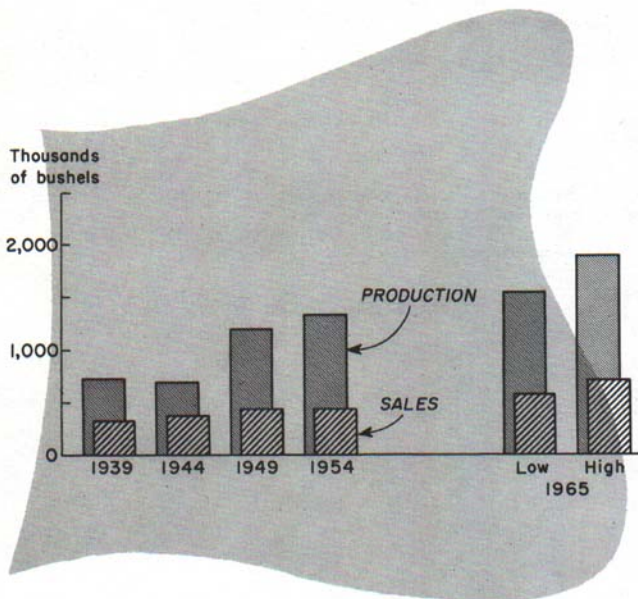


ANALYZING CENSUS DATA

as a guide in

Country Elevator Management



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How Census Data Can Be Analyzed
As A Guide in County Elevator Management

INTRODUCTION

Background--This bulletin developed as one result of a progress report by the Elevator Outlook Committee.* The committee was formed in 1958 to see what could "be done to help individual elevator managers to look into the future and do a better job of adjusting to change," or in other words, "to keep up with the times". The committee included representatives of the Michigan Feed and Grain Dealers' Association, The Michigan Association of Farm Cooperatives, The Michigan Bean Shippers' Association, and staff members representing several departments in the College of Agriculture, Michigan State University.

Shortly after the release of the progress report in December, 1958 the management of two country elevators in Michigan requested assistance in a survey of prospective changes in their trade area as a guide to their advance planning up to 1965. That survey became the basis of this bulletin.** Place names and other information that would reveal the identity of the elevators involved have been changed, but the statistical data remain unchanged.

The elevators at Alton and Bell, operated by the same firm, are located in Central County, south of the Muskegon-Bay City line. Both elevators market grain and sell feeds and farm supplies. Corn, oats, wheat and soybeans are the principal grain crops handled and the feed business consists of dairy, swine and poultry feeds.

Purpose - The purpose of this report is to indicate several kinds of census data that are available for use in elevator management planning and how the operators of a country elevator can assemble and analyze such information. More specifically, the purpose is to show how census data can help to provide reasonably accurate answers to two questions:

1. What is the prospective grain marketing potential in the trade area of the Alton and Bell elevators for 1965?
2. What is the potential feed business in their trade area for 1965?

Limitations of projected trends - A few words of caution should be added here in regard to the construction and interpretation of trend lines and future estimates based on trend line projections. In the first place trend lines fitted by sight, as described and used in this report, are less precise than when fitted mathematically. That is one reason for expressing the 1965 estimates as a range between a probable low and a probable high rather than the single figure indicated by a projected trend line.

* Elevator outlook committee progress report. Vernon L. Sorenson and David Spaeth. Ag. Econ. 742, (mimeo) Department of Agricultural Economics, Michigan State University, December 5, 1958.

** The writer wishes to thank the operators of the two elevators for their permission to use the results of this study in this form. Thanks are also due to several staff members of the Department of Agricultural Economics and Farm Crops who have reviewed the manuscript.

As noted later, it is necessary to assume that the elevator trade areas are representative of the county in general. To the extent that a difference is recognized, a corresponding allowance should be made in interpreting the significance of the trade area figures or trends. Finally, it is necessary to consider the effect of factors that change over a period of time and thus modify the trends that would be indicated if such changes were ignored. Such factors include:

1. Higher yields per acre through improved farm technology.
2. The trend toward a smaller number of farms of larger average size.
3. Local shifts in agricultural production: for example, in Central County the acreage of grain is moving upward, more feeder cattle are finished for market, and fewer sheep are being raised.

It is apparent from the preceeding paragraph that future estimates based on projected trend lines indicate approximate probabilities, not exact certainties. The justification for using such estimates is that they are much better guides for planning adjustments to prospective future changes in the trade area than guesses. The more the management knows about the farming situation in the trade area and appraises the projected trends in the light of that knowledge, the more reliable these guides will be.

Sources of information- The census publication used in this report was "Michigan Counties and State Economic Areas"-1954 Census of Agriculture, Vol. I, part 6. Census publications are generally available in local libraries, and this particular volume is also likely to be found in most county offices of the Michigan Cooperative Extension Service. Copies may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C. (\$1.75 in paper binding, payable by postal money order but not by check).

The published census data are broken down only to the county level. The township census data used in this report were obtained from photostat copies of tables obtained from the Bureau of the Census. These figures are not available locally, but may be obtained from the Bureau of the Census, U.S. Department of Commerce, Washington 25, D. C. For this reason most of the estimates in this report are based upon county rather than township census data.

Corn and wheat acreage data, by townships, can be obtained from the county ASC office. These figures are available on an annual basis and thus permit the trends to be based on figures for a longer period of time and including the years since the last census.

Step 1. Determine the trade area

Location and size-The first step in getting ready to use census data for planning purposes is to determine the boundaries of the trade area of the firm concerned. This can be done in at least two ways:

1. Trace the boundaries on a county highway map.
2. Locate patrons' farms on township plat maps and draw the boundary line that includes them.

The first method is quicker but can only be done accurately when the manager has had long experience at his elevator. If this method is used, it is well to ask the bookkeeper, delivery truck drivers and other employees acquainted with the extent of the trade area to check

the tentative boundary line before it is considered in final form. The trade areas of elevators in neighboring towns generally overlap to some degree, so it is recognized that the trade area for a given elevator will include some farmers who are not among its customers. Furthermore, the trade area of an elevator may not include every patron. For example, the manager may have a relative or personal friend who lives considerably farther from the elevator than practically any other customer, yet patronizes the elevator because of that personal situation. The boundary of the trade area, therefore, would not be extended into a long, finger-like projection just to include such a patron.

County highway maps show township lines, highways, railroads, towns, lakes and streams, and other details. They generally include north-south and east-west grid lines at one mile intervals, so that the total square miles within the trade area boundary can be closely determined. County highway maps can usually be obtained at the county highway commission office.

Since the trade area of a country elevator is likely to include parts of several townships, it is easy to calculate the percentage of each township included in the trade areas and the percentage of the county that is included, as shown in Figure 1 and Table 1. The trade area of the Alton elevator includes 132 square miles in six townships in the northwestern part of Central county, while the trade area of the Bell elevator adjacent to the eastern side of the Alton trade area, includes 74 square miles in parts of six townships. The combined trade area of 206 square miles amounts to 39 percent of Central county: 25 percent in the Alton area and 14 percent of the county in the Bell elevator territory.

The second way to determine the trade area of a county elevator is to use a county plat book. Such a book consists of a series of township maps showing all farm boundaries and the owner's names. The manager can then mark the location of each of his member's or customer's farms and draw a boundary line to include them. As previously mentioned, the trade area will include some farmers who trade at other elevators and will omit an occasional patron who travels an unusual distance for special reasons. The county highway commission office, county surveyor, register of deeds, a local bank or Chamber of Commerce secretary can generally tell a person where he can buy a copy.

Number of farms in area- When a county highway map is used in mapping the trade areas, as in this report, it is necessary to assume that the elevator trade area is representative of the county as a whole, so that calculations for the trade area can be based on the percentage of the county within its boundaries. If a plat book is used, the farms within the boundary can be counted, rather than estimated. Since the plat books are generally published at rather long intervals, the current number of farms may be somewhat smaller than is apparent because some farms shown separately have since been purchased and combined with adjacent properties. In the case of these two elevators, the managers considered the Alton area to be typical of Central county, while the Bell area is probably somewhat superior to the county average in the general characteristics of its agriculture. The survey results were thus evaluated with that situation in mind.

The figures shown in the tables of this report were all computed on the assumption that both elevator trade areas were representative of the county. In 1954, there were 2,021 farms in the county and an estimated 788 in the total trade area of both elevators, as shown in

Table 1. Trade areas of Alton and Bell elevators in relation to Central county and individual townships, 1958.

Townships	Size of townships	Size of trade area			Percent of township in trade area		
		Alton	Bell	Total	Alton	Bell	Total
Ash	36.0	36.0	--	36.0	100	--	100
Aspen	36.0	32.4	3.6	36.0	90	10	100
Basswood	36.0	--	7.2	7.2	--	20	20
Beech	36.0	--	--	--	--	--	--
Cherry	36.0	36.0	--	36.0	100	--	100
Elm	35.0	17.5	17.5	35.0	50	50	100
Fir	37.0	--	29.6	29.6	--	80	80
Hemlock	36.0	--	--	--	--	--	--
Hickory	35.5	7.1	--	7.1	20	--	20
Linden	33.5	3.4	5.0	8.4	10	15	25
Maple	36.0	--	10.8	10.8	--	30	30
Oak	36.0	--	--	--	--	--	--
Pine	27.1	--	--	--	--	--	--
Poplar	24.0	--	--	--	--	--	--
Spruce	21.0	--	--	--	--	--	--
Walnut	21.0	--	--	--	--	--	--
County total	522.1	132.5	73.7	206.2	25	14	39

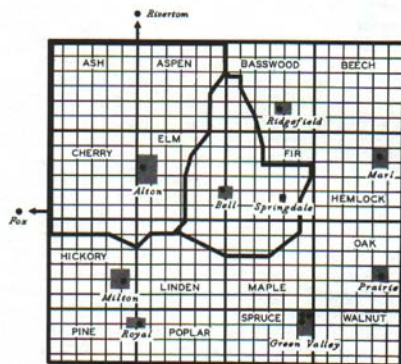


Figure 1. Location of competing elevators in this study.

Tables 9, 10 and 11 (Appendix). Of these 788 farms, 505 were presumed to be in the Alton trade area compared to 283 for the Bell area. The 1939-54 trend suggests that there will be from about 390 to 475 farms in the present Alton trade area by 1965, with from about 220 to 265 in the Bell elevator area.* The total area, therefore, is expected to include from about 610 to 740 farms by 1965.

The 1965 projections of the 1939-54 trends in this survey are expressed as a range: from a probable low of 10 percent below the 1965 estimate to a probable high of 10 percent above the estimate. Such a range is more realistic than a single figure because of the conditions under which the estimates must be made, and a range is likely to be more useful as a guide because the indicated future figure can be adjusted within the range according to the degree to which the area is regarded as typical of the county as a whole. In this case, for example, the expected number of farms by 1965 in the Alton area should be about 432, the mid-point of the range (389-476), while the number in the Bell area may not be as close to the middle of the range, since that area is not quite as typical of the county as a whole. Since its agriculture is somewhat above the county in general, the average size of farm may be somewhat larger than the county average with a correspondingly smaller number of farms.

If the 1939-54 trend continues, the average size of farm will increase until it reaches about 150 acres in 1965 compared to 135 in 1954.

Competition - The Alton elevator competes with five others within its trade area; at Ridgefield, Milton, and Royal in Central county and at Fox in the county to the west and Rivertom in the county to the north. (see figure 1)

The Bell elevator competes with seven others in its area, including Ridgefield which competes with the Alton elevator also. The others are the elevators at Springdale, Marl and Prairie, plus three elevators at Green Valley. The Alton and Bell elevators, together, handle from 20 to 25 percent of the estimated potential feed sales in their combined trade area (Table 6, page 18) and close to half the estimated farm sales of corn, oats, wheat and soybeans in their trade area (Table 4, page 13).

Step II. Analyze the use of farm land in the county and trade area

Land in farms - The use of land in Central County in 1954 is shown in considerable detail in Table 9 (Appendix). The comparable information for the Alton and Bell elevator territories is included in Table 10 (Appendix), using 25 percent of the county numbers for the Alton area and 14 percent of the county totals for the Bell elevator area, as found in Table 1. Table 11 (Appendix) shows the same information for the combined trade area because it is likely that the management will need to consider the total area if some of the operations are consolidated in one elevator for the combined area.

When only one elevator is involved in this type of survey, only two tables are needed; the county table and the trade area table

* The methods for fitting trend lines by sight to the 1939-54 figures are illustrated in the Appendix.

computed as a percentage of the county figures. The percentages of land used in various ways and the average size of farms, of course, are the same in either case.

Farm land in Central county amounted to 83 percent of the total in 1954, and the 1939-54 trend indicates that the proportion is likely to be from 73 to 86 percent by 1965. In 1954 the acreage of harvested crops was 53 percent of all land in farms, and the 1939-54 trend indicates that this percentage is likely to increase until it ranges from 61 to 64 percent of farm land in the county by 1965.

Crop acres harvested - The trend in the acreage of harvested crops in the county has been upward since 1939 and appears likely to reach from 146,000 to 178,000 acres by 1965, compared with 142,087 in 1954, a gain of 3 to 25 percent.

The upward trend in the acreage of crops harvested and the decline in the acres in pasture since 1939 are shown in Figure 2. There has been a small increase in the acreage of farm woodlands, but very little change in the importance of "other" farm land. The possible farm acreage and the proportions used for harvested crops, pasture and woodlands in 1965 based on these trends, are also shown in Figure 2.

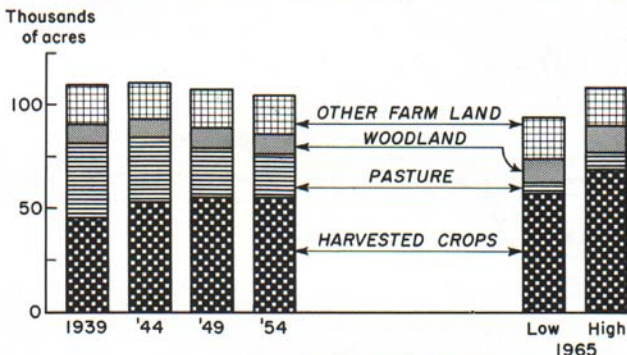


Fig. 2. Use of farm land in combined trade area of Alton and Bell elevators, 1939-54 and 1965 estimate.

Figure 2 and the others that follow are included to show that a simple chart can be used to illustrate the highlights of a table (Table 9, Appendix) which may be so detailed that its meaning is not quickly apparent.

Since the amount of farm land in woods and "other" uses shows a very limited prospective change by 1965, the bulk of the change will involve readjustments in the acreages used for harvested crops and pasture. The census includes land from which hay was cut and harvested in the reported acres of crops harvested, so pasture refers to land used only for grazing throughout the season. Although the trend line indicates a possible decline in pasture land in the county from 52,605 acres in 1954 to about 16,000 to 20,000 acres by 1965, the actual decline may be less if the sheep population levels off near the 1954

numbers and the upward trend in cattle feeding continues.

Crop acres harvested per farm - The number of farms in the county and in the two elevator trade areas with different numbers of acres of crops harvested per farm are shown in Tables 9, 10, and 11 (Appendix), and are illustrated in Figure 3 for the 1939-54 period. The probable minimum and maximum number of farms in the combined trade area with some harvested crops will apparently range from 472 to 578 by 1965, with

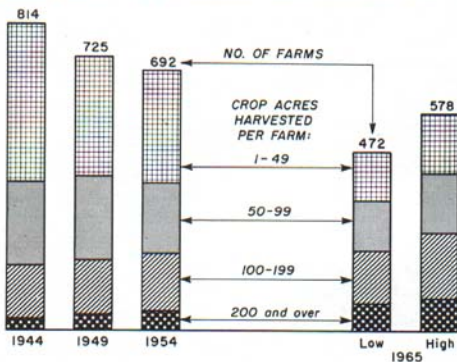


Figure 3. Number of farms by acreage of crops harvested in combined trade area of Three Rivers and Centerville elevators, 1944-54 and estimates for 1965.

significant increases in the percentage of farms with 100 or more acres of harvested crops.

Types of farming - The number of farms, according to U.S. census type-of-farm classification, in Central county and the computed number in the trade areas of the two elevators are listed in Tables 12 and 13 (Appendix) and are charted in Figure 4. The number of farms with fruit,

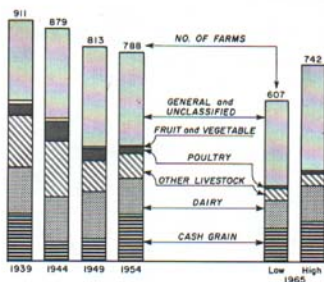


Figure 4. Number of farms, by type, in combined trade area of the Alton and Bell elevators, 1939-54 and 1965 estimates

vegetables or poultry as the major source of farm sales appears almost certain to continue to decline, at least until 1965. The number of farms with farm sales chiefly from cash grain, dairy, and other livestock

than dairy cattle or poultry will probably continue to decline at a slower rate. However, the upward trend in the average size of these farms and in a larger acreage of harvested crops, more cows, and feeder cattle per farm will likely maintain or increase the total output of such farms.

Classes of commercial farms - Tables 14 and 15 (Appendix) show that the number of farms in Central county with farm sales of \$5,000 or more has been increasing in recent years, with a decline in the number of farms with less than \$5,000 in farm sales per year. Class I, II and III farms will become relatively more important elevator patrons, but smaller scale farmers will continue to be important as buyers of supplies in small lots and of items that have a higher than average mark-up.

Step III. Estimate future potential production
and farm sales of grain in the trade area
and potential grain sales by the firm

Acreage vs. production as basis of estimates - Estimates of future grain production can be based on the projected trend of bushels of grain produced or on the trend in grain acreage harvested, assuming normal yields per acre. The advantage of using actual production figures is that yield factors are included as well as the factor of acreage. The 1965 potential grain production in Central county and the two elevator trade areas in this report, however, are based on projected grain acreage data for three reasons:

1. It seemed desirable to compare the 1965 estimates when based on county data with similar estimates based on township data. The census data for grains, by townships, is only available on an acreage basis.
2. It seemed desirable to have the data on an annual basis as far as possible so that figures for the years since 1954 could be used to fit more accurate trend lines. The annual corn and wheat records at the county ASC offices, by township and county, are of acreages rather than production.
3. It was believed that a projected trend beyond 1965 would be considerably less accurate, when fitted by sight, than the much more elaborate mathematical procedure required for a longer future projection. The projection period seemed short enough to permit only relatively small errors due to changes in acre yields as a result of the use of superior varieties, improved cultural practices, etc.

As will be shown later, the estimates on a county basis proved to be quite close to those on a township basis, indicating that grain farming conditions in the elevator trade areas were quite representative of the county in general. In such situations county data can be used for establishing the trends in the elevator trade areas, and the trends can be based on production rather than acreage, since grain production figures are available on a county basis in Michigan for these crops.

Percent of grain sold - Since the future estimates in this report were based on projected acreage trends rather than production trends, the average percentages of the four grain crops that were sold during the 1939-57 period were first assembled in Table 16 (Appendix). Michigan farmers sold 33 percent of their corn grown for grain in 1957 compared with 22 percent in 1953 and 1954. There was also an upward trend in the proportion of oats sold, but the percentages of wheat and soybeans sold showed no apparent change in trend. Total farm sales of these four crops ranged from 32 to 44 percent of the state's production

during the 1953-57 period with an average of 38 percent. The indicated farm sales of these crops in Central county and in the trade area of the two elevators were estimated on the basis of the percentages sold in Michigan as a whole because the quantities sold are not reported on a county basis.

Acreage estimates by county vs. townships - Low and high estimates of grain acreage in 1965 in the county and trade area were computed on both a county base Tables 17, 19, 20 and 21 (Appendix) and by townships, Tables 22, 23, 24 and 25 (Appendix), as a statistical check.

Table 2. Comparison of estimates of 1965 acreage of four grain crops in combined trade area of Alton and Bell elevators.

Crop	000 Acres					
	39% of county estimate		Sum of township est. in trade area		Average of estimates	
	Low	High	Low	High	39% of county	Sum of townships
	Corn	21,060	25,740	22,492	27,538	23,400
Oats	9,477	11,583	11,459	13,981	10,530	12,720
Winter Wheat	8,073	867	12,167	14,853	8,970	13,510
Soybeans	1,404	1,716	1,678(a)	2,051(a)	1,560	1,864
Total	40,014	48,906	47,796	58,523	44,460	53,159

(a) Estimated on basis of 19.5% above county estimate, the differential for the other three crops.

Source: Tables 17, 19, 20, 21, 22, 23, 24 and 25 in Appendix.

The results, compared in Table 2, show that the 1965 estimates on the township basis are somewhat larger, particularly for wheat. Since no allowance was made for technological progress in yields, etc., it may be wiser to use the larger of the two estimates when considering the elevator facilities and services needed in the area by 1965.

Projections of the 1939-57 trends indicate that by 1965 all the elevators in the trade area should be handling some 600,000 to 700,000 bushels of these four grain crops: (see Table 3 and Tables 17, 19, 20, 21 in Appendix)

Corn 310,000 to 379,000 bu. wheat 186,000 to 277,000 bu.
Oats 59,000 to 72,000 bu. Soybeans 25,000 to 31,000 bu.

Table 18 (Appendix) shows that the acreage of corn grown for grain in Central county has increased from 43,452 in 1944 to 49,646 in 1954, while the acreage grown for silage or fodder declined.

The trends in production and sales of these four grain crops in the county are illustrated in Figures 5 and 6.

Grain sales potential - According to the information in Table 4, the total grain sales of the Alton and Bell elevators in the 1957 crop year included a third of the corn sold in the trade area, three-fifths of the wheat, three-fourths of the oats and all or practically all the soybeans sales. The reason that the elevator volume of soybeans exceeded the estimated farm sales in the trade area is that the Alton and Bell elevators draw soybeans from a somewhat larger area than their trade are for other grain and feed business.

Assuming that the Alton and Bell elevators retail their 1957-58 competitive position in their trade areas, their potential 1965 grain sales (using data in Tables 17, 19, 20, and 21 in appendix) should total

Table 3. Production and farm sales of corn, oats, winter wheat and soybeans in Central county and combined trade area, 1939-57.

Year	County				Trade area (39% of county)		
	Acres	000 bu.		% of prod. sold	Acres	000 bu.	
		Prod.	Sold			Prod.	Sold
1939	65,359	1,937	314	16	25,490	736	310
1944	87,883	1,782	381	21	34,275	692	374
1949	99,148	3,063	1,099	36	38,669	1,195	429
1954	106,000	3,413	1,095	32	41,340	1,330	427
1955	99,500	3,759	1,474	39	38,815	1,466	575
1956	96,900	4,227	1,803	43	37,791	1,647	703
1957	91,200	3,790	1,529	40	35,568	1,380	598
1965 est.							
Low	102,600	3,959	1,488	38	40,014	1,544	580
High	125,400	4,829	1,818	38	48,906	1,888	709

Source: Summation of Tables 17, 19, 20 and 21, Appendix.

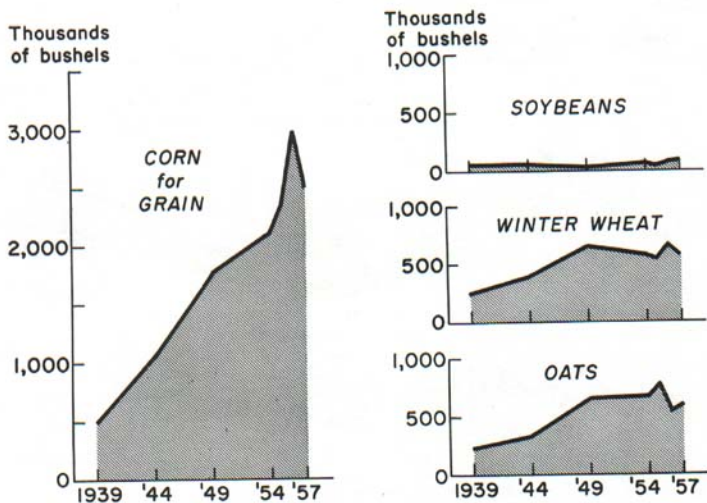


Figure 5. Production of four grain crops in Central County, 1939-57.

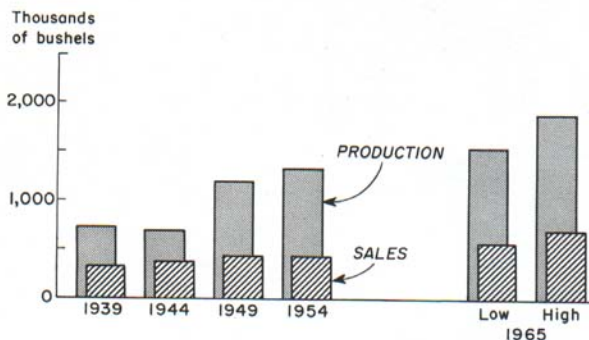


Figure 6. Estimate production and sales of four grain crops in combined trade area of Alton and Bell elevators, 1939-54 and 1965 estimates.

Table 4. 1957-58 grain sales of two elevators compared to estimated farm sales of four grains in trade area from 1957 crop.

Grain	Estimated farm sales in trade area 1957 crop (000 bu.)	Alton and Bell sales, 1957-58	
		(000 bu.)	% of est. area total
Corn	322	104	32
Oats	44	33	75
Winter Wheat	196	116	59
Soybeans	36	42	117
Total or average	598	295	49

Source: County production data from Michigan agricultural statistics. Michigan Coop. Crop Rept. Service

approximately 300,000 to 350,000 bushels, as follows:

Corn - 103,000 to 126,000 bu. Wheat - 112,000 to 136,000 bu.
 Oats - 44,000 to 54,000 bu. Soybeans - 25,000 to 30,000 bu.

Bin storage capacity - In planning the future operations of a country elevator it is necessary to consider the present and prospective adequacy of the total bin storage capacity of elevators in the trade territory. The Division of Foods and Standards, Michigan Department of Agriculture administers the Farm Produce Storage Act (Act 141, P.A. of 1939) and can supply the total bin storage capacity figures for elevators and mills, by county. The total bin storage capacity of the elevators doing business in the Alton trade area totaled 214,000 bushels in 1957, and the total elevator storage capacity in the Bell trade area was 232,000 bushels in 1957. These and other data in Table 5 indicate that the present elevator facilities are equivalent to 60 to 75 percent of the probable farm sales of these grain crops in this grain area by

1965. Because of farm storage facilities and in view of the normal seasonal sales pattern by farmers, the elevator facilities in the area are adequate for their probable 1965 volume of grain business.

Step IV. Estimate potential feed sales

Livestock numbers - As shown in Figures 7a and 7b, there has been a considerable increase in cattle other than milk cows in Central county since 1940, but the number of milk cows has remained close to a horizontal trend line. There has been a marked decline in sheep numbers, but a

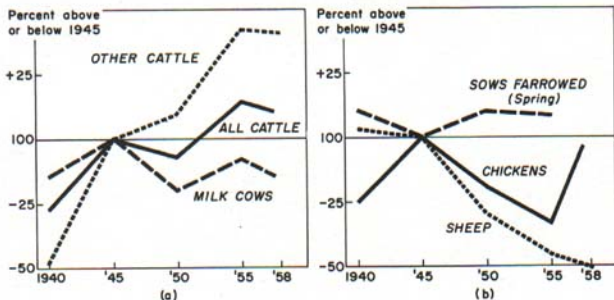


Figure 7. Trend in livestock numbers in Central County, 1940-58.

much less distinct trend for swine and chickens, as shown also in Table 26 (Appendix).

Potential feed sales - The potential market for concentrate feeds in the trade area of the two elevators is shown in Table 6, based on the projections of the 1940-58 livestock trends in the county. If the 1965 sales of the Alton and Bell elevators represent the same proportion of the estimated total potential in the area as in 1957 (Table 7), the low and high estimates of their concentrate feed sales in 1965 would be as follows: dairy feeds - 169 to 207 tons, hog feed - 294 to 326 tons and poultry feed - 65 to 79 tons, or total concentrate feed sales of 528 to 612 tons.

Table 5. Elevator bin storage capacity in relation to farm sales of four crops in Central county and trade areas of Alton and Bell elevators.

1954-57 average farm sales					
Crop	County	000 Bu.			
		Alton (a)	Bell (b)	Total trade area	
Corn	725	181	102	283	
Oats	123	31	17	48	
Winter wheat	506	125	71	197	
Soybeans	64	16	9	25	
Total	1,418	354	199	553	
Est. 1965: (c)	Low	1,488	372	208	580
	High	1,818	455	254	709
Bin storage capacity of elevators, by areas, 000 bu.					
	County (d)	Alton	Bell	Total (e)	
	439	214	232	431	

Storage capacity as percent of farm sales

Year	County	Alton	Bell	Total
1957		31	60	78
Est. 1965: (c)	Low	24	47	61
	High	30	58	74

(a) 25 percent of county total

(b) 14 percent of county total

(c) From Table 9

(d) Includes one elevator in each of two adjacent counties that compete with Alton elevator. Storage capacity data from Mich. Dept. of Agr.

(e) One elevator competes in both trade areas

Step V. Summarize the projected estimates

Summary is a convenient reference - A summary of the projected estimates provides the elevator management with a convenient reference source when considering specific phases of their plans for future operations and facilities.

The 1965 estimates included in various tables prepared for the Alton and Bell elevator firm are listed in Table 8.

Step VI. Use the projected estimates as a supplement to the firm's business records and experience

The kinds of U.S. census information discussed in this report is a useful supplement to the business records of an elevator firm and the experience of its management. It cannot be a substitute for either. Elevator managers, like business men in general, frequently make their future plans in terms of the next year rather than for five or ten years ahead. The purpose of this report has been to indicate how census information can be assembled and analyzed as a guide in such planning. There is a tendency for short-run plans to be too small to cope with situations that may easily develop within several years, and a series of changes over a decade is likely to be more expensive and troublesome to make than a single change geared to the anticipated situation a decade ahead.

Appendix

Fitting trend lines to a series of data - An estimate of future crop acreage or production, of livestock numbers, or a similar item at a specified time involves the consideration of several factors:

1. The past record or trend for the item.
2. Technological changes that may occur, such as the adoption of higher yielding varieties or improved cultural practices.
3. Changes in market demand or prices.
4. Changes in government agricultural programs.
5. Experimental error due to the limited number of figures on which a trend is based or to the method used in fitting the trend.

While a trend line can be fitted to a series of points, its significance involves the experience and judgement of the person who uses the indicated trend as a guide. That is the reason, as previously mentioned, that the 1965 estimates in this report are expressed as ranges (within 10 percent below or above the indicated estimate) rather than a single figure. An elevator manager's knowledge of the situation in his county and trade area may cause him to decide that the upper or lower limit of the range is a more accurate forecast. Despite these limitations a projected trend is an aid in future planning and a much better guide than a guess.

Examples - Figure 8 shows two examples of straight line trends and one with a curved line projected ten years beyond the time of the last point in the series of figures used in each example. When the four points for the 1939-54 period in example I are plotted, it is apparent that they lie along a straight line rather than a curve. The trend line can be computed and fitted statistically, but the process is quite technical and time consuming, especially without an electric calculator. In many situations similar to the present elevator survey, it is quite satisfactory for planning purposes to fit the trend lines by sight.

A black thread stretched between the hands and extending somewhat beyond the left and right sides of the chart, or a transparent plastic ruler may be used to determine the trend line quite closely to a mathematically fitted line. Example I illustrates about the easiest four point trend situation that may be fitted by sight. As the number of plotted points increases, it becomes easier to determine a line that

fits the data, but the number of plotting points in this survey ranged from four to seven. The projected trend line in example I crosses the 1965 axis at 180 units on the vertical scale. Because of the limited number of plotted points used to indicate the trend and because the line was fitted by sight rather than mathematically, it is desirable to express the projected 1965 estimate as a range rather than the exact figure of 180. In this study and in the examples in Figure 8 the 1965 estimates are expressed as a range with upper and lower limits of 10 percent above and below the projected trend figure, 180 in example I. Thus the 1939-54 trend in example I indicates that the number of units involved in this illustration in 1965 will probably range between a high of 198 and a low of 162, as shown by points H and L, respectively. These are the values, like those shown in the tables of this survey as the high and low 1965 estimates.

The first two or last two plotted points may be quite a distance from a trend that seems to pass close to other points in the series, as in example II. In that case the mid-point of a line between the two points (A and B in example II) may be used as a plotting point. The trend in example II thus passes through the mid-point of the line A-B and the two other points.

The trends in this survey proved to be straight lines, but sometimes the data indicate a curved trend, as in example III. In such instances a draftsman's French Curve is a useful aid in fitting a curved trend, or it may be done freehand. In most cases the eye is quite sensitive in selecting between two or more tentative trend curves that may be drawn the one that "fits" best. Dotted lines from a point near the last plotted point on the curve to the high and low limits of the range, as shown in example III, illustrates the range within which a mathematically fitted line would be likely to fit.

Reference tables - The following tables are included in the appendix to make the text of the report more readable, but they include details that the elevator management are likely to need in planning.

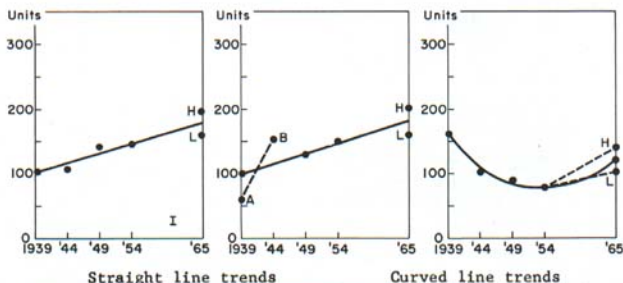


Figure 8. Examples of trend lines fitted to data by sight method.

Table 6. Estimated concentrate feed sales potential in Central county and trade areas of Alton and Bell elevators, 1965.

Livestock	Concentrate feed sales potential per unit (b)	Estimated concentrate feed sales potential (a)																		
		County		Trade Area																
		Low	High	Low	High	Low	High	Low	High	Low	High									
Milk Cows	1¢/head/day or .1825 tons /head/yr.	1,971	2,409	769	940	493														
Other Cattle	3¢/head/day or .0456 tons /head/yr.	739	903	288	352	185														
Sows Farrowed (c)	872¢/sow /yr or .436 tons/yr.	3,139	3,488	1,224	1,360	785														
Chickens (hens and pullets)	6.6¢/day /100 birds or 1.204 tons /100 birds/yr.	1,842	2,251	718	878	460														
Total		7,691	9,051	2,999	3,530	1,923														

(a) Numbers of livestock from Table 22.

(b) Sales potentials used by operators of the two elevators.

(c) Sows farrowed in spring averaged 55% of total number of the year in Michigan during 1953-57 period. Total number of sows estimated on that basis.

Table 7. Summary of 1965 estimates

Item and Units	Areas	1965 Estimates	
		Low	High
<u>Land in Farms</u> (000 acres)	County	238	279
	Bell	34	39
	Trade Area	94	109
	Alton	60	70
<u>Average Acres Per Farm</u>	All	147	153
<u>Crop Land Harvested</u> (000 acres)	County	146	178
	Trade Area	57	69
	Alton	36	44
	Bell	21	25
<u>Use of Land in Farms</u> (percent)	All		
	Cropland Harvested	61	64
	Pasture	7	7
	Woodland	12	12
	Other Farm Land	17	20
<u>Number of Farms</u>	County	1,557	1,903
	Trade area	607	742
	Alton	389	476
	Bell	218	266
<u>Number of Farms, selected types</u>			
	Cash Grain		
	Dairy	123	150
	Other Livestock	109	133
	Poultry	42	51
		7	8
<u>Prdduction of 4 Grains</u> (000 bu.)	County	3,959	4,829
	Trade Area	1,544	1,888
	Alton	990	1,212
	Bell	554	676
<u>Farm Sales, 4 Grains</u> (000 bu.)	County	1,488	1,818
	Trade Area	580	709
	Alton	372	455
	Bell	208	254
<u>Total Acres, 4 Grains</u>	Trade Area		
	39% of county estimate	40,014	48,906
	Sum of township estimates	47,796	58,523
<u>All Cattle</u>	County	27,000	33,000
	Trade Area	10,530	12,870
	Alton	6,750	8,250
	Bell	3,780	4,520

Table 7 (Continued)

Items and Units	Areas	1965 Estimates	
		Low	High
<u>Milk Cows</u>	County	10,800	13,200
	Trade Area	4,212	5,148
	Alton	2,700	3,300
	Bell	1,512	1,848
<u>Other Cattle</u>	County	16,200	19,800
	Trade Area	6,318	7,722
	Alton	4,050	4,950
	Bell	2,268	2,772
<u>Sows Farrowed (spring)*</u>	County	3,960	4,840
	Trade Area	1,544	1,888
	Alton	990	1,210
	Bell	554	678
<u>Stock Sheep</u>	County	3,150	3,850
	Trade Area	1,228	1,502
	Alton	787	963
	Bell	441	539
<u>Chickens (000)</u>	County	153	187
	Trade Area	60	73
	Alton	39	47
	Bell	21	26

* 55 percent of total annual number of farrowings in recent years in Michigan are in spring.

Table 8. 1957-58 feed sales of two elevators compared to estimated concentrate feed sales potential for trade area in 1957.

Feeds	Concentrate feed sales potentials per unit (a)	Estimated feed sales potentials (tons) (b)	Feed sales 1957-58	
			(tons)	% of sales potential
Dairy	.1925T/head	833	183	22
Hog	.436 T/sow	1,113	271	24
Poultry	1.204T/100	704	156	22
Total		2,650	610	23

- (a) Sales potentials used by operators of the two elevators.
 (b) Numbers of livestock from Appendix
 (c) Data from elevator operator

Table 9. Land use data for Central county, 1939-54.

Item	1939	1944	1949	1954	1965 estimates*	
					Low	High
Number of farms	2,336	2,255	2,084	2,021	1,557	1,903
Land area--acres	325,120	325,120	325,120	325,120	325,120	325,120
Acres in farms	281,019	285,804	275,472	268,887	238,000	279,000
Percent of land in farms	86	88	85	83	73	86
Ave. acres per farm	120	127	132	135	153	147
Acres of harvested crops	118,214	135,054	140,507	142,087	146,000	178,000
Number of farms with:						
1-9 acres of har. crops	--	243	188	191	99	121
10-19 " " "	--	217	157	181	81	99
20-29 " " "	--	202	173	140	70	86
30-49 " " "	--	403	285	276	81	99
50-99 " " "	--	588	593	478	333	407
100-199 " " "	--	355	360	384	365	445
200 & over " " "	--	80	170	136	180	220
Acres pastured	92,736	81,295	61,503	52,605	15,200	19,800
Acres in woodland	21,568	21,900	25,988	26,209	27,900	34,100
Acres of other farm land	48,501	47,555	47,474	47,986	48,000	48,000
Percent of farm land in:						
Harvest crops	42**	47	51	53	61	64
Pasture	33	28	22	20	7	7
Woodland	8	8	9	10	12	12
Other uses	17**	17	18	17	20	17
* 10 percent below and 10 percent above projected trend figure						
** Estimated						

Source: U.S. Census of Agriculture.

Table 10. Estimated land use data, Alton and Bell elevator trade areas, 1939-54.

Item	Alton (25% of county)				1965 estimates*	
	1939	1944	1949	1954	Low	High
Number of farms	584	564	521	505	389	476
Land area--acres	81,280	81,280	81,280	81,280	81,280	81,280
Acres in farms	70,255	71,451	68,868	67,222	59,500	69,750
Percent of land in farms	86	88	85	83	73	86
Ave. acres per farm	120	127	132	135	153	147
Acres of harvested crops	29,554	33,764	35,127	35,522	36,500	44,500
Number of farms with:						
1-9 acres of har. crops	--	61	47	47	26	30
10-19 " " "	--	55	39	45	21	25
20-29 " " "	--	51	43	35	17	20
30-49 " " "	--	101	71	67	21	25
50-99 " " "	--	147	148	119	83	102
100-199 " " "	--	88	90	96	91	123
200 & over " " "	--	20	27	34	45	55
Acres pastured	23,184	20,324	15,376	13,151	4,050	4,950
Acres in woodland	5,392	5,475	6,497	6,552	6,950	8,300
Acres of other farm land	12,125	11,888	11,868	11,997	12,000	12,000
Percent of land in:						
Harvested crops	42	47	57	53	61	64
Pasture	33**	28	22	20	7	7
Woodland	8	8	9	10	12	12
Other uses	17**	18	17	17	20	17

(Continued)

Table 10. (Continued)

Item	Bell (14% of county)					1965 estimates*	
	1939	1944	1949	1954	Low	High	
Number of farms	327	315	292	283	218	266	
Land acres--area	45,517	45,517	45,517	45,517	45,517	45,517	
Acres in farms	39,342	40,013	38,566	37,644	33,320	39,060	
Percent of land in farms	85	88	85	83	73	86	
Ave. acres per farm	120	127	132	135	153	147	
Acres of harvested crops	16,549	18,907	19,671	19,892	20,440	24,920	
Number of farms with:							
1-9 acres of har. crops	--	34	26	27	14	17	
10-19 " " " "	--	30	22	25	11	14	
20-29 " " " "	--	28	24	20	10	12	
30-49 " " " "	--	56	40	37	11	14	
50-99 " " " "	--	82	83	67	47	57	
100-199 " " " "	--	50	50	54	51	62	
200 & over " " " "	--	11	15	19	25	31	
Acres pastured	12,983	11,381	8,610	7,365	2,268	2,722	
Acres in woodland	3,020	3,066	3,638	3,670	3,892	4,639	
Acres of other farm land	6,790	6,659	6,647	6,717	6,720	6,720	
Percent of land in:							
Harvested crops	42	47	51	53	61	64	
Pasture	33**	28	22	20	7	7	
Woodland	8	8	9	10	12	12	
Other uses	17**	18	17	17	20	17	

* 10 percent below and 10 percent above projected trend figure.

** Estimated

Source: U.S. Census of agriculture.

Table 11. Estimated land use data, total trade area, 1939-54.

Item	1939	1944	1949	1954	1965 estimates*	
					Low	High
Number of farms	911	879	813	788	607	742
Land area-acres	126,797	126,797	126,797	126,797	126,797	126,797
Acres in farms	109,597	114,464	107,434	104,866	96,820	108,810
Percent of land in farms	86	88	85	83	73	86
Ave. acres per farm	120	127	132	135	153	147
Acres of harvested crops	46,103	52,671	54,798	55,414	56,940	69,420
1-9 acres of har. crops	--	95	73	74	39	47
10-19 " " " "	--	85	61	70	32	39
20-29 " " " "	--	79	69	55	27	34
30-49 " " " "	--	157	111	104	32	39
50-99 " " " "	--	229	231	186	130	159
100-199 " " " "	--	138	140	150	142	174
200 & over " " " "	--	31	42	53	70	86
Acres pastured	36,167	31,705	23,986	20,516	6,318	7,722
Acres in woodland	8,412	10,541	10,135	10,222	10,862	12,948
Acres of other farm land	18,547	18,714	18,615	18,714	18,720	18,720
Percent of land in:						
Harvested crops	42	47	51	53	61	64
Pasture	33*	28	22	20	7	7
Woodland	8	8	9	10	12	12
Other uses	17*	17	18	17	22	18

* 10 percent below and 10 percent above
Source: U.S. Census of Agriculture.

Table 12. Number of farms, by type, in Central county and estimated numbers in trade areas of Alton and Bell elevators, 1940-54, and projected estimates for 1965.

Type	County				
	1939	1944	1954	1965 (a)	
				Low	High
Cash Grain	453	187	212	315	385
Dairy	459	432	458	279	341
Livestock (b)	500	551	303	108	132
Poultry	108	187	116	75	22
Fruit	38	26	15	9	11
Vegetable	28	21	10	0	0
General	750	513	398	828	1,012
Unclassified		338	572		
Total	2,336	2,255	2,084	1,557	1,903

Type	Total trade area (39% of county)				
	1939	1944	1949	1965 (a)	
				Low	High
Cash Grain	177	73	83	123	150
Dairy	179	168	179	109	133
Livestock (b)	195	215	118	42	51
Poultry	42	73	45	7	8
Fruit	15	10	6	4	5
Vegetable	11	8	4	0	0
General	292	200	155	144	
Unclassified		132	223	202	
Total	911	879	813	607	742

(a) 10 percent below and above trend figure, respectively.

(b) Other than dairy and poultry.

Source: U.S. Census of Agriculture.

Table 13. Estimated number of farms, by type, in trade areas of Alton and Bell elevators, 1940-54, and projected estimates for 1965.

	Alton trade area (25% of county)				
	1939	1944	1949	1954	
				Low	High
Cash Grain	113	47	53	114	79
Dairy	115	108	114	86	70
Livestock (b)	125	138	76	59	27
Poultry	27	47	29	19	5
Fruit	10	6	4	6	3
Vegetable	7	5	2	0	0
General	187	128	100	92	257
Unclassified		85	143	129	315
Total	584	564	521	505	389

26

	Bell Trade area (14% of county)				
	1939	1944	1949	1954	
				Low	High
Cash Grain	64	26	30	63	44
Dairy	64	60	65	48	39
Livestock (b)	70	77	42	33	15
Poultry	15	26	16	10	2
Fruit	5	4	2	4	1
Vegetable	4	3	2	0	0
General	105	72	55	52	145
Unclassified		47	80	73	178
Total	327	315	292	283	218

Source: From county data, Table 12.

(a) 10 percent below and above trend figure, respectively.

Table 15. Farms, by economic class in trade areas of Alton and Bell elevators, 1939-54.

Economic Class	Alton (25% of county)				Bell (14% of county)			
	1939	1944	1949	1954	1939	1944	1949	1954
Commercial			382	380			214	213
I \$25,000 & over			5	8			3	4
II \$10,000-24,999			28	51			16	29
III \$5,000-9,999			67	95			37	53
IV \$2,500-4,999			118	98			66	54
V \$1,200-2,499			113	95			64	53
VI \$250-1,199			50	34			28	19
Part-time			76	65			42	36
Residential, other			63	60			36	34
Total	584	564	521	505	327	315	292	283

Source: From Table 14.

Table 16. Production and farm sales of four grain crops in Michigan,
1953, 57.
(000 bu.)

Crop and Item	1953	1954	1955	1956	1957	5-year Ave.
Corn - production	80,262	83,028	93,186	102,204	91,278	89,992
sold	17,701	18,064	30,964	37,364	30,545	26,928
% sold	22	22	33	36	33	30
Oats - production	48,825	55,497	57,068	34,850	40,882	47,424
sold	6,836	8,880	13,126	8,016	8,176	9,007
% sold	14	16	23	23	20	19
Winter wheat - production	44,692	30,000	27,966	31,290	29,739	32,737
sold	37,664	24,373	23,561	27,042	24,908	27,710
% sold	84	81	84	86	84	85
Soybeans - production	2,090	3,476	3,036	4,200	5,192	3,599
sold	1,877	3,254	2,818	3,981	4,929	3,372
% sold	90	94	93	95	95	94
Total - production	175,869	172,001	181,256	172,544	167,091	173,752
sold	64,078	54,571	70,469	76,403	68,558	67,017
% sold	36	32	39	44	41	38

Source: Michigan Agricultural Statistics. Mich. Coop. Crop Rept. Service.

Table 17. Corn acreage, production and farm sales in Central county and combined trade area, 1939-57.

Year	County			% of prod. sold	Trade area		
	Acres (all purposes) (a)	000 bu.			Acres (all purposes)	000 bu.	
		Prod. (a)	Sold (b)			Prod.	Sold
1939	35,359	1,413	113	8	14,180	551	44
1944	45,586	1,025	82	9	17,779	400	32
1949	46,699	1,748	453	26	18,213	682	177
1954	54,800	2,095	461	22	21,372	817	180
1955	52,000	2,375	784	33	20,280	926	306
1956	53,100	2,973	1,070	36	20,709	1,159	417
1957	49,400	2,398	824	33	19,266	976	322
1965 est.*							
Low	54,000	2,565	795	31	21,060	1,000	310
High	66,000	3,135	972	31	25,740	1,223	379

* 10 percent below and above trend, respectively.

Sources: (a) U.S. Census of Agriculture, 1939-49. Michigan Agricultural Statistics, Mich. Coop. Crop Rept. Service, 1954-57.

(b) U.S. Census of Agriculture, 1939-49. 1954-57 quantities based on state-wide percentage sold - no table.

Table 18. Corn utilization in Central county and trade area of Alton and Bell elevators 1940-54.

Use	County			Trade area (35% of county)	
	1944	1949	1954	Alton (25% of county)	
				1944	1949
<u>All purposes</u>					
Farms	1,814	1,668	1,580	454	417
Acres	45,586	46,699	52,175	13,896	11,675
<u>For Grain</u>					
Farms	1,799	1,647	1,568	450	412
Acres	43,452	43,452	49,646	10,863	10,863
(000) bu. prod.	1,026	1,748	2,303	256	437
(000) bu. sold	*	453	1,001	*	113
<u>For Silage</u>					
Acres	*	2,326	1,711	*	581
<u>Hogged or Fodder</u>					
Acres	*	921	818	*	231
Use	County Bell (14% of county)			Total	
	1944	1949	1954	1949	
				1944	1954
<u>All purposes</u>					
Farms	254	234	221	708	651
Acres	6,382	6,538	7,304	20,279	18,213
<u>For Grain</u>					
Farms	252	230	220	702	642
Acres	6,083	6,083	6,950	16,946	16,946
(000) bu. prod.	144	245	392	400	682
(000) bu. sold	*	63	140	*	176
<u>For Silage</u>					
Acres	*	326	240	*	907
<u>Hogged or Fodder</u>					
Acres	*	129	114	*	360

* Not available

Source: U. S. Census of Agriculture.

Table 19. Oat acreage, production and farm sales in Central county and combined trade area, 1939-57.

Year	County			Trade area (39% of county)			
	Acres (all purposes) (a)	000 bu.		% of prod. sold	Acres (all purposes)	000 bu.	
		Prod. (a)	Sold (b)			Prod. (a)	Sold
1939	8,037	217	22	10	3,134	85	8
1944	16,017	314	31	10	6,247	122	12
1949	22,689	659	120	18	8,849	257	46
1954	25,000	678	108	16	9,750	264	42
1955	22,000	782	180	23	8,590	305	70
1956	19,000	532	106	20	7,410	207	41
1957	17,000	600	114	19	6,630	234	44
1965 est.*							
Low	24,300	758	152	20	9,477	296	59
High	29,700	927	185	20	11,583	362	72

* 10 percent below and above trend, respectively.

Source: (a) U.S. Census of Agriculture, 1939-49. Michigan Agricultural Statistics, Mich. Coop. Crop Rept. Service, 1954-49.
 (b) U.S. Census of Agriculture, 1939-49. 1954-57 quantities based on state-wide percentage sold.

Table 20. Winter wheat acreage, production and farm sales in Central county and combined trade areas, 1939-57.

Year	County			Trade area (39% of county)			
	Acres (a)	000 bu.		% of Prod. sold	Acres	000 bu.	
		Prod. (a)	Sold (b)			Prod.	Sold
1939	18,461	252	144	57	6,810	98	56
1944	21,231	393	228	58	8,280	153	89
1949	29,053	645	515	80	11,331	252	202
1954	23,000	583	472	81	8,970	227	184
1955	23,000	554	465	84	8,970	216	181
1956	21,000	647	556	86	8,190	252	217
1957	20,000	598	502	84	7,800	233	196
1965 est.*							
Low	20,700	567	476	84	8,073	221	186
High	25,300	693	582	84	9,867	270	227

* 10 percent below and above trend, respectively.

Sources: (a) U.S. Census of Agriculture, 1939-49. Michigan Agricultural Statistics, Mich. Coop. Crop Rept. Service, 1954-57.
 (b) U.S. Census of Agriculture, 1939-49. 1954-57 quantities based on state-wide percentage sold.

Table 21. Soybean acreage, production, and farm sales in Central county and combined trade area, 1939-57.

Year	County			Trade area (35% of county)			
	Acres (a)	000 bu.		% of prod. sold	Acres	000 bu.	
		Prod. (a)	Sold (b)			Prod.	Sold
1939	3,502	55	35	64	1,366	27	14
1944	5,049	49	40	82	1,969	19	16
1949	707	11	11	100	276	4	4
1954	3,200	57	54	94	1,248	22	21
1955	2,500	48	45	93	975	19	18
1956	3,800	75	71	95	1,482	29	28
1957	4,800	94	89	95	1,872	37	36
1965 est.*							
Low	3,600	69	65	94	1,404	27	25
High	4,400	84	79	94	1,716	33	31

* 10 percent below and above trend, respectively.

Sources: (a) U.S. Census of Agriculture, 1939-49. Michigan Agricultural Statistics, Mich. Coop. Crop Rept. Service, 1954-57.
 (b) U.S. Census of Agriculture, 1939-49. 1954-57 quantities based on state-wide percentage sold,

Table 22. Trend in corn acreage in Central county by townships, 1939-57.

Townships	Acres						
	1939	1940	1949	1954	1955	1956	1957
Ash	2,093	2,652	2,500	3,453	3,367	3,460	3,561
Aspen	2,308	1,618	2,492	3,265	3,176	3,235	3,606
Basewood	2,941	3,387	3,767	5,108	4,755	5,209	5,492
Beech	2,996	3,761	3,492	4,261	4,230	4,426	4,665
Cherry	1,725	2,108	2,230	2,605	2,477	2,511	3,136
Elm	1,836	2,795	2,079	3,417	3,085	3,306	3,490
Fir	3,160	3,524	3,950	4,442	4,137	4,350	4,760
Hemlock	2,628	3,766	3,359	4,069	3,762	4,194	4,679
Hickory	2,538	3,264	3,220	3,647	3,523	3,698	4,032
Linden	2,865	3,337	3,826	4,690	4,755	4,872	5,487
Maple	2,175	2,726	3,029	3,060	2,965	3,281	3,765
Oak	2,549	3,401	3,547	4,698	4,578	5,017	5,226
Pine	1,340	1,735	2,013	2,115	2,112	2,213	2,252
Poplar	1,580	2,408	2,313	3,024	2,978	3,122	3,251
Spruce	2,005	2,243	2,409	2,765	2,791	2,871	2,939
Walnut	1,523	2,001	2,069	2,144	2,230	2,438	2,552
Trade Area							
County	36,359	45,586	46,699	56,763	54,921	62,203	62,893

(Continued)

Table 22 (Continued)

	1965 estimates(a)		
	Townships		
	Low	High	Trade Area
Ash	3,960	4,840	3,960
Aspen	3,780	4,620	3,780
Basswood	5,550	7,150	1,110
Beech			1,430
Cherry	2,880	3,620	2,880
Elm	3,780	4,620	3,780
Fir	4,680	5,720	3,744
Hemlock			3,520
Hickory	3,970	4,730	794
Linden	5,670	6,930	1,418
Maple	3,420	4,180	1,026
Oak			946
Fine			1,732
Poplar			1,254
Spruce			
Walnut			
Trade Area			22,492
County	54,000	66,000	27,538

(a) 10 percent below and above 1965 figures, respectively.

Sources: 1940-50 Acreages from U.S. Census of Agriculture
1945-57 Acreages from Central County ASC Office, U.S.D.A.

Table 23. Trend in oat acreage in Central county by townships, 1939-54.

Townships	Acres 1939	1965 estimates (a)									
		1944	1949	1954	Townships		Trade Area		High	Low	
		1944	1949	1954	Low	High	Low	High			
Ash	821	1,299	1,669	1,873	2,430	2,970	2,430	2,970	2,430	2,970	
Aspen	198	288	1,224	1,230	2,250	2,750	2,250	2,750	2,250	2,750	
Basswood	924	1,577	1,992	1,781	2,520	3,080	2,520	3,080	504	616	
Beech	1,435	1,778	2,336	1,963							
Cherry	470	1,080	1,256	1,060	1,530	1,870	1,530	1,870	1,530	1,870	
Elm	146	411	908	747	1,350	1,650	1,350	1,650	1,350	1,650	
Fir	800	1,568	1,968	1,733	2,520	3,080	2,520	3,080	2,016	2,464	
Hemlock	985	1,346	1,912	1,799							
Hickory	521	1,088	1,326	1,591	2,170	2,530	2,170	2,530	434	506	
Linden	236	896	1,421	1,270	2,160	2,640	2,160	2,640	540	660	
Maple	367	826	1,073	979	1,350	1,650	1,350	1,650	405	495	
Oak	381	1,395	1,570	1,309							
Pine	59	309	726	1,236							
Poplar	--	457	891								
Spruce	328	816	1,330	2,129							
Walnut	250	278	957								
Trade Area									11,459	13,981	
County	8,037	16,017	22,689	20,846	24,300	29,700					

(a) 10 percent below and above 1965 figures, respectively.

Source: U.S. Census of Agriculture.

Table 24. Trend in winter wheat acreage in Central county, by townships, 1939-58.

Township	Acres									
	1939	1944	1949	1954	1955	1956	1957	1958		
Ash	1,264	1,534	1,882	1,835	1,941	1,924	2,325	1,327		
Aspen	755	510	2,645	2,415	2,311	2,252	2,709	1,107		
Basswood	1,189	1,549	2,663	3,314	3,550	3,614	3,814	2,108		
Beech	1,782	1,870	2,637	2,842	2,842	2,806	3,041	1,780		
Cherry	1,035	1,266	1,400	1,696	1,603	1,739	1,892	1,135		
Elm	799	1,103	1,643	1,916	1,763	1,928	2,143	901		
Fir	1,692	2,134	2,357	1,368	2,796	2,727	3,051	1,711		
Hemlock	1,504	1,707	2,157	2,348	2,285	2,481	2,517	1,463		
Hickory	1,311	1,545	1,821	1,767	1,808	1,818	2,069	1,244		
Linden	1,093	1,673	2,541	2,472	2,363	2,232	2,730	1,278		
Maple	1,052	1,292	1,445	1,304	1,207	1,394	1,650	878		
Oak	1,080	1,484	1,690	1,760	1,779	1,789	2,261	1,525		
Pine	383	554	800	1,268	1,438	1,315	1,586	905		
Poplar	825	918	1,301	1,541	1,679	1,528	1,670	1,061		
Spruce	960	1,224	1,416	1,839	1,849	1,823	1,945	1,109		
Walnut	737	728	824	906	960	1,016	1,150	770		
Trade Area										
County total	17,461	21,231	29,053	32,145	32,184	32,286	36,682	20,302		

(Continued)

Table 24, (Continued)

Township	1965 Estimates (a)			
	Townships		Trade Area	
	Low	High	Low	High
Ash	1,890	2,310	1,890	2,310
Aspen	2,430	2,970	2,430	2,970
Basswood	4,000	4,800	800	960
Beech				
Cherry	1,575	1,925	1,575	1,925
Elm	1,890	2,310	1,890	2,310
Fir	2,700	3,300	2,160	2,640
Hemlock				
Hickory	1,710	2,090	346	418
Linden	2,700	3,300	675	825
Maple	1,350	1,650	405	495
Oak				
Pine				
Poplar				
Spruce				
Walnut				
Trade Area			12,167	14,853
County total	20,700	25,300		

(a) 10 percent below and above 1965 figures, respectively

Sources: 1940-50 Acreages from U.S. Census of Agriculture.
1954-58 Acreages from Central County ASC Office, U.S.D.A.

Table 25. Trend in soybean acreage in Central county, by townships, 1939-54.

Townships	Acres				Estimates for 1965 in Trade Area*	
	1939	1944	1949	1954	Low	High
Ash	Not	154	4	Not		
Aspen	rept.	401	100	rept.		
Basswood		277	70			
Beech		160	63			
Cherry		140	30			
Elm		820	72			
Fir		369	108			
Hemlock		186	57			
Hickory		672	79			
Linden		1,068	129			
Maple		178	17			
Oak		235	48			
Pine		1,102	198			
Poplar		438	90			
Spruce		295	32			
Walnut		275	8			
Total		6,945	1,105		3,600	4,400

* 10 percent below and above 1965 figures, respectively.

Source: U.S. Census of Agriculture.

Table 26. Numbers of livestock on farms in Central county and trade areas of Alton and Bell elevators, 1940-58.

Year	All Cattle			Milk Cows				
	County	Total Trade Area	Alton	Bell	County	Total Trade Area	Alton	Bell
1940	17,173	6,697	5,256	2,404	11,034	4,303	2,758	1,545
1945	23,590	9,200	5,897	3,303	13,020	5,078	3,255	1,923
1950	22,009	8,584	5,503	3,081	10,436	4,070	2,609	1,461
1954	25,300	9,867	6,325	3,542	12,400	4,836	3,100	1,736
1955	27,000	10,530	6,750	3,780	12,000	4,680	3,000	1,680
1956	25,000	9,750	6,250	3,500	12,300	4,797	3,075	1,722
1957	25,000	9,750	6,250	3,500	11,700	4,563	2,925	1,638
1958	26,000	10,140	6,500	3,640	11,100	4,329	2,775	1,554
1965 est.*	27,000	10,530	6,750	3,780	10,800	4,212	2,700	1,512
Low	33,000	12,870	8,250	4,520	13,200	5,141	3,300	1,848

(Continued)

Table 26 (Continued)

Year	Other Cattle			Sows Farrowed (spring)		
	County	Total Trade Area	Alton Bell	County	Total Trade Area	Alton Bell
1940	6,139	2,392	1,535	4,139	1,614	1,035
1945	10,570	4,122	2,642	3,744	1,460	936
1950	11,573	4,514	2,894	4,110	1,603	1,028
1954	12,900	5,031	3,225	4,900	1,911	1,225
1955	15,000	5,850	3,750	4,043	1,577	1,011
1956	12,700	4,953	3,175	4,000	1,560	1,000
1957	13,300	5,187	3,325	3,600	1,404	900
1958	14,900	5,811	3,725	--	--	--
1965 est.*						
Low	16,200	6,318	4,050	3,960	1,544	990
High	19,800	7,722	4,950	4,840	1,888	1,210

(Continued)

Table 26 (Continued)

Year	Stock Sheep			Chickens (000)				
	County	Total Trade Area	Alton	Bell	County	Total Trade Area	Alton	Bell
1940	14,888	5,806	3,722	2,084	132	57	33	18
1945	14,389	5,612	3,598	2,014	176	69	44	25
1950	10,124	3,948	2,531	1,417	142	55	35	20
1954	7,800	3,042	1,950	1,092	150	59	38	21
1955	7,800	3,042	1,950	1,092	118	46	30	16
1956	8,500	3,315	2,125	1,190	160	62	40	22
1957	8,500	3,315	2,125	1,190	150	59	38	21
1958	7,000	2,730	1,750	980	170	66	42	24
1965 est.*								
Low	3,150	1,228	787	441	153	60	39	21
High	3,850	1,502	963	539	187	73	47	26

* 10 percent below and above trend, respectively.

Sources: U.S. Census of Agriculture, 1940-50
Michigan Agricultural Statistics, Mich. Coop. Crop. Rept. Serv., 1954-58.

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