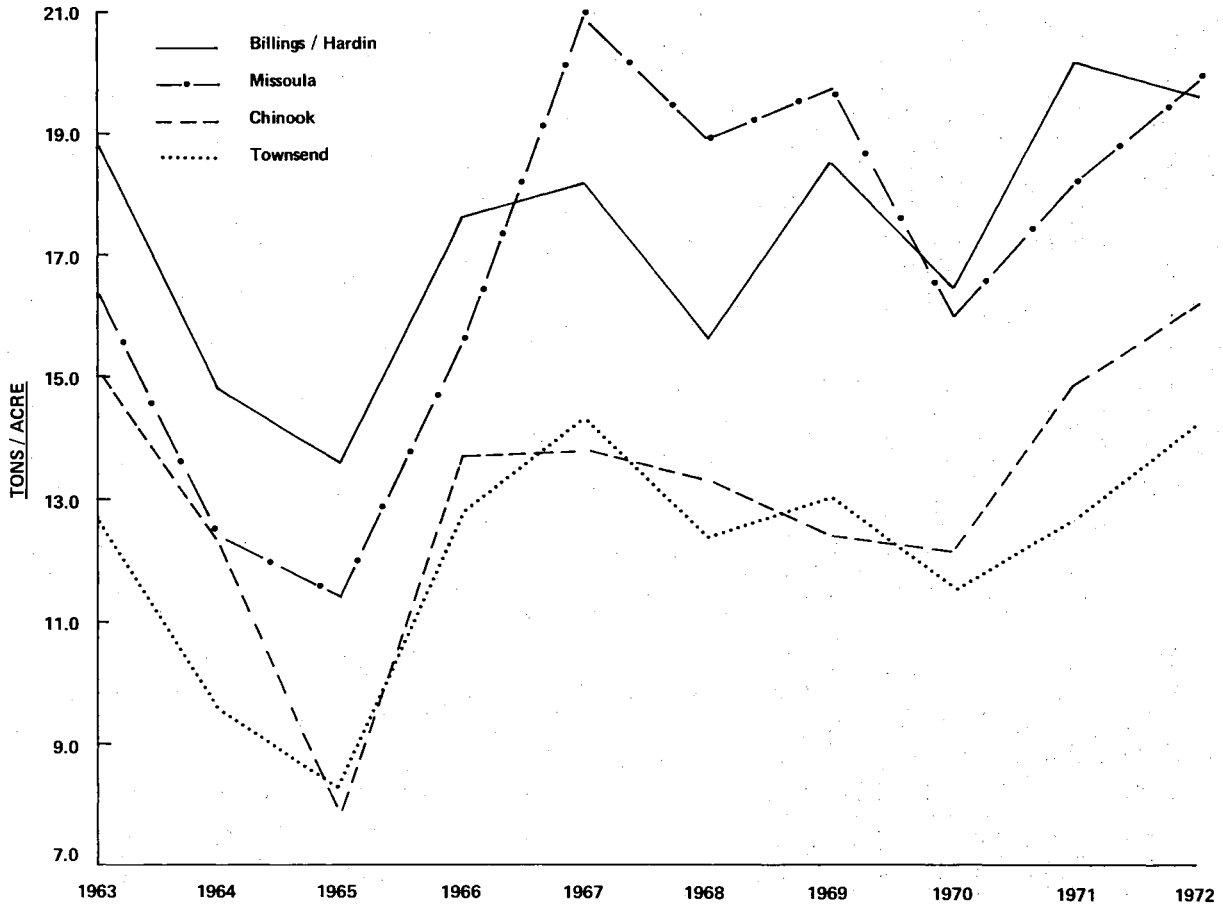
Table 5.5 demonstrates that sugarbeets do not occupy a large proportion of the planted acreage in any of the regions especially in comparison with wheat, barley and alfalfa. But it must be remembered that irrigated land suitable for beets accounts for a fairly small proportion of the land surface in the area.

Overall, the level of production in Area Five is not expected to change significantly in the near future, although a slight decrease may be expected if the prices of competing crops remains consistently more attractive than in the past. Some reductions in production in the outlying areas have resulted in a greater percentage of beets being produced close to the factory, thus tending to stabilize production

by reducing freight costs. The closure of the Hardin factory has allowed both Billings and Sidney to contract for nearly optimal acreages.

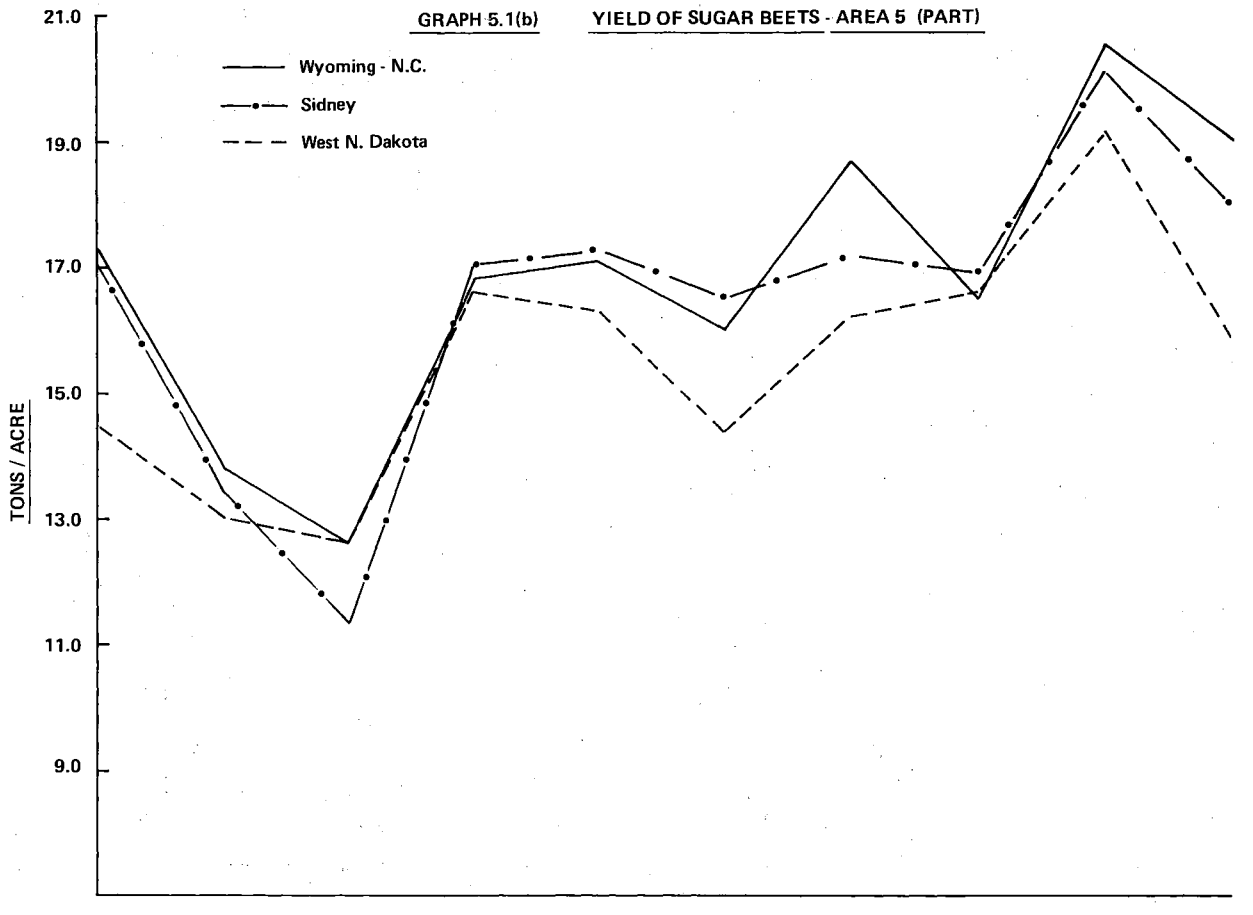
Although the unspectacular yields from competing crops and the competition for irrigated land are unlikely to cause growers already established in beet production to reduce their acreage, there is a faint possibility of the Billings and Sidney plants closing. Although Great Western now appears to be a viable organization, a cessation of production may be considered a possibility. It has also been suggested that Holly Sugar is unsatisfied with the number of acres contracted to its Sidney plant, and a closure similar to that at Hardin may occur, although this is not expected for the next few years. Expansion of acreage beyond present levels would require significant reconstruction of the existing factories, or construction of a new facility. However, very little enthusiasm for such expansion is apparent.

GRAPH 5.1 (a) YIELD OF SUGARBEETS - AREA 5 (PART)



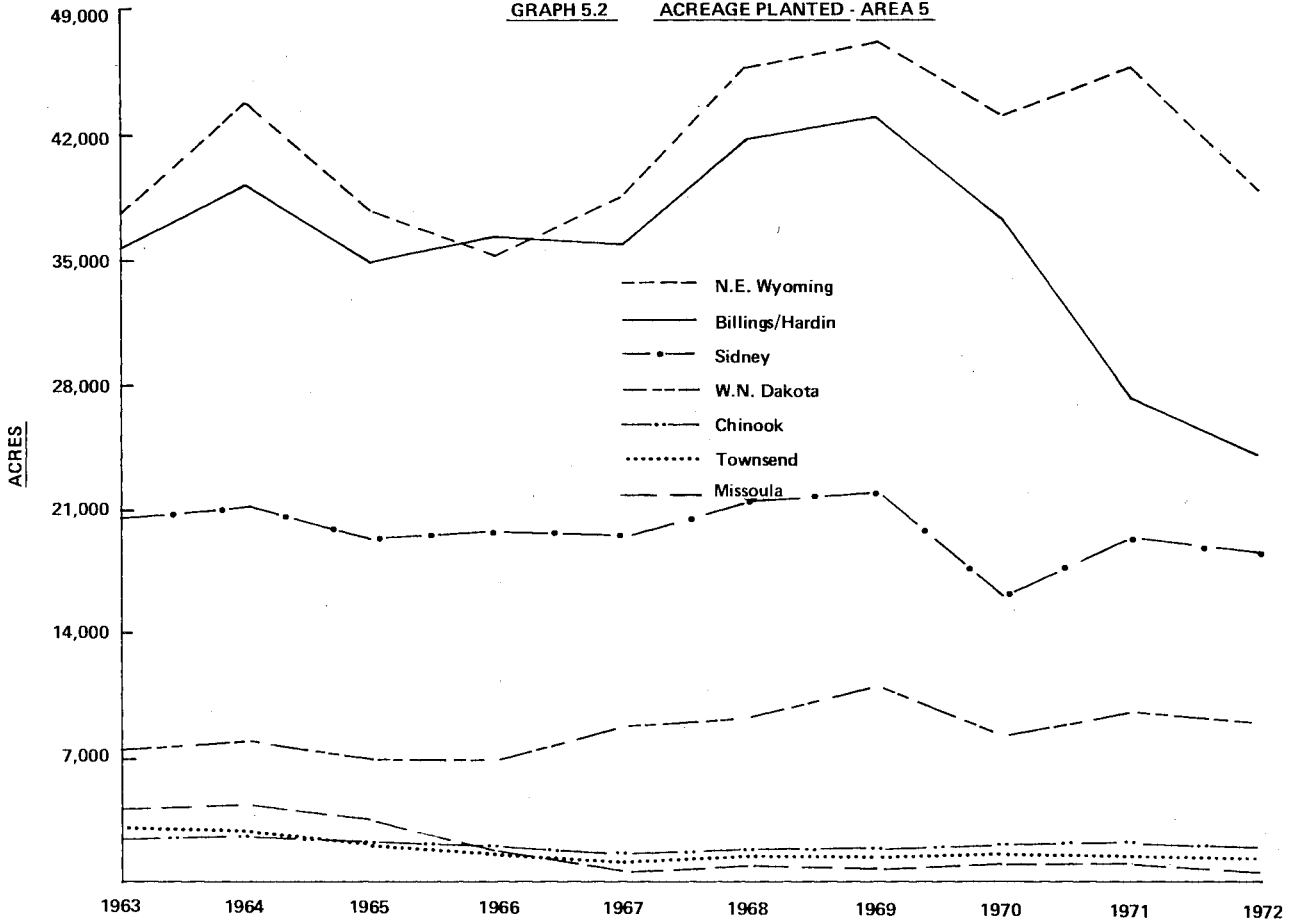
Source: Table 5.4

GRAPH 5.1(b) YIELD OF SUGAR BEETS - AREA 5 (PART)



Source: Table 5.4

GRAPH 5.2 ACREAGE PLANTED - AREA 5



Source: Table 5.4

TABLE 5.1

1972 PER ACRE COST DATA FOR SUGARBEETS
(dollars)

	STUDY DATA					
	Montana-Hamilton	Montana-Billings	Montana-Sidney	Wyoming-North Central	ASCS Area 5	ASCS Data-Area 5 (1972 Cost Study)
Labor-own	32.40	22.09	26.65	48.64	55.31	62.59[1]
-custom and hand	33.55	12.29	25.30	45.54	46.61	35.57
Machine operations						
-own	27.22	29.33	21.00	38.13	26.16	28.35
-custom	49.21	3.76	6.22	4.57	3.87	2.43
Seed	5.30	6.05	4.64	5.31	5.24	7.28
Fertilizer	15.32	26.91	23.85	26.03	33.30	33.91
Chemicals	21.87	11.07	5.86	13.27	5.18	7.15
Water operating costs	7.24	5.29	7.04	7.66	5.02	7.56
Miscellaneous	12.44	10.49	9.65	3.04	9.18	14.57
Interest on operating capital	7.94	4.12	4.83	8.12	7.96	8.63
Total variable costs	212.49	132.30	135.04	200.31	197.83	208.04
Interest on land	37.42	27.12	30.24	24.65	36.80	38.87[2]
Interest on machinery investment	13.40	25.95	19.60	14.58	12.91	7.30
Machinery depreciation	29.74	57.60	43.48	28.68	28.65	34.38
Taxes and insurance	11.90	23.85	17.40	10.76	11.67	11.55
Water fixed costs	10.89	2.42	9.61	43.25	. . .	
Total fixed costs	103.35	136.94	120.33	121.92	90.03	92.10
Total all costs	315.84	269.24	255.37	322.23	287.86	300.14
5 year average yield (tons/acre)	18.52	18.04	17.74	18.14	17.65	17.68
5 year average sugar content	16.26	16.26	15.93	16.43	16.25	16.08
Sugar yield (tons/acre)	3.01	2.93	2.83	2.98	2.87	2.14
Cost per ton of sugar	104.93	91.89	90.24	108.13	100.30	140.25

Sources: References 98,101-104, 143,20, Table 5.4, Statistical Background (2)

[1] Includes farm maintenance labor.

[2] Paid and imputed interest on land and net rent.

TABLE 5.2

1972 PER ACRE COST AND YIELD DATA FOR SELECTED COMPETING CROPS

Crop	Variable Costs	Fixed Costs	Total Costs	Yield
State: MONTANA, Region: Hamilton				
Barley-irr.	55.17	86.60	141.77	80 bushels
Alfalfa-established irr.	59.46	86.31	145.77	. . .
Alfalfa produce irr.	35.30	83.23	118.53	5 tons
Pasture-irr.	36.88	89.84	89.84	10 aum.
Sugarbeets	212.49	103.35	315.84	18.52 tons
Region: Billings				
Alfalfa-irr.	34.05	52.03	86.08	4 tons
Barley, feed irr.	47.11	53.92	101.03	75 bushels
Barley, malting irr.	54.32	53.47	107.79	75 bushels
Beans, dry-irr.	54.16	67.82	121.98	25 cwt.
Corn-irr.	66.94	49.54	116.48	120 bushels
Corn silage-irr.	74.04	91.14	165.18	25 tons
Pasture-irr.	29.89	40.54	70.41	12 aum.
Peas, canning-irr.	56.17	113.13	169.30	2 tons
Sugarbeets-irr.	132.30	136.94	269.24	18.04 tons
Region: Sidney				
Barley-irr.	28.06	57.31	85.37	70 bushels
Corn-irr.	68.54	62.44	130.98	110 bushels
Corn silage-irr.	56.62	80.52	137.14	18 tons
Alfalfa-irr.	33.38	63.12	96.50	3.5 tons
Sugarbeets-irr.	135.04	120.33	255.37	17.74 tons
State: WYOMING, Region: North Central				
Alfalfa-irr.	44.97	37.71	82.68	3.9 tons
Barley-malting irr.	37.36	37.11	74.47	75 bushels
Field beans, irr.	90.86	45.57	136.43	18.6 cwt.
Corn-irr.	55.91	37.59	93.50	114.5 bushels
Corn silage-irr.	72.42	38.06	110.48	20.8 tons
Oats-irr.	49.52	39.46	88.98	75 bushels
Potatoes-irr.	232.62	55.10	287.72	150 cwt.
Sugarbeets-irr.	200.31	121.92	322.23	18.14 tons

Sources: References 98,100-104, 141-143, Table 5.1

TABLE 5.3

1972 AND ESTIMATED 1973 PER ACRE NET RETURNS FOR SELECTED COMPETING CROPS

Crop	1972 Total Costs	1972 Price**	1972 Net Returns	1973 Total Costs*	1973 Price**	1973 Net Returns
State: MONTANA, Region: Hamilton						
Barley-irr.	141.77	1.45	(25.77)	151.69	2.25	28.31
Alfalfa established-irr.	145.77	. . .	. . .	155.97	. . .	. . .
Alfalfa produce-irr.	118.53	32.00	41.47	126.83	56.00	153.17
Pasture-irr.	89.84	. . .	. . .	96.13	. . .	. . .
Sugarbeets-irr.	315.84	19.81	51.04	337.95	N/A	. . .
Region: Billings						
Alfalfa-irr.	86.08	32.00	41.92	92.11	56.00	131.89
Feed Barley-irr.	101.03	1.45	7.72	108.10	2.25	60.65
Malting barley-irr.	107.79	1.45	0.96	115.34	2.25	53.41
Dry beans-irr.	121.98	8.40	88.02	130.52	19.00	344.48
Corn for grain-irr.	116.48	2.83	223.12	124.63	4.23	382.97
Corn silage-irr.	165.18	. . .	. . .	176.74	. . .	. . .
Pasture-irr.	70.41	. . .	. . .	75.34	. . .	. . .
Canning peas-irr.	169.30	119.00	68.70	181.15	121.00	60.85
Sugarbeets-irr.	269.24	19.81	88.13	288.09	N/A	. . .
Region: Sidney						
Barley-irr.	85.37	1.45	16.13	91.35	2.25	66.15
Corn for grain-irr.	130.98	2.83	180.32	140.15	4.23	325.15
Corn silage-irr.	137.14	. . .	. . .	146.74	. . .	. . .
Alfalfa-irr.	96.50	32.00	15.50	103.26	56.00	92.74
Sugarbeets-irr.	255.37	19.81	96.06	273.25	N/A	. . .
State: WYOMING, Region: North Central						
Alfalfa-irr.	82.68	32.50	44.07	88.47	44.00	83.13
Malting barley-irr.	74.47	1.23	17.78	79.68	2.13	80.07
Field beans-irr.	136.43	9.10	32.83	145.98	22.00	263.22
Corn for grain-irr.	93.50	1.94	128.63	100.05	3.01	244.60
Corn silage-irr.	110.48	. . .	. . .	118.21	. . .	. . .
Oats-irr.	88.98	0.83	(26.73)	95.21	1.30	2.29
Potatoes-irr.	287.72	2.85	139.78	307.86	3.25	179.64
Sugarbeets-irr.	322.23	20.16	43.47	344.79	N/A	. . .

*Assumed as 107 percent of 1972 total costs
**Includes government payments, if any.

Sources: Table 5.2, References 18,97,140

TABLE 5.4

SUGARBEET PRODUCTION

Year	Number of Farms	Acres Per Farm	Acres Planted	Acres Harvested	Percent Acres Harvested	Yield (tons/acre)	Tons Marketed
MONTANA: Missoula							
1963	63	65.7	4139	4113	99	16.4	67630
1964	64	68.0	4354	4254	98	12.4	52545
1965	51	68.3	3481	3328	96	11.4	37795
1966	31	52.7	1633	1073	66	15.5	16598
1967	10	51.1	511	482	94	20.9	10064
1968	12	61.1	733	645	88	18.9	12167
1969	11	62.0	682	667	98	19.7	13152
1970	12	63.4	761	761	100	16.0	12146
1971	10	74.5	745	745	100	18.2	13547
1972	7	65.1	456	456	100	19.8	9023
1973	7	53.6	375	375	100	20.4	7630
MONTANA: Townsend							
1963	24	98.7	2368	2116	89	12.7	26786
1964	24	107.1	2571	2365	92	9.6	22700
1965	18	127.0	2286	2010	88	8.3	16563
1966	14	123.4	1728	1474	85	12.8	18818
1967	11	127.5	1402	1402	100	14.3	20010
1968	13	143.3	1863	1824	98	12.4	22519
1969	13	141.1	1834	1818	99	13.0	23539
1970	13	161.9	2105	2079	99	11.5	23885
1971	13	159.0	2067	2023	98	12.7	25676
1972	12	176.8	2121	1944	92	14.2	27545
1973	11	182.6	2009	1573	78	15.1	23790
MONTANA: Billings/Hardin							
1963	670	53.2	35616	35582	100	18.8	668525
1964	683	57.4	39217	38972	99	14.8	577320
1965	586	59.3	34735	34023	98	13.6	461837
1966	570	63.5	36216	35121	97	17.6	617972
1967	565	63.6	35941	34746	98	18.2	631598
1968	573	72.7	41644	40708	98	15.6	636386
1969	552	77.8	42939	42366	99	18.5	784614
1970	511	73.2	34381	36795	98	16.4	604509
1971	368	73.6	27099	26613	98	20.1	534511
1972	332	72.2	23971	23781	99	19.6	466863
1973	314	73.6	23116	22671	98	19.8	449090

Table 5.4 (Continued)

Year	Number of Farms	Acres Per Farm	Acres Planted	Acres Harvested	Percent Acres Harvested	Yield (tons/acre)	Tons Marketed
MONTANA:	Sidney						
1963	333	61.7	20540	20423	99	17.1	348269
1964	336	63.3	21272	21170	100	13.4	284424
1965	314	61.4	19274	19104	99	11.3	215228
1966	290	68.2	19774	19639	99	17.0	332909
1967	276	70.6	19489	19049	98	17.3	329483
1968	274	78.1	21410	21043	98	16.5	346851
1969	267	82.4	21991	21391	97	17.2	368152
1970	243	65.6	19529	15600	98	16.9	263711
1971	238	80.8	19224	16201	84	20.1	325697
1972	237	77.2	18293	18067	99	18.0	324261
1973	226	86.3	19509	19475	100	20.3	395467
MONTANA:	Chinook						
1963	65	47.7	3097	3097	100	15.1	46759
1964	62	47.4	2937	2893	99	12.3	35511
1965	40	51.6	2065	1901	92	7.8	14787
1966	29	50.7	1469	1315	90	13.7	18003
1967	30	36.5	1096	1073	98	13.8	14815
1968	32	41.4	1324	1324	100	13.3	17611
1969	28	47.2	1321	1282	97	12.4	15924
1970	22	63.6	1398	1398	100	12.1	16865
1971	20	64.0	1280	1214	95	14.8	17945
1972	16	67.7	1083	1081	100	16.1	17420
1973	12	62.8	754	754	100	17.5	13228
WYOMING:	North Central						
1963	569	66.1	37586	37561	100	17.3	651087
1964	597	73.5	43848	43667	100	13.8	601383
1965	521	72.5	37779	37487	99	12.6	472879
1966	462	76.2	35212	33998	97	16.8	570093
1967	451	85.1	38400	36844	96	17.1	630665
1968	466	98.1	45705	44736	98	16.0	715718
1969	452	104.3	47132	46746	99	18.7	873786
1970	413	104.1	42981	42807	100	16.5	707329
1971	384	118.8	45613	44684	98	20.5	916997
1972	346	111.7	38635	38604	100	19.0	732941
1973	310	120.8	37456	37428	100	18.1	677891

Table 5.4 (Continued)

Year	Number of Farms	Acres Per Farm	Acres Planted	Acres Harvested	Percent Acres Harvested	Yield (tons/acre)	Tons Marketed
NORTH DAKOTA: Western							
1963	103	72.6	7475	7475	100	14.5	108090
1964	109	72.0	7843	7782	99	13.0	100987
1965	114	60.5	6901	6877	100	12.6	85680
1966	99	69.9	6920	6904	100	16.6	114390
1967	103	83.9	8645	8533	99	16.3	138777
1968	98	93.4	9155	9113	100	14.4	131620
1969	106	103.6	10976	10847	99	16.2	175586
1970	96	85.0	8162	8150	100	16.6	135090
1971	96	99.6	9561	7940	83	19.1	151321
1972	89	101.1	8999	8999	100	15.9	142987
1973	89	111.6	9933	9891	100	20.7	204523

Sources: Reference 22 (Appendix One), Statistical Background (1)

TABLE 5.5

1972 HARVESTED ACREAGES OF COMPETING CROPS
IN SUGARBEET COUNTIES

	Montana Missoula	Montana Townsend	Montana Billings/Harden	Montana Sidney	Montana Chinook	Wyoming North Central	North Dakota Western
Alfalfa Hay	69,200*	39,600*	165,000*	45,700*	65,700*	260,600	305,000
Barley	16,500	17,200	84,400	76,900	110,500	26,250	160,000
Dry Edible Beans	. . .	. . .	6,400*	4,600*	. . .	13,300	N/A
Corn Grain	. . .	. . .	4,400	1,500	. . .	9,300	3,800
Corn Silage	1,900	400	29,600	19,800	3,900	21,600	53,700
Flax	. . .	. . .	. . .	1,100*	200*	. . .	104,300
Oats	3,800*	4,600*	25,300*	37,100*	12,800*	23,500	304,000
Pasture	66,200*	25,100*	72,900*	83,700*	67,100*	. . .	427,000
Potatoes	3,170*	490*	130*	250*	. . .	. . .	. . .
Rye	100*	. . .	100*	100*	700*	. . .	11,700
Wheat-Spring	2,300	15,300	9,300	61,300	106,000	4,650	769,500
Winter Wheat	12,000	17,500	206,200	181,000	67,000	15,000	12,100
Durem	100	100	500	2,400	200	. . .	255,500
Sugarbeets	456	1,944	23,781	18,067	1,081	38,604	8,999

*1971 Data
Sources: References 97, 113,140

STATISTICAL BACKGROUND

(1) The areas chosen include the following counties:

MONTANA--Missoula--Lake, Missoula, Ravalli.

Townsend--Broadwater, Lewis and Clark.

Billings/Hardin--Stillwater, Carbon, Yellowstone, Big Horn, Treasure, Rosebud.

Sidney--Richland, Dawson, Prairie, Custer

Chinook--Blaine, Phillips.

NORTH DAKOTA--Western--Burleigh, Emmons, Kidder, McLean, Oliver, McKenzie, Williams.

WYOMING--North Central--Big Horn, Crook, Fremont, Hot Springs, Johnson, Natrona, Park, Sheridan, Washakie.

(2) Sugar Content

Sugar company records state the 5-year average sugar content of the crop to be:

MONTANA	Billings region	16.26%
	Sidney and Western North Dakota	15.93%
WYOMING	Lovell and Worland	16.43%

CHAPTER IX

AREA SIX

Introduction

Sugarbeet production included in ASCS Area Six comes from the whole state of Utah, the Twin Falls area of central Idaho and the Idaho Falls area in eastern Idaho. Since two Utah factories (at West Jordan and Lewiston) were closed, only four factories remain in the area. The Amalgamated Sugar Company operates plants at Twin Falls and Paul, Idaho, (usually referred to as Mini-Cassia) and the Utah-Idaho Sugar Company has plants at Idaho Falls, Idaho, and Garland, Utah.

Elevations tend to rise moving eastward, with Twin Falls lying at 3,600, Garland at 4,300, and Idaho Falls at 4,700 feet above sealevel. The growing seasons are respectively 133, 150, and 122 days per year. Annual rainfall varies from 9 inches in Idaho to 16 inches in Utah, and all beets are irrigated with water originating in the melting snows in the surrounding mountains.

Area Descriptions

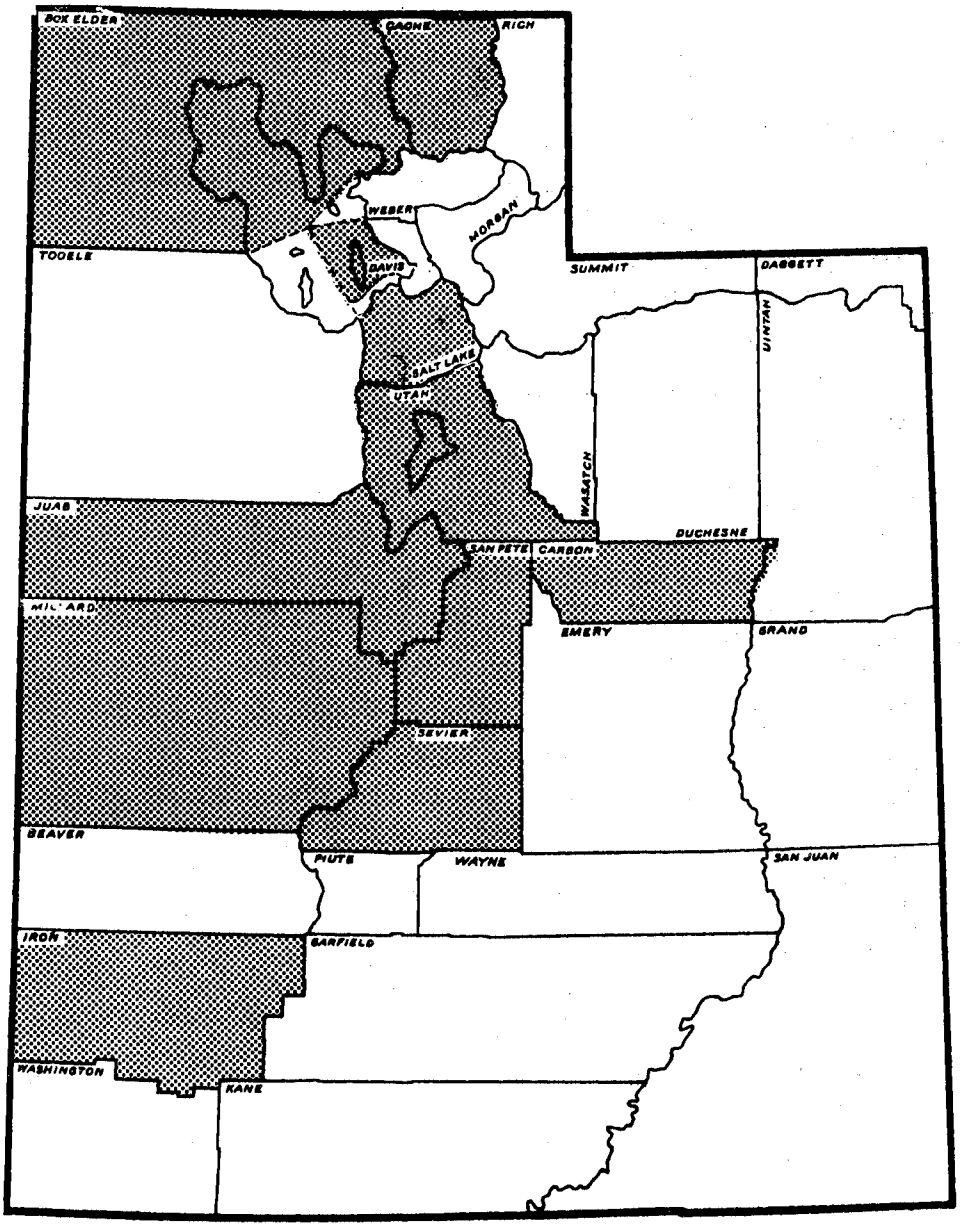
6.1 Utah

Although there were 113,000 acres of sugarbeets and 17 operating factories in Utah in 1921, by 1972 only one factory was still working and planted acreage was reduced to 22,500 (Table 6.4). Production on either side of the Idaho-Utah border may be processed in the neighboring state. In 1972, Amalgamated contracted for 6,500 acres in Utah, to be processed in Idaho, and Utah-Idaho's Garland, Utah, plant contracted for 2,400 acres in Idaho. The picture is further complicated when a company agrees to process part of its competitor's crop.

There are two schools of thought relating to the future of sugarbeet production in Utah. One group argues that closure of the factory is likely, and the other that production will remain at present levels.

Considering the pessimistic view first, the arguments run as follows: (a) Because of the large amount of mountain and desert land in the state, there is little land near Garland suitable for beet production that is not already under cultivation, so an increased price for competing crops will tend to reduce the beet acreage (see Table 6.5). (b) Utah sugarbeet farms tend to be fairly small, preventing economies of scale and raising production costs. (c) Confidence

UTAH--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA SIX



in the beet industry is lacking since past relationships between growers and the Utah-Idaho sugar company have been somewhat less than amiable, and production in the state has been declining for some fifty years. (d) Increasing urbanization has created pressure on the land resource and is tempting farmers and farm workers to leave agriculture or to farm part-time, thus creating a tendency to grow crops that are less trouble to raise than sugarbeets. (e) Overworking of some beet land has led to an increasing problem from nematode attack, which now costs $45/acre to control, although cheaper fumigants are reportedly nearing the production stage. (f) Alternative crops are becoming very competitive since the recent rise in the prices of small grains (see Table 6.3). Drought conditions in south Utah, Idaho or Montana frequently create a demand for hay or silage grown in northern Utah.

The optimistic argument holds that although high freight costs, low yield, and frequently inconvenient weather conditions combined to make production in the center and south of the state uneconomic, statewide average yields per acre have certainly generally risen as these areas closed down and the center of sugarbeet production moved further northward (see Table 6.4). It is further held that the factors of plant obsolescence, urbanization, labor shortage, high freight rates and pollution problems, which all counted towards the closure of the West Jordan and Lewiston plants, apply in a much lesser degree to the Garland plant. Indeed, if sugarbeet production continues in Utah, Garland certainly seems to be a reasonable place to locate the factory, since the factory itself is in satisfactory mechanical condition and the weather is suited to beet production. Sufficient beets can be grown close to the factory to keep freight costs low, and the presence of the factory is important in providing employment for local labor over the winter season.

One other factor may be of considerable importance in considering the future of the Garland plant. Management of the Utah-Idaho Sugar Company is reputed to be made up of essentiall members of the Church of Jesus Christ of Latter-Day Saints. There might well be strong feeling aroused if the company were to announce any intention of closing down the last remaining plant in Utah. Closing down single plants is one matter, but the final extinction of an industry from a state may be somewhat embarassing. As has been noted, when there was a greater grower demand to produce beets in Utah, the company was not noted for making strong attempts to establish amicable relations with its growers. Recently, however, a significant effort has been made to win grower support, so the company certainly can be said to be making an effort to retain the sugarbeet industry in Utah.

6.2 Idaho-Central and Eastern

Owing to the poor agricultural topography of most of the rest of the state, Idaho sugarbeet production is concentrated in the Snake River Valley. Moving from west to east along the valley, the increasing altitude and shorter growing season provide a continuous spectrum of agricultural practice. West of Boise, sugarbeet yields average over 22 tons per acre (see ASCS Area Seven), and yields in Twin Falls County, Cassia County and the Idaho Falls area are respectively 21.1, 16.3 and 15.0 tons per acre. A wide variety of crops are grown in the west, but the shorter growing season in the east, restricts competitive crops to alfalfa, potatoes and grain (Table 6.5).

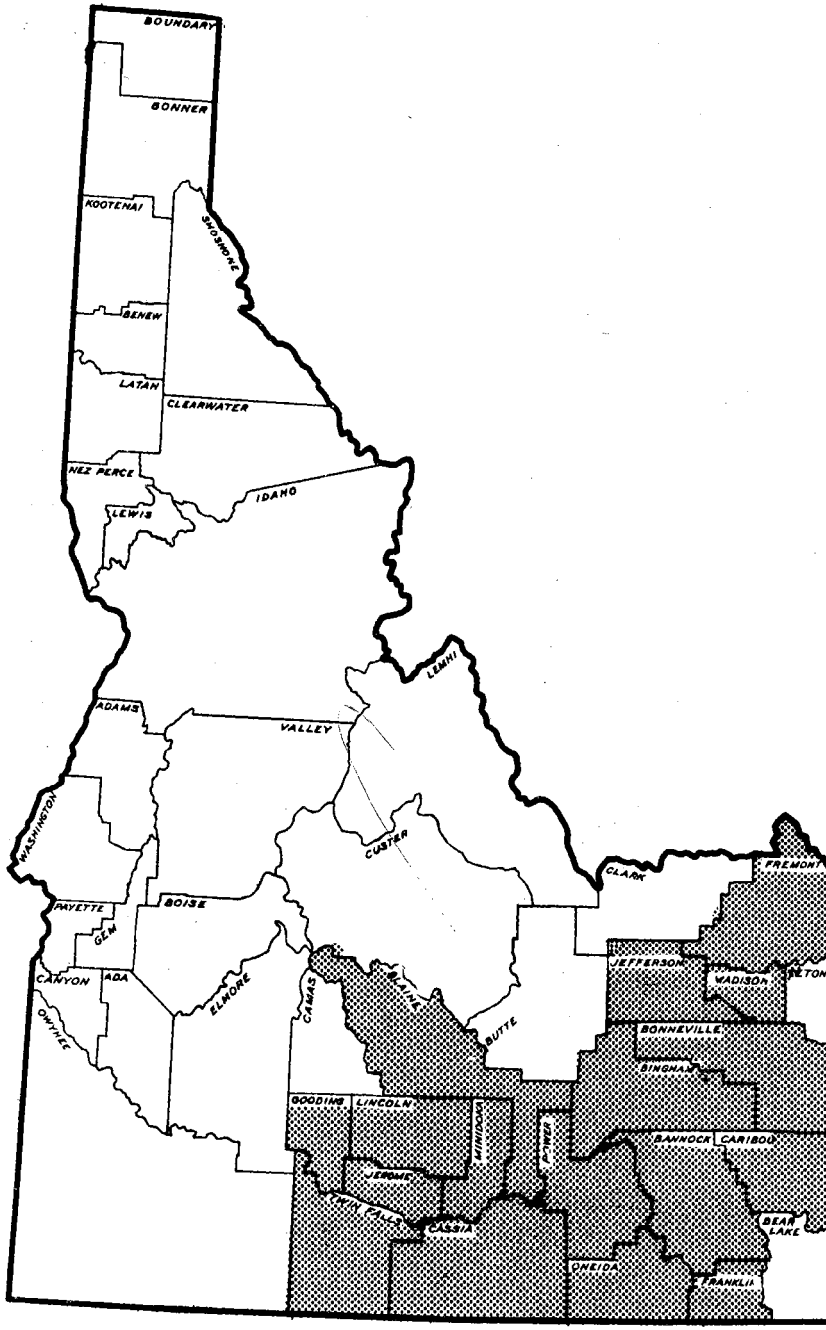
The three Idaho factories included in Area Six are the Amalgamated plants at Twin Falls and Mini-Cassia (Paul), and the Utah-Idaho plant at Idaho Falls. Thick juice tanks are installed at Twin Falls and Idaho Falls. Growers in both areas admitted to some friction between themselves and the sugar companies in the past, but acknowledged that their relationship is improving.

In the eastern area around Idaho Falls, potatoes and sugarbeets were traditionally the high valued crops prior to 1972. Growers preferred to grow both to spread the risk factor caused by the wide fluctuations in potato prices, but smaller farmers often were only able to afford the specialized equipment to produce one of the two crops. The expectation of continued improved returns from grains and hay since 1972 has caused a swing away from sugarbeets as an insurance crop against potato price failure (Table 6.3). Another factor operating against beet production in the region is the increase in urbanization. Idaho Falls is an attractive city to which many people are retiring, and farmers within 20 miles of the city are reaching a position where they can afford to farm less acreage and sell off land for development instead. To offset this trend, more distant land comes under irrigation each year, so the total agricultural land available stays relatively constant. However, freight charges for sugarbeets increase as average farm- to-factory distance increases.

Sugarbeet production is not as popular in the area as it was ten years ago, but the Idaho Falls factory is not expected to close in the near future. The Utah-Idaho Sugar Company owns a considerable acreage in the region, and local feeling is strong that the company would be greatly loath to close its last plant in Idaho, to the extent that unprofitable operations might be continued for up to five years. Also, sugarbeet tops are valued in this region as a livestock feed.

Further west, in the Twin Falls/Mini-Cassia region, the growing season increases to the extent that corn and beans are frequently included in a rotation (Table 6.5). Although growers have more high-valued crop alternative than are

IDAHO--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA SIX



available further east (see Tables 6.3 and 6.5), the yield per acre of sugarbeets rises going west (to about 21 tons per acre around Twin Falls) keeps sugarbeets competitive. Urbanization pressures on land are strong in this region also, but increasing areas are coming under irrigation in Minidoka and Elwyhee Counties. Idaho includes some desert land, and it is the edges of these regions that are being brought under irrigation. Ample water is available since apart from the Snake River a large underground aquifer exists, fed by the Lost Rivers which go underground in the lava beds west of Idaho Falls and reappear west of Twin Falls, at Hagerman.

Summary and Projections

As is the case with Wyoming, the cost and returns data for Idaho Falls area (Tables 6.1-6.3) show the increase in costs due to the operations necessary to feed the beet tops, but do not include the returns from the feed value of the tops. The University of Nebraska Experiment Station at Scottsbluff considers that 1,000 pounds of edible beet top silage can be produced per ton of beets harvested, equivalent in feeding value to corn silage produced from 100 bushel-an acre corn. Thus, at $10 per ton, an extra $75 per acre should be added to the returns of those many farmers in the Idaho Falls region who feed beet tops. Higher than average yields at Twin Falls and lower than average costs in Utah reduce both regions costs per ton of sugar below the ASCS area average (Table 6.1).

At 1972 price levels, corn and onions appeared competitive in Utah, and potatoes, beans and irrigated wheat in Idaho, but the increase in price levels in 1973 shown in Table 6.3 makes alfalfa and barley also competitive. Sugarbeets seem to have maintained a better position in Utah.

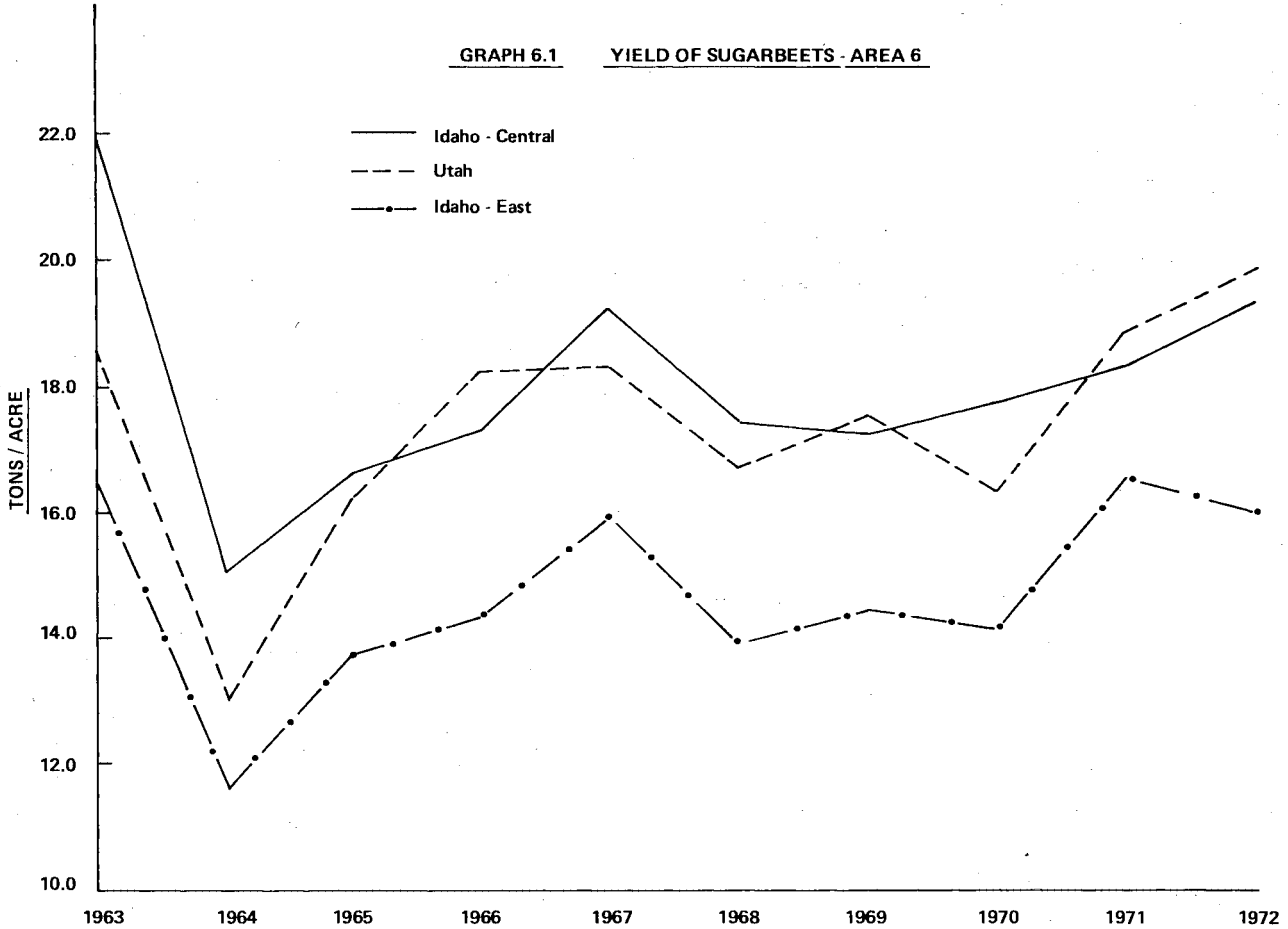
Graph 6.1 shows few wild fluctuations in yield per acre, except in 1964, and comparing Graphs 6.1 and 6.2 suggests that the lower the acreage, the higher the yield in Utah and Idaho Falls. This effect would seem to be common in the U.S. sugarbeet industry in that growers with lower yields tend to drop out, raising the overall yield average. The yield levels for the Central Idaho region are fairly constant, but the wide planted acreage fluctuations are held to be due to the variations in the relative prices of competing crops.

Despite certain adverse circumstances, the level of sugarbeet production in ASCS Area Six is not expected to alter significantly in the near future, although there will probably be local geographic shifts in production location. Taking the gloomiest view, if the returns from alternative crops were to exceed those from sugarbeets significantly and consistently, then the Garland, Utah, and Twin Falls plants might be expected to close. Amalgamated should still be able to contract for enough beets in central Idaho to keep the more up-to-date plant at Mini-Cassia working, and Utah-Idaho has a stronger operation in Idaho than in Utah (closure of

both plants would leave the Utah-Idaho Sugar Company in the ironical position of only owning plants in Washington State).

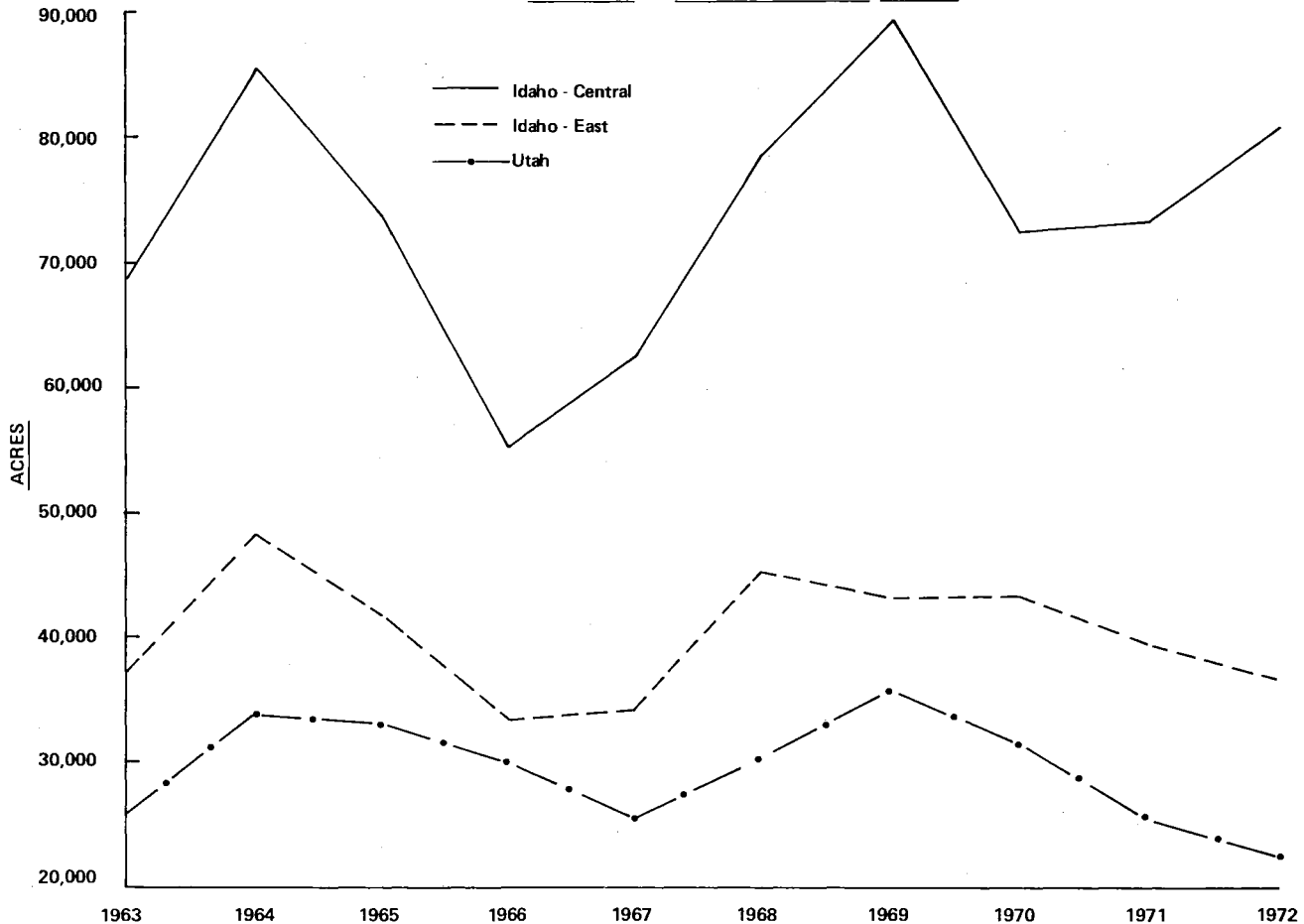
Even if the return from sugarbeets become more attractive than at present, there seems little likelihood of a new plant being constructed in the area, although the capacity of the four factories could be expanded to accept production from some 15,000 additional acres. Should the competitive position of sugarbeet production revert to a pre-1972 level, then little change in production is expected. As new land comes into production, urbanization consumes the old, especially in Idaho. Despite the optimism of the sugar company and local growers, the closure of the Garland, Utah, plant remains a possibility, especially as the age of the plant increases.

GRAPH 6.1 YIELD OF SUGARBEETS - AREA 6



Source: Table 6.4

GRAPH 6.2 ACREAGE PLANTED - AREA 6



Source: Table 6.4

TABLE 6.1

1972 PER ACRE COST DATA FOR SUGARBEETS

(dollars)

	STUDY DATA				
	Utah	Idaho-Twin Falls	Idaho-Idaho Falls	ASCS Area 6	ASCS Data-Area 6 (1972 Cost Study)
Labor-own	28.97	16.42	39.94	55.40	62.73[1]
-custom and hand	47.52	38.70	48.33	43.21	32.25
Machine operations-own	44.33	18.41	23.09	20.15	21.87
-custom	13.95	38.10	9.12	13.19	20.05
Seed	3.62	3.69	4.16	4.58	4.46
Fertilizer	19.72	47.70	36.44	34.34	34.65
Chemicals	8.33	9.12	1.82	2.63	8.42
Water operating costs	4.36	2.93	10.09	12.96	28.37
Miscellaneous	8.16	8.40	2.87	14.58	23.92
Interest on operating capital	5.94	7.34	7.65	7.60	8.58
Total variable costs	184.90	190.81	183.51	213.64	245.30
Interest on land	39.33	42.12	33.07	35.90	46.40[2]
Interest on machinery investment	6.53	14.73	18.48	15.80	7.39
Machinery depreciation	13.05	19.88	24.94	27.35	29.93
Taxes and insurance	7.12	10.21	14.92	3.43	10.11
Water fixed costs	4.90	2.86	14.47	. . .	. . .
Total fixed costs	70.93	89.80	105.88	82.48	93.83
Total all costs	255.83	280.61	289.39	296.12	339.13
5 year average yield (tons/acre)	17.78	17.98	14.98	17.08	17.17
5 year average sugar content	15.41	16.02	15.74	15.82	15.88
Sugar yield (tons/acre)	2.74	2.88	2.36	2.70	2.20
Cost per ton of sugar	93.37	97.43	122.62	109.67	154.15

Sources: References 20, 72, 136, Table 6.4, Statistical Background (1)

[1] Includes farm maintenance labor.

[2] Paid and imputed interest on land and net rent.

TABLE 6.2

1972 PER ACRE COST AND YIELD DATA FOR
SELECTED COMPETING CROPS

Crop	Variable Costs	Fixed Costs	Total Costs	Yield
State: UTAH , Region: North				
Alfalfa-irr.	63.40	60.66	124.06	4.3 tons
Barley-irr.	56.89	65.43	122.32	80 bushels
Corn Grain-irr.	89.60	81.63	171.23	133 bushels
Corn Silage-irr.	115.64	74.33	189.97	20 tons
Onions-irr.	445.52	64.52	510.04	350 cwt.
Pasture-irr.	33.12	44.90	78.02	10.6 Aum.
Sorghum Grain-irr.	79.72	54.76	134.48	80 bushels
Sorghum Silage-irr.	118.56	84.52	203.08	25 tons
Sugarbeet Seed-irr.	344.54	69.52	414.06	30 cwt.
sugarbeets-irr.	184.90	70.93	255.83	17.78 tons
State: IDAHO, Region: Southeast				
Alfalfa-irr.	70.50	59.75	130.25	4.2 tons
Barley-irr.	61.63	57.86	119.49	70 bushels
Potatoes-irr.	212.86	45.98	258.84	205 cwt.
Wheat-irr.	63.39	57.86	121.25	74 bushels
Sugarbeets	183.51	105.88	289.39	14.98 tons
Region: South Central				
Alfalfa-irr.	55.80	36.45	92.25	4.8 tons
Field Beans-irr.	65.63	36.45	102.08	17.5 cwt.
Barley-irr.	51.04	36.45	87.49	83 bushels
Potatoes-irr.	196.39	36.45	232.84	215 cwt.
Wheat-irr.	51.04	36.45	87.49	82 bushels
Sugarbeets-irr.	190.81	89.80	280.61	17.98 tons

Sources: References 71, 73, 136, Table 6.1

TABLE 6.3

1972 AND ESTIMATED 1973 PER ACRE NET RETURNS FOR SELECTED COMPETING CROPS

Crop	1972 Total Costs	1972 Price**	1972 Net Returns	1973 Total Costs*	1973 Price*	1973 Net Returns
State: UTAH, Region: North						
Alfalfa-irr.	124.06	35.00	26.44	132.74	39.00	34.96
Barley-irr.	122.32	1.47	(4.72)	130.88	2.36	57.92
Corn Grain-irr.	171.23	2.37	143.98	183.22	2.98	213.12
Corn Silage-irr.	189.97	. . .	. . .	203.27	. . .	. . .
Onions-irr.	510.04	6.16	1645.96	545.74	4.70	1099.26
Pasture-irr.	78.02	. . .	. . .	83.48	. . .	. . .
Grain Sorghum-irr.	134.48	1.73	3.92	143.89	2.33	42.51
Silage Sorghum-irr.	203.08	. . .	. . .	217.30	. . .	. . .
Sugarbeet Seed-irr.	414.06	24.00	305.94	443.04	N/A	. . .
Sugarbeets-irr.	255.83	19.64	93.37	273.74	N/A	. . .
State: IDAHO, Region: Southeast						
Alfalfa-irr.	130.25	31.50	2.05	139.37	48.00	62.23
Barley-irr.	119.49	1.43	(19.39)	128.29	2.44	42.51
Potatoes-irr.	258.84	2.45	243.41	276.96	2.65	266.29
Wheat-irr.	121.25	2.62	72.63	129.74	4.70	218.06
Sugarbeets-irr.	289.39	18.85	(7.02)	309.65	N/A	. . .
Region: South Central						
Alfalfa-irr.	92.25	31.50	58.95	98.71	48.00	131.69
Field Beans-irr.	102.08	10.20	76.42	109.23	24.00	310.77
Barley-irr.	87.49	1.43	31.20	93.61	2.44	108.91
Potatoes-irr.	232.84	2.45	293.91	249.14	2.65	320.61
Wheat-irr.	87.49	2.62	127.35	93.61	4.70	291.79
Sugarbeets-irr.	280.61	18.85	58.31	300.25	N/A	. . .

*Assumed at 107 percent of 1972 total costs
**Includes Government payment, if any

Sources: Table 6.2, References 18, 69, 134

TABLE 6.4

SUGARBEET PRODUCTION

Year	Number of Farms	Acres per Farm	Acres Planted	Acres Harvested	Percent Acres Harvested	Yield (tons/acre)	Tons Marketed
UTAH: North Central							
1963	1117	23.2	25879	25052	97	18.5	462927
1964	1323	25.5	33762	32875	97	13.0	428270
1965	1304	25.3	32924	32206	98	16.2	522426
1966	1014	29.5	29934	28851	96	18.2	524451
1967	870	29.1	25297	25064	99	18.3	457546
1968	955	31.7	30263	29492	97	16.7	493398
1969	1010	35.5	35822	32513	91	17.3	563019
1970	873	35.9	31350	29666	95	16.3	482042
1971	670	37.9	25414	24691	97	18.8	462997
1972	573	39.2	22477	21760	97	19.8	431545
1973	449	42.8	19203	18343	96	17.6	321839
IDAHO: Eastern							
1963	830	44.4	36823	36204	98	16.4	593813
1964	896	53.6	48043	45698	95	11.6	532322
1965	744	53.7	41528	40878	98	13.7	561385
1966	562	59.3	33304	26016	78	14.3	373025
1967	474	72.1	34158	31524	92	15.9	500213
1968	526	85.8	45102	42480	94	13.9	590166
1969	469	91.8	43069	37522	87	14.4	541991
1970	448	96.2	43082	41833	97	14.1	588120
1971	393	100.1	39334	34663	88	16.5	572039
1972	347	105.7	36661	34836	95	16.0	556463
1973	272	96.8	26325	24800	94	15.7	389079
IDAHO: Central							
1963	1873	36.5	68322	67489	99	21.8	1469139
1964	1990	42.9	85451	82021	96	15.0	1226397
1965	1886	39.1	73683	72713	99	16.6	1206959
1966	1349	40.8	55079	47911	87	17.3	828649
1967	1354	46.0	62347	58514	94	19.2	1123759
1968	1386	56.6	78429	74405	95	17.4	1298282
1969	1478	60.3	89143	80481	90	17.2	1388128
1970	1294	56.0	72411	70864	98	17.7	1256829
1971	1222	59.8	73077	71291	98	18.3	1301398
1972	1192	67.6	80557	79333	96	19.3	1531784
1973	1066	65.9	70247	66025	94	18.1	1193347

Sources: Reference 22 (Appendix 1), Statistical Background (1).

TABLE 6.5

1972 HARVESTED ACREAGES OF COMPETING CROPS
IN SUGARBEET COUNTIES

	Utah All State	Idaho All State	Idaho Eastern	Idaho Central
Alfalfa Hay	455,000	1,089,000	. . .	. . .
Alfalfa Seed	9,000	36,000	. . .	. . .
Barley	132,000	736,000	375,800	91,700
Dry Edible Beans	13,000	113,000	. . .	. . .
Corn-Grain	8,000	25,000	. . .	. . .
Corn-Silage	69,000	80,000	. . .	. . .
Lentils	. . .	20,000	. . .	. . .
Oats	13,000	56,000	. . .	. . .
Onions	1,000	4,200	. . .	. . .
Pasture Hay	131,000	280,000	. . .	. . .
Peas	. . .	106,000	. . .	. . .
Potatoes	4,300	300,000	186,500*	60,000*
Rye	. . .	3,000	. . .	. . .
Sugarbeet Seed	490	. . .	. . .	. . .
Tomatoes-processing	1,300*	. . .	. . .	. . .
Wheat-Spring	16,000	186,000	104,600	41,500
Wheat-Winter	205,000	772,000	334,600	66,800
Sugarbeets	21,760	172,396	34,836	79,333

*1971 data

Sources: References 59, 134, 70.

STATISTICAL BACKGROUND

(1) The sub-areas chosen include the following counties:

UTAH--North Central--Box Elder, Cache, Carbon, Davis, Emery, Iron, Juab, Millard, Salt Lake, Sanpete, Sevier, Utah.

IDAHO--Eastern--Bannock, Bingham, Blaine, Bonneville, Caribou, Franklin, Fremont, Jefferson, Madison, Oneida, Power.

Central--Cassia, Gooding, Jerome, Lincoln, Minidoka, Twin Falls.

(2) From the records of the Utah-Idaho and Amalgamated Sugar Companies, the five-year average sugar percentages are taken as:

UTAH	North Central	15.41
IDAHO	Eastern	15.74
	Central	16.02

CHAPTER X

AREA SEVEN

Introduction

Production of sugarbeets in ASCS Area Seven, which comprises western Idaho, Oregon, and Washington, is concentrated around two groups of two factories. The Amalgamated Sugar Company's plants at Nampa, Idaho, and Nyssa, Oregon, process beets from six counties in western Idaho, and from Malheur County, Oregon. The Utah-Idaho Sugar Company plants at Moses Lake and Toppenish, Washington, process beets from seven counties in the Columbia Basin, Yakima Valley, and Walla Walla areas of Washington and from Umatilla County, Oregon. In both regions beets are usually sent to the nearest factory but may be shipped to the other to maintain adequate stocks or to optimize railcar utilization.

Elevations in Washington range between 600 and 1,100 feet above sea level and vary between 2,100 and 3,100 feet in the Oregon-Idaho area. Growing seasons range from 127 days at Mountain Home, Idaho, to 165 days near Ontario, Oregon, and from 175 to 190 days within the Washington area. Rainfall in the Oregon-Idaho area varies from 7.5 to 13 inches and in the Washington area from 6 to 8 inches annually, so all beets in area seven are raised under irrigation systems.

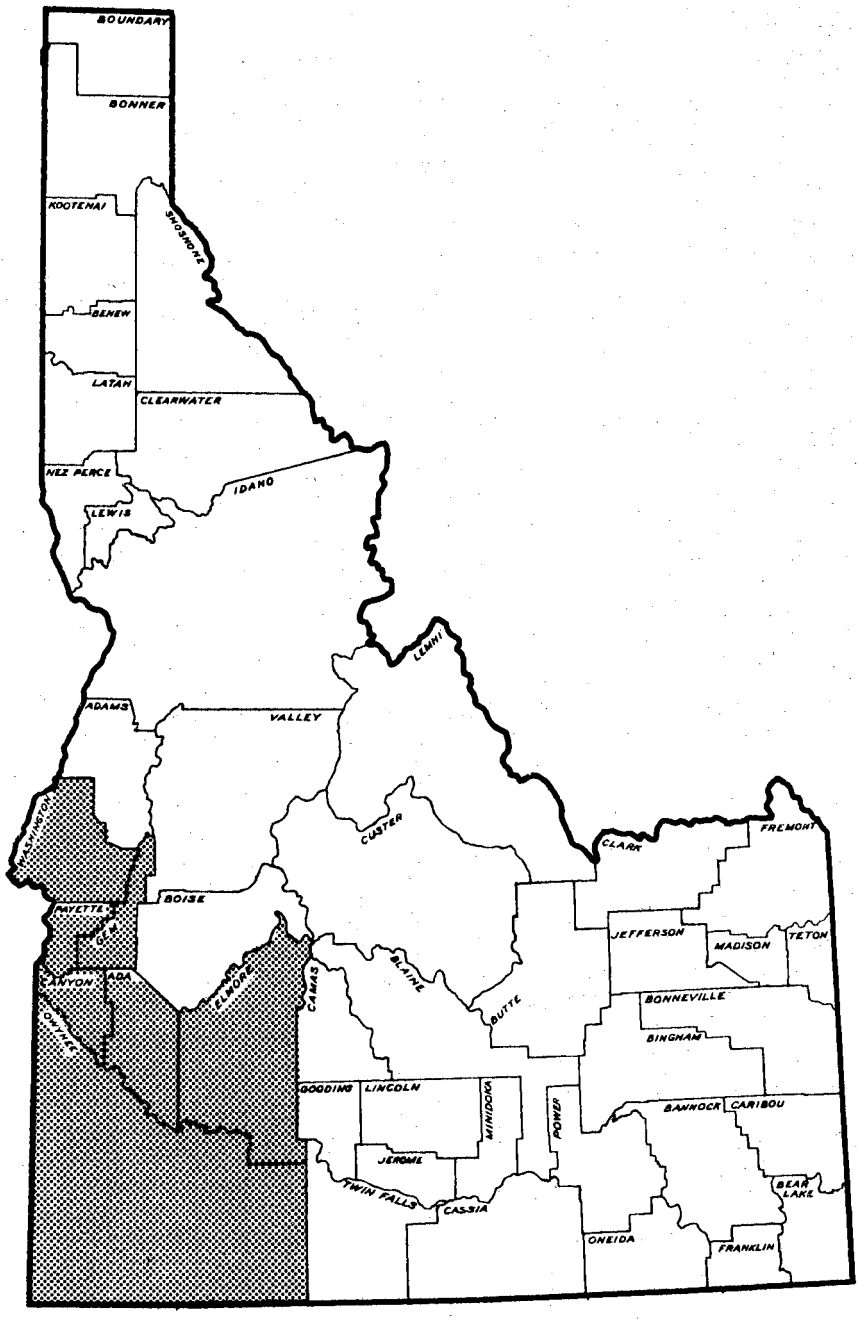
Area Descriptions

7.1 West Idaho

Growers in western Idaho have long considered sugarbeets a reliable crop even though economic returns have been less than those from several other crops (Table 7.3). The growing season in western Idaho is a month longer than that in the east of the state, so farmers have a wider choice of high value cash crops including potatoes, onions, alfalfa seed, red clover seed, hops, corn seed, and sweet corn (see Table 7.5). The returns from these enterprises are subject to fluctuation due to bad growing conditions or a fluctuating market price, but in any given year one or more of these enterprises normally yields a greater net return than that from sugarbeets. However, uncertainty is an especially important factor in agriculture, and sugarbeets have long been prized as a reliable alternative crop. The plant is relatively hardy, so yield remains fairly constant, and the price is considerably more secure than for onions or seed crops.

The Amalgamated Sugar Company has been increasing the productive capacity of the Nampa plant steadily to the present level of some 9,400 tons sliced per day, and

IDAHO--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA SEVEN



thick juice tanks have been installed to extend the campaign length. A large percentage of the population of Idaho lives along the Snake River Valley. With the growth of the nearby state capital city of Boise, urbanization pressure on land in western Idaho--known as the Treasure Valley--is strong and increasing. This reduction in available land is presently being offset by the introduction of various irrigation schemes in the Mountain Home region of Elmore and Owyhee Counties, and the additional production expected will be shipped to the plants at Nampa and Twin Falls/Mini-Cassia.

The steady growth in the region's beet production was affected considerably during 1973 when the unexpectedly high prices for competing crops reduced the price attractiveness of growing sugarbeets (see Table 7.3). Growers in the area, skilled in the production of vegetable and seed crops, voiced no objection to the management effort required to raise beets but due to the nature of the vegetable and seed crop markets, are extremely sensitive to price fluctuations. Increased returns from grain crops and alfalfa hay mean that these crops can now be considered along with sugarbeets as relatively safe and stable alternatives. Therefore, the 1974 planted acreage of beets was expected to be below the 1973 figure, which in turn was 2,100 acres less than that of 1972.

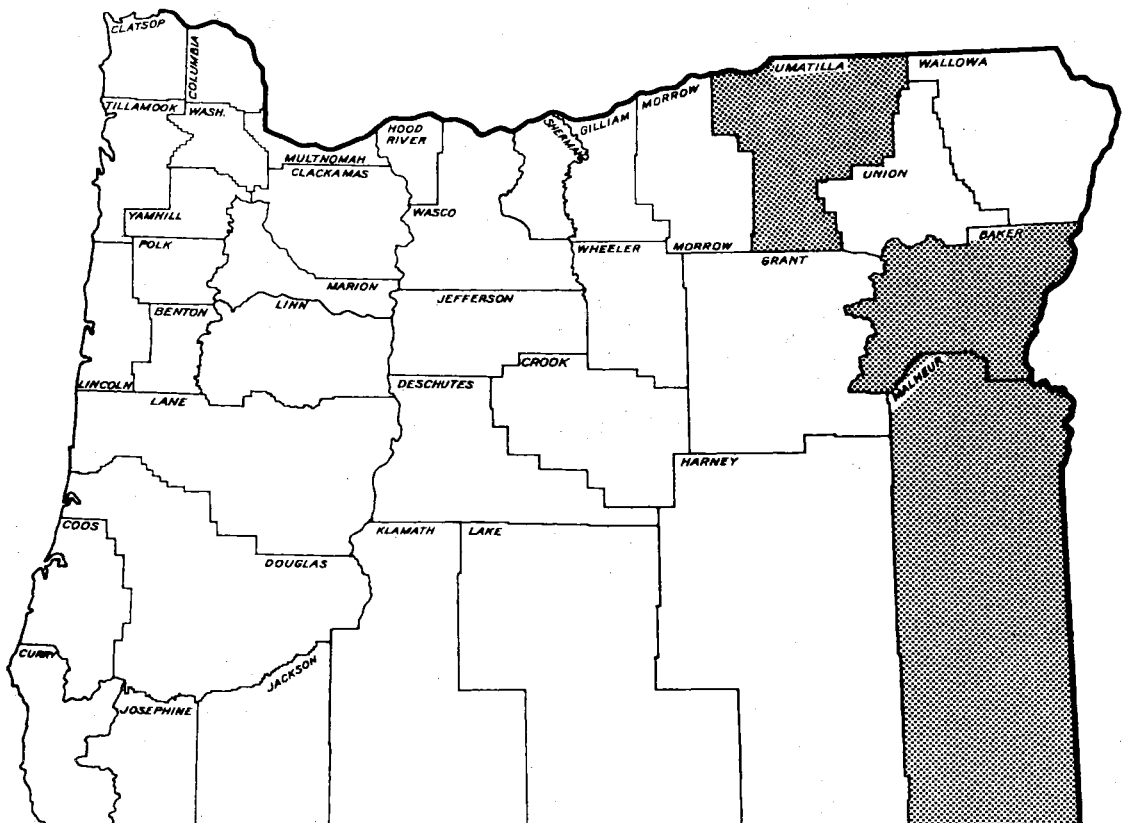
The future level of production in the area is strongly related to the prices of competing crops. If sugarbeets remain uncompetitive in price, the acreage will decline. However, the reduction is not expected to reach the level at which the factory would need to shut down. On the other hand, if the price of beets rises to re-establish the crop in its old competitive position, then planted acreage should return to between 60,000 and 70,000 per year. Further expansion is unlikely at present since the Nampa factory has been continuously modernized and updated over the last eight years, and is now in a period of financial consolidation.

7.2 Oregon-Eastern

Eastern Oregon sugarbeet production now comes entirely from Malheur County. The Amalgamated Sugar Company plant at Nyssa (capacity 6,500 tons a day) processes these beets and those from another 12,000 acres in Payette, Washington, Canyon, and Owyhee Counties in Idaho. As in western Idaho, sugarbeets have long been considered a secure enterprise, forming the basis of the onion, potatoe, sugarbeet row-crop program. Planted acreage has been remarkably constant since 1963 (Graph 7.2). The climate also encourages production of many vegetable and fruit crops including red beets, melons, asparagus, and alfalfa. Grain crops also give high yields (Table 7.2).

Three production constraints are apparent in the area. First, high ground to the west of the valley land limits the acreage which can be cheaply irrigated. The expense of pumping water to the marginal uplands requires that very high value crops be grown. Second, the area

OREGON--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA SEVEN



suffers from light soil, which is very susceptible to blowing, local infestations of Rhizoctinium fungus and nematodes. Third, a socio-economic problem exists in that eastern Oregon growers apparently dislike to employ hired labor. However, recent advances in the mechanization of potato and sugarbeet production have made these enterprises more acceptable.

The planted acreage contracted to the Nyssa factory dropped by some 6,000 acres between 1972 and 1973, and this reduction is held to be a direct result of competition by other crops for the available land resource. The position of sugarbeets as an "insurance" crop makes the extinction of the industry unlikely, but planted acreage seems certain to remain down until the competitive position of beets improves. Land constraints preclude much expansion of the crop in Oregon, but the Nyssa plant could process production from new areas in Idaho.

7.3 Washington and North Oregon

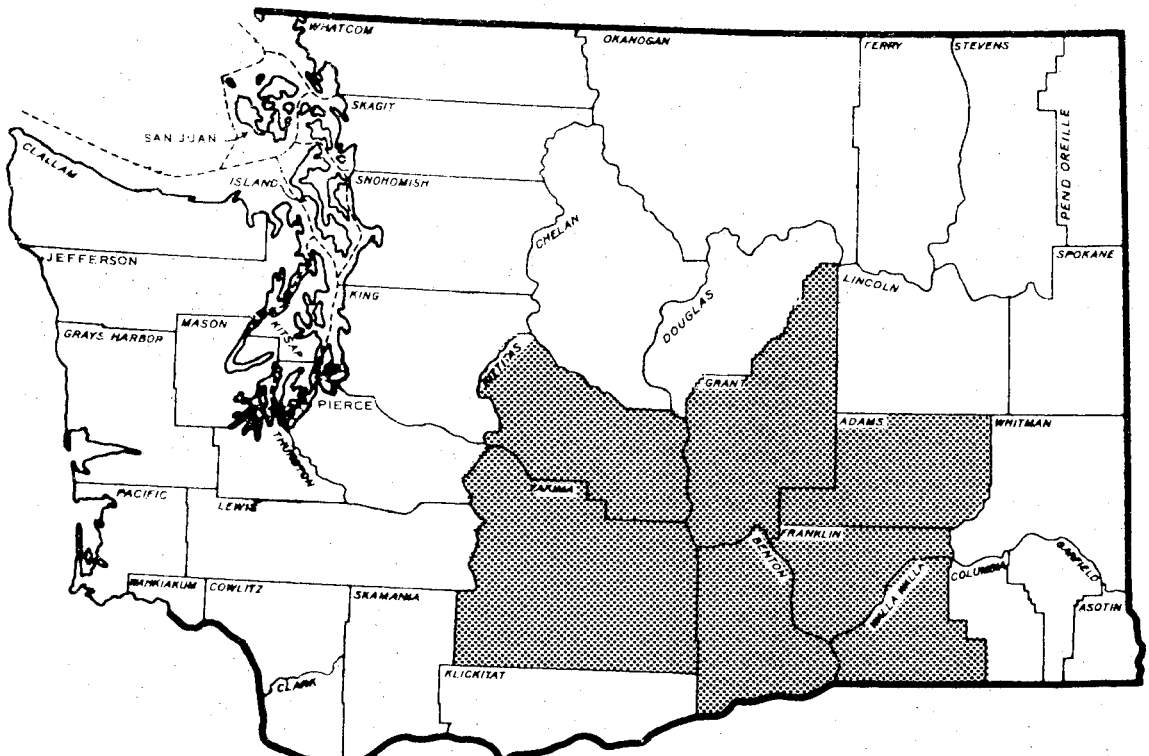
Since the installation of large scale irrigation projects in the 1950's, the sugarbeet industry in Washington State has grown enormously. The Moses Lake factory processes beets from the Columbia Basin, and the Toppenish plant from the Yakima Valley. Beets grown in southern Washington, including those from some 2,000 acres in Umatilla County Oregon, are processed at whichever plant is most convenient to the Utah-Idaho Sugar Company.

Some 1.5 million acres are presently under irrigation, with another 100,000 expected to come in by 1980. Total potentially irrigable land exceeds 5 million acres (see Table 7.5). Special attention is being paid to the development of irrigation in the Horse Heaven Hills region of southern Washington. Sugarbeets and potatoes are the highest returning cash crops in the region. The nights are somewhat cool for corn grain production (Table 7.3 shows low net returns from corn), but large amounts of animal feeds based on alfalfa and corn silage are grown and shipped to the west of the state and overseas. Large areas are also planted with wheat (Table 7.5), and the recent net returns from this crop (see Table 7.3) have created an attractive alternate enterprise. There is also claimed to be considerable potential for fruit production in the state, but this industry is still in the development stage.

Wind erosion of the light, sandy soils is a major problem facing farmers in the area, since the fields tend to be too large to support effective windbreaks. Nematode attack is rare and labor has become less of a problem since mechanization techniques were introduced.

The Moses Lake factory, with a daily slicing capacity of 11,500 tons, is the largest in the U.S. and the second

WASHINGTON--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA SEVEN



largest in the world. The Toppenish plant, rated at 4,400 tons per day, is smaller and older but specializes in the production of bulk liquid sugar. Introduction of a system whereby the grower is paid on his individual sugar content has raised the amount of sugar produced. In the record-breaking 1972-1973 season the Moses Lake factory ran a 13-month campaign--thick juice from the 1972 harvest was still being processed while the first of the 1973 crop beets were sliced. A new and successful technique of using plastic-covered piles to prevent sugar loss in storage over winter has also helped to increase factory output. Once the beet piles are frozen in areas such as Montana and the Red River Valley they stay frozen, but the variable climate of the Pacific northwest may allow a pile to unfreeze, setting in motion a chain of chemical changes resulting in severe sugar loss.

Although the planted acreage reached new records in 1972-1973, the increase in the prices of competing crops has caused a reduction in grower enthusiasm for the crop. When lending money to farmers starting up in the new irrigation areas, bankers were relatively willing to lend money to sugarbeet growers, since good returns from the crop were more certain than from competitive enterprises. However as these loans are being repaid, growers become freer to consider alternative crops with higher returns than sugarbeets.

Summary and Projections

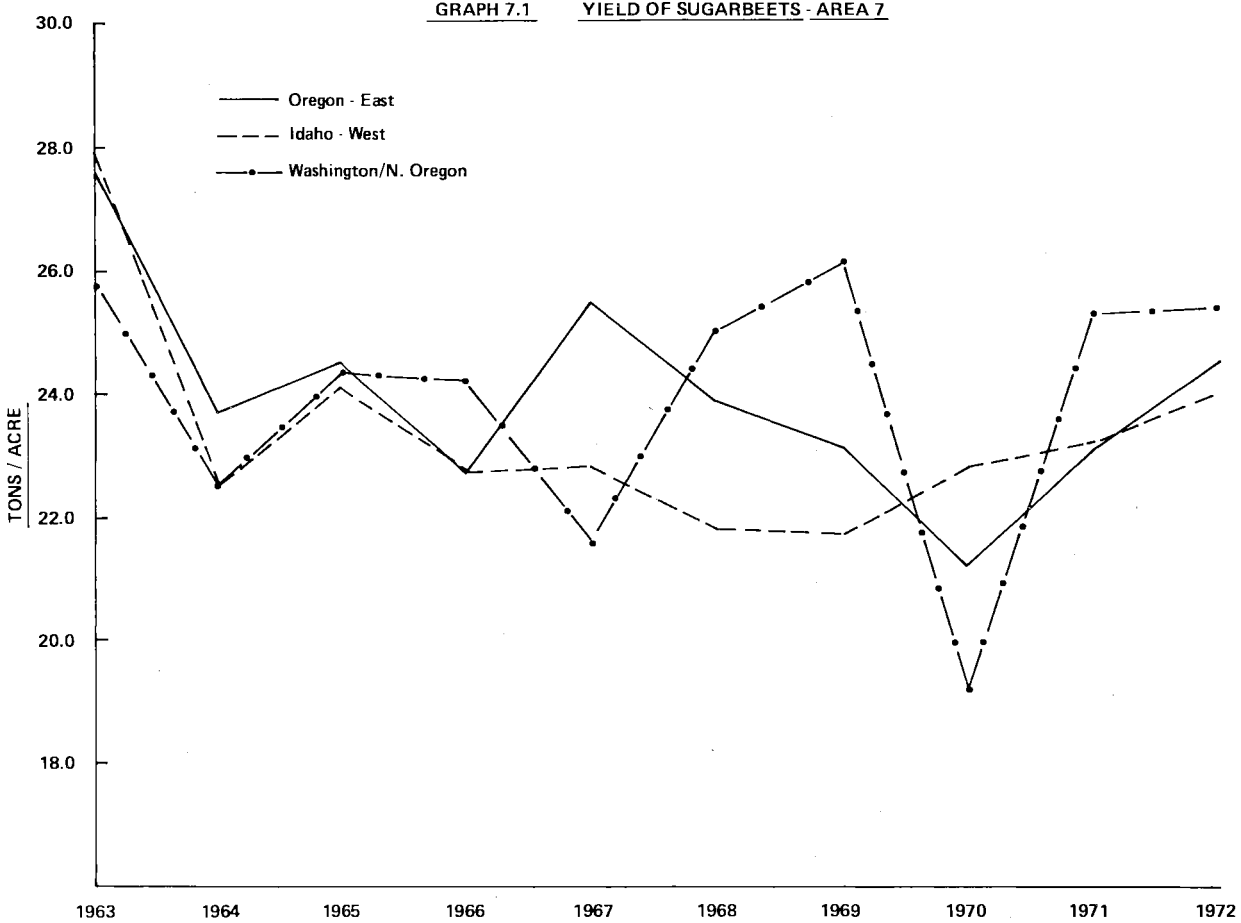
Reference to Table 7.3 suggests that the sudden price increases between 1972 and 1973 have transformed alfalfa, beans, corn, and wheat into very serious competitors to sugarbeets. Although potatoes and onions gave substantially higher returns than sugarbeets in 1972, it must be remembered that these are high risk crops and the market is uncertain. Furthermore, the total harvested acreage of onions in Idaho, Oregon and Washington in 1973 was only 13,800 compared with some 275,000 acres of sugarbeets; so even if the acreage of onions were to triple, the expected percentage reduction in sugarbeet production would be small.

Bad weather at harvest time is the usual cause of the occasional yield reductions noticeable in Graph 7.1, but yield per acre seems to have remained relatively unchanged since 1964. Oregon planted acreage (Graph 7.2) has remained constant despite considerable grower interest in the crop, since land constraints have limited expansion. Washington acreage has nearly doubled since 1967, but planted acreage in west Idaho has returned to the 1963 level, with a slight diminution of yield levels as urbanization forces production further out onto marginal land.

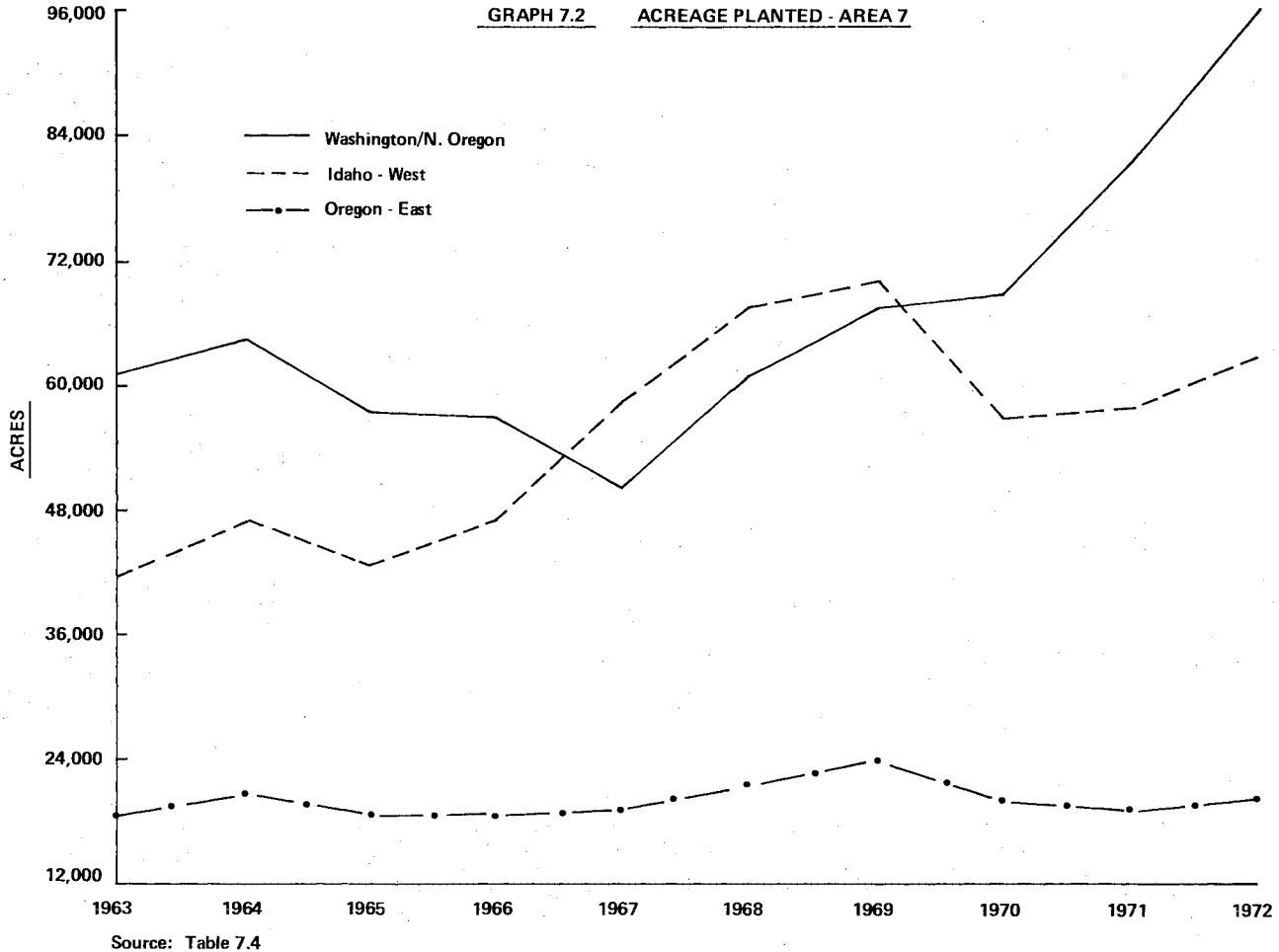
To summarize, the relatively mild climate in the Pacific Northwest allows farmers to raise cash crops yielding higher net returns per acre than those from sugarbeets But sugarbeets are attractive in that the income is not as liable to unexpected fluctuation, which is the problem with potatoes and onions under present marketing arrangements. The major threat to the area's sugarbeet industry in the area comes from the recent rise in the prices of crops such as small grains and alfalfa, which are less trouble to grow. Farmers in the area are quick to adapt to changing circumstances. One county agent ruefully admitted that he tended to be the last to be informed of the latest developments and there seems every likelihood that growers would reduce their planted acreages of sugarbeets if sugarbeet prices were to become uncompetitive. If this situation were to be prolonged, there is a possibility that the smaller of each pair of factories i.e., Nyssa and Toppenish, might be shut down, although this does not seem likely at present.

Although production expansion in the area has been substantial in the past, a plateau has been reached at present. Considerable capital has been invested in the factories to bring them up to their present high output level, and no further sizeable expansion is foreseen. Physical land constraints exist in Oregon, and urbanization takes the equivalent of the new land coming under irrigation in Idaho, so no great increase in production is seen for Nampa/Nyssa for some while. However, the continuing irrigation programs in Washington pose a real possibility of a new factory being constructed, possibly at Pasco, within the next ten years, should the industry regain its former attractiveness.

GRAPH 7.1 YIELD OF SUGARBEETS - AREA 7



Source: Table 7.4



Source: Table 7.4

TABLE 7.1

1972 PER ACRE COST DATA FOR SUGARBEETS

(dollars)

	STUDY DATA				
	Idaho-West	Oregon	Washington-Columbia	ASCS Area 7	ASCS Data-Area 7 (1972 Cost Study)
Labor-own	37.43	50.35	32.59	79.65	75.71[1]
-custom and hand	54.38	39.22	75.50	56.01	44.30
Machine operations-own	17.62	19.90	11.09	18.73	27.28
-custom	21.46	. . .	82.39	19.98	15.09
Seed	4.03	8.03	3.99	4.54	5.30
Fertilizer	48.77	38.76*	43.68*	49.50	44.44
Chemicals	3.99	20.71	20.98	4.54	14.01
Water operating costs	7.23	9.09	14.76	17.46	16.12
Miscellaneous	3.20	21.20	13.53	16.58	26.30
Interest on operating capital	8.54	3.71	12.30	10.41	11.65
Total variable costs	206.65	210.97	310.81	277.40	280.20
Interest on land	44.64	58.80	33.16	54.04	53.01[2]
Interest on machinery investment	12.66	23.03	6.20	25.88	5.05
Machinery depreciation	14.87	26.35	16.59	29.62	23.95
Taxes and insurance	13.54	23.96	11.55	20.50	12.97
Water fixed costs	9.18	. . .	. . .	. . .	. . .
Total fixed costs	94.88	132.14	67.50	130.04	94.98
Total all costs	301.53	343.11	378.31	407.44	375.18
5 year average yield (tons/acre)	22.74	23.16	24.20	23.54	24.15
5 year average sugar content	15.30	15.30	15.73	15.50	15.58
Sugar yield (tons/acre)	3.48	3.54	3.81	3.65	3.16
Cost per ton of sugar	86.65	96.92	99.29	111.63	118.73

*Cost includes custom operations

Sources: References 20, 72, 125, 135, Table 7.4, Statistical Background (1)

[1]Includes farm maintenance labor.

[2]Paid and imputed interest on land and net rent.

TABLE 7.2

1972 PER ACRE COST AND YIELD DATA FOR SELECTED COMPETING CROPS

Crop	Variable Costs	Fixed Costs	Total Costs	Yield
State: IDAHO, Region: Southwest				
Alfalfa hay-irr.	70.50	59.75	130.25	5.2 tons
Alfalfa seed-irr.	132.33	58.65	190.98	3 tons and 5.1 cwt
Field beans-irr.	60.82	59.54	120.36	18.3 cwt
Barley-irr.	61.63	57.86	119.49	87 bushels
Corn-grain-irr.	90.94	58.62	149.56	93.5 bushels
Corn-vegetable-irr.	82.71	58.62	141.33	7.3 tons
Corn-seed-irr.	116.39	58.62	175.01	18.5 cwt
Red clover seed-irr.	106.48	57.97	164.45	4.8 cwt and 1 ton
Potatoes-irr.	245.42	58.61	304.03	280 cwt
Wheat-irr.	63.39	57.86	121.25	88 bushels
Sugarbeets-irr.	206.65	94.88	301.53	22.74 tons
State: OREGON, Region: East				
Alfalfa hay-irr.-established	128.00	87.45	215.45	4 tons
Alfalfa hay-irr.-produce	93.50	74.85	168.35	6 tons
Onions-irr.	547.08	162.20	709.28	450 cwt
Potatoes-50 acres-irr.	250.42	182.36	432.78	290 cwt
Potatoes-1000 acres-irr.	609.35	173.00	782.35	400 cwt
Wheat-irr.	49.37	61.64	110.01	80 bushels
Alfalfa seed-irr.-established	27.31	27.56	54.85	3 cwt
Alfalfa seed-irr.-produce	184.19	97.37	281.56	6 cwt
Sugarbeets-irr.	210.97	132.14	343.11	23.16 tons
State: WASHINGTON, Region: Columbia Basin				
Alfalfa hay-45 acres, established	108.21	77.91	186.12	6.5 tons
Alfalfa hay-200 acres established	54.14	95.72	150.06	6.5 tons
Lima beans-irr.	155.71	95.57	251.28	30 cwt
Corn-grain-irr.	204.56	82.42	286.98	119 bushels
Corn-silage-irr.	203.26	63.40	266.66	30 tons
Corn-vegetable-irr.	157.45	62.78	220.23	8.5 tons
Green peas-irr.	90.22	38.37	128.59	1.5 tons
Seed peas-irr	109.56	75.74	185.30	25 cwt
Potatoes-irr.	570.12	97.44	667.56	480 cwt
Winter-wheat-irr.	95.12	71.91	167.03	100 bushels
Sugarbeets-irr.	310.81	67.50	378.31	24.20 tons

Sources: References 71, 73, 125, 135, Table 7.1

TABLE 7.3

1972 AND ESTIMATED 1973 NET RETURNS FOR SELECTED COMPETING CROPS

Crop	1972 Total Costs	1972 Price**	1972 Net Returns	1973 Total Costs	1973 Price**	1973 Net Returns
State: IDAHO, Region: Southwest						
Alfalfa hay-irr	130.25	31.50	33.55	139.37	48.00	110.23
Alfalfa seed-irr	190.98	43.60	125.88	204.35	93.70	417.52
Field beans-irr.	120.36	10.20	66.30	128.79	24.00	310.41
Barley-irr.	119.49	1.43	4.92	127.85	2.44	84.43
Corn for grain-irr.	149.56	1.86	24.35	160.03	2.89	110.19
Corn for vegetables-irr.	141.33	26.50	52.12	151.22	28.10	53.91
Corn for seed-irr.	175.01	13.50	74.74	187.26	N/A	. . .
Red clover seed-irr.	164.45	40.80	662.89	175.96	60.20	161.00
Potatoes-irr.	304.03	2.45	381.97	325.31	2.65	416.69
Wheat-irr.	121.25	2.62	109.31	129.74	4.70	283.86
Sugarbeets-irr.	301.53	18.85	127.12	322.64	N/A	. . .
State: OREGON, Region: East						
Alfalfa hay established-irr.	215.45	. . .	. . .	230.53	. . .	. . .
Alfalfa produce-irr.	168.35	33.50	32.65	180.13	55.00	149.87
Alfalfa seed established-irr.	54.85	. . .	. . .	58.69	. . .	. . .
Alfalfa seed produce-irr	281.56	43.60	(19.96)	301.27	93.70	260.93
Onions-irr.	709.23	7.71	2760.22	758.93	6.60	2211.07
Potatoes-50 acre-irr.	432.78	2.75	364.72	463.07	3.36	511.33
Potatoes-100 acre-irr.	782.35	2.75	317.65	837.11	3.36	506.89
Sugarbeets-irr.	343.11	18.08	75.62	367.13	N/A	. . .
Wheat-irr.	110.01	2.43	84.39	117.71	4.92	275.89
State: WASHINGTON, Region: Columbia Basin						
Alfalfa hay-45 acre-irr.	186.12	31.50	18.63	199.15	60.00	190.85
Alfalfa hay-200 acre-irr.	150.06	31.50	54.69	160.56	60.00	229.44
Lima beans-irr.	251.28	10.80	72.72	268.87	26.50	526.13
Corn for grain-irr.	286.98	2.04	(44.22)	307.07	2.87	34.46
Corn for silage-irr.	266.66	. . .	. . .	285.33	. . .	. . .
Corn for vegetable-irr.	220.23	30.70	40.72	235.65	38.70	93.30
Green peas-irr.	128.59	114.00	42.41	137.59	123.00	46.91
Seed peas-irr.	185.30	5.45	(49.05)	198.27	6.06	(46.77)
Potatoes-irr.	667.56	2.09	335.64	714.29	3.30	869.71
Wheat-irr.	167.03	2.38	70.97	178.72	5.05	326.28
Sugarbeets-irr.	378.31	20.01	105.93	404.79	N/A	. . .

*Estimated as 107 percent of 1972 total costs
**Includes Government payments, if any

Sources: References 18, 69, 124, 138, Table 7.2

TABLE 7.4

SUGARBEET PRODUCTION

Year	Number of Farms	Acres per Farm	Acres Planted	Acres Harvested	Percent Acres Harvested	Yield (tons/acre)	Tons Marketed
IDAHO: Western							
1963	940	44.2	41533	40918	98	27.6	1130380
1964	987	47.5	46851	45349	97	23.7	1073242
1965	945	45.0	42571	42434	100	24.5	1037659
1966	904	51.9	46930	45200	96	22.7	1025557
1967	813	71.6	58233	56168	96	22.8	1281201
1968	784	86.0	67462	64150	95	21.8	1398020
1969	780	89.6	69921	65852	94	21.7	1427796
1970	673	84.4	56793	55208	97	22.8	1257103
1971	613	94.4	57874	57104	99	23.2	1327011
1972	629	99.3	62484	60230	96	24.2	1454844
1973	582	93.9	54625	52770	97	25.5	1345247
OREGON: Eastern							
1963	364	50.9	18532	18376	99	27.9	513291
1964	380	53.8	20427	20197	99	22.5	455263
1965	363	50.7	18411	18362	100	24.1	442714
1966	353	52.0	18360	17675	96	22.8	402596
1967	310	61.7	19125	18811	98	25.5	479735
1968	289	73.9	21348	21033	99	23.9	502766
1969	279	85.3	23805	23532	99	23.1	542420
1970	259	76.8	19891	18661	94	21.2	395284
1971	251	75.7	19008	18738	99	23.1	431844
1972	249	84.9	21138	20992	99	24.5	514304
1973	229	75.3	17249	16976	98	26.0	440936
WASHINGTON AND NORTH OREGON							
1963	1300	47.0	61137	61124	100	25.8	1579357
1964	1304	49.3	64225	62182	97	22.5	1379824
1965	1208	47.4	57311	56692	99	24.3	1377778
1966	1077	52.8	56838	53765	95	24.2	1303263
1967	800	62.4	49936	49288	99	21.6	1066610
1968	828	73.6	60969	56059	92	25.0	1403029
1969	831	81.1	67407	66196	98	26.1	1726490
1970	870	79.2	68858	63627	92	19.2	1224119
1971	881	92.4	81443	79116	97	25.3	2001587
1972	917	104.6	95899	93361	97	25.4	2372989
1973	901	108.3	97546	96944	95	26.9	2503637

Sources: Reference 22 (Appendix 1), Statistical Background (1)

TABLE 7.5

1972 HARVESTED ACREAGES OF COMPETING CROPS

IN SUGARBEET COUNTIES

	IDAHO		OREGON	WASHINGTON	
	All State	Western	All State	All State	Columbia Basin
Sugarbeets	172,396	60,230	22,561	91,792	52,683
Alfalfa hay	1,089,000	. . .	428,000	535,000	158,428
Alfalfa seed	36,000	. . .	. . .	37,000	14,635
Asparagus	. . .	. . .	. . .	19,200	3,226
Barley	736,000	70,700	250,000	258,000	6,139
Beans-various	136,000	. . .	. . .	25,000	19,928
Beans-lima	. . .	. . .	. . .	2,400	. . .
Corn-grain	25,000	. . .	11,000	51,000	29,047
Corn-seed	. . .	. . .	. . .	. . .	351
Corn silage	80,000	. . .	. . .	55,000	. . .
Corn-vegetable	21,800	. . .	. . .	28,000	9,129
Cucumbers	. . .	. . .	. . .	1,400	. . .
Hops	3,800	. . .	5,200	19,200	. . .
Lentils	20,000	. . .	. . .	63,000	. . .
Lettuce	. . .	. . .	. . .	. . .	. . .
Mint	7,300	. . .	34,500	17,800	3,231
Peas-consume	123,300	. . .	3,900	74,000	1,849
Oats	56,000	. . .	95,000	35,000	. . .
Onions	4,200	. . .	. . .	. . .	770
Pasture hay	280,000	. . .	622,000	375,000	24,416
Potatoes	300,000	31,000*	40,700	73,000	35,285
Red clover seed	4,000	. . .	. . .	1,500	1,734
Rye	. . .	. . .	10,000	18,000	. . .
Wheat-winter	772,000	29,700	838,000	2,603,000	33,228
Wheat-spring	186,000	14,300	51,000	. . .	. . .

* 1971 data

Sources: References 69, 70, 124, 136-138.

STATISTICAL BACKGROUND

(1) The sub-areas chosen include the following counties:

IDAHO--Western--Ada, Canyon, Elmore, Gem, Owyhee, Payette, Washington.

OREGON--Eastern--Baker, Malheur.

WASHINGTON--Adams, Benton, Franklin, Grant, Kittitas, Walla Walla, Yakima, plus Umatilla County, Oregon.

(2) The five year average sugar percentages, according to the records of Utah-Idaho and Amalgamated Sugar companies are:

WEST IDAHO/EAST OREGON	15.30%
WASHINGTON/NORTH OREGON	15.73%

CHAPTER XI

AREA EIGHT

Introduction

ASCS Area Eight includes production from California, Arizona and part of New Mexico. Four sugar companies operate ten factories in California and one in Arizona. American Crystal has a plant at Clarksburg in the Sacramento Valley and Holly Sugar operates at Hamilton City and Tracy in the Sacramento Valley, Santa Ana in the coastal region and Brawley in the Imperial Valley. Spreckles Sugar is located at Woodland in the Sacramento Valley, Manteca and Mendota in the San Joaquin Valley, Spreckles in the coastal region and Chandler (the only Arizona factory), and Union Sugar operates one factory at Betteravia, near Santa Maria, in the coastal region. Many sugarbeets are planted in the fall and harvested the following spring, and a significant proportion of beets are shipped long distances from production areas to the processor to keep the factories operating as long as possible.

Six distinct production regions are identifiable. In California: a) the North Central (Sacramento Valley), b) South Central (San Joaquin Valley), c) the Coastal Region and the d) Imperial Valley. In Arizona: e) the lowland areas around Phoenix and Yuma and f) the highland region near Willcox, including small acreages in western New Mexico. The following table summarizes environmental data for the regions:

	Region	Elevation (feet)	Annual Rainfall (inches)	Growing Season (days)
California:	North Central Valley	20-200	14-18	265-290
	South Central Valley	200-400	6-10	245-300
	Coastal	20-300	13	220
	Imperial Valley	-113	3	310
Arizona:	Lowland	1,000	9	260
	Highland	4,000	11.5	180

All beets are raised under irrigation conditions in area eight.

Area Descriptions

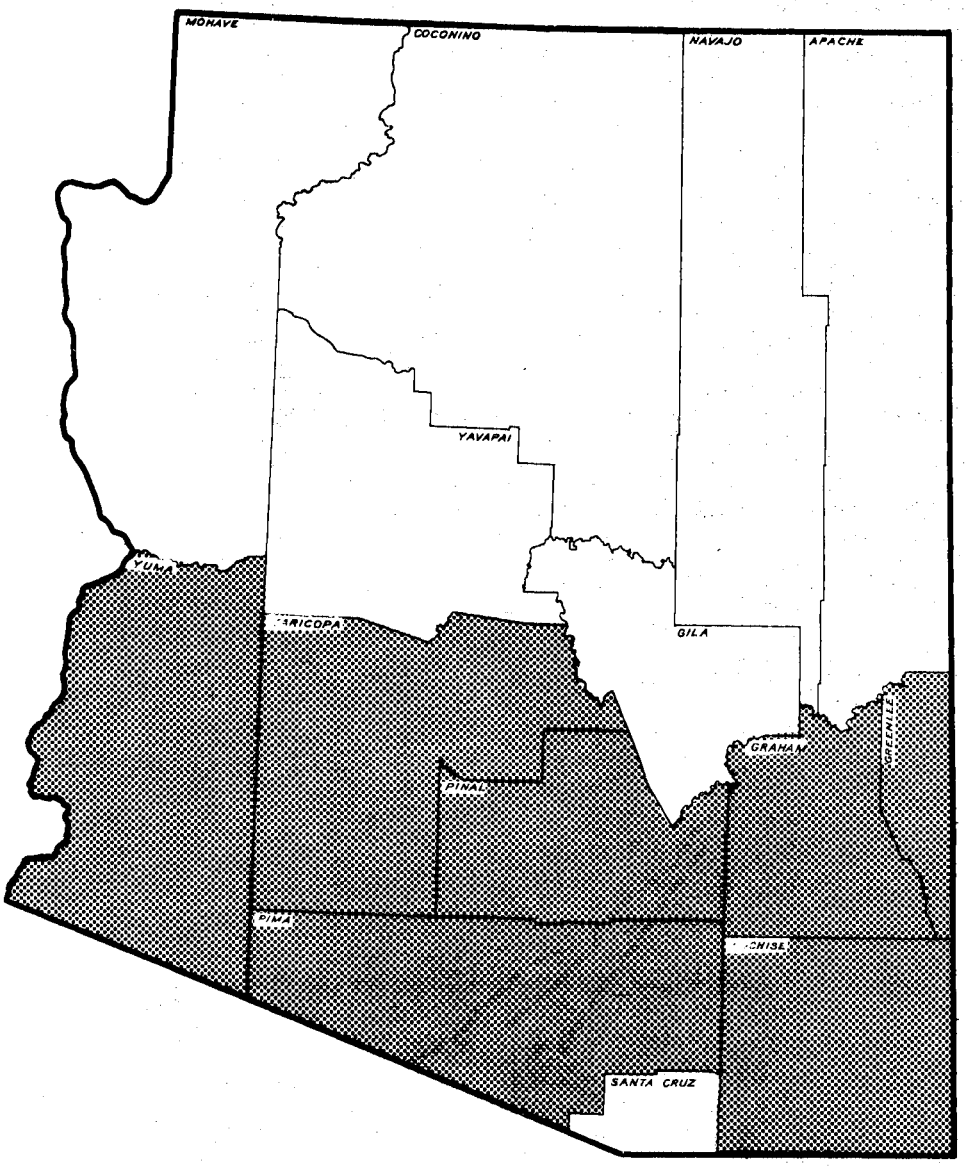
8.1 Arizona

Lying well south, usually under clear skies, Arizona receives vast amounts of strong sunlight, allowing high crop yields, but the enormous agricultural potential of the state is unrealized because of a severe lack of water. The completion of the Salt River Project around Phoenix allowed development of crop farming, and the 1963 Cuban crisis stimulated the introduction of sugarbeets to the area. A basic allotment for 20,000 acres producing 20 tons per acre at 15 percent sugar content was granted under the Sugar Act, and a factory, constructed by Spreckles Sugar at Chandler, just south of Phoenix) started production in 1966 with a slicing capacity of some 4,000 tons per day (Table 8.4).

The pattern of beet production varies between the different Arizona areas supplying the factory. September planted beets are harvested in the Yuma region in May and June, beets planted around Phoenix in September are harvested in June and July, and beets from the mountain regions near Willcox are planted in March or April and harvested in November or December. Thus, the factory has the potential for an unusually long campaign season.

Planted acreage contracted to the factory had increased to some 30,000 acres by 1969, but during that year the yield per acre fell spectacularly to below 15 tons per acre (see Table 8.4) owing to losses from disease attack and weed build-up. Planted acreage dropped below 10,000 acres by 1971, but sugarbeet production is not yet finished in Arizona for several reasons. First, the Spreckles Sugar Company, a subsidiary of Amstar, (the largest sugar company in the U.S.) (9), has used its unusual financial strength to purchase some 2,500 acres of land in the Willcox area and lease 1,900 acres in the lowlands in order to help ensure a supply of beets. The high ground land is run as a complete year-round farming operation. Per acre yields in the Wilcox area increased enormously in 1971-1972, as have yields in the lowland areas since Spreckles started growing its own beets (Table 8.4). Second, growers in the Imperial Valley of California who are extremely enthusiastic towards sugarbeet production are assisting the Arizona project. Some of these California growers have a) leased sugarbeet land in Arizona and b) contracted and shipped some 100,000 tons of beets from the Imperial Valley to Chandler in May and June of recent years in order to permit the factory to process an economic tonnage of beets. Third, many of the growers involved in beet production prior to 1970 were relatively inexperienced in sugarbeet production, but those now remaining in the industry are more expert, achieving much higher yields. Fourth, in conjunction with California practice, the build-up of disease, which so contributed to earlier yield failures when acres of beets were abandoned and left to

ARIZONA--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA EIGHT



rot in the ground, is now successfully controlled by 30-day 'beet-free' periods, when no sugarbeets at all are in the ground in the area. Research into solving the severe weed problems at higher elevations has also been fruitful. Fifth, considerable research into planting dates and fertilizer practice is underway in order to increase the sugar content of the crop. Low sugar content makes the cost of producing a ton of sugar extremely high (Table 8.1).

Production in the region still faces problems. Considerable attention must be paid to planting dates, since the crop will begin to rot in the ground if left until August. Furthermore, labor is becoming expensive as the state population and off-farm job opportunities mushroom, so grower investment must be made in mechanization. Use of Mexican spring varieties has allowed a 50 percent yield increase for wheat. The recent increases in the prices of competitive crops such as small grains, hay and sorghum has also affected the enthusiasm of growers for beets, although the effect is reduced by recent sugar-beet yield increases. The crop ranked third after vegetables and cotton in profitability if a 22 ton yield of beets is assumed (Table 8.3).

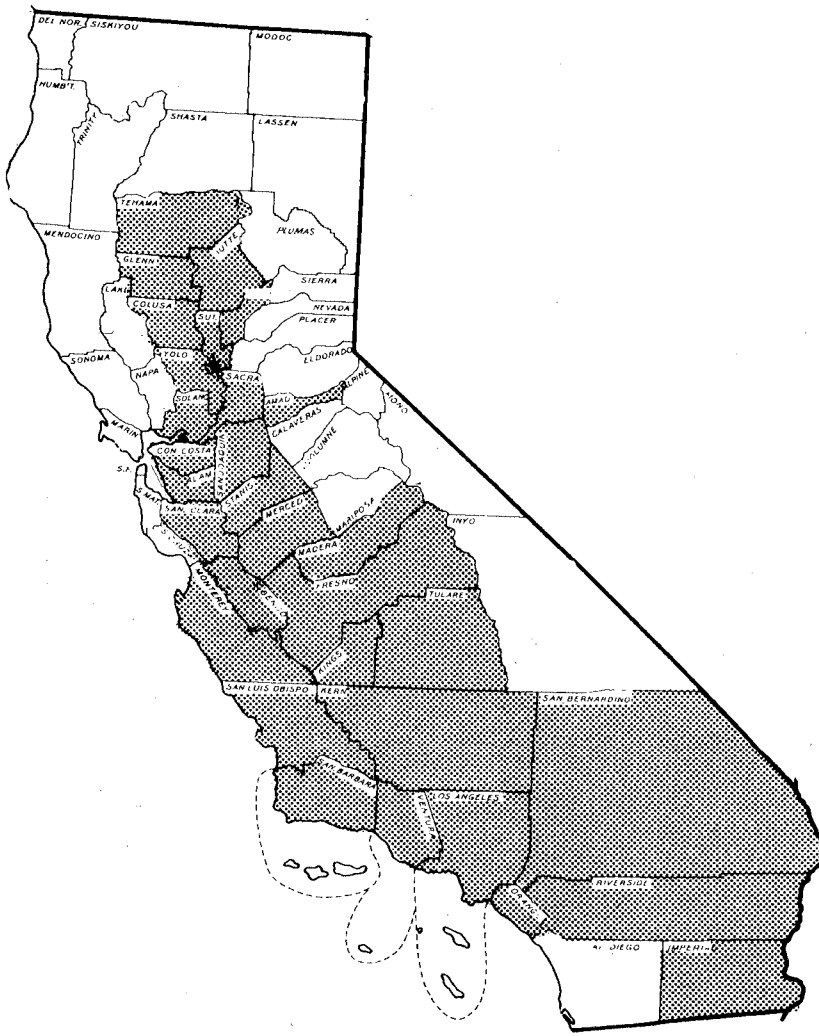
Looking to the future, the industry is expected to remain in the area. Production problems of the past are being overcome, grower skills are increasing, and the sugar company may be prepared to invest in more land. Surplus production is available from the nearby Imperial Valley, and new land is coming under irrigation, especially on the Parker Indian Reservation and in the Yuma region. The decline of the water table is causing some concern for the long-term future but some authorities are considering using atomic power to desalinate and pump water up from the Gulf of California.

The number of growers is expected to decline further, perhaps to some 40 in total, plus Spreckles, and a total of 25,000 acres is hoped for within five years (5,000 each at Yuma and Willcox and 15,000 in the Phoenix area).

8.2 California

Four production areas are easily identifiable in California, the state with the largest sugarbeet acreage of any in the U.S. Planted acreage in 1973 totaled 277.000 acres, some 42 percent in the North Central Valley, 6 percent in the Coastal region, 23 percent in the Imperial Valley and 29 percent in the South Central Valley. General trends over the last five years have shown increases in the North Central and Imperial Valley and decreases on the coast and in the South Central Valley (Graph 8.2).

CALIFORNIA--SUGARBEET PRODUCING COUNTIES, 1963-1972, AREA EIGHT



The climate of California, extremely beneficial to crop production, has allowed adoption of production systems different to those in the rest of the United States. The sugarbeet plant is biennial; it is vegetative in the first year and flowers in the second. The change between the two phases being initiated by the combination of daylength and temperature effects occurring in the seasonal progression from fall through winter into spring. However, in much of southern California winters are not sufficiently severe to initiate the change from root sugar storage to seed production and therefore the crop can be left in the ground to continue growth over the mild winters in that region. This practice of 'overwintering' is not common in the north of the state or other areas where the weather is more severe and a crop may be lost if it starts to 'bolt' (the term used for the commencement of seed production). Harvesting begins in the Imperial Valley in April, and sugarbeets are harvested somewhere in the state until the year-end, the location moving northward as the year progresses.

The acreage of beets planted in California has approximately doubled since 1946 (52), and the sugar companies have been able to absorb the increased production in a large part by lengthening the harvest season and factory operating period rather than increasing the productive capacity of the factories. The only thick juice tanks in the state are in the Imperial Valley plant. This spreading of the factory fixed costs over a longer period allows the industry to tolerate higher production costs in California than would be acceptable elsewhere. One of these high costs is for beet transportation. For example, in 1972, Union Sugar, located on the coast near Santa Maria, only contracted some 18,000 acres of their 45,000 acre total in the coastal region. Of the remainder, 11,000 acres were contracted in the South Central Valley, and 16,000 acres were obtained from the Imperial Valley, some 400 miles away. The high transportation costs incurred in this case were more than offset by the economies effected in having the factory operate for more than 300 days that year.

Of the 61,000 acres planted in the Imperial Valley in 1972, only 31,000 were contracted to Holly Sugar, the owners of the only plant in the Valley (Brawley). Apart from Union Sugar's 16,000 acres, another 14,000 were contracted to Spreckles, which shipped production from some 4,500 acres to Arizona for processing at Chandler, the remaining tonnage being shipped north to the company's other factories. Indeed, the logistics of the sugarbeet transport operations in and around California make a fascinating study.* American Crystal

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*See Niles, James N. and French, Ben C., "A Simulation Model of Grower-Processor Coordination in the Beet Sugar Industry," California AES Giannini Foundation, Research Report No. 321 (Davis, 1974), for a study of the Spreckles harvest-transport-processing operation in that state.

is the only company not to transport large tonnages around the state.** One drawback to this mode of operation lies in the need to transport the beets very quickly, since they will begin to spoil if left more than five days in a railcar in hot weather. Another disadvantage to the system is claimed to be a slight lowering of yield per acre. Those planting and harvest times which are most convenient for the sugar companies may not result in an optimal growing season for the sugarbeets, which would have yielded more highly if grown at a different time of the year.
Apart from price fluctuations, four major developments have caused sugarbeet yields and acreage to vary considerably over the years. First, the practice of having beets in the ground for most of the year, coupled with the mild climate, caused severe problems with a complex of diseases known as 'virus yellows.' Only now is the problem being overcome, thanks to the praiseworthy cooperative efforts of the sugar companies, the growers and extension personnel, using resistant varieties (e.g., USH9 seed) and establishing 'beet-free' periods. To avoid carryover of disease on the crop in the ground, whole areas have been designated either 'early plant-early harvest' or 'late plant-spring harvest' areas, and extreme care is taken to ensure that no beets are in the ground for a continuous period of 30 days each year in each area. Although these measures have been highly successful, some reduction in yield and sugar content is claimed to have occurred as a result.

Second, there has been increasing pressure on the land resource from competing crops. The state is well off for competing crops since every crop produced in the United States is produced somewhere in California (Table 8.5 lists the major competitors of sugarbeets). The chief competitors include alfalfa, corn, tomatoes and grains in most areas, with the addition of rice in the northern regions, cotton in the San Joaquin Valley and the Imperial Valley, and cold-weather vegetables in the Imperial Valley and coastal regions. Grape production is expanding very quickly, especially in the coastal counties.

Third, a trend of relocation of beet production to less productive land has been apparent. California fruit and vegetable produce is not only consumed in the eastern United States, but also finds a ready market with the huge and expanding local population. Prices of agricultural land in the coastal region between San Francisco and Los

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**The farmers contracting to the American Crystal plant at Clarksburg are not members of that cooperative, but deal with the company as if it were a private corporation.

Angeles have risen to over $3,000 per acre in some instances, owing to the increased demand for vegetable acreage. Sugarbeet production is tending to relocate away from the coast (Graph 8.2) and some of the marginal land schemes that have been introduced, such as the Lost Hills region of Kern County, have been less than successful, with problems from disease and low sugar content.

The very high water costs encountered inland constitute the fourth factor. Although completion of the California Aqueduct has increased water supply, demand for the resource, from agriculture, industry and the general population, is extremely high (note the figure of $63.00 per acre for water operating costs in Kern County (Table 8.1).)

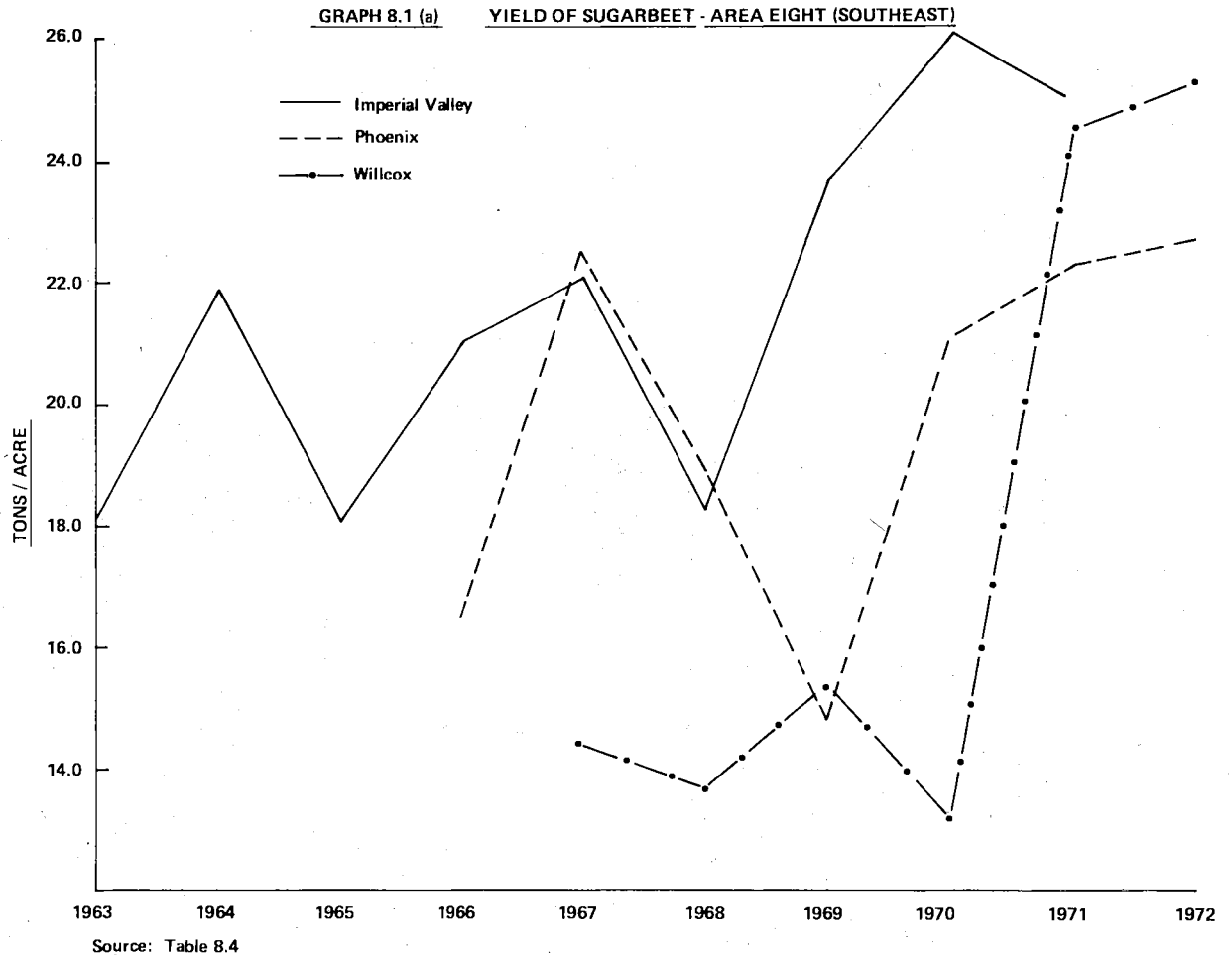
The 1973, planted acreage in California was down by some 57,000 acres to 277,000, but this reduction was partly due to bad weather at planting time. Acreage is expected to stabilize at around 300,000 per year in the future. Yield per acre and sugar content are expected to increase slightly as the growers in marginal areas gain experience, virus attacks are defeated and more care is taken in optimizing planting and harvesting dates. However, competition from crops such as alfalfa and grains which have recently enjoyed spectacular price increases, will have a negative effect (Table 8.3). Many growers grow other crops which return more per acre than do sugarbeets, but these high value crops demand much more management expertise. Replacement of sugarbeets by crops which are easier to grow, such as alfalfa, releases part of the management resource for increased production of the higher valued crops. However, high prices for grains and alfalfa are not guaranteed for the future, and most sugarbeet growers are highly reluctant to lose their history of production for fear that reentering the industry may be much harder than leaving it. One factor arguing for little further acreage reduction lies in the fact that the sugar companies and growers enjoy very amicable relationships, as demonstrated in the co-operative effort to establish 'beet-free' areas. However, if returns from sugarbeets remain significantly and consistently below those from competing crops, the California planted acreage is certain to decline drastically.

Summary and Projections

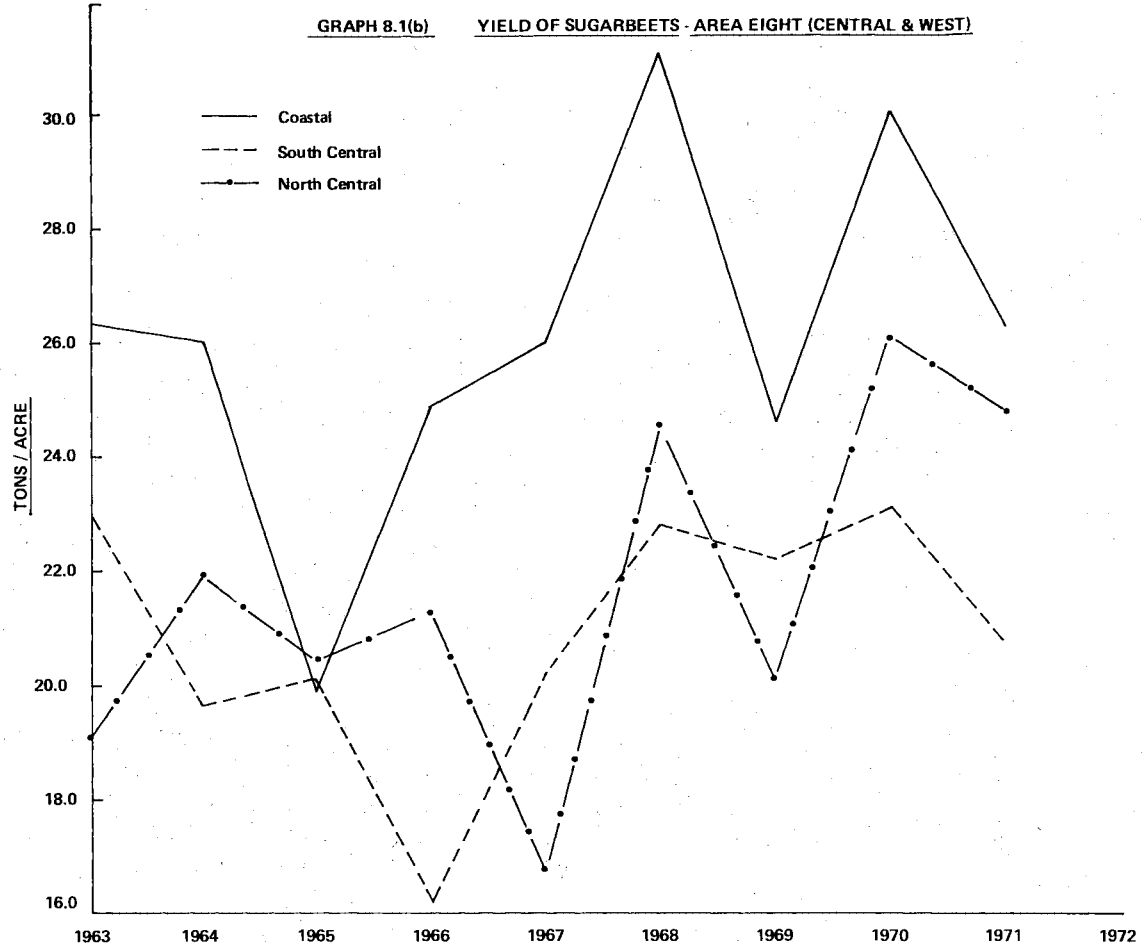
The use of a 5-year yield average partly explains the apparent unprofitability of producing sugarbeets in Arizona and Southern California evident in Tables 8.1-8.3. Recent yield increases suggest that levels of 23 tons per acre in Phoenix, Arizona, and Kern County, California, 25 tons per acre in Willcox, Arizona, 26 tons per acre in the Imperial Valley and 28 tons per acre on the coast might be more reasonable. However, the cost figures provided still seem on the high side, since successful growers expect to achieve net returns of some $80 to $100 per acre.

Altogether, the future of the sugarbeet industry in ASCS Area Eight seems more promising at the present than during the last seven years. Considerable problems with water shortage, disease attack and low yields have been overcome, and yields are expected to maintain levels slightly higher than those of the past, allowing for fluctuations due to weather conditions.

The competition for sugarbeet land from other crops takes an unusual form in Area Eight. According to the budget figures furnished (see Table 8.3), all regions have one or more crops with higher returns than those for sugarbeets (assuming $80-100 per acre for beets)--lettuce, cotton and cantalopes in Arizona, beans, tomatoes, sorghum and rice in the North Central Valley, lettuce, onions, cotton, grapes and peppers in the South Central Valley, broccoli, celery, lettuce, onions, grapes, and tomatoes on the coast, and asparagus, cantalopes, carrots, cotton, garlic, lettuce, onions and watermelons in the Imperial Valley. However, the market for many of these crops is limited, they all have their peculiar growing problems, and all require high inputs of labor, capital and management. Sugarbeets have offered a more modest but predictable return per acre to the grower. Over the next five years, barring unforeseen happenings, the California acreage is expected to stabilize around 300,000 acres and that in Arizona at 20-25,000 acres, with a modest trend towards higher yields per acre.

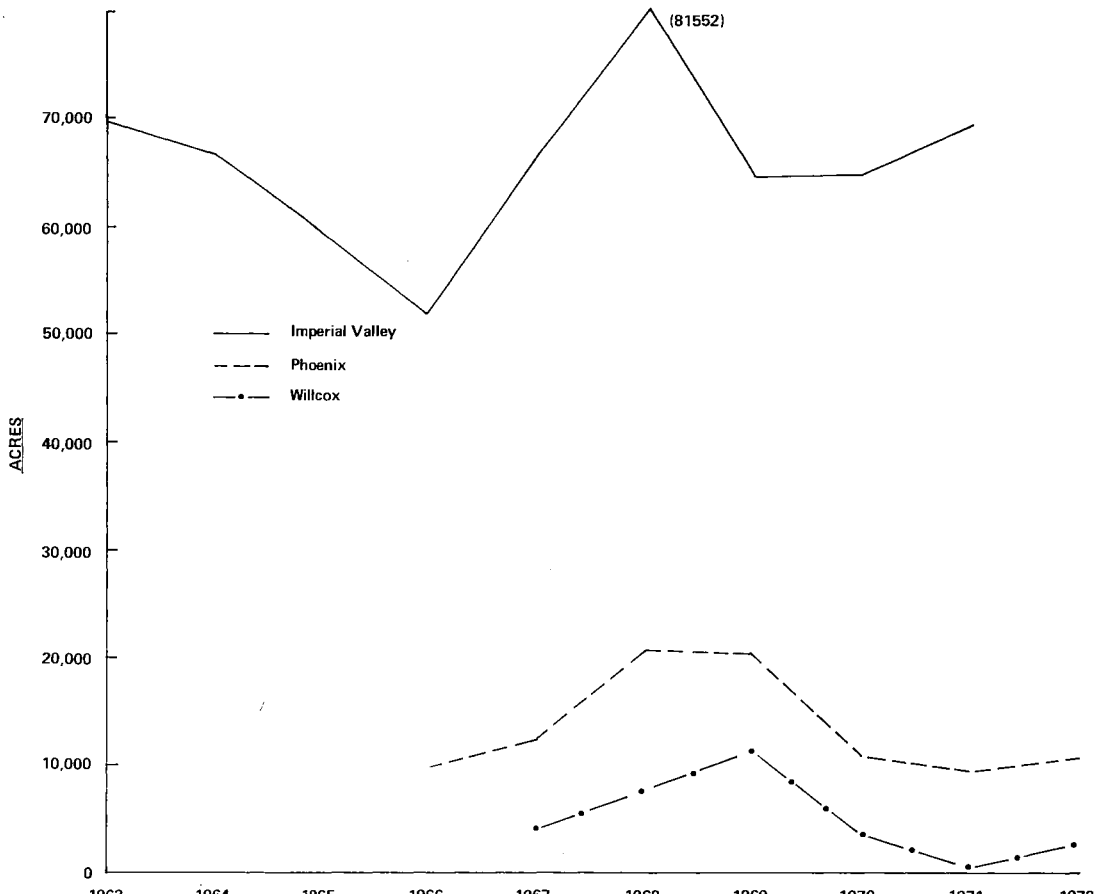

GRAPH 8.1 (a) YIELD OF SUGARBEET - AREA EIGHT (SOUTHEAST)
Imperial Valley
Phoenix
Willcox
TONS / ACRE
26.0
24.0
22.0
20.0
18.0
16.0
14.0
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
Source: Table 8.4

GRAPH 8.1(b) YIELD OF SUGARBEETS - AREA EIGHT (CENTRAL & WEST)



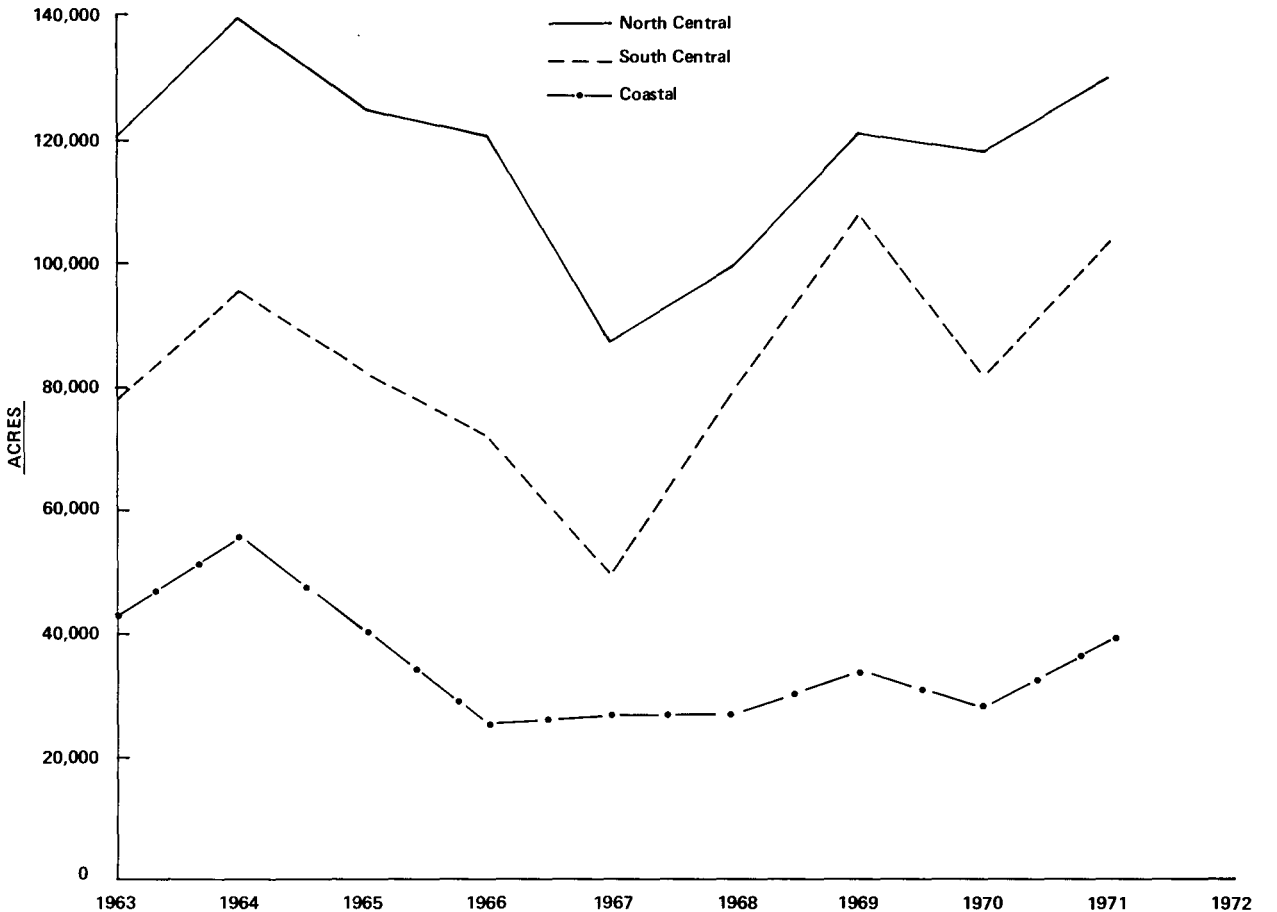
Source: Table 8.4

GRAPH 8.2 (a) PLANTED ACREAGE OF SUGARBEETS - AREA EIGHT / (SOUTHEAST)



Source: Table 8.4

GRAPH 8.2(b) PLANTED ACREAGE OF SUGARBEETS - AREA EIGHT (CENTRAL & WEST)



Source: Table 8.4

TABLE 8.1

1972 PER ACRE COST DATA FOR SUGARBEETS
STUDY DATA
(dollars)

	Arizona Maricopa Co.	Arizona Cochise Co.	California North Central Valley Solano Co.	California North Central Valley Butte Co.	California North Central Valley Colusa Co.	California South Central Valley Kern Co.	California Coastal San Benito Co.	California Desert Imperial Co.	ASCS Area 8	**
Labor-own	24.98	20.88	51.77	32.49	37.07	42.70	58.06	19.71	51.23	62.99[1]
-custom and hand	35.10	35.10	25.88	33.00	44.00	20.00	41.60	29.16	51.65	34.93
Machine operations-own	8.44	8.47	22.60	14.53	21.31	28.00	15.98	. . .	19.80	21.83
-custom	56.34	62.65	55.00	50.14	62.56	54.50	79.75	157.50	74.64	78.95
Seed	6.66	6.66	2.00	4.60	8.05	4.00	3.75	6.00	5.11	5.64
Fertilizer	19.79	23.79	19.75	15.79	10.34	27.00	44.56	51.00	27.75	29.80
Chemicals	16.53	22.80	8.00	18.87	36.30	37.50	. . .	26.00	10.75	18.56
Water operating costs	53.27	31.01	15.45	10.90	10.90	63.00	17.45	13.60	25.63	32.11
Miscellaneous	11.62	14.20	10.43	10.98	7.05	16.80	14.54	. . .	10.54	29.38
Interest on operating capital	8.84	8.45	8.02	7.21	13.58	11.20	7.27	. . .	7.77	7.08
Total variable costs	241.46	234.01	218.90	198.51	251.16	304.70	282.96	302.97	284.87	321.27
Interest on land	74.16	27.81	63.80	63.60	71.36	83.10	115.00	90.00	45.26	57.32[2]
Interest on machinery investment	12.08	9.74	5.34	66.05	6.61	8.15	14.21	. . .	13.02	2.78
Machinery depreciation	21.38	18.37	14.23	18.89	19.10	18.10	28.40	. . .	13.12	11.48
Taxes and insurance	16.88	18.18	. . .	2.37	2.37	3.00	8.19	. . .	25.68	26.25
Water fixed costs	23.16	18.30	. . .	. . .	. . .	. . .	13.35	48.14	. . .	. . .
Total fixed costs	147.66	92.40	83.37	90.91	99.44	112.35	179.15	138.14	97.08	97.83
Total all costs	389.12	326.41	302.27	289.42	350.60	416.05	462.11	441.11	381.95	419.10
5 year average yield (tons/acre)	19.96	18.42	22.44	22.44	22.44	21.80	27.58	23.04	22.77	24.01
5 year average sugar content					15.36	13.75	15.26	16.09	15.02	14.93
Sugar yield (tons/acre)					3.45	3.00	4.21	3.71	3.42	2.88
Cost per ton of sugar					101.62	138.68	109.76	118.90	111.68	145.52

Sources: References 20, 35, 37, 38, 50, 51, 53, 55, 56, 58, Table 8.4, Statistical Background (2)
**ASCS Data-Area 8 - (1972 Cost Study)

[1]Includes farm maintenance labor.

[2]Paid and imputed interest on land and net rent.

TABLE 8.2

1972 PER ACRE COST AND YIELD DATA FOR SELECTED COMPETING CROPS

Crop	Variable Costs	Fixed Costs	Total Costs	Yield
State: ARIZONA, Region: Phoenix				
Alfalfa-establish-irr.	125.00	89.00	214.00	. . .
Alfalfa-produce-irr.	80.00	70.00	+52.80	5.9 tons
Barley-irr.	67.00	73.00	140.00	75 bushels
Cantaloupes-irr.	695.39	85.56	780.95	120.0 cwt.
Cotton-irr.	294.00	117.00	411.00	1.88 bales
Lettuce-fall-irr.	964.98	86.52	1051.50	170 cwt.
Lettuce-spring-irr.	923.73	84.87	1008.60	160 cwt.
Grain sorghum-irr.	67.00	72.00	139.00	78 bushels
Wheat-irr.	83.00	74.00	157.00	67 bushels
Sugarbeets-irr.	241.46	147.66	389.12	19.96 tons
Sugarbeets (Willcox)-irr.	234.01	92.40	326.41	18.42 tons
State: CALIFORNIA, Region: Kern County				
Alfalfa-establish-irr.	79.60	72.00	151.60	. . .
Alfalfa-produce-irr.	192.70	109.10	301.80	8.5 tons
Barley-irr.	88.00	83.02	171.02	83 bushels
Cotton-irr.	293.98	111.31	405.29	15 cwt. seed 10 cwt. lint
Lettuce-irr.	1163.59	68.89	1232.48	270 cwt.
Onions-irr.	283.43	84.21	367.64	360 cwt.
Bell peppers-from seed-irr.	815.13	95.74	910.87	120 cwt.
Bell peppers-transplant-irr.	860.60	95.68	956.48	
Potatoes-irr.	922.52	112.88	1035.40	270 cwt.
Safflower-irr.	113.29	47.71	161.00	25 cwt.
Grain sorghum-irr.	91.17	108.53	199.70	89 bushels
Soybeans-irr.	92.60	121.60	214.20	50 bushels
Sugarbeets-irr.	304.70	112.35	416.05	21.80 tons
State: CALIFORNIA, Region: Solano County				
Alfalfa-established-irr.	45.65	64.26	109.91	. . .
Alfalfa-produce-irr.	145.40	89.24	234.64	7.0 tons
Barley-irr.	31.38	46.19	77.57	35 cwt.
Pink beans-single-irr.	140.27	64.93	205.20	22 cwt.
Pink beans-double-irr.	123.54	40.18	163.72	15 cwt.
Field corn-irr.	177.19	80.45	257.64	140 bushels
Safflower-irr.	45.58	82.45	128.03	17 cwt.
Grain sorghum-irr.	70.26	47.38	117.64	107 bushels
Tomatoes-irr.	460.63	191.39	652.02	24.0 tons
Wheat-irr.	39.72	81.15	120.87	83 bushels
Sugarbeets-irr.	218.90	83.37	302.27	22.44 tons

Table 8.2 (Continued)

	Variable Costs	Fixed Costs	Total Costs	Yield
State: CALIFORNIA, Region: Colusa County				
Rice-irr	137.04	97.85	234.89	54 cwt.
Sugarbeets-irr.	251.16	99.44	350.60	22.44 tons
State: CALIFORNIA, Region: Butte County				
Sugarbeets-irr.	198.51	90.91	289.42	22.44 tons
State: CALIFORNIA (Coastal), Region: San Benito				
San Benito Alfalfa green-irr.	107.76	154.12	261.88	31.5 tons
San Benito Alfalfa hay irr.	80.74	172.47	253.21	7.0 tons
San Benito Barley-dry	34.68	64.07	98.75	52.1 bushels
San Benito Lettuce-irr.	1155.65	88.74	1244.39	258.5 cwt.
San Benito Peppers-irr.	1556.49	205.43	1761.92	195.0 cwt.
San Benito Tomatoes-process-irr.	726.12	206.54	932.66	30.0 tons
San Benito sugarbeets-irr.	282.96	179.15	462.11	27.58 tons
State: CALIFORNIA (Coastal), Region: Monterey				
Monterey small white beans-irr.	7187.97	123.02	312.99	22 cwt.
Monterey broccoli-irr.	307.79x	139.06	448.85	60 cwt.
Monterey cauliflower-irr.	1334.65	117.82	1452.47	125 cwt.
Monterey celery-irr.	2592.23	207.71	2799.94	600 cwt.
Monterey lettuce-irr.	1109.28	129.55	1238.83	256.2 cwt.
Monterey onions process-irr.	478.34	233.40	711.74	400.0 cwt.
Monterey spinach-irr.	186.70	128.26	314.96	10.0 tons
Monterey tomatoes-m/c harv.-irr.	726.12	206.54	932.66	30.0 tons
Monterey tomatoes-hand harv.-irr.	1815.42	186.19	2001.61	11.0 tons
State: CALIFORNIA, Region: Imperial County				
Alfalfa-hay-irr.	173.43	116.75	290.18	7.0 tons
Alfalfa-seed-irr.	92.62	68.81	161.43	4 cwt.
Asparagus-irr.	1220.50	174.70	1395.20	40 cwt.
Cereal crops-irr.	85.70	79.04	164.74	125 bushels
Cabbage-irr.	1019.48	130.94	1150.42	250 cwt.
Cantaloupes-spring-irr.	818.38	120.04	938.42	128 cwt.
Cantaloupes-fall-irr.	767.08	113.91	870.99	128 cwt.
Carrots-irr.	1641.78	125.68	1767.46	270 cwt.

x excludes harvest costs

Table 8.2 (Continued)

Crop	Variable Costs	Fixed Costs	Total Costs	Yield
State: California, Region: Imperial County (Continued)				
Cotton-irr	265.30	135.87	401.17	1500 pounds
Garlic-irr.	461.18	127.62	588.80	100 cwt.
Lettuce-irr.	1081.68	137.16	1218.84	234 cwt.
Onions-market-irr.	1154.98	130.50	1285.48	300 cwt.
Grain sorghum-irr.	888.80	56.51	145.31	89 bushels
Sudangrass-irr.	104.10	55.06	159.16	6.0 tons
Tomatoes-mature green-irr.	1859.53	141.04	2000.57	160 cwt.
Watermelons-irr.	488.38	125.84	614.22	200 cwt.
Ryegrass-pasture-irr.	67.50	67.63	135.13	. . .
Sugarbeets-irr.	302.97	138.14	441.11	23.04 tons

Sources: References 32, 33, 38, 53, 55-58, 48, 50, 51, Table 8.1

TABLE 8.3

1972 AND ESTIMATED 1973 PER ACRE NET RETURNS FOR SELECTED COMPETING CROPS

Crop	1972 Total Costs	1972 Price**	1972 Net Returns	1973 Total Costs*	1973 Price**	1973 Net Returns
State: ARIZONA, Region: Phoenix						
Alfalfa-establish-irr.	214.00	. . .	. . .	228.98	. . .	. . .
Alfalfa-produce-irr.	202.80	35.00	3.70	217.00	41.50	27.85
Barley-dry	140.00	1.53	(25.25)	149.80	2.05	3.95
Cantaloupes-irr.	780.95	8.20	203.05	835.62	10.40	412.38
Cotton-irr.	411.00	0.42 +146.00	288.94	439.77	0.5+ 150.00	358.86
Lettuce (fall)-irr.	1051.50	8.16	335.70	1125.11	4.00	(445.11)
Lettuce (spring)-irr.	1008.60	5.53	(123.80)	1079.20	12.20	872.80
Grain sorghum-irr.	139.00	1.98	15.44	148.73	3.03	87.61
Wheat-dry	157.00	1.71	42.43	167.99	2.64	8.89
Sugarbeets-irr.	389.12	16.53	(59.18)	416.36	N/A	. . .
Region: Willcox						
Sugarbeets-irr.	326.41	16.12	(29.48)	349.26	N/A	. . .
State: CALIFORNIA, Region: Solano County (North Central Valley)						
Alfalfa-establish-irr.	190.91	. . .	. . .	117.60	. . .	. . .
Alfalfa produce-irr.	234.64	34.50	6.86	251.06	48.00	84.94
Barley-dry	77.57	1.64	(20.17)	83.00	2.35	(0.75)
Pink beans-single crop-irr.	205.20	19.70	228.20	219.56	31.50	473.44
Pink beans-double-irr.	163.72	19.70	131.78	175.18	31.50	297.32
Corn for grain-irr.	257.64	1.94	13.96	275.67	3.08	155.53
Safflower-irr.	128.03	7.86	5.65	136.99	N/A	. . .
Grain sorghum-irr.	117.64	1.87	82.71	125.87	2.95	190.19
Tomatoes-irr.	652.02	34.00	163.98	697.66	41.10	288.74
Wheat-irr.	120.87	2.01	45.96	129.33	3.32	146.23
Sugarbeets-irr.	302.27	17.91	99.63	323.43	N/A	. . .
Region: Colusa County (North Central Valley)						
Rice-irr.	234.89	6.83	133.93	251.33	13.50	477.67
Sugarbeets-irr.	350.60	17.91	51.30	375.14	N/A	. . .

Table 8.3 (Continued)

Crop	1972 Total Costs	1972 Price**	1972 Net Returns	1973 Total Costs	1973 Price**	1973 Net Returns
State: CALIFORNIA, Region: Butte County (North Central Valley)						
Sugarbeets-irr.	289.42	17.91	112.48	309.68	N/A	. . .
Region: Kern County (South Central Valley)						
Alfalfa establish-irr.	151.60	. . .	. . .	162.21	. . .	. . .
Alfalfa produce-irr.	301.80	34.50	(8.55)	322.93	48.00	85.07
Barley-irr.	171.02	1.64	(34.90)	182.99	2.35	12.06
Cotton-irr.	405.29	seed= 2.87 lint= 0.40	37.76	433.66	seed= 3.50 lint= 0.55	168.84
Lettuce-irr.	1232.48	5.38	220.12	1318.75	7.14	609.05
Onions-irr.	367.64	3.19	780.76	393.37	3.03	697.43
Bell peppers-from seed-irr.	910.87	9.96	284.33	974.63	12.26	496.57
Bell peppers-transplants-irr.	956.48	9.96	238.72	1023.43	12.26	447.77
Potatoes-irr.	1035.40	3.07	(206.50)	1107.88	5.49	374.42
Safflower-irr.	161.00	7.86	35.50	172.27	N/A	. . .
Grain sorghum-irr.	199.70	1.87	(33.27)	213.68	2.95	48.87
Soybeans-irr.	214.20	4.37	4.30	229.19	5.65	53.31
Sugarbeets-irr.	416.05	17.91	(25.61)	445.17	N/A	. . .
Region: San Benito County (Coastal)						
Alfalfa-green-irr.	261.88	. . .	. . .	280.21	. . .	. . .
Alfalfa-hay-irr.	253.21	34.50	(11.71)	270.93	48.00	65.07
Barley-dry	98.75	1.64	13.34	105.66	2.35	16.73
Lettuce-irr.	1244.39	5.38	146.34	1331.50	7.14	514.19
Onions-market-irr.	1010.40	3.19	744.10	1081.13	3.03	585.37
Peppers-irr.	1761.92	9.96	180.28	1885.25	12.26	505.45
Tomatoes for process-irr.	686.84	34.00	333.16	734.92	41.10	498.08
Sugarbeets-irr.	462.11	17.91	31.85	494.46	N/A	. . .

Table 8.3 (Continued)

Crop	1972 Total Costs	1973 Price**	1972 Net Returns	1973 Total Costs	1973 Price**	1973 Net Returns
State: CALIFORNIA, Region: Monterey County (Coastal)						
Small white beans-irr.	312.99	19.70	120.41	334.90	31.50	358.10
Broccoli-irr.	448.85	13.90	385.15	480.27	15.80	467.73
Cauliflower-irr.	1452.47	14.40	347.53	1554.14	17.10	583.36
Celery-irr.	2799.94	6.00	800.06	2995.94	6.27	766.06
Lettuce-irr.	1238.83	5.38	139.53	1325.55	7.14	503.72
Onions for process-irr	711.74	3.19	564.26	761.56	3.03	450.44
Spinach for process-irr.	314.96	39.00	75.04	337.01	40.70	69.99
Tomatoes-m/c-harvest-irr.	932.66	34.00	87.34	997.95	41.10	235.05
Tomatoes-hand-irr.	2001.61	18.60	2090.39	2141.72	21.50	2588.28
State: CALIFORNIA, Region: Imperial County						
Alfalfa hay-irr.	290.18	34.50	(48.68)	310.49	48.00	25.51
Alfalfa seed-irr.	161.43	43.60	12.97	172.73	93.70	202.07
Asparagus-irr.	1395.20	26.30	(343.20)	1492.86	30.80	(260.86)
Barley-irr.	164.74	1.64	40.26	176.27	2.35	117.48
Cabbage-irr.	1150.42	3.60	(250.42)	1230.95	5.30	94.05
Cantaloupes-spring-irr.	938.42	7.09	(30.90)	1004.11	9.31	187.57
Cantaloupes-fall-irr.	870.99	5.24	(200.27)	931.96	6.20	(138.36)
Carrots-irr.	1767.46	6.75	55.04	1891.18	7.06	15.02
Cotton-irr	401.17	0.40	198.83	429.25	0.55	395.75
Garlic-irr.	588.80	9.84	395.20	630.02	12.30	599.98
Lettuce-irr.	1218.84	5.38	40.08	1304.16	7.14	366.60
Onions-market-irr.	1285.48	6.48	658.52	1375.46	7.36	832.54
Grain sorghum-irr.	145.31	1.87	21.12	155.48	2.95	107.07
Sudangrass-irr.	159.16	35.00	50.84	170.30	N/A	. . .
Tomatoes-mature-green-irr.	2000.57	17.20	751.43	2140.61	20.10	1075.39
Watermelons-irr	614.22	2.62	(90.22)	657.22	4.61	264.78
Ryegrass pasture-irr	135.13	. . .	. . .	144.59	. . .	. . .
Sugarbeets-irr.	441.11	19.15	0.11	471.99	N/A	. . .
Wheat-irr.	164.74	2.01	86.51	176.27	3.32	238.73

*Estimated at 107 percent of 1972 Total Costs
**Includes Government payments, if any.

Sources: Table 8.2, References 18, 34, 45.

TABLE 8.4

SUGARBEET PRODUCTION

Year	Number of Farms	Planted Acres per Farm	Acres Planted	Acres Harvested	Percent Acres Harvested	Yield (tons/acre) Harvested	Tons Marketed
ARIZONA: Phoenix							
1963							
1964							
1965							
1966	108	90.9	9814	9079	93	16.5	149852
1967	115	107.1	12319	12199	99	22.5	274832
1968	166	123.6	20512	19904	97	18.9	375721
1969	158	128.3	20275	19338	95	14.8	286132
1970	69	157.9	10896	9989	92	21.1	210457
1971	50	188.2	9410	9201	98	22.3	205576
1972	52	240.0	12480	12464	100	23.0	286272
1973	38	244.8	9304	9268	100	23.8	220803
ARIZONA: Willcox and West New Mexico							
1963							
1964							
1965							
1966							
1967	68	56.5	3844	3444	90	14.4	49414
1968	997	77.4	7508	5556	74	13.7	75818
1969	119	94.8	11282	10403	92	15.4	160341
1970	36	96.3	3465	2207	64	13.2	29110
1971	4	95.0	380	380	100	24.5	9302
1972	5	115.4	577	577	100	26.3	15166
1973	7	115.6	809	779	96	18.4	14360
CALIFORNIA: North Central Valley							
1963	775	154.9	120063	115815	96	19.0	2195958
1964	843	165.9	139853	136460	98	21.9	2981923
1965	823	151.6	124723	120384	97	20.4	2460038
1966	696	172.9	120316	114961	96	21.3	2452458
1967	478	182.1	87031	76724	88	16.7	1277314
1968	532	186.2	99081	91971	93	24.5	2254585
1969	590	204.1	120402	113596	94	20.1	2280420
1970	629	187.8	117575	114950	98	26.1	3000889
1971	621	207.9	129104	128590	100	24.8	3193114
1972	633	219.3	138829	136718	98	29.2	3991447
1973	574	218.0	125155	115235	92	20.2	2325681

Table 8.4 (Continued)

Year	Number of Farms	Planted Acres per Farm	Acres Planted	Acres Harvested	Percent Acres Harvested	Yield (tons/acre) Harvested	Tons Marketed
CALIFORNIA: Coastal							
1963	517	81.9	42334	41460		26.3	1088421
1964	614	90.8	55778	45018		26.0	1427923
1965	493	82.3	40601	39622		19.9	787361
1966	319	79.8	25470	25176		24.6	626238
1967	300	87.8	26330	25664	97	26.0	666281
1968	266	100.1	26613	26357	99	31.0	817073
1969	284	119.2	33851	32553	96	24.6	801700
1970	274	98.2	27883	27506	99	30.0	825819
1971	224	170.1	38101	37709	99	26.3	991989
1972	291	180.1	31446	31099	99	33.4	1038019
1973	172	86.0	14791	13888	94	26.7	371215
CALIFORNIA: South Central Valley							
1963	633	122.0	77215	76620	99	23.1	1770415
1964	677	140.6	95192	93819	99	19.6	1840309
1965	612	134.4	82180	81097	99	20.1	1625907
1966	437	164.4	71852	69668	97	16.2	1127833
1967	286	157.1	44919	44486	99	20.2	898813
1968	333	238.4	79462	76867	97	22.8	1753311
1969	381	282.1	107491	105763	98	22.2	2348124
1970	364	223.7	81423	80770	99	23.1	1865595
1971	372	276.4	102807	101535	99	20.7	2097027
1972	357	262.7	93790	87458	93	24.3	2124882
1973	312	214.7	66981	65049	97	23.9	1553610
CALIFORNIA: Imperial Valley							
1963	408	170.7	69648	69419	100	18.1	1256181
1964	387	173.0	66952	66083	99	21.9	1446353
1965	303	196.7	59609	58856	99	18.1	1066944
1966	223	232.7	51882	50736	98	21.0	1063133
1967	236	280.2	66130	64358	97	22.1	1421731
1968	250	326.2	81552	81220	100	18.3	1484448
1969	225	286.8	64538	64140	99	23.7	1517466
1970	210	308.0	64686	64686	100	26.1	1690586
1971	206	335.0	69006	68739	100	25.0	1720503
1972	217	321.4	69750	69715	100	25.0	1743093
1973	194	360.0	69841	69841	100	26.7	1864828

Sources: Reference 22 (Appendix 1), Statistical Background (1)

TABLE 8.5

1972 HARVESTED ACREAGES OF COMPETING CROPS
IN SUGARBEET COUNTIES

Crop	Arizona Phoenix	Willcox	California North Central Valley	South Central Valley	Coastal	Imperial Valley
Alfalfa hay	182000	17000	238860	593327	35786	109558
Barley	99000	9600	257570	463204	125530	96809
Dried beans and peas	1200	. . .	66768	29338	32313	1455
Broccoli	1200					
Cabbage	1200					
Cantaloupes	11150					
Carrots	3800					
Cauliflower	1100					
Corn Grain	50000	300	217510	159256	5146	5045
Corn Silage	4050	750				
Cotton	246780x	37986x	. .	827347	. . .	43603
Wild and Grain hay	26800	3000	117410	25971	116388	23373
Lettuce	43800	1400	3348	9400	85446	48739
Oats	. . .	. . .	23210	8324	1551	4115
Onions	1500	. . .	. . .	. . .	. . .	. . .
Pasture	. . .	. . .	422070	319800	29349	51979
Potatoes	8000	. . .	2320	34224	8301	4469
Rice	. . .	. . .	296380	22780	. . .	. . .
Safflower	33000	. . .	103046	59203	450	260
Grain sorghum	61300	74100	121365	76155	. . .	56305
Tomatoes	. . .	. . .	131216	42750	29394	3221
Wheat	141700	27200	188307	104476	66383	84757
Other vegetables and melons	5700	. . .	90302	90698	181674	66343
Seed crops	. . .	. . .	66315	100849	12417	6306
Grapes	44004	. . .	60705	316689	11529	22125
Sugarbeets	10592	12259	128590x	101535x	37709x	68739x

x 1971 data

Sources: References 34, 45.

STATISTICAL BACKGROUND

(1) The sub-areas chosen include the following counties:

ARIZONA--Phoenix--Maricopa, Pima, Pinal, Yuma.

Willcox--Cochise, Graham, Greenlee, New Mexico-Grant and Hidalgo Counties.

CALIFORNIA--North Central Valley--Amador, Butte, Colusa, Contra Costa, Glenn, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, Tehama, Yolo, Yuba.

South Central Valley--Fresno, Kern, Kings, Madera, Merced, Tulare.

Coastal--Alameda, Monterey, Orange, San Benito, San Luis Obispo, Santa Barbara, Santa Clara, Santa Cruz, Ventura.

Imperial Valley--Imperial, Los Angeles, Riverside, San Bernardino.

(2) Sugar Content

From the records of the ASCS and the Spreckels Sugar Company, the 5-year average sugar content percentages are taken as follows:

ARIZONA	Phoenix	13.93%
	Willcox	13.05%
CALIFORNIA	North Central Valley	15.36%
	South Central Valley	13.75%
	Coastal	15.26%
	Imperial Valley	16.09%

CHAPTER XII

THE FUTURE

The Effect of Comparative Production Costs on Location of Production

The introductory chapters of this report include the observation that no sound methodology appears to have been developed for forecasting the location of U.S. sugarbeet production. The statistical analysis carried out suggests that significant production cost differences often occur between the subareas within a given area (see Table X.1 of each area description). The foundation for a predictive methodology might be laid were it possible to demonstrate that comparative costs of production bore some relationship to levels of production. Therefore a test was made of the simple hypothesis that the trend in planted acreage in a subarea bears a relation to whether that subarea's costs of production are higher or lower than the ASCS costs for the area.

The first set of tables of each area report have been used as source material for the construction of Table 12.1. This table lists, by subarea within area, the production costs per acre of sugarbeets (Column C) and per ton of sugar (Column D). ASCS area costs for the same categories are listed in Columns E and F. The first Column (G) under the heading "ASCS Cost Index" is derived by dividing the ASCS area cost per acre by the subarea cost per acre and expressing the result as a percentage. A figure in Column G which is greater than 100 indicates that the ASCS area cost is greater than that for the subarea. This being the case, production in the subarea might be expected to increase, since production costs are below the area average. The figures in Column H are derived in a similar fashion to show the same type of relationship between the cost per ton of sugar in the ASCS area and in the various subareas.

The figures listed in Column I, below the heading "Acreage Index," represent the trend in planted acreage from 1968 to 1972 (1971 in Arizona and California). This time period was selected because the U.S. beet sugar industry was undoubtedly affected both by the ban on importation of Cuban sugar after 1960 and by the exceptionally high world sugar prices in 1963, but it seems reasonable to assume that any resulting effects to the structure of the industry would have taken place by 1968. Further, no new beet factories came into production between 1968 and 1972. The "Acreage Indices" were derived by dividing the 1968 planted acreage by the 1968-1972 average

TABLE 12.1

COMPARISON OF SUBAREA PRODUCTION COSTS
WITH ASCS AREA DATA

ASCS Area	Subarea	Subarea Acre	Cost/ Ton Sugar	ASCS Acre	Cost/ Ton Sugar	ASCS Cost	ASCS Index	Acreage Index	Code
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
1	Ohio	321	111	340	125	106	113	111	A
	Michigan	206	77	340	125	165	162	102	F
2	South Minnesota	161	70	179	86	111	123	71	D
	Red River Valley	186	90	179	86	96	96	95	B
3	Colorado-North Central	225	79	275	96	122	122	88	D
	Colorado-South Platte	235	89	275	96	117	108	101	F
	Colo/Ks-High Plain	216	83	275	96	127	116	112	A
	Wyoming-Eastern	322	107	275	96	85	90	105	G
	Nebraska-Panhandle	259	85	275	96	106	113	114	A
4	Colorado-Delta	235	76	298	105	127	138	89	D
	Colo/Ks-Arkansas R.V.	246	111	298	105	121	95	86	H
	Texas-High Plains	215	75	298	105	139	140	84	D
5	Montana-Hamilton	316	105	288	100	91	95	92	B
	Montana-Billings	269	92	288	100	107	109	83	D
	Montana-Sidney	255	90	288	100	113	111	90	D
	Wyoming-North Central	322	108	288	100	89	93	96	B
6	Utah	256	93	296	110	116	118	96	D
	Idaho-Twin Falls	281	97	296	110	105	113	100	F
	Idaho-Idaho Falls	289	123	296	110	102	89	92	B
7	Idaho-West	302	87	426	118	141	136	93	D
	Oregon	343	97	426	118	124	122	99	D
	Washington-Columbia	378	99	426	118	113	119	123	A
8	Arizona-Lowland	389	140	382	117	98	84	70	K
	Arizona-Highland	326	136	382	117	117	86	67	L
	*N. California-Solano	302	88	382	117	126	133	122	A
	California-Butte	389	84	382	117	132	139	122	A
	California-Colusa	351	102	382	117	109	115	122	A
	E. California-Kern	416	139	382	117	92	84	117	E
	W. California-S. Benito	462	110	382	117	83	106	122	J
	S. California-Imperial	441	119	382	117	87	98	86	C

*California 1972 planted acreages taken from unofficial estimates.

Sources: Table X.1 of each area report

TABLE 12.2

CLASSIFICATION OF TABLE 12.1

Column j) Code	Subarea Planted Acreage	ASCS per Acre Costs*	ASCS per Ton Costs*	Number of Occurrences	Result
A	Up	High	High	7	Consistent
B	No Change	No Change	No Change	4	Consistent
C	Down	Low	No Change	1	Indeterminate
D	Down	High	High	9	Inconsistent
E	Up	Low	Low	1	Inconsistent
F	No Change	High	High	3	Indeterminate
G	No Change	Low	Low	1	Indeterminate
H	Down	High	No Change	1	Indeterminate
J	Up	Low	No Change	1	Indeterminate
K	Down	No Change	Low	1	Indeterminate
L	Down	High	Low	1	Indeterminate
				30	

*"High" signifies that ASCS costs were higher than those for the subarea, etc.

Source: Table 12.1

planted acreage and expressing the result as a percentile (a number above 100 signifies that planted acreage rose). Although this index cannot be defended as statistically rigorous, it appears to be satisfactory as a proxy variable for trends in planted acreage levels. Comparing the Acreage Index in Column I with the eight ASCS area graphs of planted acreage suggests that in all but three cases the Index does reflect the shape of the graph. Acreage in the South Platte Valley and High Plains regions of Colorado and Kansas did not reach maximum levels until 1969, one year after the opening of the Goodland Factory. Thus, the use of a low divisor (the 1968 acreage) resulted in the Acreage Index being too high in each case. Conversely, the 1968 planted acreage in California's Imperial Valley was exceptionally high, probably reflecting enthusiasm generated by the initial success of the nearby Arizona beet industry, resulting in a low Acreage Index of 86. If the 1968 figure is ignored, planted acreage in the Imperial Valley has in fact tended to increase somewhat during the last five years.

Many combinations of circumstances are indicated in Table 12.1. ASCS area costs may be higher ("High") or lower ("Low") than those for the subareas; and planted acreage may have increased or decreased. Also, to allow for inaccuracies in the source data, an intermediate "No Change" case is considered to occur whenever an index is within 10 percent of 100. Codes for the combinations that actually occurred are recorded in Column J of Table 12.1, and Table 12.2 explains the meaning of these codes.

An example may help to clarify this somewhat unorthodox methodology. Referring to Table 12.1, "Colorado-Delta" is a subarea of ASCS Area 4. The ASCS cost per acre (Column E) is greater than the subarea cost per acre (Column C) so Column G registers an ASCS Cost Index greater than 100, specifically 127. Similarly, the ASCS cost per ton of sugar (Column F) is greater than the subarea cost (Column D) so Column B is also over 100 (i.e., 138). The Acreage Index of 89 in Column I reflects the reduction in planted acreage since 1968 (See Table 4.4). The code in Column J is D. Referring to Table 12.2 the D code states that subarea planted acreage has declined, and the ASCS per acre and per ton costs were "High" in comparison with those for the subarea. The number of occurrences of each code in Table 12.1 is also listed in Table 12.2 and each code is categorized as consistent or inconsistent with the original hypothesis.

Results "consistent" with the hypothesis were achieved if, in cases where the ASCS area costs were above, below, or the same as the subarea costs, the planted acreage in the subarea had respectively risen, fallen, or not changed. "Inconsistent" results were achieved if, when the ASCS area costs were above those of a subarea, planted acreage fell. "Indeterminate" results, which appeared to neither

support nor invalidate the hypothesis, also occurred.

Of the twenty-seven (i.e., 3x3x3) possible combinations of trends in planted acreage and relationships of ASCS area costs to those in the subareas, eleven combinations actually occurred. Of the thirty observations, eleven were in the A or B "consistent" code categories, tending to support the hypothesis. Ten D and E code results were "inconsistent" with the hypothesis, and nine "indeterminate" cases also occurred.

Upon further examination of the "consistent" cases, support for the hypothesis diminishes even more. In Area One, both the Ohio and Michigan costs are below the ASCS area costs, thus casting doubts on the validity of either or both sets of cost data. Further, local authorities hold that costs in excess of $210 per acre would prevent producers from making a reasonable profit (see Area One description). "Consistent" results in Areas 2, 3 and 6 seem reasonable but the Hamilton, Montana, data (ASCS Area 5) are atypical of the beet industry as a whole, since they refer to a very small acreage located far from a factory. Also in Area 5, the North Central Wyoming costs do not reflect the value attributed to beet tops by farmers in the area. A feeding value of some $40 per acre is equivalent to reducing costs to roughly $280, resulting in "No Change" cases in Columns G and H. All the subarea costs in Area Seven are below the ASCS figures, again raising questions as to the validity of the data. "Consistent" results in Northern California do seem to bear out the expansion of production in that subarea relative to other subareas in ASCS Area 8.

Thus, the hypothesis that comparitive costs of production bear some relationship to changes in levels of production does not seem to be supported to any extent. Two conclusions can be drawn. First, the hypothesis is probably not tenable, i.e., relative costs of production do not have a great effect in determining changes in production levels. Second, the previously noted (Chapter Three) inconsistencies between ASCS and subarea cost of production studies greatly reduce the value of this form of analysis.

Estimates of Future Production Levels

The inconclusive results of the analysis conducted in the first part of this chapter did not result in a predictive methodology based on quantifiable data. However, the stated objective of this report, i.e., to predict 1980 production levels, can be partly served by presenting a list of what, in the opinion of the authors, will be the levels of production in the various subareas by 1980. This subjective analysis is summarized in Table 12.3, which indicates the position of the industry in 1972, and in Table 12.4, which indicates the expected position in 1980.

TABLE 12.3

1972 PRODUCTION IN THE U.S. SUGARBEET INDUSTRY, AND FACTORS INFLUENCING THE LEVEL OF PRODUCTION

Area	Subarea	1972 Acreage	1972 Yield (tons/acre)	Most Important Influences
1	Ohio	44,000	19.0	1,4,5,7
	Michigan	94,000	18.5	1,2,3
2	South Minnesota	20,000	15.5	1,5,7
	Red River Valley	165,000	13.5	5,6
3	Colorado-North Central	58,000	18.0	1,2,3,4,5,7
	Colorado-S. Platte Valley	42,000	17.5	1,4,5,7
	Colo/Kansas-High Plains	63,000	17.0	1,4,5,7
	Wyoming-Eastern	20,000	18.0	6
	Nebraska-Panhandle	89,000	18.5	1,4,5,7
4	Colorado-Delta	9,000	20.0	1,8
	Colo/Kans.-Arkansas River Valley	19,000	16.5	1,5,7
	Texas-High Plains	26,000	21.0	1,7
5	Montana-Missoula	450	18.5	4,5,6,9
	Montana-Townsend	2,100	13.0	4,5,6,9
	Montana-Billings	24,000	18.0	4,5,6,9
	Montana-Sidney	18,000	17.5	6,9
	Montana-Chinook	1,100	13.5	4,5,6,9
	Wyoming-North Central	39,000	18.0	4,5,6
	North Dakota-Western	9,000	16.5	6,9
6	Utah	22,000	18.0	1,2,3
	Idaho-Twin Falls	81,000	18.0	1,7
	Idaho-Idaho Falls	37,000	15.0	1,2
7	Idaho-Western	62,000	22.5	1,2,7
	Oregon-Eastern	21,000	23.0	1,2,7
	Washington-Columbia Basin	96,000	24.0	1,7
8	Arizona-Lowland	11,000	20.0	1,7
	Arizona-Highland	2,600	18.0	1,7,9
	California-North Central Valley	129,000	22.5	1,2,7
	California-South Central Valley	102,000	22.0	1,7
	California-Coastal	38,000	27.5	1,2,7,9
	California-Imperial Valley	69,000	23.0	1,7

Influence codes: (a) Tending to reduce production
(1) Pressure from competing crops
(2) Urbanization pressure on land resource
(3) Implementation of harsh pollution control legislation

(b) Necessary for expansion of production to occur
(4) Cooperative takeovers carried out successfully
(5) Producer cooperatives prove to be viable concerns
(6) Reasonable returns from beet production regardless of prices of competing crops
(7) Stable prices for sugarbeets
(8) Success of local sugar-using industries
(9) No disproportionate rise in rail rates

Table 12.3 lists, by subarea, 1972 acreages and yields rounded respectively to the nearest thousand acres or half ton per acre. Codes for those particular influences which are considered to be the most important in determining future production in each subarea are listed in the last column. It is not held that these are the only influences acting in a subarea, but in the opinion of the authors, they are the most important. The influence codes are explained at the foot of the table. It can be seen that nine factors of primary importance have been recognized of which three have been recognized as tending to reduce production and six are necessary for expansion to occur. The numbers used for the codes are for identification purposes only and have no quantitative function; that is, influence Number 2 is not necessarily more important than influence Number 8. The actual relative importance of these factors can best be assessed by consulting the appropriate area description.

Using the Delta, Colorado, subarea (ASCS Area 4) as an example, the influence codes should be interpreted as follows: Although a considerable number of factors will obviously interact in the future in the Delta, Colorado, subarea, two are considered to be of primary importance in influencing production levels. Influence Number 1 states that a continuation of price competition from other crops will tend to reduce acreage. Although this may seem a somewhat obvious statement, reference to Table 12.3 will show that in some of the more northerly subareas, such as Wyoming and Montana, competition from other crops is not held to be as important, owning to low yields and the feed value of beet tops, and therefore, influence Number 1 is not recorded for these northerly subareas. Influence code Number 8 is noted for the Delta subarea to indicate that for further expansion of production to occur in this subarea, local sugar-using industries must be successful.

The original intention in this report was to produce a list stating, with some degree of certainty, what acreage and yield might be expected in each subarea by 1980. However, it became very apparent during the course of the research that the changing nature of the beet sugar industry would not justify any such definite statements. Over the past fifteen years, various sections of the industry have been affected by a political crisis (Cuba), unexpected disease attack (California and Arizona), and the emergence of producer-controlled cooperatives. Furthermore, the industry has also been affected by the past stability and continuity of the U.S. Sugar Act. Recently, however, the Sugar Act has expired, alternative crop enterprises have suddenly become highly competitive, and severe pollution control regulations have been proposed. To make firm predictions in the face of these changes would be folly. For example, consider the prices of competing crops. Almost to a man, the local experts surveyed were convinced that prices would quickly drop from the peaks

of 1973 and reestablish at some level intermediate between those of 1971 and 1973. However, when pressed, the explanation for such a statement usually took the form of "that is what prices were, and that is what they will be." It may indeed be true that the high levels of 1973 will not be repeated, but it may also be true that with a growing world food shortage, and the transitory nature of international trading agreements, 1973 may merely be the first of several years, not necessarily consecutive, in which crop prices attain very high levels. Five years ago, the competitive position of sugarbeets relative to other crops was fairly well established in most production regions, and predictions could have been made confidently, but such was not the case at the time that this report was prepared.

Recognizing that the correctness of a single definite prediction of 1980 production would be due more to luck than judgement, the authors have restricted themselves to forecasting, in Table 12.4, what they consider 1980 production levels would be under two sets of conditions. "Favorable Conditions" refer to a situation in which, by 1980, everything has gone right for the beet sugar industry in a given subarea. Such conditions would include sugarbeet prices being competitive with other crops, little change in government policy concerning the sugar industry, producer cooperatives proving successful, no severe disease attack, adequate water supplies, reasonable weather, small increases in transport costs, improved technology, gradual urbanization, and the implementation of only moderate pollution control legislation. Conversely, "Unfavorable Conditions" represent the worst possible combination of circumstances that might reasonably be expected in a subarea.

Acreage and yield levels were derived by considering historical data, the opinions of local experts, and the probability of factories coming into production or closing. Although forecasts thus derived must essentially be value judgements, it is felt that the statements made are reasonable in the face of the evidence.

An estimate of the relative capacity of a subarea to expand or reduce production has been computed in the form of an "Index of Total Production Relative to 1972" (Table 12.4). This index was calculated by dividing the 1980 expected Total Production (Acreage x Yield) by that for 1972, derived from Table 12.3, and expressing the result as a percentage. For example, in ASCS Area Eight, under "Favorable Conditions" production in the Highland region of Arizona is expected to more than double (Index=235). However, the reader is cautioned to note that this production increase for the Arizona Highlands subarea represents only some 2,400 additional acres at higher yields (see Table 12.3), whereas the Index of 112 for the South Central Valley of California represents an additional 8,000 acres at higher yields. Similarly, it should be noted that, in the column entitled "Unfavorable Conditions,"

TABLE 12.4

EXPECTED FUTURE LEVELS OF PRODUCTION IN THE U.S. SUGARBEET INDUSTRY, UNDER FAVORABLE AND UNFAVORABLE CONDITIONS

Area	Subarea	Favorable		Index of Total Production* Relative to to 1972*	Unfavorable		Index of Total Production* Relative to to 1972
		Acreage	Yield (tons/acre)		Acreage	Yield (tons/acre)	
1	Ohio	50,000	19.0	113	30,000**	18.0	64
	Michigan	100,000	19.0	109	60,000**	18.0	62
2	South Minnesota	55,000	16.0	284	35,000	14.5	163
	Red River Valley	400,000	14.0	251	250,000	13.0	145
3	Colorado-North Central	70,000	19.0	127	25,000**	17.0	40
	Colorado-South Platte Valley	55,000	18.0	135	30,000	17.0	69
	Colo/Kans-High Plains	70,000	17.5	114	40,000	16.5	61
	Wyoming-Eastern	25,000	19.0	131	14,000	17.0	66
	Nebraska-Panhandle	95,000	19.0	109	55,000**	17.0	56
4	Colorado-Delta	12,000	21.0	140	0**	. .	0
	Colo/Kans-Arkansas River Valley	21,000	17.5	117	0**	. .	0
	Texas-High Plains	35,000	22.0	141	22,000	20.0	80
5	Montana-Missoula	800	19.0	182	0	. .	0
	Montana-Townsend	2,500	13.0	119	0	. .	0
	Montana-Billings	28,000	18.5	119	20,000	17.0	78
	Montana-Sidney	22,000	18.0	125	0**	. .	0
	Montana-Chinook	2,000	14.0	188	0	. .	0
	Wyoming-N. Central	42,000	18.5	110	30,000	17.0	72
	North Dakota-Western	10,000	16.5	111	0	. .	0
6	Utah	25,000	18.5	116	0**	. .	0
	Idaho-Twin Falls	90,000	19.0	117	50,000**	17.5	60
	Idaho-Idaho Falls	44,000	16.0	126	23,000	14.0	58
7	Idaho-Western	70,000	23.0	115	45,000	22.0	70
	Oregon-Eastern	25,000	24.0	124	10,000	22.0	45
	Washington-Columbia Basin	105,000	25.0	113	60,000	23.0	59

TABLE 12.4 (Continued)

Area	Subarea	Favorable Acreage	Favorable Yield (tons/acre)	Favorable Index of Total Production* Relative to to 1972*	Unfavorable Acreage	Unfavorable Yield (tons/acre)	Unfavorable Index of Total Production* Relative to to 1972
8	Arizona-Lowland	20,000	22.0	200	11,000	21.0	105
	Arizona-Highland	5,000	22.0	235	3,000	20.0	128
	California-North Central Valley	135,000	24.0	111	90,000	21.0	65
	California-South Central Valley	110,000	23.0	112	50,000**	20.5	45
	California-Coastal	40,000	29.0	111	20,000	26.0	49
	California-Imperial Valley	75,000	24.0	113	60,000	22.0	83

*Total Production taken as (Acreage x Yield). Index is calculated as percentage of 1972 Total Production (Table 12.3).

**Probable factory closure.

the proportional reduction in acreage in the Imperial Valley to 83 percent of 1972 production is the least of any in the four California subareas.

Before concluding this report two other points concerning the future of the U.S. sugarbeet industry should be made. First, the former U.S. sugar program has been abolished. Although the long term effects of this step remain unknown, it seems reasonable to assume that the U.S. price of sugar will likely be subject to considerably more variation than it has been in the past. Such variation in price could have a significant effect on both the farming and processing sections of the domestic beet sugar industry. As has been noted in the Area Descriptions, many growers have been attracted to sugarbeet production because the returns from this crop, although seldom spectacular, have been usually moderately high and steady, with little risk attached. Sugarbeets are an expensive crop to grow, total costs per acre ranging between $200 and $400, and the fixed costs involved often exceed $100 per acre (Tables X.1). If occasional low prices were to be expected many of the growers surveyed stated that they would have serious doubts as to whether to continue to produce sugarbeets. Growers will likely continue production in the short run as long as variable costs are covered, but the high fixed costs obviously pose serious problems for the industry should prices remain low for any extended period.

Sharp price fluctuations would seriously affect sugarbeet processors due to the entry into the industry of risk-taking forces attracted by high prices, and the exit of some of those who raised beets as an "insurance crop". Under these conditions production levels would tend to vary from year to year to a greater extent than under a fairly steady price system. Sugarbeet factories are an expensive investment and are designed to run at a certain optimum tonnage per season. Fluctuations in the amounts of beets produced by farmers would mean that either the factory capacity would have to be expanded to deal with large tonnages in some years, leaving unused capacity in years of low local production, or that excess beets could not be processed, and would be lost owing to storage difficulties.

The second factor to be considered in estimating future production has been briefly mentioned above. The situation in the sugar industry is never stable and many recent predictions have been upset by some unexpected event. In the period during which this report was being researched and written, several situations with significant implications for the domestic sugarbeet industry occurred: (a) the U.S. Sugar Act was abolished, (b) world sugar prices rose to all-time record highs and then rather abruptly declined, (c) the closure of a Boston cane sugar refinery generated considerable new interest in reviving the Maine beet industry, and (d) signs of a possible reopening of trade negotiations with Cuba became apparent. Thus, due to the nature of the subject matter, portions of this report are likely to be out of date at the time of its publication.

SUMMARY

1. The main competitors of sugarbeets used to be high valued crops demanding heavy resourse use, such as cotton, potatoes, onions and vegetables. A new situation has arisen wherein crops which are considerably easier to grow, such as alfalfa, and cereals have become competitive with sugarbeets. The growth of the Midwest feedlot industry, for example clearly threatens sugarbeet production in Kansas and Colorado. We cannot necessarily assume that relative prices of competing crops and sugarbeets will revert to their 1972 position.

2. Many growers, particularly in the west, have raised sugarbeets because the returns were not only reasonably attractive, but also relatively assured. Now that the Sugar Act has been abolished and the domestic market is unprotected from the price volatility of the world market, many U.S. growers will probably stop beet production. A corresponding entry of risk-taking farmers attracted by high prices will increase the probability of periodic over-and under-supply to the factories. A constant level of supply of beets is necessary for factories to operate economically. Several sugarbeet processing factories are not in a position to tolerate greater inefficiencies, and may be threatened with closure should prices fluctuate significantly.

3. A large number of interdependent factors interact to determine sugarbeet production levels (15). For example, sugarbeets can be grown in California at costs above the national average since the long harvesting season allows factory fixed costs to be spread over a longer operating period. Thus, due to the great interdependencies between the growing and processing sectors of the industry, they must be analyzed as a single unit.

4. Grower production costs are an inadequate measure of the competitive relationship of domestic and foreign production. Also to be considered are factory operating costs, transport costs from factory or refinery to market, and the basing point pricing structure (9).

5. Establishment of producer cooperatives appears to be beneficial to the industry, providing new capital and stabilizing planted acreage because of grower investment. However an altering of the institutional assumptions under which the cooperatives presently operate, might endanger the viability of these ventures. The failure of these new cooperatives would have a serious effect on the rural communities involved, particularly in the Red River Valley, Nebraska, Wyoming, Montana and Colorado.

6. Since raw sugarbeets are a commodity of high volume and low value per unit of weight, it is necessary to locate relatively sophisticated processing plants near the source of production. Clearly, the industry is modular in nature. That is, a factory with an optimum capacity of 30,000 contracted acres may process production from a lesser acreage for a time, but will cease production if acreage falls too low. Thus, in an area where anywhere from zero to 30,000 acres of wheat may be grown, only 30,000 to 20,000 acres of beets can be grown, below which point the factory will close, and acreage drops to zero. Many factories contracted suboptimal acreages in 1973, and a future recession in the industry would threaten factory closures in Ohio, Michigan, Colorado, Nebraska, Montana, Utah, and Idaho.

7. Recent events that have taken place in the U.S. and world sugar economies pose an uncertain future for each major sugarbeet producing area as well as for the entire U.S. sugarbeet industry. Each producing area faces rather unique and distinct problems and/or potentials. The national industry clearly faces a very complex set of national and international uncertainties, in large part due to its unique economic, political and institutional nature. Future U.S. sugar policy must take into account these complexities if long term stability and viability of the industry is a desired national objective.

APPENDIX I

1973

SUGARBEET AREA DATA

(Except 1972 data for Arizona and California)

STATES & COUNTIES	No. Farms	Planted Acres	Harvested Acres	Tons Marketed	Sugar Act Payments
ARIZONA - (4)	57	13,057.1	13,041.4	301,438.1	$508,905.93
Cochise	5	577.4	577.4	15,166.1	25,717.14
Maricopa	32	9,559.6	9,543.9	224,073.2	360,272.44
Pinal	14	1,383.7	1,383.7	25,495.5	51,066.88
Yuma	6	1,536.4	1,536.4	36,703.3	71,849.47
CALIFORNIA - (30)	1,498	333,814.3	324,989.6	8,897,440.2	$15,514,794.72
Alameda	10	1,258.5	1,258.5	33,648.0	61,890.49
Butte	19	3,664.5	3,627.6	94,416.4	164,779.65
Colusa	54	14,252.4	13,776.3	323,706.2	565,860.74
Contra Costa	13	2,294.1	2,294.1	88,880.5	139,708.04
Fresno	84	40,433.3	34,448.5	887,384.8	1,498,427.09
Glenn	15	3,315.2	3,315.2	91,544.2	156,047.08
Imperial	193	63,786.7	63,776.7	1,584,359.3	2,918,358.22
Kern	129	23,451.1	23,240.1	560,611.1	942,217.88
Kings	17	8,790.8	8,719.9	150,889.3	259,175.82
Los Angeles	3	1,749.2	1,749.2	55,097.1	92,322.29
Madera	14	2,159.0	2,159.0	63,926.4	116,087.42
Merced	44	9,946.9	9,881.9	261,601.0	482,311.61
Monterey	150	18,077.2	17,946.0	645,307.9	1,129,069.31
Orange	1	100.0	100.0	2,938.5	5,249.04
Riverside	20	3,870.7	3,870.7	95,708.9	169,615.23

STATES & COUNTIES	No. Farms	Planted Acres	Harvested Acres	Tons Marketed	Sugar Act Payments
CALIFORNIA - (Continued)					
Sacramento	50	7,182.2	6,785.4	209,488.2	382,838.37
San Benito	27	2,090.4	2,090.4	57,737.2	113,382.52
San Bernardino	1	343.0	318.2	7,927.6	12,649.28
San Joaquin	221	37,645.7	37,252.4	1,152,595.1	2,029,479.88
San Luis Obispo	12	1,706.2	1,490.0	33,341.4	64,905.04
Santa Barbara	22	3,222.6	3,222.6	87,506.5	153,089.20
Santa Clara	24	2,010.6	2,010.6	75,641.8	148,689.24
Santa Cruz	7	218.2	218.2	8,183.6	16,640.64
Solano	93	24,017.1	23,652.8	727,392.7	1,250,989.06
Stanislaus	30	5,085.9	5,085.9	159,310.6	288,708.54
Sutter	22	9,841.1	9,841.1	269,685.4	393,598.82
Tehama	5	792.9	792.9	24,842.4	41,199.05
Tulare	69	9,008.4	9,008.4	200,469.1	363,090.20
Ventura	38	2,762.4	2,762.4	93,714.0	176,210.55
Yolo	111	30,738.0	30,294.6	849,585.0	1,378,204.42
COLORADO - (21)	1,359	122,188.5	114,146.1	1,860,432.9	$4,123,802.63
Adams	19	1,811.2	1,570.4	17,937.6	49,323.16
Baca	4	534.4	534.4	7,941.3	15,942.25
Boulder	35	1,881.5	1,744.5	24,216.1	59,918.95
Cheyenne	3	889.5	889.5	12,582.5	26,285.21
Crowley	4	324.7	324.7	4,674.7	9,580.81
Delta	14	1,476.9	1,419.3	29,399.8	65,386.79
Kit Carson	78	17,325.7	16,776.9	299,823.4	599,680.05
Larimer	89	6,036.6	5,976.1	100,176.4	231,440.52
Logan	139	10,395.2	8,835.5	161,793.2	350,797.64
Mesa	46	3,445.9	3,414.8	61,715.4	142,129.60
Montrose	37	2,230.0	2,195.5	38,545.7	87,890.37
Morgan	178	12,188.2	11,518.1	170,278.4	383,437.79
Otero	23	1,003.5	987.2	14,951.6	30,012.97
Ouray	1	39.0	39.0	776.3	1,750.24
Phillips	40	6,170.9	5,266.6	83,171.8	184,814.14

STATES & COUNTIES	No. Farms	Planted Acres	Harvested Acres	Tons Marketed	Sugar Act Payments
COLORADO - (Continued)					
Prowers	9	1,100.0	1,100.0	14,304.7	29,186.49
Pueblo	10	220.8	220.8	3,709.7	7,881.52
Sedgwick	28	2,982.9	2,788.4	51,260.2	110,977.29
Washington	10	1,293.6	1,282.6	18,598.9	40,165.64
Weld	545	37,782.3	34,977.3	557,332.4	1,314,902.46
Yuma	47	13,055.7	12,284.5	187,242.8	382,298.74
IDAHO - (23)	1,920	151,197.8	143,594.3	2,927,672.7	$6,350,889.99
Ada	15	1,380.5	1,318.2	29,260.9	61,247.78
Bannock	18	1,685.4	1,517.0	22,022.5	50,147.97
Bingham	65	8,625.0	8,002.3	120,328.0	272,586.34
Blaine	5	339.0	332.0	5,077.3	12,322.14
Bonneville	35	3,236.4	3,140.4	43,370.6	98,850.43
Canyon	382	33,164.8	32,837.2	918,106.5	1,855,945.79
Caribou	2	143.6	0	0	1,084.80
Cassia	186	16,437.7	15,793.6	262,467.5	596,327.90
Elmore	21	5,777.4	4,680.4	73,315.3	177,179.28
Franklin	63	1,563.7	1,504.3	23,884.0	53,273.34
Fremont	10	452.8	327.6	5,007.6	13,332.00
Gem	2	181.6	181.6	3,843.0	8,275.20
Gooding	45	2,564.8	2,564.8	44,437.5	98,011.12
Jefferson	11	794.2	769.2	10,661.3	23,366.92
Jerome	115	6,179.1	5,667.7	102,284.9	237,253.20
Lincoln	14	2,105.2	1,864.0	29,197.1	67,726.90
Madison	18	724.9	561.2	7,537.8	18,329.04
Minidoka	360	27,341.2	25,058.5	429,418.0	985,297.75
Owyhee	69	7,127.6	6,913.1	135,913.2	298,767.23
Payette	35	3,737.5	3,648.1	99,062.0	188,010.42
Power	45	8,760.2	8,645.6	151,189.8	317,298.72
Twin Falls	346	15,619.5	15,075.9	325,541.9	737,687.95
Washington	58	3,255.7	3,191.6	85,746.0	178,567.77

STATES & COUNTIES	No. Farms	Planted Acres	Harvested Acres	Tons Marketed	Sugar Act Payments
KANSAS - (11)	152	34,923.0	34,126.3	612,086.8	$1,162,231.89
Cheyenne	7	2,144.8	2,144.8	36,049.3	70,743.21
Finney	12	984.4	984.4	15,917.4	30,762.26
Grant	11	2,903.0	2,824.0	54,426.4	95,081,84
Greeley	2	493.0	429.9	4,466.7	11,856.62
Haskell	4	1,769.7	1,769.7	33,048.7	57,887.73
Kearny	6	1,195.7	912.9	19,682.3	29,419.31
Sheridan	6	1,252.3	1,252.3	24,726.9	47,636.70
Sherman	68	14,579.6	14,530.1	262,653.6	519,829.54
Stanton	9	3,055.0	2,854.1	53,493.3	91,583.42
Thomas	2	124.0	124.0	1,781.3	3,727.68
Wallace	25	6,421.5	6,300.1	105,840.9	203,703.58
MICHIGAN - (18)	1,794	89,208.9	87,243.5	1,524,400.8	$3,406,436.31
Arenac	36	1,865.3	1,844.8	32,236.8	65,959.91
Bay	434	17,406.2	16,827.8	287,864.8	612,908.26
Clinton	4	207.5	207.5	3,180.5	6,986.72
Genesee	2	44.0	44.0	441.6	911.44
Gladwin	4	181.9	181.9	3,238.5	7,144.24
Gratiot	95	3,861.5	3,777.2	76,169.6	172,415.08
Huron	378	16,550.3	16,366.6	285,536.9	648,143.41
Ingham	1	2.0	2.0	14.5	32.72
Isabella	7	218.7	205.1	3,228.4	7,453.52
Lapeer	5	294.9	294.9	4,090.5	9,033.76
Lenawee	21	1,361.8	1,359.2	20,714.8	49,656.83
Macomb	2	101.0	101.0	1,555.0	3,394.72
Midland	32	1,943.6	1,884.7	33,973.6	75,751.87
Monroe	14	723.7	673.0	7,262.8	21,153.04
Saginaw	271	17,148.5	16,831.1	318,474.6	703,720.15
St. Clair	21	1,135.0	1,115.0	16,263.6	35,519.12
Sanilac	102	6,278.2	5,922.6	89,826.2	195,111.99
Tuscola	365	19,884.8	19,605.1	340,328.1	791,139.53

STATES & COUNTIES	No. Farms	Planted Acres	Harvested Acres	Tons Marketed	Sugar Act Payments
MINNESOTA - (8)	818	132,142.3	131,069.3	2,169,140.1	$4,683,319.74
Clay	180	33,385.6	32,994.1	599,149.4	1,281,952.47
Grant	1	120.0	120.0	1,910.8	4,648.64
Kittson	92	10,823.7	10,577.4	130,640.4	298,569.07
Marshall	137	17,984.1	17,777.8	253,635.6	565,171.22
Norman	64	9,577.1	9,475.8	175,034.3	372,579.16
West Polk	312	56,504.9	56,478.4	942,392.3	2,013,311.65
Traverse	3	304.4	304.4	5,180.5	12,707.28
Wilkin	29	3,442.5	3,341.4	61,196.8	134,380.25
MONTANA - (12)	570	45,762.6	44,847.5	889,204.6	$1,939,848.45
Blaine	12	754.1	754.1	13,227.6	29,961.04
Broadwater	11	2,008.6	1,572.6	23,790.2	55,363.88
Carbon	89	6,697.0	6,420.9	107,299.1	244,792.63
Custer	35	2,430.5	2,415.0	55,031.8	117,175.72
Dawson	31	3,103.8	3,103.8	56,611.3	119,788.39
Prairie	30	2,188.8	2,179.8	40,988.1	88,782.85
Ravalli	7	374.7	374.7	7,629.9	17,177.99
Richland	130	11,786.1	11,776.1	242,836.2	513,906.67
Rosebud	16	1,281.1	1,281.1	27,254.5	60,058.54
Stillwater	15	968.1	873.1	16,743.2	38,113.12
Treasure	27	4,053.4	4,050.7	94,397.2	196,889.04
Yellowstone	167	10,116.4	10,045.6	203,395.5	457,838.58
NEBRASKA - (14)	965	77,734.2	73,279.4	1,469,898.5	$3,209,859.90
Box Butte	111	11,505.8	10,528.3	185,962.6	422,943.17
Chase	18	4,347.7	4,082.1	65,827.9	137,175.05
Cheyenne	5	323.4	297.4	5,209.2	11,156.64
Dawson	13	2,144.8	1,984.8	39,425.7	78,491.13
Deuel	19	2,641.8	2,619.5	50,416.7	104,727.72
Garden	2	155.4	155.4	2,908.9	5,914.56
Kearney	2	202.0	202.0	3,328.8	6,666.64

STATES & COUNTIES	No. Farms	Planted Acres	Harvested Acres	Tons Marketed	Sugar Act Payments
NEBRASKA - (Continued)					
Keith	37	5,672.5	5,367.3	106,894.3	220,194.81
Lincoln	11	1,204.4	1,121.7	23,109.3	48,436.41
Morrill	143	9,910.9	9,317.4	193,512.7	427,219.46
Perkins	6	1,535.8	1,424.0	27,365.1	56,675.38
Red Willow	4	486.4	486.4	7,505.7	14,772.92
Scotts Bluff	541	34,018.1	32,252.8	684,456.7	1,509,556.32
Sioux	53	3,585.2	3,440.3	73,974.9	165,929.69
NEW MEXICO - (1)	7	751.3	751.3	14,001.7	$27,032.03
Curry	7	751.3	751.3	14,001.7	27,032.03
NORTH DAKOTA - (12)	574	80,251.1	79,427.2	1,278,553.3	$2,786,017.54
Burleigh	1	140.0	140.0	2,580.6	5,873.75
Cass	55	9,690.3	9,690.3	178,887.8	388,557.83
Foster	1	41.5	41.5	514.6	1,201.36
Grand Forks	77	11,022.5	10,978.0	154,305.4	338,843.90
McKenzie	65	6,465.7	6,423.7	136,003.2	284,680.83
McLean	1	69.0	69.0	1,183.5	2,543.12
Oliver	2	230.1	230.1	4,949.7	10,921.50
Pembina	161	22,487.8	21,808.1	299,103.2	653,501.28
Richland	34	4,951.9	4,951.9	90,984.4	206,493.87
Traill	49	6,990.9	6,963.0	122,384.2	263,190.75
Walsh	108	15,133.0	15,103.2	227,850.9	508,551.14
Williams	20	3,028.4	3,028.4	59,805.8	121,658.21

STATES & COUNTIES	No. Farms	Planted Acres	Harvested Acres	Tons Marketed	Sugar Act Payments
OHIO - (14)	638	30,993.6	29,588.7	373,642.5	$1,017,359.82
Allen	19	464.6	443.4	5,858.1	14,935.92
Defiance	3	78.8	78.8	852.4	2,024.32
Erie	16	723.7	693.9	10,395.0	27,241.28
Hancock	47	2,059.5	1,946.0	21,618.4	61,166.51
Hardin	2	33.5	33.5	205.6	900.16
Henry	54	1,648.4	1,606.4	17,380.2	48,920.88
Huron	1	77.9	77.9	1,058.1	2,227.12
Lucas	28	1,974.0	1,917.1	24,401.1	65,328.45
Ottawa	48	2,699.7	2,544.7	30,470.2	79,353.10
Putnam	172	7,202.9	6,968.2	92,049.3	245,941.09
Sandusky	134	8,063.7	7,716.4	103,137.8	277,026.11
Seneca	35	2,258.0	2,159.1	31,840.7	83,276.70
Van Wert	4	296.9	293.3	3,722.9	9,735.81
Wood	75	3,412.0	3,110.0	30,652.7	99,282.37
OREGON - (2)	242	18,704.2	18,304.0	472,615.2	$974,800.09
Malheur	229	17,248.6	16,975.6	440,936.1	904,743.16
Umatilla	13	1,455.6	1,328.4	31,679.1	70,056.93
TEXAS - (8)	190	22,911.4	20,647.2	400,826.3	$792,331.21
Castro	60	6,897.9	6,591.4	140,726.4	277,951.31
Dallam	1	85.0	0	0	845.20
Deaf Smith	83	9,050.2	7,669.1	149,446.9	305,443.01
Hartley	2	2,843.0	2,743.0	45,046.0	70,267.83
Moore	2	155.0	75.0	1,416.6	3,449.44
Parmer	23	2,454.3	2,189.5	41,694.0	86,181.27
Randall	14	1,120.0	1,073.2	16,367.9	35,897.79
Sherman	5	306.0	306.0	6,128.5	12,295.36

STATES & COUNTIES	No. Farms	Planted Acres	Harvested Acres	Tons Marketed	Sugar Act Payments
UTAH - (8)	449	19,203.2	18,342.5	321,839.0	$725,286.14
Box Elder	194	10,459.0	10,171.4	189,860.3	418,603.66
Cache	83	1,806.0	1,757.6	27,808.8	61,038.30
Carbon	6	401.7	377.7	5,253.2	12,665.44
Davis	38	1,512.0	1,234.4	22,787.1	54,446.70
Salt Lake	35	1,233.2	1,206.7	19,816.2	47,020.61
Sevier	1	86.0	86.0	1,636.3	3,598.64
Utah	49	1,771.5	1,766.4	25,959.5	56,403.35
Weber	43	1,933.8	1,742.3	28,717.6	71,509.44
WASHINGTON - (7)	888	96,090.8	91,616.0	2,471,957.7	$5,217,081.68
Adams	91	13,166.2	12,919.6	359,423.2	744,908.87
Benton	33	7,092.7	6,437.2	158,488.7	306,339.11
Franklin	205	15,924.9	15,041.3	421,781.6	913,811.15
Grant	347	34,525.0	32,670.6	867,736.9	1,896,708.25
Kittitas	9	748.2	719.2	16,113.4	36,076.94
Walla Walla	10	3,421.2	3,186.8	80,507.4	138,863.38
Yakima	193	21,212.6	20,641.3	567,906.5	1,180,373.98
WYOMING - (9)	575	55,254.4	53,868.6	979,053.9	$2,220,657.56
Big Horn	95	10,376.1	10,374.6	188,882.8	430,766.63
Converse	3	235.2	203.2	2,036.1	5,040.24
Fremont	26	1,798.3	1,798.3	26,289.0	64,566.96
Goshen	223	14,461.9	13,451.6	259,355.6	581,074.88
Hot Springs	1	183.0	183.0	3,619.9	7,736.30
Laramie	11	1,199.6	1,199.6	13,804.8	35,664.50
Park	115	14,891.4	14,891.4	256,242.5	590,083.82
Platte	28	1,901.3	1,585.8	25,966.3	65,143.23
Washakie	73	10,207.6	10,181.1	202,856.9	440,581.00

STATES & COUNTIES	No. Farms	Planted Acres	Harvested Acres	Tons Marketed	Sugar Act Payments
AREA TOTAL - (202)	12,696	1,324,188.7	1,278,882.9	26,964,204.3	$54,660,655.63

SOURCE:
ASCS:SU Division
August 1974

APPENDIX II

PRELIMINARY OUTLINE OF FACTORS AFFECTING REGIONAL SUGARBEET PRODUCTION LEVELS

1. Institutional Factors

A. Price Effects
   Effects of world price on U.S. price
   Trends in sugar price levels
   Sugar price levels in relation to the Consumer Price Index

B. Supply and Demand Effects
   Supply is inelastic in S. R. but elastic in L.R., assuming finance available. Elastic upwards, i.e., ratchet effect
   Projected future consumption, relative to income and population

C. Competition faced by Beet Producers
   Effect of foreign policy changes, e.g., Cuba, on supply
   Differential between cane and beet sugar prices in a market
   Competition from cane--divided into overseas and domestic refiners
   Alternate cane supply in beet shortfall season
   Other substitute sweeteners

D. Legislative Considerations
   How much carryover is required?
   Proportionate shares allow new producers, usually based on history
   Change in processor quota set by government
   Granting of expansion areas, either new or existing
   Change in conditional payment regulations, esp. abandonment
   Any government payment if area abandons beet growing

2. Internal Farm Factors

A. Locational Factors
   Possession of suitable soils
   Ability to produce at extremities of factory season
   Distance to factory
   Drained Land available

B. Farming System
Any on-farm use for by-products
Response to previous prices of other crops
Other crop acreage allotments
Rotational requirements, e.g., summerfallow

C. Production Considerations
Replacement of labor with machinery, and labor availability
Achievement of (sugar) yield increases
Ability to perform optimal tillage operations
Optimal fertilizer use
Use of correct seed-polyploidy, early maturing
Ability to achieve satisfactory stand
Adoption of mechanical thinning
Weed control costs
Disease control costs
Harvesting skills
New technology

D. Farmer Considerations
Leisure requirements, no supervision, freedom from contracts
Off-farm work opportunities
Percent of net proceeds received under contract
Past ability to fill quota
Period of price uncertainty before final settlement
Credit availability

E. Other
Projected yield trends and quality
Projected cost trends
Projected price trends

3. Factors Relating to Production Area

A. Locational Factors
Location relative to market and inputs
Weather fluctuations and probabilities
Soils
Topography
Frost-free
Rainfall in growing season
Cool dry autumn
Nematode invasion
Availability of suitable land
New housing/industrial developments
Availability of irrigation water

B. Local Agricultural System
Importance of sugar to local economy
Will farmers buy factory or vice versa
General farming Systems in the area

Strongly competitive crops, stock
Transport facilities
Trends in farm size
Trends in cooperatives for machinery, land, etc.
Local temporary abandonment and alternate resource use--floods
Local permanent abandonment and alternate resource use
Trends in number of growers
Trends in acreage
Land ownership patterns
Local trends in land, operation and irrigation costs
Forecast of alternate enterprises
Quota available to area

C. Production Considerations
Labor supply
Quality of company fieldsmen
Custom hire availability
Availability of machinery
Availability of labor at right time, and costs of importing
Local wage rates and trends
Efficiency of factory turn-around; transport charges
Hauling availability
Complete specialization possibility
New technologies

D. Farmer Considerations
Non-farm work opportunities
Availability of local credit
Cost to enter industry
Local reaction to uncertainty
Power of local grower's association/cooperative

4. Processor Factors

A. Locational Factors
Location relative to raw material supplies
Nearness to suitable soil
Sufficient acreage nearby (15,000)
Quality of beets supplies
Ability to extend processing season
Storage facilities with respect to climate
Rail access

B. Production Considerations
Recovery percent achieved
Labor productivity vs. capital investment
Abilities of staff
New technology
Waste disposal problems
Fuel supply problems
Water supply problems

Processing capacity
Pollution problems

C. Financial Considerations
Feasibility of expansion of construction
Control of overhead expenses
Financial implications of grower contracts
Liquidation costs
Return on investment offered and financial sources available

D. General
Trends for number of factories in region
Processor allotments and past performance in fulfillment
Other financial interests of owners
Trend in ability to interest enough growers

5. Marketing Factors

A. Locational Factors
Communications/transportation facilities
Storage until peak season possible?
Location in relation to market
Freight rates

B. Marketing Effectiveness
Ability to produce required products
Competition from cane and other sweeteners
General ability to meet industrial specifications
Price elasticity of industrial specifications
Market profile

C. Other
Ability to sell factory by-products
Trends in supply forms--bulk/liquid
Trends in consumer forms--sachet, convenience foods

APPENDIX III

SOURCES CONSULTED

Because of the large volume of source material, Appendix IV has been divided into sections. Sources classified under "General" were used mainly for the preparation of Chapters 1-3, and 12. Material used in preparing Chapters 4-8 has been arranged by state.

As a condition of the personal interviews, the names of those individuals giving their own opinions on the state of industry in an area have not been cited.

Almost all the sources consulted are very short, and it was decided that specific reference to page numbers was unnecessary. Either the source material is so short that the quoted passages are immediately obvious, or a comment in the text of this report was the result of a synthesis of several observations in a reference, where quoting the page numbers would be impossible.

Especially in dealing with statistical data it should be remembered that various conversion factors may have been applied to the original material to produce conformity with the remainder of this report.

The following abbreviations have been used:

AES	Agricultural Experiment Station
ASCS	Agricultural Stabilization and Conservation Service
CES	Cooperative Extension Service
C&LRS	Crop and Livestock Reporting Service
EPA	Environmental Protection Agency
ERS	Economic Research Service
ND	No Date
SRS	Statistical Reporting Service
USDA	United States Department of Agriculture
USGPO	United States Government Printing Office

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