RELATIVE IMPORTANCE OF ALTERNATIVE MARKET OUTLETS USED BY MICHIGAN FARMERS IN SELLING LIVESTOCK

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RELATIVE IMPORTANCE OF ALTERNATIVE MARKET OUTLETS USED BY MICHIGAN FARMERS IN SELLING LIVESTOCK

by

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A THESIS

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CHAPTER I

INTRODUCTION

Purpose of Investigation. This study was undertaken with a view to making an economic and statistical analysis of a portion of data concerning livestock marketing gathered by the Economics Section of the Michigan Agricultural Experiment Station in cooperation with the Bureau of Agricultural Economics of the United States Department of Agriculture during the summer of 1941.[1/]

A specific purpose of this study was to break down the above mentioned state-wide data to show differences in the importance of each type of outlet by areas for each species, market classes thereof, and different sized producers. A concurrent major purpose of the study was to ascribe economic significance to the statistical findings of the study.

The seven alternative types of initial markets for which this study attempts to ascertain the relative importance are as follows: (1) terminal public markets, (2) concentration yards or local markets, (3) packing plants, (4) dealer or truck buyers, (5) local cooperative livestock marketing associations, (6) auctions or sale barns, and (7) farmer buyers or others.[2/]

1/ This investigation of "Marketing Livestock in the Corn Belt Region," sponsored by the Division of Marketing and Transportation Research of the Bureau of Agricultural Economics, was conducted in cooperation with the Agricultural Experiment Stations of fourteen north central states, using uniform schedules prepared by the sponsoring agency. As a graduate research assistant in the Department of Economics of Michigan State College, the author was employed in the statistical tabulation of data obtained by field representatives and mail questionnaires from over 1700 livestock producers in Michigan.

2/ For definition of terms used in designating these markets, see pp.

A Master's thesis by F. A. Voss entitled, "Marketing Michigan Livestock; Survey of Transportation Trends and Market Outlets"[3] presents a large amount of material concerning livestock transportation and some material relevant to the importance of markets which have developed as supplements to terminal markets. The present study does much to clarify the relative importance of all markets, as it is based on a larger, more representative sample, and includes an analysis by producing areas. Differences in markets utilized for different areas, for each species and market class thereof, and for different sized producers are ascertained and presented in this study.

Utility of the Study. The potential utility of this study lies in the need for overall information regarding the importance of initial livestock markets in various parts of the state. The importance of the livestock industry in Michigan can be judged from the following figures:

> There were 68,769,000 cattle and calves, 58,312,000 hogs, and 54,473,000 sheep on farms in the United States, January 1, 1940. Of these, 2.5 percent of the cattle and calves or 1,708,000, 1.5 percent of the hogs and pigs or 891,000, and 1.9 percent of the sheep and lambs or 1,045,000, were on Michigan farms.[4]
>
> Sale of meat animals contributed $47,583,000 cash farm income to Michigan farmers in 1940 which was their second most important source of income.[5]

Contemporary war-time conditions tend to accentuate the importance of the livestock industry as its products are basic in the "Food for

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[3] Presented at Michigan State College (Department of Economics) in 1940.

[4] Agricultural Statistics, 1940, U.S.D.A.

[5] Reference Book of the Meat Industry, American Meat Institute, Chicago, Illinois.

Freedom" campaign. Priorities affecting livestock transportation, make it desirable to know about market utilization within specific areas of the state. The war emergency thus adds to the general need to know more about the utilization of initial market outlets by livestock producers.

Source and Scope of Data. There are three sources of the primary data on which this thesis is based. They are as follows: (1) 234 schedules obtained by a field representative from a similar number of selected farms, (2) 695 questionnaires obtained as replies to approximately 5,000 letters sent to all Agricultural Adjustment Administration county committeemen, and (3) 820 questionnaires obtained as replies to approximately 10,000 letters sent to Agricultural Adjustment Administration cooperators other than committeemen who were selected at random. The respective methods of selecting the farms for the three sets of data were somewhat as follows. The 234 farmers interviewed by the field representative were located in representative spot areas in 26 counties, as selected by the field representative in collaboration with the county agent of the county being sampled. The 695 questionnaires from AAA committeemen are replies to letters sent to all such committeemen in the state of Michigan. The 820 questionnaires from AAA cooperators are replies to letters sent to every twentieth name on the lists of such cooperators in all counties.[6/]

As the representativeness of these data is discussed in Chapter II, it suffices to state here that, as would be reasonably expected, a varying amount of upward bias is present.

6/ The basis of sampling was devised by the economics section of Michigan State College. The statistical and geographic analysis is the personal work of the author and was not part of the work for which compensation was received from Michigan State College.

The author has limited the scope of the thesis to a consideration of those parts of the above mentioned questionnaires having to do with the utilization of the seven alternative market outlets by farmers selling each of the three major species of livestock.

Outline of Procedure. Following is an outline of the general procedure followed in conducting this study:

1. The 234 schedules filled out by the field representative were edited and then tabulated on large tabulation sheets according to counties. Tables requested by the Bureau of Agricultural Economics were filled out from these tabulated data.
2. The data on the 1515 questionnaires received from the combined AAA committeemen and cooperators' samples were edited and then transferred to tabulation cards. The cards were summarized by counties on a special tabulating board. Results of this tabulation and summarization were used to fill in other tables requested by the Bureau of Agricultural Economics.[1]
3. Three major livestock marketing areas following county and farming type area lines were delimitated.[2]
4. Probabilities of the data being random samples of each of these areas were ascertained.
5. Discrepancies between the census data and those appearing in the 234 schedules gathered by the field representative were found to be so large as to make this sample unusable for purposes of this study. The other two samples from AAA committeemen and

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[1] Beyond this point, the work was done on the initiative of the author.

[2] See Chapter II.

cooperators' samples were combined and accepted as the best available information relevant to the use made of alternative livestock market outlets by Michigan farmers as a whole.

6. County data from the 1515 questionnaires in the combined samples were sorted according to livestock marketing areas and a separate tabulation made.
7. Statistical tables and graphic illustrations were constructed showing the utilization of the seven alternative types of market outlets for each market class of each species of livestock in the geographic areas considered.
8. Findings of the study which were found to have some degree of statistical validity were then described and subjected to economic analysis and interpretation in the textual preparation of this manuscript.

Use of Terms. The subsequent list of terms will be used in light of the following qualifications in all subsequent portions of this thesis.[9]

1. The designation terminal markets includes market outlets which the farmers answering the mail questionnaires considered to be "terminal public markets" to which they consigned livestock directly through commission firms. In practice this refers mainly to the terminal stockyards in Detroit, Chicago, and Buffalo.
2. The term concentration yards includes market outlets which the farmers answering the mail questionnaires considered to be "con-

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[9] A primary objective of defining these terms at this point is to derive short concise names for the seven alternative types of markets on which inquiries in the questionnaires are based. With a view to brevity and convenience in discussion, the author uses these shorter terms in the same sense as the more extended, self-explaining captions employed in the questionnaire. See Appendix A for copy of the farm schedule mailed to farmers.

centration yards or local markets" and normally thought of as markets in continuous or near continuous daily operation in anticipation of orders direct from local or terminal packers.

3. The term packing plants includes market outlets considered by the farmers replying to be "packing plants" and presumably includes direct sales to both local and terminal packers.

4. The term dealers, includes market outlets which the responding farmers considered to be "dealers or truck buyers." Presumably this includes individuals or firms buying livestock direct from farmers with a view to profit from resale at various points not predetermined.

5. The term local cooperatives applies to local cooperative livestock marketing associations through which farmers shipped their livestock by rail or truck to the cooperatively owned Michigan Livestock Exchange or the Detroit terminal market.

6. The term auction includes initial market outlets which the respondents considered to be "auctions or sale barns." Presumably, this includes private or possibly cooperative markets operating on definitely scheduled days at which livestock is sold to the highest bidder.

7. The term farmers, as used in this study in reference to a type of initial market, includes local buyers which the respondents considered to be "farmers or others." In addition to farmer-buyers, the term may include local butchers, hucksters, retailers, and other initial market outlets not covered by the above mentioned six classifications.

8. The term local assembling markets denotes those local markets

which function in the marketing of slaughter livestock to bring widely scattered local production together for sorting, grading, and concentrating into efficient shipping or selling lots. The term includes concentration yards, dealers, local cooperatives, and auctions as defined above.

9. The term slaughter market denotes those markets on which buyers purchase slaughter livestock with the intention of direct slaughtering. These outlets are represented mainly by packing plants and by local butchers (included under "farmers and others").

10. The term local clearing point markets denotes those local markets acting to facilitate the movement of market classes of producer livestock from farmers wishing to sell to those wishing to buy. Concentration yards, dealers, and auctions perform this function.

11. The phrase terminal clearing point markets denotes terminal markets and local cooperatives shipping to terminals which act to facilitate the exchange of market classes of producer livestock, on an inter-area and interstate basis.

Functional Analysis of Initial Livestock Market Outlets. The analysis of market utilization used by the author in discussing the movements of livestock from farm to initial markets is based on the function performed by the markets under consideration. As function performed by given markets varies between slaughter and producer classes of market livestock, it is necessary to set up two functional analyses.

For the slaughter class of each species, including veal in the case of cattle, initial markets may perform three functions which are: (1) to provide a terminal market, (2) to perform an assembling function,[10/]

[10/] Markets performing this function are included in the term local assembling markets as defined above.

and (3) to buy animals for direct slaughter.[11]

The need for the first function arises from the concentration of large packing plants at points where the surplus slaughter livestock of a region can be shipped for packing. At these points large numbers of livestock are concentrated making it possible for the large packing plants at these markets to operate on a sufficiently large scale to secure economical operations of their plants.[12]

Market outlets performing the second function are concentration yards, dealers, local cooperatives and auctions. These local assembling markets act as intermediaries between the farmers selling the slaughter livestock and those wishing to buy. Their overall function is to bring widely scattered small quantities of slaughter livestock together in such numbers as can be economically sorted, graded, and shipped. To the individual farmer who has only an insignificant amount of livestock for sale at one time it is often cheaper and much more convenient to patronize these local assemblying markets than to attempt to ship or deliver his animals directly to the terminal market.

The third function, of providing direct contact between producer and processor, is afforded by such outlets as direct sales by producers to packing plants, and to local butchers (included under "farmers and others").

A different analysis applies to markets handling market classes of

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[11] Markets performing this function are included in the term local slaughter markets as defined above.

[12] There is some feeling that the importance of this function has overemphasized the advantages of concentration of packing facilities at the terminals and that decentralization of the industry would result in economies of transportation.

producer livestock such as (1) stockers or feeders and (2) breeding animals. The ultimate object of all such trade in producer livestock is the transfer of these animals from farms with surpluses to sell to other farms where they are wanted for fattening or finishing or for building up herds. This movement can also be classified into three smaller movements: (1) farm to farm movements as when farmers buy and sell between themselves; (2) movements to the local clearing points which are concentration yards and auctions where buyers and sellers of these producer classes are brought together;[13/] (3) terminal clearing point markets where regional surpluses of the producer classes are cleared through commission firms between farmers wishing to sell and those wishing to buy. It should be added that terminal clearing point markets are probably more important as a secondary market outlet than as an initial market outlet.

13/ The secondary sales at the local clearing point are not necessarily to farmers; dealers and inter-area scalpers may bring together and barter the animals among themselves, but eventually the animals come into the hands of farmers.

CHAPTER II

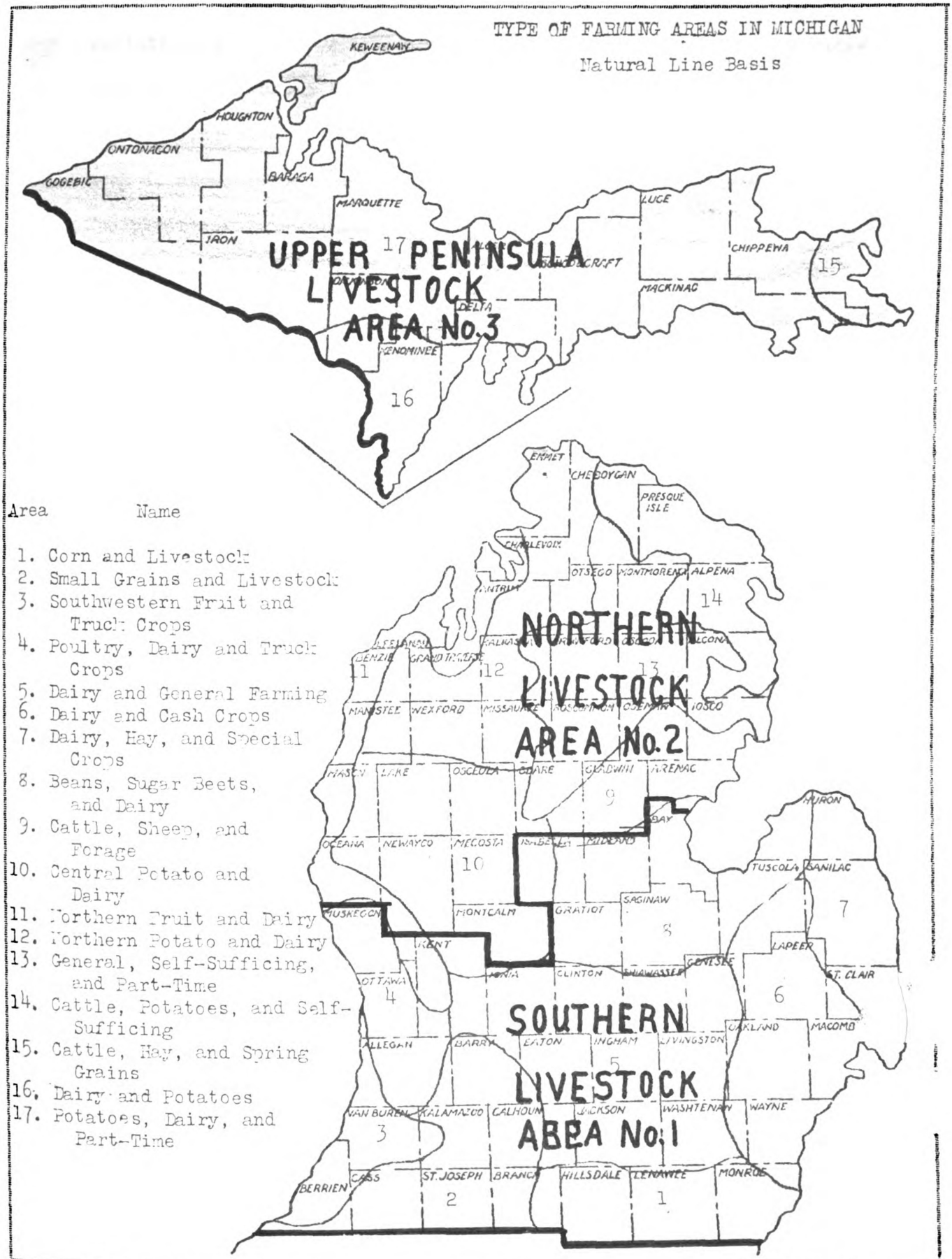
GEOGRAPHIC SUB-DIVISION OF THE DATA AND A STATISTICAL EVALUATION

As implied by the title, this chapter is divided into two sections: (1) a section dealing with the geographic subdivision of the data, and (2) a section consisting of a statistical evaluation of the sample data.

In order to provide a basis for generalization as to inter-area differences the data, tabulated by counties, was grouped into three large areas following a rather conventional classification of the state according to general geographic and economic areas. These areas are as follows: Area 1, Southern, which consists of the region lying south of the Bay City-Muskegon line; Area 2, Northern, which consists of that part of the Lower Peninsula lying north of the Bay City-Muskegon line, and Area 3, the Upper Peninsula. (See Figure 1 for the actual demarcation between areas 1 and 2 which has been made to coincide with county and farming-type-area lines).

Factors which should properly be considered in the delimitation of livestock marketing areas include the availability of transportation facilities, location of market outlets, type of farming areas, and distribution of the livestock population. Inasmuch as this particular delimitation constituted a classification of a sample which had already been gathered, the quality of that data and the effect of excessive subdivision of the data on accuracy of sample percentages (see Table 4) also had to be considered. It was obviously difficult to divide the state into areas satisfactory in all these respects.

Differences in marketing conditions are associated with the three general economic and geographic areas to such an extent that a subdivision



Area Name

1. Corn and Livestock
2. Small Grains and Livestock
3. Southwestern Fruit and Truck Crops
4. Poultry, Dairy and Truck Crops
5. Dairy and General Farming
6. Dairy and Cash Crops
7. Dairy, Hay, and Special Crops
8. Beans, Sugar Beets, and Dairy
9. Cattle, Sheep, and Forage
10. Central Potato and Dairy
11. Northern Fruit and Dairy
12. Northern Potato and Dairy
13. General, Self-Sufficing, and Part-Time
14. Cattle, Potatoes, and Self-Sufficing
15. Cattle, Hay, and Spring Grains
16. Dairy and Potatoes
17. Potatoes, Dairy, and Part-Time

Fig. 1. Livestock Survey Regions and Types of Farming Areas in Michigan (Base map prepared by Farm Management Department, Michigan State College)

on this basis could hardly be avoided-if any breakdown was to be made-regardless of making the number of observations too small in northern areas. This classification left about 85 per cent of the livestock in area 1, about 14 per cent in area 2, and about 1 per cent in area 3. The possibility of breaking down the data in area 1 so as to differentiate between the feeding area in the Thumb, the corn and feeding area in southern cornbelt counties, the southwest fruit belt, and the central generalized farm area was discussed with livestock marketing specialists in the Department of Economics at Michigan State College. The principal consideration deterring such a further breakdown was the fact that such subdivision of the data would limit the expected accuracy of the percentages sold to the alternative markets to such an extent as to render the data for the very important southern area as poor in statistical quality as the data for the relatively unimportant areas 1 and 2. The fact that sales per farm are larger in the southern area further accentuates the statistical danger of excessive subdivision of data.

The pertinent economic and geographic characteristics of these three areas are summarized in the following paragraphs.

Area 1: Southern Livestock Area. The region, as a whole, may be characterized as fertile relative to the remainder of the state, well situated in regard to the meat consuming centers of Michigan and the eastern United States, well served by rail and trucking facilities, and productive of concentrated feed-stuffs for livestock fattening. Cattle and lambs fattened in the southern tier of counties are often moved in from western sources by farmers to utilize their abundant corn supplies. In the Thumb area the bulk of the feeder cattle are of local or north central Michigan origin.

Farmers in this large heterogeneous area marketed 77 per cent of the cattle and calves, 89 per cent of the hogs and pigs, and 85 per cent of the sheep and lambs sold off farms in Michigan, 1939.[1] Its heterogeneity is attested by the following list of farming-type areas as distinguished and delimited by the Farm Management Department of Michigan State College.[2] (1) corn and livestock, (2) small grains and livestock, (3) southwestern fruit and truck crops, (4) poultry, dairy, and truck crops, (5) dairy and general farming, (6) dairy and cash crops, (7) dairy, hog, and special crops, and (8) beans, beets, and dairy. (See Figure 1.)

Initial market outlets in this major area include terminal packing plants at Detroit which serve Ohio and Indiana as well as Michigan, interior packing plants at Grand Rapids, Bay City, and other points, concentration yards such as the one at St. Johns, and numerous auctions, dealers, local cooperatives, local butchers and farmers.

Within the area lie such heavily populated manufacturing centers as Detroit, Grand Rapids, Flint, Saginaw, Bay City, and Lansing whose meat consumption demands are only partially supplied by the area or even by the state as a whole. Incoming shipments of finished livestock, concentrated feed, and feeder livestock offset this discrepancy. Shipments are also made from border counties in area 1 to such out-of-state markets as Toledo, Buffalo, Cincinnati, Ft. Wayne, and Chicago. However, in the writer's opinion the out-of-state shipments of livestock and meat products do not offset the combined weight of in-state shipments of fat and feeder cattle, feedstuffs, and meat products. Further characteristics of this

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[1] United States Census of Agriculture, 1940.

[2] E. B. Hill, "Types of Farming in Michigan," Michigan Agricultural Experiment Station, Special Bulletin 206 (Rev., 1939).

area are presented in subsequent chapters and the present characterization should be considered only a rather general background of livestock production and marketing in this area.

Area 2: Northern Livestock Area. As a whole, area 2 is a thinly populated, relatively infertile cut-over forest region largely given over to provision of recreational facilities to tourists and hunters who enjoy the scenic values of the landscape as well as the resources of wild life.

The type-of-farming areas which have been delimited within this region include (See Fig. 1): (9) cattle, sheep, and forage; (10) central potato and dairy; (11) northern fruit and dairy; (12) northern potato and dairy; (13) general, self-sufficing and part-time; (14) cattle, potatoes, and self-sufficing.

Soils and climate in area 2 are generally unfavorable to the production of feed grains, and shipping expenses make it uneconomical to ship in feeds and then ship the finished animals south to large consuming centers; hence, the region is at a comparative disadvantage in the production of fat stock.

A few stockers are shipped in from western ranges to utilize the summer grasses. The stocker cattle and sheep are handled primarily by a few large rancher dealers who find it more economical to sell the acclimated livestock to southern or small scattered local feeders than to transport feedstuffs north. Thus western stockers and native cattle provide a medium of commercial utilization of the summer grasses of this region. Few hogs are raised except for local slaughter purposes.

With the exception of the summer tourist trade, area 2 does not have heavy meat consumption demands within its bounds. Traverse City, Manistee, and a few other towns of similar size are the main year around consuming

centers.

Area 3: Upper Peninsula Livestock Area. About one-half of the area of the Upper Peninsula has been set off in natural and state forests. This sparsely populated region has been divided by the Farm Management Department into three types of farming areas as follows: (15) cattle, hay, and spring grains; (16) dairy and potatoes; and (17) potatoes, dairy and part-time. (See Fig. 1.) Commercial farms are to be found mainly in Chippewa county at the eastern end, Menominee county in the southernmost extremity, and in scattered localities elsewhere.

Compared to the Lower Peninsula area, area 3 is relatively insignificant in relation to livestock marketings, as only 4 per cent of the cattle and calves, 1 per cent of the hogs and pigs, and a negligible proportion of the sheep and lambs reported sold in Michigan in 1939 were marketed from farms in this region.

The tourist trade, the iron and copper mining industry, and lumbering are the basis for meat consumption demands found in this area. Although there are only a few relatively small sized consuming centers in the area, it does not produce its requirement of livestock. This discrepancy is offset by inshipment of meat products of pork and beef. Despite this, some livestock do more out of the area to areas where farmers have access to feedstuffs. A few finished sheep move out as there is a lack of local demand for mutton.

Initial market outlets in this area function primarily to assemble the sparse livestock production for local slaughter and occasionally for shipments to southern markets. The major livestock markets serving this area are at Green Bay, Wisconsin, and Menominee, Ironwood, and Houghton, Michigan. The area is quite distant from the terminal markets at Detroit

and Chicago and quantities large enough to make long distant shipping be economical are rarely produced; as a result little use is made of terminal markets. Concentration yards and auctions are seemingly out of place in the Upper Peninsula as not enough livestock is produced to provide for an ample business; auctions are nonexistent and it is doubtful if any true concentration yards are in operation. Dealers are numerous relative to the volume of business which is probably explained by the fact that some of them act as hucksters; also they do not have to compete with auctions and concentration markets and packing plants.

Statistical Reliability of the Data

Tabulation of the data on which this study is based revealed the percentages of each species of livestock sold to the various alternative market outlets by 1515 farm operators returning mail questionnaires. Because all conclusions, originating solely with the sample data, as to the relative importance of the alternative market outlets are based on these percentages, the question immediately arises as to whether the samples indicate the actual percentages that existed in the populations they purport to represent. It is the purpose of this section to attempt an answer to this question so that conclusions based on the sample percentages may be properly qualified.

In order to determine how representative the sample percentages are, an attempt was made to ascertain how nearly the sample is representative of the important determinants of these percentages. The 1940 United States Census of Agriculture furnishes data as to the distribution by counties of each species of livestock, as well as the average number sold per farm

reporting sales during 1939. These two factors are revealed, in later portions of this study, to be major determinants of percentages of each species sold through the various alternative markets.

Succeeding portions of this chapter indicate the degree of similarity between the 1515 sample farms, with respect to geographic distribution and number sold per farm in 1939, and all the farms from which the sample was taken. On the basis of the later demonstrated relationships between these two factors and the percentages sold through the alternative markets, knowledge as to the similarity between sampled farms and the universe of farms from which the sample is drawn permits proper qualifications of conclusions based on the sample percentages.

Geographic Representativeness. The percentage distribution of livestock sold from the 1515 sampled farms in 1940 is compared, by areas, with the percentage distribution of livestock sold from all Michigan farms in 1939 in Table 1 .

TABLE 1.

PERCENTAGE DISTRIBUTION OF LIVESTOCK SALES AS REPORTED BY THE CENSUS AND BY 1515 COMBINED SAMPLE FARMS, BY LIVESTOCK AREAS, MICHIGAN

Source and Area	Cattle and Calves	Hogs and Pigs	Sheep and Lambs
1515 sample farms, 1940	Per Cent	Per Cent	Per Cent
Area 1	67	80	86
Area 2	23	17	13
Area 3	10	3	1
Michigan	100	100	100
All farms, U.S. Census, 1939			
Area 1	77	89	85
Area 2	19	10	14
Area 3	2	1	1
Michigan	100	100	100

Source: 1940 United States Census of Agriculture and 1515 mail questionnaires.

It appears from the above table that the proportion of cattle and hogs to all livestock reported sold in 1940 from sampled farms in area 1 was smaller than that indicated by the Census for all farms reporting livestock sales in 1939. In view of the great differences which exist in the relative importance of the market outlets between areas, this area bias[3/] must be kept in mind when dealing with percentages derived from the sample and supposedly applying to all farms in the state. Thus, if sample farms in area 1 report a considerably larger proportion of their cattle sold to terminal markets than in other areas, the sample for the state would show too small a percentage sold to this outlet because area 1 would be, in a sense, underweighted in the state figures. Qualifications such as the above proved to be necessary at numerous points in subsequent chapters.

Size and Representativeness of Sample, as to Volume of Farm Marketings. Two qualities of a near perfect sample of Michigan farmers selling livestock for purposes of this study would be: (1) that the average number sold per farm be identical in the sample and in the entire group of farms from which the sample is drawn; (2) that the number of farms in the sample be large enough to insure a high probability of the percentages derived from the sample having a standard error small enough to be usable. The degree to which the present sample approaches these ideals, a factor greatly affecting the validity of the economic conclusions, is examined in this section.

On the basis of relationships found to exist between size of farm livestock operations, as indicated by number of each species sold per farm per year, and the percentages sold through alternative market outlets, it

3/Assuming no major shifts in the marketing pattern from 1939 to 1940, this area bias exists in the sample data.

was decided that samples whose average number of livestock sold per farm per year deviated from the census average by three or more head in the case of cattle and calves, or six head in the case of hogs and pigs, or ten head in the case of sheep and lambs would not be likely to give accurate percentages of each species sold through alternative market outlets.

Table 2 shows how the average number of each species sold per farm per year varies between the reports of (1) the census, (2) the two independent samples, and (3) the combination of the two independent samples. One sample consists of the 694 usable questionnaires returned in answer to letters sent to all Agricultural Adjustment Administration committeemen, and the other sample consists of the 820 usable questionnaires returned in answer to letters sent to every twentieth AAA cooperator. One sample gathered by a field representative is omitted from this table and the study, as the deviations of its averages from the Census averages were far too great, in view of the statement in the preceding paragraph.

Statistically, one of the most important characteristics of the table is the fact that all but two of the deviations of the sample averages fall above the census average, whereas in random sampling an equal number would normally be expected to fall on each side. This bias is due to: (1) the fact that in one case only AAA committeemen were sampled and in the other case only AAA cooperators were sampled; (2) the selectivity of responses to mail questionnaires; (3) error conditioned by size of sample in relation to variance; and (4) possible errors in the calculation and recording of Census and sample data. From the standpoint of the economic analyst, these deviations in the average are significant to the extent that they increase the expected error in the sample percentages of each

TABLE 2.

AVERAGE NUMBER OF LIVESTOCK SOLD PER FARM REPORTING SALES IN 1940 CENSUS AND IN SAMPLE

Species and Area	Census 1939	AAA Committeemen Sample 1940	AAA Cooperator Sample 1940	Combined Sample 1940
	Number	Number	Number	Number
Cattle and calves				
Area 1	6.78	12.48	9.76	11.18
Area 2	5.44	8.28	7.66	7.98
Area 3	4.31	7.30	11.35	9.32
Michigan	6.34	10.81	9.21	10.00
Hogs and Pigs				
Area 1	17.46	24.96	20.67	22.87
Area 2	8.90	12.65	10.34	11.79
Area 3	9.11	13.59	7.12	7.71
Michigan	15.81	20.85	16.93	17.11
Sheep and lambs				
Area 1	36.82	60.30	47.18	55.07
Area 2	32.64	36.29	22.50	31.04
Area 3	17.47	1/	1/	1/
Michigan	35.95	58.25	43.04	52.65

Source: United States Census of Agriculture, 1939, and 1515 mail questionnaires.

1/ Sample too small for calculations to be significant.

species sold through the alternative market outlets. It will be observed that the bias is greatest in the case of the committeemen sample--great enough to raise a question as to the advisability of combining the two samples rather than rejecting the committeemen sample and using only the cooperator sample. The 't' test was applied to the differences between the averages of the two samples. (See Table 3 .) Significant differences were found to exist only in the cases of hogs and pigs, area 3, and sheep and lambs, all areas. Reference to Table 4 will indicate that the size of sample for the areas for which significant differences were found to exist is also too small to insure accurate percentages;

hence, the significant differences were ignored and the samples combined as the best available data.

TABLE 3.

DIFFERENCES BETWEEN SAMPLE MEANS AND BETWEEN COMBINED SAMPLE MEANS AND THE CENSUS MEANS

Species and Area	Difference between mean of committeemen and member sample	Difference between combined sample means and census means
	Number	Number
Cattle and calves		
Area 1	2.72	1/ 4.40
Area 2	.62	1/ 2.54
Area 3	4.05	5.01
Michigan	1.60	1/ 3.66
Hogs and pigs		
Area 1	4.29	1/ 5.41
Area 2	2.31	2.89
Area 3	1/ 11.47	1.41
Michigan	3.89	1.30
Sheep and lambs		
Area 1	1/ 13.12	18.25
Area 2	1/ 13.79	1.61
Area 3	2/	2/
Michigan	1/ 15.20	16.69

Source: United States Census of Agriculture and 1515 mail questionnaires.

1/ Significantly different, that is, differences such as these, in relation to size of the sample and variance as to number of each species sold per farm per year, would normally be expected to occur between two random samples or one random sample and a census average from the same universe less than 10 times out of 1000 sample tries.

2/ The sample is too small for calculation to be significant.

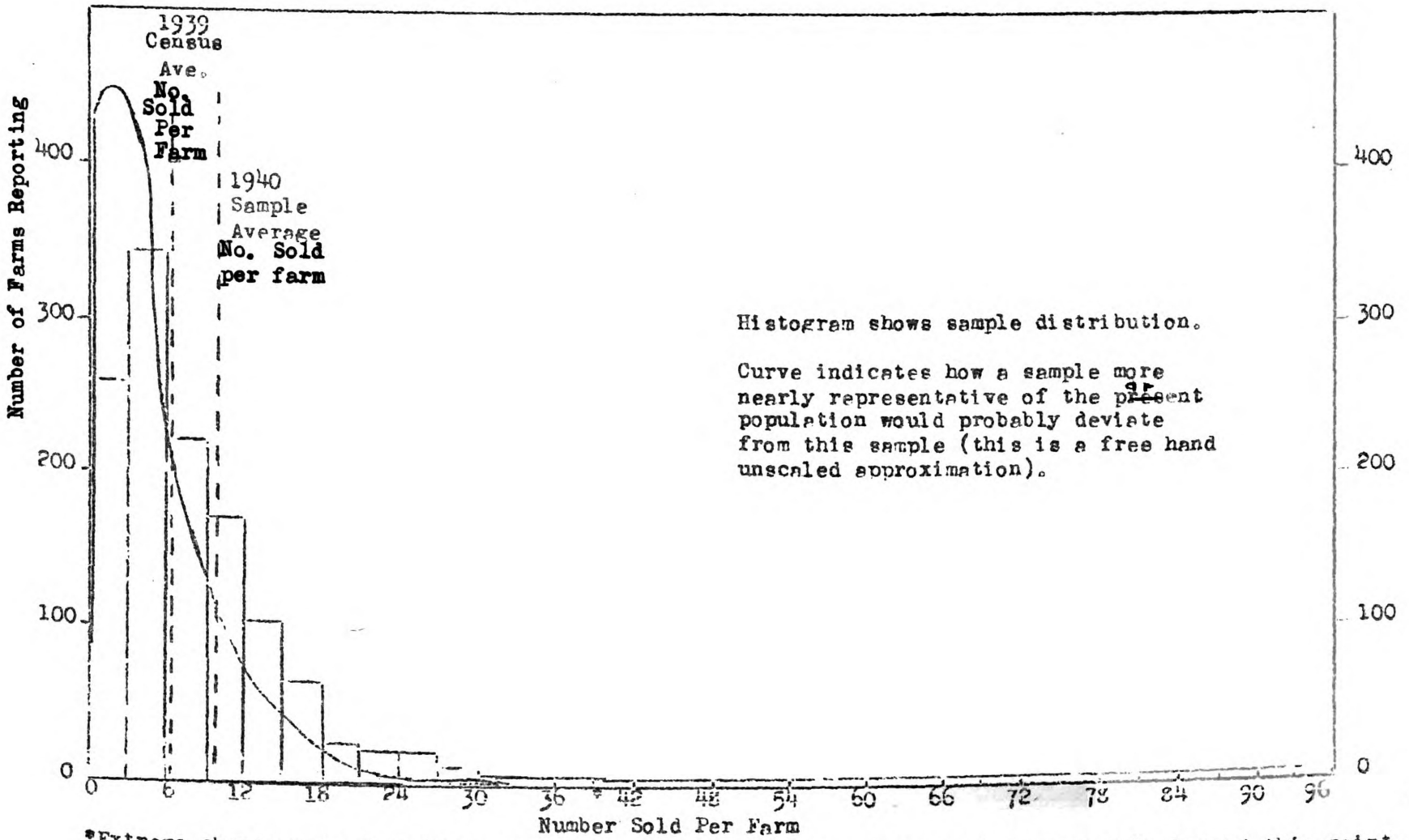
Application of the 't' test to differences between the average of the combined sample and the census indicated the difference to be larger in areas 1, 2, and for the state in the case of cattle and for area 1 in the case of hogs than would normally occur in the 10 poorest random samples out of 1000.

Figures 2, 3, and 4, present a comparison of the distribution of farms in the sample according to average number of each species sold per year, with an unscaled approximation of the probable distribution of all farms in the state. In these figures are two dotted vertical lines representing average number of each species sold per farm per year in the combined sample and in the census. It is largely on the basis of the relationship between these two lines and the skewness of the distribution that the free-hand lines were drawn. Obviously, if the census average is considerably smaller than the sample average, as in the case of cattle, the census or population would have more farms, relative to the sample, with smaller average sales per year. From these charts it is evident that the greatest bias exists in the sheep and lamb and the cattle and calf data.

Before summarizing the qualifications necessary in utilizing the data on which this study is based some attention should be given to the significance of percentage differences and the size of random sample needed to make a sample percentage significant. The following question illustrates the meaning of significance as used in this instance: are differences in the percentage utilization of a given market outlet in two different areas the result of actual differences in the two areas or are they just the fluctuations normally expected from sampling? By calculating the standard error, it can be determined whether or not a difference found is due to random sampling from one universe. Thus, the answer to the above question would be relatively simple if the sample had been gathered by random methods.

The quandary of this study arises when it is realized that the samples studied are biased and not selected at random and that sample averages of

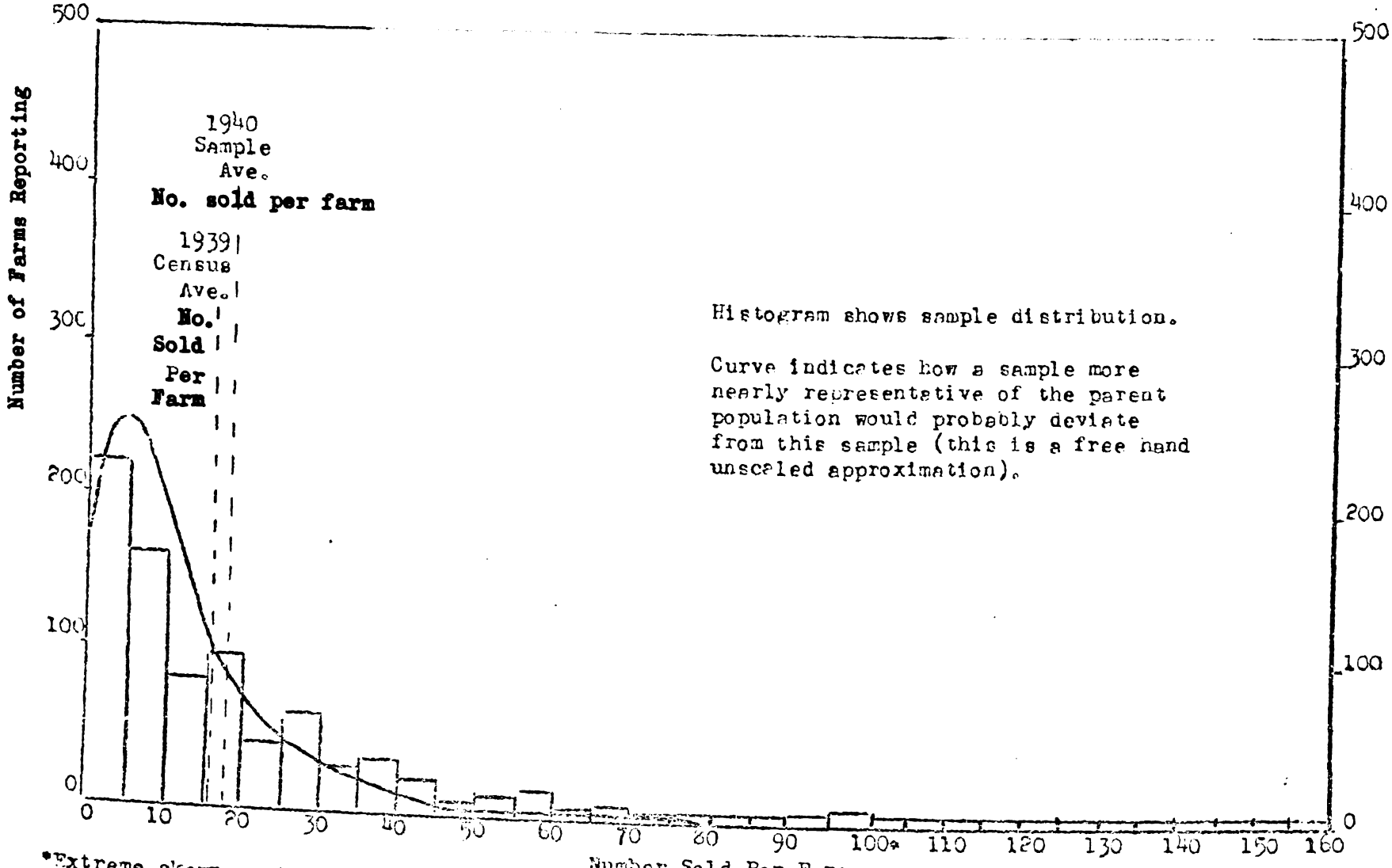
Figure 2. Distribution of 1294 farms reporting cattle and calves sold according to number sold per year compared to 1939 census, Michigan, 1940.



*Extreme skewness to the right makes it impractical to draw distribution accurately beyond this point.

Source: 1515 Mail Questionnaires

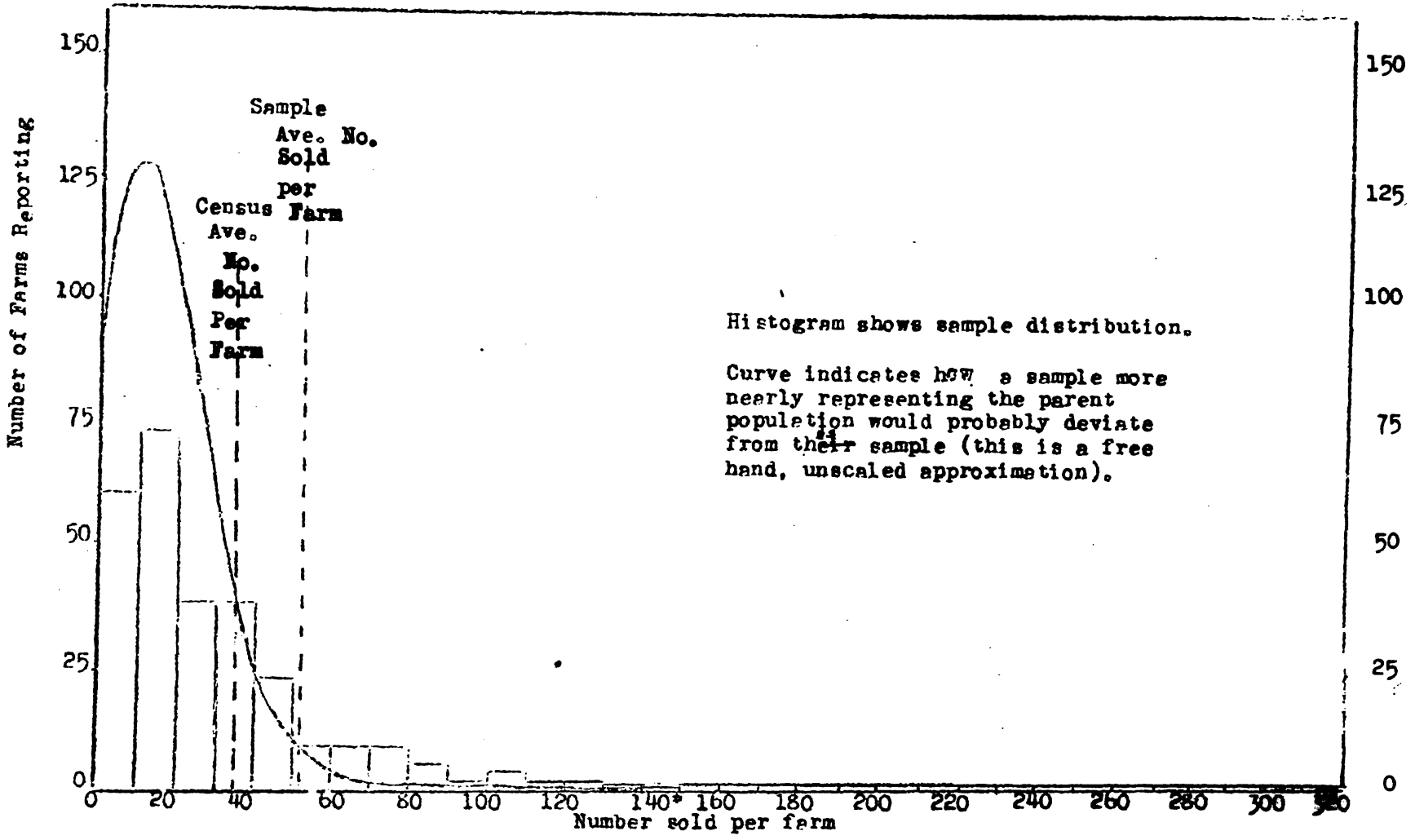
Figure 3. Distribution of 808 farms reporting hogs and pigs sold according to number sold per year compared to 1939 census, Michigan, 1940.



*Extreme skewness to the right makes it impractical to draw distribution accurately beyond this point

Source: 1515 Mail Questionnaires

Figure 4. Distribution of 295 farms reporting sheep sold according to number sold per year compared to 1939 census, Michigan, 1940.



* Extreme skewness to the right makes it impractical to draw distribution accurately beyond this point.

Source: 1515 Mail Questionnaires

number of each specie sold per year--a factor greatly affecting the utilization of the markets studied--deviate so much from the census averages that it is highly improbable in most cases that the samples under consideration can be compared with a random sample. If it cannot be assumed that the samples studied are random the formula for standard error is not applicable as it is based on that assumption; thus, it cannot be determined statistically whether the sample difference in percentages are true differences or are probably due to normal fluctuations in random smples. This being the case the standard error formula does not indicate the probable error of the sample percentage in relation to the corresponding true percentage in the purported population; it indicates, instead, the probable error of the sample percentage in relation to the corresponding percentage in the biased population from which the sample was drawn. Thus, it is futile to calculate the standard errors of percentages derived from this sample as the results would only be a measure of error from an erroneous parent population. In lieu of this calculation the author presents Table 4 which is derived from a modification of the standard error formula.

This table shows the size of sample needed to secure given degrees of accuracy in a series of sample percentages, thus, indicating roughly the adequacy of present sample sizes. The table indicates whether or not a sample is large enough to give stated degrees of accuracy to a given series of percentages in relation to the same percentage in whatever parent population it does represent; it does not indicate whether or not a sample represents its purported parent population or whether or not there is a significant difference between two percentages. Use of this table in connection with this study will prevent attempts to ascribe im-

TABLE IV

SIZE OF SAMPLE NEEDED TO SECURE GIVEN DEGREES OF ACCURACY IN SAMPLE PERCENTAGES [1]

Percentage Concerned (Per Cent)	Precision Needed in 950 Out of 1000 Samples	
	Within 2 Per Cent	Within 10 Per Cent
	Number of Farms or Units Required in Sample	Number of Farms or Units Required in Sample
5	236	
10	448	
15	636	24
20	798	
25	936	36
30	1048	
35	1136	44
40	1198	
45	1236	48
50	1248	
55	1236	48
60	1198	
65	1136	49
70	1048	
75	936	36
80	793	
85	636	24
90	448	
95	236	

[1] Number of farm or units required in sample is calculated from the following formula:

$$n = \frac{p_1 q_1 + p_2 q_2}{\left(\frac{p_1 - p_2}{t}\right)^2}$$

For example, it is desired to know how large a random sample must be taken to insure 95 random samples having a stated degree of precision, say within 2 per cent, out of every 100 random samples for a given component part making up 15 per cent of the parent population.

p_1 = percentage concerned plus permissible error in per cent (15 + 2 = 17). Express in decimals .17

$q_1 = 1 - p_1 = .83$

p_2 = percentage concerned minus permissible error in per cent (15 - 2 = 13). Express in decimals .13

$q_2 = 1 - p_2 = .87$

t = the abscissa of the ordinate of normal curve at the 5 per cent point = 2

portance to percentages derived from samples too small to be indicative of their purported parent population, whether or not the sample is biased; use of the table will not, however, prevent attempts to ascribe importance to percentages derived from samples of adequate size but too biased to be usable.

1/ (Continued from page 27) Then substituting in the formula

$$n = \frac{.17 \cdot .83 + .13 \cdot .87}{\left(\frac{.13 - .17}{2}\right)^2}$$

$$n = \frac{.2542}{(.04)} = 636$$

636 then becomes the size of sample needed when sampling a universe concerning a component part equalling 15 per cent and when the desired precision is 2 per cent in either direction in 95 out of 100 samples.

The size of samples needed for a series of percentages at 2 and 10 percentages of error are given in the table.

Derivation of

$$(1)\quad n = \frac{p_1q_1 - p_2q_2}{\left(\frac{p_1 - p_2}{t}\right)^2}$$

from

$$(2)\quad t = \frac{p_1 - p_2}{\sqrt{\frac{p_1q_1}{n_1} + \frac{p_2q_2}{n_2}}}$$

$$(3)\quad t\left(\sqrt{\frac{p_1q_1}{n_1} + \frac{p_2q_2}{n_2}}\right) = p_1 - p_2$$

$$(4)\quad \frac{p_1q_1 + p_2q_2}{n} = \left(\frac{p_1 + p_2}{t}\right)^2$$

$$(5)\quad n = \frac{p_1q_1 + p_2q_2}{\left(\frac{p_1 - p_2}{t}\right)^2}$$

Results of the preceding statistical analyses and evaluation of the sample data are summarized in Table 5, which in itself constitutes a summary of the statistical evaluation of each sample. Confidence to be placed in the sample data varies considerably between samples. Hence, generalization of value in regard to confidence cannot be made except as follows: variation as to the quality of the data is so great from area to area and between species that an understanding of these differences is almost a prerequisite to sound use of the percentage data derived from these samples.

TABLE V

EVALUATION OF ADEQUACY AND RELIABILITY OF THE COMBINED SAMPLE DATA FOR PURPOSES OF THIS STUDY

Purported Parent Population of Sample	Size of Sample	Expected number of greater mean deviations per 1000 random samples[1]	Deviation of Sample Average From Average Number reported Sold per Farm in Census		Qualifications Necessary in Applying Sample Results to Purported Parent Population and an Evaluation of Sample Quality[2]
			Maximum for Good Results	Actual	
	Number of farms	Number	Number	Number	
Cattle and Calves					
Michigan....	1295	(1 out of 9.73 x 10^8)	3	3.66	It is improbable that this sample could result from random sampling. A downward bias from geographic distribution is compensated by an upward bias as to number sold, thus making the percentages quite usable.
Area 1....	794	0.003	3	4.40	It is improbable that this sample could result from random sampling. The upward bias as to number sold is quite large and uncompensated, but the sample is large enough to make sample percentages usable if the bias is kept in mind.
Area 2....	381	0.0005	3	2.54	It is improbable that this sample could result from random sampling. The moderate upward bias as to average number sold is uncompensated, and the size of sample is not large enough to make the sample percentages very accurate, unless the above qualifications are kept fully in mind.
Area 3....	120	35.9	3	5.01	It is probable that this sample could result from random sampling, but the upward bias is so large and the sample so small that preceding qualifications must be used to make the sample percentages of value.

Hogs and Pigs					
Michigan..	808	218.	6	1.30	It is probable that this sample would result from random sampling. The upward bias as to number sold is small but somewhat accentuated by a bias from geographic distribution; however, the sample is large enough to make the sample percentage quite usable.
Area 1..	533	0.1	6	5.41	It is improbable that this sample would result from random sampling. The upward bias as to number used is moderate, but the sample is large enough to make the sample percentages usable if qualified as to the influence of the above.
Area 2..	241	666.	6	7.73	It is very probable that this sample would result from random sampling, and the upward bias as to number sold is unimportant. The size of sample, however, is rather small; hence the sample percentages should be qualified in this respect.
Area 3..	34	833.6	6	1.41	It is probable that this sample would result from random sampling and only a slight upward bias as to number sold is present; however, the size of sample is so small that only a slight degree, say 10 per cent, of accuracy can be expected in the sample percentages, regardless of qualifications.
Sheep and Lambs					
Michigan..	295	73	10	16.69	It is probable that this sample would occur from random sampling. The upward bias as to number sold per farm is large and the size of sample is only medium; hence, the sample percentages are probably accurate only within about 5 per cent margins, even if qualified as above.
Area 1..	234	14.6	10	13.25	It is probable that this sample would occur from random sampling. The upward bias as to number sold per farm is large and the size of sample is only medium; hence, the sample percentages are probably accurate only within about 5 per cent margins, even if qualified as above.

Area 2..	55	404.1	10	1.61	It is probable that this sample would occur from random sampling. The upward bias as to number sold is negligible, but the size of sample is so small as to make sample percentages only reasonably accurate.
Area 3..	6	----	10	---	The size of sample is too small to ascribe any validity to the sample percentages.

1/ Formula for calculation of t when

$$t = \frac{M_2 - M_1}{\sqrt{\frac{\sigma_{sample_1}}{\sqrt{N_1}} + \frac{\sigma_{sample_2}}{\sqrt{N_2}}}}$$

M_1 = Mean of sample 1
M_2 = Mean of sample 2
σ = Standard deviation
N_1 = Number of items in sample 1
N_2 = Number of items in sample 2

Once t is calculated it can be looked up in a table of probabilities and ordinates and then expressed in terms of number per 1000. If number per 1000 is less than 10, the sample probably is not taken at random.

2/ Statements as to size of sample apply to percentages based on all the sampled farms in the area under consideration. Classification as to size of operator or market class sold reduces the expected accuracy of the percentages if it reduces the number of observations from which the percentages are calculated.

The influence of qualifications as to size of sample is not always stated as the reader, if not familiar with the importance of the qualifications, can consult preceding sections of this chapter. It should be stressed that lack of randomness is not serious in this study unless accompanied by a greater deviation of sample average than the maximum permissable for good results.

CHAPTER III

MOVEMENTS OF CATTLE AND CALVES TO INITIAL MARKETS

Relative Importance of Market Classes of Cattle and Calves by Livestock Marketing Areas

As a preliminary to discussion of the importance of alternative initial market outlets for each market class of cattle and calves, indications of the relative importance of each market class are presented at this point.

For purposes of this study, all cattle reported sold off farms have been divided into four market classes: slaughter cattle, veal calves, stocker and feeder cattle, and dairy and breeding cattle.

Slaughter Cattle. Data presented in Table 6 and Figure 5 indicate that for the state as a whole 35 per cent of all cattle sold are slaughter cattle. Little variation is evident between areas in this respect. Sampled farms in area 1 and area 3 report slightly larger percentages of all cattle sold as slaughter cattle than is the case in area 2 or in the state-wide sample data.

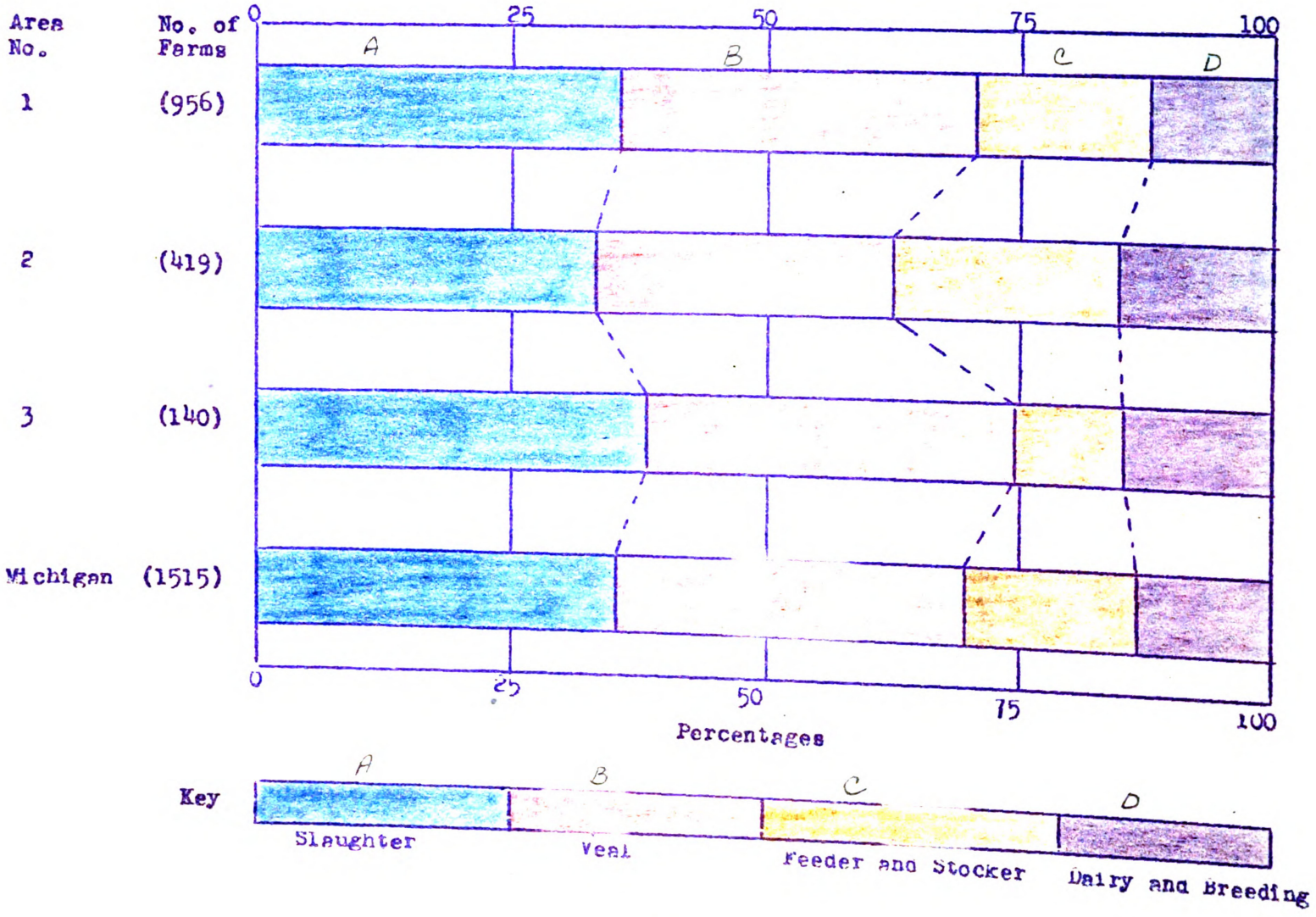
Veal Calves. As in the case of slaughter cattle, approximately 35 per cent of the cattle and calves reported sold by the 1515 sampled farms were veal calves. While the proportion was almost identical (36 per cent) for areas 1 and 3, veal calves accounted for barely 30 per cent of sales of all classes of cattle from sample farms in area 2. Inasmuch as area 2 contains proportionally fewer dairy cattle than areas 1 and 3, this situation is to be expected. Another factor accounting for this situation is to be found in the large amount of pasture land in area 2,

Table 6. Percentage which each class makes up of total cattle and calves marketed from 1515 farms by areas, Michigan, 1940.

Area	Number of farms replying	Number of farms reporting cattle sales	Slaughter cattle	Veal calves	Stocker and feeder cattle	Dairy and breeding cattle	Number of cattle and calves equal to 100 per cent
	Number	Number	Per cent	Per cent	Per cent	Per cent	Number
Area 1	956	794	35.52	36.07	15.78	12.65	8867
Area 2	419	381	33.01	29.74	21.72	15.54	2993
Area 3	140	120	38.08	36.04	11.49	14.39	1279
Michigan	1515	1295	35.20	34.62	16.69	13.48	13139

Source: 1515 mail questionnaires.

Figure 5. Percentages which each class makes up of total cattle and calves marketed from 1515 farms, by areas, Michigan, 1940.



which makes it feasible to bring grass-fed calves to feeder size and then sell them as such to farmers having access to feed supplies.

Stocker and Feeder Cattle. The state-wide sample of 1515 farms indicates that about 17 per cent of all cattle sold in the state were feeder cattle. As would be expected from the above discussion of veal calves, farmers in area 2 sold more of their cattle as feeder cattle than in other areas of the state.

Dairy and Breeding Cattle. Data from the 1515 sampled farms indicate that about 13 per cent of the cattle sold in the state are dairy or breeding cattle. The northern areas 2 and 3 showed a larger proportion sold as producer cattle proportionally than indicated for area 1 or for the state as a whole. Although these slight differences may be wholly the result of chance in sampling, the above inference is supported by the fact that more feeders are purchased for fattening and then resold as slaughter stock in area 1 than elsewhere. This in itself would tend to reduce the proportion of dairy and breeding cattle sales in that area.

Inter-Area Differences in Movements of Cattle and Calves Through Initial Market Outlets, by Market Classes

It is the purpose of this chapter to present, by livestock marketing areas, the percentage of each market class sold through each initial market outlet. In the case of slaughter cattle the breakdown has been carried one step farther, producers being classified according to the number of such cattle sold by each during the year.

Slaughter Cattle. The sampled farms were classified as to whether the farms were casual, medium-sized commercial, or carlot-commercial producers.[1/] Data for the three classes of producers were tabulated

1/ In reference to cattle producers:
1. A casual producer is defined as a producer who either did not market any cattle, or sold less than 4 head of slaughter cattle during the year.
2. A medium-sized commercial producer is defined as one who sold from 5 to 19 head of slaughter cattle during the year.
3. A carlot-commercial producer is defined as one who sold over 19 head of slaughter cattle during the year.

separately for each area. Results of this tabulation are presented in Table 8 and Figures 6, 7, 8, and 9.

Examination of the data presented in these table and charts indicates that: (1) the percentage of slaughter cattle sold to terminal markets tends to increase with the size of producer; (2) the percentages of slaughter cattle sold to concentration yards and dealers decrease with the size of producers, in all cases where some degree of confidence can be placed in the data; and (3) there seems to be no consistent correlation which holds throughout the areas between size of producer and percentage of slaughter cattle sold to packing plants, local cooperatives, auctions, and farmers.

Inter-area differences in market outlets utilized by all producers of slaughter cattle among the 1515 sampled farms are indicated in Table 7 and in the portions of Figures 10, 11, 12, and 13, dealing with slaughter cattle.

TABLE 7.

PERCENTAGES OF SLAUGHTER CATTLE SOLD THROUGH ALTERNATIVE MARKET OUTLETS FROM 1515 FARMS, BY AREAS, MICHIGAN, 1940

Market Outlets	Michigan	Areas		
		Area 1 Southern	Area 2 Northern	Area 3 Upper Peninsula
	Per Cent	Per Cent	Per Cent	Per Cent
Terminal markets	26.36	32.92	11.74	13.55
Concentration yards	8.58	9.17	6.17	9.65
Packing plants	12.80	12.51	9.62	21.15
Dealers	3.70	3.05	4.35	6.57
Auctions	14.68	14.22	23.28	.21
Farmers and others	6.16	6.32	6.78	3.90
Totals	100.00	100.00	100.00	100.00
Number of cattle equal to 100 per cent	4625	3150	988	487

Source: 1515 mail questionnaires.

Table 8. Slaughter cattle: percentage sold through each type of market outlet, classified by number sold per farm, by areas, Michigan, 1940

Species and class	Number of farms	Terminal public markets	Concentration yards or local markets	Packing plants	Dealers or truck buyers	Local coop. ass'ns.	Auctions or sale barns	Farmers or others	Number of livestock equal to 100 per cent
	Number	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Number
Area 1									
0-4	(a)755	18.12	15.61	10.40	31.71	3.69	15.60	4.87	596
5-19	179	25.04	9.66	17.24	21.40	3.93	17.52	5.21	1729
Over 19	22	60.12	3.52	4.12	15.51	.73	6.30	9.70	825
Area 2									
0-4	(b)352	8.99	8.71	1.12	46.62	1.97	21.35	11.24	356
5-19	64	16.12	5.76	5.95	34.36	3.65	29.56	4.60	521
Over 19	3			54.05	27.93	15.32		2.70	111
Area 3									
0-4	(c)122	4.72	11.81	29.14	41.73	9.45	.79	2.36	127
5-19	15	25.81		3.87	68.71	10.32		1.29	155
Over 19	3	9.76	15.61	29.27	36.58	1.95		6.83	205
Michigan									
0-4	(d)1229	13.53	12.88	9.55	37.81	3.80	15.76	6.67	1079
5-19	258	23.16	6.17	13.93	26.61	4.28	19.01	4.82	2405
Over 19	28	45.22	5.35	13.50	20.50	2.37	4.56	8.50	1141
Total	1515								

Source: 1515 mail questionnaires

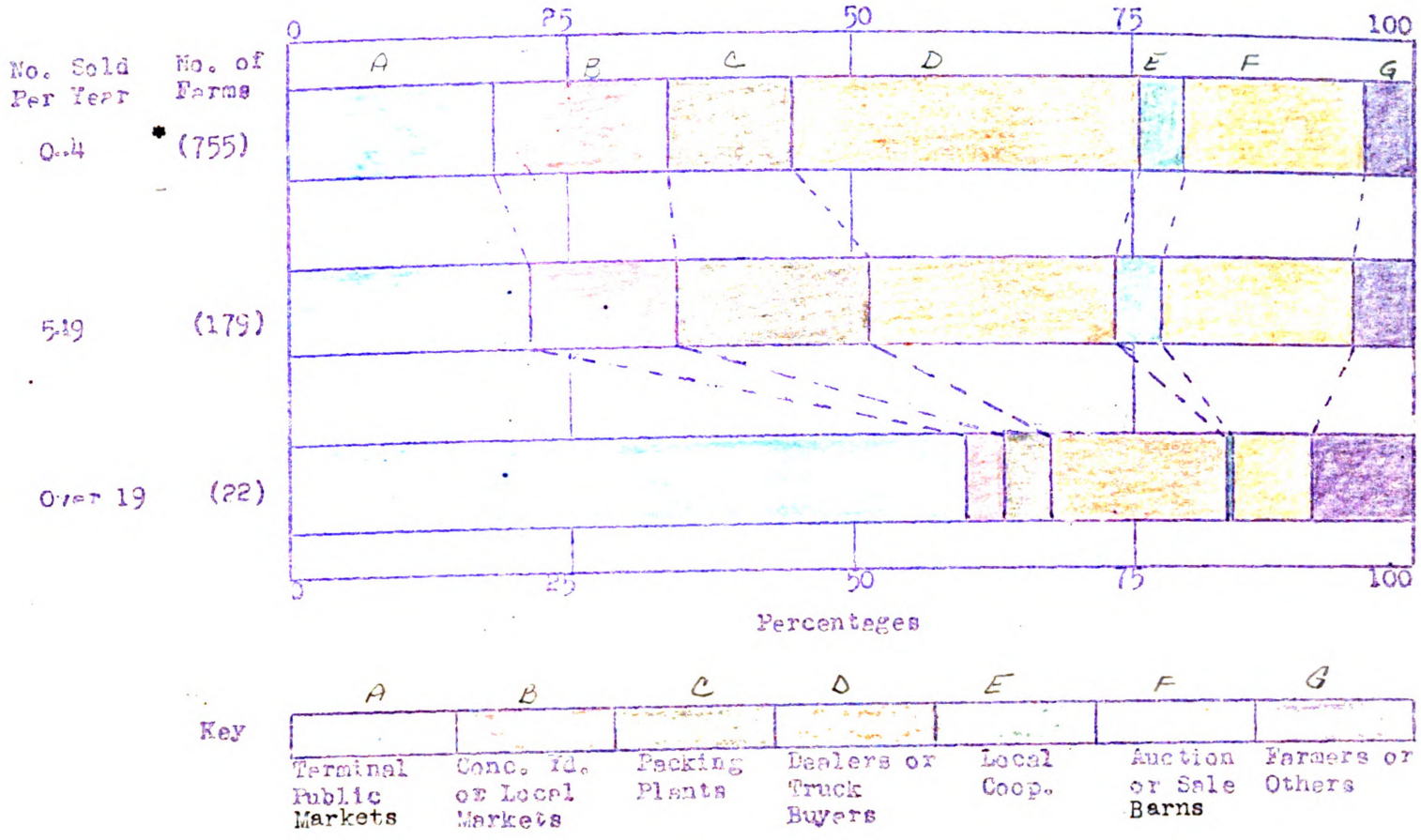
a) Includes 162 farms reporting no cattle sold in any market class.

b) " 38 " " " " " " " " "

c) " 20 " " " " " " " " "

d) " 220 " " " " " " " " "

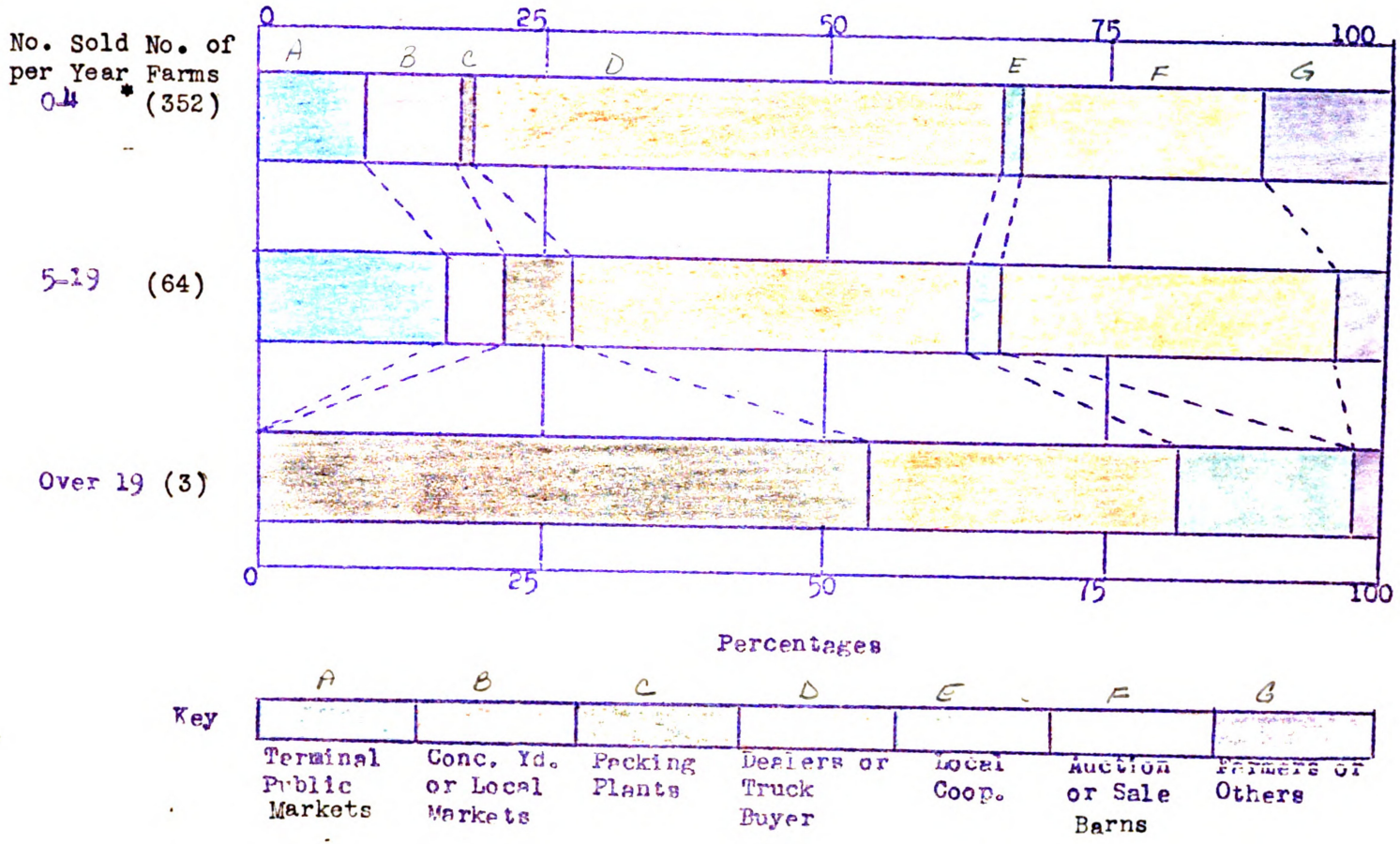
Figure 6. Percentages of slaughter cattle sold through alternative outlets, according to number sold per farm per year, from 956 farms, Area 1, 1940.



Source: 1515 Mail Questionnaires

*Includes 162 farms reporting no cattle or calves sold in any market class.

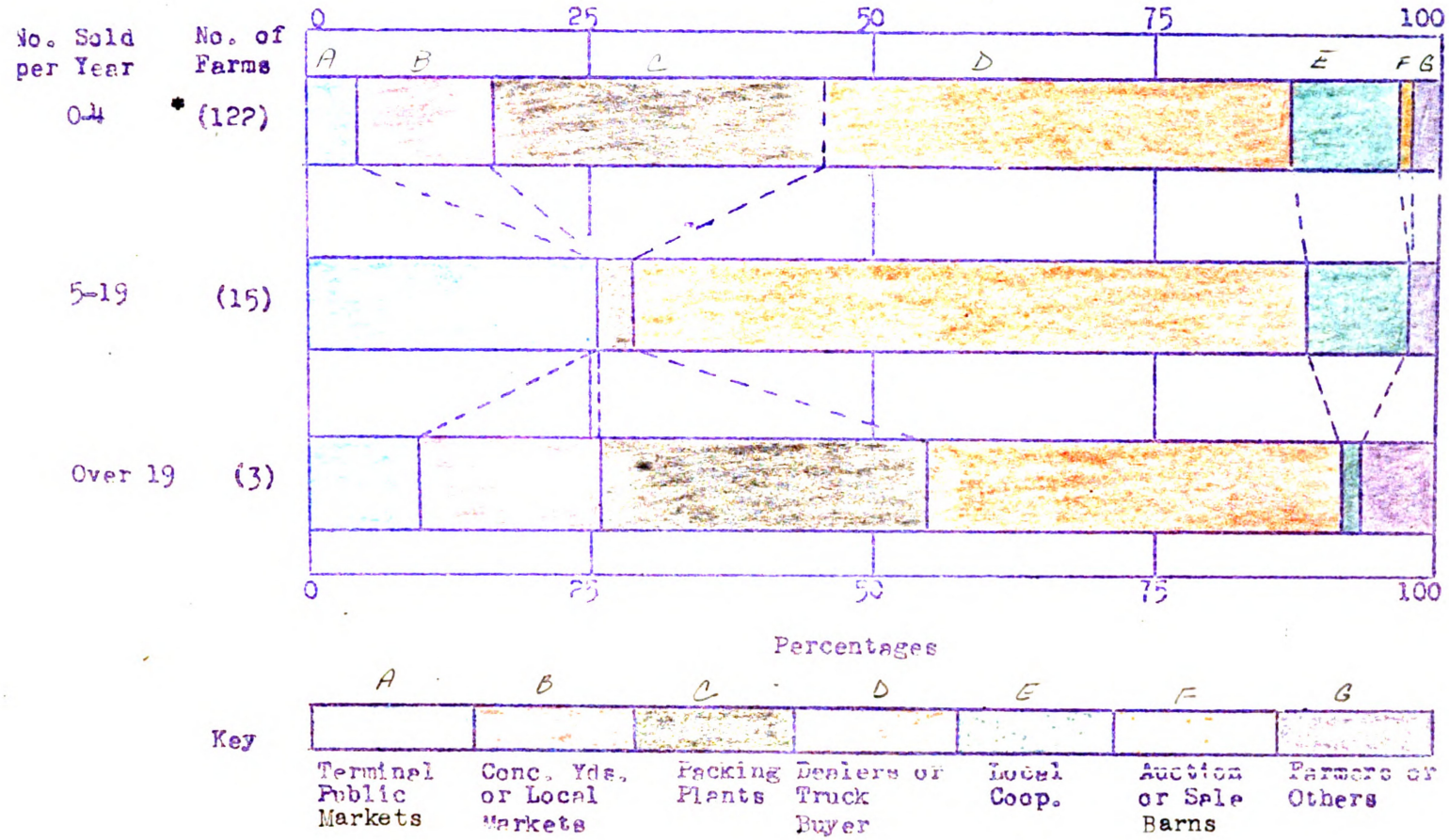
Figure 7. Percentage of slaughter cattle and calves sold through alternative outlets, according to number sold per farm per year, from 419 farms, Area 2, 1940.



Source: 1515 Mail Questionnaires

*Includes 38 farms reporting no cattle or calves sold in any market class.

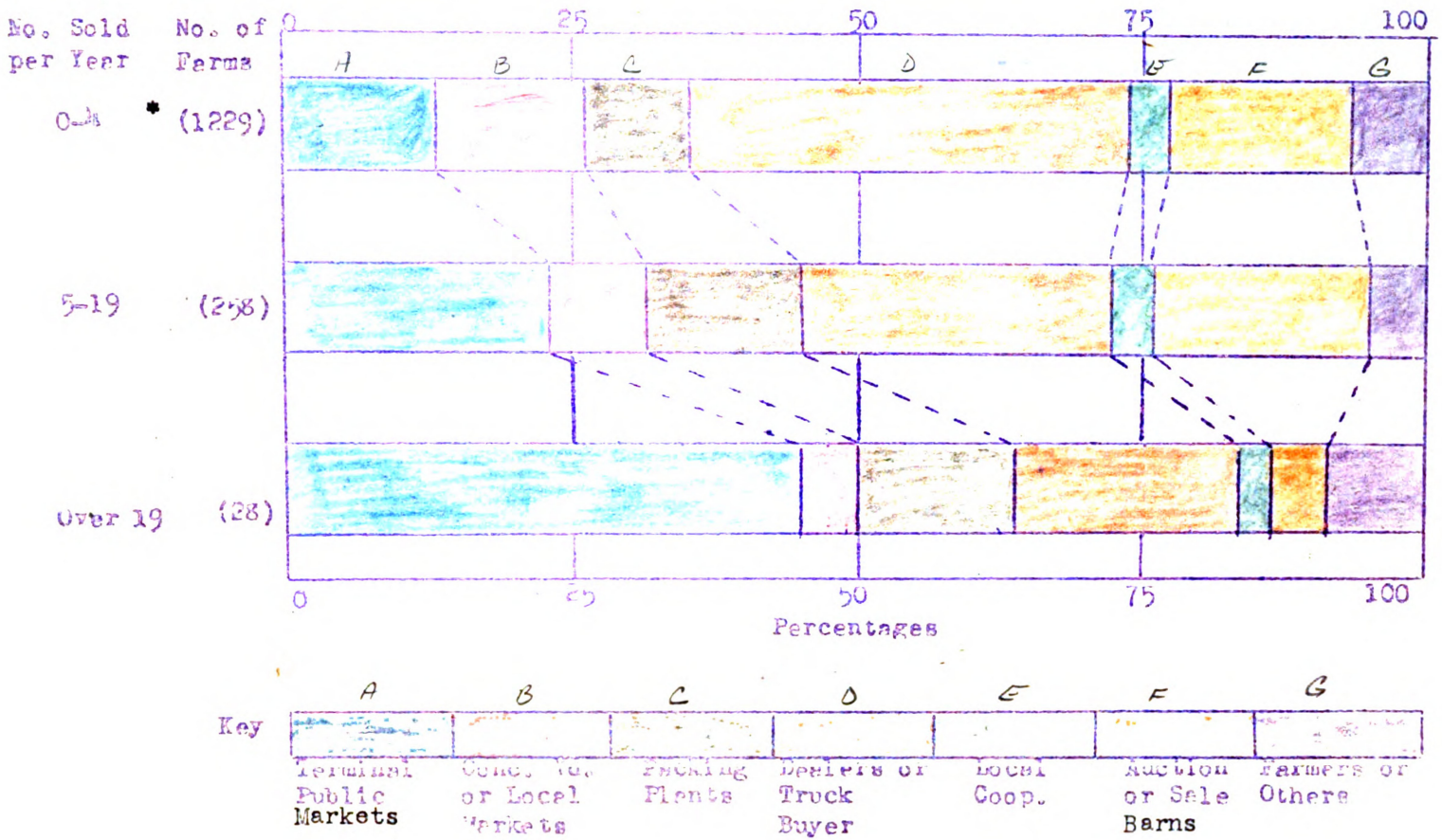
Figure 8. Percentages of slaughter cattle and calves sold through alternative outlets, according to number sold per farm per year, from 140 farms, Area 3, 1940.



Source: 1515 Mail Questionnaires

*Includes 20 farms reporting no cattle or calves sold in any market class.

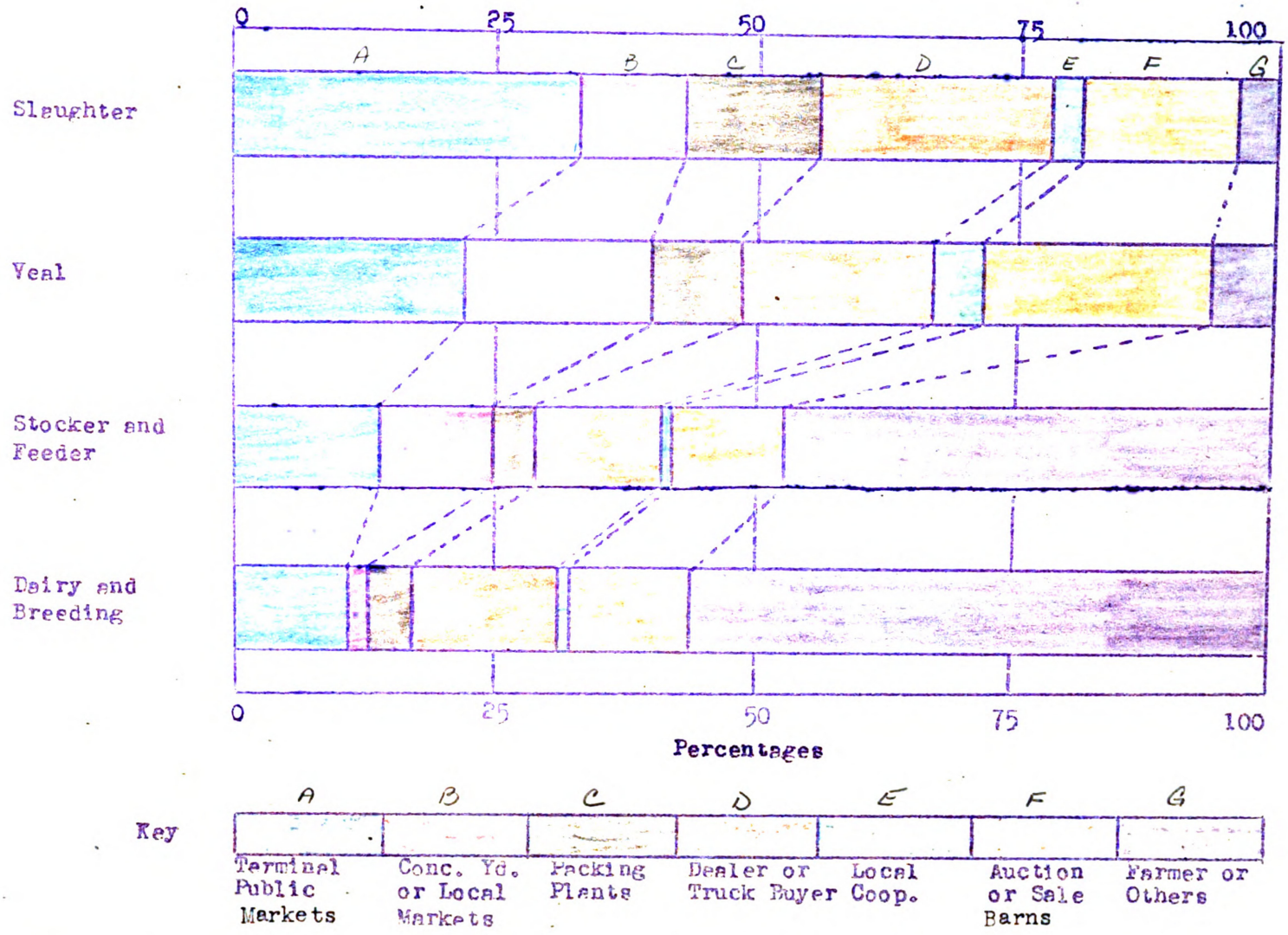
Figure 9. Percentage of slaughter cattle and calves sold through alternative outlets, according to number sold per farm per year, from 1515 farms, Michigan, 1940.



Source: 1515 Mail Questionnaires

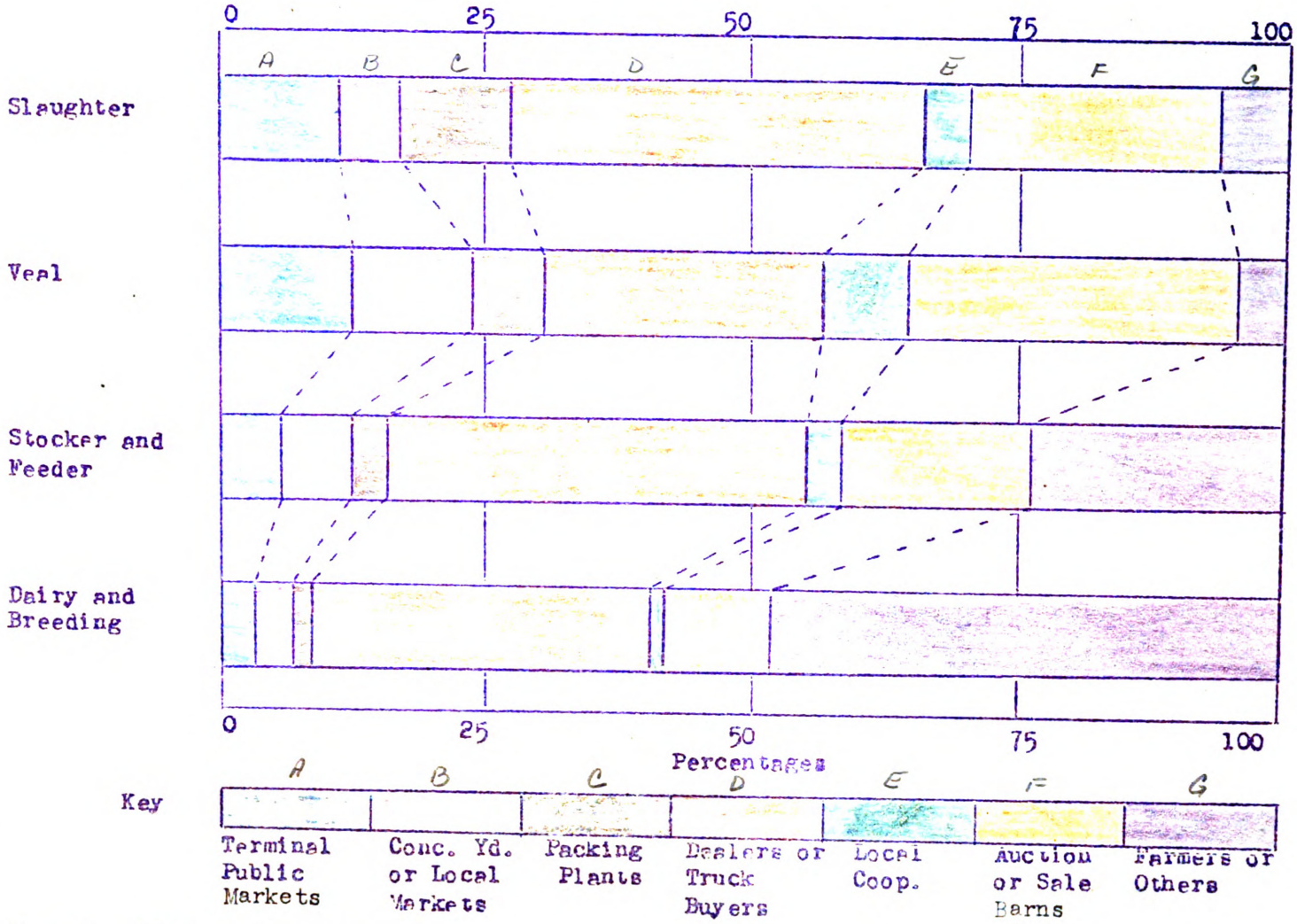
*Includes 220 farms reporting no cattle or calves sold in any market class.

Figure 10. Percentages of cattle and calves sold through alternative outlets from 956 farms, Area 1, Michigan, 1940.



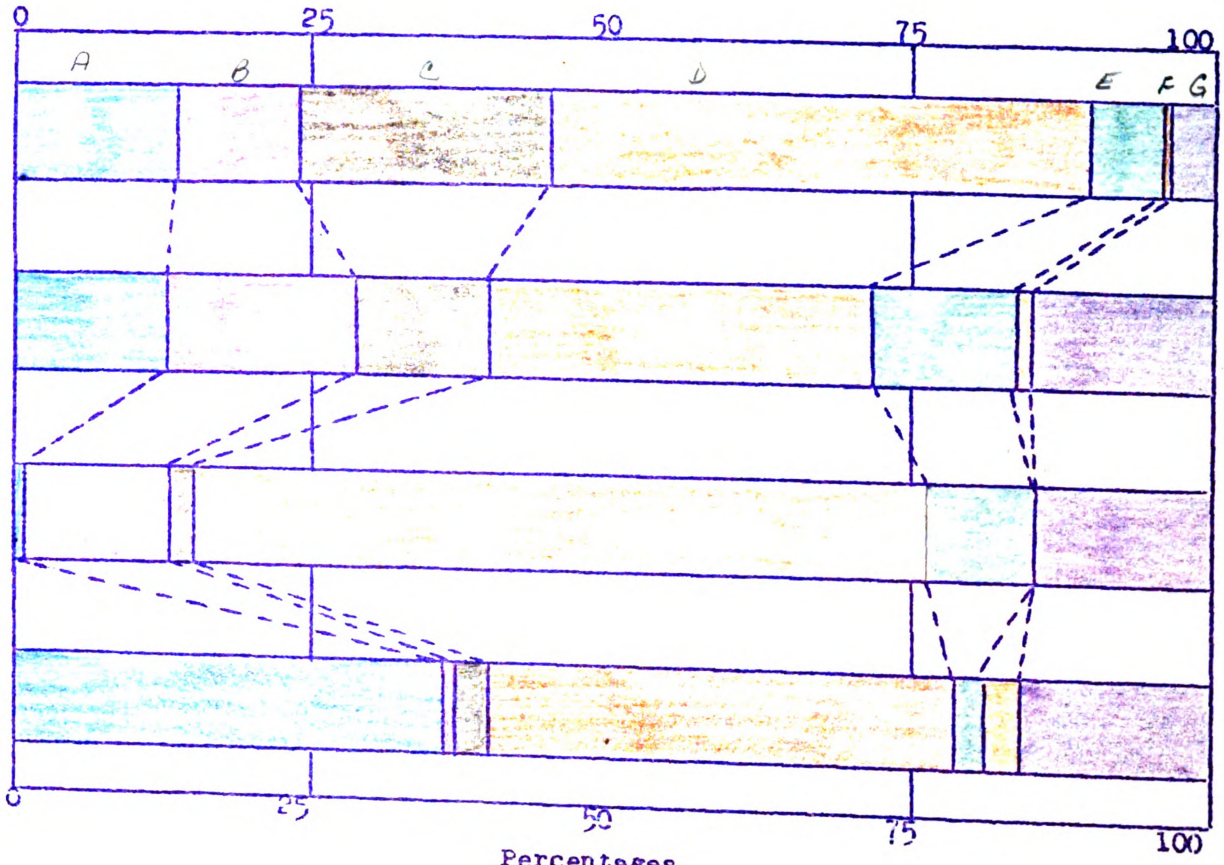
Source: 1515 Mail Questionnaires

Figure 11. Percentage of each class of cattle and calves sold through alternative outlets, from 419 farms, Area 2, 1940.



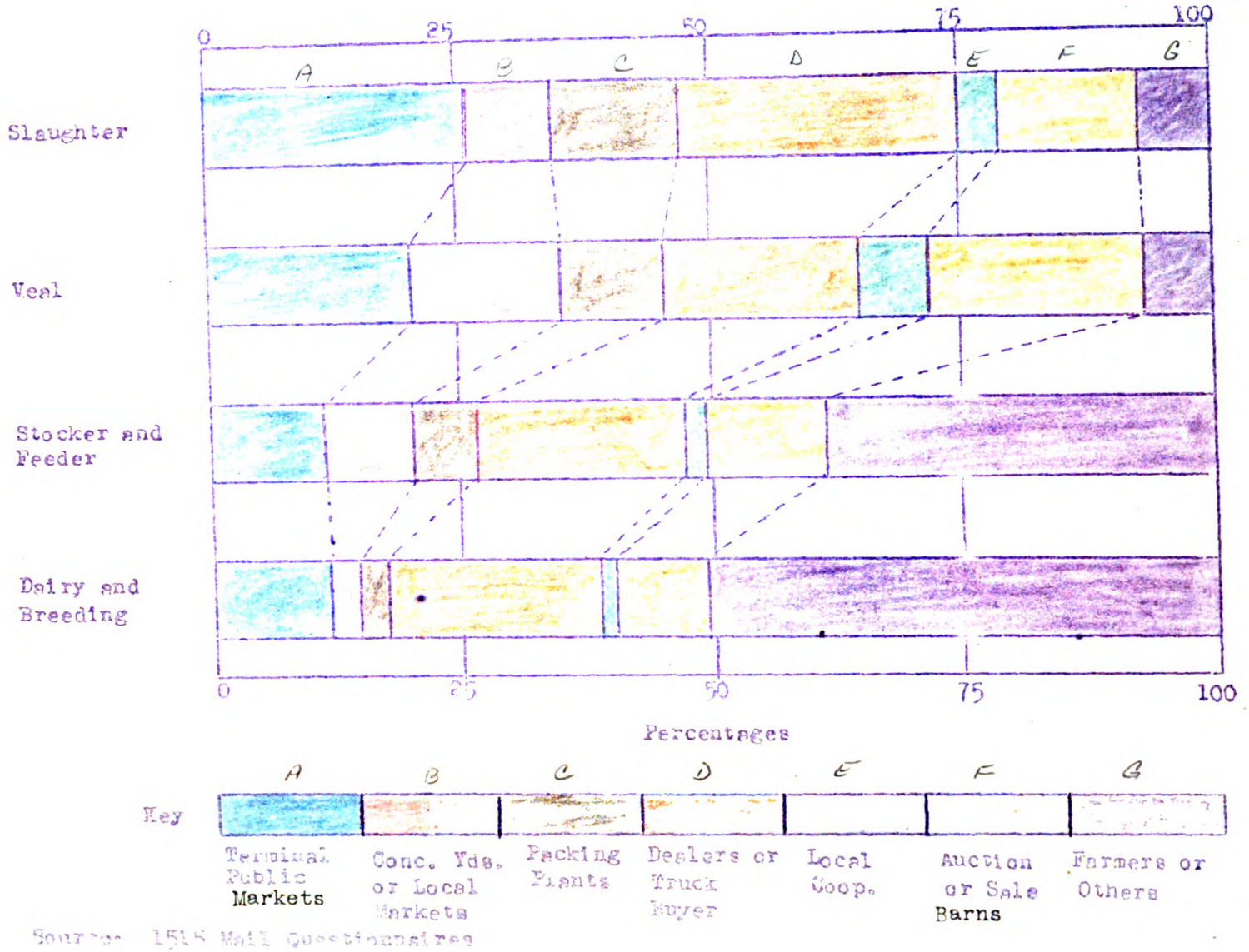
Source: 1515 Mail Questionnaires

Figure 12. Percentage of each class of cattle and calves sold through alternative outlets, from 140 farms, Area 3, Michigan, 1940.



Source: 1515 Mail Questionnaires

Figure 13. Percentages of each class of cattle and calves sold through alternative outlets, from 1515 farms, Michigan, 1940.



Source: 1515 Mail Questionnaires

Explanation of these inter-area differences will be facilitated if it is borne in mind by the reader that the identification numbers of the areas from south to north correspond to their rank in respect to population, soil fertility, and distance from terminal markets. Moreover, as shown in Chapter II, greater statistical reliability can be attached to the data for area 1 than for the two more northerly areas.

Considerable inter-area differences exist in the utilization of initial market outlets for selling slaughter cattle. In area 1, terminal markets were the most important single market outlet; in areas 2 and 3, terminal markets occupy a position of lesser importance in comparison with area 1 and also with respect to other outlets in these two northerly areas.

Assembly market outlets, including concentration yards, dealers, local cooperatives, and auctions, are more important in the northern areas as would be expected in view of: (1) the more distant location of these areas from Detroit, and (2) the widely scattered small lot production of cattle in these areas.

The importance of dealers can be accounted for by the efficiency and convenience with which they perform the assembling function among the small, widely scattered producers. Terminal markets, on the other hand, are better suited to the large producer who is more concerned with such factors as price and dependability than with convenience and immediate payment.[2/] Auctions owe their popularity to factors similar to those causing farmers to patronize dealers. In area 2, where production

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[2/] Data tabulated in the Experiment Station project, but not presented in this thesis, support the conclusion that large producers are more concerned with "dependability" factors than with convenience and immediate payment.

is in medium sized lots, but from which it is generally inconvenient to ship to terminals, auctions enjoy their greatest popularity as a market for slaughter cattle. The varying importance of packing plants is probably conditioned more upon the relation between local production and the needs of the packing plants rather than by preferences of the producers themselves. Concentration markets, local cooperatives and farmers occupy positions of varying minor importance.

For the state as a whole, sample data in regard to sales of 4,625 slaughter cattle to initial market outlets indicate that terminal public markets received directly about one quarter of slaughter cattle sold from farms; a slightly larger proportion is purchased by dealers. Assembling markets, inclusive of dealers, received about 55 per cent, while about 19 per cent was purchased for immediate slaughter by packing plants and local butchers. (Figure 13.)

Veal Calves. Table 9 and the portions of Figures 10, 11, 12, and 13 dealing with veal calves show numbers of veal calves sold from sample farms for each area and for the state as a whole, as well as the percentages of the veal sold to the various alternative initial market outlets.

When the utilization of individual initial market outlets for veal is considered on an area basis the following can be stated: in area 1, terminal markets and auctions were the most important of the initial markets; in area 2 which is farther away from the terminals, the auctions were most important, dealers second most important, and concentration yards approximately as important as the terminal markets; in area 3, the most important initial market outlet was dealers, with concentration yards second in importance, while terminal markets, packing plants, local cooperatives, and farmers occupied positions of lesser importance.

TABLE 9.

PERCENTAGES OF VEAL CALVES SOLD THROUGH ALTERNATIVE MARKET OUTLET FROM 1515 FARMS, BY AREAS, MICHIGAN 1940

Markets	Michigan	Areas		
		Area 1 Southern	Area 2 Central	Area 3 Upper Peninsula
	Per Cent	Per Cent	Per Cent	Per Cent
Terminal markets	19.35	22.26	12.25	12.80
Concentration yards	16.52	17.73	12.69	15.40
Packing plants	9.14	9.79	5.73	11.27
Dealers	20.14	16.92	25.62	31.89
Local Cooperatives	6.90	5.85	8.09	11.93
Auctions	20.87	21.04	30.90	.44
Farmers	7.08	6.41	4.72	16.27
Totals	100.00	100.00	100.00	100.00
Number of calves equal to 100 per cent	4549	3198	890	461

Source: 1515 mail questionnaires.

The three most important single market outlets for veal in the state, auctions, dealers, and terminals, owe their importance to different factors in different areas. In area 1 proximity to Detroit and more direct rail connections with Buffalo and Chicago undoubtedly accounts for the greater use of terminal markets. Furthermore, in area 1, the presence of eastern buyers for veal calves at the auctions in this area probably maintains price relationships making it advantageous for a large number of farmers in the southern tier of counties to market veal calves at auctions. In area 2 distance from terminal markets tends to accentuate the use of auctions for veal calves. Dealers, in area 2, also take a large proportion of the veal calves sold. A major factor accounting for the extensive patronage of dealers and truckers is the convenience of selling the relatively low valued veal calves to a dealer coming past the barnyard in his truck. In area 3, where auctions are non-existent

and dairying is relatively more important, the convenience factor is even of greater consequence, thus explaining the great importance of dealers in that area. While local cooperatives are comparatively unimportant as a market for most livestock, they are quite popular for veal which can be shipped with mixed carloads of hogs or sheep, thus obviating the necessity of getting large numbers together for shipment.

For the state as a whole, 19 per cent of the 4,549 veal calves in the sample were sold to terminal markets; 16 per cent was sold to immediate slaughter markets. Auctions, dealers, and terminals, in the order named, competed very closely for the dominant position by each taking approximately one-fifth of the total number sold. Concentration yards were quite important, while packing plants, farmers, and local cooperatives were of lesser significance.

Stocker and Feeder Cattle. The number of stocker and feeder cattle sold from sampled farms in each marketing area and in the entire state as well as the percentages thereof going to each alternative market outlet are shown in Table 10 and in the portions of Figures 10, 11, 12, and 13, dealing with stocker and feeder cattle.

Sampled farms in areas 2 and 3, the northern areas, sold proportionately less stockers and feeders to terminal markets than sampled farms in area 1. This was offset to a certain extent by the greater relative importance, in the northern areas, of local cooperatives through which stockers and feeders pass to terminal clearing point market outlets. Local clearing point market outlets (including dealers, auctions, and concentration yards as a group) were relatively more important in the northern areas where scarcity of feedstuffs leads to feeders and stockers

being sold through terminal markets handling inter- and intra-area trade. Scarcity of feed, likewise, tends to reduce the importance of farmers as a market outlet for this class of cattle.

TABLE 10.

PERCENTAGES OF STOCKER AND FEEDER CALVES SOLD THROUGH ALTERNATIVE MARKET OUTLETS FROM 1515 FARMS, BY AREAS, MICHIGAN, 1940

Markets	Michigan	Areas		
		Area 1 Southern	Area 2 Central	Area 3 Upper Peninsula
	Per Cent	Per Cent	Per Cent	Per Cent
Terminal markets	11.30	14.53	6.77	.68
Concentration yards	8.93	10.31	5.23	12.25
Packing plants	4.47	5.01	3.85	2.04
Dealers	22.97	11.45	39.08	61.22
Local Cooperatives	1.87	.57	3.07	8.84
Auctions	12.40	10.88	18.46	----
Farmers	38.06	47.25	23.54	14.97
Totals	100.00	100.00	100.00	100.00
Number of calves equal to 100 per cent	2194	1397	650	147

Source: 1515 mail questionnaires

The entire state sample reported 2194 stocker and feeder cattle sold, 38 per cent of which was sold directly to other farms. Forty-four per cent was sold to local clearing point markets and 13 per cent was sold to terminal clearing point markets. Five per cent went to packing plants. Most important of the local clearing point channels were dealers; second most important were auctions. These two media are very well adapted to the performance of the local clearing point function both as to convenience to farmers and as to efficiency. Clearing through these markets is generally on a relatively local basis but may assume inter-

interregional proportion, as in area 2, where dealer ranchers purchase feeders from the western range, acclimate them on summer grass, and, then, distribute them in small lots to feeders throughout the state.

Dairy and Breeding Cattle. The distribution of the 1771 breeding cattle sold on sampled farms by areas and the percentages sold through alternative initial market outlets, by areas, are given in Table 11 and in the portions of Figures 10, 11, 12, and 13, dealing with dairy and breeding cattle.

If an analysis of the utilization of markets by farmers selling dairy and breeding cattle is made by areas from north to south certain inter-area characteristics can be ascertained. Characteristics associated with the areas from north to south are: decreasing fertility and population, increasing distance from terminals, and decreasing reliability of data in the sample data under consideration.

TABLE 11.

PERCENTAGES OF DAIRY AND BREEDING CATTLE SOLD THROUGH ALTERNATIVE MARKET OUTLETS FROM 1515 FARMS, BY AREAS, MICHIGAN, 1940

Markets	Michigan	Areas		
		Area 1 Southern	Area 2 Central	Area 3 Upper Peninsula
	Per Cent	Per Cent	Per Cent	Per Cent
Terminal markets	12.25	11.68	4.30	35.87
Concentration yards	2.32	2.14	3.23	1.09
Packing plants	3.22	4.10	1.51	2.17
Dealers	21.17	13.90	31.61	39.13
Local Cooperatives	1.58	1.60	1.07	2.72
Auctions.....	9.32	9.89	10.54	2.72
Farmers	50.14	56.69	47.74	16.30
Totals	100.00	100.00	100.00	100.00
Number of cattle equal to 100 per cent	1771	1122	465	184

Source: 1515 mail questionnaires

Terminal markets and local cooperatives, the two initial market outlets performing a terminal clearing point function, were of greater proportional importance in area 1 than in area 2. The data indicate that 35 per cent of the dairy and breeding cattle in area 3 were sold to terminal markets. In view, however, of distance from the terminal markets, it is likely that this figure is considerably higher than the actual situation throughout the area.

Concentration yards, dealers, and auctions, the initial market outlets performing the local clearing point function, are of greater importance in area 1 than in areas 2 and 3. Movements of dairy and breeding cattle from farm to farm are of much greater importance in areas 1 and 2 than in area 3 according to the sample data. This is to be expected in view of the fact that shortages of feed supplies in the northern areas make it necessary for the surpluses of dairy and breeding cattle to move considerable distances, thus necessitating greater use of terminal and local clearing point markets.

CHAPTER IV

MOVEMENTS OF HOGS AND PIGS TO INITIAL MARKETS

Relative Importance of Market Classes of Hogs and Pigs by Livestock Marketing Areas

In this introductory section, the relative importance of the three major market classes of hogs are shown as revealed by the sample for the state and the three component marketing areas. Such a procedure will facilitate the attaching of significance to differences in initial market outlets utilized in marketing hogs and pigs.

Slaughter Hogs. Eighty per cent of all hogs and pigs reported sold in the entire state sample were slaughter hogs. Taking into consideration the necessary qualifications of the data, it is probably safe to indicate that the percentage of all hogs sold which are sold as slaughter hogs decreases from north to south. This would be expected in view of a corresponding decrease in available concentrates for fattening hogs.

Feeder Hogs. Eighteen per cent of all hogs and pigs reported sold from the sampled farms were feeder hogs. Lack of available feed supplies and irregularity of feed production would be expected to cause large percentages of the hogs marketed from farms in the northern areas to be sold as feeder hogs; this hypothesis is borne out by the data derived from the samples. (See Table12 and Figure 14).

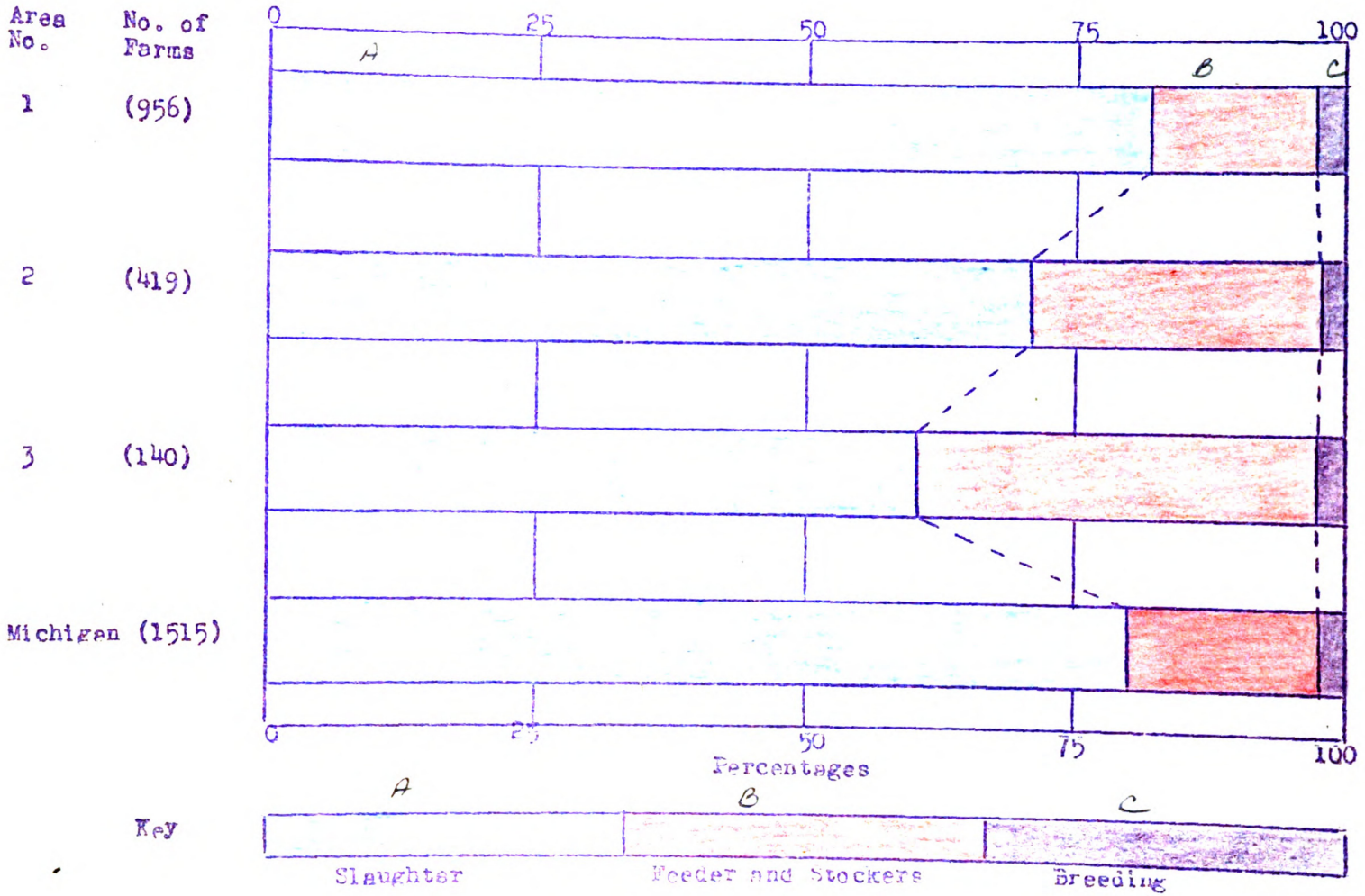
Breeding Hogs. A practically constant ratio of breeding hog sales to all hog and pig sales was found to exist throughout the three areas in the sample data; that is, approximately 2.5 per cent of all hogs sold were breeding hogs in all areas.

Table 12 . Percentage which each class makes up of total hogs and pigs marketed from 1515 farms, by areas, Michigan 1940.

Area	Number of farms replying	Number of farms reporting hogs sold	Slaughter hogs	Feeder hogs	Breeding hogs	Number of hogs and pigs equal to 100 per cent
	Number	Number	Per cent	Per cent	Per cent	Number
Area 1	956	533	82.19	15.75	2.08	12609
Area 2	419	241	70.84	26.39	2.78	2702
Area 3	140	34	60.65	36.81	2.55	432
Michigan	1515	808	79.64	18.15	2.21	15743

Source: 1515 mail questionnaires.

Figure 14. Percentages which each class makes up of total hogs and pigs marketed from 1515 farms, by areas, Michigan, 1940.



Source: 1515 Mail Questionnaires

Inter-Area Differences in Movements of Hogs and Pigs Through Initial Market Outlets, By Market Classes

Inter-area differences in the percentages of each of the above discussed market classes going to alternative initial market outlets are considered in this section.

Slaughter Hogs. In order to obtain a rough indication of the association between volume of hog marketings from individual farms and percentages sold through various initial market outlets, the schedules were grouped and tabulated according to whether they represented casual, medium sized, or carlot hog producers.[1/] The resulting data are presented in Table 13. The relationships indicated in this tabulation are presented graphically in Figures 15, 16, 17, and 18 showing initial market outlets utilized by the different sized producers for each of the marketing areas and for the state.

Upon examining the data, it is evident that relationships in area 1, which produces over 80 per cent of the slaughter hogs in the state, determine to a considerable extent the relationships found for the state as a whole. Hence, area 1, the southern area, and the state are discussed first and concurrently. Discussion of areas 2 and 3 constitutes therefore mainly a consideration of exceptions to general conditions.

In area 1 and generally among important hog producers, large pro-

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[1/] In reference to hog producers:
1. A casual producer is defined as a farmer who either did not market any slaughter hogs, or who sold less than 10 head during the year.
2. A medium-sized commercial producer is defined as a producer selling 10-59 head of slaughter hogs during the year.
3. A carlot producer is defined as a producer selling 60 or more head of slaughter hogs during the year.

Table 13. **Slaughter hogs: Percentage sold through each type of market outlet, classified by number sold per farm, by areas, Michigan, 1940.**

Species and class	Number of farms	Terminal public markets	Concentration yards or local markets	Packing plants	Dealers or truck buyers	Local coop. ass'ns.	Auctions or sale barns	Farmers or others	Number of livestock equal to 100 per cent
	Number	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Number
Area 1									
0-9	(a) 632	16.97	16.15	14.63	21.15	2.44	14.61	14.23	780
10-59	300	25.38	14.08	23.92	15.58	7.03	12.56	1.45	7451
Over 59	24	25.53	19.52	24.22	4.22	13.42	11.54	1.55	2131
Area 2									
0-9	(b) 341	15.61	9.06	5.97	28.52	1.54	22.74	16.57	519
10-59	78	13.41	17.99	9.25	14.48	7.74	27.46	9.68	1395
Over 59			None reported for this class						
Area 3									
0-9	(c) 135	16.46	26.58	5.06	12.66	12.66		26.58	79
10-59	4	8.43	25.30	4.82	31.33	30.12			83
Over 59	1		50.00	50.00					100
Michigan									
0-9	(d) 1108	16.33	14.08	10.81	23.44	2.68	16.84	15.82	1378
10-59	382	23.35	14.79	21.45	15.56	7.36	14.77	2.72	8929
Over 59	25	24.38	20.89	25.37	4.03	12.82	11.03	1.48	2231
Total	1515								

Source: 1515 mail questionnaires

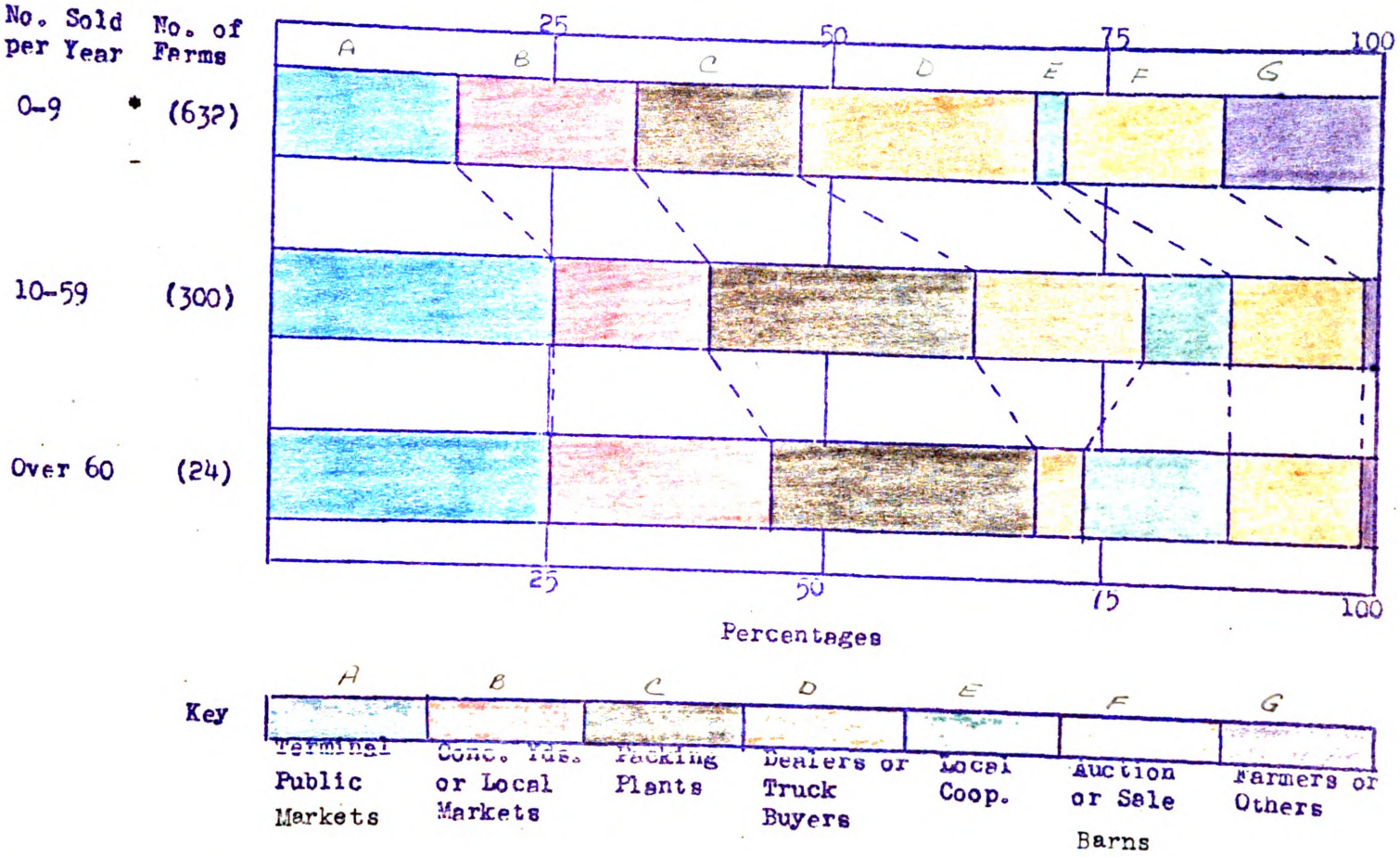
a) Includes 423 farms reporting no hogs sold in any market class.

b) " 178 " " " " " " " " "

c) " 106 " " " " " " " " "

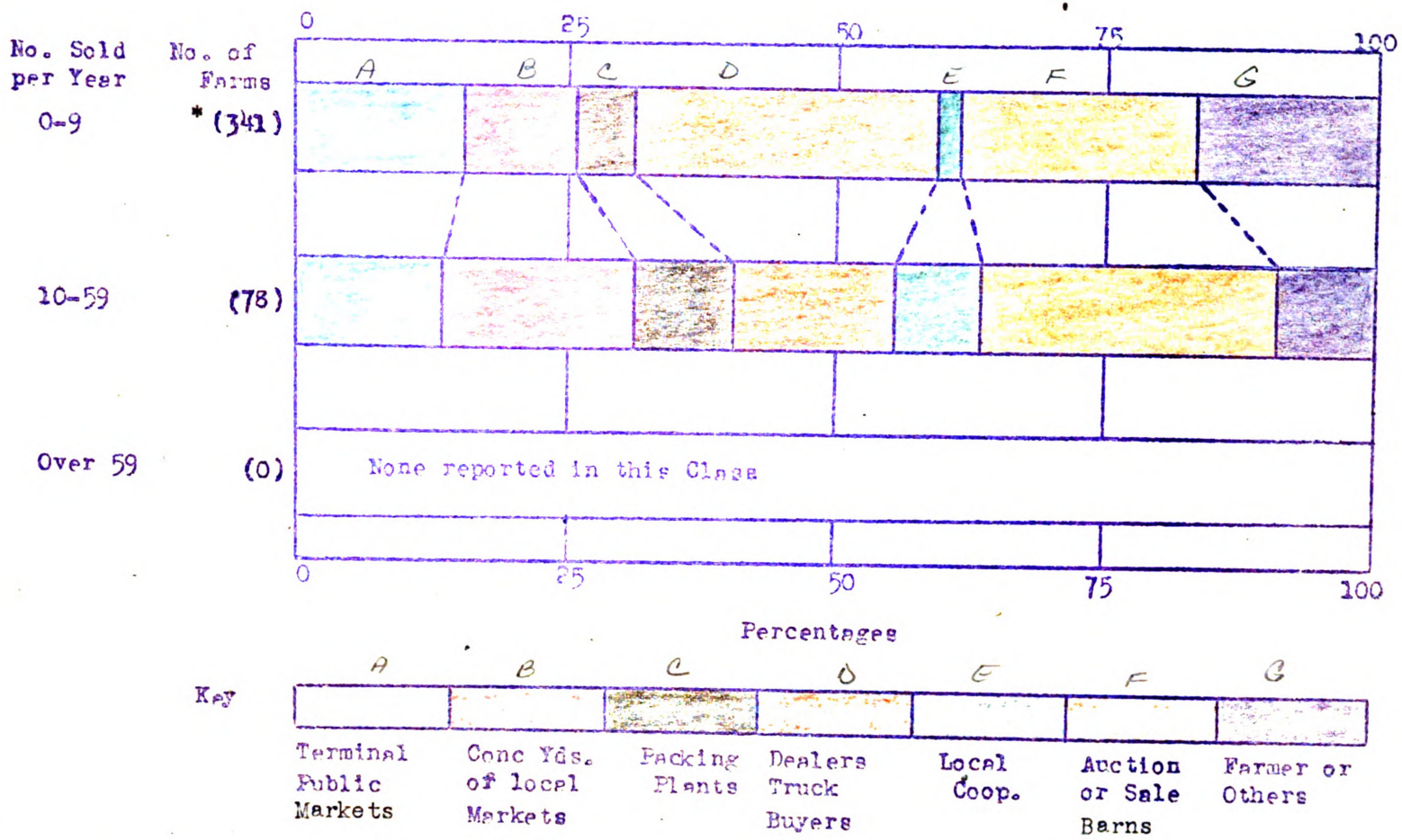
d) " 707 " " " " " " " " "

Figure 15. Percentage of slaughter hogs and pigs sold through alternative outlets according to number sold per farm per year from 956 farms, Area 1, 1940.



Source: 1515 Mail Questionnaires
*Includes 423 farms reporting no hogs sold in any market class.

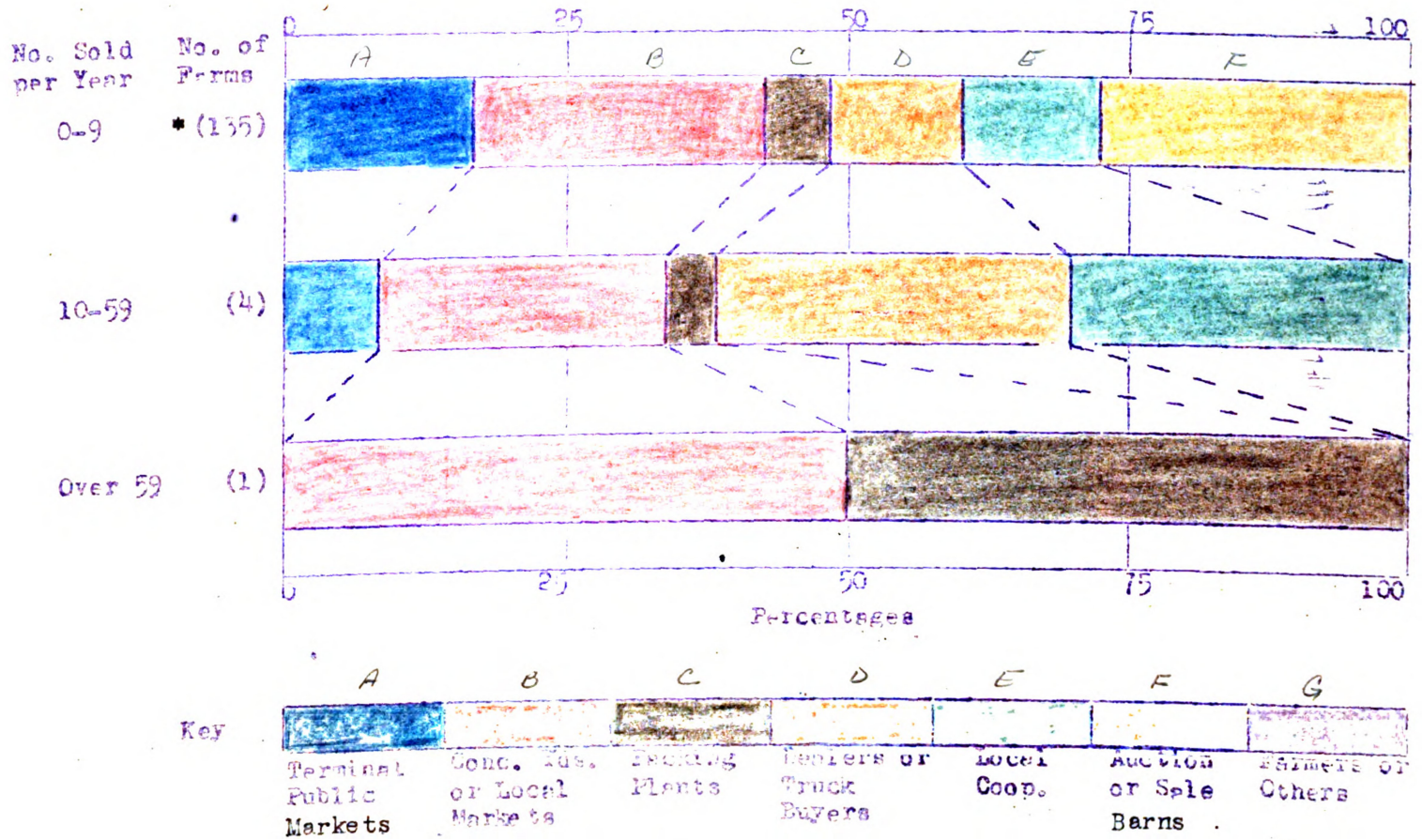
Figure 16. Percentages of slaughter hogs and pigs sold through alternative outlets according to number sold per farm per year, from 419 farms, Area 2, 1940.



Source: 1515 Mail Questionnaires

*Includes 178 farms reporting no hogs sold in any market class.

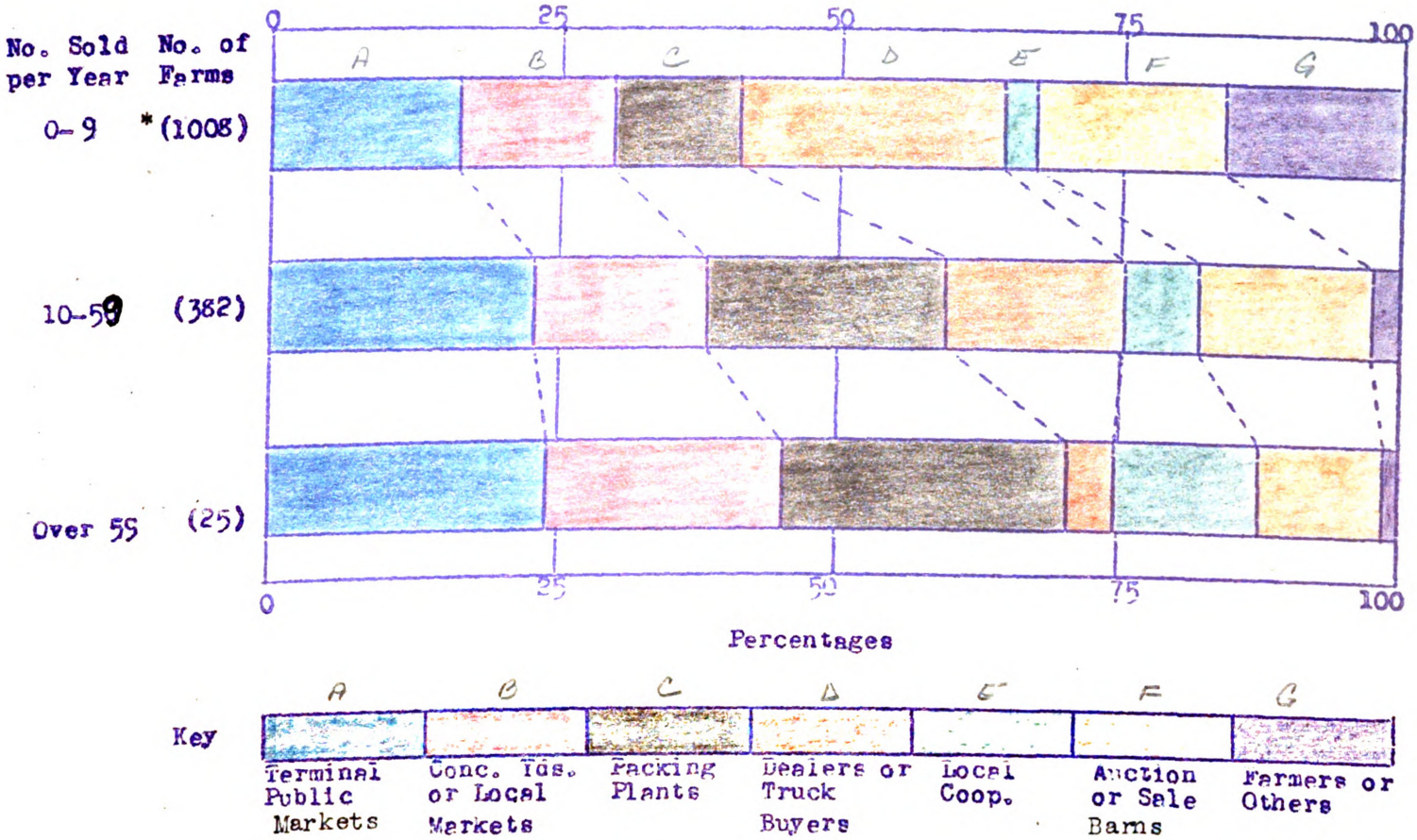
Figure 17. Percentage of slaughter hogs and pigs sold through alternative outlets according to number sold per farm per year from 140 farms, Area 3, 1940.



Source: 1515 Mail Questionnaires

*Includes 106 farms reporting no hogs sold in any market class.

Figure 18. Percentages of slaughter hogs and pigs sold through alternative outlets, according to number sold per farm per year, from 1515 farms, Michigan, 1940.



Source: 1515 Mail Questionnaires.

*Includes 707 farms reporting no hogs sold in any market class.

ducers sell larger proportions of their slaughter hogs directly to terminal markets than do small producers. The same generalization is applicable in regard to direct sales to packing plants and local cooperatives. The reverse appears with respect to disposal through dealers and auctions, in that the larger producers as a group tend to utilize these outlets to a lesser extent. Portions of the data indicate that larger producers patronize the concentration yards to a greater extent than small producers.

For areas 2 and 3 the data are rather inconclusive when broken down as to size of producer. It appears however that terminal markets are of lesser importance as outlets to all producers in these areas than are auctions, dealers, or concentration yards which act to assemble the widely scattered local production.

Inter-area differences in market outlets utilized by all producers of slaughter hogs, as revealed by the tabulation of the sample data, are indicated in Table 14, or can be seen graphically by comparing the portion of Figures 19, 20, 21, & 22 dealing with slaughter hogs.

It is probable that some generalizations can be validly drawn from the sample data in respect to actual utilization of the alternative market outlets for hogs. Farmers in area 1 made a greater use of terminal markets than did farmers in areas 2 and 3; likewise, farmers in area 2 made a greater use of terminal markets than farmers in area 3. Distance from terminal markets and more widely scattered production of small quantities per farm tend to account for the slight utilization of terminal markets in the two northerly areas. Probably, these same factors tend in turn to account for the greater utilization by producers in these areas of local assembling markets. Greater proportions of slaughter

TABLE 14

PERCENTAGES OF SLAUGHTER HOGS SOLD THROUGH ALTERNATIVE OUTLETS FROM 1515 FARMS, BY AREAS, MICHIGAN, 1940

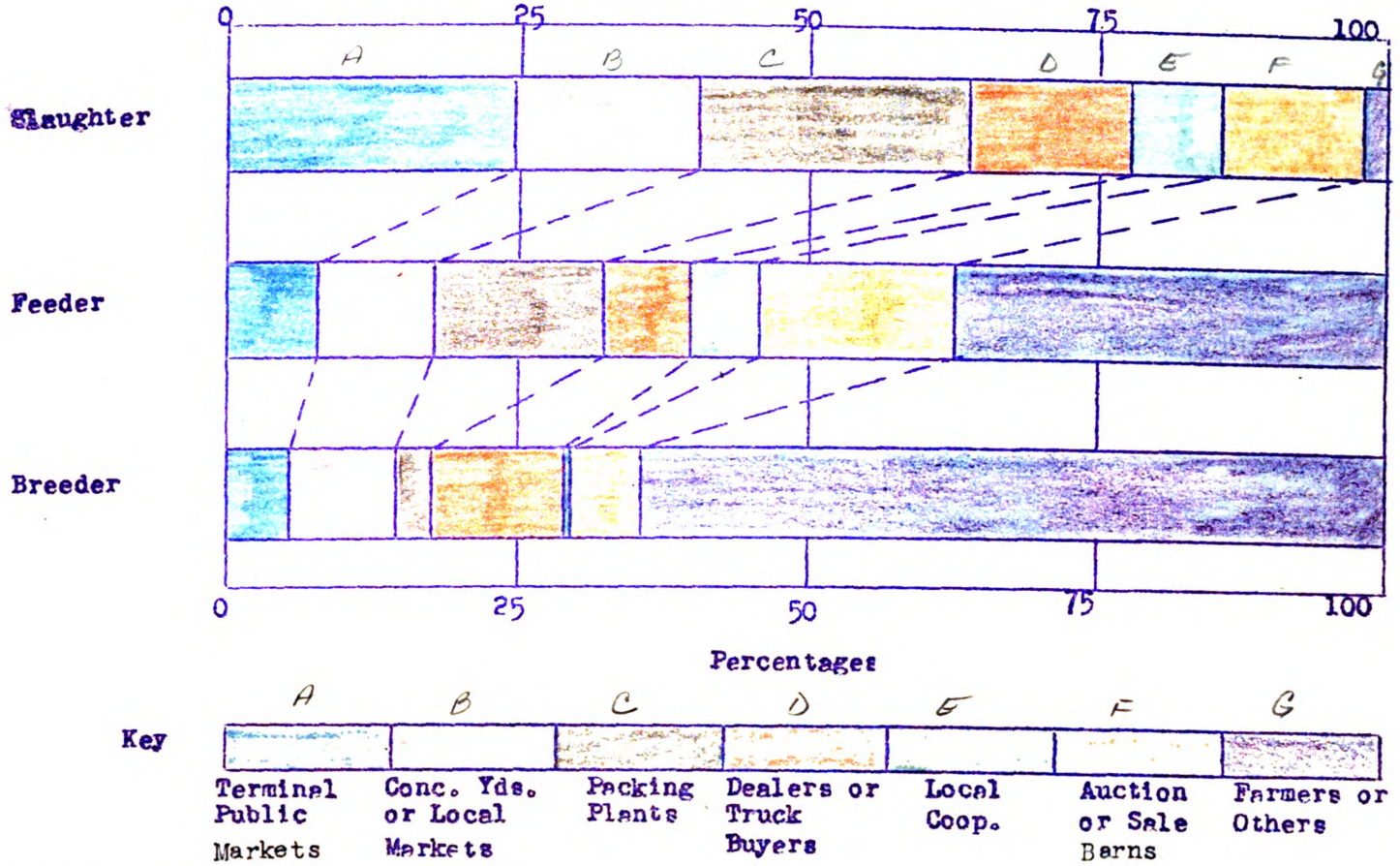
Market Outlets	Michigan	Areas		
		Area 1 Southern	Area 2 Northern	Area 3 Upper Peninsula
	Per Cent	Per Cent	Per Cent	Per Cent
Terminal markets	22.76	24.76	14.00	7.63
Concentration yards	15.80	15.35	15.57	35.11
Packing plants	20.98	23.28	8.36	22.14
Dealers	14.37	13.67	18.29	13.74
Local Cooperatives	7.82	8.00	6.06	13.36
Auctions.....	14.33	12.51	26.17	---
Farmers	3.94	2.43	11.55	8.02
Totals	100.00	100.00	100.00	100.00
Number of hogs equal to 100 per cent.	12538	10362	1914	262

Source: 1515 mail questionnaires.

hogs produced were probably sold to local packing plants or butchers in the northern areas because a considerable number of the hogs sold direct to packers in area 1 were sold to terminal packing plants at Detroit.

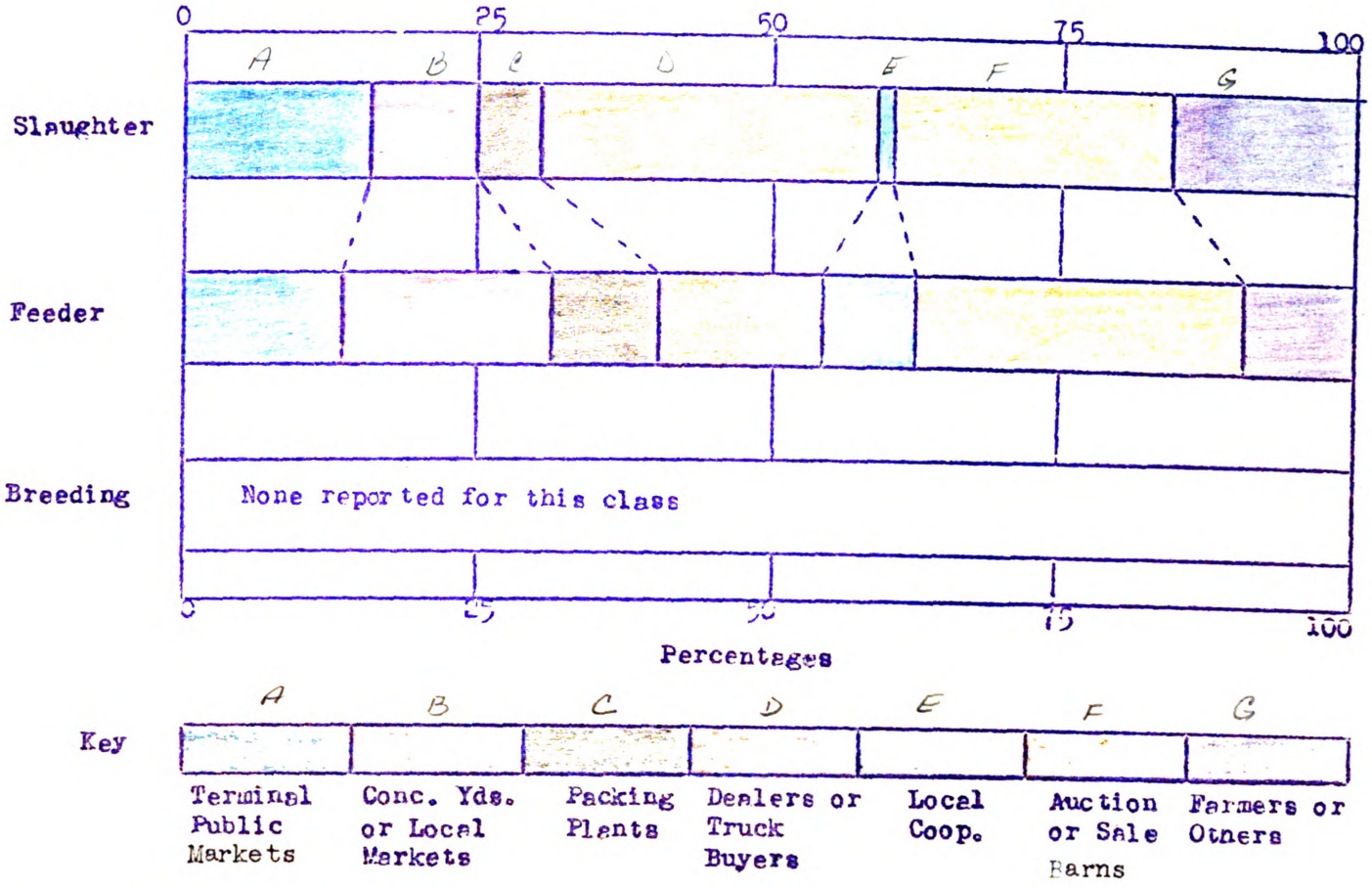
In Chapter I three types of initial market movements of slaughter livestock were outlined: movements direct to terminals, movements to local assembling markets, and movements to markets of local slaughter. In regard to these movements the following generalizations can be drawn: (1) movements of slaughter hogs to terminal markets are as stated above; (2) movements to local assembly markets are of greater importance in the northern areas than in the south due to increased distance from terminals and more widely scattered production in smaller lots in the north. Lack of feedstuffs, due to unfavorable soil and climatic conditions, limits the production of high quality slaughter hogs in the northern areas;

Figure 19. Percentages of each class of hogs and pigs sold through alternative outlets from 956 farms, Area 1, 1940.



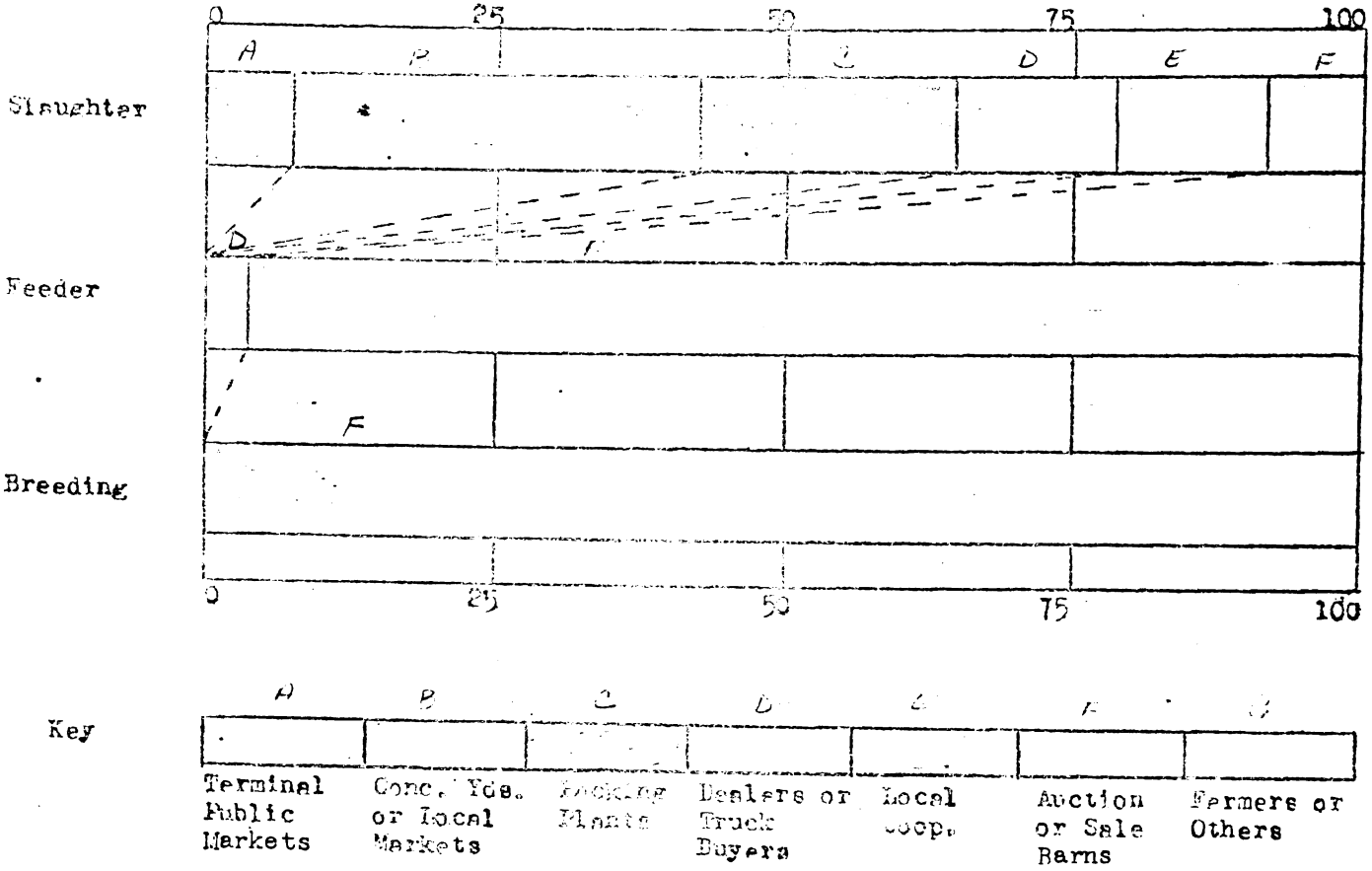
Source: 1515 Mail Questionnaires

Figure 20. Percentages of each class of hogs and pigs sold through alternative outlets, from 419 farms, Area 2, 1940



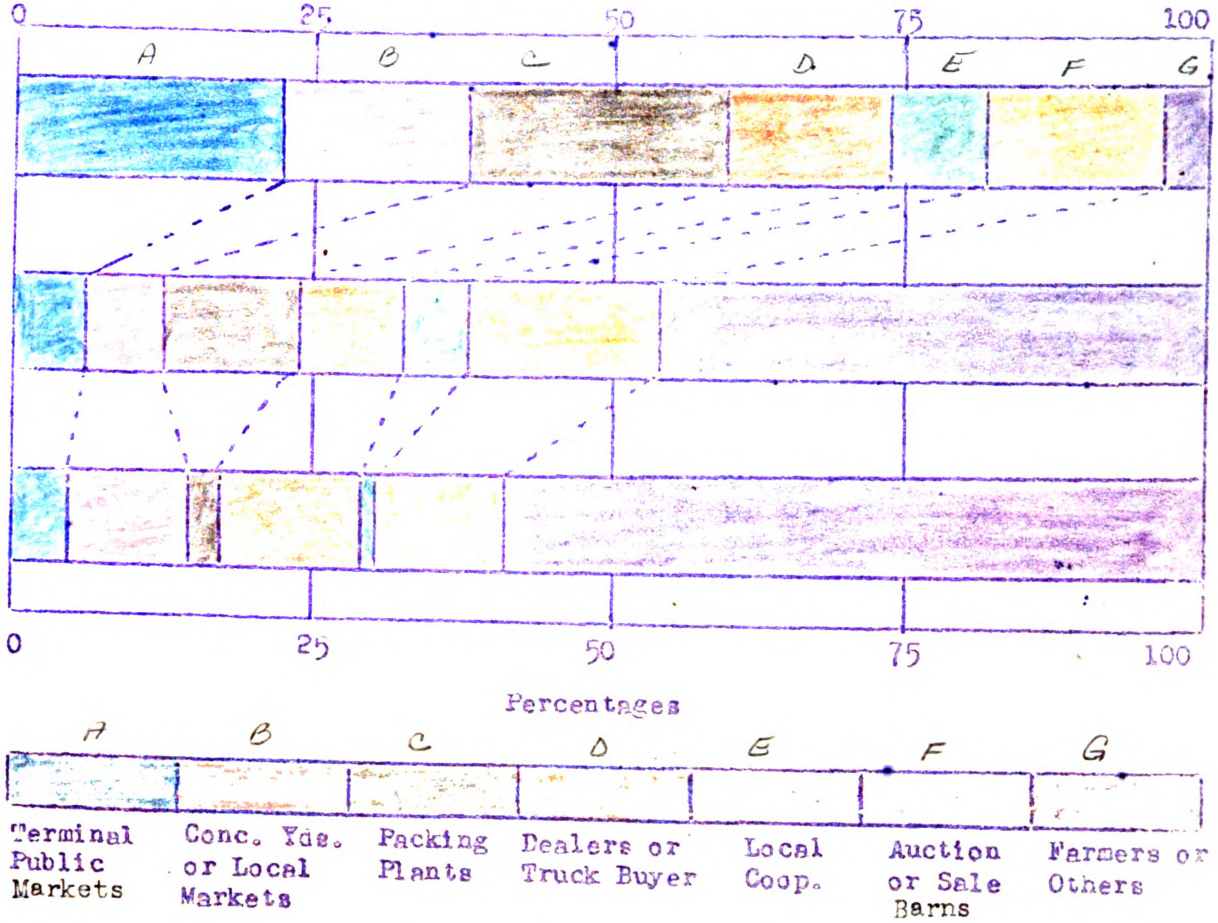
Source: 1515 Mail Questionnaires

Figure 21. Percentage of each class of hogs and pigs sold to alternative market from 140 farms, Area 3, 1940.



Source: 1515 Mail Questionnaires

Figure 22. Percentages of each class of hogs and pigs sold through alternative outlets, by 1515 farms, Michigan, 1940.



Source: 1515 Mail Questionnaires

distance from feed supplies and consuming centers raises transportation costs to such an extent as to make it impracticable to produce finished hogs from shipped-in feeds except for the small local consumption.

Feeder Hogs. Sales of feeder hogs were not of enough importance to justify tabulation of markets utilized by size of producer; hence, discussion of markets utilized by Michigan farmers when selling feeder hogs is limited to a discussion of inter-area differences. Inter-area differences are indicated in Table 15 or can be seen by comparing the portions of Figures 19, 20, 21, and 22 which deal with feeder hogs.

A factor of primary importance in determining whether or not hogs will be sold as feeders or as finished hogs is the availability of concentrated feedstuffs. In view of the cheapness and ease with which considerable number of feeders can be produced by farmers having access to feedstuffs either on their own farms or from cheap off-farm sources, there is little inducement for such farmers to buy feeder stock from other areas, unless they can be purchased at distinctly favorable prices. This is borne out by the fact that there is no large specialized feeder hog producing area in the United States. Short feed crops in areas such as Minnesota, the Dakotas, Missouri, Kansas, and in individual corn belt sections may at times, however, cause considerable movements of feeders from such areas to farms with abundant feed supplies. Michigan is on the periphery of the corn belt and is subject to fluctuating supplies of feed crops; consequently, there is a considerable trade in feeder hogs both within areas and between areas.

In area 1, the most important Michigan feed producing region, considerable numbers of feeder hogs were reported sold to inter- and intra-area clearing point markets (auctions, concentration yards, and dealers)

TABLE 15.

PERCENTAGES OF FEEDER HOGS SOLD THROUGH ALTERNATIVE MARKET OUTLETS FROM 1515 FARMS, BY AREAS, MICHIGAN, 1940

Markets	Michigan	Areas		
		Area 1 Southern	Area 2 Central	Area 3 Upper Peninsula
	Per Cent	Per Cent	Per Cent	Per Cent
Terminal markets	6.09	7.81	2.66	---
Concentration yards	7.70	10.13	2.66	---
Packing plants	10.57	14.06	3.23	---
Dealers	8.09	7.86	9.82	3.14
Local Cooperatives	4.52	5.59	2.53	---
Auctions	17.22	16.57	22.86	---
Farmers	45.81	37.98	56.24	96.86
Totals	100.00	100.00	100.00	100.00
Number of Hogs equal to 100 per cent .	2857	1985	713	159

Source: 1515 mail questionnaires.

indicating that a considerable market movement was necessary to effect the transfer from producer to producer. Due, however, to general availability of feedstuffs this area reports only a small proportion of all hog sales as feeder hog sales.

The data reflects the lack of feed grain production in area 2 in two ways: (1) less hogs are produced and (2) a larger proportion are sold as feeders which also indicates irregularity of grain production. In area 2 large proportions of hogs sold as feeders move direct from farm to farm, while smaller proportions move to inter-and intra-area clearing points from which they probably move south to the feedstuffs of area 1.

If any validity can be attached to the data from area 3, they indicate that a large proportion of all hogs sold are sold as feeder hogs

and that the largest proportion of feeder hogs is sold direct from farm to farm. In view of the meager production of hogs and feedstuffs in this area, this can be expected to hold true as the sales probably consist of one or two hogs sold to a neighbor who in turn fattens them for home consumption on kitchen refuse.

Breeding Hogs. As in the case of feeder hogs the primary object of trade in breeding hogs is to move the animals from one producer to another, not from producer to slaughterer. Hence, it is generally where large quantities or very high qualities of breeding animals are sold that the more highly developed marketing mechanisms such as terminal markets and concentration yards or purebred auctions as distinct from the community auctions are utilized.

Data on breeding hog trade secured from this study are very meager and unreliable. The data secured are presented in Table 16. The same data are shown graphically in the portion of Figures 19, 20, 21, and 22 dealing with breeding hogs.

Table 16 permits a few very limited generalizations to be drawn relative to inter-area differences in the utilization of outlets by farmers selling breeding hogs. Inadequacy of sample size limits the confidence which can be placed in the data. Little can be stated in regard to area 3. In area 2 the data indicate that farmers utilized auctions when selling breeding hogs to a greater extent than in area 1, while farmers in area 1 tended to sell a large proportion of breeding hogs direct to other farms. Assuming this to be true, two possible explanations can be advanced: (1) auctions were widely used in area 2 for all species and classes of livestock; hence, farmers tended to sell the relatively small amount of breeding hogs through the same channel; and (2) the greater

TABLE 16.

PERCENTAGES OF BREEDING HOGS SOLD THROUGH ALTERNATIVE MARKET OUTLETS FROM 1515 FARMS, BY AREAS, MICHIGAN, 1940

Markets	Michigan	Areas		
		Area 1 Southern	Area 2 Central	Area 3 Upper Peninsula
	Per Cent	Per Cent	Per Cent	Per Cent
Terminal markets	5.17	5.72	4.00	---
Concentration yards	10.66	8.78	16.00	---
Packing plants	2.59	3.44	---	---
Dealers	11.49	11.07	14.67	---
Local Cooperatives	.57	.76	---	---
Auctions	11.78	6.11	33.33	---
Farmers	58.34	64.12	32.00	100.00
Totals	100.00	100.00	100.00	100.00
Number of hogs equal to 100 per cent	348	262	75	11

Source: 1515 mail questionnaires

importance of hogs in area 1 make it more desirable for breeding hogs to move direct from farm to farm rather than through auctions, thus eliminating the risks of disease and mixed breeding which may accompany disposal through auction markets. Nothing can be stated with any degree of certainty concerning the other markets, except that they are of lesser and varied importance.

Chapter V

MOVEMENTS OF SHEEP AND LAMBS TO INITIAL MARKETS

Relative Importance of the Market Classes of Sheep and Lambs by Livestock Marketing Areas

Considerable differences exist among the livestock areas of the state in the relative importance of the three market classes of sheep (slaughter, stockers and feeders, and breeding). It is necessary therefore to give some attention to these differences before attempting to ascribe economic significance to the movements of sheep to the initial market outlets.

Slaughter Sheep. Eighty-nine per cent of all sheep reported sold by sampled farms in the entire state were slaughter sheep. From the sample, taking cognizance of its reliability, it is probably safe to state that a somewhat larger proportion (91 per cent from the sampled farms) of all sheep sold from farms in area 1 are slaughter sheep, while lesser proportions are slaughter sheep in areas 2 and 3. (See Table 17 and Fig. 23).

Stocker and Feeder Sheep. Six per cent of all sheep reported sold by sampled farms in the entire state were stocker and feeder sheep. It is probable that a smaller proportion of all sheep are sold as feeders and stockers in the southern areas than in other areas of the state.

Breeding Sheep. The generalizations stated above as applicable to stocker and feeder sheep are applicable in a slightly more accentuated form in the case of breeding sheep.

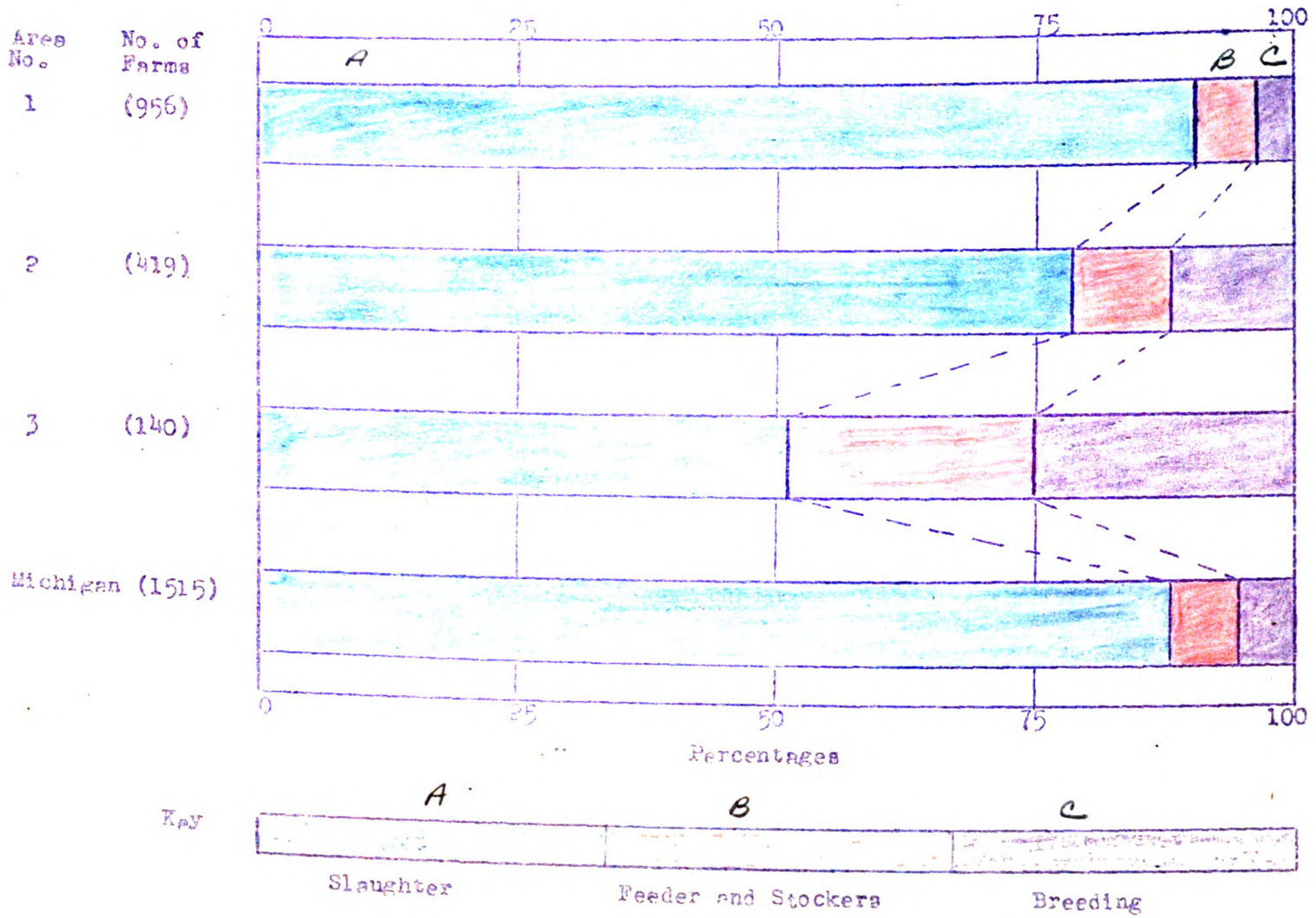
The relatively large production of feed grains in area 1 and the relatively large production of pastureage and roughage in area 2 make it advantageous for farmers in area 2 to produce stockers and feeders, and for farmers in area 1 to produce slaughter sheep. As more purchased feeder sheep are fattened in area 1, a relatively smaller proportion of total sales consist of sheep for breeding purposes. Another factor accounting for the high proportion of slaughter sheep in Michigan is the fact that most of the sheep are of a mutton or dual purpose type.

Table 17. Percentage which each class makes of total sheep and lambs reported from 1715 farms by areas, Michigan, 1940.

Area	Number of farms reporting	Number of farms reporting sheep sold	Slaughter sheep	Stocker and feeder sheep	Breeding sheep	Number of sheep and lambs equal to 100 per cent
	Number	Number	Per cent	Per cent	Per cent	Number
Area 1	956	134	80.49	7.33	7.75	14818
Area 2	419	55	78.50	9.43	11.93	1900
Area 3	140	6	79.61	12.68	7.71	697
Michigan	1715	195	80.33	8.17	7.14	17915

Source: 1940 Farm Management Survey.

Figure 23. Percentages which each class makes up of total sheep and lambs marketed from 1515 farms, by areas, Michigan, 1940.



Inter-Area Differences in Movements of Sheep and Lambs through Initial Market Outlets, by Market Classes

The scattered nature of sheep production as a farm enterprise is indicated by the fact that only 295 of the 1515 farms sampled in this study reported sheep sold. The fact that these 295 farms reported a total of 15,015 sheep sold is indicative of the concentration of sheep production in the hands of larger producers. Although it is known that this sample is biased upward it is significant as an indication of concentration to note that the 25 farms selling over 99 head of slaughter sheep per year accounted for 7,353 of the 13,323 slaughter sheep marketed by the 295 sampled farms reporting sheep sold. (See Table 18).

Slaughter Sheep. As a result of tabulating the sample data to show the percentage importance of each of the alternative initial market outlets to casual, medium sized commercial, and carlot producers[1/] for each area and for the state as a whole, Figures 24, 25, and 26, were constructed showing, graphically, the relative importance of the alternative market outlets to the different sized producers in the three areas. Figure 27 is the composite picture for the state as a whole.

In all areas where any validity can be attached to the findings and for the entire state the data supports the following generalizations: (1) relevant to the proportional initial utilization, larger producers as a group sell larger proportions of their slaughter sheep to terminal markets; (2) relevant to the proportional utilization of local assembling markets, (including concentration yards, dealers, local cooperatives and auctions), the larger producers as a group sell less of their slaughter sheep to assembling markets; and (3) relevant to the utilization of packing plants and local butchers as an initial market outlet, a variable relationship exists between size of producer and percentage utilization.

1/ In reference to sheep producers:

1. A casual producer is defined as a producer who either did not market any sheep or who sold less than 20 slaughter sheep during the year.
2. A medium-sized commercial producer is defined as a producer who sold 20-99 head of slaughter sheep during the year.
3. A carlot producer is defined as a producer who sold 100 or more slaughter sheep during the year.

Table 18. Slaughter sheep: percentage sold through each type of market outlet, classified by number sold per farm, by areas, Michigan, 1940

Species and class	Number of farms	Terminal public markets	Concentration yards or local markets	Packing plants	Dealers or truck buyers	Local coop. ass'ns.	Auctions or sale barns	Farmers or others	Number of livestock equal to 100 per cent
	Number	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Number
Area 1									
0-19	a/ 837	28.67	19.95	4.51	24.60	8.15	10.92	3.20	687
20-99	97	34.53	11.33	9.68	14.67	14.48	13.02	2.29	4069
Over 99	22	58.06	5.83	5.95	10.55	9.12	10.49		6894
Area 2									
0-19	b/ 394	18.79	9.40		41.94	9.40	17.45	3.02	298
20-99	22	29.74			43.99	11.15	14.99	..13	807
Over 99	3	67.54		8.71		22.66		1.09	459
Area 3									
0-19	c/ 139	36.84			36.84			26.32	19
20-99	1	13.33	86.67						90
Over 99	0			None reported for this class					
Michigan									
0-19	d/ 1369	25.90	16.43	3.09	29.98	8.36	12.66	3.59	1004
20-99	121	33.37	10.85	7.93	19.17	13.67	13.11	1.90	4966
Over 99	25	58.66	5.47	6.12	9.88	9.96	9.84	.07	7353
Total	1515								

Source: 1515 mail questionnaires

a/ Includes 722 farms reporting no sheep sold in any market class.

b/ Includes 364 " " " " " " " " "

c/ Includes 134 " " " " " " " " "

d/ Includes 1220 " " " " " " " " "

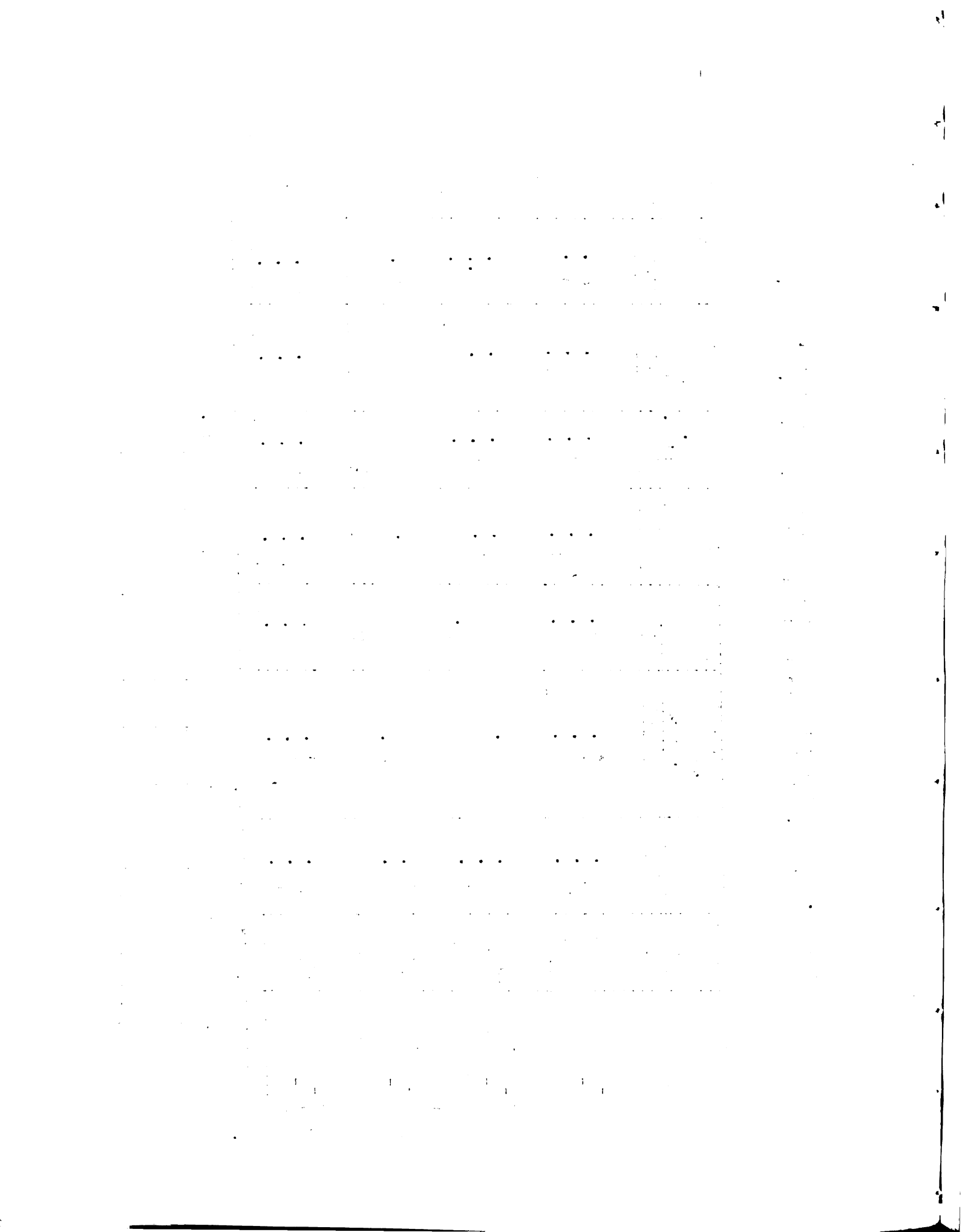
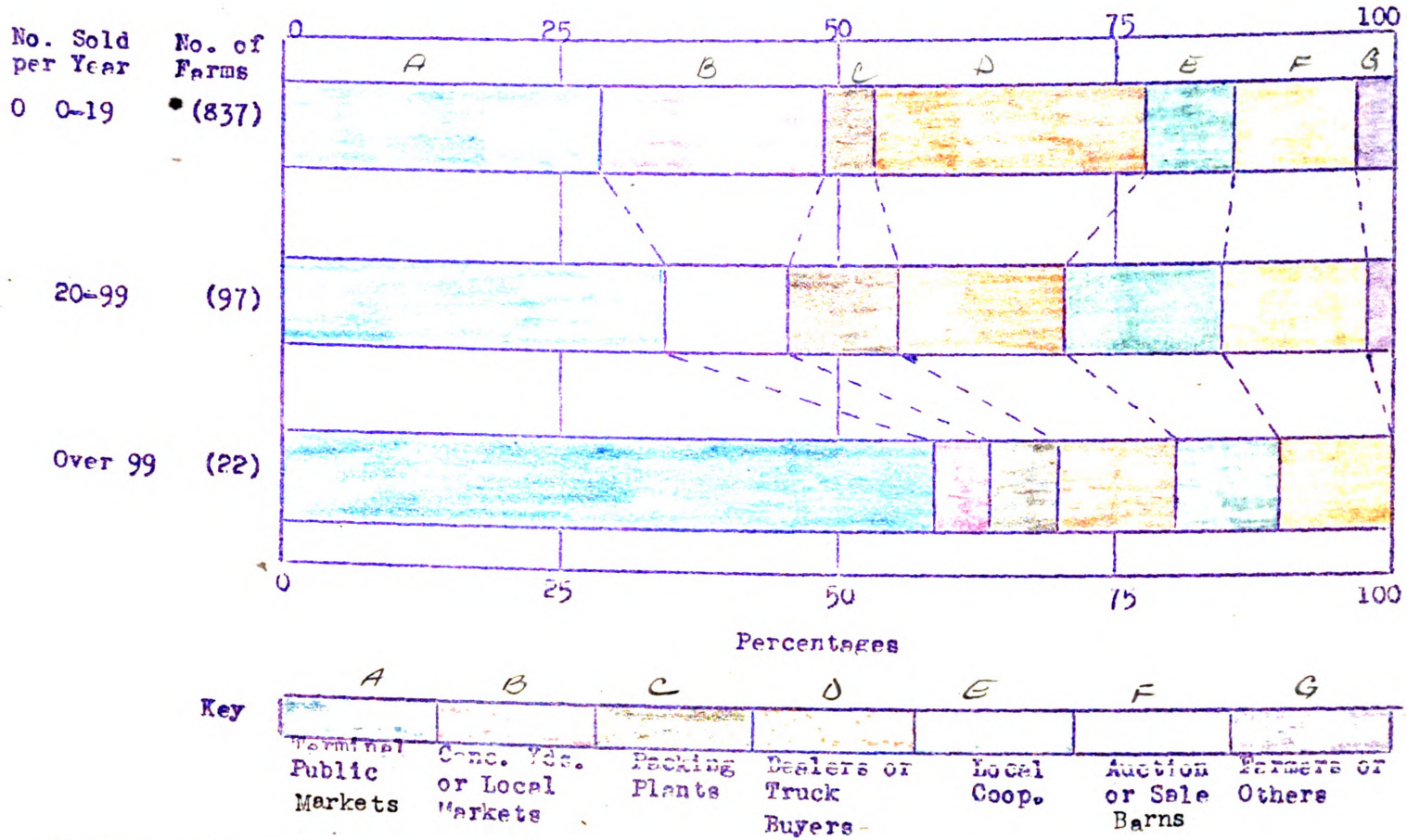


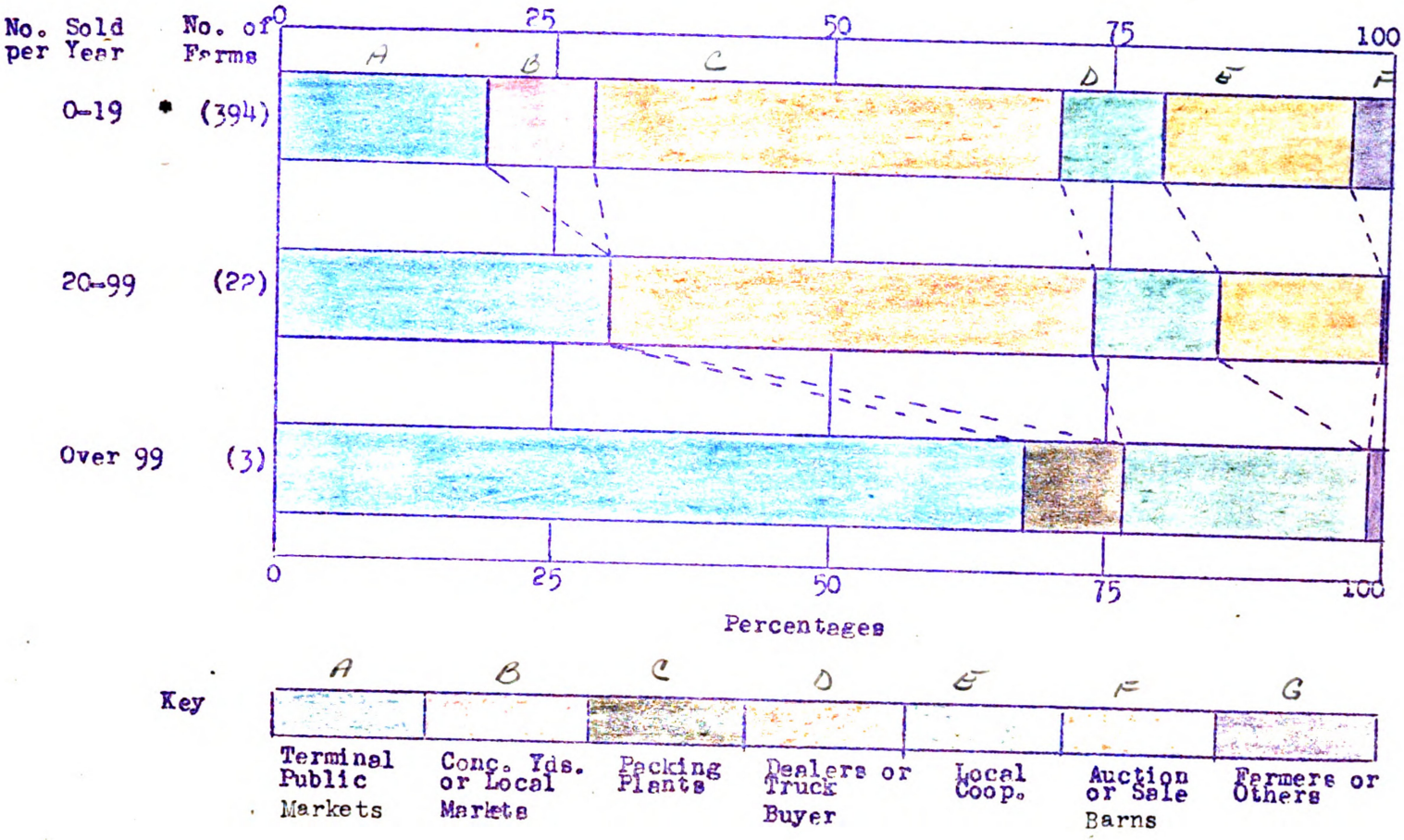
Figure 24. Percentages of slaughter sheep sold through alternative outlets according to number sold per farm per year from 956 farms, Area 1, 1940.



Source: 1515 Mail Questionnaires

•Includes 722 farms reporting no sheep sold in any market class.

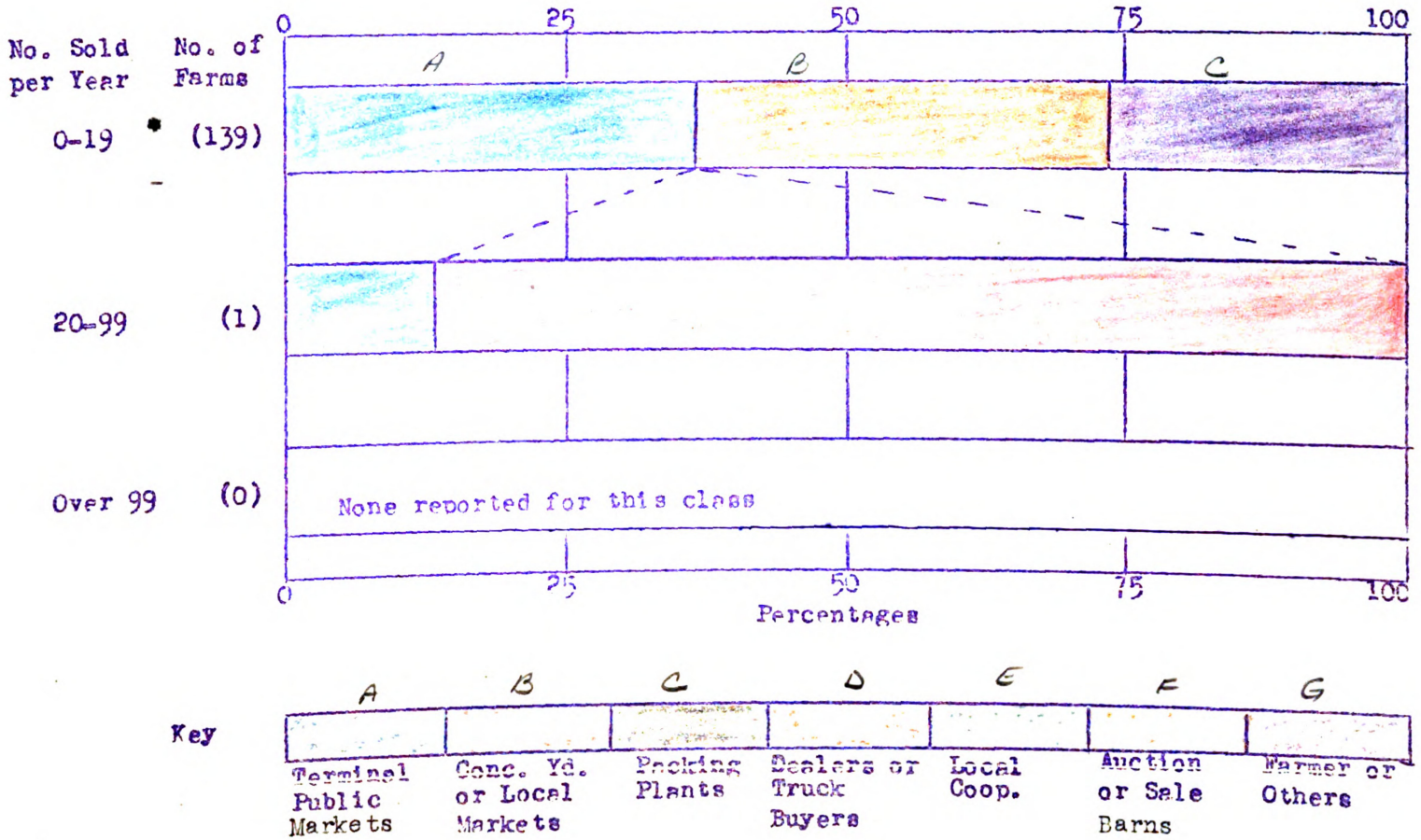
Figure 25. Percentage of slaughter sheep and lambs sold through alternative outlets from 419 farms, Area 2, 1940.



Source: 1515 Mail Questionnaires

*Includes 364 farms reporting no sheep sold in any market class.

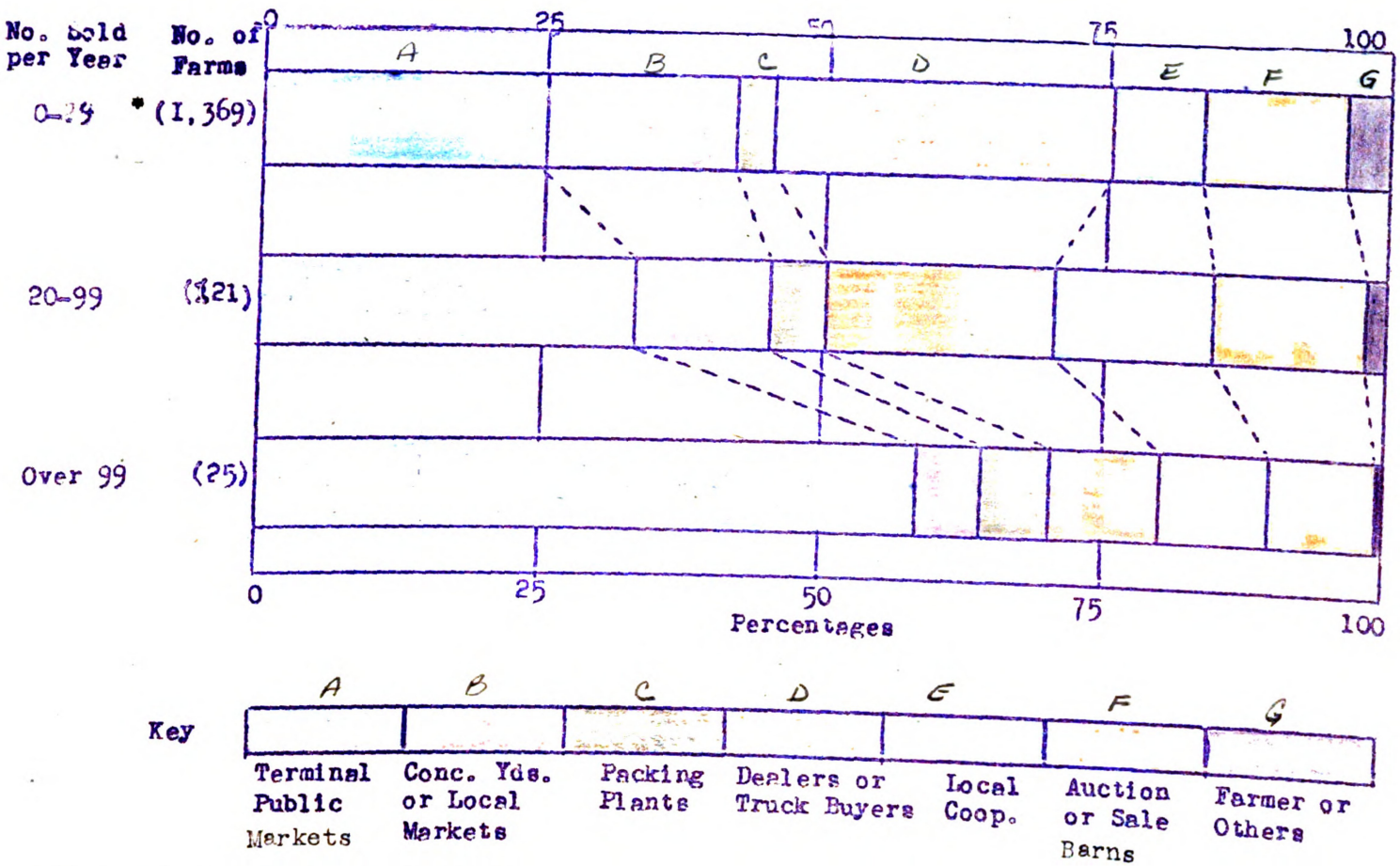
Figure 26. Percentages of slaughter sheep and lambs sold through alternative outlets from 140 farms, Area 3, 1940.



Source: 1515 Mail Questionnaires

*Includes 134 farms reporting no sheep sold in any market class.

Figure 27. Percentage of slaughter sheep and lambs sold through alternative, according to number sold per farm per year, from 1515, Michigan, 1940.



Source: 1515 Mail Questionnaires

*Includes 1220 farms reporting no sheep sold in any market class.

It can be seen from the above generalizations that inter-area differences in markets utilized for all slaughter sheep are probably quite dependent upon the proportional importance of the different sized producers; hence, bias as to size of producer in the sample effects the degree to which sample percentages represent their purported populations.

Inter-area differences in the utilization of markets for the 13,323 slaughter sheep reported sold from the 295 sampled farms can be noted from Table 19 , or from the graphic presentation in Figures 28, 29, and 30.

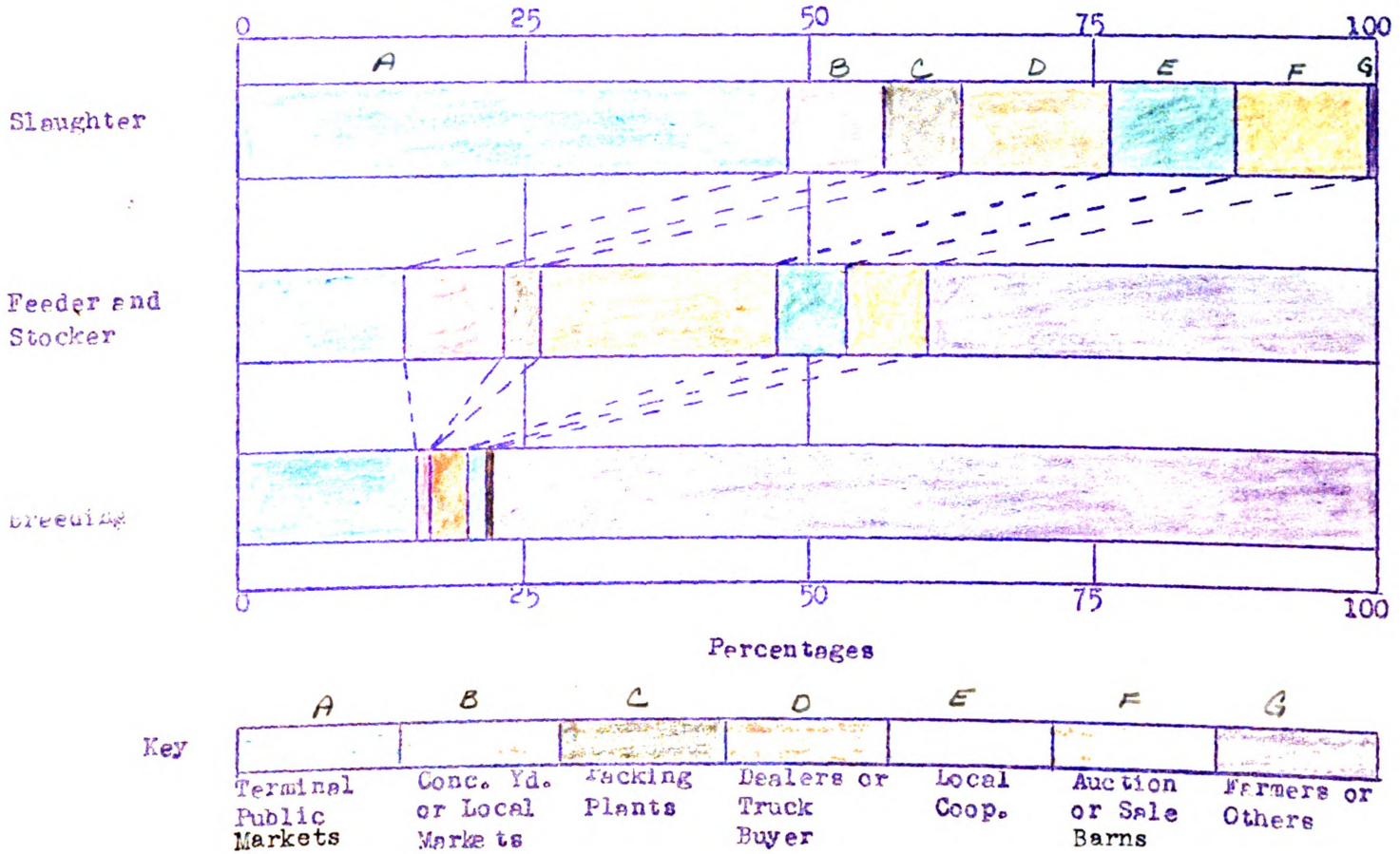
Table 19. Percentages of slaughter sheep sold to alternative markets from 295 farms, by areas, Michigan, 1940.

Markets	Michigan	Areas		
		Area 1	Area 2	Area 3
	Per cent	Per cent	Per cent	Per cent
Terminal markets	46.76	48.11	38.75	17.43
Concentration yards	8.30	8.58	1.79	71.56
Packing plants	6.57	7.17	2.56	-----
Dealers	14.86	12.82	30.69	6.42
Local Cooperatives	11.23	10.94	14.19	-----
Auction	11.27	11.40	11.06	-----
Farmers	1.01	.98	.96	4.59
Totals	100.00	100.00	100.00	100.00
Number of sheep equal to 100 per cent	13323	11650	1564	109

Source: 1515 mail questionnaires.

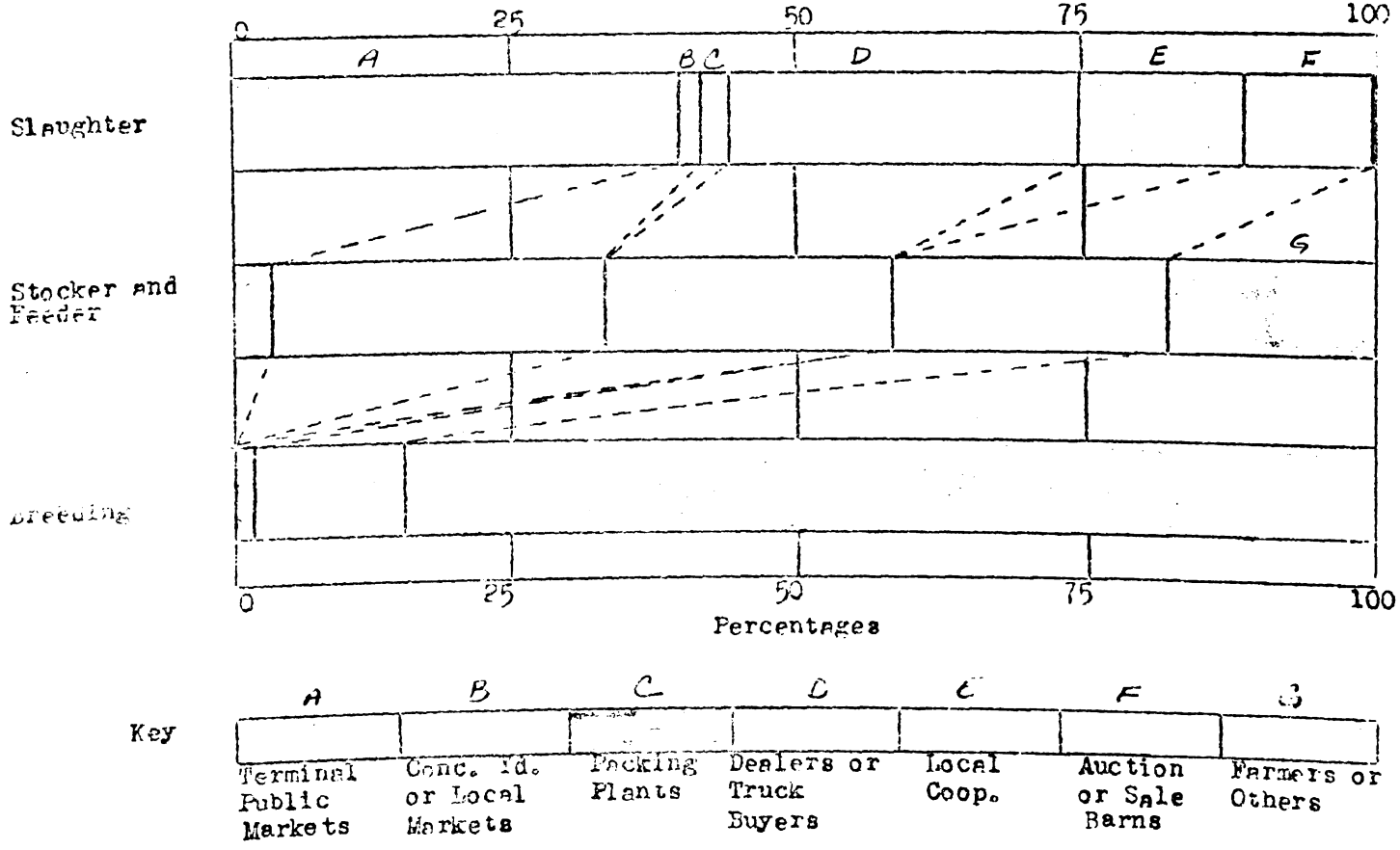
Comparisons between northern and southern areas with reference to any single market outlet are of little value because the sample size for the Upper Peninsula is quite inadequate; however, the data for areas 1 and 2 have a fair degree of reliability which will permit certain comparisons to be made as follows on an inter-area basis: (1) terminal markets, concentration yards, and packing plants were of more importance as initial market outlets for slaughter sheep in area 1 than in area 2; (2) dealers and local cooperatives were probably more important as initial market outlets for slaughter sheep in area 2 than in area 1; and, (3) little can be stated relevant to the inter-area importance of auctions and farmers as initial market outlets for slaughter sheep.

Figure 28. Percentages of each class of sheep and lambs sold through alternative outlets from 956 farms, Area 1, 1940.



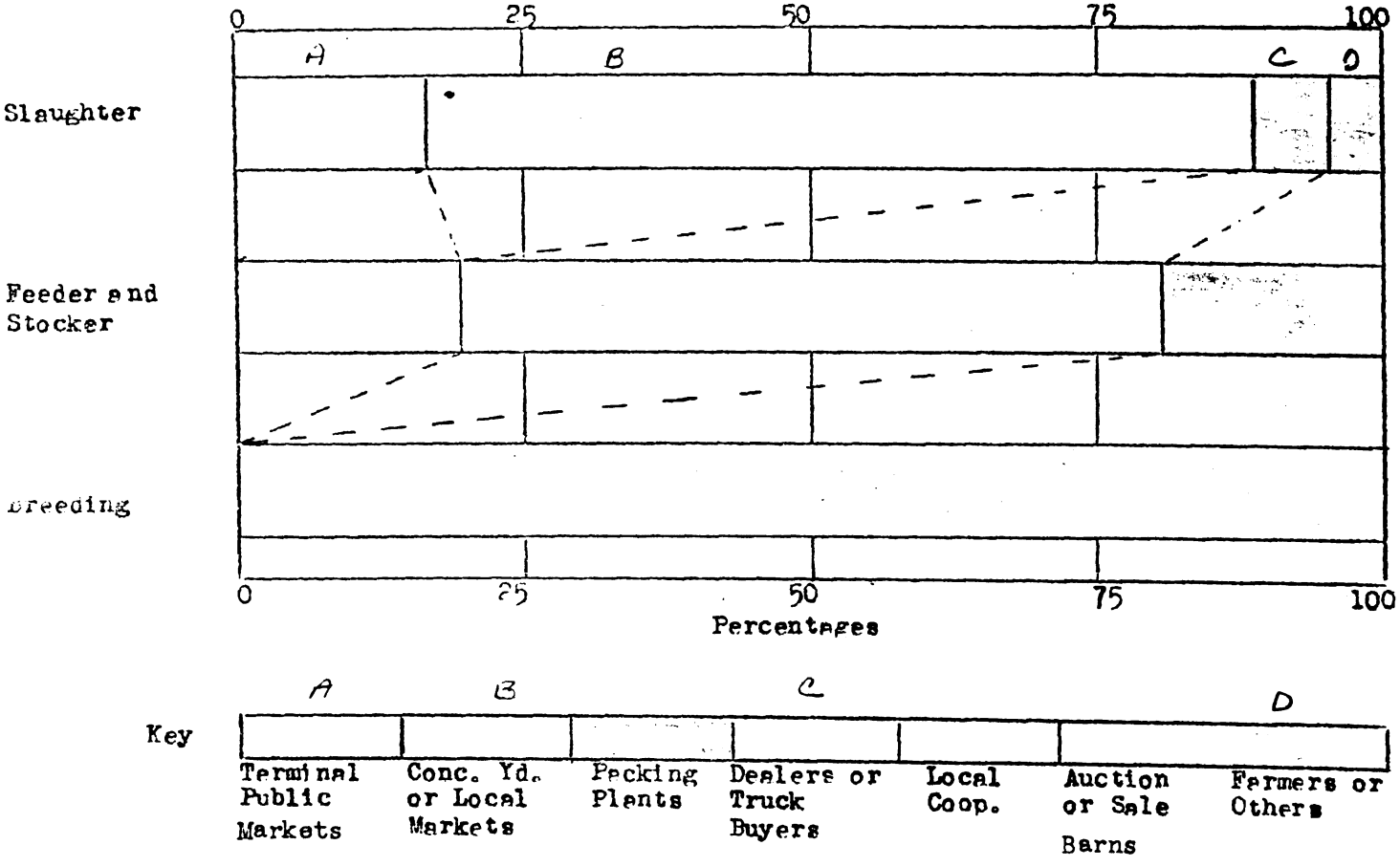
Source: 1515 Mail Questionnaires

Figure 29. Percentages of each class of sheep and lambs sold through alternative outlets from 419 farm, Area 2, 1940.



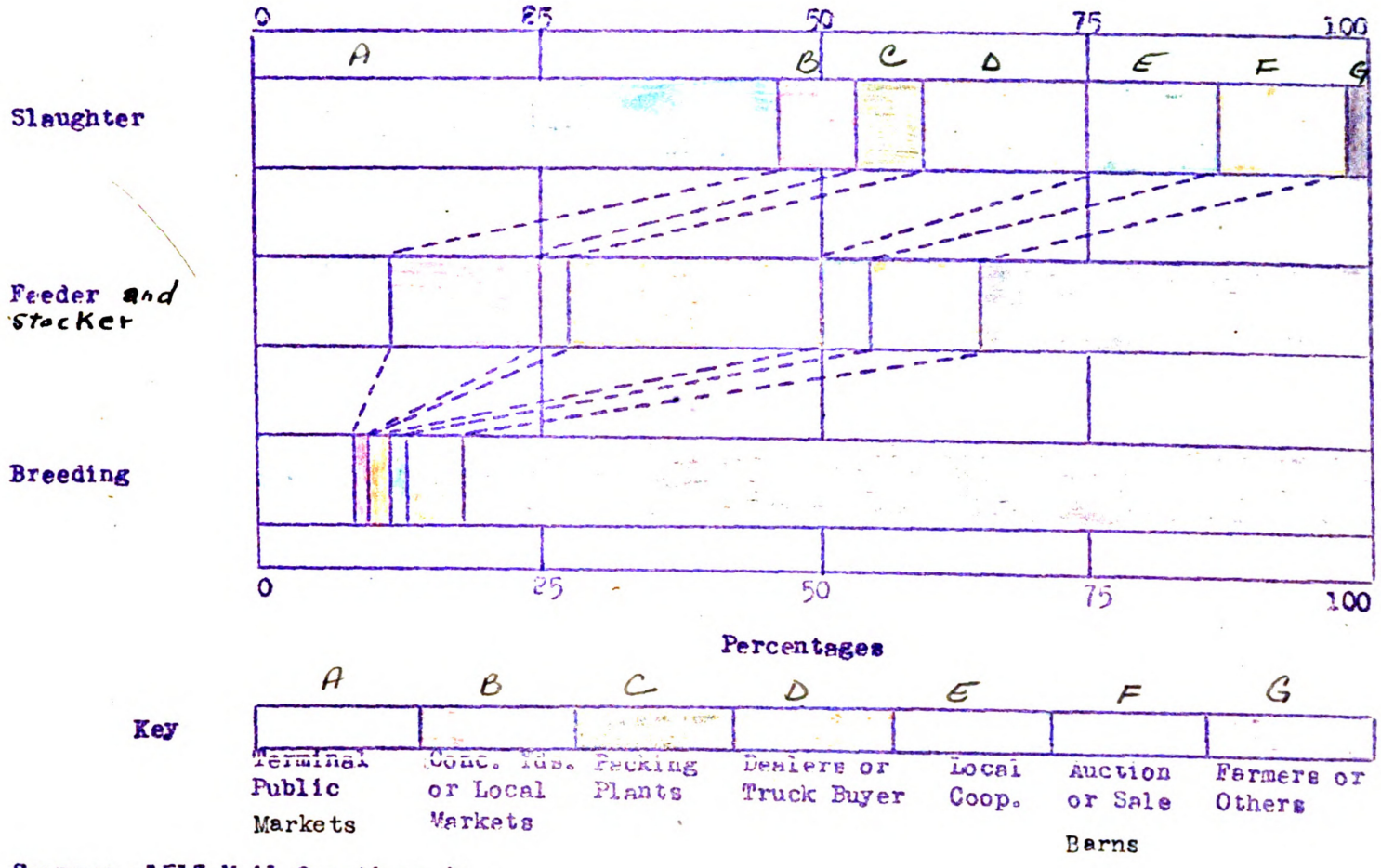
Source: 1515 Mail Questionnaires

Figure 30. Percentages of each class of sheep and lambs sold through alternative outlets from 140 farms, Area 3, 1940



Source: 1515 Mail Questionnaires

Figure 31. Percentages of each class of sheep and lambs sold through alternative outlets, from 1515 farms, Michigan, 1940.



Source: 1515 Mail Questionnaires

It is probably safe to assert that the local assembling markets, (including dealers, auctions, concentration yards, and local cooperatives), are of greater importance in the more northern areas as initial market outlets for slaughter sheep.

Proximity to the terminal markets of Detroit, Chicago, and Toledo provides at least a partial explanation of greater utilization of these markets in area 1. The widely scattered nature of sheep production in area 2 accounts for the prominence of local concentrating markets, especially in the case of dealers. Lack of local consumer demand offers an economic explanation for the small proportions going to the local slaughter markets in all areas.

Utilization of the alternative market outlets for all the slaughter sheep reported sold in the entire sample is graphically presented in Figure 31. Of the total of 13,323 slaughter sheep sold, 47 per cent was sold to the terminal markets, most important of which was Detroit. Dealers, local cooperatives, and auctions were of secondary importance, taking from 11 to 15 per cent each. Concentration yards took 8 per cent, while direct sales to packing plants accounted for 7 per cent.

The large proportion of slaughter sheep moving to terminal markets initially, without going through local assembling markets, is attributable to the concentration of the sheep business in the hands of large producers who are in a position to make direct carload shipments to terminal yards.[2/] Importance of the assembly function tends to be minimized by production in larger lots. As a result of being well adapted to perform the assembling function in the two northern areas where production occurs in small widespread lots, dealers afford the most important outlet of the local assembling markets in the state as a whole.

Feeder and Stocker Sheep. Table 20 and Figures 28, 29, 30, and 31 present the proportional importance of each of the markets for stocker and feeder sheep to sampled farms in the different areas and in the state. It should be recalled that as indicated in Figure 23, stocker and feeder sheep sales are of greater proportional

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2/ The 25 largest producers in this sample sold 7,353 of 13,323 slaughter sheep reported sold from all the 1515 farms.

importance in the two northern areas than in area 1.

Table 20. Percentages of feeder and stocker sheep sold through alternative market outlets from 295 farms, by areas, Michigan, 1940

Markets	Michigan	Areas		
		Area 1	Area 2	Area 3
	Per cent	Per cent	Per cent	Per cent
Terminal markets	12.81	14.99	3.19	19.57
Concentration yards	12.60	8.88	29.25	-----
Packing plants	2.28	3.06	-----	-----
Dealers	23.45	20.52	25.00	60.86
Local Cooperatives	4.45	5.97	-----	-----
Auction	9.88	6.70	23.94	-----
Farmers	34.53	39.88	18.62	19.57
Totals	100.00	100.00	100.00	100.00
Number of sheep equal to 100 per cent	921	687	188	46

Source: 1515 mail questionnaires.

Relevant to the inter-area importance of initial market outlets for feeder and stocker sheep, the following may be stated: (1) auctions were probably of greater importance in area 2, than in any other areas; and (2) dealers were probably more important in the two northern areas than in area 1.

Feed supplies are more widespread or accessible to farmers in the south than in the north, which accounts for the greater farm-to-farm movement of the producer classes of sheep in the south. Likewise, the meagerness of feed grain supplies in the north probably is a strong factor causing proportionally larger numbers of the producer classes to move initially to the local clearing point market outlets where they can be sold to inter- and intra-area buyers.

Combining the area data to secure percentages for the state, it is found that of the 921 stocker and feeder sheep reported sold from the sampled farms, 35 per cent was sold from farm to farm. Forty-six per cent was sold to local clearing point markets. Packing plants took the remaining 2 per cent. Evidently the two main movements are from farm to farm and from farm to dealers, although direct shipments to terminals and sales to concentration yards are also of considerable proportions.

Breeding Sheep. Again it is proper to pay attention to the inadequacies of the sample on which the percentages are based before drawing conclusions in regard to the inter-area importance of the outlets as markets for breeding sheep. Valid conclusions can probably be drawn as follows: (1) larger proportions of breeding sheep were sold to farmers in the two northern areas than in area 1; (2) terminal markets as an initial outlet for breeder sheep were used only in area 1; and (3) auctions were probably of greater importance in area 2 than in other areas.

Table 21. Percentages of breeding sheep sold to alternative markets from 1515 farms, by areas, Michigan, 1940.

Markets	Michigan	Area		
		Area 1	Area 2	Area 3
	Per cent	Per cent	Per cent	Per cent
Terminal markets	9.86	15.80	-----	-----
Concentration yards	.64	1.04	-----	-----
Packing plants	-----	-----	-----	-----
Dealers	2.08	3.33	-----	-----
Local Cooperatives	1.69	1.87	1.68	-----
Auction	4.15	.21	13.03	-----
Farmers	81.58	77.75	85.29	100.00
Totals	100.00	100.00	100.00	100.00
Number of sheep equal to 100 per cent	771	481	238	52

Source: 1515 mail questionnaires.

Combination of the area data to secure state percentages indicating the relative importance of the alternative market outlets resulted in the figures presented in Table 21 above and in Figure 31. Of the 771 breeding sheep reported sold by the sampled farms in the entire state, 82 per cent were sold direct from farm to farm. Local clearing point markets (inclusive of auctions, concentration yards, and dealers) took only 7 per cent, while 11 per cent (probably including some culls) moved to terminal clearing point markets. The small numerical and proportional trade in breeding sheep, the difficulty of judging quality and age in breeding sheep, and their small unit value tend to account for the importance of the farm-to-farm movement in contrast to movement to other market outlets.

Chapter VI

SUMMARY AND CONCLUSIONS

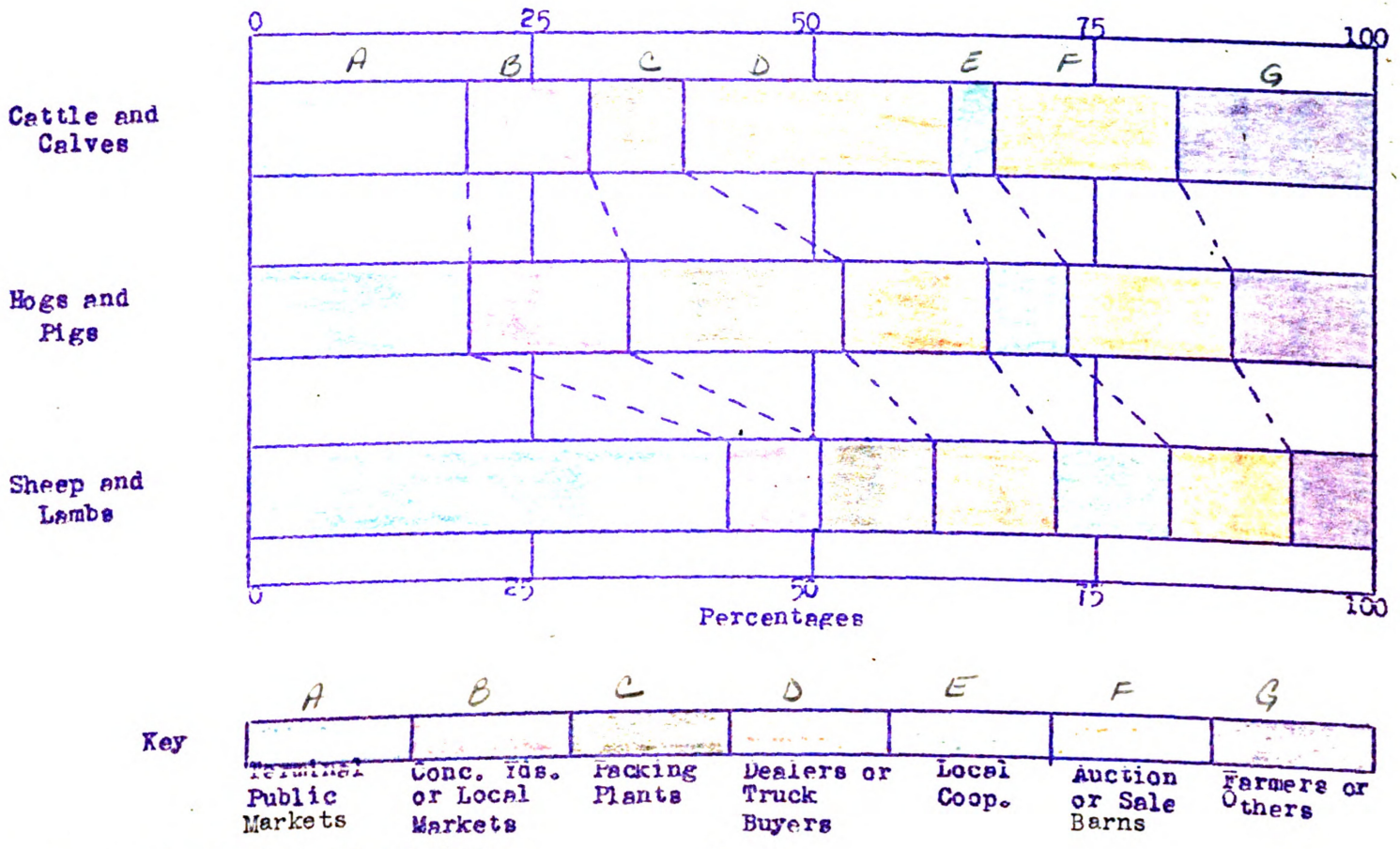
Large inter-area differences in the utilization of initial market outlets for livestock from Michigan farms tend to nullify the value of figures representing the entire state; that is, a more adequate description results from a discussion of utilization by livestock species and areas than from a consideration of state wide figures. It is with this thought in mind that the advantages of very concise summarizations are sacrificed to the extent of offering inter-area differences as explanations of state figures presented in this chapter.

Figure 32 is, in a sense, a statistical summary of the whole study in that it represents a combination of all preceding data showing differences in initial market outlets utilized, by areas, by market classes, and size of producer for the state of Michigan. It should be recalled at this point that two biases exist in the data on which this study is based: (1) the sample contains a disproportionate number of large livestock producing farms, and (2) areas 2 and 3 are overweighted in the sample, especially in the case of hogs and cattle. Thus, in view of these limitations of the data, conclusions as to actual percentage importance will not be advanced in this chapter other than as indicated in the aforementioned figure.

Relative Importance of Different Market Outlets for Different Species. Terminal markets, it will be observed from Figure 32, were of greater importance as an initial market for sheep than for cattle and hogs. The principal explanations of this difference between sheep and the other two species lie in the concentration of sheep feeding in the hands of a relatively few large producers, and the lack of a local slaughter demand for lambs and mutton.

Concentration yards and auctions were of greater importance as initial market outlets for hogs than for either sheep or cattle. In area 1 dealers are of lesser proportional importance for all species, and concentration yards and auctions relatively more important, than in areas 2 and 3. Moreover, in area 1 a greater

Figure 32. Percentages of each species of livestock sold through alternative markets from 1515 farms, Michigan, 1940.



Source: 1515 Mail Questionnairee

proportion of hogs than of cattle are marketed. Hence, it follows as indicated by the data for the state as a whole that proportionally more hogs than cattle will be sold through auctions and concentration yards, since cattle are more evenly distributed throughout the state. Sheep production on the other hand is concentrated in the hands of a relatively few large producers who favor the terminal markets. This fact rules out a comparison of sheep with hogs and cattle on the basis of differences in geographic distribution.

A greater proportion of cattle than of hogs are produced in the northern areas where dealers and truck buyers play a prominent role. Hence, as borne out by the data, dealers constitute a more important outlet for cattle than for other livestock when the state is considered as a whole.

Local cooperatives are of greater importance as an initial market outlet for sellers of sheep than for sellers of hogs and cattle. This may be due in part to the fact that a larger proportion of sheep than of other livestock are slaughtered at terminal points, so that there has been a greater tendency to continue the use of cooperative shipping associations for marketing sheep. Market channels other than direct shipment to terminals and through local cooperatives are of less importance for sheep and lambs than for the other species.

In area 1 a larger proportion of the livestock reported sold to packing plants is sold to the terminal packers at Detroit than in other areas. As a larger proportion of the hogs marketed in Michigan is produced in area 1 than is the case for the other species, packing plants are thus more important for hogs than for other species when the state is considered as a whole; also, lack of local consumer demand for lamb and mutton minimizes the sale of sheep and lambs to local packers.

Farmers or others act as buyers of cattle and calves to a greater extent than in the case of hogs and pigs or sheep and lambs. Several factors affecting farmer purchases of feeder and breeding stock offer plausible explanations of this situation. As proportionally few hogs are needed as a breeding stock foundation, there is a smaller breeding hog trade proportional to all hogs sold than in the case

of cattle. Also, since few farmers produce feeder sheep for sale and since feeder sheep are purchased mainly from out of state breeders, trade in native feeder and breeding sheep is of insignificant proportion.

Factors Influencing Relative Utilization of Initial Market Outlets. Among the general factors influencing the proportional utilization of market outlets are: (1) size of producer, (2) geographic location of the area concerned in respect to terminal markets, (3) species sold, (4) market class sold, (5) relation of total local production to demand of local slaughter markets, (5) available feedstuffs, and (7) population density of each species.

Considerable evidence as to the affect of size of producer on market utilization for slaughter animals has been brought out in this study. In almost all cases where a degree of validity can be ascribed to the sample data it was found that a direct relationship existed between the number of livestock produced per farm and the proportion of slaughter livestock, regardless of species, sold to terminal markets. An inverse relationship exists between the number of livestock produced per farm and the proportion of slaughter livestock sold to local assembling markets.

In general the greater the distance from terminal markets the smaller the proportion of livestock sold direct to terminal markets and the greater the proportion sold to local assembling markets.

The relative importance of the various initial market outlets as associated with the species of livestock sold has been discussed in the preceding section of this chapter.

Slaughter classes of livestock are sold to those markets facilitating movements to the ultimate slaughterer, while producer classes of livestock evidently move into the more complex marketing channels only as supplies exceed the ability of farmers to deal directly with each other.

Large supplies of feedstuffs increase the demand for feeding, breeding, and dairy animals, thus bringing about movements of these animals in such volume as to necessitate the use of the complex marketing channels. Shortage of fattening

feedstuffs or the production of excess supplies of roughages necessitates the use of the complex markets to move excesses of the producer classes of livestock to other areas.

A lack of local demand for the meat of a given species causes greater proportions of the slaughter animals of that species to be sold direct to terminals or through assembling markets rather than to local slaughter markets.

Density of population of a species brings about increased utilization of the more complex marketing channels for all species and market classes.

Position of Terminal Markets as an Initial Outlet. As indicated by this study the seven alternative market outlets, arranged in order of their probable proportional importance, for each species, are as follows:

Cattle	Hogs	Sheep
1. Dealers	1. Terminal Markets	1. Terminal Markets
2. Terminal Markets	2. Packing Plants	2. Dealers
3. Farmers	3. Auctions	3. Auctions
4. Auctions	4. Concentration Yards	4. Local Cooperatives
5. Concentration Yards	5. Dealers	5. Packing Plants
6. Packing Plants	6. Farmers	6. Farmers
7. Local Cooperatives	7. Local Cooperatives	7. Concentration Yards

While the Detroit terminal market occupies a position of major importance as an ultimate market for Michigan livestock, it should not be stated that it is the major initial market. Despite the statewide influence of the Detroit terminal market, quite important movements of livestock do occur whose only connection with the Detroit market is through the price structure. These movements are: (1) movements of slaughter livestock to interior packers and local slaughters; (2) movements of livestock to markets outside of Michigan;[1] and (3) farm to farm and farm to local clearing point movements of the producer classes of livestock.

More important than initial movements of livestock to terminal markets or initial movements to out of state markets is the initial movement of livestock to

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[1] Examples of these markets are Chicago, Ft. Wayne, Toledo, Cincinnati, and Buffalo which serve southern Michigan farmers. Green Bay is another out of state market and is important in the Upper Peninsula.

local agencies such as auctions, concentration yards, dealers, and local cooperatives which act as intermediaries between producer and producer, or between producer and terminals or local slaughterers, depending upon whether the livestock under consideration are producer or slaughter animals.

At this point a reconciliation of the above conclusions regarding the importance of terminal and local market agencies with those drawn by F. A. Voss in his Master's thesis , "Marketing Michigan Livestock,"[2] is in order. On this point the following paragraph may be quoted from Voss' conclusions:

> "In 1937 a representative group of Michigan producers marketed over 70 per cent of their livestock through the terminal market in Detroit. It is apparent from this that this institution serves as the hub of the state's marketing system. Ranking below the terminal market in the proportion of stock handled were the auction markets (7 per cent), the local dealers (7 per cent), the packing houses (6 per cent), and the concentration yards (5 per cent). Least popular were the local butchers and truckers at the farm; the producers contacted in the study selling only 1 to 2 per cent of their livestock through each of these agencies." (Thesis, pp. 100-101).

Examination of the sample on which the above conclusions are based will indicate that the sample is composed primarily of large producers. Thus, in view of the tendency of large producers to sell greater proportions of their livestock directly to terminal markets as revealed in the present study, the above conclusions are very understandable. In this respect the Voss sample was very similar to the sample gathered by the field representative in the 1940 Michigan survey, which because of its bias, was not used in this study.[3]

The above quoted conclusions should be considered as applicable to an undefinable group of larger Michigan livestock producers. Conclusions based on the present study should be considered as applicable to a rather poorly defined group of small medium to large Michigan livestock producers.[4]

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[2] Marketing Michigan Livestock: A Survey of Transportation Trends and Market Outlets," submitted as M. A. thesis, Department of Economics, Michigan State College, 1940.

[3] See above, pp.4,19.

[4] See Chapter 2 as an aid in defining the group of farmers represented in the present study.

Some Methodological Conclusions. A few conclusions of a statistical nature can be drawn from the present study which may be of value to subsequent researchers contemplating sampling of Michigan farms. They may be stated as follows:

1. Random selection of mailing lists from Agricultural Adjustment Administration committeemen or cooperators is a questionable procedure if the object is to secure a sample representative of all farms as to number of livestock sold per year.
2. The upward bias as to number of livestock sold per year found in the combined sample resulting from the above method of sampling was most prominent in the case of cattle and calves. For sheep and lambs the bias was of some importance but not as important as lack of a sufficient number of observations. For hogs and pigs the bias found in the combined samples was insignificant.
3. Samples secured by random selection of mailing lists from AAA committeemen contained an upward bias in relation to samples secured by random selection of mailing lists from AAA cooperators. This bias was most noticeable in the case of sheep, less noticeable in the case of hogs, and insignificant in the case of cattle.
4. The author respectfully refers subsequent researchers who are concerned with securing representative percentages by sampling to Table 4 , page 27.

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APPENDIX A

The questionnaire on page 101 is the questionnaire mailed to the agricultural adjustment administration cooperators and committeemen.

UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Agricultural Economics
in cooperation with
Michigan Agricultural Experiment Station
Agricultural Economics Section
LIVESTOCK MARKETING-FARM SCHEDULE

Name _____ Post Office _____ County _____

Acres operated _____ Acres owned _____ Acres rented from others _____

1. Number of head of livestock SOLD through each of the following in 1940:

Species and class	Terminal public markets	Concentration yards or local markets	Packing plants	Dealers or truck buyers	Local coop. ass'ns	Auctions or sale barns	Farmers or others
	Number	Number	Number	Number	Number	Number	Number
Cattle & calves							
Slaughter							
Veal calves							
Stocker & feeder							
Dairy & breeding							
Hogs & pigs							
Slaughter							
Feeder							
Breeding							
Sheep & lambs							
Slaughter							
Feeder							
Breeding							

2. Number of head of livestock BOUGHT through each of the following in 1940:

Species and class	Terminal public markets	Coop. agencies distributing direct	Concentration yards or local markets	Dealers or truckers	Auctions or sale barns	Farmers or ranchers
	Number	Number	Number	Number	Number	Number
Cattle & calves						
Stocker & feeder						
Dairy & breeding						
Hogs & pigs						
Feeder						
Breeding						
Sheep & lambs						
Feeder						
Breeding						

3. How many times did you sell livestock of each species in 1940?
(a) Cattle _____ (b) Calves _____ (c) Hogs _____ (d) Sheep _____

4. How many times did you buy stocker and feeder livestock of each species in 1940?
(a) Cattle _____ (b) Calves _____ (c) Hogs _____ (d) Sheep _____

5. Of the livestock sold in 1940, how many head were moved from the farm as follows:

	Cattle	Calves	Hogs	Sheep
(a) In your own trucks				
(b) By truckers you hired				
(c) By the buyer				
(d)				

6. What do you consider to be your most important problem when marketing livestock?

_____

_____

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APPENDIX B

Supplementary Tables

Table **B I** . Percentage of Livestock sold through various Types of Outlets by 956 Farmers in Area 1, Classified by Species and Classes, 1940.

Species and class	Terminal public markets	Concentration yards or local markets	Packing plants	Dealers or truck buyers	Local coop. ass'ns.	Auctions or sale barns	Farmers or others	Number of livestock equal to 100 per cent
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Number
Cattle & calves								
Slaughter	32.92	9.17	12.51	21.81	3.05	14.22	6.32	3150
Veal calves	18.26	17.73	9.79	15.92	5.85	21.04	6.41	3199
Stocker & feeder	14.53	10.31	5.01	11.45	.37	10.28	47.25	1397
Dairy & sundries	11.69	2.14	4.10	14.90	1.60	9.89	56.69	1122
Hogs & pigs								
Slaughter	24.75	15.35	28.28	15.67	2.30	12.51	2.43	10362
Feeder	7.51	10.13	14.06	7.86	3.59	16.37	37.98	1985
Breeding	3.72	8.78	3.44	11.07	.76	6.11	64.12	262
Sheep & lambs								
Slaughter	46.11	3.35	7.17	14.82	10.94	11.40	.98	11650
Feeder	14.99	3.83	3.06	20.35	3.97	6.73	39.88	687
Breeding	15.80	1.04		3.33	1.87	.21	77.75	481

Source: 1515 mail questionnaires.

Table **B II.** Percentage of Livestock sold through various Types of Outlets by Farmers in Area 2, Classified by Species and Classes, 1940.

Species and class	Terminal public markets	Concentration yards or local markets	Packing plants	Dealers or truck buyers	Local coop. ass'ns.	Auctions or sale barns	Farmers or others	Number of livestock equal to 100 per cent
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Number
Cattle & calves								
Slaughter	11.74	6.17	9.62	38.06	4.55	23.28	6.78	988
Veal calves	12.25	12.69	5.72	25.62	8.09	30.90	4.72	890
Stocker & feeder	6.77	5.23	3.95	39.08	2.07	18.46	23.54	650
Dairy & breeding	4.50	[illegible]	1.61	31.51	1.07	10.54	47.74	465
Hogs & pigs								
Slaughter	14.00	15.57	8.36	18.29	6.06	26.17	11.55	1914
Feeder	2.66	2.66	3.23	9.6[illegible]	2.[illegible]2	22.86	55.24	713
Breeding	4.00	16.00	.00	14.67	.00	33.33	32.00	75
Sheep & lambs								
Slaughter	38.75	1.79	2.[illegible]6	[illegible].69	14.19	11.06	.96	1564
Feeder	3.19	29.26	.00	26.00	.00	23.94	18.62	188
Breeding	.00	.00	.00		1.68	13.02	85.29	238

Table **B III**. Percentages of Livestock sold through various Types of Outlets by 140 Farmers in Area 6, Classified by Species and Classes, 1940.

Species and class	Terminal public markets	Concentration yards or local markets	Packing plants	Dealers or truck buyers	Local coop. ass'ns.	Auctions or sale barns	Farmers or others	Number of livestock equal to 100 per cent
	per cent	per cent	per cent	per cent	per cent	per cent	per cent	Number
Cattle & calves								
Slaughter	13.55	9.65	21.13	44.97	6.87	.21	3.90	487
Veal calves	12.80	13.40	11.37	31.81	11.90	.44	16.27	461
Stocker & feeder	.68	12.82	2.04	61.22	8.84		14.97	147
Dairy & breeding	30.97	1.09	2.17	39.18	2.72	2.72	16.30	184
Hogs & Pigs								
Slaughter	7.63	30.11	23.14	13.74	13.38		8.02	262
Feeder				3.14			96.86	159
Breeding							100.00	11
Sheep & Lambs								
Slaughter	17.43	71.36		6.42			4.59	109
Feeder	19.57			60.86			19.57	46
Breeding							100.00	52

Source: 1941 mail questionnaires.

Table **B IV**. Percentage of Livestock sold through various Types of Outlets by 1515 farmers in Michigan, classified by Species and Classes, 1940.

Species and class	Terminal public markets	Concentration yards or local markets	Packing plants	Dealers or truck buyers	Local coop. ass'ns.	Auctions or sale barns	Farmers or others	Number of livestock equal to 100 per cent
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Number
Cattle & calves								
Slaughter	26.36	8.58	12.80	27.72	3.70	14.68	6.16	4625
Veal calves	19.35	16.52	9.14	20.14	6.90	20.88	7.08	4549
Stocker & feeder	11.30	8.93	4.47	22.97	1.87	12.40	38.06	2194
Dairy & breeding	12.25	2.32	3.22	21.17	1.58	9.32	50.14	1771
Total								13139
Hogs & pigs								
Slaughter	22.76	15.80	20.98	14.37	7.82	14.33	3.94	12538
Feeder	6.09	7.70	10.57	8.09	4.52	17.22	45.81	2857
Breeding	5.17	10.66	2.59	11.49	.57	11.78	58.34	348
Total								15743
Sheep & lambs								
Slaughter	46.76	8.30	6.57	14.86	11.23	11.27	1.01	13323
Feeder	12.81	12.60	2.28	23.45	4.45	9.88	34.53	921
Breeding	9.86	.64		2.08	1.69	4.15	81.58	771
Total								15015

Source: 1515 mail questionnaires.

Table **B V**. Percentages of Slaughter Livestock sold through each Type of Outlet in Area 1, Classified by number sold per Farm for each Species, 1940.

Species and class	Number of farms	Terminal public markets	Concentration yards or local markets	Packing plants	Dealers or truck buyers	Local coop. ass'ns.	Auctions or sale barns	Farmers or others	Number of live-stock equal to 100 per cent
	Number	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Number
attle & calves									
0 - 4	755	18.12	15.61	10.40	31.71	3.69	15.60	4.87	596
5 -19	179	25.04	9.66	17.24	21.40	3.93	17.52	5.21	1729
Over 19	22	60.12	3.52	4.12	15.51	.73	6.30	9.70	825
Total	956								3150
ogs & pigs									
0 - 9	632	16.79	16.15	14.63	21.15	2.44	14.61	14.23	780
0 -59	300	25.38	14.08	23.92	15.58	7.03	12.56	1.45	7451
ver 59	24	25.53	19.52	24.22	4.52	15.42	11.54	1.55	2131
Total	956								10362
heep & lambs									
0 -19	837	28.67	19.95	4.51	24.60	8.15	10.92	3.20	687
0 -99	97	34.53	11.33	9.68	14.67	14.48	13.02	2.29	4069
ver 99	22	58.06	3.83	3.95	10.55	9.12	10.49		6894
Total	956								11650

Source: 1515 mail questionnaires.

Table **B VI.** Percentages of Slaughter Livestock sold through each type of Outlet in Area 2, Classified by number sold per Farm for each species, 1940.

Species and class	Number of farms	Terminal public markets	Concentration yards or local markets	Packing plants	Dealers or truck buyers	Local coop. ass'ns.	Auctions or sale barns	Farmers or others	Number of livestock equal to 100 per cent
	Number	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Number
Cattle & calves									
0- 4	352	8.99	8.71	1.12	46.62	1.97	21.35	11.24	356
5-19	64	16.12	5.76	5.95	34.36	3.65	29.56	4.60	521
Over 19	3			54.05	27.93	15.32		2.70	111
Total	419								988
Hogs & pigs									
0- 9	341	15.61	9.06	5.97	28.52	1.54	22.74	16.57	519
10-59	78	13.41	17.99	9.25	14.48	7.74	27.46	9.68	1395
Over 59	0	None reported for this class							
Total	419								1914
Sheep & lambs									
0-19	394	18.79	9.40		41.94	9.40	17.45	3.02	298
20-99	22	29.74			43.99	11.15	14.99	.13	807
Over 99	3	67.54		8.71		22.66		1.09	459
Total	419								1564

Source: 1515 mail questionnaires.

Table **B VII.** Percentages of Slaughter Livestock sold through each type of Outlet in Area 3, Classified by number sold per Farm for each Species, 1940.

Species and class	Number of farms	Terminal public markets	Concentration yards or local markets	Packing plants	Dealers or truck buyers	Local coop. ass'ns.	Auctions or sale barns	Farmers or others	Number of livestock equal to 100 per cent
	Number	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Number
Cattle & calves									
0 -4	122	4.72	11.81	29.14	41.73	9.45	.79	2.36	127
5-19	15	25.81		3.87	38.71	10.32		1.29	155
Over 19	3	9.76	15.61	29.27	36.58	1.95		6.83	205
Total	140								487
Hogs & pigs									
0-9	135	16.46	26.58	5.06	12.66	12.66		26.58	79
10-59	4	8.43	25.30	4.82	31.33	30.12			83
Over 59	1		50.00	50.00					100
Total	140								262
Sheep & lambs									
0-19	139	36.84			36.84			26.32	19
20-99	1	13.33	86.67						90
Over 99	0	None reported for this class							
Total	140								109

Source: 1515 mail questionnaires.

Table **B VIII.** Percentage of Slaughter Livestock sold through each Type of Outlet, classified by number Sold per Farm for each Species, Michigan, 1940.

Species and class	Number of farms	Terminal public markets	Concentration yards or local markets	Packing plants	Dealers or truck buyers	Local coop. ass'ns.	Auctions or sale barns	Farmers or others	Number of live-stock equal to 100 per cent
	Number	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Number
ttle and calves									
- 4	1229	13.53	12.88	9.55	37.81	3.30	15.76	6.67	1079
-19	258	23.16	8.17	13.93	26.61	4.28	19.01	4.82	2405
ver 19	28	45.22	5.35	13.50	20.50	2.37	4.56	8.50	1141
Total	1515								4625
gs and pigs									
- 9	1108	16.33	14.08	10.81	23.44	2.68	16.84	15.82	1378
-59	382	23.35	14.79	21.45	15.56	7.36	14.77	2.72	8929
er 59	25	24.38	20.89	25.37	4.03	12.82	11.03	1.48	2231
Total	1515								12538
eep and lambs									
-19	1369	25.90	16.43	3.09	29.98	8.36	12.65	3.59	1004
-99	121	33.37	10.85	7.93	19.17	13.67	13.11	1.90	4966
er 99	25	38.66	5.47	6.12	9.88	9.96	9.84	.07	7353
Total	1515								13323

Source: 1515 mail questionnaires.