AN ANALYSIS OF FARM TYPE CLASSIFICATION SYSTEMS

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The undersigned, appointed by the Dean of the Graduate Faculty, have examined a thesis entitled

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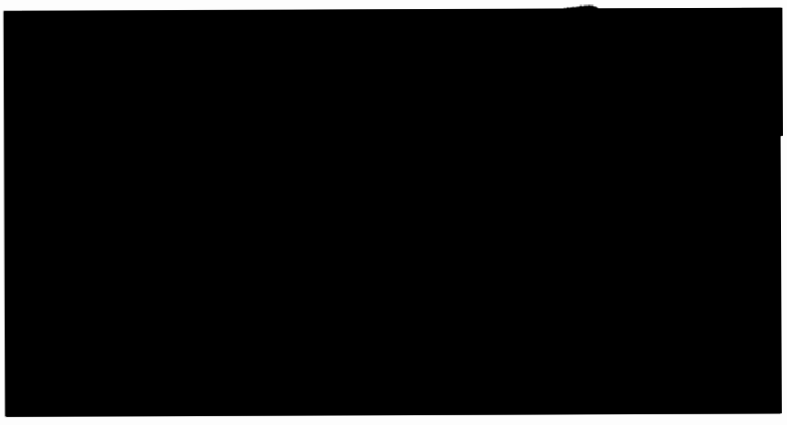

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CHAPTER I

INTRODUCTION

Several land grant universities have programs in operation to analyze farm records. The analysis results are used by farm firms as organizational guides and as a tool to locate strong and weak parts of the firm's business. Segregation of the records into similar groups provides the basis for explaining agricultural structure useful to legislators, administrators and farm leaders. Thus, the usefulness of the results of any program is a function of the system used for classifying the farms by type.

The criteria for typing farms vary greatly among university programs. Also, the method of grouping a set of farm records into subsets differs greatly. Additionally, criteria used by the U.S. Census for typing farms differs from the states' criteria. Complications exist when comparability is attempted among university criteria, Census criteria and U.S.D.A. programs such as "Costs and Returns on Commercial Farms". "Costs and Returns on Commercial Farms" are not actual farms but are farms constructed from: (1) the U.S. Census of Agriculture, (2) rural carrier and mailed questionnaire sent to farmers by the Agricultural Estimates Division, SRS, (3) enumerative field survey and (4) results of research and related data from state experiment stations and federal agencies when group data meet the specifications for

farms by types, size and location.[1] A closely related variation involves aggregate use of farm data in constructing national income accounts by the U.S. Department of Commerce.

Various systems of classifications attempt to stratify the sets of records into homogeneous subsets which are then analyzed. The stratification process consists of classifying the records by type, location and various notions of income or sales. Additionally, various schemes group farms by size, represented by sales, labor inputs, value added, acres or other indicators.

Almost 30 years ago Benedict and others pointed out the need for classification:[2]

> "What is particularly needed is a segregation of farms into a few simple, distinct and clearly recognizable classes, and a tabulation for each of these classes of data as are needed for recognizing and understanding the problems related to them. The classifications should be clear to both lay and technical users as well as farm leaders, legislators and administrators."

The criteria should reflect differences in interests, characteristics, and behavior under varying conditions.[3] Clear cut lines do not exist between groups of farms. Standards for homogeneity of groups, then, must be chosen somewhat arbitrarily. Comparability of the results of farm record analysis from various land grant university programs becomes difficult, if not impossible. This situation arises due to non-uniform definitions, criteria and systems used to classify farms by type

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[1] Wylie D. Goodsell and Isabel Jenkins, Costs and Returns on Commercial Farms, Long-Term Study, 1954-63, Statistical Bulletin No. 368, Economic Research Service, USDA (Washington, D.C.: U.S. Government Printing Office, March, 1966), p. 3.

[2] M. R. Benedict and others, "Need for a New Classification of Farms," Journal of Farm Economics, XXVI, No. 4 (November, 1944), 695.

[3] Ibid.

and sort into similar groups or subsets from a larger sample or set. A similar situation exists when comparing subsets of farms typed by 'a' state system to those typed by Census criteria.

OBJECTIVES

The situation described sets the stage for isolating certain facets of record programs which must be identified in order to determine the programs' effectiveness to firms and institutions. Specific objectives of the study were:

1. To identify and isolate the various criteria used in the North Central Region to classify farms by type.[4]
2. To determine the different systems used to group sets of farm records into subsets of a similar nature.
3. To demonstrate the divergence in the composition of the subsets due to the application of the various definitions, criteria, and systems identified in the North Central Region.[5]
4. To analyze the results of a typical 'year-end' business analysis in order to enumerate forthcoming differences concerning firm and aggregate recommendations resulting from the analysis.
5. To point out strong and weak parts of the various systems.
6. To determine areas of future studies.
7. To suggest a method which segregates the farms into simple, distinct and recognizable types as well as provides identifying

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[4]The North Central Region, as used in this study, includes North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa, Illinois, Wisconsin, Missouri, Indiana, Michigan and Ohio. Kentucky was also included as its criterion was very similar to Illinois. The specific states selected for this study were those representative of the systems currently used in the North Central Region.

[5]The Census System of classification was included as part of the study because of its wide use in agricultural studies.

measures for grouping the farms into recognizable subsets.

METHOD

A basic set of 403 farm records from the Missouri Mail-In Record project for the 1970 year was utilized for the analysis. The Missouri program typed the individual farms and stratified the basic set into subsets according to type.

Computer programs were written to type each farm in the basic set and group the farms into subsets according to type for each of the representative systems other than the Missouri System. The unique criteria of each system provided subsets which varied from those produced by the Missouri System. Thus, the retyping provided the framework for enumerating the difference in the subsets due to varying criteria and definitions used by the different systems.

The subsets generated by the various systems provided the grouping necessary for a 'year-end' analysis. The analysis applied to the subsets was the computerized program currently used by the Missouri project. The analysis was completed for five types which were common to the systems included in the study. The 'year-end' analysis of the subsets provided the guidelines for presenting the differing implications, due to the varying criteria and definitions, being utilized by the state universities and the United States Census classification systems.

The remaining chapters refer to specific states to identify the systems used by the respective land grant universities. The basic set of farms are actual farm records from the Missouri Mail-In Record project. When the basic set is retyped by 'a' university system, it is denoted by the state name or alternately the state system. The retyping

accomplished by the Census system is denoted by Census or the Census system. Thus, the caveat is that the records were Missouri farms which utilized a system other than the Missouri system to classify the basic set by type and group into subsets by the respective systems.

CHAPTER II

A SELECTED REVIEW OF LITERATURE CONCERNING CLASSIFICATION SYSTEMS AND RELATED IMPLICATIONS

United States agriculture is exceedingly heterogeneous. The purpose of classifying farms by type is to show: the kinds of farms in various locations, variation in the use of resources, combinations of resources, production, and characteristics of organization.[1] It is evident that an ideal approach would call for a great number of classes of farms.[2] Some sort of compromise must be made between the highly detailed and the very broad classifications which are generally used.[3]

Production economists who focus their attention on agriculture are concerned with choice and decision-making in the use of capital, labor, land and management resources in the farming industry.[4] The goals of production economics are twofold: (1) to provide guidance to individual farmers in using their resources most efficiently, and (2) to facilitate the most efficient use of resources from the standpoint of the consuming economy.[5] Concerning efficiency, Johnson indicates

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[1] Early classification studies include type tabulation by W. J. Spillman and the comprehensive tabulation worked out by F. F. Elliott in connection with the 1930 Census and published in the monograph, "Types of Farming in the United States," (Bureau of the Census, 1933).

[2] Benedict and others, op. cit., p. 698.

[3] Ibid.

[4] Earl O. Heady, Economics of Agricultural Production and Resource Use (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1952), p. 3.

[5] Ibid.

"the first step is to study the way in which resources in agriculture are employed."[6] Stratification by type and possibly within types is necessary for meaningful economic research and adequate description. "All farm" averages without stratification prohibit analysis which is meaningful to the firms or to aggregate use in the framework suggested by Heady. Inroads have been made to achieve 'adequate' stratifications according to type by many land grant record programs. However, the following discussion of systems in use in the North Central Region and the Census system will point out the disparities in effective comparisons among systems. Possibly more important, farm management recommendations and policy implications will differ because the subsets for each type are composed of different farms due to the typing criteria.

Systems used by land grant universities, in the North Central Region, to classify farm records by type fall into four general categories.[7]

(1) Productive Man Work Units

Missouri and Kansas use this general system of classification. However, the two states differ in at least two respects. First, the two states differ in the factors used to arrive at productive man work units. Productive man work units are defined as the amount of work required by a farm, assuming that usual farm tasks are performed and that average conditions prevail. A productive man work unit is the amount

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[6] D. Gale Johnson, "Contribution of Price Policy to the Income and Resource Problems in Agriculture," Journal of Farm Economics, XXVI, No. 4, November, 1944, p. 630.

[7] See Appendix I for a discussion of definitions and specific questions asked the computer in order to meet each state's criteria. Appendix I also contains specific reference for criteria used by the systems included in the analysis.

of work a man will accomplish under average farm conditions at usual farm tasks in a ten-hour day.[8] Thus, each enterprise has a physical measure such as number of acres or head multiplied by a factor which results in the time required to accomplish the enterprise for the productive period.

The second major difference results from different percentage requirements for a farm to be classified as a particular type. Specific livestock farms are an example. Missouri livestock farms are those farms having less than 33 percent of total farm productive man work units in grain and cash crops and 50 percent or more of productive man work units devoted to any one animal enterprise.

Kansas requirements entail less than 33 percent of total farm productive man work units in any enterprise other than the specific livestock type under question. More than 33 percent (rather than 50 percent) of the total productive man work units devoted to that enterprise are needed to type the farm a specific livestock farm. Other types than livestock have similar percentage differences when considering Missouri and Kansas systems.

(2) Value of Farm Produced Feed Fed to Livestock

Illinois is the state in the North Central Region using this system. The analysis investigated the Kentucky system since it is basically the same as Illinois. If more than one-half the value of crops produced is sold directly rather than marketed through livestock, the farm was classified a grain farm. Livestock farms are those feeding more than one-half the value of crops produced. Specific livestock types were determined

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[8]Emery N. Castle and Manning H. Becker, Farm Business Management: The Decision-Making Process (New York, London: The MacMillan Co., 1962), p. 104.

by the proportion of feed fed to a specific livestock class to the total feed fed.

(3) Value of Production

This system of classification is used by several states. It is closely related to the Census method. However, the Census uses cash sales rather than "value" produced. Michigan, Wisconsin and Nebraska systems are representative of this method of classification. These state systems were chosen because of disparities shown in definitions of terms and varying percentage requirements necessary for a farm to be a specific type. Definitions of Value of Production and Total Farm Production for each of the three states are presented in Appendix I. Chapter IV will be devoted to an analysis of the differences due to definitions alone. (That is, a standard percent was applied to all three states which resulted in differences in the subsets attributed to only the one variable.)

'Value added' is a concept often used to attempt to evaluate farm production. Thus, feed fed or feed purchased is a major adjustment used by the systems to arrive at value of production. The adjustment process is handled differently by the three systems. The implications of this adjustment will be emphasized in Chapter IV.

(4) Hybrid

For lack of a short descriptive name, the fourth general system of type classification will be labeled "hybrid". This is the criteria used by Iowa. Iowa classifies farms by type initially on percentage feed fed as discussed under number (2) to differentiate between livestock and grain farms.

Specific livestock types are then determined by the value of the specific livestock enterprise as a percent of total value of all livestock

produced. Thus, the Iowa system is similar to parts of 'Feed Fed' and 'Value of Production'.

CENSUS

The Census system of classifying commercial farms appears similar to the Value of Production system. Terminology, however, warranted a special category. Livestock and grain farms are separated into their types by percent sales. Sales are cash receipts, except in some cases where the product is "on hand" and is expected to be marketed during the year in question. Expected receipts are then included in sales. The classification of Census farms, by type, was made on the basis of the relationship of the value of sales from one source, or a number of sources in the case of dairy and similar multiple related products, to the total value of all products sold from the farm.[9] The value from a particular source must represent 50 percent or more to be classified a type.

Value of sales, as computed for the Census, does not represent the gross income of farm operators. The principle omissions are non-farm income, government payments, rental income and changes in the values of farm inventories of crops, livestock, and equipment.

Commercial farms, comprise those farms (except abnormal farms) with: (1) a total value of sales of farm products of $2,500 or more plus (2) those with a total value of sales of $50 to $2,499 provided the operator of the farm was under 65 years of age, and worked off the

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[9]U.S. Department of Commerce, Bureau of the Census, "Value of Farm Products Sold and Economic Class of Farm," The 1964 U.S. Census of Agriculture, Vol. II, Chap. 6 (Washington D.C.: U.S. Government Printing Office, 1966), p. 593.

farm less than 100 days during the year.[10] The basic set of 403 farm records used in the study all qualified as commercial by value of sales over $2,500.

Early classifications in the Census were by size, by tenure, by race, and by a few other categories, and were designed to present an overall picture of the nation's agriculture. "In these first efforts at classification, there was no very definite thought of adopting the data to specific end uses."[11] The original purpose was a count of people for apportionment of Congressional representation. Further, it was pointed out that a discussion of classifications raises the question as to the 'basis' for classifications.[12] Size is one approach.

Problems arise concerning the measures of size. Gross value of product has been widely used as one measure. In general, it reflects the physical resources and productivity of the farm. Limitations include: years of crop failure, expanding or contracting farms, farms on which a considerable part of the products sold is represented by purchased items, and varying farm prices. Any one of these limitations may cause a farm to be typed differently from one period of time to another.

Acres is one of many size measures. Acre limitations are obvious, due to the heterogeneous nature of products produced and the inherent productivity of land. For example, a 160 acre farm in Iowa represents

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[10] Idem., "Type of Farm," The 1964 U.S. Census of Agriculture, Vol. II, Chap. 10 (Washington, D.C.: U.S. Government Printing Office, 1968), p. 961.

[11] Benedict and others, op. cit., p. 694.

[12] Ibid.

a vastly different situation from a 160 acre farm in western Kansas.[13] In the south, the measure of farm operations frequently was the number of mules used.[14]

Single input factors are frequently used as number of mules or the number of cows. Labor input is used as a measure of size by either the number of workers or a calculation of Productive Man Work Units (PMWU). Total investment managed is another measure of size used to classify farms. "The true equivalent of size is capacity, and capacity is measured in inputs and not outputs. Output reflects efficiency as well as capacity."[15] A true measure of size calls for using all the inputs and reducing them to an annual-cost basis.[16]

A type-of-farming area can be defined as all the territory within which a particular product or combination of products is found on most of the farms; or within which the same systems or types of farming are intermingled.[17] Applying the definition by Black and others to a single farm results in 'a type farm' as one within a group of farms producing similar products. Likewise a set of farms may be classified as a specific type if they produce similar products.

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[13]K. L. Bachman and others, "Appraisal of the Economic Classification of Farms," Journal of Farm Economics, XXX, No. 4, November, 1948, p. 688.

[14]U.S. Department of Commerce and U.S. Department of Agriculture, "Analysis of Specified Farm Characteristics For Farms Classified by Total Value of Products," Technical Monograph (Washington D.C.: U.S. Government Printing Office, 1943), p. 3.

[15]John D. Black and others, Farm Management (New York: The MacMillan Co., 1947), p. 434.

[16]Benedict and others agreed with Black and associates that inputs would be the most satisfactory classification system if this could be handled on a practical basis.

[17]Bachman and others, op. cit., p. 134.

Bachman et al. suggest the purpose of a classification system is to "segregate groups of farms that are somewhat alike in their characteristics and have similar problems". Thus, some measure of size is relevant to classifying farms by type and this becomes apparent when considering system and criteria. Iowa, for example, has minimum head requirements for dairy farms.[18] Michigan has specialized and general farms.[19] The Kansas requirements for stock-ranches are five acres of grass to each acre of cropland. If the 'ideal', as suggested by several authors, of typing by inputs is to be achieved a synthesis of size indicators and enterprise identification becomes a necessity.

Types of farming may be defined in many ways, depending upon the contrast in mind.[20] Warren pointed out that type may be defined as to its diversity or specialty and that source of income may be one way to arrive at type. Labor intensity may also be the point of emphasis.

From the preceding discussion, it can be seen that there are so many factors involved that consideration cannot be given to all the conflicting forces concerning type.[21] The factors to be considered in

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[18] E. G. Stoneberg, Costs and Returns on Iowa Farms - 1969, Report for the Iowa Agricultural Experiment Station, Proj. No. 111 (Ames, Iowa: Iowa State University of Science and Technology, Cooperative Extension Service, November, 1970), pp. 8-9. The percentages used were those used in Iowa for 1968. Iowa increased their percentage necessary for a farm to meet specific type classification in 1970 (for 1969 records) according to correspondence from E. G. Stoneberg, Extension Economist, Cooperative Extension Service, Iowa State University, Ames, Iowa, July 7, 1971.

[19] Ralph E. Hepp and L. H. Brown, Dairy - General Farming Today in Southern Michigan, 1969, Agricultural Economics Report, No. 176, August, 1970. TelFarm Business Analysis Summary for Southern Dairy General, 1969 (East Lansing, Mich.: Department of Agricultural Economics, Michigan State University, August, 1970), and letter from Myron P. Kelsey, Extension Specialist in Agricultural Economics, June 21, 1971.

[20] G. F. Warren, Farm Management (New York: The MacMillan Co., 1919), p. 43.

[21] Ibid., p. 101.

'modern' agriculture have increased since Warren's writings due, in part, to mechanization, technology and increased physical size.

Costs and Returns on Commercial Farms published by the Economic Research Service, U.S. Department of Agriculture, is a widely-used series concerning U.S. agriculture. The series began in 1930 for some farm types.[22] As indicated earlier, this series should not be construed as actual farm data but is designed to represent typical farms within a type. However, the background data are of a real nature and types are constructed to reflect a major product in terms of income.[23] Physical criteria concerning minimum acres and head are also considered.[24] Specific requirements are not rigidly established concerning the percentage income from a major product for a farm to be included in a class. Typing large numbers of farm records by computer requires rigid specifications concerning the factors upon which the type is determined.

A concluding note on review of the literature concerns the magnitude of detail necessary to arrive at logical conclusions for individual farm firm organizations and adequate answers to aggregate farm policy problems.

To the question, "Is too much time spent in developing and refining input-output data for use in farm management?", the answer must be

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[22]Wylie D. Goodsell and others, Costs and Returns on Commercial Farms, Long-Term Study, 1930-57, Statistical Bulletin No. 297, Economic Research Service, USDA (Washington, D.C.: U.S. Government Printing Office, 1958), p. 1.

[23]Telephone conversation with Wylie Goodsell, Leader, Type of Farm Analysis Group, Production Adjustments Branch, FPED, Economic Research Service, USDA, Washington, D.C., July, 1971.

[24]Idem.

a qualified yes.[25] The question is somewhat different when considering classification of farms according to type. The question then relates to disparity in systems and criteria. Standardization of definitions and criteria are necessary to get comparable data for analysis. In this case, the time spent in developing and refining may not be 'too much'.

The problem of defining like-behaving groups of farms offers real challenges because the definition varies with the particular problem studies. Which farms belong in a specific group depends on the types of characteristics of the firm and kinds of economic forces which are important to the particular problem.[26]

This study emphasizes methods of stratifying basic data records into useful, homogeneous sets so recommendations and description of structure will not be averages of unlikes.

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[25]Robert M. Finley, Larry N. Langemeier, and Carrol L. Kirtley, Effects of Varying Management Levels of Crops and Livestock on Optimal Farm Organizations, Research Bulletin 866, University of Missouri (Columbia, Mo.: University of Missouri College of Agriculture and Agricultural Experiment Station, July, 1964), p. 51.

[26]George D. Irwin and Joseph Havlicek, Jr., "Tailoring Farm Account Projects to Answer Aggregate Questions," Journal of Farm Economics, 48, No. 5, December, 1966, p. 1624.

CHAPTER III

THE APPLICATION OF TYPE CLASSIFICATION SYSTEMS TO THE BASIC SET OF 403 MISSOURI MAIL-IN RECORDS

The objective stated in the Introduction forms the basis for a specific hypothesis applicable to the method of analysis discussed in this chapter. The specific hypothesis was:

> Varying criteria will result in different subsets due to: a) criteria alone and b) definitional differences even though the verbal criteria appear similar.

Criteria refer to different methods of typing, as discussed in Chapter II and presented in more detail in Appendix I. Thus, the concern is with dividing the basic set of farms into subsets, using percentages which differ. Additionally, the division utilizes feed fed, some form of value of production, or productive man work units according to which system is considered. Definitive differences refer to items which had the same verbalization but different meanings for the various systems.

As discussed in Chapter II, four general methods of typing farms were used by the states in the North Central Region in addition to the Census method. An examination of Appendix I shows that, in addition to the variations in the general methods, there were also differences among states using the same general method. The differences result from differing percentages used to make the divisions as well as differing methods of arriving at the basic factors for typing the basic set into subsets. Therefore, it was necessary to analyze seven systems in addition to the Missouri system in order to reflect the representative

systems in use in the North Central Region and the Census. Each of the 403 farms was typed by the Missouri program and grouped according to the respective types. Computer programs were written typing the farms according to the seven systems other than Missouri.

Table 1 will be used throughout the remainder of this study as a reference for the numeric indicator of farm type. The discussion will refer to General Farms as type 0, Grain Farms as type 1, etc. Types 1 through 9 were directly derived for each of the systems. Type 0 was a residual for those farms not meeting the criteria for other classifications.

TABLE 1

NUMERIC REFERENCE FOR THE VERBAL DESCRIPTION OF FARM TYPES (SUBSETS)

Farm Types (Subsets)	Numeric Reference
General Farms	0
Grain Farms	1
Grain-Hog Farms	2
Hog Farms	3
Grain-Beef Farms	4
Beef Farms	5
Grain-Dairy Farms	6
Dairy Farms	7
General Livestock Farms	8
Poultry Farms	9

The Missouri system of classification was the foundation for discussing the composition of the subsets generated by the other systems of classification. The procedure was to compare each system with the foundation set. The basic set of 403 farms showed dramatic movement from type to type when each system of classification was applied to the basic set. Table 2 validates the point that the subsets generated varies according

TABLE 2

TYPE CHANGE FOR 403 MISSOURI, 1970 MAIL-IN RECORD, FARMS DUE TO VARIOUS SYSTEMS OF CLASSIFICATION[a]

Change		Farm Type 0	1	2	3	4	5	6	7	8	9	Total
Missouri Type		100	78	39	29	31	21	0	99	4	2	403
Kansas:	Enter	0	55	39	34	19	1	22	1	5	(0)	176
	Leave	97	6	7	5	20	17	0	18	4	(2)	176
	Type	3	127	71	58	30	5	22	82	5	(0)	403
Iowa:	Enter	24	32	(0)	55	(0)	24	(0)	4	(0)	(0)	139
	Leave	40	12	(39)	1	(31)	4	(0)	6	(4)	(2)	139
	Type	84	98	(0)	83	(0)	41	(0)	97	(0)	(0)	403
Ill & Ky:	Enter	9	27	(0)	98	(0)	43	(0)	3	(0)	4	184
	Leave	86	15	(39)	1	(31)	5	(0)	3	(4)	0	184
	Type	23	90	(0)	126	(0)	59	(0)	99	(0)	6	403
Census:	Enter	0	20	(0)	0	(0)	0	(0)	3	223	1	247
	Leave	100	22	(39)	29	(31)	21	(0)	4	0	1	247
	Type	0	76	(0)	0	(0)	0	(0)	98	227	2	403
Mich:	Enter	162	1	(0)	16	(0)	34	(0)	0	(0)	(0)	213
	Leave	2	70	(39)	21	(31)	14	(0)	30	(4)	(2)	213
	Type	260	9	(0)	24	(0)	41	(0)	69	(0)	(0)	403
Wisc:	Enter	55	25	(0)	35	(0)	14	(0)	1	(0)	(0)	130
	Leave	29	13	(39)	2	(31)	3	(0)	7	(4)	(2)	130
	Type	126	90	(0)	62	(0)	32	(0)	93	(0)	(0)	403
Neb:	Enter	41	12	(0)	54	(0)	25	(0)	2	(0)	(0)	134
	Leave	35	18	(39)	0	(31)	2	(0)	3	(4)	(2)	134
	Type	106	72	(0)	83	(0)	44	(0)	98	(0)	(0)	403

[a]Type 0 is for those farms not meeting the criteria for other types.

Parenthesis ( ) indicates types not classified for systems other than Missouri.

to the criteria used by each system of classification.

The material in the remainder of this chapter deals with the reasons behind the shifts to the various subsets. Each system was considered individually and then viewed collectively.

KANSAS

As noted in Table 2, 176 farms changed type within the basic set when Kansas criterion was applied to the basic set. The Kansas system was similar to the Missouri system in that verbal criterion (productive man work units) was the same. The movement of the 176 farms as shown in Table 2 was attributed to two causes. The first cause concerns the factor used by the states to generate the productive man work units. That is, each state uses a different factor to multiply by acres or head to arrive at the productive man work units. Table 3 illustrates these differences. Minnesota was not included in the overall analysis since Minnesota does not type farms by productive man work units. However, the factors used to arrive at productive man work units were available and presented in Table 3 to illustrate the different productive man work units generated by varying only the factors. The physical measurements of acres, crops and head of livestock were the same for Missouri, Kansas and Minnesota as the set of 403 farms were common to each.

The second underlying reason for different composition of the subsets generated by the Kansas and Missouri system was attributed to the percentages used to segregate the individual farms into the subsets. The percentage breakdown is detailed in the Appendix and a description of the method was contained in Chapter II. The major result of relaxing percentage requirements from Missouri to Kansas was the movement of farms into specific types such as grain, hogs, beef, dairy and the exit of general farms.

TABLE 3

PRODUCTIVE MAN WORK UNIT DIFFERENCES GENERATED BY APPLYING VARYING PRODUCTIVE MAN WORK UNIT FACTORS TO A BASIC SET OF 403 FARMS[a]

	Missouri	Kansas	Minnesota
Livestock PMWU	296	372	258
Crop PMWU	430	270	211
Total PMWU	726	642	469

[a]For the factors used to generate the productive man work units, see Appendix I.

Application methods used by the Kansas system have substantiated the hypothesis that the criteria used will result in different subsets of farms from an original basic set, such as the 403 Missouri Mail-In Record farms used in the study. Table 4 indicates the specific movement of the 176 farms into different subsets. As stated previously, the largest exodus from the Missouri classification was from general farm type with entry occurring in all types that were classified by the Kansas system. However, the largest entries were into types 1, 2 and 3. The results were somewhat surprising for the grain-beef farms, considering the less rigid percentage used by the Kansas system, as twenty of the thirty-one farms left the Missouri subset and moved into type 1 for the Kansas subset.

It was expected that the dairy farms might exhibit the most stability and this expectation was substantiated. However, eighteen of the ninety-nine Missouri dairy farms exited from type 7 when the Kansas system of classification was used. This can be explained by the factor used to arrive at productive man work days for dairy farms. The factor for calculating productive man work units used by the Missouri system

TABLE 4

MOVEMENT OF FARMS FROM MISSOURI TYPE DUE TO THE KANSAS SYSTEM OF CLASSIFICATION

Farm Type		Missouri	Change in Farm Type										Total Leaving
			0	1	2	3	4	5	6	7	8	9	
General	0	100		32	23	23	5	1	4	1	3	-	97
Grain	1	78	0		6	0	0	0	0	0	0	-	6
Grain Hog	2	39	0	0		7	0	0	0	0	0	-	7
Hog	3	29	0	1	4		0	0	0	0	0	-	5
Grain Beef	4	31	0	20	0	0		0	0	0	0	-	20
Beef	5	21	0	1	0	0	14		0	0	2	-	17
Grain Dairy	6	0	0	0	0	0	0	0		0	0	-	-
Dairy	7	99	0	0	0	0	0	0	18		0	-	18
Mixed Livestock	8	4	0	0	1	3	0	0	0	0		-	4
Poultry*	9	2	0	1	0	1	0	0	0	0	0		2
TOTAL ENTERING			0	55	39	34	19	1	22	1	5	-	176 / 176
NO CHANGE			3	72	32	24	11	4	-	81	0		227
TOTAL BY KANSAS CRITERIA			3	127	71	58	30	5	22	82	5	0	403

*Poultry farms were not typed by the Kansas System.

was considerably higher for dairy than the factor used by the Kansas system of classification. Missouri productive man work units for dairy were based on (head dairy cows) X (10.0 days) plus (head other dairy) X (1.5 days) while Kansas productive man work units were based on (mature dairy cows) X (9.0 days).

The type variations due to Missouri and Kansas systems result from factors used to generate productive man work units and varying percentage requirements when the productive man work units for an enterprise are compared to those for a particular farm. The implications of this part of the study did not suggest either system was wrong but did suggest a need for time and motion empirical studies to validate the factors used to generate the productive man work units for each enterprise.

The percentages used by each system are rather arbitrary and their rigidity may be limited by the number of farms in each state's basic set. That is, a state with 'many' farms in their record program may want more rigid requirements for a farm type than a state with only a 'few' farms in their program. However, this policy has not been followed by Missouri and Kansas; Missouri used more rigid requirements to classify 400 to 500 farm records than did Kansas with over 3,000 farm records.

IOWA

The Iowa system of classification is completely different in both nomenclature and method than the Kansas or Missouri system. However, classification of the basic set by the Iowa system produced the smallest number of farms changing type. One hundred thirty-nine farms changed type as shown in Table 2 and detailed in Table 5.

A word of caution is in order concerning use of Table 5. The caveat concerns only comparing totals for Missouri and Iowa. Dairy is a case in point. Missouri's type classification resulted in ninety-nine dairy farms and Iowa's system resulted in ninety-seven dairy farms. Closer examination of Table 5 shows that six dairy farms exited from the Missouri group and entered type 0 and type 1 while four farms entered type 7 when the Iowa system of classification was applied to the basic set.

The classification system used by Iowa initially separated the grain farms from the other farms in the basic set. Type 1 were those which had sales greater than one-half the value of feed produced. Compared with the productive man work unit system used by Missouri, the Iowa system resulted in the exit of twelve farms from the type 1 classification. However, thirty-two farms which had some livestock type connotation by the Missouri system entered as grain farms when using value of feed fed classification criteria.

The hypothesis is validated for the Iowa system as compared with the Missouri system for type 1 farms.

TABLE 5

MOVEMENT OF FARMS FROM MISSOURI TYPE DUE TO THE IOWA SYSTEM OF CLASSIFICATION

Farm Type		Missouri	Change In Farm Type										Total Leaving
			0	1	2*	3	4*	5	6*	7	8*	9*	
General	0	100		8	-	20	-	8	-	4	-	-	40
Grain	1	78	8		-	1	-	3	-	0	-	-	12
Grain Hog*	2	39	2	4		33	-	0	-	0	-	-	39
Hog	3	29	0	1	-		-	0	-	0	-	-	1
Grain Beef*	4	31	4	14	-	0		13	-	0	-	-	31
Beef	5	21	4	0	-	0	-		-	0	-	-	4
Grain Dairy*	6	0	0	0	-	0	-	0		0	-	-	0
Dairy	7	99	2	4	-	0	-	0	-		-	-	6
Mixed Livestock*	8	4	3	0	-	1	-	0	-	0		-	4
Poultry*	9	2	1	1	-	0	-	0	-	0	-		2
TOTAL ENTERING			24	32	-	55	-	24	-	4	-	-	139 / 139
NO CHANGE			60	66	-	28	-	17	-	93	-	-	263
TOTAL BY IOWA CRITERIA			84	98	-	83	-	41	-	97	-	-	403

*Not typed by the Iowa System.

The Missouri and Kansas systems grouped farms into types 2, 4, and 6 according to grain-livestock enterprise combinations. Each system also generated type 8 composed of farms having livestock-livestock enterprise combinations. The Iowa system specified types composed of livestock-livestock combinations into classes other than type 8, rather than grain-livestock combinations. Therefore, the two systems were not directly compatible for types 2, 4, 6, and 8 which were omitted when the farms were typed according to Iowa criteria.

If types composed of livestock combinations were used, it might be expected that type 0 would have fewer farms. That is, some of the general farms would be classified as beef-hog, beef-dairy, dairy-hog or dairy-beef. Farms in types 2, 4, 6, 8, and 9 were obviously forced to exit from the Missouri classifications and entered into types 0, 1, 3, 5, or 7 with the application of the Iowa system to the basic set.

Even though type 0 was a residual, forty farms exited from the Missouri type 0 and twenty-four farms entered, resulting in eighty-four general farms by the Iowa system of classification versus 100 farms by the Missouri system of classification. This would seem contrary to the previous discussion which stated that some of the general farms could fall into livestock combinations. It appears that the results were due to the heterogeneous nature of several of the Missouri Mail-In Record farms reflecting the type of agriculture in much of the state. The Iowa percentage requirements for comparing an enterprise to the total farm operation were those used in 1968. Iowa has increased the percentage requirements for 1970 (see footnote 3, Appendix I). The new requirements reflect more specialization on a farm classified as a specific type. It is possible that the later reflections would result in fewer general farms.

A few farms left the Missouri types in each of the hog, beef and dairy categories. Type 7 was shown to be rather stable; however, startling differences occurred concerning the number entering type 3 and type 5 by the Iowa system. Both types 3 and 5 required a ratio of value of the specific livestock type to value of all livestock production greater than .7. Results of comparing the Iowa and Missouri systems of classification suggested a need to further study the relationship between the value of production and productive man work units required to produce specific levels of output within specific types. If it can be assumed that productive man work units are a proxy for all inputs, then part of the varying composition of types 3 and 5 could be explained by variation in 1970 livestock prices. If the assumption is not correct, then it could be assumed that productive man work units are not a correct proxy for other inputs or do not correctly reflect the value of production.

Implications for farm management recommendations at the firm level will vary depending upon which of the two systems is used. The recommendation for a farm with an excess of labor but little capital would be different than the recommendation for a farm with labor shortage and an excess of capital. This would be especially important for specific enterprise recommendations.

ILLINOIS AND KENTUCKY

The initial break for typing the 403 farms under the Illinois and Kentucky systems of classification was similar to the Iowa system. The first division separated grain from other farms and was based on the ratio of the value of feed fed to the feed and grain returns from the farm under question. As noted, the Iowa system resulted in twelve grain farms leaving the seventy-eight classified under the Missouri system. Under the Illinois and Kentucky system, fifteen farms exited from the type 1 group of seventy-eight farms. This resulted from the Illinois and Kentucky system having an additional parameter (i.e., if more than one-sixth of the feed and grain returns were fed to dairy or poultry, the farm was excluded from type 1). The inclusion of poultry as a restriction for grain farm criteria precluded including type 9 in the classification analysis.

The discussion of type 7 will be considered first since it again demonstrates stability with only three farms leaving and three farms entering, resulting in ninety-nine dairy farms. After initially classifying the farms grain or nongrain, the nongrain farms were typed according to the value of feed fed. That is, the ratio value of feed fed to a specific livestock enterprise and the total feed fed was computed. If the ratio met specific percentage requirements, a specific type was determined. A similar comparison can be made concerning feed fed and productive man work units as was made with the results from the value of production and productive man work unit systems.

As shown in Table 6, few farms left from each type other than type 0; however, considerable instability was indicated for each type when entry was considered. Particularly surprising results were noted in type 3 where ninety-seven farms entered the hog classification, resulting in 125 farms being typed as hog farms with the value of feed fed criteria. Large numbers also entered types 1 and 5, resulting in each also having a larger number of farms than was shown by the productive man work unit system of classification. A trend appears to be developing for larger numbers in each of the specialized livestock types as different systems are applied to the basic set.

The farms' position before entering a specific livestock type can be determined from Table 6: Eighty-six general farms moved into specific livestock types; fifty-three of the eighty-six farms were typed 3 by the feed-fed criteria; thirty-five of the hog farms originated from the Missouri grain-hog farm classification. The feed-fed criteria with 184 farms changing type demonstrates the second highest instability with only Michigan's specialized farm criteria being higher with 213 farms changing type.[1]

The divergence of the Missouri system and the Illinois-Kentucky system could result from price variations of the feed input similar to prices affecting output for the Iowa system. The physical feed-fed input should be rather stable from year to year on average farms in each particular type. Price of the feed input would be the variable resulting in inter-system instability. The analysis suggests that studies are needed

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[1]Before specifically discussing the value of production systems, a view of Table 2 shows that the trend to larger specialized subsets will hold for the methods of typing farms used by Michigan, Wisconsin and Nebraska when the percentage requirements are "low enough". Michigan requirements are rather rigid and the analysis resulted in only very specialized farms in a particular livestock type.

TABLE 6

MOVEMENT OF FARMS FROM MISSOURI TYPE DUE TO THE ILLINOIS AND KENTUCKY SYSTEM OF CLASSIFICATION

Farm Type		Missouri	Change In Farm Type 0	1	2*	3	4*	5	6*	7	8*	9	Total Leaving
General	0	100		8	-	53	-	21	-	2	-	2	86
Grain	1	78	3		-	3	-	6	-	1	-	2	15
Grain Hog*	2	39	0	4		35	-	0	-	0	-	0	39
Hog	3	29	0	1	-		-	0	-	0	-	0	1
Grain Beef*	4	31	1	14	-	1		15	-	0	-	0	31
Beef	5	21	3	0	-	2	-		-	0	-	0	5
Grain Dairy*	6	0	0	0	-	0	-	0		0	-	0	0
Dairy	7	99	2	1	-	0	-	0	-		-	0	3
Mixed Livestock*	8	4	0	0	-	3	-	1	-	0		0	4
Poultry	9	2	0	0	-	0	-	0	-	0	-		0
TOTAL ENTERING			9	28	-	97	-	43	-	3	-	4	184 / 184
NO CHANGE			14	63	-	28	-	16	-	96	-	2	219
TOTAL BY ILLINOIS AND KENTUCKY CRITERIA			23	91	-	125	-	59	-	99	-	6	403

*Not typed by the Illinois and Kentucky System.

to show the relationship between feed-fed as an input and productive man work units as a proxy for all inputs. If an index of prices were used, the remaining task to make the systems compatible would be to arrive at an adjustment factor for the various systems.

It should be apparent from the analysis that comparison between the types generated by the two systems would be rather difficult to undertake. This is particularly true when a descriptive measure concerning the structure of agriculture is considered. Implications concerning recommendations at the firm level or use of the analysis for aggregate work will be discussed in Chapter V.

CENSUS

The Census system of classification was included in the study because of its wide use by agricultural researchers and policy makers concerning the structure of American agriculture. It is often used by land grant university researchers to compare with or expand upon university record programs where a broader description is found necessary. The Census system of classification types farms by income criteria. Income is cash sales or expected sales by Census standards. Adjustments are made for government payments and capital items sold. Sales of capital items are also eliminated from many of the state systems; however, government payments are usually included as part of gross income or gross sales in the state system. After the adjustment to income, the Census system divides the farms into grain farms and other farms similar to the last two systems discussed (i.e., grain farms being those with crop sales greater than one-half of the adjusted total farm sales).

Table 7 shows that the Census classification system resulted in several farms shifting from Missouri classification. There were seventy-seven type 1 farms, but over 25 percent turnover. Note that types 2, 3, 4, 5 and 6 were not typed by the Census system. This results from the Census system typing only grain, dairy, poultry and general farms with all other commercial livestock farms classified mixed-livestock. Type 8 included the specialized livestock farms which were separated into specific livestock types by the other systems of classification.

No general farms were generated by the Census system. As previously

TABLE 7

MOVEMENT OF FARMS FROM MISSOURI TYPE DUE TO THE CENSUS SYSTEM OF CLASSIFICATION

Farm Type		Missouri	Change In Farm Type										Total Leaving
			0	1	2*	3*	4*	5*	6*	7	8	9	
General	0	100		7	-	-	-	-	-	2	90	1	100
Grain	1	78	0		-	-	-	-	-	1	21	0	22
Grain Hog*	2	39	0	4		-	-	-	-	0	35	0	39
Hog*	3	29	0	0	-		-	-	-	0	29	0	29
Grain Beef*	4	31	0	9	-	-		-	-	0	22	0	31
Beef*	5	21	0	0	-	-	-		-	0	21	0	21
Grain Dairy*	6	0	0	0	-	-	-	-		0	0	0	0
Dairy	7	99	0	0	-	-	-	-	-		4	0	4
Mixed Livestock	8	4	0	0	-	-	-	-	-	0		0	0
Poultry	9	2	0	0	-	-	-	-	-	0	1		1
TOTAL ENTERING			0	20	-	-	-	-	-	3	223	1	247 / 247
NO CHANGE			0	56	-	-	-	-	-	95	4	1	156
TOTAL BY CENSUS CRITERIA			0	76	-	-	-	-	-	98	227	2	403

*Not typed by the Census System.

used, general farms were those not meeting the criteria for some other type. Ninety of the 100 Missouri general farms moved into the mixed-livestock class. It can be noted from Table 7 that dairy was again rather stable. Types 3 and 5 were included in type 8 (mixed-livestock), due to the definition. This is indeed what happened with the hog and beef farms as they moved into mixed-livestock farms. The combination grain-hog and grain-beef farms, as determined by the Missouri system, moved into either grain or mixed-livestock, showing that the Census criteria will result in varying types due to percentage requirements and the basic definitions used to arrive at the ratios for determining the specific types.

If government payments were not removed from total farm receipts, the denominator used to calculate the ratios would have been larger. Thus, for an enterprise to meet the 'one-half criteria' would have required the enterprise sales to be larger for a farm to be typed into a specific group.

Results from the Missouri and Census systems demonstrated the variance of the farm type compositions due to the criteria used and supports the hypothesis presented at the beginning of this chapter. The results further support the trend that dairy farms may be typed by various systems with similar results, therefore, exhibiting considerable stability when stratified into groups. However, the implications for farm and aggregate resource use for types other than dairy, as hypothesized, will differ greatly when aggregating farms into broad classes such as mixed-livestock (227 of the 403 Missouri Mail-In Record farms). The implications of this type hypothesis will be discussed in Chapter V.

MICHIGAN

The Michigan system classified farms by type using 'value of production'. Total value of farm production is the total value of farm production to the operator less the cost of purchased feed and livestock.[2] The basic notion is to generate ratios for the individual farm enterprises to accomplish typing.

The Michigan system illustrates a system which uses rigid percentage requirements for classification. As discussed earlier, the high number of records in the Michigan program allows this sort of rigidity and may not be feasible for states having fewer farm records to analyze.

As in the other systems, grain farms were the initial break; however, the ratio of crop value to value of farm production had to be greater than .95 in order for a farm to be typed 1. Therefore, the seventy-eight grain farms under the Missouri system was reduced to nine when applying Michigan criteria (Table 8).

Results of type 3 indicate rigid ratios are a necessity for compatibility between the productive man work unit system and the value of production system when considering the total farms. An examination of Table 8 for type 3 farms indicates that twenty-one farms left the

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[2]The Michigan system is the first system presented which uses some measure of production. Nebraska and Wisconsin systems have the same basic notion and very similar terminology, however, interpretation of value of production and adjustments concerning feed are quite different. The definitional differences were analyzed and will be presented in Chapter IV.

TABLE 8

MOVEMENT OF FARMS FROM MISSOURI TYPE DUE TO THE MICHIGAN SYSTEM OF CLASSIFICATION

Farm Type		Missouri	Change In Farm Type										Total Leaving
			0	1	2*	3	4*	5	6*	7	8*	9*	
General	0	100		0	-	0	-	2	-	0	-	-	2
Grain	1	78	50		-	1	-	19	-	0	-	-	70
Grain Hog*	2	39	23	1		15	-	0	-	0	-	-	39
Hog	3	29	21	0	-		-	0	-	0	-	-	21
Grain Beef*	4	31	18	0	-	0		13	-	0	-	-	31
Beef	5	21	14	0	-	0	-		-	0	-	-	14
Grain Dairy*	6	0	0	0	-	0	-	0		0	-	-	0
Dairy	7	99	30	0	-	0	-	0	-		-	-	30
Mixed Livestock*	8	4	4	0	-	0	-	0	-	0		-	4
Poultry*	9	2	2	0	-	0	-	0	-	0	-		2
TOTAL ENTERING			162	1	-	16	-	34	-	0	-	-	213 / 213
NO CHANGE			98	8	-	8	-	7	-	69	-	-	190
TOTAL BY MICHIGAN CRITERIA			260	9	-	24	-	41	-	69	-	-	403

*Not typed by the Michigan System.

Missouri type 3 classification and sixteen different farms entered when the Michigan system was applied to the basic set. Similar patterns of entry and exit are shown for type 5. The trend to larger totals for types 3 and 5 than shown by the Missouri system continues.

The dairy farms showed stability when considering the rigid requirements of 95 percent of the value of farm production necessary from dairy to be typed as such. Type 0 was used to classify those farms not meeting other criteria; therefore, it was expected that a high number such as the 162 farms shown in Table 8 would enter the general farm classification.

The general implications resulting from the comparison of the movement of Missouri farms to different types when using Michigan criteria are comparable to those at the end of the discussion of each previous system. The analysis demonstrated that the 'value of production' system of classification generates 'subsets' different in composition from the Missouri subsets and the basic hypothesis is supported.

WISCONSIN

The Wisconsin system is the second system using a 'value of production' criteria; however, value of farm production is arrived at differently, compared to the Michigan system.

Value of farm production as used by the Wisconsin system again is value of livestock production plus value of crops produced but the adjustment is minus value of home-grown feed fed. Note that the Michigan adjustment was made by subtracting the cost of purchased feed and livestock. The differences due to this type definition will be more clearly demonstrated in the next chapter. Continued support of the hypothesis is that varying criteria result in different subsets shown.

The total farms changing from the Missouri system to the type classification using the Wisconsin system was 130 farms. The method used to determine specific type was initially determined by the separation of grain and other farms. Specific livestock farms were determined and farms not meeting specific types were assumed to be type 0.

Table 9 illustrates that dairy totals did not differ greatly for Missouri and Wisconsin, but that each of the other types, including general farms, increased. This movement again demonstrated that even though each of the systems did not have as many specific classes as the Missouri and Kansas systems, the 'catchall' category of general farms was not the only type that increased in number. The trend continued for type 3 and 5 to increase the total with a large exit and entry in each of these classes.

TABLE 9

MOVEMENT OF FARMS FROM MISSOURI TYPE DUE TO THE WISCONSIN SYSTEM OF CLASSIFICATION

Farm Type		Missouri	Change In Farm Type										Total Leaving
			0	1	2*	3	4*	5	6*	7	8*	9*	
General	0	100		9	-	16	-	3	-	1	-	-	29
Grain	1	78	12		-	0	-	1	-	0	-	-	13
Grain Hog*	2	39	17	4		18	-	0	-	0	-	-	39
Hog	3	29	2	0	-		-	0	-	0	-	-	2
Grain Beef*	4	31	9	12	-	0		10	-	0	-	-	31
Beef	5	21	3	0	-	0	-		-	0	-	-	3
Grain Dairy*	6	0	0	0	-	0	-	0		0	-	-	0
Dairy	7	99	7	0	-	0	-	0	-		-	-	7
Mixed Livestock*	8	4	3	0	-	1	-	0	-	0		-	4
Poultry*	9	2	2	0	-	0	-	0	-	0	-		2
TOTAL ENTERING			55	25	-	35	-	14	-	1	-	-	130 / 130
NO CHANGE			71	65	-	27	-	18	-	92	-	-	273
TOTAL BY WISCONSIN CRITERIA			126	90	-	62	-	32	-	93	-	-	403

*Not typed by the Wisconsin System.

NEBRASKA

Nebraska is the third system where an analysis was made based upon some notion of 'value of production'. One term used by the Nebraska system in arriving at the ratios for typing concerns gross production. Gross production is an estimate of all value added on the farm during the year. It is total net livestock production plus total value of all crop production on the farm. Net livestock production is the value added to all classes of livestock during the year accounting for: purchases, sales, inventory change and home use. Thus, net livestock production is computed by the 'accrual method'. The other component of gross production is total value of all crop production and is computed by multiplying acres by yield (total physical production) by a standard price.

Gross production thus calculated is an inflated production figure and is a function of the amount of feed fed to livestock. Thus, if all crop production on the farm is fed to livestock, the value is counted twice in arriving at gross production. Stated alternatively, the total value of all crop production is added to the livestock value of production when sold by feeding to livestock and is thus counted in net livestock production, as well as counted in value of crop production to derive gross production.

Typing the farms by the Nebraska system produced results similar to those presented for the Michigan system. Dairy farms exhibited considerable stability with a few leaving the type. Again a high percentage of the farms in specific types exited with new entries likewise noted.

TABLE 10

MOVEMENT OF FARMS FROM MISSOURI TYPE DUE TO THE NEBRASKA SYSTEM OF CLASSIFICATION

Farm Type		Missouri	Change In Farm Type										Total Leaving
			0	1	2*	3	4*	5	6*	7	8*	9*	
General	0	100		2	-	24	-	7	-	2	-	-	35
Grain	1	78	14		-	0	-	4	-	0	-	-	18
Grain Hog*	2	39	10	2		27	-	0	-	0	-	-	39
Hog	3	29	0	0	-		-	0	-	0	-	-	0
Grain Beef*	4	31	9	8	-	0		14	-	0	-	-	31
Beef	5	21	2	0	-	0	-		-	0	-	-	2
Grain Dairy*	6	0	0	0	-	0	-	0		0	-	-	0
Dairy	7	99	3	0	-	0	-	0	-		-	-	3
Mixed Livestock*	8	4	1	0	-	3	-	0	-	0		-	4
Poultry*	9	2	2	0	-	0	-	0	-	0	-		2
TOTAL ENTERING			41	12	-	54	-	25	-	2	-	-	134 / 134
NO CHANGE			65	60	-	29	-	19	-	96	-	-	269
TOTAL BY NEBRASKA CRITERIA			106	72	-	83	-	44	-	98	-	-	403

*Not typed by the Nebraska System.

The implications concerning the Nebraska system again are similar to those previously discussed. The effects of the fallacy of the system concerning double accounting of crop production cannot be isolated in this study; however, the ratios for grain farms should be smaller due to the larger denominator. The ratios for 'pure' livestock farms will vary according to the magnitude of the constant (value of crop production) added to both the numerator and the denominator when calculating the ratios for typing. This was validated in the study since the number of grain farms declined and the number of hog and beef farms increased. The differences due to definitions alone will be demonstrated in Chapter IV where a constant percentage was applied to arrive at the ratios for the value of production method used by Michigan, Wisconsin and Nebraska.

The method in Chapter IV will be to use a constant percentage to demonstrate the instability of farm types under the three systems. The variation of the subsets shown in Chapter IV will be due only to varying definitions.

SUMMARY

The various systems of classification resulted in considerable type instability which can be attributed to eight different classification systems and criteria used. The analysis demonstrated that criteria alone, as defined at the beginning of the chapter, can create differences. Within the general framework, additional specific causal factors within a system can be isolated. 'Value of Production' systems (such as the last three discussed) raises questions concerning definitional differences. These differences are examined further in the next chapter.

The objective of this part of the study was to determine if different subsets would be generated by the different systems. The answer is clearly yes and part (a) of the hypothesis has been substantiated. If the results had not substantiated the hypothesis, the study would have ended at this point. Since the hypothesis was validated, the analysis continued for definitional differences (part (b) of the hypothesis) and 'year-end' business analysis for each of the subsets generated. The results of these two parts of the analysis will be reported in Chapters IV and V.

CHAPTER IV

DEFINITIONAL DIFFERENCES FOR VALUE OF PRODUCTION SYSTEMS

The purpose of this part of the study was to isolate the definitional difference effect on the subsets generated by the value of production systems. Michigan, Wisconsin and Nebraska systems were utilized to type the basic set of 403 farms using a constant percent to make the division into the subsets. Thus, any change in number of farms in each subset was the result of definitions of the terms used to calculate the ratios for specific enterprise value of production/whole farm value of production. The general procedure and table format is the same as used in the preceding chapter. However, a brief review is in order on the procedure used. Table 11 indicates the basic set of 403 farms typed according to the Missouri system. The section for Wisconsin (own percent), Michigan (own percent), and Nebraska (own percent) is repeated from Table 2.

The different procedure used in this part of the study was to apply Wisconsin's percent to Nebraska and Michigan's systems. Michigan and Nebraska definitions were retained to derive their values of production. Wisconsin percentage was used as a constant to determine farm type because it was intermediate in value between those for Nebraska and Michigan. The three systems shown in Table 11 were discussed using their own total system of classification in the preceding chapter. Emphasis here will be upon the changes generated by using a constant percentage

TABLE 11

TYPE CHANGE FOR THOSE STATES USING "VALUE OF PRODUCTION" CRITERIA DUE TO DIFFERING DEFINITIONS OF PRODUCTION[a]

Change		Farm Type 0	1	2	3	4	5	6	7	8	9	Total
Missouri Type		100	78	39	29	31	21	0	99	4	2	403
Wisc:	Enter	55	25	(0)	35	(0)	14	(0)	1	(0)	(0)	130
(own%)	Leave	29	13	(39)	2	(31)	3	(0)	7	(4)	(2)	130
	Type	126	90	(0)	62	(0)	32	(0)	93	(0)	(0)	403
Mich:	Enter	162	1	(0)	16	(0)	34	(0)	0	(0)	(0)	213
(own%)	Leave	2	70	(39)	21	(31)	14	(0)	30	(4)	(2)	213
	Type	260	9	(0)	24	(0)	41	(0)	69	(0)	(0)	403
Mich:	Enter	9	61	(0)	48	(0)	31	(0)	1	(0)	(0)	150
(Wisc. %)	Leave	56	9	(39)	3	(31)	3	(0)	3	(4)	(2)	150
	Type	53	130	(0)	74	(0)	49	(0)	97	(0)	(0)	403
Neb:	Enter	41	12	(0)	54	(0)	25	(0)	2	(0)	(0)	134
(own%)	Leave	35	18	(39)	0	(31)	2	(0)	3	(4)	(2)	134
	Type	106	72	(0)	83	(0)	44	(0)	98	(0)	(0)	403
Neb:	Enter	76	69	(0)	9	(0)	3	(0)	0	(0)	(0)	157
(Wisc. %)	Leave	29	5	(39)	7	(31)	17	(0)	23	(4)	(2)	157
	Type	147	142	(0)	31	(0)	7	(0)	76	(0)	(0)	403

[a]Percent refers to percentage income (Value of Production) for a particular enterprise to Total Income (Total Farm Production) to be classified a particular type.

Parenthesis ( ) indicate types not classified for systems other than Missouri. Numbers denoted in these columns are for balancing only.

for all three states.[1]

The most noticeable item when viewing the Michigan project concerns the movement from general farms into other types when the percentage requirements were relaxed. Thus, the revised Michigan system was less specialized with the relaxation of the specific type requirements. It would appear that the trend in movement to new types with the revised Michigan system was very similar to movements when the Wisconsin system was applied to the basic set. Notable exceptions were fewer general farms and a larger number of grain farms in the revised Michigan system compared to the Wisconsin system alone. Nebraska's own percentages were less restrictive than Wisconsin's, resulting in more farms moving into the general and grain classifications. It appears that the revised Nebraska system generated notable exceptions to the trends discussed in the previous chapter and the double-accounting of total value of farm production appears as a feasible explanation.

Movements from the foundation subsets typed by the Missouri system are presented for the revised Michigan system in Table 12. The fifty-six farms exiting from the general classification entered type 1 and type 3 with a few farms entering type 5. Sixty-one farms entered type 1 and were distributed rather broadly from all of the Missouri types.

Comparing Tables 12 and 13 emphasizes that the revised Nebraska system resulted in a somewhat different pattern than was attributed to the revised Michigan system. Only three farms entered type 5 rather than thirty-one and these moved from the grain-beef type 4 Missouri classification. The results presented in Table 13 are contrary to the trend established previously concerning the stability of type 7. Type 7

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[1]Henceforth, the systems using a percent common to each (Wisconsin's percent) will be referred to as 'The Revised Michigan System' and 'The Revised Nebraska System'.

TABLE 12

MOVEMENT OF FARMS FROM MISSOURI TYPE DUE TO THE REVISED MICHIGAN SYSTEM OF CLASSIFICATION

Farm Type		Missouri	Change In Farm Type										Total Leaving
			0	1	2*	3	4*	5	6*	7	8*	9*	
General	0	100		19	0	28	0	8	0	1	0	0	56
Grain	1	78	1		0	0	0	8	0	0	0	0	9
Grain Hog*	2	39	1	20		18	0	0	0	0	0	0	39
Hog	3	29	0	3	0		0	0	0	0	0	0	3
Grain Beef*	4	31	0	15	0	1		15	0	0	0	0	31
Beef	5	21	2	0	0	1	0		0	0	0	0	3
Grain Dairy*	6	0	0	0	0	0	0	0		0	0	0	0
Dairy	7	99	2	1	0	0	0	0	0		0	0	3
Mixed Livestock*	8	4	2	2	0	0	0	0	0	0		0	4
Poultry*	9	2	1	1	0	0	0	0	0	0	0		2
TOTAL ENTERING			9	61	0	48	0	31	0	1	0	0	150 / 150
NO CHANGE			44	69	0	26	0	18	0	96	0	0	253
TOTAL			53	130	0	74	0	49	0	97	0	0	403

*Not typed by the revised Michigan System.

TABLE 13

MOVEMENT OF FARMS FROM MISSOURI TYPE DUE TO THE REVISED NEBRASKA SYSTEM OF CLASSIFICATION

Farm Type		Missouri	Change In Farm Type										Total Leaving
			0	1	2*	3	4*	5	6*	7	8*	9*	
General	0	100		27	-	2	-	0	-	0	-	-	29
Grain	1	78	5		-	7	-	0	-	0	-	-	5
Grain Hog*	2	39	16	6		0	-	0	-	0	-	-	39
Hog	3	29	7	0	-		-	0	-	0	-	-	7
Grain Beef*	4	31	7	21	-	0		3	-	0	-	-	31
Beef	5	21	15	2	-	0	-		-	0	-	-	17
Grain Dairy*	6	0	0	0	-	0	-	0		0	-	-	0
Dairy	7	99	20	3	-	0	-	0	-		-	-	23
Mixed Livestock*	8	4	4	0	-	0	-	0	-	0		-	4
Poultry*	9	2	2	0	-	0	-	0	-	0	-		2
TOTAL ENTERING			76	69	-	9	-	3	-	0	-	-	157 / 157
NO CHANGE			71	73	-	22	-	4	-	76	-	-	246
TOTAL			147	142	-	31	-	7	-	76	-	-	403

*Not typed by the revised Nebraska System.

had twenty-three farms leaving and none entering, thus, reducing the Missouri dairy farms from ninety-nine to seventy-six. A possible explanation was the observation that the revised Nebraska system generated an inflated total farm value of production which became the denominator for the ratio used to classify a farm a specific type. The numerator (the enterprise value of production) remained constant. Therefore, the ratio was reduced below that necessary for a specific farm to be type 7.

SUMMARY

The hypothesis in Chapter III stated: Varying criteria will result in different subsets due to a) criteria alone and b) definitional differences even though the verbal criterion appear similar. Chapter III discussed and validated the (a) part of the hypothesis. Chapter IV presented results from the analysis of definitional differences which validated the (b) part of the hypothesis. The analysis indicated that instability of subsets can be attributed to the definitions especially for a basic set from an area of diversified agriculture. Conclusions concerning the effects of the varying composition of the subsets will be deferred until the business analysis is discussed in the next chapter.

CHAPTER V

BUSINESS ANALYSIS FOR THE SUBSETS GENERATED BY THE VARIOUS SYSTEMS OF CLASSIFICATION

Results of the study to this point have demonstrated that different subsets will be generated by the various systems of classification. The task remains to determine if the different composition of the subsets will affect the output from 'a' year-end business analysis for each subset.

A year-end farm business analysis, as used by the Missouri program, was completed for types 0, 1, 3, 5, and 7 generated by the eight systems of classification. The general objectives presented in the Introduction and applicable to this chapter can be summarized in a specific hypothesis:

> Different subsets generated by the various systems of classification will result in varying farm management recommendations for individual firms and differing policy recommendations concerning aggregate use of the analysis results.

The year-end analysis was accomplished on the 360-65 computer at the University of Missouri. The program utilized by the Missouri Mail-In Record project was used for each of the five types by the eight systems.

> "An organized farm record and record analysis program, as an activity of the Missouri Extension Service, started in 1955 under Paul Bebermeyer's leadership. Farmers kept their own records in the Missouri loose-leaf record book. Students were employed by the Agricultural Economics Department to analyze the records manually. In 1960, a pilot program of mail-in records was set up in eight counties. In 1961, it was decided to offer the farmers of Missouri a mail-in record program which would be mechanized."[1]

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[1] Carrol L. Kirtley, "The Missouri Farm Business Record Analysis Program," IBM Agricultural Symposium (Endicott, N.Y., May 10-13, 1965), p. 315.

The Missouri computer accounting program has had at least four objectives according to Thomas G. Brown:[2]

(1) To provide current benchmark information about Missouri farms.

(2) To provide a source of information to be used in research in the Department of Agricultural Economics.

(3) To provide a training activity for field agents conducting educational programs in farm management.

(4) To provide an accounting and analysis program to service farmers enrolled in farm management educational programs conducted by the Extension field staff.

These objectives are an example of the type information expected from a record program and its associated analysis as discussed in this chapter. Finley aptly ties together the need for adequate data in his appraisal of EDP and its relationship to the decision-making process in farm management.[3]

> "The entire problem of using records as a base for decision making cannot be dismissed. Nevertheless, forward planning and record analysis has been far too independent in the past. It should be recognized that the two processes have different intermediate objectives--forward planning as basically a prescriptive implement while records are a diagnostic device. But both are necessary ingredients for successful and meaningful farm management. It can hardly be overemphasized that a wide gap between the data-gathering and the forward planning processes must be narrowed. If they are not made more complimentary, neither is likely to

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[2]Thomas G. Brown, "Missouri's Experience in the Application of EDP in Farm Management Educational Programs," Proceedings of a Workshop: Computer Use in Farm Management Analysis and Production Decisions, November 20-22, 1968 (Washington, D.C.: U.S. Department of Agriculture, August, 1969), p. 12

[3]Robert M. Finely, An Appraisal of EDP and Its Relationship to the Decision Making Process in Farm Management, Agricultural Economics Paper #1966-3 (Federal Extension Service USDA, Washington, D.C. and Department of Agricultural Economics, University of Missouri, Columbia, Mo.), pp. 24-25.

> be very meaningful. Furthermore, the data-orientated processes, as we now know them, will not and should not survive unless their contribution to the decision-making process is substantially increased. On the other hand, without a satisfactory data base, the succession of 'fashionable' planning techniques will continue with each one having its 'day in the sun' only to be discarded in favor of another tool without ever being subjected to a real test."

The format of the output generated by the computer analysis program is basically the format presented in the 1969 Missouri Farm Business Summary publication.[4] Over 700 items for each farm are available on tape as well as the same number of items for each subset of farms. The selection of items presented in this chapter is considerably fewer than 700, but the items are those thought to effectively demonstrate connotations for description and prescription.

One basic change was made in the analysis format from the year-end business summary format reported by Missouri. The items reported are average of all farms in a subset except in the cases of specific production where items such as number of pigs per litter or milk per cow was more meaningful than an average of all farms in the particular group. The basic change allows totals to represent a sum of the items contributing to said total.

The analysis was completed for five types of farms. The basis for choosing the five types was twofold: (1) the five types represented those used in each system studied except the Census system and (2) the types represented specialized livestock farms, specialized grain farms and general farms, which are often used in published year-end analyses. The results of the analysis for general grain, hog, beef and dairy farm types are reported in Tables 14 through 18. Each table is four pages

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[4]Carrol L. Kirtley and Leroy Rottmann, Missouri Farm Business Summary for 1969 (Columbia, Mo.: Extension Division, University of Missouri, August, 1970), p. 2.

and contains the results for each of the eight systems included in the study. In each set of tables, 139 items pertaining to a particular group of farms is presented. It was not the intent of this study to explicitly discuss each of the items contained in the tables; however, they were included in order to view inter-relationships of particular interest or significance which occurred. A description of selected items, from the 139 reported in Tables 14 through 18, is found in Appendix II. For a more complete description, reference is made to the Missouri Farm Business Summary, 1969.[5]

A word is in order concerning the approach used in the Missouri Year-End Analysis. Total cash expenses include total new investments expenses. It should be noted that the total investment expenses are the costs of the items under consideration even though many capital items may be purchased over a period of time or with borrowed funds. Receipts include sales from all sources including government payments, miscellaneous income, custom work, and sale of capital items. Cash balance, then, is the difference between total cash receipts and total expenses. Depreciation is reflected in the change of inventories when arriving at the various returns. All items reported are for the business unit which includes the landlord's and/or partner's share in the business.

The remainder of this chapter will explore the year-end analysis of the five types in terms of various measures of size, selected expense items, returns and several efficiency measures followed by the overall implications of the relationship of the findings to the statedhypothesis. Each subset generated by the eight systems for the general farm type will be referred to as 'The Missouri group' or only as 'Missouri'. The subset

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[5]A similar summary publication for 1970 was being prepared at the time this dissertation was being written.

generated by the Illinois and Kentucky system will be referred to as Illinois. Lastly, the terms 'subset', 'group', and 'the farms' will be used interchangeably to vary the dialogue flow.[6]

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[6]Terminology, such as 'Illinois farms', should not be contrued to mean... the farms are representative of Illinois farms...but should mean a group or subset from the basic set of 403 Missouri Mail-In Records typed and grouped by the Illinois system with the same implications for the systems other than the Illinois system.

GENERAL FARMS (TYPE 0)

The discussion for the year-end business analysis concerning the general farms is based on information in Table 14. The Kansas and Census systems of classification did not generate any general farms. The remaining systems produced subsets ranging from a low of ten to a high of 261 farms by the Michigan system.

The measures of size, reported in the business analysis, varied for the six systems which generated general farms. Illinois, with twenty-two farms, was low in terms of acres while Wisconsin was high in terms of acres with the difference being 12 percent. However, measures of size using capital were high in Illinois, indicating more intensive capital use on fewer acres. As could be expected, land and improvement capital managed was low due to the low acres but the components of total capital managed for livestock, feed, seed and supplies, and machinery and equipment were all high for the twenty-two farms included in the Illinois general farm type. The same groups of farms were largest in terms of man years of labor used as well as crop productive man work units and livestock productive man work units. While the number of head per farm was not high for each class of livestock in the Illinois group, several of the farms had livestock requiring high productive man work units.

The group of general farms producing the low measures of size did not tend to one system as was true for the high group. When viewing which group had the lowest indicator of capital managed, size was rather randomly distributed among the groups. This was also true for the year-

TABLE 14

YEAR END BUSINESS SUMMARY FOR GENERAL FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 GENERAL FARMS		MISSOURI		KANSAS	IOWA		ILLINOIS & KENTUCKY		CENSUS	MICHIGAN		WISCONSIN		NEBRASKA	
Description	Code		(100)	(0)		(84)		(22	(0)		(261)		(126)		(105)
Total Livestock Expense	100	16380	100		17083	84	16329	22		15853	261	16220	126	12344	105
Feed	110	15033	100		15899	84	14620	22		14374	261	14907	126	11300	105
Other	XXX	1347	100		1184	84	1709	22		1479	261	1213	126	1044	105
Total Machinery & Eq. Expense	200	5589	100		5490	84	7156	22		6037	261	6140	126	5770	105
Auto	210	445	89		382	76	437	20		383	233	419	118	421	96
Gas and Oil	220	1204	99		1223	83	1624	22		1379	260	1340	125	1268	105
Tractor	230	592	98		654	83	710	22		707	257	769	124	658	105
Truck	240	747	98		708	83	666	21		807	260	900	125	804	103
Other Machinery	250	1273	100		1142	84	1321	22		1441	250	1394	126	1311	105
Machine Hire	260	1328	97		1382	82	2397	21		1321	255	1318	124	1307	103
Total Crop Expense	300	6782	100		6999	84	8591	22		7639	261	7618	126	7584	105
Lime	310	339	64		352	54	287	13		398	180	354	81	301	68
Phosphate	320	75	15		110	21	111	3		66	39	77	22	89	16
Other Fertilizer	XXX	3831	99		3958	84	4974	22		4258	260	4239	125	4273	104
Chemicals	350	1228	94		1239	80	1949	22		1529	244	1515	120	1463	101
Miscellaneous	370	1309	99		1340	83	1270	22		1388	259	1433	125	1458	104
Total Labor Expense	400	2129	93		2087	81	1926	20		2275	246	2176	121	2008	99
Wages	410	1941	92		1906	81	1803	20		2057	245	1950	121	1822	99
Other Labor	XXX	188	89		181	76	123	18		218	235	226	117	186	89
Total Miscellaneous Expense	500	8458	100		8363	84	11302	22		8850	261	9064	126	8360	105
Real Estate Main. & Repairs	510	1414	100		1422	84	1777	22		1375	260	1445	126	1294	105
Utilities	XXX	716	100		671	84	659	22		727	261	710	126	653	105
Taxes	550	1542	99		1504	84	1450	22		1583	259	1617	125	1674	105
Insurance	560	503	100		443	84	541	22		521	260	542	126	503	105
Interest	570	3044	95		3172	78	5224	22		3456	240	3573	117	3128	96
Cash Rent	580	963	49		888	41	1329	15		896	136	892	69	842	52
Miscellaneous Overhead	590	276	98		263	83	322	21		292	258	285	125	266	105
Total Operating Expense	XXX	39338			40022		45304			40654		41218		36066	
Breeding Livestock	610	3103	91		2586	72	3252	20		2336	210	2720	106	2330	88
Stocker & Feeding Livestock	620	11856	69		14517	60	32447	16		11519	172	12108	87	10490	68
Mach. and Equipment	630	4332	90		4337	75	5495	19		4761	235	5111	115	5197	98
Buildings & Feed Lots	640	2856	48		2239	33	1904	7		2090	103	2237	54	2467	42
Field Improvements (land clearing, fences, terraces, etc.)	650	533	46		273	40	456	11		489	121	296	63	609	56
Total New Investment	XXX	22680			23942		43554			21195		22472		21093	
Total Cash Expense		62016			63964		88856			61849		63690		57159	
Resale (A+B)		490			728		225			775		721		544	

TABLE 14 (continued)

YEAR END BUSINESS SUMMARY FOR GENERAL FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 GENERAL FARMS		MISSOURI		KANSAS	IOWA		ILLINOIS & KENTUCKY		CENSUS	MICHIGAN		WISCONSIN		NEBRASKA	
Description	Code		(100)	(0)		(84)		(22)	(0)		(261)		(126)		(10
Total Livestock Receipts	700	55046	100		58360	84	78962	22		53221	261	55160	126	49368	10
Beef Cattle	720	26275	100		29852	83	51376	21		24197	240	27412	120	25134	10
Dairy Cattle	730	242	15		176	13	865	9		974	56	764	24	280	1
Hogs	740	26544	97		26650	81	20439	19		22975	240	22645	118	20943	9
Sheep	750	2	1		2	1	0	0		6	12	2	3	8	
Milk	786	1285	11		359	11	5541	8		4111	50	2591	20	1188	1
Poultry	790	11	5		445	6	9	1		540	13	1112	6	1331	
Eggs	XXX	687	5		876	6	732	1		418	13	634	6	484	
Total Crop Receipts	800	13199	98		11427	82	8287	21		17300	256	14601	124	16542	10
Forage Crops	810	466	42		455	32	251	7		341	90	379	47	452	4
Fruits, Nuts	820	.08	1		0.10	1	0	0		2	3	0.49	1	0	
Corn	833	2279	55		2231	42	2559	13		4931	161	3319	75	3895	6
Grain Sorghum	836	121	8		160	5	235	3		298	32	309	16	276	
Soybeans	837	4450	76		3758	57	3596	15		6116	187	5476	95	5153	8
Soybean Seed	847	884	16		627	10	0	0		820	38	801	20	1123	2
Wheat	838	312	32		179	25	95	5		493	93	461	47	504	4
Wheat Seed	848	24	1		0.17	1	0	0		53	10	15	2	72	
Grain Sorghum	850	146	27		213	23	-1.49	4		107	47	106	29	176	2
Legume Seeds	860	22	10		47	8	41	3		55	17	38	12	25	1
Truck Crops	870	0.33	1		0	0	0	0		9	2	0.26	1	0.31	
Government Payments	899	3733	85		3158	68	1382	12		3648	212	3354	106	4197	9
Total Miscellaneous Income	900	2976	98		3014	84	3593	22		2962	258	3185	126	3056	10
Custom Work	910	639	60		750	48	1319	16		840	167	934	81	863	6
Ins. from Machines, Bldg.	XXX	430	43		509	15	53	5		349	42	536	24	508	2
Government Payments	960	104	43		97	33	77	5		90	103	95	52	103	4
All Other Farm Receipts	XXX	1794	92		1658	78	2144	20		1683	243	1620	116	1582	9
Total Cash Receipts		71221			72801		90842			73483		72946		68966	
Cash Balance (Bus)	40011	8715	100		8109	84	1761	22		10859	261	8535	126	11263	10
Interest (Bus)	40012	3044	95		3173	78	5224	22		3456	240	3573	117	3128	9
Home Used Products	40013	433	87		393	72	554	19		422	225	408	112	404	9
Net Change of Inventory	40014	2164	100		-219	84	1989	22		1510	261	2229	126	1353	10
Total Business Unit and Family Earnings	40019	14355	100		11456	84	9528	22		16248	261	14745	126	16148	10
Interest Allow. on Total Cap.	40021	12257	100		12011	84	13301	22		12563	261	12529	126	12802	10
Value of Family Labor	40022	1060	56		869	43	1324	14		1065	159	1062	74	781	6
Value of Operator's Labor	40023	5543	100		5661	84	4916	22		5434	261	5529	126	5555	10
Return to Mgt: Business Unit	40024	-4505	100		-7086	84	-10013	22		-2814	261	-4375	126	2990	10
Return to Labor & Management	40026	1038	100		-1424	84	-5097	22		2620	261	1154	126	2565	10
Return to Labor & Mgt/Man	40027	-41	100		-1978	84	-4717	22		1371	261	-471	126	2017	10

TABLE 14 (continued)

YEAR END BUSINESS SUMMARY FOR GENERAL FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 GENERAL FARMS		MISSOURI		KANSAS	IOWA		ILLINOIS & KENTUCKY		CENSUS	MICHIGAN		WISCONSIN		NEBRASKA	
Description	Code		(100)	(0)		(84)		(22)	(0)		(261)		(126)		(10
Return to Capital & Mgt. Business Unit	40028	7752	100		4926	84	3288	22		9749	261	8154	126	9812	10
Percent Return: Business Unit	40029	2.78	100		1.75	84	1.16	22		3.23	261	3.24	126	3.68	10
Net Earnings per $100 Charged for Land, Labor & Capital	40030	77	100		64	84	57	22		82	261	77	126	84	10
Total Acres in Business Unit	41010	741	100		740	84	667	22		714	261	759	126	755	10
Acres of Cropland	41012	455	100		446	84	491	22		472	261	489	126	513	10
Total Capital Managed	41020	245141	100		240228	84	266022	22		251259	261	250576	126	256037	10
Land & Improvements	41021	169521	100		161827	84	164693	22		176908	261	173507	126	181176	10
Livestock	41022	41917	100		44687	84	59089	22		37685	261	40598	126	37872	10
Feed, Seed & Supplies	41023	15024	100		15002	84	18331	22		16154	261	14785	126	16401	10
Machinery and Equipment	41024	18681	100		18711	84	23908	22		20515	261	20689	126	20590	10
Total Value of Production	41030	38357	100		35290	84	37164	22		41497	261	40505	126	40688	10
Per Acre of Open Land	41031	63.97	100		61.78	84	70.20	22		75.58	261	69.45	126	67.89	10
Productive Man Work Units	41040	726	100		727	84	908	22		733	261	756	126	716	10
Per Man	41041	373	100		363	84	433	22		373	261	393	126	380	10
Man Years of Labor	41050	2.01	100		2.03	84	2.15	22		2	261	2	126	1.92	10
Crop Productive Man Work Units	41110	291	100		293	84	363	22		309	261	320	126	328	10
Value of Crops Harvested	41210	21185	100		19908	84	24736	22		24055	260	23361	126	24940	10
Value of All Production on Cropland	41220	26177	100		24368	84	27732	22		29041	261	28040	126	30536	10
Per Acre of Cropland	41221	58.84	100		57.75	84	61.94	22		60.23	261	59.23	126	60.61	10
Crop Costs Per Acre of Cropland	41303	29.49	100		30.61	84	38.16	22		32.07	261	30.77	126	29.75	10
Fixed Machine Costs	41310	3606	98		3693	83	4478	22		4234	257	4231	125	4354	10
Per Acre of Cropland	41311	7.99	98		8.29	83	11.06	22		9.13	257	8.64	125	8.62	10
Variable Machine Costs	41320	3057	100		2961	84	3702	22		3395	261	3467	126	3311	10
Per Acre of Cropland	41321	6.18	100		6.05	84	8.34	22		6.89	261	6.30	126	3.32	10
Fertilizer and Lime	41330	3978	100		4071	84	5296	22		4322	261	4484	126	4489	10
Per Acre of Cropland	41331	9.51	99		10.13	83	12.08	22		9.84	260	9.61	125	8.99	10
Cropland Returns to Land and Labor	41410	12917	100		11000	84	10941	22		14116	261	12843	126	15365	10
Per Acre of Cropland	41411	29.35	100		27.14	84	23.77	22		28.16	261	28.46	126	30.86	

		AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO
Alfalfa Hay (tons)	41431	27	3.0	46	25	3.0	29	25	3.0	10	27	2.7	100	26	3.1	46	23	3.2	36
Rotation Pasture	41434	128	1.4	81	130	1.6	65	147	1.8	17	116	1.5	196	136	1.3	97	133	1.3	87
Permanent Pasture	41435	201	1.2	86	206	1.3	68	143	1.5	18	147	1.2	213	179	1.3	100	179	1.2	83
Corn Silage (tons)	41436	34	11.2	43	49	10.5	35	79	10.8	13	39	10.6	112	40	11.2	57	42	10.8	39
Corn	41448	123	60.0	89	140	57.4	73	175	57.7	21	157	58.3	225	149	58.6	114	152	61.8	99
Sorghum	41451	49	62.5	23	45	54.4	23	54	53.6	9	58	56.3	54	54	54.0	32	53	57.7	27
Soybeans	41452	99	26.8	77	92	26.4	59	74	28.1	16	132	27.1	193	118	26.8	99	115	27.7	86
Wheat	41453	29	27.8	58	25	29.2	46	26	28.7	12	32	29.7	155	29	29.0	81	33	29.5	69

TABLE 14 (continued)

YEAR END BUSINESS SUMMARY FOR GENERAL FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 GENERAL FARMS		MISSOURI	(100)	KANSAS	IOWA	(84)	ILLINOIS & KENTUCKY	(22)	CENSUS	MICHIGAN	(261)	WISCONSIN	(126)	NEBRASKA	(105
Description	Code			(0)					(0)						
Livestock Productive Man Work Units	41501	420	100		416	84	512	22		404	261	413	126	366	105
Value of All Livestock Prod.	41502	39472	100		39732	84	43937	22		48262	261	39340	126	34255	105
Feed Fed to Livestock	41503	29794	100		31519	84	47632	22		28093	261	29473	126	26678	105
Livestock Returns Above Feed Costs	41504	9678	100		8213	84	6305	22		10169	261	9867	126	7577	105
Livestock Returns Per $100 Feed Fed	41505	135	100		130	84	119	22		142	261	138	126	133	105
Livestock Returns for Labor and Housing	41506	1482	100		203	84	-3472	22		2109	261	1788	126	321	105
Feed Purchased	41509	9080	100		10129	84	8578	22		9086	261	9576	126	7727	105
Average No. of Dairy Cows	41511	18	14		8	12	26	8		38	51	31	20	17	15
Milk Per Cow	41513	8137	12		6488	11	10715	8		9019	47	1336	19	8186	13
Value of Dairy Production	41514	3847	40		1745	27	13132	11		12653	102	3139	41	4964	30
Number of Beef Cows	41521	91	86		81	70	66	16		64	194	60	102	75	87
Number of Stocker & Feeders	41522	119	100		133	83	190	22		108	247	116	121	113	102
Value of All Beef Production	41525	16666	100		18464	83	21949	22		15298	248	17226	122	15936	102
Litters of Pigs Farrowed	41531	76	91		71	71	61	16		74	202	70	105	64	86
Value of All Pork Production	41535	21310	97		19554	81	17025	19		17958	242	18650	118	15753	98
Pigs Per Litter	41536	8	91		8	70	8	16		8	201	8	104	8	85
Value of Poultry Production	41557	388	21		4341	16	746	5		648	50	6382	25	8709	17
Total Labor Charge	41610	9064	100		8963	84	8756	22		9104	261	9096	126	8672	105
Per $100 Production	41611	28.89	100		30.65	84	27.50	22		27.36	261	24.46	126	25.31	105
Per Man	41612	4540	100		4397	84	4129	22		4520	261	4652	126	4568	105
Total Mach. & Equip. Cost	41700	10328	100		10198	84	12439	22		11222	261	11317	126	11045	105
Fixed Mach. & Equip. Cost	41710	5697	100		5761	84	7093	22		6319	261	6368	126	6405	105
Fixed Mach. & Equip. Cost: Lvst	41711	2091	100		2068	84	2616	22		2085	261	2137	126	2050	105
Variable Machine Cost: Total	41720	4630	100		4437	84	5346	22		4903	261	4950	126	4640	105
Variable Machine Cost: Lvst.	41721	1573	100		1476	84	1644	22		1508	261	1482	126	1329	105
Machine & Equip. Cost/$100 Production	41730	29.84	100		32.30	84	34.50	22		31.18	261	30.19	126	30.96	105
Machine & Equipment Investment	41740	18681	100		18711	84	23908	22		20515	261	20689	126	20590	105
Machine and Equip. Invest/Man	41741	9425	100		9420	84	11340	22		10511	261	11050	126	11016	105
Mach. & Equip. Invest./$100 Production	41742	52.97	100		58.05	84	65.77	22		56.34	261	54.61	126	56.97	105
Combined Labor & Machinery and Equip. Charge/$100 Production	41800	58.73	100		63	84	62	22		58.55	261	57	126	56.28	105

end business analysis when considering size indicators other than capital managed.

A significant result concerning general farm size, from the year-end analysis, was the difference in physical size. This implied that the different systems generated varying capital intensity and structure implications.

Total cash expenses for type 0 varied by 36 percent from the group generated by the Nebraska system to the Illinois group. Two-thirds of the difference was attributed to total new investment expense. The component of total new investment expense which made the Illinois group high was the sixteen farms with $32,447 stocker and feeding livestock expense.

Total operating expense showed a 20 percent difference from Illinois to Nebraska. Interest expense can be used as a proxy for indebtedness and was highest for the Illinois group ($5,224) and lowest for the Missouri group ($3,044). At 6 percent, the difference from the high to the low group represents $36,333 indebtedness.

The high Illinois machinery investment was reflected in the unit cost with total crop cost per acre, variable cost and fixed machine cost per acre being highest for the Illinois group. The low costs per unit were random among the other groups of farms within the general farm type.

Total cash receipts were considerably higher for the twenty-two farms in the Illinois group than the other five groups. The main contribution to the high receipts was livestock with beef the major contributor to total livestock receipts.

Only the Nebraska general farm type showed a positive return to management for the business unit. The high cash receipt group (Illinois) showed a negative return to management of approximately $10,000. All

subsets of general farms indicated negative returns to management except Nebraska, which showed $2,990 positive return.

The Illinois and Iowa general farms had negative returns to labor and management while the other four groups did have a positive return when labor and management were combined. The percent return to the business unit was high for the Nebraska group with 3.68 and low for the Illinois group with 1.16.[7]

The subsets generated by the various systems of classification resulted in varying year-end business analysis results. The implications should be that the structure of the general farms portrayed by the year-end analysis varied according to the composition of the farms in each of the general farm type groups. Size indicators and other items discussed above were fairly consistent for the largest farms which made up the Illinois group. However, a description of the group most adequately describing general farms of the 403 farms used for the basic set is difficult, if not impossible, to determine since the indicators were widely distributed among the five types discussed.[8]

Some questions relative to this class are: do the general farms in Missouri require 261 productive man work days for livestock or 512 days? Are the returns per $100 feed fed $142 or $119? Are the livestock returns for labor and housing negative or positive? Is the capital required for livestock $59,000 or $37,000 for general farms? Are crop costs per acre $29 or $38? Is the cost for management to the operator negative $10,000 or is the operator receiving a positive $3,000 return for his management input to the business unit?

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[7]The percent return is calculated by the return to capital and management divided by total capital managed and converted to percent.

[8]Illinois was an exception to this statement.

The above questions are only a sample of those which are raised from viewing the year-end analysis for the groups of farms produced by the various systems of classification concerning general farm types. Affirmative or negative answers cannot be given to any of the questions. If a trend were observed in the items, a case could be made for one type classification system over the other concerning the general farms. However, the only trend observed was the physical size measurement being highest for the Illinois group of farms. The implications from the physical measurements being largest are contrary to expected higher returns from larger physical units. Resources, according to the analysis, were not combined in the most productive manner or diseconomies of scale resulted in lower returns for the larger size farms. Therefore, the questions raised will go unanswered until the grain, hog, beef, and dairy farm results are viewed to see if more pointed and logical trends develop under the classification systems for each of the said types.

GRAIN FARMS (TYPE 1)

The composition of the grain type initially was composed of seventy-eight farms by the Missouri system. Michigan's rigid requirements for the high percentage value of production necessary for a farm to be classified type 1 resulted in only nine grain farms by the Michigan system. All eight classifications generated a group of grain farms ranging from nine in Michigan to 128 in Kansas. It would be expected that types composed of a similar number of farms would produce similar results in the year-end business analysis. However, it should be remembered that even though the totals may be similar, the composition of the farms making up the totals vary significantly with exit and entry of completely different farms.

The specialized grain farms making up the Michigan group were larger in terms of physical measurements. In terms of total acres, the average for these nine farms was 1,182 compared with a low in the Iowa group of 785. Total capital managed was also highest for the Michigan group since the large acreage caused land and improvements to be the 'big' contributor to the high total capital managed. Machinery and equipment investment was also larger for the Michigan farms even though the number of acres (694) was not greatly larger than the other groups. Man years of labor of 2.43 appeared significantly higher for Michigan than the low of 1.79 for the Illinois group. The number of crop productive man work days was highest for the Missouri group which was explained by the acres of each crop grown, (i.e., Missouri farms had more

TABLE 15

YEAR END BUSINESS SUMMARY FOR GRAIN FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 GRAIN FARMS		MISSOURI		KANSAS		IOWA		ILLINOIS & KENTUCKY		CENSUS		MICHIGAN		WISCONSIN		NEBRASKA	
Description	Code		(78)		(128)		(98)		(90)		(77)		(9)		(90)		(73)
Total Livestock Expense	100	5597	78	8940	128	6659	98	5739	90	4525	77	10280	9	5356	90	4345	73
Feed	110	5184	77	8265	127	6010	97	5251	89	4159	76	9823	9	4885	89	3975	72
Other	XXX	413	73	675	127	649	97	488	89	366	76	457	8	471	89	470	72
Total Machinery & Eq. Expense	200	7166	78	7044	128	6775	98	6466	90	6662	77	8430	9	6715	90	6857	73
Auto	210	369	70	380	114	404	86	376	79	399	70	458	6	394	79	358	64
Gas and Oil	220	1966	78	1742	128	1741	98	1721	90	1743	77	1602	9	1736	90	1853	73
Tractor	230	761	75	750	125	783	95	727	87	729	75	587	9	738	87	754	70
Truck	240	803	78	860	127	912	97	791	89	746	76	1787	9	770	89	801	73
Other Machinery	250	1805	78	1759	128	1627	98	1654	90	1673	77	2083	9	1690	90	1748	73
Machine Hire	260	1463	74	1552	122	1309	94	1697	86	1371	72	1913	9	1388	86	1342	69
Total Crop Expense	300	10348	78	9550	128	9822	98	9838	90	9447	77	11436	9	9677	90	10097	73
Lime	310	412	44	389	81	406	58	421	53	435	47	347	3	390	52	429	42
Phosphate	320	83	4	56	8	79	7	86	7	95	6	345	1	79	5	67	4
Other Fertilizer	XXX	5284	75	4960	125					4775		7385	9				
Chemicals	350	2674	77	2314	125	2384	96	2398	88	2353	74	2459	9	2402	89	2608	72
Miscellaneous	370	1747	77	1704	125	1662	97	1629	89	1640	76	1688	9	1671	89	1687	72
Total Labor Expense	400	2181	71	2491	117	2271	86	2021	80	2068	67	6582	9	2196	80	2173	65
Wages	410	2010	71	2252	117	2077	86	1857	80	1910	67	5402	9	2028	80	2016	65
Other Labor	XXX	171	32	239	58	194		164		158	5	1180		168		157	
Total Miscellaneous Expense	500	9451	78	9757	128	8816	98	8641	90	8765	77	9604	9	9096	90	9134	73
Real Estate Maint. & Repairs	510	1004	78	1182	128	1026	98	1005	90	914	77	1006	9	949	90	894	73
Utilities	XXX	207	78									1220	9				
Taxes	550	2061	78	2049	128	1909	98	1914	90	1967	77	1911	9	1974	90	1982	73
Insurance	560	574	77	561	127	382	97	582	89	562	76	483	9	551	89	559	72
Interest	570	3723	70	4015	118	3315	87	3577	81	3323	67	4110	9	3489	80	3618	65
Cash Rent	580	1162	36	994	59	996	45	996	41	1047	31	211	2	1185	43	1146	34
Miscellaneous Overhead	590	308	77	305	126	308	97	294	89	319	77	665	9	292	89	300	72
Total Operating Expense	***	34743	78	37782	128	34343	98	32705	90	31467	77	46332	9	32872	90	32606	73
Breeding Livestock	610	1426	42	1613	80	1878	57	1474	53	1253	46	1939	5	1543	51	1125	39
Stocker & Feeding Livestock	620	10111	51	15401	89	6625	60	6985	57	3838	42	4107	3	7683	55	7641	45
Mach. and Equipment	630	6261	72	5910	115	5860	89	5884	82	5647	70	8721	9	5914	82	6179	67
Buildings & Feed Lots	640	1343	22	1245	42	1226	32	1251	30	1276	25	5166	4	1361	30	1109	20
Field Improvements (land clearing, fences, terraces, etc)	650	431	30	532	63	584	47	592	43	464	34	857	5	592	40	445	27
Total New Investment	***	19572		24701	115	16173	89	16186	82	12478		20790	9	17093	82	16449	67
Total Cash Expense		54315		62483		50516		48891		43945		67122		49965		49105	
Resale		1438		1274		1420		1523		1843		2099		1602		1429	

TABLE 15 (continued)

YEAR END BUSINESS SUMMARY FOR GRAIN FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 GRAIN FARMS		MISSOURI		KANSAS		IOWA		ILLINOIS & KENTUCKY		CENSUS		MICHIGAN		WISCONSIN		NEBRASKA	
Description	Code	Value	No. (78)		(128)		(98)		(90)		(77)		(9)		(90)		(73)
Total Livestock Receipts	700	28943	75	42499	125	26287	95	24985	87	16540	74	16199	7	24355	87	21371	70
Beef Cattle	720	19349	64	29439	115	14784	77	15831	73	9401	63	6113	4	15715	73	14666	58
Dairy Cattle	730	22	2	44	6	531	8	7	3	22	2	28	1	21	3	25	3
Hogs	740	9347	53	12341	96	8464	63	9007	61	6939	49	10052	5	8439	58	6460	44
Sheep	750	3	3	2	4	4	3	5	3	0.78	1	0	0	5	3	2	1
Milk	786	1	3	8	6	1302	6	.01	1	1	1	0	0	1	3	1	3
Poultry	790	10	5	292	7	1056	4	.07	1	8	3	0	0	8	4	10	4
Eggs	XXX	50	4	152	8					25	3	0	0				
Total Crop Receipts	800	41997	78	33491	127	39460	98	40287	90	43721	77	56924	9	41273	90	43823	73
Forage Crops	810	328	23	314	44	330	36	293	33	385	28	560	5	359	33	331	26
Fruits, Nuts	820	0	0	3	1	3	1	4	1	4	1	0	0	4	1	6	1
Corn	833	17492	76	12204	110	15537	91	15865	86	16947	73	20897	9	16086	87	17818	70
Grain Sorghum	836	1182	19	899	22	993	23	1071	20	1069	16	3900	3	1018	20	1209	19
Soybeans	837	13226	73	11109	113	12172	89	12324	83	13521	71	14928	9	12688	85	14233	69
Soybean Seed	847	1235	15	1271	23	1483	20	1527	19	1767	18	1950	2	1510	18	1139	12
Wheat	838	1284	51	1058	73	1228	61	1277	58	1314	52	1825	5	1234	59	1378	48
Wheat Seed	848	132	7	81	7	130	7	142	7	130	6	125	1	141	7	71	4
Grain Sorghum	850	47	10	133	22	186	14	203	14	153	13	74	2	203	14	163	12
Legume Seeds	860	4	3	28	9	28	5	5	4	10	5	0	0	5	4	4	3
Truck Crops	870	135	2	82	2	107	2	93	1	137	2	0	0	117	2	144	2
Government Payments	899	6174	59	5618	106	6372	79	6538	74	7042	67	8575	7	6716	74	6466	59
Total Miscellaneous Income	900	3925	78	3779	128	3980	98	3699	90	3779	77	2196	9	3739	90	3977	73
Custom Work	910	1473	59	1254	89	1412	71	1211	65	1395	56	444	4	1290	66	1510	56
Ins. from Mach., Buildings	XXX	299	17		28					253	14						
Government Payments	960	75	23	83	46	84	34	88	32	77	25	22	1	77	27	68	20
All Other Farm Receipts	XXX	2044	73	1983	119					2020	74	1578	9				
Total Cash Receipts		74865		79769		69727		68971		64040		75319		69367		69171	
Cash Balance (Bus)	40011	19112	78	16012	128	17791	98	18557	90	18252	77	6098	9	17800	90	18637	73
Interest (Bus)	40012	3722	70	4015	118	3315	87	3220	81	3323	67	4110	9	3489	80	3619	65
Home Used Products	40013	293	51	311	89	390	63	290	57	264	48	155	2	281	56	267	43
Net Change of Inventory	40014	2164	78	1097	128	3472	98	2950	90	3378	77	3758	9	3162	90	2475	73
Total Business Unit and Family Earnings	40019	25291	78	21436	128	24868	98	25017	90	25217	77	14121	9	24732	90	24997	73
Interest Allow. on Total Cap.	40021	15885	78	15740	128	15056	98	15261	90	15226	77	18002	9	15251	90	15330	73
Value of Family Labor	40022	619	46	520	67	592	58	523	50	527	49	549	5	458	51	484	43
Value of Operator's Labor	40023	5251	78	5474	128	5284	98	5346	90	5087	77	4231	8	5170	90	4954	73
Return to Mgt: Business Unit	40024	3536	78	-298	128	3935	98	3957	90	4377	77	-8661	9	3852	90	4229	73
Return to Labor & Management	40026	8788	78	5175	128	9219	98	9303	90	9464	77	-4431	9	9022	90	9183	73
Return to Labor & Mgt/Man	40027	7016	78	3375	128	7227	98	8287	90	7442	77	-10054	8	6969	90	6910	73

TABLE 15 (continued)

YEAR END BUSINESS SUMMARY FOR GRAIN FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 GRAIN FARMS		MISSOURI		KANSAS		IOWA		ILLINOIS & KENTUCKY		CENSUS		MICHIGAN		WISCONSIN		NEBRASKA	
	Code	Value	(78)		(128)		(98)		(90)		(77)		(9)		(90)		(73)
Return to Capital & Mgt. Business Unit	40028	19421	78	15442	128	18991	98	19218	90	19603	77	9340	9	19104	90	19558	73
Percent Return: Business Unit	40029	5.77	78	4.84	128	6.26	98	6.08	90	6.13	77	3.62	9	6.01	90	6.07	73
Net Earnings Per $100 Charged for Land, Labor & Capital	40030	110	78	99	128	115	98	115	90	114	77	98	9	113	90	113	73
Total Acres in Business Unit	41010	829	78	842	128	785	98	787	90	798	77	1182	9	798	90	792	73
Acres of Cropland	41012	665	78	620	128	616	98	617	90	632	77	694	9	628	90	630	73
Total Capital Managed	41020	317692	78	314819	128	301120	98	305218	90	304525	77	360039	9	305027	90	306595	73
Land & Improvements	41021	249825	78	237370	128	236300	98	239384	90	245183	77	293561	9	239943	90	243401	73
Livestock	41022	18373	77	30845	127	20058	97	20116	89	15819	76	12063	8	19796	89	16587	72
Feed, Seed, & Supplies	41023	22387	78	21550	128	20418	98	21260	90	19693	77	20677	9	20736	90	12027	73
Machinery and Equipment	41024	27107	78	25056	128	24346	98	24460	90	23832	77	33738	9	24553	90	25581	73
Total Value of Production	41030	53769	78	49860	128	52046	98	51308	90	51574	77	53100	9	51786	90	52214	73
Per Acre of Open Land	41031	74	78	70	128	80	98	77	90	73	77	65	9	75	90	75	73
Productive Man Work Units	41040	621	78	676	128	606	98	583	90	567	77	530	9	583	90	569	73
Per Man	41041	337	78	361	128	344	98	344	90	340	77	282	9	338	90	337	73
Man Years of Labor	41050	1.91	78	1.97	128	1.88	98	1.79	90	1.79	77	2.43	9	1.83	90	1.82	73
Crop Productive Man Work Units	41110	433	78	407	128	389	98	388	90	391	77	410	9	393	90	403	73
Value of All Production on Cropland	41220	48546	78	43082	128	45017	98	45370	90	45949	77	52629	9	46765	90	48176	73
Per Acre of Cropland	41221	73.31	78	69.13	128	72.89	98	74.04	90	71.33	77	73.32	9	74.40	90	75.94	73
Crop Costs Per Acre of Cropland	41303	34.10	78	43.27	128	30.20	98	33.61	90	32.33	77	39.02	9	33.18	90	43.17	73
Fixed Machine Costs	41310	7006	78	6227	128	6331	98	6450	90	6504	77	9157	9	6478	90	6923	73
Per Acre of Cropland	41311	10.82	78	10.22	128	10.52	98	10.65	90	10.54	77	13.03	9	10.60	90	11.31	73
Variable Machine Costs	41320	4828	78	4482	128	4346	98	4242	90	4436	77	6158	9	4399	90	4504	73
Per Acre of Cropland	41321	7.68	78	7.33	128	6.96	98	7.32	90	7.30	77	9.43	9	7.32	90	7.48	73
Fertilizer and Lime	41330	5745	78	5354	128	5470	98	5466	90	5261	77	6951	9	5353	90	5484	73
Per Acre of Cropland	41331	8.70	78	8.77	128	8.89	98	8.93	90	7.96	77	10.01	9	8.5	90	8.53	73
Cropland Returns to Land and labor	41410	26368	78	22854	128	24633	98	25021	90	25542	77	25785	9	26266	90	26800	73
Per Acre of Cropland	41411	39.21	78	36.23	128	39.69	98	40.43	90	39.10	77	34.31	9	38.76	90	41.55	73

		AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO
Alfalfa Hay (tons)	41431	19	2.4	16	21	2.6	32	20	2.7	26	19	2.7	22	21	2.9	19	20	3.4	2	20	2.6	22	18	2.6	18
Rotation Pasture	41434	77	1.3	43	96	1.5	86	90	1.2	60	83	1.2	56	77	1.3	46	36	2.1	4	67	1.3	53	51	1.3	40
Permanent Pasture	41435	87	1.4	55	150	1.3	97	96	1.3	71	93	1.3	67	90	1.3	58	222	1.2	5	99	1.2	66	93	1.3	53
Corn Silage (tons)	41436	41	10.6	20	44	11.4	46	24	12	25	22	11.7	22	21	11.2	15	0	0	0	23	11.3	19	24	11.8	17
Corn	41448	260	63.4	75	214	62.2	125	220	64.7	94	216	65.0	88	218	63	74	272	69	9	211	67.6	87	233	67.2	70
Sorghum	41451	76	50.0	20	70	55.5	31	75	60.3	22	82	63.3	19	65	54	16	56	43	2	75	59.8	20	79	56.3	16
Soybeans	41452	208	29.0	73	182	28.8	115	192	29.8	91	192	30.5	84	203	29	73	192	33	8	194	30.0	85	210	29.6	69
Wheat	41453	48	33.2	55	45	31.1	86	47	31.1	66	47	31.1	62	45	31	56	46	33	5	48	31.2	60	49	32.3	46

TABLE 15 (continued)

YEAR END SUMMARY FOR GRAIN FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 GRAIN FARMS		MISSOURI		KANSAS		IOWA		ILLINOIS & KENTUCKY		CENSUS		MICHIGAN		WISCONSIN		NEBRASKA	
Description	Code	Value	(78)		(128)		(98)		(99)		(77)		(9)		(90)		(73)
Livestock Productive Man Work Units	41501	151	77	237	127	182	97	165	89	142	76	109	8	158	89	129	72
Value of All Livestock Prod.	41502	15979	77	23953	127	16926	97	15377	89	12381	76	6598	8	13775	89	10941	72
Feed Fed to Livestock	41503	13102	78	19854	128	12200	98	11581	90	9044	77	8361	9	10939	90	9245	73
Livestock Returns Above Feed Costs	41504	2877	78	4099	128	4727	98	3796	90	3336	77	-1763	9	2836	90	1695	73
Livestock Returns Per $100 Feed Fed	41505	154	77	144	127	158	97	155	89	161	76	83.89	8	151	89	152	72
Livestock Returns for Labor and Housing	41506	-998	78	-1551	128	286	98	-331	90	-23	77	-7168	9	-1255	90	1701	73
Feed Purchased	41509	2899	76	4824	126	3861	96	3235	88	2473	75	4884	8	2877	88	2380	71
Average No. of Dairy Cows	41511	1	2	1.4	5	41	6	1	2	1	2	0	0	1	3	1	1
Milk Per Cow	41513	2820	2	4715	3	8190	5	2640	1	2640	1	0	0	1440	2	2640	1
Value of Dairy Production	41514	184	2	104	5	8589	6	168	2	212	2	0	0	237	3	2640	1
Number of Beef Cows	41521	37	49	56	86	47	64	48	61	45	58	40	6	46	60	37	46
Number of Stocker & Feeders	41522	73	70	122	120	71	85	74	80	56	68	25	5	77	79	69	64
Value of All Beef Production	41525	11023	70	16061	120	9632	86	10347	79	8120	68	3479	5	9284	79	7801	64
Litters of Pigs Farrowed	41531	37	31	41	65	41	41	42	40	37	34	28	4	39	38	33	26
Value of All Pork Production	41535	8532	54	10855	98	8730	65	8833	63	7651	51	8417	5	8210	60	6225	46
Pigs Per Litter	41536	8.0	31	8.1	64	8.0	41	7.9	40	8.0	34	8.0	4	8.12	38	7.86	26
Value of Poultry Production	41557	333	15	2458	21	6281	15	143	10	316	10	0	0	371	12	371	12
Total Labor Charge	41610	8417	78	8872	128	8475	98	8119	90	8026	77	11841	9	8171	90	7946	73
Per $100 Production	41611	17.47	78	19.77	128	17.94	98	17.68	90	17.34	77	55.00	9	17.31	90	16.82	73
Per Man	41612	4384	78	4570	128	4543	98	4550	90	4516	77	4696	9	4459	90	4360	73
Total Mach. & Equip. Cost	41700	13906	78	13429	128	12863	98	12796	90	12668	77	18663	9	12979	90	13211	73
Fixed Mach. & Equipment Cost	41710	8404	78	7899	128	7652	98	7723	90	7583	77	11110	9	7765	90	8016	73
Fixed Mach. & Equip. Cost: Lvst	41711	1397	76	1672	126	1321	96	1273	88	1080	75	1952	7	1287	88	1093	71
Variable Machine Cost: Total	41720	5502	78	5530	128	5211	98	5072	90	5085	77	7554	9	5214	90	5195	73
Variable Machine Cost: Lvst.	41721	674	75	1049	125	865	95	830	87	649	74	1395	6	816	87	691	70
Machine & Equip. Cost/$100 Production	41730	29	78	29.67	128	27.41	98	27.38	90	27.95	77	63.67	9	27.98	90	28.71	73
Machine & Equipment Investment	41740	27108	78	25056	128	24346	98	24460	90	23832	77	33738	9	24553	90	25582	73
Machine and Equip. Invest/Man	41741	15172	78	14437	128	14785	98	15225	90	15195	77	18033	9	15019	90	15947	73
Mach. & Equip. Invest./$100 Production	41742	56.45	78	56.28	128	52.16	98	52.49	90	53.77	77	108.22	9	53.41	90	55.90	73
Combined Labor & Machinery and Equip. Charge/$100 Prod.	41800	46.22	78	49.45	128	45.35	98	45.06	90	45.29	77	118.67	9	45.29	90	45.53	73

acres of high labor using crops such as corn silage and other row crops).

The Michigan groups' high machinery and equipment investment expense and high operating expense contributed to the highest total cash expenses for the subset of grain farms produced by the Michigan system. The Illinois group had the lowest operating expenses.

As was the case in general farms, the per acre cost for grain farms was high for Michigan and appeared to vary significantly from the low groups. The use of fertilizer and lime was considerably higher and contributed to higher unit costs on the highly specialized Michigan farm group. However, this group of farms did not produce the highest value per acre nor did the yields appear significantly higher. Capitalization of the interest paid (at 6 percent) resulted in approximately $17,000 difference in indebtedness from the highest interest expense by Michigan to the low interest expenditure by the Illinois group.

The group of grain farms typed 1 by the Kansas system produced the highest total cash receipts due to considerably higher livestock receipts. As was pointed out earlier, the Kansas type 1 criteria allowed farms with considerable numbers of livestock to move into the grain type. Application of the Kansas system of classification resulted in 128 grain farms which was the highest number produced by the eight systems of classification. Allowing diversified farms into the Kansas group produced the lowest value of crops per acre. Kansas grain farms also had the lowest livestock return per $100 feed fed. One conclusion from the effects of allowing somewhat 'general' farms into the type 1 classification was: the more diversified farms did not produce as high unit returns as specialized farms.

The combined labor, machinery and equipment charged per $100 production varied from a low of $45 for the Iowa farms to $118 for the

Michigan farms. Interpretation of this result is questionable and possibly could be explained by one of the nine farms greatly distorting the Michigan average. This seems to be validated since all of the seven systems generated groups with average labor, machinery and equipment charged per $100 production of $45 to $49. This is also in line with an explanation in the 1969 Missouri Farm Business Summary: "Over the past years, the labor and management returns have been unsatisfactory on those farms which have had a labor and machinery cost in excess of $50 per $100 production."

Regardless of whether the average for the Michigan group was distorted by one or more records, the above statement from the Missouri Farm Business Summary holds since the return to management was a negative $8,661 on the Michigan group while all of the other farm groups were positive with the exception of Kansas with a minus $298 return.

The Michigan group had a negative $4,431 return to labor and management while all of the other groups were positive. The percent return varied from a high of 6.26 (Iowa) to a low of 3.62 for the Michigan group.

The same questions raised in the discussion of general farms seem to be applicable to the grain farms. That is, there seems to be a trend in physical size measurements and expense for the specialized Michigan farms while the measurements of the lower size groups varied among the other seven types in a random fashion. Which of the eight systems adequately describes the true structure of Missouri grain farms and which year-end business analysis should be used for farm management recommendations? Particularly significant are the questions raised concerning productive man work units for livestock and crops along with per unit returns, per unit cost and efficiency factors. The attraction of outside capital into grain farms based upon expectations of the percent return indicated by the year-end business analysis would be highly re-

warding or highly disappointing depending upon which system of classification was applied to the basic set in order to stratify the 403 farms into grain farms as a basis for the year-end analysis.

HOG FARMS (TYPE 3)

Results of the year-end business analysis for the hog farms are presented in Table 16. Compared to previous types, the measures of size are more consistent for this type. However, the numbers of farms classified by the various systems ranged from twenty-four by the Michigan system to 126 by the Illinois system (the Census system did not contain a hog farm classification). The Illinois group of farms was high for cropland and total acres as well as all measure of capital managed. The number of man years of labor, as a measure of size, was also high for the Illinois group.

The twenty-nine farms in the Missouri group generated the lowest physical size measure in terms of acres, capital and man years of labor. The same trend continued for Illinois and Missouri for crop productive man work units. However, the Missouri hog farms were larger in terms of litters farrowed and had the highest value of all pork production among the seven systems classifying farms type 3. Although the Illinois group was lowest in terms of number of litters, it was not lowest in value of pork production due to several feeder pig operations included in the 126 farms composing the Illinois group. The Missouri group had the highest total operating expense with livestock expense being the major contributor to the high total. Likewise, the Missouri group had the highest total cash expenses while the Illinois group was near the bottom in magnitude of total expense.

The Missouri subset had the highest total cash receipts, but the

TABLE 16

YEAR END BUSINESS SUMMARY FOR HOG FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 HOG FARMS		MISSOURI		KANSAS		IOWA		ILLINOIS & KENTUCKY		CENSUS	MICHIGAN		WISCONSIN		NEBRASKA	
Description	Code		(29)		(58)		(83)		(126)	(0)		(24)		(63)		(84
Total Livestock Expense	100	32344	29	27100	(58)	20811	83	19494	126		22711	24	25005	63	24027	84
Feed	110	30755	29	25575	(58)	19209	38	18028	126		21149	24	23089	63	22236	84
Other	XXX	1589		1525		1602		1466			1562		1916		1791	
Total Machinery & Eq. Expense	200	4692	29	4515	58	5104	83	5148	126		4457	24	4950	63	5009	84
Auto	210	225	18	304	46	336	70	349	110		200	15	296	49	320	70
Gas & Oil	220	1070	28	1007	56	1163	82	1181	125		987	23	1092	62	1115	83
Tractor	230	597	29	556	56	659	82	641	125		520	24	602	63	647	83
Truck	240	644	28	724	57	716	82	740	125		678	23	764	62	751	83
Other Machinery	250	1146	29	981	58	1253	83	1196	126		1130	24	1183	63	1152	84
Machine Hire	260	1010	29	941	58	976	97	1042	121		943	22	1013	59	1024	80
Total Crop Expense	300	3909	27	3821	56	6074	81	6315	124		5685	22	5459	61	5801	82
Lime	310	352	19	334	39	289	47	309	76		206	11	326	38	329	50
Phosphate	320	25	2	57	10	19	4	42	15		0	0	29	4	38	9
Other Fertilizer	XXX	2099	28	2129	57	3409	82	3535	125		3624	23	3199	62	3352	83
Chemicals	350	703	24	630	49	1290	77	1255	118		1201	21	1010	56	1112	77
Miscellaneous	370	730	8	671	57	1067	82	1174	125		954	23	895	62	970	83
Total Labor Expense	400	2477	28	2019	55	2348	77	2260	119		2135	22	2646	58	2428	78
Wages	410	2145	27	1808	53	2043	75	2000	117		1798	21	2269	56	2124	76
Other Labor	XXX	332	10	211	46	305	10	260	97		337	19	377	37	304	58
Total Miscellaneous Expense	500	6577	29	6876	58	7412	83	7482	126		7008	24	7107	63	7365	84
Real Estate Maint. & Repairs	510	1758	28	1441	57	1376	82	1395	125		1252	24	1486	62	1432	83
Utilities	XXX	893														
Taxes	550	870	29	1019	58	1252	83	1353	125		974	24	1133	63	1163	83
Insurance	560	544	28	432	57	497	82	579	125		600	24	496	62	489	83
Interest	570	2119	26	2433	56	2662	75	2598	115		2595	21	2301	56	2544	77
Cash Rent	580	122	10	497	22	433	36	550	59		268	7	405	23	553	35
Miscellaneous Overhead	590	272	29	246	56	297	82	581	125		233	24	320	61	295	82
Total Operating Expense	XXX	49999	29	44331	58	41749	83	40699	126		41996	24	45167	63	44630	82
Breeding Livestock	610	2305	27	2455	52	2212	68	2141	105		2135	18	2540	53	2317	72
Stocker & Feeding Livestock	620	3560	12	4835	28	4503	41	6103	70		175	4	5263	28	6688	47
Mach. and Equipment	630	4242	25	3714	52	5344	77	5156	118		6605	21	4741	57	4805	77
Buildings & Feed Lots	640	4114	14	3494	37	3808	51	3451	72		5623	16	4121	40	3284	50
Field Improvements	650	778	16	556	27	602	41	567	61		1071	16	662	33	593	45
Total New Investment	XXX	14999		15054		16479		17418			15609		17327		17687	
Total Cash Expense		64998		59385		58228		58117			57605		62494		62317	
Resale		577		989		323		322			0		366		406	

TABLE 16 (continued)

YEAR END BUSINESS SUMMARY FOR HOG FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 HOG FARMS		MISSOURI		KANSAS		IOWA		ILLINOIS & KENTUCKY		CENSUS	MICHIGAN		WISCONSIN		NEBRASKA	
Description	Code		(29)		(58)		(83)		(126)	(0)		(24)		(63)		(84
Total Livestock Receipts	700	62104	29	57224	58	53474	83	53034	126		44249	24	60260	63	58141	84
Beef Cattle	720	9885	24	14444	51	10312	71	13998	113		790	7	11454	51	12504	71
Dairy Cattle	730	34	2	48	8	20	6	125	11		20	3	27	6	24	8
Hogs	740	52141	29	40731	58	43035	83	38368	126		43435	24	48628	63	45373	84
Sheep	750	3	1	2	1	1	1	1	1		4	1	2	1	1	1
Milk	786	7	1	56	2	1	1	338	6		0	0	3	2	3	3
Poultry	790	0	1	1775	3	1	2	1	3		0	0	1	2	1	2
Eggs	XXX	34	1	168	3	104	2	203	3		0	0	145	2	235	2
Total Crop Receipts	800	5040	25	6058	53	10239	78	10679	120		12915	21	6997	58	8123	79
Forage Crops	810	246	11	367	24	255	30	329	47		301	8	226	23	219	29
Fruits, Nuts	820	0	1	0.15	2	0.75	2	0.56	3		.02	1	0.14	2	1	3
Corn	833	837	12	651	24	2258	52	2210	75		5644	17	1506	34	1834	48
Grain Sorghum	836	27	1	79	4	188	8	139	11		450	2	128	6	174	9
Soybeans	837	1919	13	2130	32	3946	59	3909	88		3370	17	2569	40	3121	55
Soybean Seed	847	101	2	274	4	263	9	367	15		7	1	108	4	245	7
Wheat	838	61	6	110	13	310	27	288	39		132	6	60	14	125	20
Wheat Seed	848	0	1	.08	1	26	3	17	4		0	0	5	2	25	3
Grain Sorghum	850	17	2	54	9	67	11	75	21		0	0	42	6	46	9
Legume Seeds	860	12	1	6	1	18	5	14	7		0	0	14	2	11	2
Truck Crops	870	0	0	0	0	0.40	1	0.26	1		0	0	0	0	0	0
Government Payments	899	1799	20	2254	41	2595	60	2942	95		2869	13	2091	41	2124	55
Total Miscellaneous Income	900	1553	28	2489	55	1847	80	2118	123		2514	24	1988	60	2033	81
Custom Work	910	184	12	649	21	256	43	379	69		218	11	116	26	206	39
Ins. from Mach., Buildings	XXX	34	10	224	20	176	40	342	66		789	9	387	24	1073	36
Government Payments	960	54	10	94	25	84	34	87	50		60	10	79	23	80	30
All Other Farm Receipts	XXX	1267	24	1520	24	1331	35	1310	53		1447	12	1406	20	674	27
Total Cash Receipts		68697		65769		65560		65831			59678		69245		68297	
Cash Balance (Bus)	40011	3121	29	5895	58	7009	83	7392	126		2073	24	6395	63	5574	84
Interest (Bus)	40012	2119	26	2433	56	2662	75	2598	125		2595	21	2301	56	2544	77
Home Used Products	40013	429	27	408	52	429	77	379	113		251	20	435	57	403	77
Net Change of Inventory	40014	329	29	197	58	1189	83	1262	126		7459	24	-9	63	1367	84
Total Business Unit and Family Earnings	40019	5998	29	8933	58	11289	83	11631	126		12378	24	9121	63	9888	84
Interest Allow. On Total Cap.	40021	7451	29	7995	58	9651	83	10151	126		8310	24	9101	63	9410	84
Value of Family Labor	40022	741	18	1081	37	1023	54	924	72		789	12	1030	37	896	47
Value of Operator's Labor	40023	4331	29	4706	58	4811	82	5104	125		4752	24	4825	62	4933	83
Return to Mgt: Business Unit	40024	-6527	29	4849	58	4196	83	4548	126		1472	24	-4835	63	5350	84
Return to Labor & Management	40026	-2195	29	-143	58	615	83	556	126		3280	24	-1009	63	417	84
Return to Labor & Mgt/Man	40027	-1982	29	-219	58	1261	82	416	125		3224	24	264	62	102	83

TABLE 16 (continued)

YEAR END BUSINESS SUMMARY FOR HOG FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 HOG FARMS		MISSOURI		KANSAS		IOWA		ILLINOIS & KENTUCKY		CENSUS	MICHIGAN		WISCONSIN		NEBRASKA	
Description	Code	(29)		(58)		(83)		(126)		(26)	(26)		(63)		(84)	
Return to Capital & Mgt. Business Unit	40028	925	29	3146	58	5454	83	5603	126		6838	24	3266	63	4059	84
Percent Return: Business Unit	40029	-.60	29	1.20	58	2.44	83	2.31	126		2.81	24	1.28	63	1.68	84
Net Earnings Per $100 Charged for Land, Labor & Capital	40030	53.58	29	65	58	76.74	83	73.67	126		90	24	68	63	69.68	84
Total Acres in Business Unit	41010	414	28	501	57	570	82	619	126		421	23	547	62	567	83
Acres of Cropland	41012	255	28	277	57	359	82	378	125		309	23	309	62	319	83
Total Capital Managed	41020	149025	29	159896	58	193015	83	203027	126		166198	23	182023	63	188191	84
Land & Improvements	41021	92016	29	103698	58	131600	83	137858	126		116730	23	120253	63	126551	84
Livestock	41022	30422	29	32507	58	28732	83	32350	126		20096	24	30590	63	31294	84
Feed, Seed & Supplies	41023	13144	29	10168	58	14303	83	14418	126		12516	24	14193	63	13413	84
Machinery and Equipment	41024	13443	29	13525	58	18380	83	18403	126		16857	24	16988	63	16932	84
Total Value of Production	41030	26376	29	27638	58	33888	83	34606	126		34053	24	31361	63	32077	84
Per Acre of Open Land	41031	87	28	80	57	81	82	75	125		93	23	82	62	81	84
Productive Man Work Units	41040	621	29	622	58	630	83	655	126		555	24	631	63	631	84
Per Man	41041	366	29	368	58	365	83	366	126		348	24	358	63	365	84
Man Years of Labor	41050	1.69	29	1.73	58	1.82	83	1.86	126		1.62	24	1.88	63	1.82	84
Crop Productive Man Work Units	41110	151	28	171	57	227	82	241	125		200	23	200	62	206	83
Value of All Production on Cropland	41220	13213	28	15085	57	21439	82	22158	125		22845	23	17644	62	18313	83
Per Acre of Cropland	41221	47	28	47	5	58	82	58	125		67	23	55	62	57	83
Crop Costs Per Acre of Cropland	41303	32	28	29	57	34	82	33	125		36	23	35	62	35	83
Fixed Machine Costs	41310	2068	27	1996	54	3500	81	3519	124		3394	23	2964	61	3030	82
Per Acre of Cropland	41311	8	26	7	53	9	80	9	123		10	22	9	60	9	81
Variable Machine Costs	41320	2024	29	1810	58	2828	83	2872	126		2515	24	2536	63	2601	84
Per Acre of Cropland	41321	7	28	6	57	8	82	8	125		8	23	8	62	8	83
Fertilizer and Lime	41330	2558	28	2351	57	3368	82	3477	125		4124	23	3137	62	3257	83
Per Acre of Cropland	41331	11	27	10	56	10	81	10	123		11.4	22	11	61	11	82
Cropland Returns to Land and Labor	41410	4794	29	6435	58	9271	83	9797	126		10369	24	6933	63	7249	84
Per Acre of Cropland	41411	15	28	23	57	25	82	25	125		31	23	21	62	22	83

		AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO
Alfalfa Hay (tons)	41431	14	1.9	7	20	2.6	19	15	2.4	24	22	2.6	38	10	2.0	1	15	2.0	19	21	2.1	24
Rotation Pasture	41434	77	1.2	18	99	1.2	35	71	1.3	56	93	1.3	87	45	1.6	9	73	1.3	38	78	1.3	52
Permanent Pasture	41435	67	1.0	19	137	1.0	44	92	0.9	61	132	1.1	99	73	0.6	8	108	0.9	45	111	1.1	63
Corn Silage (tons)	41436	22	10.7	7	25	10.3	16	21	10.7	19	29	10.4	38	0	0	0	24	10.3	17	20	10.8	24
Corn	41448	127	48.5	22	101	50.9	43	152	55.2	74	139	56.0	111	193	65.3	20	142	52.1	53	138	52.6	72
Sorghum	41451	68	35.3	1	91	63.1	7	94	53.4	10	66	53.1	22	153	77.6	2	97	52.7	9	80	52.7	13
Soybeans	41452	72	25.7	14	76	21.7	32	99	25.4	60	97	25.6	90	85	25.7	17	80	23.6	41	85	25.3	56
Wheat	41453	15	29.1	12	20	2.7	27	27	26.1	45	26	27.5	73	26	21.7	8	21	25.9	28	22	25.7	41

TABLE 16 (continued)

YEAR END BUSINESS SUMMARY FOR HOG FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 HOG FARMS		MISSOURI		KANSAS		IOWA		ILLINOIS & KENTUCKY		CENSUS	MICHIGAN		WISCONSIN		NEBRASKA	
Description	Code		(29)		(58)		(83)		(126)	(0)		(24)		(63)		(84)
Livestock Productive Man Work Units	41501	464	29	435	58	397	83	404	126		349	24	428	63	420	84
Value of All Livestock Prod.	41502	53311	29	47493	58	43402	83	41968	126		41739	24	48682	63	46855	84
Feed Fed to Livestock	41503	40807	29	35801	58	32003	83	31149	126		31038	24	45981	63	34334	84
Livestock Returns Above Feed Costs	41504	12504	29	11691	58	11399	83	10819	126		10700	24	12700	63	12520	84
Livestock Returns Per $100 Feed Fed	41505	132	29	133	58	134	83	134	126		134	24	134	63	136	84
Livestock Returns for Labor and Housing	41506	3401	29	3214	58	3090	83	2703	126		3562	24	3529	63	3663	84
Feed Purchased	41509	17519	29	15504	58	12764	83	11814	126		14812	24	14705	63	14189	84
Average No. of Dairy Cows	41511	2	2	5	5	4	3	1	7		0	0	4	3	3.5	4
Milk Per Cow	41513	697	5	3115	4	2426	2	193	6		0	0	2426	2	2226	3
Value of Dairy Production	41514	78	8	436	22	242	25	500	36		135	6	252	23	251	27
Number of Beef Cows	41521	24	19	44	43	37	55	42	93		8	6	35	38	44	55
Number of Stocker & Feeders	41522	46	26	97	54	52	73	66	115		12	10	56	54	61	74
Value of All Beef Production	41525	5157	27	9069	55	5835	74	8891	116		776	11	5180	55	7885	75
Litters of Pigs Farrowed	41531	152	29	140	56	123	82	103	120		129	23	136	61	125	82
Value of All Pork Production	41535	48387	29	37019	58	38050	83	42404	126		41311	24	43290	63	39524	84
Pigs Per Litter	41536	8.83	29	8.48	56	8.61	82	8.16	120		8.97	23	8.87	61	8.67	82
Value of Poultry Production	41557	118	3	6663	14	159	14	41	20		82	1	174	11	30	15
Total Labor Charge	41610	7802	29	1608	14	8427	83	8549	126		7911	24	8754	63	8513	84
Per $100 Production	41611	47	29	40	58	37	83	35	126		39	24	43	63	40	84
Per Man	41612	4614	29	4724	58	4640	83	4600	126		4996	24	4654	63	4669	84
Total Mach. & Equip. Cost	41700	8519	29	7771	58	10268	83	10180	126		9354	24	9753	63	9730	84
Fixed Mach. & Equip. Cost	41710	4366	29	4115	58	5757	83	5724	126		5439	24	5284	63	5284	84
Fixed Mach. & Equip. Cost: Lvst	41711	2298	29	2119	58	2257	83	2205	126		2044	24	2320	63	2254	84
Variable Machine Cost: Total	41720	4153	29	3656	58	4512	83	4456	126		3915	24	4470	63	4446	84
Variable Machine Cost: Lvst.	41721	2129	29	1846	58	1683	83	1584	126		1400	24	1933	63	1844	84
Machine & Equip. Cost/$100 Production	41730	37.62	29	32.71	58	36.64	83	35.06	126		30.50	24	39.63	63	37.85	84
Machine & Equipment Investment	41740	13443	29	13524	58	18380	83	18403	126		16857	24	16988	63	16932	84
Machine and Equip. Invest/Man	41741	7779	29	7947	58	10124	83	9937	126		10500	24	9085	63	9390	84
Mach. & Equip. Invest/$100 Production	41742	57.17	29	54.38	58	62.89	83	60.69	126		51.33	24	65.84	63	62.46	84
Combined Labor & Machinery and Equipment Charge/$100 Prod.	41800	85.07	29	73	58	73.37	83	69.56	126		69.71	24	82.83	63	78.10	84

high expenses resulted in a cash balance of $3,121 with only the Michigan system, composed of twenty-four farms, being lower ($2,073).

Crop receipts per farm varied from $5,040 in Missouri to $12,915 in Michigan. The Michigan system, with rigid typing requirements, might be expected to produce the most highly specialized group of hog farms. However, Michigan had the highest crop receipts, the lowest livestock receipts and was the middle group in hog receipts for the seven groups.

Returns per $100 feed fed were not very different for the seven groups. Pigs per litter varied from a low of 8.16 in Illinois to a high of 8.83 in Missouri. The labor charged per $100 production was highest in Missouri and lowest in Illinois, reflecting capital intensity and measure of labor employed as discussed under measures of size. The low Missouri cash balance was reflected in the return to management of minus $6,527. The Wisconsin group also showed a negative return to management while all other groups were positive.

Returns to capital and management for the business unit varied from the low of $925 in Missouri to a high of $6,838 for Michigan. This relationship shows again in the percent return, ranging from a negative 0.6 to a positive 2.81. The combined labor, machinery and equipment charge per $100 production is usually higher on livestock farms and ranged from a high of $85 per $100 production for the Missouri group down to about $70 for the Illinois group.

The same type questions can be raised concerning the comparison discussed for the hog farm types as for general farms and grain farms. However, a significant difference appears in the group of hog farms; low measures of size tended to be consistent in one group and the high size measures in one group. High expenses tended to remain with the low size measurement group (Missouri). The Missouri group reflected

hog efficiency in terms of litter size but no differences appeared in crop yields. Expenses were enough higher to result in low or negative returns in terms of labor, management and capital for the Missouri group. Illinois resulted in the highest returns due to lower operating expenses. Efficiency did not decline for the hog farms due to size differences among the various groups.

The question remains regarding which system correctly reflects the characteristics desired to describe and analyze a group of type 1 farms. It is noteworthy that consistent patterns developed within the systems used to generate the hog farm type. The pattern was inconsistent in terms of number of farms composing each type, but as noted above, consistency showed up in the selected measures used to portray a discussion of prescription and diagnosis. The results of the beef and dairy farms need to be examined before implications considering the results for the various systems can be effectively discussed.

BEEF FARMS (TYPE 5)

Compared to the previous three types, beef farms produced the most scattered results in terms of measurements discussed (Table 17). That is, no single system generated consistently high or low results for the groups of farms making up the beef type. The computer was programmed to only run a year-end business analysis for groups of five farms or greater. The Kansas group of five farms was unique in that they were largest in terms of total acres and only one farm had any crops. Three farms averaged 580 acres of rotation pasture and the remaining farms had an average of 1,286 acres of permanent pasture. This group of five farms apparently were made up of beef cow operations since only one farm spent $86 for stocker and feeding livestock.

While the Kansas group had the highest investment in livestock, the Iowa group had the highest capital managed in the other categories. It can be noted from Table 17 that the other measures of size were randomly distributed among the seven systems producing beef farms. The lack of crop acres for the Kansas group along with considerable returns for custom work resulted in a negative figure for variable machine costs per acre. The data shown in Table 17 concerning expenses also present a scattered pattern when considering which group generated the high and low expenses for particular items.

The Wisconsin group had the highest livestock receipts; however, total cash receipts were highest for Iowa. Expenses were lowest for the Michigan group, thereby producing the highest cash balance. The high

TABLE 17

YEAR END BUSINESS SUMMARY FOR BEEF FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 BEEF FARMS		MISSOURI		KANSAS		IOWA		ILLINOIS & KENTUCKY		CENSUS	MICHIGAN		WISCONSIN		NEBRASKA	
Description	Code		(21)		(5)		(41)		(60)	(0)		(41)		(32)		(43)
Total Livestock Expense	100	17036	21	22513	5	20061	41	19946	60		9977	41	20591	32	23416	43
Feed	110	15285	21	20848	5	18376	41	18420	60		9042	40	18789	32	21642	43
Other	XXX	1751	21	1665	5	1685	41	1526	60		935	41	1802	32	1774	43
Total Machinery & Eq. Expense	200	6477	21	7118	5	8346	41	7287	60		6586	41	7557	32	8161	43
Auto	210	306	17	538	5	407	36	387	53		346	39	367	27	387	38
Gas and Oil	220	1178	20	1058	4	1632	40	1446	58		1676	40	1563	31	1635	41
Tractor	230	839	20	997	4	867	40	875	58		904	39	884	31	936	41
Truck	240	695	21	739	5	1051	41	909	60		677	40	775	32	961	43
Other Machinery	250	1067	21	728	5	2052	41	1837	60		1551	41	1625	32	1922	43
Machine Hire	260	2392	21	3058	5	2337	40	1831	59		1432	37	2343	31	2319	42
Total Crop Expense	300	7767	21	6603	5	9488	41	8602	60		8761	41	9638	32	9228	43
Lime	310	538	14	1135	2	478	30	468	44		299	20	412	32	520	30
Phosphate	320	75	3	0	0	6	1	52	6		13	2	12	2	29	3
Other Fertilizer	XXX	4996	21	4862	5	5870	39	5223	60		5329	41	6210	32	5611	43
Chemicals	350	1076	17	332	3	1674	33	1363	51		1893	37	1574	26	1665	35
Miscellaneous	370	1082	19	274	3	1460	39	1496	58		1227	39	1430	30	1403	41
Total Labor Expense	400	2947	19	4537	5	3848	38	3553	57		2600	35	3911	29	3771	40
Wages	410	2481	19	3498	5	3356	38	3123	57		2438	35	3496	29	3295	40
Other Labor	XXX	466		1039		492		430			162		415		476	
Total Miscellaneous Expense	500	10038	21	10647	5	14054	41	11998	60		9737	41	12518	32	13529	43
Real Estate Maint. & Repairs	510	1652	21	2226	5	1728	41	1536	60		916	41	1561	32	1850	43
Utilities	XXX	595	21	778	5	698	41	704	60		543	41	662	32	750	43
Taxes	550	1962	21	1392	5	2265	41	2060	60		2041	41	2086	32	2126	43
Insurance	560	425	21	506	5	682	41	587	60		499	41	536	32	664	43
Interest	570	3763	17	4592	3	6803	37	5477	53		4178	33	6296	28	6465	39
Cash Rent	580	1239	11	425	2	1497	24	1290	30		1285	20	995	16	1267	26
Miscellaneous Overhead	590	402	21	728	5	381	40	344	59		275	40	382	32	407	42
Total Operating Expense	XXX	44265		51418		55797		51386			37661		54215		58105	
Breeding Livestock	610	4561	20	6781	5	3901	33	3587	49		3007	23	4134	27	4482	34
Stocker & Feeding Livestock	620	24673	13	86	1	45692	30	33293	45		28046	26	50344	24	44553	32
Mach. and Equipment	630	5592	19	4734	3	5588	34	4870	50		6058	36	5364	26	4658	32
Buildings and Feed Lots	640	2586	6	10184	3	2365	13	2261	21		700	14	1924	8	2277	15
Field Improvements (land, clearing, fences, terraces, etc.)	650	999	13	2015	3	863	25	777	36		896	24	951	21	843	25
Total New Investment	XXX	38411		23800		58409		44788			38707		62717		56813	
Total Cash Expense		82767		75218		114206		96174			76368		116932		114918	
Resale		15		0		528		779			336		474		850	

TABLE 17 (continued)

YEAR END BUSINESS SUMMARY FOR BEEF FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 BEEF FARMS		MISSOURI		KANSAS		IOWA		ILLINOIS & KENTUCKY		CENSUS	MICHIGAN		WISCONSIN		NEBRASKA	
Description	Code		(21)		(5)		(41)		(60)	(0)		(41)		(32)		(43)
Total Livestock Receipts	700	70328	21	51444	5	95945	41	83297	60		56720	40	103842	32	98816	43
Beef Cattle	720	58646	21	35066	5	88114	41	68108	60		55463	40	93006	32	87019	43
Dairy Cattle	730	33	4	0	0	22	4	20	5		0	0	19	3	17	3
Hogs	740	11615	13	13452	3	7695	27	14888	48		1237	7	10781	20	11341	30
Sheep	750	21	2	0	0	13	4	12	5		0	0	14	2	4	3
Milk	786	13	1	0	0	7	1	14	3		0	0	9	1	6	1
Poultry	790	0	0	72	1	0.20	1	2	2		0.2	1	.25	1	9	2
Eggs	XXX															
Total Crop Receipts	800	8248	21	7865	5	15164	41	15033	60		25281	41	10918	32	14644	43
Forage Crops	810	702	7	2190	2	440	11	498	19		475	19	493	8	451	11
Fruits, Nuts	820	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Corn	833	1388	6	0	0	2828	19	2594	27		9928	30	1656	12	2501	17
Grain Sorghum	836	0	0	0	0	437	3	473	4		728	6	406	1	391	2
Soybeans	837	1260	9	83	1	6184	28	5456	43		7079	30	3349	17	5473	27
Soybean Seed	847	0	0	0	0	285	1	666	5		119	1	0	0	328	2
Wheat	838	303	4	1	1	447	12	344	20		842	25	292	6	337	12
Wheat Seed	848	0	0	0	0	0	0	0	0		0	0	0	0	0	0
Grain Sorghum	850	195	3	807	2	104	6	292	14		488	10	386	6	287	8
Legume Seeds	860	418	1	1757	1	219	3	188	5		9	3	343	3	256	3
Truck Crops	870	0	0	0	0	0	0	0	0		203	1	0	0	0	0
Government Payments	899	3947	16	2956	5	4138	33	4044	52		4988	31	3924	23	4223	36
Total Miscellaneous Income	900	3187	21	5297	5	3780	41	3496	60		4076	41	3235	32	3830	43
Custom Work	910	823	11	1965	4	873	24	679	30		1332	26	799	17	967	24
Ins. from Mach., Buildings	XXX	1122		512		240		668			288		133		235	
Government Payments	960	98	9	40	3	95	16	99	26		92	17	96	15	95	19
All Other Farm Receipts	XXX	1144		2860		2572		2050			2364		2207		2533	
Total Cash Receipts		81763		64606		114889		101826			86077		117995		117290	
Cash Balance (Bus)	40011	-1019	21	-10612	5	155	41	4873	60		9373	41	589	32	1522	43
Interest (Bus)	40012	3763	17	4591	3	6803	37	5477	53		4178	33	6296	28	6465	39
Home Used Products	40013	329	11	509	2	377	27	410	44		237	22	346	20	407	28
Net Change of Inventory	40014	9112	21	18054	5	7688	41	3953	60		2974	41	5800	32	5359	43
Total Business Unit and Family Earnings	40019	12185	21	12542	5	15624	41	14713	60		16761	41	13032	32	13753	43
Interest Allow. on Total Cap.	40021	15365	21	17503	5	18537	41	16778	60		15949	41	18468	32	18186	43
Value of Family Labor	40022	547	10	1640	2	670	16	744	28		385	20	496	13	952	20
Value of Operator's Labor	40023	5657	20	7224	4	6905	40	6166	59		5392	40	6536	31	6608	42
Return to Mgt: Business Unit	40024	-9385	21	-13825	5	-10278	41	-8976	60		4965	41	-12468	32	-11993	43
Return to Labor & Management	40026	-3727	21	-6600	5	-4184	41	-2810	60		427	41	-5932	32	-5385	43
Return to Labor & Mgt/Man	40027	-4738	20	-7678	4	-5951	40	-3877	59		1422	40	-4973	31	-6682	42

TABLE 17 (continued)

YEAR END BUSINESS SUMMARY FOR BEEF FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 BEEF FARMS		MISSOURI		KANSAS		IOWA		ILLINOIS & KENTUCKY		CENSUS	MICHIGAN		WISCONSIN		NEBRASKA	
Description	Code		(21)		(5)		(41)		(60)	(0)		(41)		(32)		(43)
Return to Capital & Mgt. Business Unit	40028	5980	21	3678	5	8258	41	7802	60		10985	41	6000.09	39	6193	43
Percent Return: Business Unit	40029	1.00	21	0.18	5	1.78	41	2.09	60		3.80	41	1.01	32	1.27	43
Net Earnings Per $100 Charged for Land, Labor & Capital	40030	54	21	50.15	5	61.80	41	66.48	60		83.25	41	54.4	32	57.94	43
Total Acres in Business Unit	41010	1027	21	1816	5	1052	41	991	60		902	41	995	32	1024	43
Acres of Cropland	41012	516	21	603	5	609	41	578	60		590	41	558	32	590	43
Total Capital Managed	41020	307302	21	350059	5	370747	41	335569	60		318984	41	369359	32	363726	43
Land & Improvements	41021	189664	21	217120	5	239028	41	222039	60		221342	41	230233	32	230522	43
Livestock	41022	84269	21	102841	5	83955	41	70973	60		50991	41	92945	32	86816	43
Feed, Seed & Supplies	41023	15309	21	9720	5	21260	41	19050	60		21127	41	20357	32	21259	43
Machinery and Equipment	41024	18059	21	20377	5	26505	41	23508	60		25524	41	25824	32	25129	43
Total Value of Production	41030	39990	21	42951	5	48751	41	45320	60		44282	41	44744	32	47152	43
Per Acre of Open Land	41031	60	21	33	5	57	41	59	60		62	41	57	32	60.09	43
Productive Man Work Units	41040	850	21	1113	5	938	41	876	60		722	41	948	32	947	43
Per Man	41041	411	21	429	5	454	41	416	60		416	41	409	32	422	43
Man Years of Labor	41050	2.09	21	2.75	5	2.18	41	2.18	60		1.84	41	2.27	32	2.35	43
Crop Productive Man Work Units	41110	292	21	323	5	411	41	380	60		392	41	382	32	432	43
Value of Crop Harvested	41210	17607	20	9609	5	30272	40	26903	59		31091	41	25997	31	46839	43
Value of All Production on Cropland	41220	24915	21	17761	5	36588	41	32973	60		37169	41	32256	32	36057	43
Per Acre of Cropland	41221	50	21	47	5	58.16	41	56	60		63	41	57	32	44	43
Crop Costs Per Acre of Cropland	41303	35	21	33	5	33.68	41	31	60		35	41	35	32	31.34	43
Fixed Machine Costs	41310	3360	21	2148	4	5757	39	5107	57		6504	40	5548	30	5320	40
Per Acre of Cropland	41311	7	20	3	4	8.92	39	8	57		11	40	10	30	8.41	40
Variable Machine Costs	41320	3289	21	3082	5	4741	41	4112	60		3983	41	4006	32	4559	43
Per Acre of Cropland	41321	2	21	-31	5	4.82	41	5	60		5	41	4	32	2.83	43
Fertilizer and Lime	41330	5041	21	5589	5	5940	41	5361	60		5026	41	5614	32	5625	43
Per Acre of Cropland	41331	17	21	46	5	13.44	41	12	60		12.30	41	15	32	13.53	43
Cropland Returns to Land and Labor	41410	11017	21	6071	5	16897	41	15375	60		18214	41	14026	32	14629	43
Per Acre of Cropland	41411	15	21	14	5	24.49	41	25	60		28.23	41	22	32	25.71	43

		AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO
Alfalfa Hay (tons)	41431	26	2.7	7	0	0	0	29	3.0	13	23	2.8	20	27	2.7	9	25	2.9	9	27	2.9	14
Rotation Pasture	41434	270	1.5	17	580	1.8	3	209	1.5	30	184	1.7	46	142	1.2	27	202	2.1	25	212	1.9	32
Permanent Pasture	41435	417	1.2	17	1286	.7	4	373	1.2	34	360	1.2	45	285	1.2	31	389	1.0	27	343	1.2	36
Corn Silage (tons)	41436	62	12.2	10	0	0	0	71	12.1	27	60	11.6	35	67	13.2	17	98	12.5	18	82	11.8	26
Corn	41438	69	6.0	3	0	0	0	95	5.6	4	78	5.5	4	114	4.1	3	95	5.6	4	90	5.5	4
Sorghum	41451	0	0	0	0	0	0	72	58.6	6	68	61.0	10	127	52.2	7	86	62.5	4	98	61.9	5
Soybeans	41452	58	26.6	9	10	15.3	1	145	25.6	28	127	25.9	43	158	25.5	32	97	25.3	17	135	25.0	27
Wheat	41453	20	26.2	8	0	0	0	30	29.3	24	28	30.4	31	39	28.8	25	28	26.9	14	26	28.7	22

TABLE 17 (continued)

YEAR END BUSINESS SUMMARY FOR BEEF FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 BEEF FARMS		MISSOURI		KANSAS		IOWA		ILLINOIS & KENTUCKY		CENSUS	MICHIGAN		WISCONSIN		NEBRASKA	
Description	Code		(21)		(5)		(41)		(60)	(0)		(41)		(32)		(43)
Livestock Productive Man Work Units	41501	538	21	741	5	506	41	479	60		297	41	546	32	530	43
Value of All Livestock Prod.	41502	48020	21	54194	5	51237	41	48873	60		26468	41	55226	32	55339	43
Feed Fed to Livestock	41503	36864	21	38365	5	43228	41	39976	60		22665	41	47004	32	45349	43
Livestock Returns Above Feed Costs	41504	11156	21	15829	5	8009	41	8897	60		3803	41	8222	32	9991	43
Livestock Returns Per $100 Feed Fed	41505	136	21	149	5	124	41	127	60		161	41	125	32	131	43
Livestock Returns for Labor and Housing	41506	-906	21	1034	5	-3969	41	-1823	60		-3074	41	-4293	32	-2377	43
Feed Purchased	41509	10336	21	20775	5	8763	41	9589	60		4841	40	9891	32	11536	43
Average No. of Dairy Cows	41511	2	1	0	0	1	2	1.5	4		1	1	1	2	1	2
Milk Per Cow	41513	1826	1	0	0	3000	1	3915	3		3000	1	3000	1	3000	1
Value of Dairy Production	41514	-225	6	540	1	-125	12	65	18		-30	3	-152	9	-87	13
Number of Beef Cows	41521	165	18	297	5	101	30	124	43		103	27	162	21	101	30
Number of Stocker & Feeders	41522	298	21	295	5	333	41	269	60		211	41	354	32	337	43
Value of All Beef Production	41525	39329	21	42245	5	45612	41	37597	60		25706	41	48155	32	46993	43
Litters of Pigs Farrowed	41531	52	11	58	3	42	20	55	39		32	2	54	14	50	22
Value of All Pork Production	41535	14196	13	16422	3	8221	28	13562	49		3927	8	10822	21	11240	31
Pigs Per Litter	41536	9	11	9	3	8	20	8	39		10	2	8	14	9	22
Value of Poultry Production	41557	-16	1	10782	1	148	3	1238	6		185	3	234	2	2265	5
Total Labor Charge	41610	9750	21	14165	5	11197	41	10922	60		8735	41	11529	32	11911	43
Per $100 Production	41611	33	21	39	5	27.66	41	29	60		21.02	41	32	32	28.53	43
Per Man	41612	4639	21	5342	5	5192	41	5031	60		4814	41	4845	32	5145	43
Total Mach. & Equip. Cost	41700	11134	21	10334	5	15091	41	13420	60		13068	41	14148	32	14499	43
Fixed Mach. & Equip. Cost	41710	6078	21	5675	5	8223	41	7308	60		8036	41	8035	32	7870	43
Fixed Mach. & Equip. Cost: Lvst	41711	2719	21	3526	5	2465	41	2201	60		1532	41	2487	32	2550	43
Variable Machine Cost: Total	41720	5055	21	4660	5	6869	41	6112	60		5032	41	6113	32	6630	43
Variable Machine Cost: Lvst.	41721	1766	21	1577	5	2128	41	1999	60		1049	41	2107	32	2070	43
Machine & Equip. Cost/$100 Production	41730	37	21	25	5	35.54	41	34	60		31.44	41	38	32	31.23	43
Machine & Equipment Investment	41740	18059	21	20377	5	26505	41	23508	60		25524	41	25824	32	25129	43
Machine and Equip. Invest/Man	41741	8530	21	7129	5	12910	41	11502	60		16830	41	10768	32	11514	43
Mach. & Equip. Invest./$100 Production	41742	58	21	52	5	61.10	41	58	60		61.39	41	66	32	54.14	43
Combined Labor & Machinery and Equipment Charge/$100 Prod.	41800	700	21	64	5	63.20	41	62	60		52.46	41	69	32	59.77	43

cash balance for Michigan generated positive returns to management, to labor and management and to labor and management per man. All other systems generated groups of farms which showed negative returns for these factors. The percent return to capital and management for the business ranged from a high of 3.80 (Michigan) to a low of 0.18 (Kansas).

If livestock returns per $100 feed fed are meaningful, then the $161 return shown for the Michigan group was a contributing factor to the positive returns to labor, management and capital. Although the physical crop yields were not highest for Michigan, the value per acre of cropland was highest and was another factor explaining the positive returns. Also, the combined labor, machinery and equipment charge per $100 production was lowest for this group.

While type 3 (hog farms) showed consistency in terms of physical size measurement and other factors, it appeared that the type 5 (beef farms) groups were inconsistent in all factors except the Michigan group. The results of the business analysis for beef farms again raise the same questions that were raised for types 0, 1, and 3. The task remains to examine the results of the year-end business analysis for the dairy farms and then determine if general conclusions can be made concerning the five types.

DAIRY FARMS (TYPE 7)

As noted earlier, the eight systems were consistent in the number of dairy farms composing the eight subsets. The purpose of this section was to determine if the exit and entry of a few farms (except the Michigan subset with thirty-one fewer farms than the Missouri subset) generated varying analysis factors.

The dairy farms, in terms of acres, were considerably smaller than other types with the total acres ranging from 379 to 445. The crop acres ranged from 227 to 284. The average number of dairy cows per farm did not appear significantly different for each system with a range of fifty-eight to sixty-one. Size, as measured in head of livestock other than dairy, did not appear significantly different except for the specialized Michigan group which had only three farms with three beef cows each and two farms with four litters of pigs farrowed. Capital managed as a size measure was lowest for the Kansas group; the Kansas subset was also lowest in terms of acres. As might be expected from the number of head, the investment in livestock was very similar for the eight systems. Total capital managed was also quite similar except for the Kansas group where total capital was lower due primarily to fewer acres. Crop productive man work units were lowest for Kansas. Yields expressed in value of production per crop acre showed no apparent significant differences. Total expenses, total receipts and, therefore, the average cash balance for the business unit appeared similar for all groups.

Returns to management, returns to labor and management, returns to

TABLE 18

YEAR END BUSINESS SUMMARY FOR DAIRY FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 DAIRY FARMS		MISSOURI		KANSAS		IOWA		ILLINOIS & KENTUCKY		CENSUS		MICHIGAN		WISCONSIN		NEBRASKA	
Description	Code		(99)		(84)		(97)		(99)		(97)		(68)		(92)		(98)
Total Livestock Expense	100	16283	99	16900	84	16613	97	16035	99	16156	97	15657	68	16184	92	16432	98
Feed	110	12345	99	13003	84	12640	97	12110	99	12253	97	11472	68	12224	92	12483	98
Other	XXX	3893	99	3897	84	3973	97	3925	99	3903	97	4185	68	3960	92	3949	98
Total Machinery & Eq. Expense	200	4641	99	4174	84	4572	97	4649	99	4471	97	4499	68	4379	92	4656	98
Auto	210	300	83	276	69	280	82	289	82	294	82	302	57	271	77	302	82
Gas & Oil	220	1057	99	902	84	1034	97	1055	99	1003	97	1037	68	1014	92	1070	98
Tractor	230	703	99	612	84	656	97	679	99	645	97	679	68	610	92	681	98
Truck	240	487	96	444	81	473	94	506	96	460	94	391	65	452	92	509	95
Other Machinery	250	1220	99	1109	84	1268	97	1235	99	1223	97	1190	68	1218	92	1241	98
Machine Hire	260	873	97	830	83	860	95	885	97	847	95	900	67	814	90	853	96
Total Crop Expense	300	5194	99	4494	84	5004	97	5232	99	4994	97	4950	68	4847	92	5219	98
Lime	310	283	69	273	59	284	68	279	69	286	68	239	43	294	65	281	67
Phosphate	320	42	20	46	18	40	18	42	20	37	18	27	9	41	8	41	19
Other Fertilizer	XXX	3430	99	2934	84	3162	97	3246	99	3186	98	3122	68	3394	92	3362	98
Chemicals	350	429	90	410	75	575	88	660	89	542	89	608	63	523	83	613	89
Miscellaneous	370	1010	99	831	84	943	97	1005	99	943	97	954	68	595	92	922	98
Total Labor Expense	400	2351	94	2115	80	2271	93	2303	94	2206	92	2350	63	2252	87	2401	93
Wages	410	2183	94	1965	80	2130	93	2138	94	2070	92	2189	63	2113	87	2232	93
Other Labor	XXX	168		150		141		165		136		161		139		169	
Total Miscellaneous Expense	500	6793	99	6539	84	6942	97	7042	99	6735	97	6872	68	6762	92	7001	98
Real Estate Maint. & Repairs	510	1113	99	1054	84	1095	97	1105	99	1120	97	1115	68	1089	92	1125	98
Utilities	XXX	846	99	633	84		97	450	99		97	859	68	838	92	871	98
Taxes	550	949	98	841	83	939	96	960	98	917	96	937	68	889	91	936	97
Insurance	560	431	98	412	83	430	96	829	98	425	96	442	67	423	91	428	97
Interest	570	2464	91	2601	78	2561	90	2663	92	2436	89	2458	64	2490	86	2607	90
Cash Rent	580	749	63	760	52	833	64	795	63	756	62	814	45	803	59	789	63
Miscellaneous Overhead	590	241	98	238	83	239	96	240	98	239	96	247	67	230	91	245	97
Total Operating Expense	XXX	35262		34222		35402		35261		34562		34328		34424		35709	
Breeding Livestock	610	2619	67	2308	57	2369	69	2726	66	2606	66	2543	43	2182	62	2658	66
Stocker & Feeding Livestock	620	711	22	692	19	918	24	738	21	505	21	104	10	490	21	695	23
Mach. and Equipment	630	5681	93	5391	78	5663	91	5536	93	5618	91	6390	65	5608	86	5734	92
Buildings and Feed Lots	640	1631	42	1706	38	1839	42	1764	41	1822	41	2120	34	1692	39	1898	44
Field Improvements	650	377	43	398	37	414	42	407	42	379	40	363	29	376	38	408	42
Total New Investment	XXX	11019		10695		11223		11141		10930		11520		10548		11391	
Total Cash Expense		46281		44917		46625		46042		45492		45848		44972		47100	
Resale		679		75		80		442		69		43		80		82	

TABLE 18 (continued)

YEAR END BUSINESS SUMMARY FOR DAIRY FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 DAIRY FARMS		MISSOURI		KANSAS		IOWA		ILLINOIS & KENTUCKY		CENSUS		MICHIGAN		WISCONSIN		NEBRASKA	
Description	Code		(99)		(84)		(97)		(99)		(97)		(68)		(92)		(98)
Total Livestock Receipts	700	48755	99	48906	84	49842	97	48153	99	48024	97	47958	68	48085	92	49067	98
Beef Cattle	720	2180	37	1620	31	2570	38	2271	38	883	36	171	19	1177	34	1759	37
Dairy Cattle	730	7218	88	6893	84	6981	97	7139	99	7335	97	7231	68	7022	92	7270	98
Hogs	740	1945	23	2336	20	2418	26	1687	23	2192	24	149	4	1836	21	2250	24
Sheep	750	4	4	5	4	4	4	4	4	3	3	0	0	5	4	4	4
Milk	786	37269	99	37892	84	37740	97	36904	99	37498	97	40383	68	37958	92	37691	98
Poultry	790	1	3	1	3	1	3	1	3	1	3	1	2	1	3	1	3
Eggs	XXX	138	3	159	3	128	3	147	3	112	3	23	2	86	3	92	3
Total Crop Receipts	800	5387	88	2920	73	4027	85	5144	88	4327	86	4631	58	3747	8	4502	87
Forage Crops	810	276	33	237	28	247	31	304	32	380	30	191	18	257	29	249	30
Fruits, Nuts	820	8	2	9	2	8	2	8	2	8	2	11	2	8	2	8	2
Corn	833	1135	32	615	24	689	32	1133	31	826	32	923	19	773	28	1111	32
Grain Sorghum	836	85	11	92	9	132	11	98	12	129	12	52	7	59	7	86	11
Soybeans	837	1550	36	728	22	1402	35	1811	35	1536	35	1821	25	1354	31	1510	34
Soybean Seed	847	188	3	9	1	133	3	210	4	89	2	116	1	8	1	88	2
Wheat	838	203	29	138	22	164	25	197	27	173	27	185	21	140	20	171	27
Wheat Seed	848	11	2	0.21	1	11	2	11	2	11	2	16	2	12	2	11	2
Grain Sorghum	850	34	11	37	10	41	12	40	12	35	11	20	7	38	11	35	11
Legume Seeds	860	28	2	5	2	4	2	28	3	28	3	40	3	4	2	28	3
Truck Crops	870	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Government Payments	899	1145	65	914	53	1063	64	1180	66	1112	65	1106	41	1017	60	1671	63
Total Miscellaneous Income	900	2095	98	2081	83	2134	96	2184	98	2039	96	2000	67	2085	91	2161	97
Custom Work	910	472	55	508	45	524	54	491	55	460	53	385	32	462	50	505	55
Ins. From Mach., Buildings	XXX	669	55	393	45	355	54	451	55	394	53	431	32	369	50	444	55
Government Payments	960	55	40	54	35	51	37	56	40	57	39	48	23	58	37	58	40
All Other Farm Receipts	XXX	899	48	1126	41	1204	54	1186	55	1128	53	1136	63	1196	50	1154	55
Total Cash Receipts		56327		53907		56003		55481		54390		54589		53917		55732	
Cash Balance (Bus)	40011	9277	99	8915	84	9298	97	8997	99	8819	97	8698	68	8865	92	8550	98
Interest (Bus)	40012	2464	91	2415	78	2561	90	2663	92	2436	89	2458	64	2490	86	2602	90
Home Used Products	40013	483	95	493	81	499	94	489	95	494	93	493	64	497	88	486	94
Net Change of Inventory	40014	4767	99	4645	84	4620	97	5087	99	5402	97	6690	68	4711	97	5263	98
Total Business Unit and Family Earnings	40019	16991	99	16469	84	16978	97	17236	99	17151	97	18338	68	16563	92	16907	98
Interest Allow. on Total Cap.	40021	8131	99	7382	84	8115	97	8276	99	8004	97	7916	68	7794	92	8133	98
Value of Family Labor	40022	1998	84	1917	71	1986	82	1989	84	2023	83	1743	57	1960	88	2067	83
Value of Operator's Labor	40023	5292	99	5205	84	5329	97	5350	99	5309	97	5412	68	5265	92	5265	98
Return to Mgt: Business Unit	40024	1571	99	1965	84	1549	97	1622	99	1815	97	3267	68	1543	92	1442	98
Return to Labor & Management	40026	6863	99	7170	84	6878	97	6971	99	7124	97	8678	68	6809	92	6707	98
Return to Labor & Mgt/Man	40027	5179	99	5752	84	5373	97	5233	99	5675	97	6714	68	5352	92	5139	98

YEAR END BUSINESS SUMMARY FOR DAIRY FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 DAIRY FARMS		MISSOURI		KANSAS		IOWA		ILLINOIS & KENTUCKY		CENSUS		MICHIGAN		WISCONSIN		NEBRASKA	
Description	Code		(99)		(84)		(97)		(99)		(97)		(68)		(92)		(92)
Return to Capital & Mgt. Business Unit	40028	9701	99	9347	84	9664	97	9897	99	9819	97	11183	68	9338	92	9574	98
Percent Return: Business Unit	40029	5.65	99	5.86	84	5.10	97	5.74	99	5.91	97	7.19	68	5.72	92	5.76	98
Net Earnings Per $100 Charged for Land, Labor & Capital	40030	108	99	110	84	108	97	109	99	110	97	121	68	109	92	108	98
Total Acres in Business Unit	41010	430	99	379	84	427	97	445	99	420	97	393	68	403	92	430	98
Acres of Cropland	41012	274	99	227	84	269	97	284	99	268	97	259	68	252	92	272	98
Total Capital Managed	41020	162612	99	147634	84	162306	97	165511	99	160084	97	158328	68	155882	92	162651	98
Land & Improvements	41021	102697	98	89873	83	101512	96	105722	98	100657	97	97479	67	96959	91	101899	97
Livestock	41022	30145	99	29838	84	30725	97	30134	99	29882	97	29550	68	29656	92	30382	98
Feed, Seed & Supplies	41023	9049	99	8146	84	9064	97	9034	99	8993	97	9267	68	8678	92	9196	98
Machinery and Equipment	41024	20721	99	19777	84	21005	97	20622	99	20553	97	22033	68	20590	92	21174	98
Total Value of Production	41030	40792	99	38463	84	40497	97	40966	99	40205	97	42107	68	39485	92	40804	98
Per Acre of Open Land	41031	133	99	141	84	134	97	131	99	134	97	147	68	137	92	134	98
Productive Man Work Units	41040	913	99	891	84	922	97	913	99	908	97	906	68	901	92	921	98
Per Man	41041	401	99	398	84	408	97	399	99	404	97	403	68	402	92	401	98
Man Years of Labor	41050	2.31	99	2.26	84	2.29	97	2.32	99	2.29	97	2.29	68	2.70	92	2.34	98
Crop Productive Man Work Units	41110	218	99	189	84	218	97	224	99	215	97	211	68	206	92	219	98
Over Harvest	41210	13674	99	11122	84	13083	97	13961	99	13071	97	13990	68	12414	92	13457	98
Value of All Production on Cropland	41220	15776	99	12912	84	15120	97	16076	99	15128	97	15867	68	14337	92	15428	98
Per Acre of Cropland	41221	57.98	99	57.96	84	57.77	97	57.16	99	58	97	61.97	68	57.84	92	57.75	98
Crop Costs Per Acre of Cropland	41303	42.01	99	43.39	84	42.24	97	41.19	99	42	97	44.94	68	42.57	92	42.53	98
Fixed Machine Costs	41310	3417	98	3005	83	3329	96	3373	98	3270	96	3596	68	3257	91	3410	97
Per Acre of Cropland	41311	13.55	98	14.05	83	13.70	96	13.15	98	13.35	96	14.73	68	11.83	91	13.77	9
Variable Machine Costs	41320	2513	99	2117	84	2416	97	2557	99	2396	97	2543	68	2364	92	2521	98
Per Acre of Cropland	41321	9.44	99	9.67	84	9.48	97	9.31	99	9.37	97	10.35	68	9.59	92	9.51	98
Fertilizer and Lime	41330	3284	99	2971	84	3183	97	3293	99	3190	97	3151	68	3107	92	3326	98
Per Acre of Cropland	41331	13.29	99	14.11	84	13.39	97	13.09	99	13.30	97	13.91	68	13.53	92	13.52	98
Cropland Returns to Land and Labor	41410	4897	99	3572	84	4668	97	5166	99	4785	97	5019	68	4189	92	4545	98
Per Acre of Cropland	41411	15.98	99	14.57	84	15.53	97	15.97	99	16.04	97	17.03	68	15.27	92	15.22	98

		AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO	AC	YLD	NO
Alfalfa Hay (tons)	41431	34	2.7	65	33	2.8	53	37	2.7	64	37	2.7	66	37	2.7	24	32	2.8	44	38	2.7	60	37	2.7	64
Rotation Pasture	41434	81	1.7	81	73	1.7	68	85	1.7	79	83	1.6	80	83	1.7	79	65	1.6	54	76	1.7	74	78	1.7	79
Permanent Pasture	41435	87	1.3	86	80	1.3	75	88	1.3	85	90	1.3	85	83	1.3	83	75	1.4	61	80	1.4	79	89	1.3	84
Corn Silage (tons)	41436	47	9.8	78	47	9.5	66	48	9.6	78	48	9.8	76	47	9.8	77	51	9.8	55	48	9.5	73	48	9.7	78
Corn	41448	56	8.2	51.2	55	49.0	44	65	51.0	56	84	51.2	55	67	50.8	56	70	53.7	41	65	49.8	52	82	50.4	56
Sorghum	41451	43	40.6	18	47	38.3	15	52	40.1	18	44	39.3	18	46	42.1	19	39	38.3	14	40	38.3	14	43	40.6	18
Soybeans	41452	70	22.9	40	43	22.6	25	66	22.9	38	85	22.3	39	66	22.8	39	76	24.1	26	43	22.5	34	69	26.5	38
Wheat	41453	22	32.9	49	20	33.5	39	22	32.6	46	22	31.7	47	22	32.2	49	22	32.4	34	21	33.1	44	24	32.1	47

TABLE 18 (continued)

YEAR END BUSINESS SUMMARY FOR DAIRY FARMS TYPED BY VARIOUS SYSTEMS OF CLASSIFICATION

1970 DAIRY FARMS		MISSOURI		KANSAS		IOWA		ILLINOIS & KENTUCKY		CENSUS		MICHIGAN		WISCONSIN		NEBRASKA	
Description	Code		(99)		(84)		(97)		(99)		(97)		(68)		(92)		(98)
Livestock Productive Man Work Units	41501	683	99	689	84	692	97	676	99	681	97	686	68	683	92	690	98
Value of All Livestock Prod.	41502	48232	99	48878	84	49274	97	4781	99	48254	97	49208	68	48349	92	48653	98
Feed Fed to Livestock	41503	24657	99	24829	84	25411	97	24253	99	24588	97	24338	68	24647	92	24759	98
Livestock Returns Above Feed Costs	41504	23574	99	24048	84	23863	97	23428	99	23666	97	24871	68	23702	92	23894	98
Livestock Returns per $100 Feed Fed	41505	198	99	200	84	197	97	200	99	199	97	207	68	199	92	199	98
Livestock Returns for Labor and Housing	41506	12786	99	13359	84	12866	97	12682	99	12876	97	13842	68	12929	92	12976	98
Feed Purchased	41509	8210	99	8639	84	8488	97	8109	99	8185	97	7418	68	8319	92	8178	98
Average No. of Dairy Cows	41511	59	99	60	84	59	97	58	98	59	97	61	68	59	92	60	98
Milk Per Cow	41513	11226	99	11232	84	11353	97	11080	98	11309	97	11684	68	11329	92	11251	98
Value of Dairy Production	41514	44930	99	45653	84	45274	97	44408	99	45175	97	48750	68	45684	92	45395	98
Number of Beef Cows	41521	34	17	37	13	39	17	36	19	31	17	3	3	32	15	34	18
Number of Stocker & Feeders	41522	22	39	23	31	27	40	25	39	18	38	7	19	18	36	21	39
Value of All Beef Production	41525	3088	58	2615	50	3707	58	3395	59	2390	57	609	37	2316	54	2749	58
Litters of Pigs Farrowed	41531	25	16	26	14	26	19	21	16	27	17	4	2	23	15	26	17
Value of All Pork Production	41535	5375	25	5750	22	5738	28	4405	25	5815	26	102	6	3835	23	5773	26
Pigs Per Litter	41536	9	15	8	13	8	18	9	15	9	16	10	1	9	14	9	16
Value of Poultry Production	41557	357	14	452	11	51	15	310	16	352	14	188	9	19	3	51	14
Total Labor Charge	41610	9859	99	9445	84	9800	97	9863	99	9749	97	9731	68	9681	92	9946	98
Per $100 Production	41611	26.76	99	27.04	84	26.49	97	26.54	99	26.28	97	24	68	26.67	92	26.45	98
Per Man	41612	4278	99	4202	84	4285	97	4246	99	4271	97	4248	68	4266	92	4254	98
Total Mach. & Equip. Cost	41700	9981	99	9177	84	9925	97	9943	99	9771	97	10200	68	9670	92	10061	98
Fixed Mach. & Equip. Cost	41710	6047	99	5717	84	6100	97	6015	99	5980	97	6342	68	5970	92	6129	98
Fixed Mach. & Equip. Cost: Lvst	41711	2629	99	2712	84	2772	97	2642	99	2710	97	2746	68	2714	92	2718	98
Variable Machine Cost: Total	41720	3934	98	3460	84	3824	97	3928	99	3791	97	3858	68	3700	92	3932	98
Variable Machine Cost: Lvst.	41721	1421	99	1343	84	1408	97	1371	99	1395	97	1315	68	1336	92	1411	98
Machine and Equip. Cost/$100 Production	41730	25.80	99	25.37	84	25.7	97	25.47	99	25.19	97	24.37	68	25.7	92	25.72	98
Machine & Equipment Investment	41740	20721	99	19777	84	21005	97	20622	99	20553	97	22033	68	20585	92	21174	98
Machine & Equip. Invest/Man	41741	9037	99	8774	84	9168	97	8935	99	9013	97	9580	68	9117	92	9127	98
Mach. & Equip. Invest./$100 Production	41742	53.37	99	54.20	84	53.99	97	52.82	99	52.20	97	51.81	68	54.28	92	54.20	98
Combined Labor & Machinery and Equipment Charge/$100 Prod.	41800	52.56	99	52.40	84	52.20	97	52.01	99	51.46	97	48.57	68	52.37	92	52.17	98

labor and management per man, as well as percent returns, showed little variance for all groups. The only exception was possibly the slightly higher percent return (7.19) for the sixty-eight farms in the Michigan group.

The year-end summary analysis for dairy farms indicated that the systems used did not result in different factors from the analysis. This could be expected from the stable composition of the farms in each group. It appears that any differences were for the specialized Michigan farms which were somewhat more efficient as reflected in the percent returned to the business unit for capital and management.

SUMMARY

The objectives of computer farm accounting programs are to provide benchmarks, to be a data source for research and to provide analysis results meaningful for decision making and forward planning. The computer accounting objectives were only met for the analysis of the dairy subset. Thus, the system of classification did not produce differences that were evident in the year-end analysis for dairy.

Types 0, 1, 3, and 5 analysis results did not meet the above objectives. The systems of classification applied to the basic set caused differences in the composition of the subsets and resulted in varying implications from the year-end analysis. Thus, four of the five types considered for the eight systems of classification verified the hypothesis that: different subsets generated by the various systems of classification will result in varying farm management recommendations for individual firms and differing policy recommendations concerning aggregate use of the analysis results.

CHAPTER VI

SUMMARY

A type classification system should type farms individually and stratify the farms into subsets that portray those farms producing like products. If this were accomplished, it would be expected that resource use for farms within the subsets would be rather stable. Factors used to describe the subsets should be consistent for various measures commonly used in farm management interpretations of year-end analysis results.

The major enterprise on a farm should be the major contributor to income, be the major user of labor and capital, and have relatively high variable expenses. The enterprise name should be descriptive of the farm type.

Specialized dairy farms with few enterprises other than dairy can be classified by various systems and grouped into subsets which meet the above criteria. Classification and stratification into subsets meeting the above criteria cannot be accomplished for farms other than dairy due to: (1) their heterogeneous nature (heterogeneity is not unique to Missouri farms), (2) variations in the classification criteria and (3) variation in classification definitions.

Beef farms included in the study covered a broad spectrum of beef production and were all included in type 5. Additional classifications are needed for farms producing beef in order for the subsets to meet the above requirements. For example, cow-calf operations have different

requirements for capital, labor and feed than backgrounding or finishing operations.

Each system will be summarized with suggested modifications in order to more effectively classify the farms by type, stratify the subsets into groups and improve the year-end analysis results. The suggestions are presented in the framework of questions raised by the study. In some cases, suggestions should be considered tentative hypothesis for verification by future studies.

Factors used to generate the productive man work units for Missouri and Kansas should be empirically examined and adjusted to more clearly reflect the labor input for each enterprise. Until agricultural technology progresses to the point where machinery can be programmed to operate by remote control, a man and machine will continue to be a unit for tilling, planting and harvesting. Therefore, productive man work units, with the correct factor representing time required per unit, can effectively proxy for the inputs in crop production. However, machinery and equipment size can distort the proxy for crop inputs. An adjustment factor should be applied to the productive man work units for each farm to account for the size variable. The crop productive man work unit factor would be adjusted upward for those farms with large capital investments in machinery and equipment. Thus, productive man work units, with an adjustment factor, would effectively proxy for the 'bundle' of resources used for crop production, accounting for machinery size variations represented by machinery investment.

Similarly, empirical studies are needed to validate the correctness of the factors used to generate livestock productive man work units. Adjustments should be made to livestock productive man work units for each farm to represent differences in capital intensity in livestock

production. For example, feeding operations with automatic auger equipment have different labor requirements than operations handling similar numbers of livestock where the feeding is accomplished by 'hand' methods. Hog farrowing operations in individual houses require different amounts of labor compared to central farrowing houses.

If the above adjustments to productive man work units were accomplished on each farm, the variations in the labor required for specific operations due to capital intensity would be lessened. The ratios derived from comparing enterprises on each farm would then be compatible for use in typing and stratifying farms into groups. Without the adjustment, an individual farm highly capitalized in crop production and labor intensive in livestock production could be typed as a livestock farm even though crops used more total resources than livestock and crops produced more output than livestock. The adjustment factor applied to the crop productive man work units would reflect the relatively high crop resource use and output. The productive man work units, before adjusting, would continue to be used for labor efficiency studies by comparing with actual labor used per farm.

The initial division for the Iowa and Illinois systems were similar for separating grain and livestock farms. The two systems produced similar numbers of grain farms with similar year-end analysis results.

The livestock types were determined by feed-fed for Illinois and income for Iowa. Individual items in the hog analysis were very similar for the groups generated by the two systems. The composition of the beef farms resulted in varying returns as shown by the year-end analysis. Price variations affect the input (feed fed) in the same way that it

affects output (value of production). For the results to be consistent, either of these two systems would require a price index adjustment. Although the study was based on one year's records, the implication could be extended to construe the need for index adjustments over time.

The Census method of classification would produce different ratios and hence different subsets if government payments were not removed from total receipts. The ratios were biased in favor of livestock classifications due to reducing crop receipts by the government payments. The other systems included in the study (except Michigan) reflect accrued production by valuing unsold goods through inventories. The effect on the classification due to not including accrued production could not be determined from the study.

The Nebraska system will not consistently type farms or correctly stratify farms into subsets due to double accounting influencing the ratio used to determine the types of farms. The Wisconsin system adjusts the value of farm production by the value of home grown feed fed. An adjustment of this nature would correct the Nebraska method of adjusting the denominator of the ratios used to classify the farms according to type.

The Michigan system is similar to the Census classification since the value of livestock production is based on receipts and not adjusted for inventories. The Michigan system adjusts receipts by purchased livestock and feed to calculate value of livestock production. Thus, total value of farm production in Michigan is the sum of all types of farm income less the cost of purchased feed and livestock. The cost of livestock is removed from both the numerator and denominator to determine the ratio to compare with an arbitrary standard to determine specific livestock types. However, the cost of purchased feed is removed from

the denominator only which allows the ratio to be influenced by both home grown feed and the magnitude of purchased feed. It is recognized that part of the adjustment made is to arrive at 'value added' on the individual farms. If the 'value added' approach is used in part of the ratio, however, it should be used in all of the ratio.

The Michigan percentage requirements for typing resulted in specialized farms in each subset. Although the requirements were very rigid, the analysis results for the Michigan subsets were not more consistent than the results from the subsets generated by the other systems of classification.

Traditional farm management recommendations indicate that high gross income (sales, receipts, or value of production, depending on which system's terminology is used), is necessary for high net income. High income can result from large farms in terms of physical size measurements and/or efficiency in terms of production per unit for crops and/or livestock. Neither larger farms nor higher efficiency were observed for all groups generated by Michigan's system of classification. Physical crop yields for the Michigan group appeared similar to the yields for the groups generated by the other classification systems.

Value of farm production by the Wisconsin system accounts for accrued production in livestock and value of current production in crops. Value of production is adjusted by home grown feed fed so that double accounting by valuing crops produced and 'selling' crops through livestock is eliminated. Of the income systems included in the study, the Wisconsin system is the most valid in terms of accounting and system criteria.

The value of type classifications should be viewed from the use-

fulness of farm record analysis within the various systems of classification as well as among the various systems of classification. The shortcomings of each system in isolation were presented with suggested modifications. Modifications of the nature discussed would improve the usefulness of the type classification and analysis results within each system. The analysis results indicate that comparison among the various systems is impossible without major adjustments to make each system compatible with another.

A Utopian objective would be one system of classification adopted by all land grant universities, USDA agencies, U.S. Census, and others contemplating classification of farms into types. Even if this ideal is not achieved, the study demonstrated that adjustments within each system could more effectively sort farm records into homogeneous subsets. Homogeneity of the subsets would remove the conundrum presented concerning analysis desired to effectively portray the structure as well as allow effective recommendations to the firm.

The study did not determine which system was 'best'. The eight systems generated subsets which varied in number and produced varied year-end analysis results. Thus, adoption of one of the existing systems by all agencies and institutions would not be expected or desired; however, one of the modified systems suggested by this study would be desirable for widespread adoption.

Alternatives to modified systems are: (1) a type classification considering all outputs, and (2) a type classification considering all resources. Both methods would require development, testing and the use of price indexes.

Additional type designations for the modified or new systems would

be recommended. Widespread adoption of 'a' system would allow the subsets to: (1) portray those farms producing like products, (2) exhibit stability in resource use, (3) produce consistent measures used in farm management, and (4) effectively describe the structure of agriculture.

SELECTED BIBLIOGRAPHY

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Acker, Darrel; Rieck, Robert; Weigle, R. N.; and Saupe, William; editors. Wisconsin Farm Business Summary Electronic Farm Records Program, 1968. Madison, Wisc.: Cooperative Extension Programs - University Extension, Department of Agricultural Economics, University of Wisconsin, 1969.

Bachman, K. L.; Ellickson, J. C.; Goodsell, W. D.; and Hurley, Ray. "Appraisal of the Economic Classification of Farms." Journal of Farm Economics, Vol. XXX, No. 4, November, 1948, 680-702.

Benedict, M. R.; Elliott, F. F.; Tolley, H. R.; and Taeuber, Conrad. "Need for a New Classification of Farms." Journal of Farm Economics, Vol. XXVI, No. 4, November, 1944, 694-708.

Black, John D.; Clawson, Marion; Sayre, Charles R.; and Wilcox, Walter W. Farm Management. New York: The MacMillan Co., 1947.

Brown, Thomas G. "Missouri's Experience in the Application of EDP in Farm Management Educational Programs." Proceedings of a Workshop: Computer Use in Farm Management Analysis and Production Decisions. November 20 - 22, 1968. Washington, D.C.: U.S. Department of Agriculture, August, 1969.

Castle, Emery N., and Becker, Manning H. Farm Business Management: The Decision-Making Process. New York, London: The MacMillan Co., 1962.

Duey, Douglas D. Nebraska Farm Management Summary and Analysis Report - 1968. Lincoln, Nebr.: Extension Service, University of Nebraska College of Agriculture Cooperating with the U.S. Department of Agriculture and the College of Home Economics, 1968.

Finley, Robert M. An Appraisal of EDP and Its Relationship to the Decision Making Process in Farm Management. Agricultural Economics Paper #1966 - 3. Federal Extension Service, USDA, Washington, D.C. and Department of Agricultural Economics, University of Missouri, Columbia, Mo.

Finley, Robert M.; Langemeier, Larry N.; and Kirtley, Carrol L. Effects of Varying Management Levels of Crops and Livestock on Optimal Farm Organizations. Research Bulletin 866, University of Missouri. Columbia, Mo.: University of Missouri College of Agriculture and Agricultural Experiment Station, July, 1964.

Goodsell, Wylie D., and Jenkins, Isabel. Costs and Returns on Commercial Farms, Long-Term Study, 1954-63. Statistical Bulletin No. 368. Economic Research Service, USDA. Washington, D.C.: U.S. Government Printing Office, March, 1966.

Goodsell, Wylie D., and others. Costs and Returns on Commercial Farms, Long-Term Study, 1930-57. Statistical Bulletin No. 297. Economic Research Service, USDA. Washington, D.C.: U.S. Government Printing Office, 1958.

Goodsell, Wylie D.; Evans, J. Albert; Hole, Erling; Hurd, Edgar B.; Shugars, Owen K.; Strand, Edwin G.; and Jenkins, Isabel. Farm Costs and Returns: Commercial Farms by Type, Size and Location. Agriculture Information Bulletin No. 230. Economic Research Service, USDA. Washington, D.C.: U.S. Government Printing Office, October, 1967.

Heady, Earl O. Economics of Agricultural Production and Resource Use. Englewood Cliffs, N.J.: Prentice-Hall, Inc. 1952.

Hepp, Ralph E., and Brown, L. H. Dairy - General Farming Today in Southern Michigan, 1969. Agricultural Economics Report, No. 176, August, 1970. TelFarm Business Analysis Summary for Southern Dairy General, 1969. East Lansing, Mich.: Department of Agricultural Economics, Michigan State University, August, 1970.

Irwin, George D., and Havlicek, Joseph, Jr. "Tailoring Farm Account Projects to Answer Aggregate Questions." Journal of Farm Economics, Vol. 48, No. 5, December, 1966, 1623-1628.

Johnson, D. Gale. "Contribution of Price Policy to the Income and Resource Problems in Agriculture." Journal of Farm Economics, Vol. XXVI, No. 4, November, 1944, 631-664.

Kansas Farm Management Association Account Book. Revised Edition, 1970. Manhattan, Ks.: Extension Division and Department of Agricultural Economics of Kansas State University.

Kirtley, Carrol L. "The Missouri Farm Business Record Analysis Program." IBM Agricultural Symposium. Endicott, N.Y., May 10-13, 1965.

_____, and Rottmann, Leroy. Missouri Farm Business Summary for 1969. Columbia, Mo.: Extension Division, University of Missouri, August, 1970.

Stoneberg, E. G. Costs and Returns on Iowa Farms - 1969. Report for the Iowa Agricultural Experiment Station. Project No. 111. Ames, Iowa: Iowa State University of Science and Technology, Cooperative Extension Service, November, 1970.

Summary of Illinois Farm Business Records - 1969. "Commercial Farms: Production, Costs, Income, and Investments." Urbana, Ill.: University of Illinois at Urbana-Champaign, College of Agriculture, Cooperative Extension Service, Circular 1019, August, 1970.

U.S. Department of Commerce. Bureau of the Census. "Type of Farm." The 1964 U.S. Census of Agriculture, Vol. II, Chap. 10. Washington, D.C.: U.S. Government Printing Office, 1968.

_____. Bureau of the Census. "Value of Farm Products Sold and Economic Class of Farm." The 1964 U.S. Census of Agriculture, Vol. II, Chap. 6. Washington, D.C.: U.S. Government Printing Office, 1966.

_____, and U.S. Department of Agriculture. "Analysis of Specified Farm Characteristics For Farms Classified by Total Value of Products." Technical Monograph. Washington, D.C.: U.S. Government Printing Office, 1943.

Warren, G. F. Farm Management. New York: The MacMillan Co., 1919.

APPENDIXES

APPENDIX I

CRITERIA FOR TYPING THE BASIC SET

The basic set of 403 records used in the study were from Missouri farmers enrolled in the 1970 Missouri Mail-In Record Analysis Project. The farmers were enrolled and assisted through the year by County Extension Agents of the University of Missouri.

The Missouri program types the farms according to productive man work units as set out below under "Missouri". Each of the other systems of classification determined type by meeting different criteria. The subsets for specific types under each system were determined by a series of calculations and "if" statements on the 360-65 computer.

Missouri factors used to determine productive man work units can be found by referring to Code 41040 Appendix II. Additional information concerning type classifications may be found by consulting the appropriate state or Census bibliography reference.

MISSOURI[1]

(PRODUCTIVE MAN WORK UNITS)

The basis for determining the farm type for Missouri was:

1. Grain: a) Less than 33 percent of the total PMWU in any one animal enterprise, and b) 50 percent or more of total PMWU in grain, fiber, seed, and fruit crops (corn silage and grain sorghum silage are included).
2. Grain Animal (grain-hog, grain-beef, etc.): a) 33 percent or more of total PMWU in grain and cash crops, and b) 33 percent or more of total PMWU in any one type of animal enterprise.
3. Animal, one only (beef, dairy, hog, etc.): a) Less than 33 percent of total PMWU in grain and cash crops and b) 50 percent or more of total PMWU in any one type of animal enterprise.
4. Mixed Livestock (beef-hog, dairy-hog, etc.): a) Less than 33 percent of total PMWU in grain and cash crops, and b) 33 to 49 percent of total PMWU in one type of animal enterprise, and c) 33 to 49 percent of total PMWU in another type of animal enterprise.
5. General: Farms not meeting the foregoing criteria.

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[1]Carrol L. Kirtley and Leroy Rottmann, Missouri Farm Business Summary for 1969 (Columbia, Mo.: Extension Division, University of Missouri, August, 1970), p. 2.

KANSAS[2]

(PRODUCTIVE MAN WORK UNITS)

The mechanics of sorting the basic set of 403 Missouri farms to identify individual farm types according to Kansas criteria, was accomplished by a series of questions about PMWU's for each farm. Kansas PMWU factors differ from Missouri factors resulting in differing specific crop and livestock PMWU's for the calculation necessary to answer the questions. The series of questions to determine type by Kansas criteria were of the following nature:

1. Were $\frac{\text{"Total Crop PMWU's"}}{\text{"Total PMWU's"}}$ greater than 33.33 AND "Dairy PMWU's" less than or equal to 33.33 AND "Beef PMWU's" less than or equal to 33.33 AND "Hog PMWU's" less than or equal to 33.33? If yes, it was a GRAIN FARM of type #1.
2. Were "Beef PMWU's" greater than 33.33 AND "Dairy PMWU's" less than or equal to 33.33 AND "Hog PMWU's" less than or equal to 33.33 AND "Crop PMWU's" less than or equal to 33.33? If yes, it was a BEEF FARM of type #5.
3. Were "Dairy PMWU's" greater than 33.33 AND "Beef PMWU's" less than or equal to 33.33 AND "Hog PMWU's" less than or equal to 33.33 AND "Crop PMWU's" less than or equal to 33.33? If yes, it was a DAIRY FARM of type #7.

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[2]Kansas Farm Management Association Account Book (Revised ed.; Manhattan, Ks.: Extension Division and Department of Agricultural Economics of Kansas State University, 1970), p. 13A.

4. Were "Hog PMWU's" greater than 33.33 AND "Dairy PMWU's" less than or equal to 33.33 AND "Beef PMWU's" less than or equal to 33.33 AND "Crop PMWU's" less than or equal to 33.33? If yes, it was a HOG FARM of type #3.
5. Farms not meeting the above criteria were typed GENERAL FARM of type #0.

KANSAS PMWU FACTORS FOR CROPS AND LIVESTOCK

Crop Acres	X	factor
Alfalfa hay		1.5
Clover hay		0.6
Other hay		0.6
Rotation past		0.2
Silage		1.2
Barley		0.6
Corn		0.8
Oats		0.6
Rye		0.6
Sorghum		0.7
Soybeans		0.7
Wheat		0.6
Grass & legume seed		0.5
Cotton		2.1
Total Crop PMWU's		

Livestock	X	factor
Dairy (head)		9.0
Beef cows (head)		1.0
Stocker & feeders		0.5
Litter hogs		3.0
Feeder pigs		0.2
Laying hens		0.075
Total Livestock PMWU's		

Total Farm PMWU's = Total Livestock + Total Crops

IOWA[3]

(FEED FED AND RECEIPTS)

Sorting the basic set of 403 Missouri farms to identify individual farm types, according to Iowa criteria, was accomplished by a series of questions concerning 'feed fed' and 'livestock increase'.

1. Was the ratio $\frac{\text{"Value Feed Fed"}}{\text{"Value Open Land Production"}}$ less than .50? If yes, the farm was a GRAIN FARM of type #1.
2. Was the ratio $\frac{\text{"Value Hog Production"}}{\text{"Value All Livestock Production"}}$ greater than or equal to .70? If yes, the farm was a HOG FARM of type #3.
3. Was the ratio $\frac{\text{"Value of Dairy Production"}}{\text{"Value All Livestock Production"}}$ greater than or equal to .50 AND "Number of dairy cows" greater than or equal to 18? If yes, the farm was a DAIRY FARM of type #7.
4. Was the ratio $\frac{\text{"Value of Beef Production"}}{\text{"Value of All Livestock Production"}}$ greater than or equal to .70? If yes, the farm was a BEEF FARM of type #5.
5. Farms not meeting the above criteria were typed GENERAL FARM of type #0.

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[3]E. G. Stoneberg, Costs and Returns on Iowa Farms - 1969, Report for the Iowa Agricultural Experiment Station, Project No. 111 (Ames, Iowa: Iowa State University of Science and Technology, Cooperative Extension Service, November, 1970), pp. 8, 9. Iowa increased their percentage necessary for a farm to meet specific type classification in 1970 (for 1969 records) according to correspondence dated July 7, 1971 from E. G. Stoneberg, Extension Economist, Cooperative Extension Service, Iowa State University, Ames, Iowa.

ILLINOIS AND KENTUCKY[4]

(FEED FED)

The 403 Missouri farms were typed by Illinois (Kentucky)[5] criteria as follows:

1. If the value of feed fed was less than one-half of the feed and grain returns and value of feed fed to dairy or poultry was not more than one-sixth of the feed and grain returns, the farm was a GRAIN FARM.
2. HOG or BEEF FARMS were those farms where the value of feed fed was more than one-half of the feed and grain returns and either hog or beef enterprises received more than one-half of the value of feed fed.
3. DAIRY FARMS were those where the value of feed fed was more than one-half of feed and grain returns and either dairy or poultry enterprises received more than one-third of the value of feed fed.
4. Those farms not meeting the above criteria were classified GENERAL FARMS.

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[4]Summary of Illinois Farm Business Records - 1969, "Commercial Farms: Production, Costs, Income, and Investments" (Urbana, Ill.: University of Illinois at Urbana-Champaign, College of Agriculture, Cooperative Extension Service, Circular 1019, August, 1970), p. 13.

[5]Kentucky criteria were essentially the same as Illinois.

CENSUS[6]

(CASH RECEIPTS METHOD)

Sorting the basic set of 403 Missouri farms to identify individual farm types according to Census criteria was accomplished by a series of questions about receipts. Farm "receipts" for Census purposes are cash sales. "Total farm receipts" were livestock, crop and miscellaneous receipts plus 'expected' sales minus government payment and minus capital items sold.[7]

1. Was the item "Total Crop Receipts" greater than one-half of "Total Farm Receipts"? If yes, it is a GRAIN FARM of type #1.
2. Was the ratio $\frac{\text{"Poultry Receipts"}}{\text{"Total Farm Receipts"}}$ greater than or equal to .5? If yes, it was a POULTRY FARM of type #9.
3. Was the ratio $\frac{\text{"Dairy Receipts"}}{\text{"Total Farm Receipts"}}$ greater than or equal to .5? If yes, it was a DAIRY FARM of type #7.
4. Was the ratio $\frac{\text{"Total Livestock Receipts minus Dairy Receipts"}}{\text{"Total Farm Receipts"}}$ greater than or equal to .5? If yes, it was a MIXED LIVESTOCK FARM of type #8.

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[6]U.S. Department of Commerce, Bureau of the Census, "Type of Farm," The 1964 U.S. Census of Agriculture, Vol. II (Washington, D.C.: U.S. Government Printing Office, 1968), Chap. 6, pp. 593-596 and Chap. 10, p. 961.

[7]The Census does not classify beef, hog, and grain - livestock combinations. Thus, all livestock farms other than noted above were grouped into "mixed livestock".

5. Farms not meeting the above criteria were GENERAL FARMS of type #0.

MICHIGAN

(VALUE OF PRODUCTION METHOD)

Sorting the basic set of 403 Missouri farms to identify individual farm types according to Michigan criteria, was accomplished by a series of questions concerning the 'production' of each farm.[8]

1. Was the ratio $\frac{\text{"Crop Value"}}{\text{"Value of Farm Production"}}$ greater than or equal to .95? If yes, the farm was a SPECIALIZED GRAIN FARM, type #1. If no, go to 2.
2. Was the ratio $\frac{\text{"Value of Hog Production"}}{\text{"Value of Farm Production"}}$ greater than or equal to .95? If yes, the farm was a HOG FARM, type #3. If no, go to 3.
3. Was the ratio $\frac{\text{"Value of Beef Production"}}{\text{"Value of Farm Production"}}$ greater than or equal to .95? If yes, the farm was a BEEF FARM, type #5. If no, go to 4.
4. Was the ratio $\frac{\text{"Value of Dairy Production"}}{\text{"Value of Farm Production"}}$ greater than or equal to .95? If yes, the farm was a DAIRY FARM, type #7. If no, go to 5.

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[8]Ralph E. Hepp and L. H. Brown, Dairy - General Farming Today in Southern Michigan, 1969, Agricultural Economics Report, No. 176, August, 1970, TelFarm Business Analysis Summary for Southern Dairy General, 1969 (East Lansing, Mich.: Department of Agricultural Economics, Michigan State University, August, 1970) and a letter from Myron P. Kelsey, Extension Specialist in Agricultural Economics (June 21, 1971).

5. The remaining farms were classified GENERAL FARMS, type #0.

Michigan definitions used for the above calculations:

Value of Farm Production is the sum of all types of farm income less the cost of purchased feed and livestock.[9]

Crop Value is computed by yield X acres X standard price including government payments.

Value of Livestock is receipts minus purchases.

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[9]Landlord's share from rented land is not included for the Michigan system.

WISCONSIN[10]

(VALUE OF PRODUCTION METHOD)

Sorting the basic set of 403 Missouri farms to identify individual farm types according to Wisconsin criteria, was accomplished by a series of questions about the production of each farm.

1. Was "Total Value of Livestock Produced" greater than one-half of "Total Value of Farm Production"? If no, it was a GRAIN FARM of type #1. If yes, go to 2.
2. Was the ratio $\frac{\text{"Value Dairy Produced"}}{\text{"Value of Farm Production"}}$ greater than or equal to .6? If no, go to question 3. If yes, it was a DAIRY FARM of type #7.
3. Was the ratio $\frac{\text{"Value Beef Produced"}}{\text{"Value of Farm Production"}}$ greater than or equal to .6? If yes, it was a BEEF FARM of type #5. If no, go to 4.
4. Was the ratio $\frac{\text{"Value Hogs Produced"}}{\text{"Value of Farm Production"}}$ greater than or equal to .6? If yes, it was a HOG FARM of type #3. If no, go to 5.
5. If the above criteria was not met, the farm was classified GENERAL FARM, type #0.

Wisconsin definitions used for the above calculations were:

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[10]Darrel Acker, and others, eds., Wisconsin Farm Business Summary Electronic Farm Records Program, 1968 (Madison, Wisc.: Cooperative Extension Programs - University Extension, Department of Agricultural Economics, University of Wisconsin, 1969), Appendix I, p. 45.

Value of Farm Production; Value of livestock production, plus value feed crops produced, plus value cash crops produced, minus value of home grown feed fed. Value of feed fed was computed by subtracting cost of purchased feed from total feed fed.

Total Value of Livestock Produced; Value of ending livestock inventory, plus value of products sold, plus livestock sold, plus home use, minus livestock purchases and minus beginning inventory.

Value of Specific Livestock Class; Calculated by same method as Total Value of Livestock Produced.

Value of Crops were computed by acres X yield X standard price.

NEBRASKA[11]

(VALUE OF PRODUCTION METHOD)

The 403 Missouri farms were typed by Nebraska criteria according to the following:

1. GRAIN FARMS were those with less than 35 percent of "Gross Production" from livestock.
2. BEEF FARMS were those with "Gross Production" from all types beef enterprises greater than 40 percent of total farm production (but no other enterprise greater than 40 percent).[12]
3. HOG and DAIRY were typed by the same criteria as no. 2 (BEEF) type #3 and #7 respectively.
4. All farms not meeting the above criteria were typed GENERAL, type #0.

Nebraska definitions used for the above classifications were:

Gross Production; An estimate of all value added on the farm during the year. It is "Total Net Livestock Production" plus "Total Value of All Crop Production on the Farm".

Net Livestock Production; The value added to all classes of livestock on the farm during the year, taking into account purchases, sales,

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[11]Douglas D. Duey, Nebraska Farm Management Summary and Analysis Report - 1968 (Lincoln, Nebr.: Extension Service, University of Nebraska College of Agriculture Cooperating with the U.S. Department of Agriculture and the College of Home Economics, 1968), pp. 3, 5, 14 and Table Ia.

[12]The statement in parenthesis was added when typing the basic set of farms to eliminate two enterprises each meeting said percentages.

inventory change and home use.

Specific Livestock Classes; Computed similar to Net Livestock Production.

APPENDIX II

DETAILED DEFINITION OF SELECTED ANALYSIS TERMS
USED IN THE 'YEAR-END' BUSINESS ANALYSIS

Code	Description
-	Resale: Resale items account for any discrepancy of (Total Cash Receipt) - (Total Cash Expense) not equaling Cash Balance.
899	Government Payments: Payments associated with the crops program.
960	Government Payments: Payments for practices other than crop program payments.
40011	Cash Balance: Total Cash Receipts less Total Cash Expense.
40012	Interest Actually Paid by the Business.
40014	Net Change of Inventory: The difference in value of all business assets, except land, at the beginning and end of the year.
40019	Total Business Unit and Farm Earnings: The sum of cash balance (40011) plus interest paid (40012) plus home used products (40013) plus net change of inventory (40014).
40021	Interest Allowance on Capital: Five percent times total capital managed (41020).
40024	Return to Management: Business unit and family earnings (40019), minus interest allowance (40021) minus value of unpaid family labor (40022) minus the value of operator labor (40023).
40026	Return to Labor and Management: Value of operator labor (40023) plus the return to management (40024).
40027	Return to Labor and Management Per Year: Labor and management (40026) divided by months of labor times 12.

40029 Percent Return: Return to capital and management divided by total capital managed times 100.

40030 Net Earnings Per $100 Charged for Land, Labor, and Capital: 25 percent of machine hire (assumed labor share of 260), plus hired labor (400), plus earnings (40019) divided by the sum of interest allowance (40021), family labor (40022), operator labor (40023), hired labor (400) and 25 percent of machine hire (260).

41020 Total Capital Managed: The market value of land and improvements reported at the end of the year (41021) plus one-half of the January 1 and one-half of the December 31 inventory of livestock (41022) plus feed, seed and supplies (41023) and machinery and equipment (41024).

41030 Total Value of Production: Value of all open land production (41230) plus livestock return above feed costs, plus custom work plus timber products.

41040 Total PMWU's: Total crop productive man work units plus total livestock productive man work units. The following indicate the factors used in computing the major crop and livestock PMWU's.

Crop	X factor
Cereals	.5
Corn (grain)	.8
Grain sorghum	.8
Soybeans	.7
Row crop silage	1.5
Alfalfa (72.5 T)	1.8
Sudan, rye, etc.	.3
Brome (hay or seed)	.4
Prairie hay	.4

Livestock	X factor
Beef cows	1.5
Dairy cows	10.0
Other beef	1.5
Other dairy	1.5
Litters farrowed	1.5
Hogs fed to market	0.2
Ewes	0.5
Other sheep	0.15
Laying hens	0.10
Broilers	0.005

41050 Man Years of Labor: Months of hired labor reported plus months of family and operator's labor plus .00125 times expenditure for custom work (260) divided by 12.

41220 Value of Production on Cropland: Value of crops harvested plus value of rotation pasture grazed plus government payments for retired acres, price support, etc.

41310 Fixed Machinery Crop Costs: Depreciation times percent machine used for crops plus .05 times (value beginning of year plus value end of year). The five percent is an allowance for interest, taxes, insurance and housing. Note: Depreciation as such is not reported in the analysis. Said figure is not carried as an explicit expense item by the Missouri method of analysis.

41320 Variable Machinery Crop Costs: This item includes the portion of the following expense items which the cooperator did not allocate to livestock: auto (210) gas, oil and grease (220), tractor (230), truck (240), other machinery and equipment (250),

75 percent of machine hire (260), minus gas tax refund and 75 percent of custom receipts (910).

VITA

Don D. Pretzer was born [redacted], at Elmdale, Kansas. He is the youngest of four children. At an early age, his family moved to Anderson county near Garnett, Kansas. His father was a beef-hog-grain farmer.

He attended rural school for his elementary education and graduated from Garnett High School. During high school, he participated in all sports, edited the high school paper, played in the band and was president of his senior class. In September of 1950, he enrolled at Kansas University where he received the "Dad Butcher" scholastic scholarship. One semester of college was missed in 1951 in order to operate the family farm while his father was ill.

Continued agricultural interests prompted transferring to Kansas State University in the fall of 1952. At Kansas State University, he received a B.S. in Agronomy and was commissioned a Second Lieutenant in the United States Air Force. While in the Air Force, he completed pilot training and served three years active duty.

After discharge from the Air Force in 1958, he started work for the Kansas Extension Service as Assistant County Agent for Balanced Farming in Rice County, Kansas. In 1959, he accepted the position of County Agricultural Agent in Linn County, Kansas. In 1964, he was appointed Extension Economist, Farm Management Fieldman, located at Garnett, Kansas.

Graduate study in Agricultural Economics was initiated in 1967

while serving as Extension Economist, Grain Marketing, Kansas State University, Manhattan, Kansas. Early in 1969, he was appointed Section Leader and Extension Economist, Farm Management . . . a position he currently occupies.

In 1969, he received an NDEA fellowship, University of Missouri, Columbia, to pursue graduate work toward a Ph.D. degree. His wife is Carolyn A. (Barndt) Pretzer. They have three children: Janis, Denise and Mark.

He is a member of American Farm Economics Association, Epsilon Sigma Phi and Omicron Delta Epsilon.

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