A DESCRIPTION OF BEEF COW-CALF PRODUCERS IN SIX STATES-- THEIR ENTERPRISE, MOTIVATION AND SOURCES OF INFORMATION

By

Elizabeth Garst

AN ABSTRACT OF A PLAN B PAPER

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE

Department of Agricultural Economics

1976

ABSTRACT

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The purposes of this study were to characterize beef cow-calf producers and their enterprise; determine the factors which would motivate them to adopt new technology, improve the use of available resources, and consider new marketing techniques; and to ascertain effective communication channels for reaching the small beef producer. The target group was defined as beef cow-calf producers with less than 50 cows over two years of age in the states of Michigan, New York, Ohio, Pennsylvania, Virginia, and West Virginia.

Primary data was gathered via mail questionnaire. The questionnaire was designed and written by a multi-disciplinary team of agricultural economists and animal scientists. Questionanires were sent to 4,200 producers in the six state area with 503 usable forms returned. The highest return rate occurred in Virginia, where questionnaire forms were returned to local extension agents, rather than to Pennsylvania State University as with the other states.

The primary types of statistical description used were means, frequency distributions, standard deviations, and ordinal ranking of selected concepts. The sampling pool may have been biased towards the

better-than-average producer. The questionnaire was not pretested on a subsample, and consequently contains some ambiguities, format problems, redundancies, and omissions of important questions. Goals, hypotheses, and data requirements were not carefully defined prior to the design of the questionnaire.

For analysis and descriptive purposes, producers were categorized by state and by herd size. The production and marketing information obtained confirm the findings of other research on beef cow-calf enterprises. The average producer was 50.4 years old, had lived on the farm for 26 years and had had a beef cow-calf enterprise for 18 years.

The average producer in this survey was increasing herd size, even though this enterprise has a low accounting profit as evidenced by farm accounting data. This paradox suggests that beef cow-calf producers may have objectives other than dollar profit. Results of this survey suggest that "utilization of available land and buildings" and "fulfilling a personal desire" were the two most important reasons for maintaining a cow herd. Other highly ranked reasons were "earn more income," "previous experience," "keep land cleared," and "farm adapted to beef cattle."

Two-thirds of the sample indicated that the enterprise fulfilled expectations, one-third were satisfied with economic returns, more than one-half were satisfied with production practices, and less than one-half would recommend the enterprise to a beginning farmer in their area.

The importance of existing channels of information was explored. Extension personnel and farm magazines were ranked as most important to producers. In general, state farm magazines reached the widest audience in their respective states. The Farm Journal was the most widely read magazine for the group as a whole.

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ACKNOWLEDGMENTS

I wish to acknowledge those who provided advice and assistance for this study. Special thanks to Dr. Gerald D. Schwab for his guidance in development of the study and in preparation of the manuscript. I also wish to express gratitude to Dr. Warren Vincent for his wise counsel during my studies at Michigan State University.

Thanks are also extended to the Department of Animal Husbandry, and especially to Drs. Dan Fox and Harlan Ritchie for the provision of a graduate research assistantship and for guidance in the course of this study.

Finally, I want to thank my sister, Kate Garst, and my friend, Thomas Jacobs, for their help and support.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

A. Problem Setting

The problem setting is that established by the Special Project Proposal: Management Systems for Small Beef Producers found in Appendix A of this paper. The proposal was written in mid-1973, and reflects the situation at that time in the beef cow-calf industry.

Beef enterprises are of major importance to the farm economy. Beef continues its popularity in the United States, where consumption has increased steadily for many years. From 1962 to 1972 per capita consumption of beef increased from 89 pounds to 116 pounds per capita, a 30 percent increase. However, in 1973 consumption dropped approximately 5 percent to 110 pounds per capita.

The decline in beef consumption in 1973 was a result of several interacting factors. Prices fluctuated erratically, but on average were much higher than in the previous year. The monthly average weighted price of cows, steers, and heifers in the United States ranged from $37.90 percent in January to $51.70 percent in August, with an average annual price of $42.80. In contrast, the average annual weighted price in the United States was $33.50 percent in 1972.[1] Prices for

[1] U.S. Department of Agriculture, Crop Reporting Board, Statistical Reporting Service, Agricultural Prices, Annual Summary 1974 (Washington, D.C.: Government Printing Office, 1975), p. 35.

calves were slightly higher, averaging $56.60 per cwt. in 1973 and $44.70 in 1972,[2] but roughly following the price trends of slaughter cattle.

One cause of the erratic price movements was because:

> . . . . .the wide price range can be attributed to speculation and undue optimistic anticipation by cattle feeders as to the effect of eliminating price and wage controls. The phasing out of these controls was complicated during August by the elimination of controls in most agricultural products except beef. The month elapsed time period before controls were lifted, led to increased fervor and speculation about future beef prices and limited supply. However, when controls were phased out, beef prices declined.[3]

The combined effect of fewer cattle marketed, higher prices of retail beef, consumer boycotts, and the increased rate of unemployment resulted in decreased beef consumption in 1973.

This project was based on the assumption that the solution to high 1973 beef prices was to increase beef supply. It was felt that in order to generate more adequate beef supplies, it would be necessary to utilize more fully the resources involved in beef production.

Two major functions are associated with beef cattle production: (1) cow-calf operations and (2) cattle feeding operations. The former typically produces feeder calves which may be finished on-farm, or alternatively, sold to commercial cattle feeders. There are approximately 1.2 million beef cow-calf operations in the United States with less than 50 cows according to 1969 Agricultural Census data. Ninety percent of all beef herds have less than 50 cows, and these herds account for 45 percent of all beef cows in the country. The purpose of this project

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[2] Ibid., p. 38.

[3] Leonard R. Kyle and Gerald Schwab, Business Analysis Summary for Cattle Feeding Farms, 1973, AER 271 (East Lansing: Michigan State University, Department of Agricultural Economics, 1974), p. 1.

was to design a program to reach these small producers and help them improve the use of their resources, and hence their output.

However, since 1973 the beef situation has changed dramatically. The distortion of cattle markets caused by the wage-price controls have largely disappeared, and cattle numbers have been steadily increasing. In December 1972 there were 38.8 million beef cows that had calved. During 1973 beef cow numbers increased to 40.9 million head. In 1974 cow numbers increased to 42.9 million head and are expected to reach over 45 million in 1975.[4] This is roughly 117 percent of the 1972 beef cow numbers.

The shift or increase in beef supplies was greater than the increase in demand in 1974, so that slaughter beef prices fell from a 1973 annual average in the United States of $42.80 per cwt. to an annual weighted average of $35.60 in 1974.[5] Increased beef supplies, relatively cheaper prices, and decreased consumer resistance caused per capita consumption of beef to increase to 117 pounds in 1974, up 7 pounds from the previous year.

Although finished beef prices are only marginally above 1972 levels, corn prices have increased dramatically. The average annual U.S. corn price in 1972 was $1.57 while in 1974 it was $2.95. Factors contributing to this increase were poor weather conditions in the United States and increased domestic demand. Increased export demand caused in part by dollar devaluations and poor world wide crops also contributed.

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[4]U.S. Department of Agriculture, Economic Research Service, Livestock and Meat Situation (Washington, D.C.: Government Printing Office, August 1975 and earlier).

[5]Agricultural Prices, 1974, p. 35.

Consequently, grain costs in 1974 for livestock producers were almost double 1972 levels. As feed costs increase ceteris paribus, the margin remaining to cattle feeders for their discretionary payment to feeder calf producers decreases. With high priced feed and depressed slaughter cattle prices, the demand for feeder cattle is low and therefore, calf prices paid to cow-calf operators decline. This phenomena was well-illustrated in 1974. The average annual price for calves in 1974 was $33.10 per cwt., much lower than in 1972 when prices were $44.70 per cwt. Because of the increased cost of feed, feeder calf prices were lower than finished cattle prices for the first time in several years.

In short, beef producers, especially beef cow-calf producers marketing feeder calves, have been caught in a severe cost-price squeeze. Rather than increase production per se, as seemed appropriate in 1973, the beef cow-calf producer must be assisted by research and extension activities to become more efficient if he/she is to withstand these economic pressures. However, the 1973 goal of increased output and the current goal of increased efficiency are not completely incompatible.

B. Objectives of Study

The project proposal specified four major objectives. These objectives were defined in the context of certain assumptions about the target group, i.e., small beef cow-calf producers.

Some of these assumptions were:

1. "Small beef herds are supplementary to the main source of income for the family."

2. "Major source of income may be from off-farm work, retirement income, or other farm enterprises."

3. Many farmers keep beef for noneconomic reasons such as use of available forage, personal satisfaction, and fewer management problems than with other enterprises.

4. Because economic return may not be the major motive, "extension has not always been able to reach the small beef producer with traditional programs aimed at improving economic return."

5. "There has not been the proper incentive for the small beef producer to take the risk of adopting new technology."

With these assumptions in mind, four objectives were formulated.

1. "Determine the factors which would motivate small beef herd owners to (a) adopt new technology, (b) improve use of available resources, and (c) consider new marketing techniques that would improve the movement of cattle to moderate and reduce assembly and transportation costs."

2. "Formulate and begin the testing of systems of management (production and marketing) for the beef-cow herds of less than 50 cows. These will be designed to enable producers to improve productivity from available resources by 10 to 20 percent over a five-year period."

3. "Develop and test delivery systems for reaching large numbers of producers with the management systems developed."

4. "Make available results of pilot tests and materials developed for other states where small herds are a significant factor in beef production."

The second objective was to be largely handled by writing a series of "fact sheets" geared to small producers and covering a wide range of production and marketing practices. The first objective was to be achieved largely through the mechanism of a mail questionnaire to be sent to the target group and through soliciation of expert opinion. The questionnaire

was also to be used in developing delivery systems for reaching producers, part of the third objective.

C. Plan of Study

The study is divided into four parts. Chapter II reviews some of the literature and cites expert opinion on the subject of the small producer. Discussed are definitions of the small producer, characteristics and problems of small producers, and policies and specific programs designed to reach and assist low-income farmers. Chapter III describes the methodology of the study, including the sampling technique and method of gathering data, sampling biases, questionnaire design, and type of analysis. The fourth chapter describes the primary characteristics of the sample group (state of residence and number of cows), and presents the stated motivations, sense of satisfaction, and sources of information of the sample group. Chapter V describes some of the production characteristics of the sample group, and Chapter VI summarizes the findings of the study and makes recommendations for further research and extension activities.

Chapter II

REVIEW OF LITERATURE AND EXPERT OPINION

This chapter reviews some of the literature and cites expert opinion on the subject of the small farmer. Alternative definitions of target groups found in the literature are discussed. Problems and characterizations pertinent to the small producer are considered, and programs and policies designed to reach and assist the small producer are described.

Expert opinion was solicited from several sources on the subject of the ways and means of reaching and motivating the small producer. Letters of inquiry were sent to the livestock extension specialist in five of the six states covered in the survey (New York, Pennsylvania, Ohio, Virginia, and West Virginia), to the Missouri Small Farm Program at the University of Missouri in Columbia, and to the Tennessee Valley Authority in Muscle Shoals, Alabama. Informal conversations were also held with livestock extension personnel at Michigan State University.

A. Target Groups

The target group of the various publications reviewed were somewhat different, and these differences must be clarified. This study identified the target group as small beef cow-calf producers, defined as those with less than 50 cows. No information was gathered on number of cattle sold, and consequently gross sales could not be calculated. Therefore, it is impossible to directly compare this

study with most other references, such as Agricultural Census data, the TVA publications, or the Missouri Small Farm Program publications. In these publications, gross sales are the major criteria in defining a target group, variously labelled as "small farmers," "limited resource farmers," "low income farmers," and "Economic Class IV-VIII farmers." It should be remembered that gross sales are not a perfect measuring stick. Because of annual fluctuation in physical output, price, and production costs, gross sales can provide only a rough indication of net income.

Another common criteria used in the literature is number of acres, or size of farm. This is not a suitable point of comparison for this study, because the target group is defined only in the terms of one enterprise. A small beef producer can be a large farmer. There are members of the sample group for which the beef cow-calf enterprise is but a small supplement to a much larger enterprise, such as dairy, beef feeding, or grain production.

Another problem with using number of acres for defining a target group is that productivity of land can vary tremendously. Beef cow-calf farms tend to be land extensive and found primarily on poorer quality land. Large acreages are not necessarily correlated with large income.

Yet another criteria in defining target groups is whether they are part-time or full-time producers. The importance of economic return, the amount of labor involved, the amount of risk to be taken, the motivations and goals, and access to capital are in large part determined by whether the producer is a full-time or a part-time producer. Again, results of this study cannot directly be compared with agricultural census data and

other literature because the part-time and full-time producers were not specifically identified in the questionnaire.

Despite these problems it is likely that a portion of the sample group studied in this project are "small farmers," frequently defined as those with less than $10,000 gross annual sales. It was estimated that $10,000 farm sales would result in a net farm income of less than $3,000 per year, which is low for those who depend only on farm income.[1]

B. Problems and Characteristics of Small Farmers

The publication of Hard Times, Hard Tomatoes by Hightower of the Agricultural Accountability Project in 1972 called attention to the small farmer. The major thesis of this book was that:

> This public complex--composed of college of agriculture, agricultural experiment stations and state extension services--has put its tax dollars, its facilities, its manpower, its energies and its thoughts almost solely into efforts that have worked to the advantage and profit of large corporations involved in agriculture.[2]

Hightower repeatedly emphasized that the land-grant complex should do more than promote strict scientific and business efficiency with its consequential deterioration of traditional rural life. As in much of the literature, Hard Times, Hard Tomatoes stressed that large scale commercialization of agriculture has left a large segment of the rural population with low-incomes, exacerbated unequal income distribution between rural and urban populations, and intensified the problem of urban migration.

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[1] Edward R. Wiggins, "The Missouri Project for Limited Resource Farmers" in Proceedings of the Workshop on Methods of Working with Limited Resource Farmers (Muscle Shoals, Alabama: National Fertilizer Development Center, Tennessee Valley Authority, 1972), p. 64.

[2] Jim Hightower, Hard Times, Hard Tomatoes (Washington, D.C.: Agricultural Accountability Project, 1972), p. 1.

A large body of literature has dealt with the problem of rural poverty. Historically, one of the major themes for coping with the problem has been in improving the economic efficiency of farmers. Cochrane traces programs dealing with this problem since the 1930s.[3] "They [1930s programs] were too narrowly oriented in that they conceived the solution to rural poverty in terms of rehabilitating farmers--turning low-production farmers into high-production farmers." In the 1950s and 1960s, "the goal of farm spokesmen was, and to an important extent still is, to turn each low-production farm into an adquate-sized productive unit." Cochrane discusses the shortcomings of such a policy and suggests that nonfarm solutions must also be explored. Nonfarm solutions were also a major theme in more recent times. For instance, the Workshop on Improved Rural Living held in 1974 emphasized off-farm employment, part-time employment, rural industry, housing, etc. much more than it emphasized improved economic efficiency in the agricultural sector.[4]

Heady and Sonka explored some of the consequences of an agriculture based only on productive units of less than $10,000 gross sales.[5] They concluded that higher prices for farm output, higher total farm income, and lower net income per farm would result. An agricultural structure of this nature, even if feasible, was deemed undesirable. Their conclusions

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[3]Willard W. Cochrane, The City Man's Guide to the Farm Problem (Minneapolis: University of Minnesota Press, 1965), pp. 211-215.

[4]Workshop on Improved Rural Living on Limited Resources, Proceedings, Bulletin Y-88 (Muscle Shoals, Alabama: National Fertilizer Development Center, Tennessee Valley Authority, 1975).

[5]Earl O. Heady and Steven T. Sonka, Farm-Size Structure and Off-Farm Income and Employment Generation in the North Central Region (Ames, Iowa: Iowa State University, North Central Regional Center for Rural Development, 1975), pp. 75-76.

were based on the assumption that small farming units had significantly higher per unit production costs than larger farms.

In several studies it has been shown that a beef cow-calf enterprise is less profitable than other livestock enterprises. Despite this fact, the number of farms with beef cows and the number of beef cows per farm have been increasing in recent years. The possible causes for this phenomena were explored in a 1972 study in West Virginia.[6] The study had several parts. The first part was a linear program which contained several livestock enterprises, and whose objective function was to maximize income. "Relatively large changes in labor and capital coefficients and restrictions of the programming model did not result in beef cattle entering the computed optimal farm plans, but forcing full use of pasture did."[7] A second part of the study was a survey, designed much like the survey used in this study, but orally administered. The average farmer surveyed was considerably larger in both acres and number of cows than in this study, but the results obtained were remarkably similar. Farmers confirmed that land adaptability was the major reason for including a cow-calf enterprise in their farm operation.

The West Virginian respondents recognized the relatively low return to a beef cow-calf enterprise, and disliked the fact that it was not a steady income producing enterprise. However, they chose the enterprise because (in order of importance) land was adapted to beef cattle, they liked working with beef cattle, the enterprise had less management and

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[6]Stephen K. Hedrick and Dale K. Colyer, Socio-Economic Factors Affecting Beef Production in West Virginia, Bulletin 610 (Morgantown: West Virginia University Agricultural Experiment Station, 1972), p. 33.

[7]Ibid., p. 33.

labor requirements than other types of livestock enterprises, and the enterprise had less risk than other types of livestock enterprises.

A 1965 study by Maish used a budgeting approach to conclude that the net income from a beef cow-calf enterprise in Southern Michigan was much lower than for other livestock enterprises.[8] He found that "the beef cow herd seems best adapted where an abundance of forage is available, alternative enterprises are limited, and land values are low."

C. Programs and Policies for Small Producers

Several Extension programs have been developed in recognition of the fact that economic return may not be the major reason to have a small farming enterprise. For instance, a Pennsylvania publication directed to the potential part-time farmer recognized goals other than economic return.[9]

> In general, beef enterprises have relatively low labor requirements and can make use of family labor. Chore time is flexible, too. Capital investment can be kept low per unit if the farmer is careful. . . Most beef enterprises can make extensive use of home raised forage which reduces cash expenses. . . Unfortunately, beef enterprises usually have a relatively low net return per unit.

A Michigan publication, Opportunities for Supplemental Income From A Beef Cow Herd cites similar reasons why a beef cow-calf program is ideally suited to part-time farming in the region. In addition to labor, capital, and available feed factors mentioned in the Pennsylvania publication, the Michigan publication states, "Cattle do not require highly skilled management although they will respond to good husbandry

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[8] Lynn J. Maish, "The Economics of Beef Cow Herds in Michigan" (M.S. thesis, Michigan State University, 1965), p. 4.

[9] John E. Brockett, Farm Management for Part-Time Farmers, Special Circular 203 (University Park: Pennsylvania State University Extension Service, 1975), p. 5.

practices."[10] It also mentions that a beef cow-calf enterprise is a good replacement for the disappearing small dairy enterprises and that small beef cow-calf enterprises make good use of idle cropland which is in small units and cannot easily be combined to support a larger operation.

However, as in other publications, the report indicates that a beef cow enterprise is not highly profitable.[11] Assuming a 50 cow herd, $56/lb. calf prices, 420 lb. calves, and a 90 percent calf crop, returns per cow were estimated to be $212 ($10,600 for 50 cow herd). Annual costs including roughage, protein, salt and mineral, veterinary, marketing, replacement heifers, taxes, insurance, interest on livestock investment, and miscellaneous were estimated at $175 per cow unit, for a net return above annual cost of $37 per cow unit. However, if fixed charges including interest, insurance, depreciation, repairs and taxes on land, buildings, and equipment; and labor charges are included, net return plummets to $-29 per cow unit.

Other more traditional programs have also been developed to help the small producer increase economic viability and net income. A leader in such projects has been the University of Missouri.

The Missouri project was developed because of the concern that too few small farmers made use of regular extension programs, a problem articulated frequently in the literature. The university experimented with means of attracting more of them to traditional extension programs without

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[10] D. R. Hawkins, H. D. Ritchie, and G. A. Greathouse, Opportunities for Supplemental Income from a Beef Cow Herd (Chatham, Michigan: Northern Beef Demonstration Center and Michigan State University, 1975), p. 4.

[11] Ibid., p. 18, citing Leonard R. Kyle, Department of Agricultural Economics, Michigan State University, 1974.

much success.[12] The core of the program was the training and use of a corps of nonprofessional "educational assistants" to work on an intensive basis with small producers. Area farm management specialists, a small professional staff and a series of bulletins designed for small producers provided the auxillary support to the para-professionals.

In the earlier phases of the project, priority help was given to producers who wanted to expand and who didn't have off-farm income. However, the 1974 report states that 77 percent of the families participating in the program had off-farm income.[13]

According to the report, the program has been successful in improving management skills, increasing Extension participation rate, and increasing physical output. Also, a "research study near completion by Van Harrold under the direction of Dr. Jerry West at the University of Missouri shows that small farmers participating in this program progressed more than those who did not participate."[14] No where in the report are the costs of the project given, so that the cost-benefit relationship and the financial feasibility of the program for other states cannot be determined.

The Virginia Polytechnic Institute and State University has the most elaborate program of the six state universities in this study. According to James M. Moore, Farm Management Extension Specialist, VPI

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[12] Edward R. Wiggins, Missouri Extension Launches Small Farm Program, MP373 (Columbia: University of Missouri-Columbia Extension Division, 1973).

[13] Edward R. Wiggins and Duane Dailey, Missouri Small Farm Program 1974 Report, MP445 (Columbia: University of Missouri-Columbia Extension Division, 1975).

[14] Wiggins and Dailey, Missouri Small Farm Programs 1974 Report, p. 22.

has a pilot project for working with limited resource farmers. It is designed much like the Missouri program where agricultural aides make face-to-face contact with small farmers. Included in the project are beef cow farms.

There have been no publications on this program, but Dr. Moore did make observations.

> Demonstrations have been by far our most successful teaching tool. Generally the technician (nonprofessional agricultural aide) has to do much of the work on these demonstrations. . . . Positive changes appear to be highly correlated with the amount of personal contact. We have very poor success when we explain a technique or give a recommendation one time and then walk off and expect something to be done.
>
> We have the greatest amount of change in counties where the agent has been able to get the money to put on demonstrations rather than making the farmer provide the cost for the new or improved practice.
>
> The new technology that is demonstrated to this clientele must be the types that afford very low risk to the farmer. They are not risk takers for two reasons. One is that they can't afford to be any worse off, and two, they are characteristically reasonably satisfied with what they are doing. . .[15]

According to Stuart Smith, an Extension Associate at Cornell University, most of the small beef cow-calf enterprises are part-time or supplemental enterprises in New York.[16] Except for one publication on the problems and alternatives for limited resource dairy farmers in one area of the state, no other studies deal directly with the problems of small farmers. However, the traditional methods of Beef Cattleman's Short Courses, Livestock Field Days, Regional Beef Tours, and regional

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[15]Letter from Dr. James M. Moore, Farm Management Extension Specialist, Virginia Polytechnic Institute and State University, Sept. 29, 1975.

[16]Letter from Stuart F. Smith, Farm Management Extension Associate, Cornell University, Oct. 7, 1975.

educational meetings for the beginning cattleman are used to reach the part-time farmer.

The other four agricultural colleges in Michigan, Pennsylvania, Ohio, and West Virginia either have no elaborate program specifically geared to the small producer or did not respond to the letter of inquiry. Of course, many of the research efforts and extension bulletins in these states are partially applicable to small farmers.

Another leader on the subject of small farmers has been the Tennessee Valley Authority, who were one of several sponsors of a 1972 Workshop on Methods of Working with Limited Resource Farmers.[17] Several on-farm program experiences were described, including ones which made use of para-professional agricultural aides. These programs included the Texas Intensified Farm Planning Program and the Jefferson County, Mississippi Program both which resemble the Missouri Small Farm Program concept. Some of the conclusions reached during discussion of the papers presented at the workshop are presented:

1. "The demonstration as a method of teaching has a prominent place in projects with limited resource farmers."

2. "It is better to work with limited resource farmers in the context of a total extension program than it is to separate and label them as low-income."

3. Keys to successful projects are motivation, direct involvement in planning, and good face-to-face relationships.

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[17] Workshop on Methods of Working with Limited Resource Farmers, Proceedings, Bulletin Y-44 (Muscle Shoals, Alabama: National Fertilizer Development Center, Tennessee Valley Authority, 1972).

4. "A program assistant--such as an aide, a para-professional, a sub-professional--working with and under the direction of a professional is often successful in reaching this type of clientele."

5. "Use the family approach and do not work solely with the man in the family."

6. "Limited resource cooperatives are considered to be a useful tool to assist low income farmers."[18]

A 1966 study by Fliegel in Pennsylvania stressed that the key to improvement in farmer welfare was motivation.[19] He divided low-income farmers in five groups--the aged, the handicapped, the nonfarm oriented producer (part-time), the commercially oriented producer, and the subsistence oriented producer. The last group seemed to represent the real core of the persistently poor. These producers had little motivation to improve and did not know of opportunities available. Fliegel suggests that rural poverty is found in "pockets" or localized areas, partly because of a reinforcing mechanism whereby the "keeping up with the Joneses" motivation for improvement is inoperative. He suggests that "the possibility of actually acquiring such goods may have to be demonstrated."[20]

Some general conclusions about the role of the Extension Service in reaching limited resource farmers can be drawn from A People and A Spirit, a 1968 report of the joint USDA-NASULGC Extension Study

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[18] Ibid., pp. 59-60.

[19] Frederick C. Fliegel, The Low Income Farmer in a Changing Society, Bulletin 731 (University Park: The Pennsylvania State University Agricultural Experiment Station, 1966).

[20] Ibid., p. 35.

Group.[21,22] Low-income farmers were roughly defined as those with less than $10,000 in annual sales. Low income farmers were divided into seven categories, and the frequency of each group was estimated. Some farmers were classified in more than one category.

1. Full-time operators in their productive years, who lack resources--15%.

2. Full-time operators in their productive years who lack motivations--10%.

3. Full-time operators nearing retirement--21%.

4. Full-time operators mentally or phycially handicapped--8%.

5. Share operators--20%.

6. Part-time operators--30%.

7. Part-retired operators--16%.

The report suggests that from 75% to 80% of these low-income operators should stay in rural areas, rather than migrate to the city for the sake of themselves and for the sake of society.

In order to accomodate these people, the USDA-NASULGC Study Committee recommended that the percent of financial resources devoted to these farmers by the Cooperative Extension Service should be doubled. In 1968, roughly 35 percent of the professional person-years in the Cooperative Extension Services were devoted to low-income farmers.

Some general principles of assistance were suggested in the report.

> Extension is an educational agency. It is not a welfare activity nor is it a financial aid institution. . . . education requires effort and response by the recipient. . . .

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[21]Joint USDA-NASULGC Study Committee on Cooperative Extension, A People and A Spirit (Fort Collins: Colorado State University, 1968).

[22]NASULGC is the acronym of the National Association of State Universities and Land Grant Colleges.

> Extension is faced with the problem of providing sufficient motivation to encourage participation by individuals and groups who in the past have not been highly motivated toward or who have been denied the educational process--formal or informal. Lack of motivation in many instances has been due to lack of knowledge about the opportunity to participate. In this context, extension has both a challenge and an opportunity in providing some adequate information to the alienated about its programs and their benefits. This will require more intensive personal contact. That segment of the population which has the capability but not the interest will require effective stimulation before they participate in the educational process available to them through extension.[23]

D. Summary

In summary, several different sources concurred on several major themes. They are:

1. One solution to rural poverty is to improve the size and efficiency of low-income farms. However, other alternatives such as off-farm employment should also be stressed.

2. Farmers, particularly beef cow-calf producers, may have important objectives other than economic return.

3. Traditional Extension programs have had limited effectiveness in reaching the small, limited resource farmer. New innovative approaches must be attempted.

4. Lack of motivation hinders the educational process and may be a result of the lack of knowledge about the opportunity to participate.

5. An effective way to increase knowledge about the opportunity to participate is through personal face-to-face contact with Extension personnel.

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[23] Ibid., p. 37.

6. In order to extend Extension resources, and to facilitate two-way communication, nonprofessional agricultural assistants may be useful.

7. Demonstration is an essential ingredient in convincing clientele of the feasibility and appropriateness of selected improved production practices.

8. Goals other than economic return should be recognized and emphasized when introducing improved production practices.

CHAPTER III

METHODOLOGY

This chapter will describe the details of the survey method used in this study. To be discussed are the survey area, the form of the survey, the sampling technique, biases of sampling technique, questionnaire design, editing and screening procedures, and method of analysis.

A. Area of Study

The area chosen for study was a region in the eastern United States including the six states of Michigan, Ohio, New York, Pennsylvania, Virginia and West Virginia. Each of these states are represented on the advisory committee selected to serve in helping to develop the details of the project, periodically review the progress of the project, and criticize the final report. The project leaders, Dr. Dan Fox and Dr. Virgil Crowley selected these six states because of their similarity in type of producer, climate, and feed supply. The project proposal declared that most of the producers in these states have small herds which are supplementary to the main source of income for the family, such as off-farm work, retirement income, or other farm enterprises.

B. Sampling Procedure

The method of gathering data from these small producers was through the use of an eight page mail questionnaire. (See Appendix B for sample questionnaire.) Based on the recommendation of the agricultural

statistician at Pennsylvania State University, each state was to receive 300 questionnaires. However, Michigan and Pennsylvania received approximately 1,200 and 1,800 questionnaires respectively because project leadership and some funding came from the agricultural colleges in these states.

The method of distribution of the questionnaires within each state was left to the discretion of the extension animal scientist in that state. However, a general procedure was followed. County agents were asked if they were willing to have their county included in the survey before questionnaires were sent to them in February and March, 1975. A geographic dispersion within each state was attempted. The county agents were asked to write cover letters to include with the questionnaire. County agents were requested to mail the questionnaires to every other name on their beef cow and calf producers mailing list, after first eliminating those producers with more than 50 cows. A return envelope which did not require a stamp was included with each questionnaire. All completed questionnaires were to be mailed to Dr. Virgil Crowley in University Park, Pennsylvania. However, Virginia requested and received permission to have the questionnaires returned to the county agents in the selected counties and then forwarded to Dr. Crowley.

Returned questionnaires were accepted until May 15, 1975. All questionnaires were sent to Michigan State University for analysis by Elizabeth Garst, a graduate student in Agricultural Economics.

C. Initial Screening

An initial screening eliminated 44 questionnaires from consideration for the following reasons:

1. The survey was to consider the characteristics of small producers. The 20 returned questionnaires which indicated 100 or more cows were eliminated as being too large for the purposes of this study.

2. A major method of calculating averages and comparing data was on the basis of the number of cows in each herd. Twenty returned questionnaires were eliminated because the respondent did not answer the question, "Number of beef cows over 2 years of age on farm _____."

3. Four questionnaires were eliminated because the respondents no longer owned any beef cows, and either left many questions blank or supplied old data.

4. One questionnaire was eliminated because the respondent was a dairy farmer rather than a beef farmer.

5. One questionnaire was eliminated because the producer had been farming only a few months and could not answer many of the questions.

D. Questionnaire Response Level

Table III.1 Number of Mailed, Returned, and Accepted Questionnaires and Return Rate by State

	MI	NY	OH	PA	VA	WV	Total
Number Mailed	1,200	300	300	1,800	300	300	4,200
Number Returned	74	33	42	194	163	42	548
Number Accepted	65	31	40	178	153	35	503
Percent Accepted (Questionnaire Response Level)	5.4	10.3	13.3	9.9	51.0	11.7	12.0

The percent of accepted returns for the sample considered as a whole was 12.0 percent, or 503 of 4,200 questionnaires.

E. Problems and Bias of Sampling Procedures

Several observations about and criticisms of the above sampling techniques can be made. By looking at the return rates of the six states, it is obvious that Virginia had an exceptionally high return rate of 51 percent. Although sampling methods were not identical in the six states, only Virginia had a major procedural difference in technique which could account for the extremely high return rate. This difference was that Virginia respondents returned their completed questionnaires to the county extension agents rather than to Pennsylvania State University. Perhaps personal contact with the local extension agent provided the incentive for this relatively large percentage of producers to devote their time in completing the questionnaire. In Pennsylvania there was only a 9.9 percent return rate, the second smallest, which suggests that it is local, county agent loyalty, rather than state loyalty which provides the extra incentive.

There may be several biases inherent in the sampling technique. First, questionnaires were sent only to "cooperative" extension agents. These agents may have greater than average rapport with both university extension personnel and the farmers sampled.

Second, questionnaires were sent only to producers on the beef cow and calf mailing lists, which served as the sampling frame. These producer mailing lists are primarily constructed from names gathered at the registrations of various extension sponsored affairs such as field days and demonstrations. Additional names are added from other sources, but there is no guarantee that "nonbelongers" are on the lists. In short,

the sampling pool may not have contained the names of the producers that extension has been ineffective in reaching. A portion of the intended population may have been eliminated from consideration, resulting in a possible upward bias of the data collected.

A third problem with the survey technique was that information was gathered with a mail questionnaire rather than with some type of personal interview. The mail questionnaire is relatively less expensive and does avoid possible interview bias. On the other hand, much of the data requested on the questionnaire was either very detailed or complex. Because it was not personally administered, many questions were not answered, answered incompletely, or answered inaccurately. With better data, sample size could safely be smaller.

Another bias is introduced when a mail survey is used. The least educated and motivated producers and the producers with little empathy with extension are the producers least likely to bother filling out and returning such a long, detailed, and complex form. Therefore, the sample may not contain those individuals that the survey should most have reached, but instead consists largely of better-than-average producers.

F. Questionnaire Design

There were serious problems in the design of the questionnaire itself as well as in the design of the survey method. Pretesting of the questionnaire on a small subsample was not used to detect and eliminate a large number of logical inconsistencies, format problems, unit specification problems, and omissions of crucial questions. Because this procedure was not followed to redesign the questionnaire, some gathered data is unusable, and the validity of other results are seriously undermined.

Many problems could also have been avoided if goals and hypotheses had been precisely and carefully defined, the data requirements to test these hypotheses and fulfill these goals carefully deliniated, and redundant and extraneous data collection eliminated.

An integrated multi-disciplinary approach would have been helpful. More than one discipline was represented in the design of the questionnaire, but much of the collected data is fragmentary and has little connection to other gathered data or to the objectives stated in the project proposal. And, although the stated objectives emphasized psychological, sociological, and communicative factors, neither psychology, sociology, or communication disciplinarians were consulted.

Another problem with the questionnaire design was that no data was collected which would enable comparison of key characteristics of the target population of the survey with the characteristics of the actual sample group obtained. Data gathered on years of education, the only parameter in the survey likely to indicate possible sampling bias, was unusable because of the poor format of the question.

There was a degree of duplication in the questions asked, which contributed to the length of the questionnaire. For instance, data on acres and yields of crops, and data on quantities of raised feed fed to cattle were collected separately. Data on pasture acres and feeding methods were also collected twice. However, precise comparisons of the questions to ascertain producer consistency and accuracy were not possible because of slight differences in the content of each question.

Specific problems encountered in the questionnaire are discussed in the text of the next two chapters. In Appendix C, more detailed information is given on the assumptions used in coding the information

and the reasons for eliminating the discussion of certain questions are given.

G. Coding of Data

The 503 returned and accepted questionnaires were coded and key-punched at Michigan State University. During the coding process, the data was edited to eliminate obviously fallacious recorded responses and to convert recorded responses to a uniform set of terms. Missing, illegible, or obviously fallacious information was recorded as a blank, or a "missing value" in the analysis of the data. It was often difficult to determine whether a blank response to a question meant that the producer did not answer the question or whether the producer was indicating a "0" response. If the blank response was in the midst of a block of questions which had been answered by the respondent, a "0" rather than a "missing value" was assigned. On the other hand, if no questions in a block of questions were answered, all were assigned "missing values." Obviously, these rules are somewhat arbitrary, and it is quite possible that several of the aggregated responses are understated because not enough "0" values were recorded and averaged in the total. This will be referred to as the "missing values" problem.

The data were coded in a way amenable to the punched card method of processing, and read onto tape on the MSU CDC 6500 computer.

A number of FORTRAN programs were written for error checking purposes. Cross checks were made on the consistency of certain questions with other questions. Boundaries were placed on certain variables, and responses falling outside these boundaries were investigated. A number of coding and keypunching errors were also identified. (See Appendix C for details.) After these problems were corrected, the raw data were run

on the Statistical Package for The Social Sciences, known as SPSS. This is a canned computer program which can perform many functions, including frequency counts, ranges, means, standard deviations, cross-tabulations, etc., as well as variable transformations.

H. Method of Analysis

Frequency counts were kept for all coded variables. Means, maximums, minimums, and standard deviations were determined for all numeric variables. Blanks, or missing values were not incorporated into the statistics and for some numeric variables (identified in later discussion) zero values were not averaged in the statistics. Because of a large number of missing responses, and in some cases "0" responses, the sample size of calculated variables varies substantially. Therefore, in most cases the number of responses are provided along with the calculated results. The number of responses should be compared with the total possible number in the sample group, and if the difference is relatively high, the results should be regarded with scepticism. Statistics calculated from samples of less than 5 cases are not reported, and are indicated by a "-" in the tables.

Many of the results provided in the tables have been rounded to roughly correspond to the degree of accuracy inherent in information. In some of the frequency distributions, the sum of the percents may not exactly equal 100 percent because of rounding errors. In other frequency distributions, the sum of the percents may be over 100 percent because more than one response was recorded for each case, or respondent; i.e., possible answers were not mutually exclusive.

I. Summary

This chapter describes the processes and problems of collecting and analyzing data for the study. Mail questionnaires were sent to 4,200 respondents in the states of Michigan, New York, Ohio, Pennsylvania, Virginia, and West Virginia, and 503 useable forms were returned. The highest return rate occurred in Virginia, where forms were returned to local extension agents, rather than to Pennsylvania State University.

Problems in sampling and questionnaire design undermined the validity of the results discussed in Chapter IV and Chapter V. The sampling pool may have been biased towards the better-than-average producer, but data was not collected to enable comparison of the actual sample group with intended target group. The questionnaire was not pretested on a subsample, and consequently contains some logical inconsistencies, ambiguities, format problems, and omissions of crucial questions. Goals, hypotheses, and data requirements were not carefully and precisely defined.

Because of these problems, the next two chapters will consist of presentation of data in tabular form, pertinent qualifications, and simple description. Elaborate analytic techniques are not conducted because of the type and quality of data.

CHAPTER IV

PRIMARY CHARACTERISTICS, TYPE AND DEGREE OF SATISFACTION AND MOTIVATION, AND SOURCES OF INFORMATION OF SAMPLE GROUP

A. Introduction

This chapter describes the primary characteristics of the sample group, explores the type and degree of producer satisfaction and motivation, and determines the sources of information of the sample group. The primary types of description are means, frequency distributions, and ordinal ranking of selected concepts derived from the data of the questionnaire.

The underlying assumption of the questionnaire was that farmers manage their enterprises so as to maximize their satisfaction. The intent of the questionnaire was to explore the type and degree of satisfaction (especially those other than economic return) and identify sources of motivation of small beef producers. These factors could then be stressed in motivating the producer to increase output and/or economic efficiency. There are some difficulties with this concept. The producer's motivations and goals may not correspond with the goals of this project of increasing output and/or economic efficiency, and in fact, the two goals may be incompatible. Perhaps producers may think, or should be encouraged to explore the possibility of completely ceasing beef production.

At any rate, accurately determining sources and degree of satisfaction and motivation would require a large measure of sublety and sophistication,

and the services of a sociologist or a psycologist as part of a multi-disciplinary team might be helpful. In addition, well-formulated and testable hypotheses would aid in producing meaningful results. The measures of satisfaction and motivation derived from this survey lack specificity and because of sampling bias, may reflect only the attitudes of the better-than-average producers. Suspected sampling bias must also be kept in mind when reviewing the sources of information of the sample group.

Comparisons and contrasts will be made among the six state samples from Michigan, New York, Ohio, Pennsylvania, Virginia, and West Virginia. They will also be made among the three herdsize groups of producers with less than or equal to 25 cows (LE25), more than 25 cows and less than or equal to 50 cows (GT25-LE50), and more than 50 cows and less than 100 cows (GT50-LT100). The first part of this chapter will explore the number and percent of producers in each of these breakouts and will also explore some of the interdependencies of the two types of comparisons.

B. Primary Characteristics

The following table gives the number of producers who returned usable questionnaires and the percent of the total sample from each state.

Table IV.1 Questionnaire Sample by State

	MI	NY	OH	PA	VA	WV
Number of Producers	65	35	40	178	153	35
Percent of Total	13	6	8	35	30	7

As can be seen from the above table there is a large variation in respondent numbers from each of the six states, ranging from only 31 respondents in New York to 178 in Pennsylvania. Because the averages for the total sample presented in subsequent tables are weighted averages specificity and because of sampling bias, may reflect only the attitudes of the better-than-average producers. Suspected sampling bias must also be kept in mind when reviewing the sources of information of the sample from these two states. Reasons for the large variation in sample size in the six states were explored in Chapter III.

The other major factor considered in this paper is herd size. Herd size is defined as the number of cows over two years of age on the farm. Table IV.2 gives the number of producers and the percent of producers in each herd-size group. The division of the respondents into these particular herd-size groups is arbitrary. The proposal was originally conceived as a study of small producers, defined as those with fewer than 50 cows. Because of the large number of returned questionnaires with more than 50 cows but less than 100, it was decided to include this information for comparative purposes. The division of the "50 cow or less" herds into two groups roughly corresponds to a division of "one bull" and "two bull" cow herd size.

Again, there is a large variation in sample size, ranging from 272 respondents with less than or equal to 50 cows to 67 respondents with more than 50 and less than 100 cows. Because the averages and frequency distribution for the total sample are weighted averages of the four herd-size groups, it is important to keep in mind this large variation.

Table IV.2 Number and Percent of Respondents and Average Herd Size of Selected Herd-size Groups

	Less than or equal to 25 cows (LE25)	Greater than 25 cows and less than or equal to 50 cows (GT25 LE50)	Less than or equal to 50 (LE50)	Greater than 50 and less than 100 (GT50 LT100)	Total
Number in Sample	272	164	436	67	503
Percent of Total	54	33	87	13	100
Average Herd Size	14.0	36.9	22.6	67.6	28.6

The effect of the variation in herd size must be considered when examining the information from each state sample. Conversely, the effect of the variation in state representation must be considered when examining the results from the herd-size breakout.

Table IV.3 gives the number of respondents and percent of the sample for each state in each herd-size breakout. Also included is the average distribution which would be found in each herd-size breakout if sampling techniques and actual herd-size distribution had been identical in each state.

Table IV.4 is an inversion of Table IV.3 and illustrates the amount of herd-size influence in the state breakouts. Included in the table is this average distribution which would be found in each state sample if sampling techniques and actual herd-size distribution had been identical in the six states.

The relative importance of each state in the herd-size categories and the relative importance of each herd-size group in the state breakouts

Table IV.3 Number and Percent of Respondents from Each State by Herd Size

	LE25		GT25 LE50		LE50		GT50 LT100		Average
	#	%	#	%	#	%	#	%	%
Michigan	35	13	18	11	53	12	12	18	13
New York	25	9	4	2	29	7	2	3	6
Ohio	18	7	20	12	38	9	2	3	8
Pennsylvania	131	48	38	23	169	39	9	13	35
Virginia	47	17	70	43	117	27	36	54	30
W. Virginia	15	7	14	9	30	7	6	9	7
Six State Total	271	100	164	100	436	100	67	100	100

Table IV.4 Number and Percent of Respondents in Selected Herd-size Groups by State

	MI		NY		OH		PA		VA		WV		Average
	#	%	#	%	#	%	#	%	#	%	#	%	%
LE25	35	54	25	81	18	45	131	74	47	31	15	43	53
GT25, LE50	18	28	4	13	20	50	38	21	70	46	14	40	33
LE50	53	82	29	94	38	95	169	95	117	77	29	83	87
GT50	12	18	2	6	2	5	9	5	36	23	6	17	13
Herd-size Total	65	100	31	100	40	100	178	100	153	100	35	100	100

varies considerably. The degree to which this is a result of sampling differences and the degree to which it reflects actual herd-size distribution cannot accurately be determined.

According to the above information, Pennsylvania tends to have more small herds than the average of the six states. Seventy-four percent of the Pennsylvania sample has less than or equal to 35 cows, while only 53 percent of the total samples has the smallest herd-size group. Likewise, New York has a larger-than-average percent of small producers, 81 percent. The percent of small producers in Michigan is 54 percent, very close to the 53 percent average of the six states. Ohio, West Virginia, and Virginia have proportionally fewer producers in the small herd-size category, with 45, 43, and 31 percent respectively of producers with less than or equal to 25 cows.

In the total sample, 13 percent of the producers had herds of more than 50 cows. However, in Virginia 23 percent were large herd owners, while in Pennsylvania and Ohio, only 5 percent of the respective samples had more than 50 cows. There was also a large variation about the average percent of producers with between 25 and 50 cows. The Ohio sample had the largest proportion of producers with middle-sized herds, 50 percent, followed by the Virginia, with 46 percent, and West Virginia with 40 percent. New York had the smallest proportion of producers with middle-sized herds, 13 percent.

In short, variation and comparisons among the six states, and variation and comparisons among the herd sizes should be interpreted carefully, because not all variations can be attributed to the independent variable. Theoretically, a two-way analysis of variance could be used to

determine the relative importance of herd size and locational factors for each data item. However, because of the poor quality of data, such a procedure was not conducted.

C. Personal Characteristics

Questions for personal characterization of beef cow-calf operators were also asked. The average age of the respondents for the entire sample was 50.4 years, with a range of 21 to 91 years. There was little variation about the mean in either the herd size or state breakouts. According to the 1969 Agricultural Census, the average age of all farmers was 51.2 years.

The marital status of the respondents was also determined. Ninety-two percent of the total sample was married, again with only minor variation in the herd size and state breakouts.

Years of education were also requested but because of misinterpretation of the question, the results were unreasonably high and therefore not reported.

The following questions were asked to determine years on the present farm and years of experience with beef cattle.

1. "Number of years you have lived on this farm_____."

2. "Total number of years you have had beef cows on this or some other farm_____."

Table IV.5 reports the results.

Table IV.5 Average Years on Present Farm and Average Years with Beef Cattle

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	64	30	40	174	146	34	265	160	425	64	489
Average Years on Farm	26	19	26	23	29	31	24	27	25	30	26
Number in Sample	64	30	40	175	153	35	270	161	431	67	498
Average Years with Cattle	17	9	19	16	21	21	15	21	17	22	18

In every sample group, average number of years on farm exceeds the average number of years with beef cattle, by an average of eight years. The Virginia and West Virginia samples have had the longest tenure with 29 and 31 years respectively, and also the most years of experience with cattle, with 20 years each. The New York sample had the shortest tenure, 19 years, and also the least experience with beef cattle, 9 years.

As might be expected, there was a positive correlation of herd size and average number of years on farm and a positive correlation of herd size and average number of years with beef cattle. Years on farm increased from 24 to 30 and years with beef cattle increased from 15 to 22, as herd size increased from 25 cows or less to more than 50 cows.

The first question explicitly asked the number of years the respondent lived, rather than worked on his/her present farm. Ten respondents indicated that they did not live on the farm that they worked and were assigned zero values for the question, which were averaged in the above results. Only 10 of 489 respondents, or about 2 percent, indicated that

they lived off farm. The 1969 Agricultural Census reported that 81.2 percent of all farmers and 84.5 percent of Class 1-5 farm operators resided on the farm they were operating.[1]

This difference has at least two possible explanations. First, the question did not explicitly allow for the possibility of off-farm residence and respondents may have left the question blank. This is the "missing value" problem. Second, respondents may have misinterpreted the question and reported the number of years they worked rather than the number of years they lived on farm.

D. Sense of Satisfaction

According to the project proposal, this study was to develop new methods of reaching and motivating the small beef (cow-calf) producer to adopt new technology, improve the use of his/her resources, and contribute to the development of his/her rural community.

A first step in fulfilling these objectives is to obtain some feeling for the attitudinal position of the farmer towards his/her beef cow-calf enterprise in the hope that this will provide clues as to how to reach and motivate the producer. Scattered through the questionnaire were the following questions.

1. "Has the enterprise fulfilled your expectations? (check)

   Yes_____ No_____ "

2. "Are you satisfied with the economic returns from beef cattle over the years you've had the enterprise? (check)

   Yes_____ No_____ "

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[1] U.S. Department of Agriculture, Bureau of the Census, Census of Agriculture, 1969, General Report, Farm Management, Farm Operators, Vol. II, Chapter 3 (Washington, D.C.: Government Printing Office, 1973), p. 174.

3. "Has the project provided personal satisfaction for you and your family? (check)

   Yes_____ No_____ "

4. "Has the enterprise provided you and your family with a sense of achievement? (check)

   Yes_____ No_____ "

5. "Are you satisfied with you present production practices? (check)

   Yes_____ No_____ "

6. "Would you recommend a beef cow-calf enterprise to a beginning farmer in your area? (check)

   Yes_____ No_____ "

Some of the respondents seriously qualified either the "yes" or the "no" choice, and these were coded into a third category labeled "sometimes." If the "sometimes" choice been explicitly provided it might have been checked more frequently by the respondents. As presented, it indicates in a very rough way the degree of ambivalence towards the beef cow-calf enterprise that the specific question provoked. The sample number in each of the state and herd-size breakouts varied only slightly among the six questions, and therefore are not provided with each question. Roughly 90 percent of the total sample in each breakout provided nonmissing value responses.

The sum of the "yes," "no" and "sometimes" percents in each group of respondents should equal 100 percent. However, because of rounding errors, the sum of the percents of some groups may equal either 99 or 101 percent. Each question is identified by key words.

Roughly two-thirds of the respondents indicated that the enterprise fulfilled their expectations (question one), while only approximately

Table IV.6 Percent of Respondents Indicating Satisfaction by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
1. Expectations Fulfilled											
% Yes	75	81	74	62	69	59	65	75	69	61	68
% No	21	16	21	32	21	38	28	18	24	34	26
% Sometimes	5	3	5	6	10	3	7	7	7	5	6
2. Satisfactory Economic Returns											
% Yes	27	33	49	27	34	23	28	42	33	19	31
% No	64	67	49	69	58	69	68	50	61	75	63
% Sometimes	9	0	3	4	8	9	5	8	6	6	6
3. Personal Satisfaction											
% Yes	95	94	95	86	86	89	87	95	90	82	89
% No	5	7	3	13	12	11	12	6	10	14	10
% Sometimes	0	0	3	1	2	0	1	0	1	4	1
4. Sense of Achievement											
% Yes	93	100	98	81	95	91	92	95	93	95	93
% No	7	0	3	8	5	9	6	5	6	5	6
% Sometimes	0	0	0	1	1	0	2	0	1	0	1
5. Satisfactory Production Practices											
% Yes	58	57	65	53	56	54	56	61	58	44	56
% No	42	40	35	45	42	46	43	37	41	53	43
% Sometimes	0	3	0	2	2	0	1	2	1	3	1
6. Beef Cow-Calf Enterprise Recommendation											
% Yes	25	60	58	41	49	55	44	50	46	36	45
% No	62	30	28	55	47	36	51	42	47	53	48
% Sometimes	13	10	14	4	5	9	5	8	6	11	7

one-third were satisfied with the economic returns over the years (question two). A comparison of the responses to the first and second questions perhaps indicates that producers have rather low expectations for economic returns. About 40% of the respondents who indicated that their expectations were fulfilled also indicated that the economic returns were not satisfactory.

It is probable that the percent of affirmative responses to the second question was abnormally low because of the depressed price of beef in the early part of 1975 when most of the questionnaires were completed. The relatively high percentage of "sometimes" responses to this question lends support to this hypothesis. Most of the respondents who qualified their answer indicated that they had been satisfied with the economic returns in the past but were no longer satisfied.

A large majority answered both the third and the fourth question affirmatively. Roughly 90 percent felt that the cow-calf enterprise provided the producer and his/her family with personal satisfaction and a sense of achievement. There were very few qualified "sometimes" responses to these questions. Of those who did qualify their response, several producers indicated that they were satisfied but that their families were not (or vice versa).

Somewhat more than one-half of the respondents indicated that they were satisfied with their production practices (question five) and there was little ambivalence towards the question as indicated by "sometimes" responses. In the total sample, 56 percent were satisfied with production practices and 31 percent were satisfied with economic return, which indicates a complacency and lack of motivation to increase output or improve economic efficiency by a sizable number of respondents.

Less than one-half of the total respondents indicated that they would recommend a beef cow-calf enterprise to a beginning farmer in their area (question six). Many respondents qualified the answer and were coded as a "sometimes" response. The two most typical qualifications were that (1) beef prices were temporarily too low relative to production costs to make it advisable to begin a herd (as in the second question), and (2) only very highly qualified young farmers should attempt a cow-calf enterprise because it is a very competitive business.

A comparison of the responses to the six questions under the various state and herd-size breakouts is fruitful.

West Virginia producers consistently indicated the least satisfaction with their cow-calf enterprise. Only 59 percent (the lowest of the six states) felt that the enterprise fulfilled their expectations, and only 23 percent (the lowest of the six states) were satisfied with the economic returns. Nine percent indicated that the enterprise did not provide the family with a sense of achievement, and 46 percent were not satisfied with their production practice. In both these questions, West Virginia had the highest percent of negative responses of the six states. In very general terms, both the New York and Ohio samples seem, relative to the other states, satisfied with their cow-calf enterprise. New York had the highest percent affirmative response to questions one, four, and six, and Ohio had the highest percent affirmative response to questions two, three, and five.

Among the herd-size breakouts of the six questions there is also a consistent pattern. Farmers with herds of more than 25 cows but less than or equal to 50 cows had the highest percent of affirmative responses among the three size enterprises for all six questions. Again, in each

of the six questions, an affirmative response indicates some type of satisfaction with the beef cow-calf enterprise--fulfillment of expectations, satisfaction with economic returns, personal satisfaction, sense of achievement, satisfaction with present production practices, and postive recommendation.

With the exception of the fourth question on sense of achievement, farmers with herds of more than 50 cows indicated the least sense of satisfaction, in that five of the six questions had the largest negative response of the three herd-size breakouts.

To summarize, six questions were asked to obtain some feeling for the degree of satisfaction of the respondents with their cow-calf enterprise. The response to economic satisfaction was low, but the other measures of (1) fulfillment of expectation, (3) personal satisfaction, (4) sense of achievement, (5) satisfaction with production practices, and (6) positive recommendation were relatively high. West Virginia seemed the least satisfied and New York and Ohio the most satisfied among the states. Medium sized herd owners (25-50 cows) seemed more satisfied than those with more or fewer animals.

E. Motives

Questions were designed to ascertain the motives and attitudes of farmers having beef cow-calf enterprises on their farms. For each question, a list of probable responses were prepared, which the producer was asked to rank in order of importance. One question identifying motivating factors was:

"Did you select a beef cow and calf enterprise because you desired to: (If more than one applies please rank them 1-2, etc.)

(1) earn more income from the farm _____

(2) utilize land and buildings that were available _____

(3) provide a source of high quality meat _____

(4) utilize family labor and provide an opportunity for relaxation while earning additional income _____

(5) use for income tax advantage _____

(6) keep land cleared _____

A weighted average for each of the six categories was calculated and a composite ranking obtained for each of the herd-size and state breakouts and the total.[2] Sample size varied for each of the possible responses within each of the breakouts. If respondents checked rather than numbered more than one response, then a relative weight could not be assigned and the response was coded as missing value. Again, sample size did not vary significantly and is therefore not reported. In general, about 90 percent of the potential sample was included.

Table IV.7 presents the tabulated results. The six choices are presented in the order of their importance to the entire sample. It is emphasized that the numbers are ordinal and not cardinal. No quantitative inferences should be drawn from the data.

Utilization of available land and buildings is the most important reason for selecting the beef cow and calf enterprise for the total sample, for each of the herd-size breakouts, and for every state except Virginia and West Virginia. In the latter cases, the desire to earn more income was

[2]See Appendix C, Part 8.

Table IV.7 Ordinal Ranking of Selected Reasons for Enterprise by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Utilize Land Buildings	1	1	1	1	2	2	1	1	1	1	1
More Income	2	2	2	2	1	1	2	2	2	2	2
Clear Land	5	4	4	3	3	3	3	3	3	3	3
Family Labor	3	5	3	4	4	4	4	4	4	4	4
Table Meat	4	3	5	5	5	5	5	5	5	6	5
Tax Management	6	6	6	6	6	6	6	6	6	5	6

the most important reason. In all other categories, profit was the second most important reason for selecting the cow and calf enterprise.

The ranking of the six responses by the herd-size groups was almost identical. The only exception was the selection, "use for income tax advantage." Farmers with more than 50 cows gave a slightly heavier weight to this selection than did farmers with fewer animals.

Within the state breakouts there was more variability. Clearing of land was the third ranked reason in the three southeastern states, but only the fifth ranked reason in Michigan. The utilization of family labor and provision of the opportunity for relaxation was ranked third in Michigan and Ohio, while rated fourth in New York. The position of high quality meat was quite important in New York, where it was ranked third.

Closely related to the above question was the following:

"Was your decision to have a beef cow and calf enterprise primarily the result of: (if more than one applies, please rank (1-2-3) in order of importance)

(1) previous experience _____

(2) suggestions from friends already in the business _____

(3) information from an agricultural advisor _____

(4) your neighbors having beef cow and calf enterprise _____

(5) fulfilling a personal desire _____

(6) you consider farm adapted only to beef cattle _____

(7) a 4-H or FFA project of the children _____

(8) other _____ "

Many respondents qualified the sixth choice, and therefore the word "only" was eliminated from consideration, so that the choice became "you consider farm adapted to beef cattle." Many of those producers responding as "other" indicated alternative reasons. If the response was close in meaning to one of the seven provided choices, then a zero value was assigned to the "other" category and the appropriate weight assigned to the assumed response. (This was particularly common with the sixth choice.) Remaining in the "other" category were responses including (in order of importance):

(1) replacement of dairy enterprise

(2) enterprise started by father

(3) low labor requirement

(4) profit

A weighted average for each of the eight categories was taken and a composite ranking obtained for each of the herd size and state breakouts.

The responses are listed in order of their importance to the group as a whole. The ranking provides ordinal rather than cardinal data. Again, sample size varies, but not by enough to report the sample size of each response in each breakout separately. Roughly 95 percent of the sample group of each breakout answered the question.

Table IV.8 Ordinal Ranking of Selected Decision Criteria by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Desire	1	1	1	1	1	1	1	1	1	1	1
Experience	2	4	3	4	2	2	2	3	2	3	2
Farm Adapted	3	2	2	3	3	3	3	2	3	2	3
Other	5	3	4	2	4	4	4	4	4	5	4
Neighbors	6	5	7	5	5	6	5	5	5	6	5
Ag. Advisor	8	8	8	8	7	5	6	7	7	4	6
Friends	7	7	6	6	6	7	7	6	6	7	7
4-H	4	6	5	7	8	8	8	8	8	8	8

The choice of "fulfilling a personal desire" was consistently ranked as the most important reason for having a beef cow and calf enterprise. This was true for all three herd-size classifications and all six states. Previous experience and the adaptation of the farm to beef cattle ranked second or third in all breakouts except in the New York and Pennsylvania samples, where the "other" choice was relatively more important (perhaps where conversion from the dairy industry was more prevalent).

Farmers with herds larger than 50 cows depended relatively more heavily on "information from an agricultural advisor" than did farmers with herds of less than 50 cows. This may have implications for extension performance. The 4-H and/or FFA appear to have a relatively larger influence in Michigan and Ohio than in the other states.

A question similar to a composite of the previous two questions was asked in another West Virginia survey.[3] Although slightly different responses were suggested and average farm size and herd size of the sample were larger, the study largely confirms the above conclusions. In response to the question of reasons individual farmer handles cattle, "part of the land adaptable for pasture only" was ranked highest, followed by "enjoy handling beef cattle more than other types of farming." Third in importance was "beef cattle neighborhood," and the fourth-ranked reason for handling beef cattle was "father was a cattleman." "More return on investment compared to other types of farming" and "more net income compared to other types of farming" were the least important reasons to the West Virginia sample.

The results of the West Virginia study may be more meaningful than the results of this study because many of the questions were comparative in nature. Many of the suggested responses in the former included comparison with other types of farming and other enterprises, while in the latter responses tended to be absolute in nature, such as "fulfilling a personal desire."

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[3]Stephen K. Hedrick and Dale K. Colyer, Socio-Economic Factors Affecting Beef Production in West Virginia, Bulletin 610 (Morgantown: West Virginia University Agricultural Experiment Station, 1972), p. 11.

F. Sources of Information

A major objective of this study was to determine effective channels of information for reaching the small beef producer. In order to do this, the importance of existing channels of information was explored.

"What is your principal source of information concerning the management of the enterprise? (Rank the 3 most important in order of their use)

(1) feeder dealer
(2) neighbors _____
(3) friends that have beef cows _____
(4) the county extension agent _____
(5) magazines _____
(6) cattle breeders _____
(7) breed association personnel _____ _____ "

A weighted average for each of the seven categories was taken and a composite ordinal ranking obtained for each of the herd-size and state breakouts and the total. Again, sample size varied slightly for each of the possible responses within each of the breakouts, but averaged about 90 percent of sample group.

Several of the respondents indicated alternative responses to those suggested. The most common were:

1. respondents personal experience--"I taught myself"
2. respondents formal education

Table IV.9 provides the tabulated results, with each choice listed in the order of its importance to the entire sample.

Table IV.9 Ordinal Ranking of Selected Information Sources by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Extension	2	3	1	2	1	2	1	1	1	2	1
Magazines	1	1	2	1	2	1	2	2	2	1	2
Friends	3	2	4	3	3	3	3	3	3	3	3
Breeders	4	4	3	4	4	4	4	4	4	4	4
Neighbors	7	5	5	5	5	5	5	5	5	6	5
Associations	5	7	6	7	6	7	7	7	7	5	6
Feed Dealers	6	6	7	6	7	6	6	6	6	7	7

Extension personnel and farm magazines were the most important sources of information for each herd-size sample and for every state except New York, where extension ranked third in importance. In general, friends with beef cows, cattle breeders, and neighbors ranked third, fourth, and fifth in order of importance as sources of information. Breed association personnel fared relatively better in Michigan than in the other states, and also seemed more important as sources of information to producers with more than 50 cows. With those exceptions, Breed association personnel and feed dealers were the least important sources of information to the sample.

The West Virginia study also asked questions concerning sources of information.[4] The aggregated ranking of the West Virginia sample was similar to the results of this study, although slightly different responses

[4] Ibid., p. 25.

were suggested. In order of importance, they ranked farm magazines, Extension office, veterinarian, neighbors and friends, feed dealers, and relatives as sources of information most helpful in beef cattle operations.

In that study, each farmer also ranked the three persons whom he/she would contact if there was a problem concerning the beef herd. The ranked order, from most to least important was veterinarian, Extension office, neighbor-cattle farmer, feed dealer, University, and relative.

In both studies farm magazines were one of the two most important sources of information. The following question was asked to determine which magazines in each state could most effectively be used to disseminate information to the small producer.

"Please list 3 farm publications which you subscribe to and read regularly.

(1)_____ (2)_____ (3)_____"

Table IV.10 indicates the ten most widely read magazines. They are listed in the order of their importance to the entire sample. The sum of the percentages for each group is greater than one hundred because more than one magazine could be recorded for each respondent. Over 100 magazines were listed at least once, but the following were the most common.

Table IV.10 Percent of Respondents Reading Selected Farm Magazines by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
No. in Sample	62	28	40	162	145	30	245	157	402	66	465
Magazine											
Farm Journal	61	54	68	60	67	80	62	62	62	73	64
Progressive Farming	0	0	0	1	76	70	17	37	25	48	28
Pennsylvania Farmer	0	0	0	68	2	33	33	20	28	15	26
Successful Farming	34	36	43	46	0	0	31	22	27	20	26
Drover's Journal	16	4	20	9	10	10	6	15	9	18	11
Michigan Farmer	76	0	0	0	1	0	11	10	11	9	10
Ohio Farmer	0	0	75	1	0	0	6	10	8	2	7
American Agriculturist	2	43	0	7	0	0	7	3	6	9	6
National Livestock Producer	6	7	0	5	4	0	5	4	4	3	4
Hoard's Dairyman	8	11	0	6	1	3	4	4	4	3	4

The Farm Journal is the most widely distributed magazine for the group as a whole, and has a broad dissemination across both geographic area and herd size.

It is read most widely in West Virginia where 80 percent of the respondents receive it and least in New York where 54 percent receive it.

It also appears that among farms with more than 50 cows it is read more widely than among farms with less than 50 cows.

Another widely dispersed magazine is the Drover's Journal. In each of the six states there are readers, ranging from 4 percent in New York to 20 percent in Ohio. The data indicates a trend--the larger the herd size, the more often the magazine is received.

Because of the large variation in state sample size, the ranking of the total sample by magazine is distorted. The other magazines are more geographically concentrated. The Progressive Farmer is found almost exclusively in Virginia and West Virginia, with 76 and 70 percent of the sample reading it respectively. There is a tendency for the farmers with larger herds to read it. Conversely Successful Farming is found only in Michigan, New York, Pennsylvania, and Ohio, and seems to attract a larger proportion of the farms with the smallest herd classification.

The Michigan Farmer and the Ohio Farmer both attract about three-quarters of the sample farmers in their respective states, and are read almost no where else. The Pennsylvania Farmer attracts 68 percent of the Pennsylvania state sample, but also has a wide following in West Virginia, where one-third of the West Virginia respondents read it. The American Agriculturalist is popular in New York, where 43 percent of the sample reads it. Not surprisingly, the percent reading Hoards Dairyman tends to reflect the importance of the dairy industry in each state.

Only four respondents in the entire sample indicated that they did not read any magazines, but this may be an understatement because of the "missing values" problem. However, magazines appear to be

widely read and certainly constitute an excellent avenue for the dissemination of knowledge by the extension service.

G. Growth Trends

A final set of questions ascertained the growth trends of the farm, the reasons for the growth trend, and factors limiting to growth.

"Is the number of beef cows on the farm presently greater than was on hand in 1971: (check)_____same _____less than _____greater than. If less than, or greater than--Why?_____

_____

_____

_____"

Many operators found the format of the first part of this question confusing. If the answer checked in the first part of the question did not correlate to the comments written in the second part, the first response was altered to match the second part. If no comments were made in the second part, then the first part was recorded as given. This may have resulted in an overstatement of the number of operators with "less than" and an understatement of the number of operators with the "same" response.

Table IV.11 shows the percent of respondents in each breakout who had increased, decreased, and stabilized their herd size since 1971.

In the total sample, 62 percent had increased their herd size since 1971, 24 percent had decreased their herd size, and 15 percent had remained the same size. Not included in this analysis were those that had entirely ceased beef cow and calf production, and those that had increased their herd size to more than 100 cows. However, the trend to larger herds is apparent from the above information.

Table IV.11 Changes in Herd Size Since 1971

Trend	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	63	31	39	169	152	32	262	160	422	65	487
Percent Same	10	10	26	13	16	19	14	16	15	14	15
Percent Decreased	30	16	18	28	20	19	28	18	24	20	24
Percent Increased	60	74	56	59	64	62	58	66	61	66	62

It appears that fewer of the very small producers are increasing their herd size than the larger producers, and conversely, larger numbers of the smaller producers are decreasing their herd size. Only 58 percent of the producers with less than 25 cows increased their herd size, while 66 percent of those with more than 50 cows did so.

The Michigan and Pennsylvania samples had the largest percent of producers with herds smaller than in 1971. The Ohio sample has had a more stable herd size than the others--26 percent of the producers have the same number of cows as in 1971; nevertheless, 56 percent had increased their herd size. The New York sample had the largest number of growing producers--74 percent had increased their herd since 1971.

The responses to the second part of the above question indicated some of the reasons for the alterations of herd size. The responses were very diverse, but were coded into rough aggregated categories. There were four categories of reasons why the herd was larger than it was in 1971. They were:

1. desire to expand (still young and growing operation, recently started farming, desire to expand, rebuilding herd.),

2. more resources available (more land available, better utilized land, more feed available, more labor available, more capital available, etc.),

3. keep heifers (beef prices too low to sell, keep all heifers, keep all good heifers, neglected to cull)

4. profit (outlook good in 1973, more profits with economies of size).

There were also four aggregated reasons why herd sizes were smaller than they were in 1971:

1. less resources available (less land available, lack of hay-pasture, less time available, more off-farm work, retiring, fewer or deteriorated facilities such as building and fence, etc.),

2. lack of profit (feed prices too high, not profitable, change in organization - enterprise mix),

3. increased culling rate (sell when prices are high, culling for improvement),

4. sickness in herd.

Table IV.12 is a tabulation of the number of respondents in the appropriate sample who indicated each of the aggregated reasons for alteration in herd size since 1971. The "appropriate sample" consists of those producers who answered the second part of the question, who were a member of the corresponding size or state breakout, and who had increased their herd size (first part of table) or who had decreased their herd size (second part of table).

Table IV.12 Number Indicating Aggregated Reasons for Alteration of Herd Size by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Increased Herd Size											
Number in Sample	27	13	16	51	54	15	86	67	153	23	176
Number Responding:											
1. desire to expand	12	10	6	23	19	5	45	22	67	8	75
2. more resources	7	1	2	16	20	4	22	23	45	5	50
3. keep heifers	3	2	7	11	6	1	13	13	26	4	30
4. profit	5	0	1	1	9	5	6	9	15	6	21
Decreased Herd Size											
Number in Sample	7	2	4	26	11	1	38	8	46	5	51
Number Responding:											
1. less resources	2	1	2	11	7	0	16	5	21	2	23
2. lack of profit	2	0	1	12	2	0	12	2	14	3	17
3. increased culling	1	1	1	3	2	1	9	0	9	0	9
4. sickness in herd	2	0	0	0	0	0	1	1	2	0	2

The relative proportion of each of the aggregated reasons in each breakout varies considerably, and some sample sizes are very small.

However, several observations can be made. Seventy-five respondents or 43 percent of the total respondents who increased their herd since 1971 and gave a reason, did so because of the "desire to expand." Fifty respondents, or 28 percent, expanded because they had more land,

labor, or capital resources available. Twenty-one respondents, or 12 percent, increased their herd size to earn more profit, and the remaining 17 percent did so because they "kept their heifers."

Among those who had increased herd size, the "desire to expand" motive was most important in New York. The "more profit" reason was given most often in the West Virginia sample, and among the producers with more than 50 cows. The percent indicating "more resources available" was fairly constant in each breakout.

Similar data were gathered in the West Virginia survey.[5] However, the "rank the list of probable reasons" format was used rather than the open-ended design of the question in this study. Thirty-four of the 47 farmers in the sample had increased herd size since they began handling cattle. The most important reasons for expansion were related to carrying capacity of the land, including surplus feed supply, pastureland available, increased fertility of land, obtained more land, and cleared land. Other reasons (in order of importance) included lower machinery and equipment costs per head, availability of adequate facilities, and lower labor cost per head.

The six respondents in the West Virginia survey who handled fewer cattle than in the first year with the enterprise also ranked a selected list of probable responses. Difficulty in obtaining labor, shortage of feed, lack of adequate facilities, and higher machinery and equipment cost per head were the most heavily ranked reasons. Similar ranking was given by producers who handled the same number of cattle as they did in the first year with cattle.

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[5] Ibid., pp. 15-19.

Only 16 of the 47 West Virginia farmers said they were handling as many cattle as their farms were capable of supporting. The remainder ranked in order of importance, "labor shortage," "decreasing net returns per head," "do not want to work any harder," "beginning to think about retirement," and "difficulties of obtaining loans" as reasons for not expanding herd numbers to the carrying capacity of the farm.

Of the 51 respondents in this study who gave a reason for decreasing their herd since 1971, 45 percent did so because they had less resources available (primarily labor). Seventeen respondents, or 33 percent of the sample decreased herd size because they felt that there was less profit in a beef cow and calf enterprise. Nine producers, or 18 percent of the 51 respondents increased their culling rate, and two producers, or four percent, decreased size because of sickness in the herd.

Both of the producers who had fewer cows than they did in 1971 because of herd health were from Michigan. The "lack of profit" motive for shrinking was most commonly given in the Pennsylvania sample, and among producers with more than 50 cows. The "less resources available" motive was relatively most important in the Virginia sample and among producers with between 25 and 50 cows.

A question similar to the last one was also asked. "What factors, if any, prevent expansion of the beef cow-calf enterprise? _____

_____

_____"

This question was also an open-ended question which resulted in a very diverse range of responses. They were coded into rough, aggregated categories as follows:

1. Need more capital resources (money, acreage, feed, facilities, fence)

2. Lack of profit, unstable market

3. Need more labor (lack of hired help, too old, bad health, off-farm work too demanding)

4. No desire to expand, no limiting resources

5. Government regulation.

Table IV.13 gives the percent of responding producers in each breakout who indicated each of the aggregated limiting factors. A column summation of the percents equals more than 100 because more than one response was coded for each respondent if given.

Table IV.13 Percent of Respondents with Selected Factors Limiting Expansion by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	60	25	36	146	132	27	232	134	366	61	427
Percent Responding:											
1. Capital Limited	38	72	36	48	57	78	53	49	51	52	51
2. Lack of Profit	47	20	22	38	25	34	29	36	31	36	32
3. Labor Limited	25	25	42	33	32	26	32	31	31	30	31
4. No Desire	5	16	8	4	6	0	6	6	6	5	6
5. Gov't Regulation	1	0	1	0	1	0	1	0	1	3	1

The percent indicating the choice, "no desire to expand, no limiting resources" may be understated. Because of the wording of the question, many who would have indicated this choice probably left the question blank.

Thirty-one percent of the total sample indicated that labor was a limiting factor and was most frequently cited in the Ohio sample. Slightly over one-half of the total sample group indicated that lack of capital resources such as money, land, feed, facilities and fence were limiting expansion of the cow herd. Among the herd-size breakouts the percent citing this was quite stable, but among the state breakouts it ranged from 36 percent of the respondents in Ohio to 78 percent in West Virginia.

Lack of profit and an unstable market were mentioned by 32 percent of the total sample as factors limiting expansion. Forty-seven percent of the Michigan sample cited these items, while only 20 percent did so in New York. The "lack of profit and unstable market" was relatively less important to those with less than 25 cows than it was to those with more than 50 cows (29 and 36 percent respectively).

Government regulation (including pollution control regulations) was mentioned infrequently, but was relatively more important to producers with more than 50 cows than it was to the other groups.

H. Weaknesses in Production Practices

The questionnaire asked respondents to identify the greatest need of the producer in improving his/her production practices if he/she were not satisfied. It was an open, write-in question which 186 respondents answered. The response rate was not large enough to justify inclusion of state and herd-size information. More than one response could be recorded for each respondent, and therfore, the sum of the percents indicating each category is more than 100.

There was a wide diversity of responses which were roughly grouped, and are presented in the order of their importance to the total sample group. Some respondents were much more specific then others, and there was some overlapping of categories. Aspects of the enterprise mentioned by producers were:

1. Impovement in facilities, new or improved handling facilities and/or buildings, new or improved fencing--33 responses, or 18 percent of the sample group.

2. Better marketing plan, better prices, reduction in cost-price squeeze, price stabilization--30 responses, or 16 percent of the sample group of 186.

3. Better feeding management, grain yield improvement, introduction or improvement of silage production, better winter feeding management--23 responses or 12 percent of the sample group.

4. Better breeding management, better calving percentage, shorter calving season--22 respondents or 12 percent of the 186 respondents.

5. Better genetic material, better source of breeding stock, better bulls, improve culling practices--21 respondents or 11 percent.

6. More capital, more financing, money, easier credit--19 respondents or 10 percent of the sample group.

7. Better pasture management, land clearing and land improvement--14 responses or 8 percent of the 186 respondents.

8. Labor-saving improvements, more time, less labor, better quality labor--9 responses or 5 percent of the sample group.

9. Detailed management program, practical literature, regular visits by county extension agent--8 responses or 4 percent.

10. Better A.I. management--7 responses or 4 percent of the sample group.

11. Better record keeping system, performance testing--7 responses or 4 percent of the sample group.

12. Preventive health measures, parasite control, disease control--5 respondents.

13. Better weight gains--5 respondents.

14. "I don't know," "?"--5 respondents.

Many of the grouped categories are closely related to each other. Improvement of facilities (1) require capital (6), as does most improvement in genetic material (5). Better pasture management (7) is an essential ingredient in better feed management (3). Improved record keeping and performance (11) is related to culling practices (5). Better weight gains (13) are associated with most of the other categories.

The very low response rate, the respondents who indicated category 14 and who listed symptoms such as "weight gains" rather than problems, and the number who indicated "price" as the major problem all lead one to conclude that a major function of an extension program should be to help the producer identify the weaker aspects of his/her beef cow and calf operation. It is clear from data on production practices that most producers are not as efficient as they might be. Many have not been able to specifically pinpoint, or even recognize their inefficiencies.

I. Summary

In summary, it is important to remember that it is probable that the sample group is biased toward the better-than-average producer. From this sample the following conclusions are drawn.

1. On the whole, producers were satisfied with all specified aspects of their enterprise but economic return. Economic return should be emphasized as a motivational force, and the economic potential of innovations carefully delineated.

2. The most important of the specified motives for a beef cow-calf enterprise was that of utilization of fixed assets; i.e., land and buildings. Extension should suggest improved production practices in the context of fuller utilization of existing assets.

3. Extension personnel were the most important source of information to the sample group. More extension or para-professional personnel in face-to-face situations may increase the adoption rate of improved practices.

4. Magazines, especially the Farm Journal, Progressive Farming, Successful Farming, and the state farm magazines, reach a wide audience and should be used to disseminate and reemphasize improved production techniques.

5. Some producers did not recognize and/or were not able to identify the weakness of their enterprise. Extension should assist producers in identifying weaknesses and present new alternatives, so that producers can fully understand the choices available to them.

6. Producers identified weak aspects of their beef cow-calf enterprises, such as poor facilities, problems with marketing calves, poor feeding management, over-long calving season, poor breeding management and breeding stock, etc. These areas of need correspond to problem areas identified and discussed in the next chapter.

CHAPTER V

PRODUCTION AND MARKETING CHARACTERISTICS OF SAMPLE GROUP

A. Introduction

This chapter discusses the production and marketing practices of those beef cow-calf producers who responded to the survey questionnaire. The major types of description are those of means, frequency distributions and ordinal ranking of selected concepts. Comparisons and contrasts will be made among the state and herd-size sample groups.

Both physical and economic data was gathered. However, because of incomplete data collection and the limited response to some questions, beef cow-calf enterprise budgets were not constructed. Much of the information provided in the text is fragmentary and has little connection with the objectives stated in the project proposal. However, in sum, it does give a rough indication of actual production practices used by the sample group, so that obvious strengths and weaknesses of the enterprises can be identified.

The discussion begins with a description of farm size and importance of the beef cow-calf enterprise in the total farm operation. Next, an inventory of animals is presented, followed by breeding and genetic information. Marketing data is followed by cropping patterns and feeding information. Finally, some cash expenses, sources of capital, and facilities are described.

B. Size of Business

Data on farm acreage were collected, but because many farms have more than a beef cow-calf enterprise in their farm operation, a precise statistical correlation of number of cows and size of farm would not be appropriate. However, some general trends can be observed in Table V.1, which gives the total number of acres in the farming operation, the owned acres, the rented acres, and the percent of land in the farm operation which is owned. Sample size in each breakout was about 95 percent of the total possible.

Table V.1 Average Number of Owned, Rented, and Total Acres in Farm Operation

	MI	NY	OH	PA	VA	WV	LT25	GT25 LE50	LT50	GT50 LT100	Total
Acres Owned	260	175	199	172	224	227	145	235	180	373	205[a]
Acres Rented	99	79	51	37	100	92	37	97	60	148	72[b]
Total Acres in Farm	341	248	245	198	310	308	170	326	228	502	265[c]
% of Farm Land Owned	72	69	80	82	69	71	80	71	75	72	74

[a]Range: 0-1189 acres; Std. Dev.: 168.5 acres

[b]Range: 0-4500 acres; Std. Dev.: 238.3 acres

[c]Range: 19-4500 acres; Std. Dev.: 278.3 acres

The sum of owned acres and rented acres does not equal total acres because (1) the sum of the averages of two parts does not equal the average of total and (2) some land may be owned but not in the farming operation.

There is a large variance in total number of acres farmed both among states and among herd sizes, centering around the average of 265 acres for the total sample. Michigan's average of 341 acres may reflect its relatively high average herd size of 30.4 cows and its relatively large dependence on cow-calf enterprises, which tend to be land extensive rather than land intensive. In comparison, Pennsylvania had an 198 acre average, perhaps because of its relatively low average herd size of 20.5 cows. The range of acreage in the herd-size breakout is not surprising, varying from 170 average acres for farms with less than twenty-five cows to 502 average acres for farms with more than fifty cows.

The percent of owned land in the farming operation varied from 69 percent in the New York and Virginia sample to 82 percent in the Pennsylvania sample. The producers with fewer than 25 cows on average owned 80 percent of the land in their farming operation, while those with more than 25 cows owned about 71 percent of their farm land.

C. Importance of Beef Cow-Calf Enterprise

The following questions were asked to determine the relative importance of the beef cow-calf enterprise in the total farm operation.

"The principal source of farm income is from: (check) grain sales____ forage (hay) sales____ swine production____ sheep____ poultry____ beef feeding____ beef cow and calf enterprise____ fruit____ tobacco____ vegetables____ other____."

"Approximate percent of farm income from the cow and calf enterprise____."

Many respondents wrote in specific enterprises in the "other" space including dairy, wood, and Christmas trees. For the purposes of

brevity, the categories of swine production, sheep, poultry, and dairy were grouped together under the heading of "other animals." Fruit, tobacco, vegetables, and wood were grouped under the heading of "produce." Grain and forage production were also grouped, and unspecified "other" responses were tabulated separately.

A precise definition of a beef cow and calf enterprise was not given, and some producers had difficulty distinguishing beef feeding and cow-calf enterprises. If it could be ascertained that the producer finished calves produced on-farm, this was considered as a beef cow-calf enterprise. Because this fact could not always be ascertained, the results in Table V.2 should be interpreted with caution.

Table V.2 Percent of Respondents With Selected Principal Source of Farm Income and Percent of Farm Income from Beef Cow-Calf Enterprise

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
# in Sample	52	23	32	142	120	31	209	134	343	57	400
Percent with Principal Source:											
Cow-Calf	89	70	75	80	87	94	81	84	82	90	83
Beef Feeding	0	13	3	6	3	3	4	4	4	3	4
Other Animals	2	9	9	8	5	3	6	7	6	5	6
Grain & Forage	6	4	9	4	3	0	2	2	2	0	1
Produce	0	4	3	2	2	0	2	2	2	0	1
Other	4	0	0	0	1	0	1	1	1	0	2
# in Sample	58	22	32	143	144	29	217	148	365	63	428
Percent Farm Income from Beef	65	52	53	58	64	82	58	64	61	69	62

No date or time period was specified in the second question. Some respondents indicated zero percent; that is, they had lost money on their cow-calf enterprise in the recent past. These answers, where identified, were assigned missing values. Income, as a measure of enterprise importance, has disadvantages in that unusual output and price fluctuations may influence the results.

Eighty-three percent of the respondents indicated that the cow-calf enterprise was the principal source of farm income, and on the average 62 percent of farm income came from that enterprise. Within states, West Virginia had the highest percent of primarily cow-calf farms with 94 percent and New York had the lowest with 70 percent. Eighty-two percent of the farm income of the West Virginian respondents comes from the cow-calf enterprise, while only 52 percent of the income of New York respondents comes from the cow-calf enterprise.

The data from the herd-size breakout indicate that the relative importance of the cow-calf enterprise is positively correlated with herd size. The percent of farms that are primarily cow-calf operations increases from 81 percent to 90 percent as herd size increases from less than 25 cows to more than 50 cows. The percent of farm income from that enterprise increases from 58 percent to 69 percent in the same manner.

The importance of the other enterprises is relatively constant in the herd-size breakout but there is much variability in the selection of major enterprises among the six states. For instance, 13 percent of the New York sample indicated that beef feeding was the major enterprise, while none did so in Michigan.

Beef cows are reported as the major source of farm income for a majority of the sample respondents. Considering that the average herd size is about 29 cows, it could be reasoned that many of these farmers are either part-time producers or are poor.

D. Inventory of Animals

An inventory of selected types of animals on each sample farm was gathered with the following questions:

1. "Number of beef cows over 2 years of age on farm____"
2. "Number of beef heifers 12-24 months of age on farm____"
3. "Number of beef steers 12-24 months of age on farm____"
4. "Number of bulls on farm____"

The results of the first question were discussed previously, but averages rather than frequency distributions will now be presented. If respondents did not answer the first question on number of cows, the questionnaire was eliminated, so that 100 percent of the sample in each breakout is included in the averages. A smaller percent responded to the other questions. Zero responses for the questions on number of heifers, steers, and bulls were included in the averages. It is possible that some of the missing value responses (blanks) should have been recorded as zero, and therefore, there may be an upward bias to the calculated averages.[1]

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[1]See Appendix C, Parts 29-31.

Table V.3 Average Number of Beef Cows, Heifers, Steers, and Bulls by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	65	31	40	178	153	35	272	164	436	67	503
Cows	30.4	15.2	28.5	20.5	39.1	33.4	14.0	36.9	22.6	67.6	28.6[a]
Number in Sample	57	30	40	166	144	31	253	157	410	64	474
Heifers	10.3	5.9	10.6	8.1	13.5	8.7	6.0	12.5	8.5	20.6	10.1[b]
Number in Sample	56	28	39	150	128	25	229	135	364	64	428
Steers	10.3	8.0	7.5	6.3	12.3	8.6	5.2	10.9	7.3	18.3	9.0[c]
Number in Sample	56	25	31	146	142	30	217	150	367	64	431
Bulls	1.8	1.2	1.8	1.4	1.9	2.1	1.1	1.8	1.4	3.1	1.7[d]

[a]Range: 2-99 cows; Std. Dev.: 20.1 cows
[b]Range: 0-150 heifers; Std. Dev.: 10.0 heifers
[c]Range: 0-200 steers; Std. Dev.: 16.1 steers
[d]Range: 0-7 bulls; Std. Dev.: 1.1 bulls

As discussed previously, the average number of cows in each state in part reflects the differential distributions of herd sizes, and in part reflects differential sampling technique. The New York sample has the smallest average herd size with 15.2 cows and the Virginia sample has the largest with 39.1 cows.

In the smallest herd-size sample group, the average number of cows was 14.0 cows, while in the largest group with more than 50 cows, the average was 67.6 cows.

The average number of heifers, steers, and bulls in each breakout has some relationship to the average number of cows in each sample group. In order to better grasp the results of the latter questions, calculations were made to determine (1) number of heifers per cow, (2) number of steers per cow and (3) number of cows per bull for each sample group.

Table V.4 Average[a] Number of Heifers Per Cow, Steers Per Cow, and Cows Per Bull by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Heifers/Cow	.56	.67	.40	.48	.37	.36	.57	.33	.48	.31	.45
Steers/Cow	.36	.82	.25	.38	.30	.25	.42	.29	.37	.28	.36
Cows/Bull	20	11	18	14	23	16	12	24	17	27	18

[a]The average of the ratio for each respondent is given, rather than the ratio of the averages for each sample.

Sample sizes for these calculations are the same as they were for the corresponding figures in Table V.3.

Several observations can be made. There are almost one-half as many heifers as cows in the total sample. At first glance, this might be interpreted as an extremely high replacement rate. However, the question did not distinguish between replacement heifers and heifers kept for finishing to slaughter weights or heifers sold as long yearlings. The variation in the state and herd-size breakouts could be for either of these reasons. There is a tendency for the larger herds to have a smaller ratio of heifers than the smaller herds, possibly because of a tendency of smaller producers to market a relatively high portion of yearlings and finished heifers rather than calves (as discussed later in the chapter).

The average number of steers per cow was .36 for the total sample. The question did not distinguish between steers produced on-farm and steers purchased off-farm for finishing. The missing values problem mentioned previously may contribute an upward bias to the information. Like the heifer ratio, the steer ratio was highest for the smallest herd group, again possibly reflecting the propensity of small producers to market a relatively large number of long yearlings and finished cattle. There was a wide spread in the steer:cow ratio of the six states. The ratio in the New York sample was .82, while it was only .25 in Ohio and West Virginia, perhaps reflecting the differential importance of finishing calves to heavier weights in these states.

The number of cows per bull averaged 18 for the total sample, but ranged from 12 cows per bull for herds with 25 or fewer cows to 27 cows per bull for herds with more than 50 cows. The smallest herd group had such a high ratio of bulls because (1) the absolute size of the herd

is too small to fully employ one bull and (2) the producer may need two bulls, one for heifers and one for cows, or one young and one mature male animal.

The variation in the six states is probably a result of the differential representation of herd-size groups. Virginia, with a relatively high proportion of large herds represented averaged 23 cows per bull, while the New York sample, with a smaller proportion of large herds, had only 11 cows per bull.

E. Breeding Management

Three other questions determined the calving and weaning percents of the sample:

1. "Number of beef cows bull turned in with in 1974____"
2. "Number of calves born from these cows____"
3. "Number of these calves weaned____"

There were numerous problems in interpretation of the data obtained from these questions. First, some respondents answered the first question as "number of cows per bull" or harem size. Others answered it as "total number of cows to be bred." It was assumed that the intention of the question was the latter. If the respondent assumed the former or used artificial insemination, the response to the question on the number of cows over two years old was inserted if it appeared consistent with the other responses.

A second major problem with these questions is that the beef production year is not the same as the calender year. Many of the cows bred in 1974 had not calved at the time the respondents filled out the questionnaire, and many of the calves born had not yet been weaned. If respondents reconciled this problem by supplying 1973 data, and

indicated it as such, missing values were assigned. If the value of the second (or third) question was either zero, less than 50 percent of the first (or second) question, or specifically marked as incomplete, missing values were assigned. These arbitrary rules may distort the calving and weaning percents. It is possible to have death losses, stillborn and conception problems with more than 50 percent of the cows. On the other hand, calving and weaning ratios between 50 and 99 percent may be the result of incomplete calving or weaning rather than because of death and breeding problems.

With these qualifications, Table V.5 gives the calving percent and the weaning percent. The former is the percent of calves born from the number of cows bred. The latter is defined as the percent of calves weaned from the number of cows bred.

Table V.5 Calving and Weaning Percent by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	49	26	32	113	137	24	207	127	334	48	382
Calving Percent	92	92	95	92	93	93	93	94	93	92	93
Number in Sample	47	24	30	107	111	18	182	113	295	43	338
Weaning Percent	84	83	91	85	89	88	86	90	88	86	87

In the total sample, an average of 93 calves were born and 87 calves were weaned for every 100 cows turned in with a bull. Producers with between 25 and 50 cows had the highest weaning rate of 90 percent, while both larger and smaller herd-size groups had a weaning rate of 86 percent.

Ohio had the highest calving and weaning percentage of the six state breakouts with 95 and 91 percent respectively. The New York sample had the lowest weaning rate, 83 percent, perhaps in part because of its relatively harsh climate. Other causal factors may be the proportion of very small producers and the number of years with beef cattle. The New York sample had the least years of experience with a cow-calf enterprise, and the Virginia, West Virginia and Ohio samples had the most years of experience.

The reported data indicate that the calving and weaning ratios are quite respectable by national standards. However, it is important to remember that the sample may be biased to the better-than-average producer, that farmers may have a tendency to over-estimate weaning ratios, and that the questions gathering the data were ambiguous with respect to time period.

Mortality information was also requested.

"Number of cows that died in 1974_____"

Table V.6 gives the mortality rate, which was calculated by dividing the results of the above question by number of cows over 2 years of age.

Table V.6 Mortality Rate of Beef Cows by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	50	26	39	155	146	29	239	153	392	64	456
Mortality Rate	.046	.016	.032	.048	.026	.026	.046	.023	.037	.028	.036[a]

[a]Range: 0-1.0 mortality rate; Std. Dev.: .077 mortality rate

The mortality rate of cows for the entire sample was .036, or 3.6 percent. Producers with between 25 and 50 cows had the smallest mortality rate, 2.3 percent, while producers with 25 or less cows had the highest mortality rate, 4.6 percent.

In Pennsylvania and Michigan there was a relatively high mortality rate, close to 5 percent. (In Michigan, one producer lost his entire herd.) Mortality in the New York sample was the smallest, only 1.6 percent.

A controlled breeding season is one of the most elemental of beef cow-calf management techniques.

"What is the length of your breeding season: 60 days_____ 90 days_____ 120 days_____ all year_____." Table V.7 gives the percent of respondents in the total sample and each state and herd-size breakout who had a breeding season of the specified length. The few who indicated a 45 day breeding season were included in the 60 day category. An average length of breeding season was also calculated.

Table V.7 Percent of Respondents with Breeding Season of Specified Lengths

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	62	28	39	168	151	31	256	161	417	63	480
60 Days	26	32	28	19	10	19	26	12	21	5	18
90 Days	31	14	26	35	24	32	24	33	28	35	29
120 Days	16	21	26	15	24	16	14	25	18	25	19
All Year	27	32	21	32	42	32	36	30	34	35	34
Average Length of Breeding Season	163	175	146	176	210	178	185	176	182	191	183

Roughly one-third of the total sample keeps bulls in with cows year round, 29 percent have a 90 day breeding season, 19 percent have a 120 day breeding season, and 18 percent have a 60 day season. The intermediate herd-size group, those with more than 25 cows and less than or equal to 50 cows, had the smallest percentage of year round breeding programs--30 percent.

Producers with herds of less than or equal to 25 cows most frequently had a year long breeding season. This herd-size group also had the highest percent of producers with 60 day seasons, and the lowest percent with 120 day seasons. This suggests that smaller producers are more successful at maintaining a short season when attempting to control the breeding season length than producers with more cows.

In Virginia, 42 percent of the sample had a year long season, while only 10 percent had a sixty day season. Twenty-one percent of the Ohio sample had year round breeding, the smallest percent in the six states.

Closely related with the above question was the following:

"When do most of your cows calve? Mar/Apr/May_____ June/July/Aug_____ Sept/Oct/Nov_____ Dec/Jan/Feb_____ "

Many of the respondents did not answer this question as asked, but rather modified it by checking more than one category and eliminating certain months.[2] If the respondent's answer could not logically be squeezed in one of the four categories, it was recorded as an "other" response.

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[2]See Appendix C, Part 56.

Table V.8 Percent of Respondents With Cows Which Calve in Specified Months

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	61	28	38	165	140	33	247	152	399	66	465
Mar/Apr/May	70	75	68	64	26	64	66	51	60	42	58
Jun/July/Aug	5	7	5	9	1	0	9	1	6	2	5
Sep/Oct/Nov	5	7	3	1	21	3	6	9	7	17	8
Dec/Jan/Feb	7	4	16	6	36	24	11	25	16	23	17
Other	13	8	8	10	16	9	9	14	11	16	12

An average of 58 percent of the respondents had a predominately spring calving herd, and 17 percent had a winter calving herd, while much smaller percents had their calving season in the months of June through November. Herds with less than or equal to 25 cows calved more often in the spring (66 percent) than did herds with more than 50 cows (42 percent). A larger percent of the smaller herds calved in the summer months, but herds with more than 50 cows calved more frequently in the fall months.

Within the states, spring herds predominated in every state except Virginia, where only 26 percent had spring calving herds. That state had the largest percent of both fall and winter calving herds. It also had the largest percent of "other" months, which reflects the fact that Virginia had a large number of producers with a year round breeding season. West Virginia also had a large number of producers with winter calving herds, a reflection of the milder climate of the more southern states.

A final question about breeding management practices was:

"Age at which heifers calve for first time _____ "

Table V.9 Average Age in Months of Heifers Calving for First Time by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	57	29	36	159	143	34	246	150	396	63	459
Average Age in Months	26	26	26	27	27	27	26	27	27	26	27[a]

[a]Range: 18-37 months; Std. Dev.: 4.2 months

The average age of heifers calving for the first time was 27 months. There were very little variation about this figure either in the herd-size samples or in the state samples.

F. Genetic Material

A series of questions were asked in order to roughly assess the type and quality of the genetic material used by small beef cow producers.

1. Breeds

"What breed of cows make up the cow herd: _____"

Because of the format of the question, it was often difficult to distinguish between crossbreds and straightbreds when coding the information. Because of the importance of heterosis, an effort was made to interpret whether a crossbred or straightbred was indicated, although the results may be somewhat arbitrary. Table V.10 gives the percent of each sample group which owned at least some animals of the indicated breed. The very infrequently mentioned breeds are not recorded. Because two types of animal could be recorded for each questionnaire, the sum of the percents

of each sample group is more than 100. The breeds are listed in the order of their importance to the sample as a whole.

Table V.10 Percent of Respondents Owning Selected Breeds of Cows by State and Herd Size

	MI	NY	OH	PA	VA	WV	LT25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	62	30	40	171	149	32	258	161	419	66	485
Hereford	45	43	40	36	24	38	43	29	37	15	34
Angus	29	20	25	26	44	47	25	39	30	52	33
Hereford-Angus	5	7	10	10	12	9	9	9	9	17	10
Polled Hereford	11	17	10	9	7	9	9	11	10	9	10
Hereford-Charolais	5	10	8	6	2	3	4	6	5	5	5
Charolais	0	0	3	8	4	0	5	3	4	5	4
Unspecified Mix	2	0	8	5	3	3	3	4	4	5	4
Angus-Charolais & Angus-Holstein	3	6	6	4	4	3	4	6	5	2	4
Hereford-Holstein & Hereford-Simmental	2	3	0	3	4	0	4	3	3	2	2

Hereford and Black Angus were the most predominant breeds, with 34 and 33 percent of the total sample respectively. Hereford cows predominated in the northern states, while Angus were more common in Virginia and West Virginia. The popularity of the Hereford breed decreased as herd size increased. Only 15 percent of the producers with more than 50 cows had straightbred Herefords, while 43 percent had them in the smallest herd-size group. Conversely, the popularity of the Angus

increased as herd size increased. The relative number of producers with Angus more than doubled as herd size increased from less than or equal to 25 cows to more than 50 cows.

Ten percent of the total sample had some Polled Hereford, and there was little variation about this mean in the herd-size breakout. Within the states, 17 percent of the New York sample had Polled Hereford, a figure much higher than in the other states.

Four percent of the total sample owned straightbred Charolais cows, with little variation by herd size. None of the samples of Michigan, New York, or West Virginia indicated Charolais, while 8 percent of the Pennsylvania sample had them.

The Hereford-Angus cross was the most popular of the crossbreds. Ten percent of the total sample had these crossbreds which were especially important to producers with more than 50 cows, where 17 percent of the respondents had them. In general, crossbreds were found most often in the state of Ohio, where about one-third had some type of cross. Crossbred cows were the least common in Michigan and West Virginia.

The breeds of bulls used were also ascertained. "What breed of bull is used? _____ "

As in the previous question, the distinction between crossbreds and straightbreds was sometimes difficult. If given, two types of animals were recorded for each producer. A few of the infrequently mentioned breeds are not presented, and aggregation of crossbreds was done in the interest of preserving space.

Table V.11 Percent of Respondents Owning Selected Breeds of Bulls by State and Herd Size

	MI	NY	OH	PA	VA	WV	LT25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	62	30	39	167	147	32	254	160	414	64	478
Black Angus	24	20	26	29	50	38	25	44	32	52	35
Hereford	35	37	41	38	24	38	44	22	36	14	33
Charolais	16	10	13	19	12	9	13	16	14	19	15
Polled Hereford	13	17	10	12	10	13	11	14	12	9	12
Crossbreds	7	3	13	3	11	12	3	8	5	14	6
Shorthorn	10	3	3	1	0	0	2	2	2	3	2

As with the cow breeds, the Hereford and Angus breeds prevailed, with 35 percent and 33 percent of the total sample. The Angus breed was more popular in Viginia and West Virginia and among the larger producers, while Hereford bulls predominated in the four more northern states and in herds of less than or equal to 25 cows.

Charolais bulls were much more common than Charolais cows. Fifteen percent of the total sample used a Charolais bull while only 4 percent had Charolais cows. This indicates the importance of the Charolais breed in crossbreeding programs.

Polled Hereford bulls were about as important as Polled Hereford cows. Twelve percent of the total sample owned a Polled Hereford bull, while 10 percent owned Polled Hereford cows. The Polled Hereford was particularly common in the state of New York, where 17 percent owned at least one. Shorthorn bulls were most prevalent in Michigan, where 10 percent of the sample owned one.

Crossbred bulls were not as important as crossbred cows in the total sample. It appears that the number of crossbred bulls is positively correlated with herd size. Only 3 percent of the producers with less than 25 cows had a crossbred bull while 14 percent of the producers with more than 50 cows had a crossbred bull. Ohio was the state with the largest percent of producers with crossbred bulls, closely followed by West Virginia and Virginia.

It is widely recognized that heterosis from a crossbreeding program can result in improved vigor and weaning weights in commercial beef cattle. Only 25 percent of the total sample owned any crossbred cows and six percent of the total sample owned a crossbred bull. Although this does not eliminate the possibility of crossbreeding in the F_1 generation, it appears that crossbreeding programs are not widespread.

2. Bull Characteristics

The following question was asked to determine the relative importance to the producer of specified attributes in selecting a bull.

"What do you consider when selecting your herd bull/bulls? (rank in order of importance).

(1) reputation of breeder _____

(2) conformation _____

(3) performance record _____

(4) size _____

(5) pedigree _____

(6) cost _____

(7) breed _____

(8) other _____ "

A weighted average for each of the eight categories was taken and a composite ordinal ranking obtained for the total sample, and for each of the herd-size and state breakouts. Sample size varied slightly for each of the possible responses within each of the breakouts, but not by enough to warrant the separate reporting of each. Table V.12 gives the tabulated results, with each selection listed in the order of the importance to the sample as a whole.

Table V.12 Ordinal Ranking of the Importance of Selected Attributes of Bulls

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Breed	1	1	2	1	3	1	1	1	1	2	1
Size	2	3	1	2	2	3	2	2	2	3	2
Performance Record	4	2	4	5	1	2	4	3	4	1	3
Conformation	3	5	3	3	4	4	3	4	3	4	4
Cost	5	4	7	4	5	7	5	5	5	5	5
Reputation of Breeder	6	6	5	6	7	5	7	7	7	6	6
Pedigree	7	7	6	7	6	6	6	6	6	7	7
Other	8	8	8	8	8	8	8	8	8	8	8

According to the sample as a whole, the breed of the bull is the first decision criteria, following by the size of the bull. The latter selection is somewhat ambiguous in that it could refer in part to the age of the bull at time of purchase, and in part to the weight of the bull relative to others of the same age. Performance records and

conformation of the bull were next in order of importance, followed by cost, reputation of the breeder, and pedigree. This list was apparently successful in covering the attributes that farmers consider, because very little weight was given to the unspecified "other" category.

Within herd-size breakouts there was little variation on the overall ranking, with the exception of the relative importance of performance records. The largest producers ranked this attribute as the most important, while the smallest producers ranked it only fourth in importance.

Performance records were relatively important in the Virginia sample, where they were ranked as the most important attribute, while in the Pennsylvania sample they received much less stress. The reputation of the breeder was more important and the cost less important in Ohio and West Virginia than in the other states.

The price paid for breeding bulls also gives some indication of quality.

"What did you pay for your last bull? _____ "

In Table V.13, the average price paid by each breakout sample is given. Excluded from the sample are producers who exclusively used artificial insemination, who rented bulls, who borrowed them from their neighbors, or who raised their own stock.

There was a wide range of prices paid for bulls, varying from $90 up to $4,000. This indicates that some of the farmers are producing breeding stock rather than commercial beef. The questionnaire did not have a specific question to determine whether any breeding stock was produced. However, an informal tally was kept during the coding of the

Table V.13 Average Price of Last Bull Purchased by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	55	23	33	137	138	31	205	148	353	64	417
Average Price $	634	504	650	566	657	591	489	686	572	824	610[a]

[a]Range: $90-$4,000; Std. Dev.: $451.0

questionnaire, to obtain a count of those repondents who indicated somewhere in the form that they sold some breeding stock. A total of 28, or slightly less than 6 percent of the producers indicated such, although this is probably an understatement, because the information was not specifically asked for.

The average price paid for the most recently purchased bull was $610 for the total sample. Unfortunately, without knowing the age of the animals when purchased, an accurate assessment of quality by price is not possible. Producers with 25 or fewer cows paid an average of $489 while producers with more than 50 cows paid $824 or about 68 percent more than the smallest producers.

The New York sample paid $504 on the average, the lowest of the six states; while the Ohio sample paid $657, the highest of the six states. This may in part reflect the differential distribution of the large and small producers in these states.

Place of purchase, as well as price, was ascertained.

"Where do you purchase your bulls? (check)

(1) Purebred Breeder _____

(2) Local Auction _____

(3) Registered Breed Sales _____

(4) Bull Testing Station Sales _____

(5) Other _____

If two places were checked, both were recorded, so that the sum of the percent purchasing in each place is more than 100. If the producer specifically indicated that he/she raised his/her own bulls or used artificial insemination, then a missing value was assigned.

Table V.14 Percent of Respondents Purchasing Bulls in Selected Outlets by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	58	26	35	139	143	31	216	149	365	67	432
Purebred Breeder	72	77	66	61	61	55	68	61	69	76	60
Registered Breed Sales	26	12	22	11	16	19	14	19	16	16	16
Other	10	12	11	19	8	23	18	9	14	7	13
Bull Testing Station Sales	2	4	14	4	20	16	4	17	9	19	11
Local Auction	2	0	0	5	2	0	4	1	3	3	3

Among other places, incorporated in the "other" percentage were crossbred breeders, neighbors, frozen semen sources, and on-farm production. Purebred breeders were the major source of breeding stock.

Seventy percent of the total sample used this source, while 16 percent bought at registered breed sales, and 11 percent bought from bull test station sales. Only a small percent purchased at local auctions. There was a positive correlation of herd size and percent of respondents purchasing from purebred breeders and from bull test station sales.

Within states, the West Virginian sample depended on purebred breeders the least, while in the New York sample this was the most important. Fifty-five and 77 percent of the producers purchased from these sources respectively. Registered breed sales were most important in the Michigan sample, where 26 percent used them and bull testing station sales were relatively more important in Virginia, where 20 percent of the sample group purchased bulls.

3. Artificial Insemination

Another question pertaining to breeding stock management was as follows:

"Do you use artificial breeding for beef herd?

Yes _____ No _____ "

Several respondents qualified their response to this question. Some indicated that they used artificial insemination only during one of two or more breeding seasons, others indicated that they used it only on certain age groups, and some indicated they used it depending on labor availability, etc. All these qualified responses were coded as a third category labelled "sometimes."

Because the distinction between "yes" and "sometimes" cannot be precisely drawn, the absence rather than presence of an artificial insemination program will be discussed. Eighty-three percent of the total

sample had no contact with artificial insemination, and there is little deviation from this figure in the herd-size breakouts. The Michigan and New York samples have made relatively more extensive use of A.I. The Virginia sample, on the other hand, makes less use of A.I.; 11 percent have had some contact with it.

Table V.15 Percent of Respondents Using Artificial Insemination by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	63	29	39	171	150	33	258	162	420	66	486
Yes	18	21	8	14	8	9	13	11	12	11	12
No	71	69	82	84	89	85	83	85	83	80	83
Sometimes	11	10	10	2	3	6	4	4	4	9	5

G. Marketing

Several questions pertaining to marketing were also asked. "The calves from the beef herd are sold as:

	Weight at Selling	Age in Months
Feeder steer calves	_____	_____
Feeder heifer calves	_____	_____
Yearling feeders	_____	_____
Slaughter cattle	_____	_____
a. steers	_____	_____
b. heifers	_____	_____

Prices received per cwt. in 1973 and 1974 were requested, but not included here because of small sample sizes and because the

information can be obtained more accurately elsewhere. There were several problems with this question which must be taken into account when evaluating the results. First, no where in the questionnaire does it ask for the number of animals sold in total, or in each of the age and sex categories. Therefore, calculating returns from the enterprise is impossible. A rough indicator of the percent of respondents marketing at least some of each type of animal was calculated. (See Appendix C, Part 38.)

Second, the age at which feeder calves become yearling feeders was not clear, and there was some confusion. For purposes of analysis, the yearling category was defined as more than 10 months of age. If 10 months or less, the animals were defined as calves.

Breeding stock and cull cow sale information was not explicitly requested. If breeding stock sales were indicated, it was recorded elsewhere. Respondents had difficulty with the "slaughter cattle" category. Some interpreted this category as an aggregation of the steer slaughter cattle and heifer slaughter cattle categories. Others recorded old cull animals here. Because of this ambiguity, the results of this category are not reported. Sample sizes in three of the six states were very small for most categories and therefore state results are not given.

Table V.16 presents the results. The age and weight results are reported in pounds and months. Zero values were not averaged, so that the results are the average weight and age of animals actually sold.

There was much uniformity in age and weight for each category in the herd-size breakouts. Feeder steers averaged 466 pounds, feeder

Table V.16 Average Weight and Age and Percent of Respondents Marketing Selected Types of Animals.

	LE25	GT50 LE50	LE50	GT50 LT100	Total
Feeder Steers Calves					
Number in Sample	58	105	163	32	195
Weight (lbs.)	462	472	467	461	466[a]
Number in Sample	62	103	165	29	194
Age (mos.)	7.1	7.7	7.4	7.2	7.4[b]
Percent Marketing	30	73	47	53	48
Feeder Heifer Calves					
Number in Sample	41	89	130	27	157
Weight (lbs.)	429	443	437	429	436[c]
Number in Sample	44	88	132	22	154
Age (mos.)	7.2	7.7	7.5	7.5	7.5[d]
Percent Marketing	21	62	38	44	39
Yearling Feeders					
Number in Sample	27	57	84	21	105
Weight (lbs.)	567	617	593	550	584[e]
Number in Sample	26	59	85	21	106
Age (mos.)	12.6	13.1	12.9	13.0	12.9[f]
Percent Marketing	13	39	23	34	25
Steer Slaughter Cattle					
Number in Sample	48	23	71	10	81
Weight (lbs.)	952	1,023	975	945	971[g]
Number in Sample	50	26	76	9	85
Age (mos.)	19.5	19.4	19.5	21.7	19.7[h]
Percent Marketing	28	19	24	19	23
Heifer Slaughter Cattle					
Number in Sample	20	14	34	6	40
Weight (lbs.)	936	875	911	867	904[i]
Number in Sample	22	15	37	6	43
Age (mos.)	22.7	18.5	21.0	21.2	21.0[j]
Percent Marketing	13	11	12	11	12

[a]Range: 250-708 lbs.; S.D.: 63.8 lbs.; [b]Range: 3-10 mos.; S.D.: 1.2 mos.
[c]Range: 250-600 lbs.; S.D.: 53.0 lbs.; [d]Range: 5-10 mos.; S.D.: 1.1 mos.
[e]Range: 375-900 lbs.; S.D.:119.9 lbs.; [f]Range:11-21 mos.; S.D.: 3.0 mos.
[g]Range: 700-1250lbs.; S.D.:171.4 lbs.; [h]Range: 8-36 mos.; S.D.: 4.5 mos.
[i]Range: 600-1200lbs.; S.D.:120.9 lbs.; [j]Range: 8-60 mos.; S.D.:10.2 mos.

heifers averaged 436 pounds, and yearling feeders averaged 584 pounds. In all three categories, those producers with between 25 and 50 cows tended to market heavier animals than did producers with either larger or smaller herds. These middle-sized herd owners marketed their calves at an average of eight months rather than at the total sample average of seven months. In all breakouts, the age of yearling feeders averaged 13 months.

The average ages of slaughter steers and slaughter heifers were 20 and 21 months respectively for the total sample. Despite the extra average month of age, slaughter heifers weighed 904 pounds as compared to the slaughter steer average of 971 pounds.

Producers with between 25 and 50 cows produced the heaviest slaughter steers, averaging 1,023 lbs. Herd owners with more than 50 cows produced the lightest steers, 945 pounds, despite the fact that the marketed animals were an average of 3 months older than in the other samples. The largest herd owners also did relatively poorly with slaughter heifers, marketing animals that weighed only 867 pounds on the average. Producers with fewer than 25 cows marketed the heaviest slaughter heifers, averaging 936 pounds in part reflecting the relatively more advanced age of these animals.

Because of the large number of missing value responses, the information on percent of respondents marketing each type of animal should be reviewed critically. However, it does give a rough indication of the relative importance of each type of animal in marketing plans. Among the sample as a whole, feeder steer calves were the most commonly marketed animal. Feeder heifer calves were marketed by a smaller percent

of respondents, probably because of herd replacement and herd expansion requirements. Yearling feeders were next in order of importance, followed by finished steers and finished heifers.

In the herd-size breakouts, the producers with fewer than 25 cows marketed relatively more finished animals and fewer feeder calves than the other groups. Those with between 25 and 50 cows more commonly marketed feeder steers, feeder calves, and yearlings than either the larger or smaller herd-size groups.

Five respondents, or one percent of the total sample, indicated that they sold bulls rather than steers for meat. Several respondents indicated either here or in other responses that they sold at least some breeding stock, and this information was recorded. Table V.17 gives the number of respondents and the percent of each sample who sold breeding stock.

Table V.17 Number and Percent of Sample Selling Breeding Stock

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	3	1	3	10	8	3	15	10	25	3	28
Percent of Total Sample	4.6	3.2	7.5	5.6	5.2	8.6	5.5	6.1	5.7	4.5	5.6

Because the information was not specifically requested, it is likely that the above numbers and percents are understated. The percent of respondents who indicated that they sold breeding stock was very

stable in both the state and herd-size breakouts, centering around 5.6 percent for the total sample.

A second marketing question dealt with the marketing channel used in selling calves.

"The beef calves are sold: (check)

(1) at the local auction sale _____

(2) a feeder calf sale _____

(3) to a livestock dealer _____

(4) at a central livestock market _____

(5) to a farmer feeder _____

(6) other (please specify) _____ "

As each farmer may employ more than one marketing channel, the sum of the percent using the various marketing channels is more than 100 percent.

Included in the "other" percent are the following:

(1) slaughter house - veal

(2) 4-H calves

(3) breeding stock

(4) unspecified "other"

Many respondents specified the sixth choice "slaughter house." Unless veal was explicitly mentioned this was not recorded because of the likelihood that the choice referred to adult animals. It is possible that other checked categories were with reference to adult animals.

The samples reported in each breakout in Table V.18 include only those respondents who indicated that they sold calves. Those who indicated in this question that they marketed only finished cattle were not included.

Table V.18 Percent of Respondents Marketing Calves In Specified Outlets by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	52	14	35	130	143	32	202	143	345	61	406
Local Auction Sale	23	29	37	48	44	34	46	35	41	38	41
Feeder Calf Sale	60	57	69	32	65	63	39	68	51	69	54
Livestock Dealer	4	7	3	5	7	9	5	5	5	10	6
Central Livestock Market	13	0	0	5	13	9	10	8	9	7	8
Farmer Feeder	10	14	9	22	10	0	15	8	12	18	13
Other	17	3	8	13	10	9	8	12	11	8	10

Feeder calf sales are the major method of marketing calves. Fifty-four percent of the total sample used this method. Thirty-nine percent of the producers with less than 25 cows marketed at feeder calf sales, while 69 percent of producers with more than 50 cows marketed this way. There was also a large variation in the state breakouts. Only 32 percent of the Pennsylvania sample marketed at feeder calf sales, while 64 percent did so in Ohio. In Pennsylvania, producers more frequently marketed their calves at local auction sales. This method was least popular in Michigan, where only 23 percent of the sample marketed at local auction sales.

A much less important outlet to the producers were farmer feeders. Only 13 percent of the total sample used this method, although 22 percent of the respondents in the Pennsylvania sample checked the farmer feeder

category. Not a single respondent in the West Virginia sample marketed this way.

Livestock dealers and central livestock markets captured 6 and 8 percent respectively of the total sample. The importance of livestock dealers was fairly constant in state and herd-size breakouts, varying from 3 percent of the Ohio sample to 9 percent of the West Virginia sample and from 5 percent of producers with less than or equal to 50 cows to 10 percent of producers with more than 50 cows. Thirteen percent of the producers in Virginia and Michigan used a central livestock market, while none did in the New York and Ohio samples. However, the percent using central markets in the herd-size breakouts was much more uniform, centering on 8 percent for the total sample.

Another block question dealt with marketing costs. However, because of unit specification problems, cost figures could not be aggregated. Instead, each type of transportation used in hauling animals was recorded. They were:

(1) Hauled in owned truck

(2) Hauled in hired truck

(3) Some hauled in owned truck and some hauled in hired truck

(4) Sold on farm

The first three choices were explicit. The last choice was not specifically provided and therefore may be understated. Data were collected on hauling for five different types of animals--calves, yearlings, slaughter cattle, culls, and breeding stock. In order to save space a weighted average was taken rather than presenting the results for each type of animal separately. The variation between the six states is small, therefore only herd-size breakouts and the total are given.

Sample sizes varied considerably for each type of animal within each breakout, but were never more than one-quarter of the total possible sample number.

Table V.19 Percent of Respondents with Specified Hauling Methods by Herd Size

	LE25	GT25 LE50	GT50 LT100	Total
Owned Truck	48.6	57.1	71.0	59.7
Hired Truck	46.8	39.4	27.4	37.2
Hired and Owned	2.9	2.7	1.7	2.5
Sold on Farm	1.8	.8	0	.7

Among the producers with 25 or less cows, hired and owned trucks are of almost equal importance. However, as herd size increases the importance of hired trucks decline from 46.8 percent to only 27.4 percent for herd owners with more than 50 cows. The percent of producers selling their animals on the farm also declines, from 1.8 percent to none for herd owners with more than 50 cows. Offsetting these declines was an increase in the percent of respondents using their own truck. Over 48 percent of respondents with less than or equal to 25 cows used their own truck, while 71.0 percent of the respondents with more than 50 cows did so.

One of the objectives of this study, as stated in the project proposal, was to "Determine the factors which would motivate small beef herd owners to . . . consider new marketing techniques that would improve the movement of cattle to moderate and reduce assembly and

transportation costs." However, no testable hypotheses were formulated, attainable goals specified, or pertinent data gathered, so that the only result is a simple description of some aspects of current marketing practices.

H. Cropping Patterns

The following block question was used to determine cropping patterns. "Acres of crops in 1973:

Crops	Owned land	Yield/acre (in bu or t)	Rented land	Yield/acre (in bu or t)
Corn (ear or shelled)	_____	_____	_____	_____
Small Grains (oats, barley, wheat)	_____	_____	_____	_____
Alfalfa Hay	_____	_____	_____	_____
Mixed Hay	_____	_____	_____	_____
Grass Hay	_____	_____	_____	_____
Corn Silage	_____	_____	_____	_____
Grass Silage	_____	_____	_____	_____

Improved and unimproved pasture acres and yields were also requested, but because of the format of the question and inconsistency with another question on pasture acres, the results are not reported.

In only a few of the questionnaires did the sum of the rented acres and the sum of the owned acres equal the total given by the respondent. This could be because the land was in the production of a crop not listed, land was idle, owned land was rented to another farmer, or the respondent did not answer the question correctly.

To convert the various specified units into units common to all, the following assumptions were made:

1 bu. oats = 32#

1 bu. wheat = 60#

1 bu. barley = 48#

1 bu. unspecified small grain = 48#

1 bu. corn = 56#

small round bales = 60#

small square bales = 50#

unspecified small bales = 50#

large bales = 1,200#

Table V.20 gives the average number of acres on both rented and owned land in each of the six states and for the entire sample. The sample sizes given are average of the sample sizes of the rented and owned crop acres.

Table V.21 gives the average number of acres on both rented and owned land for each herd size sample and for the total. Sample sizes for acreage figures are as above.

Table V.22 provides average yields of selected crops on both rented and owned land. Zero values are not included in the average. State and herd-size breakouts are not given because of small sample sizes.

There was a wide variation in crop acres in the six states. Only mixed hay acreage stayed both relatively constant and large in the six states, averaging 30.6 acres in the total sample. Average corn acres ranged from .9 acres in West Virginia to 28.3 acres in Michigan, but averaged 14.6 acres for the total sample. Grain acres ranged from .6 acres in West Virginia to 24.3 acres in Michigan. Michigan also had the largest average acreage of alfalfa hay, 21.8 acres, and the largest corn

Table V.20 Average Owned and Rented Acreage of Selected Crops by State

	MI	NY	OH	PA	VA	WV	Total
CORN							
Average # in Sample	61	25	37	161	138	33	453
Owned Acres	19.1	9.4	14.3	9.2	7.3	.7	9.8
Rented Acres	9.2	1.5	7.7	4.3	4.2	.2	4.8
Total Acres	28.3	10.9	22.0	13.5	11.5	.9	14.6
SMALL GRAINS							
Average # in Sample	54	24	37	159	139	33	445
Owned Acres	18.9	8.9	6.6	7.9	6.5	.5	8.2
Rented Acres	5.4	1.0	1.2	1.7	2.7	.1	2.2
Total Acres	24.3	9.9	7.8	9.6	9.2	.6	10.4
ALFALFA HAY							
Average # in Sample	54	26	38	161	141	33	452
Owned Acres	16.9	4.9	3.4	5.5	1.8	4.4	5.4
Rented Acres	4.9	.5	.1	.7	.1	0	1.0
Total Acres	21.8	5.4	3.5	6.2	1.9	4.4	6.4
MIXED HAY							
Average # in Sample	54	24	35	153	137	30	432
Owned Acres	30.4	23.5	37.3	25.7	20.3	21.1	24.1
Rented Acres	2.9	5.9	5.7	5.2	4.9	13.4	5.5
Total Acres	33.3	29.4	43.0	30.9	25.2	34.5	29.6
GRASS HAY							
Average # in Sample	62	29	37	165	140	32	464
Owned Acres	1.0	5.6	6.0	4.2	6.4	5.5	4.8
Rented Acres	.2	0	0	.9	.6	2.0	.7
Total Acres	1.2	5.6	6.0	5.1	7.0	7.5	5.5
CORN SILAGE							
Average # in Sample	60	27	36	164	140	32	457
Owned Acres	3.4	.6	.1	.2	1.4	.1	1.0
Rented Acres	.3	.9	.8	.7	.1	.0	.5
Total Acres	3.7	1.5	.9	.9	1.5	.1	1.5
GRASS SILAGE							
Average # in Sample	63	29	38	163	45	33	470
Owned Acres	.3	.9	.8	.7	.1	0	.5
Rented Acres	.6	0	0	0	0	0	.1
Total Acres	.9	.9	.8	.7	.1	0	.6
Total Acres in Specified Crops	113.5	63.6	84.0	66.9	56.4	48	69.6

Table V.21 Average Owned and Rented Acreage of Selected Crops by Herd Size

	LE25	GT25 LE50	LE50	GT50 LT100	Total
CORN					
Average # in Sample	245	147	392	62	453
Owned Acres	8.2	11.0	9.3	13.0	9.8
Rented Acres	3.6	6.9	4.8	4.7	4.8
Total Acres	11.8	17.9	14.1	17.7	14.6
GRAIN					
Average # in Sample	241	146	387	58	445
Owned Acres	6.4	10.0	7.8	11.1	8.2
Rented Acres	1.8	2.7	2.2	2.8	2.2
Total Acres	8.2	12.7	10.0	13.9	10.4
ALFALFA HAY					
Average # in Sample	242	150	392	61	452
Owned Acres	3.9	5.3	4.4	11.7	5.4
Rented Acres	.4	1.8	.9	.9	1.0
Total Acres	4.3	7.1	5.3	12.6	6.4
MIXED HAY					
Average # in Smaple	229	145	374	58	432
Owned Acres	19.8	26.4	22.4	42.1	25.1
Rented Acres	3.2	5.8	4.2	13.9	5.5
Total Acres	23.0	32.2	26.6	56.0	30.6
GRASS HAY					
Average # in Sample	250	151	401	63	464
Owned Acres	3.8	6.3	4.7	5.0	4.8
Rented Acres	.7	.4	.6	1.8	.7
Total Acres	4.5	6.7	5.3	6.8	5.5
CORN SILAGE					
Average # in Sample	248	147	395	63	457
Owned Acres	.9	3.2	1.7	6.2	1.0
Rented Acres	.1	1.7	.7	2.6	.5
Total Acres	1.0	4.9	2.4	8.8	1.5
GRASS SILAGE					
Average # in Sample	254	154	408	63	470
Owned Acres	.4	.6	.5	.3	.5
Rented Acres	0	.1	.1	.3	.1
Total Acres	.4	.7	.6	.6	.6
Total Acres in Specified Crops	53.2	82.2	64.3	116.4	69.6

Table V.22 Average Yields of Selected Crops on Owned and Rented Land

	Corn (bu.)	Grain (bu.)	Alfalfa Hay (tons)	Mixed Hay (tons)	Grass Hay (tons)	Corn Silage (tons)	Grass Silage (tons)
Number in Sample	167	158	94	211	54	68	6
Yield-Owned Acres	91	47	3.3	2.4	2.1	16.0	2.4
Number in Sample	66	46	14	58	14	25	1
Yield-Rented Acres	88	45	2.7	2.2	2.2	19.5	--
Weighted Average Yield-Owned and Rented Acres	90	47	3.1	2.3	2.1	17.2	--

silage acreage, 3.7 acres. West Virginia had the smallest acreage in all but the three hay crops.

There was a positive correlation of acreage and herd size for all crops except grass silage. Mixed hay was the most important crop in all herd-size breakouts. Corn silage acres increase eightfold between the smallest and largest herd size. The acreage of alfalfa hay increased threefold, grass hay and corn acreage increased by a half, and grass silage acreage remained fairly insignificant.

The yields of the selected crops were high, and for all crops except grass hay, owned acres yielded more than rented acres. Precise statistical correlation of the above data and number of cows was not made because of the possibility that some of these crops are sold or fed in other livestock enterprises on the farm. Because 1973 rather than 1974 data was collected, consistency checks comparing the above information with feed data (discussed later) could not be made.

I. Pasture

In addition to crop acres, pasture acres were determined and pasture management practices explored.

1. Acres of Pasture and Acres Per Cow

"Acres of native pasture used by the beef cow and calf enterprise in

1974 _____ 1973_____ "

"Acres of fertilized and reseeded pasture used by the beef cow and calf enterprise in

1974 _____ 1973_____ "

Fertilized but unreseeded pasture was considered improved pasture. Technically, native pastures are those that are indigenous to the United States, such as bluestem. However, there is a common understanding that by native pasture one implies recently unimproved pasture. The word "native" was not defined in the questionnaire and may be a source of ambiguity. Table V.23 shows the average number of acres in each type of pasture for 1973 and 1974. Zero values were averaged in the means. In addition, the sum of native and improved pasture in 1974 was divided by the number of cows in each breakout, to give an indication of number of pasture acres per cow unit.

Several interesting observations can be drawn from the table. In every breakout, 1974 improved and native pasture acres were larger than 1973 native and improved pasture acres. One possible explanation is that more farmers indicated that they had expanded their herd over this time period than had indicated either stable or declining herd numbers and they increased pasture acres to accomodate the additional animals. Another

Table V.23 Acres of Native and Improved Pasture in 1973 and 1974 by Herd Size and State

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	57	25	34	154	144	30	235	150	385	60	445
Acres 1974 Native Pasture	103	45	79	62	95	136	42	108	68	181	83[a]
Number in Sample	60	26	35	160	146	31	242	154	396	63	459
Acres 1973 Native Pasture	85	38	77	58	93	149	42	102	66	165	79[b]
Number in Sample	55	21	38	145	146	31	226	151	377	60	437
Acres 1974 Improved Pasture	19	14	25	8	36	31	11	27	18	52	22[c]
Number in Sample	58	23	38	151	144	31	233	150	383	63	446
Acres 1973 Improved Pasture	17	11	20	8	33	27	9	24	15	48	20[d]
Number in Sample	52	20	34	141	142	30	217	144	361	59	420
1974 Pasture Acres/Cow Unit	3.6	4.0	3.9	4.0	3.4	5.5	4.1	3.6	3.9	3.4	3.8

[a]Range: 0-770 acres; Std. Dev.: 91.9
[b]Range: 0-1000 acres; Std. Dev.: 102.6
[c]Range: 0-250 acres; Std. Dev.: 38.2
[d]Range: 0-250 acres; Std. Dev.: 36.9

possible explanation is that of the "missing values" problem. In almost every breakout, there are more sample cases in the 1973 data than in the 1974 data. If the extra missing cases in the 1974 data were assigned zero values, it would bring the 1974 averages down closer to the 1973 averages.

The percent of improved pasture acres in the total pasture acres in both 1973 and 1974 was about 21 percent. This ratio of improved to

total pasture acres was quite stable in the herd-size breakouts, but in the state breakouts there was a lot of variation. During 1974, 11 percent of the Pennsylvania pasture was improved, in West Virginia 19 percent, in Michigan 16 percent, in Ohio and New York 24 percent, and in Virginia 27 percent.

Pasture acres (both improved and native) per cow unit were quite stable in both state and herd-size breakouts. West Virginia had the most pasture acres per cow unit with 5.5 acres. This may in part be due to the relatively low quantities fed of raised and purchased feedstuffs other than pasture, and in part due to the relatively low productivity of some land in West Virginia.

The lowest number of pasture acres per cow were found in the Virginia and Michigan samples, with 3.4 and 3.6 acres respectively. In these states, feedstuffs other than pasture were particularly important. The low pasture acreage requirement may also reflect land productivity. Virginia (although not Michigan) had a relatively high percentage of improved pasture to total pasture.

2. Pasture Fertilization

The following question was asked to ascertain management practices for improved pasture.

"What fertilizer materials were used and what was the cost per acre? _____ "

Although not specifically stated, by its position in the questionnaire, most respondents inferred that the question referred to fertilizer used on improved pasture rather than on cropland. To insure this, an arbitrary upper bound of 25 dollars was put on cost of fertilizer per

acre which eliminated several responses from consideration. In addition a cross-check was made to insure that all respondents who indicated the use of fertilizer had improved pasture to use it on.

The many types of fertilizer materials were aggregated into a few categories. All mixed analysis fertilizers were grouped in a single category labeled "N-P-K." (Twenty-two different analyses were recorded.) The nine fertilizers containing only phosphorus and potassium were aggregated into a category labelled "P-K." Each of the single analysis fertilizers and manure were recorded separately under the labels of "N" (including urea and anhydrous ammonia), "P," "K," and manure.

Table V.24 shows the percent of the appropriate sample who used each aggregated category of fertilizer. The appropriate sample consisted of the respondents within each breakout who recorded the use of some type of fertilizer material, and therefore, the sum of the percents in each breakout equals 100 (except for rounding errors). Also tabulated is the cost per acre for the total sample, and for each of the state and herd-size breakouts. Zero values were not included in the average cost figures.

In general, mixed analysis fertilizers were by far the most commonly used on pasture. Seventy-six percent of those applying fertilizer used some type of mixed analysis. However, in West Virginia only 13 percent used mixed analysis fertilizers. Instead, they used more "P-K" fertilizer mixes (38 percent compared to 9 percent for the total sample) and relatively more phosphate (37 percent compared to 2 percent of the total sample.)

The use of nitrogen either by itself or in mixed fertilizers was most common in New York and Pennsylvania. The percent applying manure to pasture land varied from 15 percent in the Michigan sample to none in the

Table V.24 Percent of Respondents Using Aggregated Categories of Fertilizer and Cost Per Acre by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	26	11	16	40	84	8	77	75	152	33	185
Percent Using N-P-K	63	82	75	83	83	13	78	75	76	79	76
Percent Using P-K	11	0	13	3	11	38	8	12	10	9	9
Percent Using N	0	9	0	5	2	0	3	4	3	0	3
Percent Using P	0	0	0	0	1	37	1	3	2	3	2
Percent Using K	11	0	6	0	1	0	1	4	3	3	3
Percent Using Manure	15	9	6	10	0	12	9	3	6	6	6
Number in Sample	19	3	20	55	55	1	41	45	86	23	109
Cost/Fertilized Acre	$11	--	$16	$17	$17	--	$16	$16	$16	$15	$16

Virginia sample. It is quite possible that the percent who used manure was understated because it was not specifically requested.

Two hundred eighteen producers in the total sample group indicated that they had some improved pasture land in 1974 and 185 producers provided a recordable fertilizer material. The difference between these figures of 33 producers is accounted for by the missing values in the fertilizer response.

Cost per acre figures are somewhat arbitrary because of the $25 lid used to screen out those who provided cost figures for fertilizing cropland other than pasture.

In New York and West Virginia results are not reported because of small sample sizes. The average producer in the total sample spent $16 per acre to fertilize improved pasture. This figure was quite stable in the herd-size breakouts. The Michigan sample spent $11 per acre on fertilizer for pasture--well below the mean for the entire group.

3. Pasture Grasses and Legumes

The types of grasses used on pasture land were also requested. "Fertilized and reseeded pasture

Grasses used: (check) orchard ____ timothy ____ bluegrass ____

brome ____ tall fescue ____ other ____

Native pasture

Grasses used: (check) orchard ____ timothy ____ bluegrass ____

brome ____ tall fescue ____ other ____ "

The question is poorly designed in that it does not ask about legumes used in pastures, either by themselves or in conjunction with other grasses. As an indication of the seriousness of the problem, Tesar and Domeier reported in 1972 that 95 percent of the seeded pasture in Michigan was planted to a grass-legume mixture.[3] Many respondents specified in the "other" category additional grasses and legumes and these

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[3]Vaugh P. Domeier and Milo B. Tesar, Forage Production and Utilization Practices in Michigan Cow-Calf Operations, Research Report 176 (East Lansing, Michigan: MSU Agricultural Experiment Station, 1974), p. 2.

were recorded and reported in separate categories. Only unspecified "others" remain in the "other" category. Because the additional legumes or grasses were not specifically mentioned, it is certain that they are underreported in the sample. No attempt was made to determine the number of mixed species pastures as compared to single species pastures.

Again, "native" pasture in this context was inferred by most farmers to mean "unimproved" rather than indigenous to North America.

Up to four grasses were recorded from each respondent in both the fertilized and reseeded pastures and the native pasture. Table V.25 gives the percent of the respondents in each breakout who indicated the corresponding plant species for each type of pasture. Because more than one could be recorded for each producer, the sum of the percents in each breakout is more than 100. A few of the infrequently mentioned grasses and legumes are not reported.

In both the fertilizer and reseeded category and the native category, there is much more variability between states than there is between herd sizes.

Orchard grass appears to be more common in the southern states than in the northern. Sixty-eight percent of the Virginia sample and 59 percent of the West Virginia sample use orchard grass as an improved pasture while only 13 percent use it in Michigan, the least of the six states. Its use as a native pasture parallels this trend. Orchard grass is widespread in Virginia and West Virginia where about one-half of the respondents have it, but was found much less frequently in the northern states of Michigan and New York.

Table V.25 Percent of Respondents Using Improved Pasture With Specified Plant Species

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	53	25	32	142	135	22	213	136	349	60	409
Orchard Grass	13	24	50	27	68	59	33	53	41	50	42
Timothy	43	76	69	48	21	50	42	46	44	28	42
Tall Fescue	0	0	34	6	59	32	11	40	22	45	26
Blue Grass	0	4	38	19	28	32	17	28	21	17	21
Brome Grass	53	28	16	15	1	5	16	13	15	18	15
Clover--All Kinds	8	4	9	4	14	9	7	13	9	5	9
Other	8	12	16	6	6	0	7	8	7	3	7
Birdsfoot Trefoil	2	28	0	8	0	0	7	3	5	3	5
Alfalfa	9	20	3	4	0	0	6	2	4	2	4
Percent of Respondents Using Native Pasture With Specified Plan Species											
Number in Sample	45	21	33	110	129	22	179	127	306	54	360
Blue Grass	9	5	55	42	45	50	34	39	39	37	38
Orchard Grass	18	10	36	28	51	50	31	35	35	43	36
Timothy	49	38	36	45	11	27	32	31	31	30	31
Tall Fescue	0	0	24	5	44	14	11	18	18	31	20
Brome Grass	56	10	6	7	1	0	13	10	10	13	11
Other	11	24	9	9	8	14	11	9	8	13	10
Clover--All Kinds	9	10	3	9	10	9	7	8	13	13	9
Birdsfoot Trefoil	0	10	0	5	0	0	3	3	0	0	2

Tall fescue is another predominantly southern grass, especially popular in Virginia where 59 percent use it as an improved grass and 44 percent have it as a native grass. It was not found at all in the samples from New York and Michigan. Likewise, blue grass is not popular in the more northern states. It has its biggest following in Ohio both as a native and improved pasture, where 55 percent and 38 percent use it respectively.

Brome grass, on the other hand, is more important in the northern states. Fifty-three percent of the Michigan sample use it as an improved grass, and 56 percent have it in native pasture. It is very unpopular in Virginia and West Virginia. Birdsfoot trefoil is widespread in New York, although it is hardly found elsewhere. Timothy seems to have a fairly wide distribution over the six states, both as an improved pasture grass and as a native grass.

The variation in the frequency of the different plant materials in the herd-size categories can largely be explained by the unequal state distributions represented in each herd-size group, and therefore will not be discussed.

4. Crop Residue

Related to pasture information is the data on the number of acres of crop residue used by the cow-calf enterprise.

"Acres of crop residue used for beef cow enterprise in 1974 ____ (include small grain stubble, aftermath from hay, corn stalks)."

Table V.26 gives the average number of acres of crop residue used for the beef cow enterprise. Sample sizes are relatively small in part because of the "missing values" problem and in part because of the low visibility of the question in the questionnaire.

Table V.26 Average Acres of Crop Residue in 1974 by State and Herd Size

	MI	NY	OH	PA	VA	WV	LT25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	46	23	26	118	112	18	171	118	289	55	344
Average Crop Residue Acres	49	24	30	16	20	19	19	24	21	36	23[a]

[a]Range: 0-450 acres; Std. Dev.: 46.3

Crop residue acres used by the enterprise increases from 19 to 36 acres as the herd size increases from less than 25 to more than 50 cows. Part of the variability among the states may be explained by the importance of grain and forage crops. In Ohio and Michigan these crops are more frequently the major enterprise (with 9 percent and 6 percent respectively) than in the other states. Reflecting this, Michigan and Ohio use relatively larger numbers of crop residue acres than the other states, with 49 acres and 30 acres respectively. The Pennsylvania average of crop residue acres was 16 acres, the smallest of the six states.

Crop residue acres are an important resource in beef cow-calf enterprises, and it appears from the above information that this resource is underutilized. The average producer in the total sample group has over 70 acres of potential crop residue acres, but grazes less than one-half of them.

J. Feeding

The single largest expense in a beef cow-calf enterprise is for feed. Grazing management has been discussed in Section I of this

chapter. Data on type, quantity, source, and cost of feedstuffs was also gathered in the questionnaire with two large block questions.

1. Purchased Feed Quantity and Cost

"Purchased feed fed to beef cows and calves in 1974:

Feed	Amount	Cost per unit	Total $ Value
Corn (ear or shelled)	_____ (cwt.)	_____	_____
Small Grain (oats, barley, wheat)	_____ (cwt.)	_____	_____
Hay	_____ (cwt.)	_____	_____
Protein supplement	_____ (cwt.)	_____	_____
Minerals	_____ (cwt.)	_____	_____
Salt	_____ (cwt.)	_____	_____
_____	_____ (cwt.)	_____	_____ "

Ambiguity problems were experienced with this question. First, "cost per unit" may refer to either "cost per cow and calf unit" or "cost per unit of feedstuff." Cost per unit figures are not reported here, but this problem may distort the Total $ Value figures. Second, it is unclear whether respondents include feed quantities and cost for calves fattened to slaughter weight on the farm. Third, many respondents did not convert feedstuffs from tons, bales, pounds, and bushels into hundred weights. If another unit was used and could be ascertained with relative certainty, conversion was made to hundredweight. The results presented are conditioned by interpretation of the data.

Mineralized salt was recorded as a salt. If no source of salt was indicated, the salt columns were assigned a missing value on the assumption that all herds require a source of salt.

Numerous additional feedstuffs were mentioned, including:

(1) mixed feeds (including creep) - 15 responses

(2) molasses - 7 responses

(3) vitamins - 2 responses

(4) magnesium oxide - 2 responses

Table V.27 reports the average total annual cost and quantity; and the average per cow cost and quantity of selected feedstuffs purchased in 1974.

Table V.27 Purchased Feedstuffs Fed in 1974 Per Farm and Per Cow

	Quantity Purchased		Dollar Expenditure	
	Total/Farm	Per Cow Unit	Total $/Farm	Per Cow Unit $
Number in Sample	385	385	378	378
Corn	24 bu.	.9 bu.	$40	$2.00
Number in Sample	390	390	381	381
Small Grain	17 bu.	.7 bu.	$17	$ .70
Number in Sample	376	376	366	366
Hay	2.5 tons	.1 tons	$58	$2.70
Number in Sample	357	357	340	340
Supplement	11.4 cwt.	.5 cwt.	$82	$3.30
Number in Sample	330	330	275	275
Mineral	2.7 cwt.	.1 cwt.	$17	$ .80
Number in Sample	278	278	207	207
Salt	8.1 cwt.	.4 cwt.	$33	$1.20
Number in Sample			10	10
Total Cost	(n.a.)	(n.a.)	$465	$39.80

Only 10 respondents in the total sample gave a nonmissing value dollar expenditure on every feedstuff listed. On the average, these 10 spent $465 on purchased feedstuffs (including the "other" feedstuff costs), or about $40 per cow-calf unit.

Cost figures were provided by the respondents. Because of the averaging technique used, the implicit "cost per unit of feedstuff" figures for total and per cow unit information are different. Also because of averaging techniques, the sum of the costs of the individual feedstuffs does not equal the total cost for feedstuffs.

2. Raised Feed Quantity and Cost

The following question was designed to ascertain the quantity and cost of raised feed fed to beef cows and calves. Results are presented in Table V.28.

"Raised feed fed to beef cows and calves in 1974:

Feed	Amount (est.)	Total $ Value
Mixed hay	_____	_____
Alfalfa hay	_____	_____
Grass hay	_____	_____
Corn silage	_____	_____
Grass silage	_____	_____
Corn	_____	_____
Oats	_____	_____
Barley	_____	_____
Wheat	_____	_____

Table V.28 Raised Feedstuffs Fed in 1974 Per Farm and Per Cow

	Quantity Raised		Dollar Value	
	Total/Farm	Per Cow Unit	Total $/Farm	Per Cow Unit
Number in Sample	392	392	355	355
Mixed Hay	53.4 tons	2.26 tons	$1642	$66
Number in Sample	420	420	410	410
Alfalfa Hay	7.1 tons	.38 tons	$215	$10
Number in Sample	422	422	418	418
Grass Hay	5.9 tons	.26 tons	$182	$7
Number in Sample	425	425	396	396
Corn Silage	32.2 tons	1.03 tons	$339	$13
Number in Sample	438	438	433	433
Grass Silage	5.4 tons	.12 tons	$41	$1
Number in Sample	388	388	372	372
Corn	172 bu.	7.0 bu.	$346	$14
Number in Sample	418	418	396	396
Oats	73 bu.	3.3 bu.	$92	$4
Number in Sample	431	431	422	422
Barley	11 bu.	.4 bu.	$10	—
Number in Sample	439	439	433	433
Wheat	4 bu.	.2 bu.	$10	$1
Number in Sample			243	243
Total Cost	(n.a.)	(n.a.)	$3176	$132

Again, there were problems with interpreting the information provided. Units were not specified, and if not provided by the producer, educated guesses were made. The hay and silage figures were recorded in tons and the grains were recorded in bushels. There was a wide range in estimated "cost per unit" of the various feedstuffs, but these were recorded unless completely out of line. Again, because of the averaging technique used, the implicit "cost per unit of feedstuff" figures for total and per cow unit information are different.

It is unclear whether respondents included feed quantities and costs for calves finished on the farm.

Two hundred forty-three respondents in the total sample gave a nonmissing value dollar value on every feedstuff listed. On the average, these 243 raised $3176 worth of feed for the cow-calf enterprise in 1974, or about $132 per cow-calf unit. This does not include the value of pasture grazed. The value of raised feedstuffs fed was over three times the value of purchased feedstuffs fed ($40 per cow).

Other comparisons between quantities and values of purchased and raised feedstuffs can be made. All salt, mineral, and most supplement must be purchased. On the other hand, almost all hay is raised on the farm. Roughly $85 worth of hay was raised on the farm per cow unit, while only $3 per cow unit of hay was purchased. Compared in terms of quantity rather than value, the spread is even wider because of a tendency of the producers to underestimate the value of home-produced feedstuffs.

Purchased corn amounted to $2 per cow unit, while the value of raised corn per head was $14. In terms of quantity, rather than value, .9 bushel of purchased corn was fed per cow unit, and 7 bushels of raised corn were fed per cow unit, or almost 8 times as much.

The same trend was evident in small grains. Seventy cents or .7 bushel of purchased small grain was fed per cow while roughly $5 or 4 bushels of raised small grain were fed.

Mixed hay was by far the most predominant type of hay, while grass hay and alfalfa hay were much less common. About 7 1/2 times as much mixed hay was fed as alfalfa hay, and 9 times as much as grass hay. About 6 times as much corn silage was fed as grass silage.

Not a single respondent indicated that they purchased silage--all of it was raised on the farm.

3. Total Feed Quantity and Cost

Table V.29 provides an aggregation of the previous two tables and also gives state and herd-size breakouts on a per cow unit basis. Corn figures include both raised and purchased figures. Grain information is a composite of purchased grain data and raised oats, wheat, and barley data. Hay information is a composite of purchased hay and raised mixed hay, alfalfa hay, and grass hay data. Silage figures include both corn and grass silage (although the amount of the latter is minimal.) Salt and mineral figures are aggregated.

Sample sizes were not large enough to give total value of feedstuffs fed by each state sample group.

Table V.29 does not present feeding costs and quantities of a typical farmer. Rather it shows a composite of many farmers feeding many types of feedstuffs. It is important to remember that zero values are averaged in all the means. However, the table is useful for indicating trends and comparisons among the six states and among different herd-size groups. The sum of raised and purchased quantities and costs presented

Table V.29 Quantity and Value of Raised and Purchased Feedstuffs Fed in 1974 Per Cow Unit

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	44	21	24	93	111	25	163	113	276	42	318
Corn (bu.)	10.2	5.2	5.4	17.0	3.0	.7	10.7	6.0	8.8	4.7	8.2
Number in Sample	43	20	24	82	109	25	150	111	261	42	303
$ Corn	$28	$19	$13	$38	$ 4	$ 1	$24	$16	$20	$ 4	$18
Number in Sample	46	21	28	107	107	24	172	114	286	47	333
Small Grain (bu.)	4.9	5.8	.9	6.1	1.5	.5	4.0	3.1	3.6	3.3	3.6
Number in Sample	45	18	27	91	100	24	152	110	262	43	305
$ Grain	$10	$ 7	$ 1	$ 7	$ 3	$ 2	$ 6	$ 5	$ 5	$ 4	$ 5
Number in Sample	42	22	23	96	106	21	160	111	271	39	310
Hay (tons)	3.1	5.9	2.8	3.8	2.1	2.5	4.0	2.2	3.3	1.9	3.1
Number in Sample	36	20	22	82	90	21	142	100	242	29	271
$ Hay	$83	$171	$93	$108	$75	$87	$120	$70	$99	$65	$96
Number in Sample	57	26	35	142	134	31	227	137	364	61	425
Silage (tons)	3.3	.8	.3	.5	1.5	.4	.9	1.3	1.2	1.7	1.2
Number in Sample	51	25	32	134	120	28	216	124	340	50	390
$ Silage	$64	$ 8	$ 2	$ 3	$12	$ 4	$13	$14	$13	$18	$14
Number in Sample	47	14	21	91	96	18	135	106	242	35	278
Salt & Mineral (cwt)	.5	.6	.5	.5	.4	.4	.5	.4	.5	.3	.4
Number in Sample	31	10	19	63	73	15	95	84	179	28	207
$ Salt & Mineral	$ 2	$ 2	$ 4	$ 2	$ 2	$ 2	$ 2	$ 2	$ 2	$ 2	$ 2
Number in Sample	50	24	25	124	110	24	187	125	312	45	357
Supplement (cwt)	.6	.4	.4	.6	.4	.3	.6	.4	.5	.4	.5
Number in Sample	48	23	24	116	106	23	180	117	297	43	340
$ Supplement	$ 5	$ 2	$ 3	$ 4	$ 3	$ 3	$ 4	$ 3	$ 3	$ 3	$ 3
Average Total Feed[a] Cost Per Cow Unit	192	209	116	162	99	98	169	110	142	96	138

[a]These figures are only a rough approximation. They are the sum of figures obtained from different and unequal sample groups.

previously does not equal the totals presented here because of the averaging technique.

All information was put on a "per cow unit" basis in order to eliminate the variation caused by differential herd sizes. The following discussion will dwell largely on physical quantities rather than dollar value because less subjectivity is involved.

Many observations can be made. First, the amount of corn fed to cattle depends in large part upon geographic location. In the most southern states, West Virginia and Virginia, only .7 and 3 bushels of corn were fed in 1974. In Pennsylvania, an average of 17 bushels was fed. West Virginians also fed the smallest amount of oats, barley, and wheat--only one-half a bushel. Again, Pennsylvania fed the highest amount of grain--6.1 bushels. On the average, more than twice as much corn as other grain was fed.

Hay consumption was highest in the New York sample and lowest in Virginia (with 5.8 and 2.1 tons respectively). The very high figure in New York may be in part because of 1) relatively longer winters and 2) relatively high proportion of small farmers.

The amount of silage fed in 1974 ranged from .3 tons in Ohio to 3.3 tons in Michigan.

The amount of salt, mineral, and supplement remained quite stable in all state breakouts.

The results of the herd-size breakouts does not bode well for the smallest farmers, whose feed costs per cow unit are much higher than for larger farmers. The only feedstuff that is fed more in larger herds than in small herds is corn silage, probably because the technology of corn silage production has some economic of size. Those with less than or equal

to 25 cows feed per cow 2-3 times as much hay, 1.7 times as much salt and mineral, and 1.5 times as much supplement as those with between 50 and 100 cows. On the other hand, the larger herd owners market, on the average, slightly lighter animals than the smaller herd owners. Other contributing factors could be the amount and quality of pasture and the amount of wastage.

There was a wide variation in the per unit value of the various feedstuffs, but no single herd-size group or state appeared to value their products consistently higher or lower than other groups.

4. Creep Feeding

Another question pertaining to feed was, "Are calves creep fed? Yes_____ No_____ (check)" Several respondents qualified their answer with 1) depends on price of calves 2) depends on cost of feed and 3) depends on season of the year. These answers were coded separately under a category labeled "sometimes." Table V.30 presents the percent of those who answered the question who checked "yes," "no," or indicated "sometimes."

Table V.30 Percent of Respondents Creep Feeding Calves by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	58	28	37	162	148	29	245	156	401	62	463
Yes	22	14	43	28	20	3	23	27	24	21	24
No	71	82	41	67	70	97	74	65	70	61	69
Sometimes	7	4	16	5	10	0	4	8	6	18	7

Because the "sometimes" category was not specified, it is probably understated. Ohio makes the most extensive use of creep feeding--59 percent of the sample group uses it at least sometimes. At the other extreme, only 3 percent of the West Virginia sample uses creep feeding.

H. Other Cash Costs

A series of questions were asked to determine some of the cash costs involved in beef cow-calf production. Data was collected on land rental costs, taxes, and custom hire charges on a per acre basis. Also gathered was information on veterinary expenses and insurance.

1. Rent and Taxes

"Rent paid per acre for cropland _____ pasture _____" This question implicitly assumed that the type of rental agreement was cash rent. However, several farmers indicated that other types of arrangements were made. For cropland rental, seven farmers indicate a share crop arrangement, eight farmers claimed no cost, and six indicated that they obtained use of the cropland in exchange for payment of taxes, for upkeep, for an exchange of resources, or some combination of the above.

For pasture rental, six farmers paid rent on a "per cow per month" basis. Eight farmers claimed no cost, and seven farmers indicated that they obtained use of the pasture land in exchange for payment of taxes, for upkeep, for an exchange of resources, or some combination of the above.

It is probable that some respondents converted these alternative rental arrangements to a cash rent basis in order to conform to the form of the question, or that they left the appropriate space blank. For these reasons, the number of respondents using the above alternative arrangements is probably understated. From those that did provide cash

rent data, Table V.31 was tabulated. Because of small sample sizes in New York, Ohio, and West Virginia, the state breakouts are not provided. Zero values were not included in the averages.

Table V.31 Average Cash Rent Per Acre on Crop and Pasture Land by Herd Size

	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	41	34	75	24	99
Cropland $ Rent	11.40	17.20	14.00	13.40	13.90[a]
Number in Sample	32	36	68	23	91
Pasture $ Rent	6.00	7.40	6.70	5.00	6.30[b]

[a]Range: $1-$75; Std. Dev.: 12.3
[b]Range: $1-$50; Std. Dev.: 4.9

The per acre rental rate for crop land averaged $13.90 for the total sample, and the pasture rental rate averaged $6.30. The cropland rental rate was about 2.2 times the pasture rental rate for the total sample data, and it was close to that for each of the herd-size breakouts.

Another cash expense is tax on land. The results of the question "Tax per acre on owned land excluding dwelling _____ " are as follows:

Table V.32 Tax Per Acre on Owned Land Excluding Dwelling by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
# in Sample	53	14	29	98	90	18	156	100	256	46	302
Tax $/Acre	5.50	4.40	2.90	5.30	2.80	2.20	4.80	3.80	4.40	2.40	4.10[a]

[a]Range: $.20-$35.00; Std. Dev.: $5.70

The average tax rate of the total sample was $4.10 per acre. The tax rate and herd size appear to be inversely related. Farmers with less than 25 cows paid the highest average tax--$4.80 per acre while those with more than 50 cows paid only $2.40 an acre. This may in part reflect the possibility that some farmers did not exclude tax on dwelling. The smaller producers had a smaller number of acres over which to spread the "dwelling per acre" charge.

The average tax per acre was relatively high in Michigan and Pennsylvania with $5.50 and $5.30 respectively. They were lowest in West Virginia at $2.20 per acre.

2. Custom Hire Costs

Another cash cost to many of the producers was that of custom hire services.

"Custom Operations hired in 1974. (check)

(1) hay baling_____ Est. Cost per bale_____

(2) grain harvest_____ Est. Cost per acre_____

(3) silo filling_____ Est. Cost per acre_____

(4) corn picking_____ Est. Cost per acre_____

(5) hay making_____ Est. Cost per acre_____"

Some of the respondents supplied cost figures in nonconvertible units, such as cost per ton, cost per large bale, cost per hour, etc. In these cases, the cost values were made missing values. Another problem with this question was that the exact type of service was undefined. Rates given by the respondent may or may not have included the services of hauling wagons, tractors, auxillary labor, etc. Some respondents were confused about the difference between hay baling and hay making.

Table V.33 is a tabulation of the percent of the nonmissing value responses which were checked for the appropriate custom service. Table V.34 gives the average cost per acre or bale incurred by those of the total sample who hired the selected custom service and gave cost figures. State and herd-size breakouts are not provided in the latter table because of small sample sizes.

Table V.33 Percent of Respondents Hiring Selected Custom Services by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	47	21	34	113	116	23	184	120	304	51	355
Percent Hiring Hay Baling	11	14	38	16	32	17	24	26	25	12	23
Percent Hiring Grain Harvest	47	33	15	35	22	0	31	21	27	31	28
Percent Hiring Silo Filling	26	0	12	6	22	17	9	22	14	20	15
Percent Hiring Corn Picking	9	14	21	22	34	9	21	25	23	24	23
Percent Hiring Hay Making	2	5	3	8	12	9	10	7	9	4	8

An average of 23 percent of the total sample hired hay baling services at an average cost of $.27 a bale. However, only 12 percent of the producers with more than 50 cows custom hired hay baling, a percent only one-half as large as the percent in the smallest herd group. Custom hired hay baling was important in Ohio and Virginia, where 38 and 32 percent of the sample populations hired it. Only 11 percent of the Michigan sample hired hay baling services.

Table V.34 Cost of Selected Custom Services by State and Herd Size

	Hay Baling (per bale)	Grain Harvest (per acre)	Silo Filling (per acre)	Corn Picking (per acre)	Hay Making (per acre)
# in Sample	67	92	38	72	8
Per Unit Cost of Selected Custom Services ($)	.27[a]	9.50[b]	24.30[c]	12.10[d]	29.50[e]

[a]Range: $.10-$.75; Std. Dev.: $.13
[b]Range: $5-$20; Std. Dev.: $2.4
[c]Range: $10-$50; Std. Dev.: $10.5
[d]Range: $5-$20; Std. Dev.: $3.9
[e]Range: $15-$50; Std. Dev.: $12.6

Twenty-eight percent of the total sample custom hired grain harvest services at an average cost of $9.50 an acre, but only 21 percent of the middle sized herd owners did so. Within states there was an enormous range, varying from 47 percent of the sample in Michigan to zero percent in West Virginia.

Silo filling was hired by 15 percent of the total sample at an average cost of $24.30 an acre, corn picking by 23 percent at an average cost of $12.10 an acre and hay making by 8 percent at an average cost of $29.50 an acre. The percent hiring these services was quite varied in the state breakouts. However, it does not appear that any one state consistently hired much more or less custom services than any other state. The same is true in the herd-size breakouts.

3. Veterinary Expense

Information on cash expended in a beef cow and calf operation for veterinary services and drugs was collected by:

"Veterinary and drug expenses for the beef cow and calf enterprise for 1973 _____."

Table V.35 gives the average total dollar expenditure and expenditure per cow in each herd-size and state breakout.

Table V.35 Total Annual Cost and Annual Cost Per Cow Unit for Veterinary Services and Drugs

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
# in Sample	55	23	37	139	134	25	210	145	355	59	414
Total Annual Cost $	97	84	87	71	103	102	56	104	76	166	89
Annual Cost Per Cow Unit	5.40	9.10	4.20	4.20	3.30	4.10	6.00	3.00	4.70	2.50	4.30

Herd size and annual veterinary cost per cow are negatively correlated; which indicate some economies of size for veterinary services. Those with less than or equal to 25 cows paid on the average $6.00 per cow per year while those with more than 50 cows paid an average $2.50 per cow per year.

Veterinary costs were highest in the New York sample, where an average of $9.10 per cow per year was spent. This in part may be a reflection of the preponderance of relatively small herds. Virginia had the lowest annual cost, $3.30 per year, perhaps because of the larger number of large producers in that state.

4. Insurance

Another possible cash expense is for insurance.

"Are the breeding animals (cows and bulls) insured? (check)

Yes _____ No _____ "

Because of the large variation in types and costs of insurance, dollar figures were not collected.

Table V.36 present the percent of respondents in each breakout who responded affirmatively to the question.

Table V.36 Percent Carrying Insurance on Breeding Animals by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	59	30	36	166	148	31	250	156	406	65	471
Percent with Insurance	59	53	89	38	60	45	46	63	53	54	53

Fifty-three percent of the total sample carried some sort of insurance on their breeding animals. In the herd-size breakout, those with herds of between 25 and 50 cows had the highest percent with insurance, 63 percent, while only 46 percent of the smallest herd owners carried insurance.

The Ohio sample had a very high percent with insurance, 89 percent. Only 38 percent of the Pennsylvania sample, on the other hand, carried insurance.

I. Sources of Capital

The results of the question: "Is borrowed capital used in the beef cow-calf enterprise? Yes ____ No ____" are found in Table V.37.

Table V.37 Percent of Respondents Using Borrowed Capital by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	65	30	40	173	150	33	265	160	425	67	492
Percent Affirmative	40	37	35	30	29	36	26	38	30	43	32

The percent using borrowed capital in the beef cow-calf enterprise is 32 percent of the total sample. According to 1969 Agricultural Census data, 60 percent of all farmers carried some real estate or nonreal estate debt.[4] However, both in this study and in the census, there was a positive relationship between size of business (measured in gross sales in census data) and use of borrowed capital. In this sample group, 26 percent of producers with fewer than 25 cows borrowed, while 43 percent of the producers with between 50 and 100 cows borrowed. Whether the smaller producers borrow relatively less frequently because of more limited access to credit or lack of desire to borrow is unclear.

[4] U.S. Bureau of Census, Census of Agriculture, 1969, Farm Finance, Vol. V, Part 11 (Washington, D.C.: Government Printing Office, 1974), p. 18.

Sources of credit were also determined.

"If yes, what is your principal credit source. (check)

(1) Commercial bank _____

(2) Production Credit Assn. _____

(3) Farmers Home Administration _____

(4) Individuals _____

(5) Other (please specify) _____ "

In the "other" category, the Federal Land Bank was mentioned by one respondent and a credit union was mentioned once.

Table V.38 gives the percent of the respondents of the appropriate sample who borrowed from each of several specified credit sources. The appropriate sample consists of those in the corresponding state or herd-size breakout who borrowed some sort of capital.

Table V.38 Percent Indicating Specified Credit Sources by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	26	11	14	50	44	11	67	60	127	29	156
Commercial Bank	73	64	14	36	73	45	52	55	54	52	53
P.C.A.	8	27	50	44	23	9	28	32	30	24	29
F.H.A.	15	0	14	10	0	18	9	7	8	10	8
Individuals	4	9	7	8	2	28	6	7	6	10	7
Other	0	0	15	2	2	0	5	0	3	3	3

An average of 53 percent of those borrowing capital obtained it from commercial banks, 29 percent from the Production Credit Association, 8 percent borrowed from the Farmers Home Administration, and 7 percent obtained credit from individuals. Some difference in borrowed fund sources exist between states, but only minor differences are exhibited in the herd-size breakouts.

The percent borrowing from commercial banks ranged from 14 percent in the Ohio sample to 73 percent in the Michigan and Virginia samples. Instead, in Ohio the major source of credit was the Production Credit Association. One half of the Ohio sample who borrowed used this source, but only 8 percent used it in Michigan, and 9 percent used it in West Virginia. In West Virginia, individuals played a large role in credit distribution--28 percent of the sample group obtained credit from individuals. The West Virginia sample also depended more heavily on the F.H.A. than the other state samples.

J. Facilities

A series of questions explored the number and type of facilities used by the beef cow-calf producer.

1. Buildings, Equipment, Machinery

"Value of buildings and equipment used only for the beef cow and calf enterprise

	Original Cost	Age	Annual Depreciation
buildings	_____	_____	_____
equipment	_____	_____	_____
machinery	_____	_____	_____

"

The quality of information obtained from this question was poor. There were several problems. First, some producers had difficulty abiding by the "only" caveat. If the assets in question were for making hay or finishing calves to market weight, they were included. Otherwise, a missing value was assigned. Second, it is likely that some respondents were confused about the difference between machinery and equipment. Third, some respondents listed more than one item in each category. The original cost and annual depreciation figures were added and recorded. The age category was assigned a missing value because of its nonadditive nature. Finally, there were two different interpretations of the meaning of "age." Some recorded the age of the building or equipment, while others recorded the expected life as in a regular depreciation schedule. A set of rules were established during coding which attempted to screen out the responses giving expected life, so that only actual age would be recorded.[5] The screening method was not infallible so that the age figures given are somewhat arbitrary. Because of these difficulties, only the results for the total sample are given.

The difference in sample size among the three types of asset variables-buildings, equipment, and machinery--was relatively small. Therefore an average of the three sample sizes is given in order to conserve space. The original cost and annual depreciation figures are averaged with zero values included. The age figures, however, are averaged without zero values, so that the result is the average age of the assets which actually exist.

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[5]See Appendix C, Part 49.

Table V.39 Average Original Cost, Age, and Annual Depreciation of Buildings, Equipment, and Machinery

	Original Cost (dollars)	Age (years)	Annual Depreciation (dollars)
Average Number in Sample	295	59	233
Buildings	6,072	36	277
Equipment	1,570	5	100
Machinery	7,596	6	527
Total	15,238	(n.a.)	904

Sample sizes of these tabulations were relatively small. However, some general observations can be made. Total depreciation cost on building, machinery, and equipment was $904.00. The average number of cows for the total sample was 28.6, resulting in an approximate annual depreciation on machinery, equipment, and buildings of $32.00/cow unit. This seems quite high in relation to beef cow farmers in Michigan in 1974 who had annual depreciation on improvements and machinery of $11.50 per cow.[6] Part of the discrepency may be a result of the "missing values" problem.

2. Handling Facilities

The percent of respondents with various types of handling facilities was also determined.

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[6]Gerald D. Schwab, Business Analysis Summary for Beef Cow Farms, 1974, AER 288 (East Lansing, Michigan: Michigan State University, Department of Agricultural Economics, 1975), p. 9.

"Are special facilities available for handling cows and calves when sorting, marketing and treating for disease, etc.

Yes_____ No_____ If yes, do the special facilities include:

(check) (1) loading chute_____ (2) scales _____ (3) holding pen _____

(4) catching chute with headgate _____ (5) cutting gates _____"

Table V.40 gives the percent of respondents in each breakout who gave an affirmative response to the above questions. The sample size is the same for the general question and each type of facility.

Table V.40 Percent of Respondents with Specified Handling Facilities by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	65	31	40	168	152	33	263	160	423	67	490
General Facilities	74	61	75	65	91	91	65	89	74	93	76
Holding Pen	63	42	55	52	84	76	52	77	61	84	64
Loading Chute	49	39	48	43	83	88	44	75	56	82	59
Catching Chute/ Headgate	45	52	58	35	78	67	34	75	50	84	54
Cutting Gates	34	13	25	24	47	27	22	43	30	48	32
Scales	12	13	3	8	15	12	5	14	9	25	11

In the total sample 76 percent had some type of facilities availabe for handling cows and calves. Holding pens and loading chutes were most common, with 64 percent and 59 percent of the total sample respectively. As might be expected, there is a positive correlation of the percent with each type of facility and herd size. The percent owning

scales increases most dramatically, from 5 percent in the smallest herd-size group to 25 percent in the largest herd-size group. The percent with holding pens increases from 52 percent to 84 percent and the percent with catching chute with headgate increases from 34 percent to 84 percent.

The states of Virginia and West Virginia are the most well equipped of the six states. Ninety-one percent in both states own some type of handling facilities. Virginia has the highest percent with each type of facility mentioned except loading chute, for which West Virginia has the highest percent. New York, on the other hand has the lowest percent, 61 percent, with some type of handling facilities. These state differences may in large part reflect herd size differences. However, in New York the percent with scales and with a catching chute with headgate is high relative to the percent with the other type of facilities. The percent of respondents with scales is remarkably low in the Ohio sample, where only 3 percent own one.

3. Fencing

Another question dealt with fencing. "Approximately how many miles of fence are used for the beef cow and calf enterprise

Fencing Material	Miles	Original Cost	Est. Annual Repair Cost
Barbed Wire	____	_____	_____
Woven Wire & 2 Strands Barbed Wire	____	_____	_____
Board Fence	____	_____	_____
Electric Fence	____	_____	_____

In order to conserve space, only the results for the entire sample are presented and discussed. The number of responses to this question was quite low. All three types of information are averaged with zero values included. The sample sizes given are averages of the samples of four types of fence.

Some respondents were uncertain about including data on fencing around feed crops and/or crop residue acres. This information was coded and averaged if given.

Table V.41 Average Miles, Original Cost, and Estimated Annual Repair of Selected Fencing Materials

Fencing Material	Miles	Original Cost (dollars)	Estimated Annual Repair (dollars)
Average Number in Sample	419	314	342
Barbed Wire	3.3	776	85
Woven Wire and 2 Strands Barbed Wire	1.5	426	42
Board Fence	.1	41	4
Electric Fence	.8	45	9

Barbed wire was the most common fencing material. There were slightly more than twice as many barbed wire miles as woven wire miles, and twice as many woven wire miles as electric fence miles. Rather than discuss total original cost and total annual repair averages, the cost figures are presented on a per mile basis in Table V.42. In this table, zero values are not averaged in the calculations.

Table V.42 Original Cost Per Mile and Annual Repair Cost Per Mile of Selected Fence Materials

Fencing Material	# in Sample	Original Cost/Mile	# in Sample	Repair Cost/Mile
Barbed Wire	132	$ 384	204	$ 40
Woven Wire With 2 Strands Barbed Wire	62	694	92	59
Board Fence	20	1,823	17	263
Electric Fence	92	135	97	29

On a per mile basis, without zero values included, it is easy to see why barbed wire is the most important fencing material. According to the data, its original cost is only 55 percent that of woven wire, and it is much cheaper than board fence. Only electric fence is cheaper.

4. Shelter

Another type of facility is that of shelter. "Shelter is provided for the beef cow herd during Winter____ Summer____ Year around____ No shelter____."

Several respondents indicated that shelter was only provided for calving, and this information was coded separately. Because it was not specifically asked for, it is probably underreported. One problem with this question may be that it does not specifically distinguish natural shelter such as trees from man-made shelter.

Not a single respondent checked that they provided shelter only in the summer. Thirty-seven percent of the total sample provided winter shelter and 28 percent provided year round shelter. A total of 67 percent

Table V.43 Percent of Respondents Who Provide Shelter During Specified Seasons by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	61	30	38	169	146	34	259	154	413	65	478
Winter	46	60	42	37	23	50	39	34	38	32	37
Year Round	31	30	18	39	18	15	38	17	30	14	28
No Shelter	21	10	32	24	57	29	22	45	31	52	34
For Calving	2	0	8	1	1	6	1	4	2	2	2

had some type of shelter available. There was a tendency for the producers with less than or equal to 25 cows to provide more shelter than those producers with more than 50 cows. As herd size increased, the percent with some type of shelter decreased from 78 percent to 48 percent. The decline in percent with shelter was much less steep for winter shelter than for year round shelter.

The Virginia sample had the smallest percent providing shelter, only 42 percent, while in New York 90 percent provided some type of shelter, certainly a reflection of climate. Fifty percent of the West Virginia sample provided winter shelter, a figure quite high when considered in relation to climate. Year round shelter was particularly prevalent in Pennsylvania when 39 percent provided it. Pennsylvania was the only state with more year round shelter than winter shelter, perhaps because of the fairly high number of respondents with converted dairy operations.

5. Feeding Methods and Facilities

A final set of questions inquired about feeding facilities and practices.

1. "Is hay stored in barns Yes_____ No _____"
2. "Do you use winter pasture including field stored hay (round bales or stacks) (check)

   Yes_____ No_____"
3. "How is hay fed? (check) in hayrack in barn _____ ,

   in hayrack outside_____, on the ground_____,

   in feedbunks outside_____, round bales in field_____"

Table V.44 gives the percent of respondents in each sample who responded affirmatively to the question dealing with the storage of hay in barns.

Table V.44 Percent of Respondent With Hay Stored in Barns by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	65	31	40	173	152	33	266	162	428	67	495
Hay in barns	98	97	98	95	93	91	97	99	98	94	97

A very high percentage, 97 percent, claim to store at least some hay in barns. There is only small variation about this figure, either in the herd-size breakouts or in the state breakouts. The Virginia sample, the West Virginia sample, and the sample with herds greater than 50 cows had a smaller percent of respondents with barn stored hay then the other samples, with 93, 91, and 94 percent respectively.

About forty percent of the total respondents used winter pasture including field stored hay. This figure is high when compared with the results of the following question, which indicates that only 6 percent of the total sample fed round bales in field. It can be deduced from this information that about 34 percent of the sample used the stacked hay method of feeding in the winter. Table V.45 gives the percent of the respondents using each of the specified feeding methods. If given, two methods of feeding hay were recorded for the question, and therefore the sum of the percents in each column may be more than 100.

Table V.45 Percent of Respondents Using Specified Feeding Methods by State and Herd Size

	MI	NY	OH	PA	VA	WV	LE25	GT25 LE50	LE50	GT50 LT100	Total
Number in Sample	63	31	40	173	152	32	264	161	425	67	492
Hayrack in Barn	37	65	45	55	29	69	51	37	46	40	45
Hayrack Outside	22	26	15	16	6	3	15	12	14	10	13
On the Ground	57	32	53	50	86	81	55	71	61	73	63
Feedbunks Outside	17	19	10	7	3	3	8	7	8	9	8
Bales in Field	3	0	28	4	6	3	4	7	5	10	6

The most common method of feeding hay was on the ground. Sixty-three percent of the total sample used this method. The percent feeding hay on the ground increased to 73 percent for producers with herds of more than 50 cows, from 50 percent for the smallest herd-size sample. Feeding on the ground was most common in Virginia and West Virginia where 86 and 81 percent used this method. It was least common in New York, where only 32 percent of the sample fed on the ground.

The second most common method of feeding hay was in hayracks in the barn. Forty-five percent of the total sample used this method. As herd size increased, the percent using this method decreased from 51 to 40 percent. Of the six states, the West Virginia and New York samples used this method most frequently, with 69 and 65 percent of the sample respectively. The method was least popular in the Virginia sample, where only 29 percent used it.

The use of outdoor hayracks averaged 13 percent of the total sample. The percent diminished from 15 percent to 10 percent as herd size increased from the smallest to the largest group. This method was most popular in the more northern states of New York and Michigan (26 and 22 percent of respective samples), and least popular in the southern states of Virginia and West Virginia (6 and 3 percent of the respective samples).

The percent using feedbunks was quite stable with respect to herd size; the average of the total sample was 8 percent. In the state breakouts, there was again a tendency for the more northern states to use the method more than the more southern states. Nineteen percent fed by this method in the New York sample, and only 3 percent fed in feedbunks in the West Virginia samples.

Feeding hay as bales in the field was the least common method, used by only 6 percent of the total sample, although 28 percent of the Ohio sample used this method.

K. Summary

In reviewing the production and marketing information, it is important to remember that it is probable that the sample group is biased

toward the better-than-average producer. From this sample the following conclusions are drawn.

1. The average producer in the sample owned 28.6 cows and had 265 acres in the farm operation, of which 74 percent was owned.

2. Beef cow-calf enterprises were relatively very important to the sample group. For 83 percent of the total sample, it was the principal source of farm income, and on average, the beef cow-calf enterprise contributed 62 percent of all farm income.

3. There were an average of .45 heifers and .36 steers for every cow in the sample group, and there were 18 cows for every bull.

4. The total sample reported a .93 calving ratio and an .87 weaning ratio. The mortality rate of cows was .036.

5. Approximately one-third of the sample group had a year long breeding season. Nineteen percent had a 120-day breeding season, 29 percent a 90-day season, and 19 percent a 60-day season.

6. The calves of 58 percent of the total respondents were born in the spring. Virginia, and to a lesser extent, West Virginia, more often had winter calving seasons.

7. In the total sample, 34 percent owned Hereford cows and 33 percent owned Hereford bulls. Black Angus cows were owned by 33 percent of the sample, and Angus bulls by 35 percent of the sample. Other breeds were found in much smaller proportions. Only 25 percent of the sample owned any crossbred cows and six percent owned a crossbred bull. Breed composition varied markedly among the six states.

8. Producers ranked "breed" as the most important attribute of bull. "Size" was next in importance, followed by "performance records,"

"conformation" and "cost." The average price paid by the sample for their last bull was $610. Sixty percent of the producers purchased bulls from purebred breeders, and 16 percent from registered breed sales.

9. Data on number of cattle marketed in total or in age and sex categories was not collected. Feeder steers calves were most commonly marketed by the sample, and weighed an average of 466 pounds at seven months of age. Heifer calves were lighter and marketed by 39 percent of the sample. Yearlings averaged 584 pounds and were marketed by 25 percent of the total sample. Finished steers and finished heifers average 971 and 904 pounds respectively, and were marketed by 23 and 12 percent of the total sample group.

10. Cropping patterns largely reflected feed requirements. Data was also gathered on purchased feed. For the total sample, 8.2 bushels of corn, 3.6 bushels of small grain, 3.1 tons of hay, 1.2 tons of silage, 40 pounds of salt and mineral, and 50 pounds of supplement were fed per cow unit. An average of 3.8 acres of pasture land was provided per cow unit, of which 21 percent was improved. Twenty-three crop residue acres per herd, or less than 1 acre per cow were also available.

11. Cash costs included $4.10 per acre average tax, and $4.30 per cow veterinary and drug expenses. Fifty-three percent carried some sort of insurance on breeding stock. Twenty-eight percent hired custom grain harvest services, 23 percent hired hay baling and corn picking services, and 15 percent hired silo filling services.

12. Less than one-third of the total sample carried debt. Of these, 53 percent obtained credit from commercial banks, 29 percent from the P.C.A., 8 percent from the F.H.A., and 7 percent from individuals.

13. Investment in machinery, buildings and equipment was high, averaging more than $30 per cow. Seventy-six percent of the total sample owned some sort of handling facilities, most commonly holding pens. About one-third of the sample provided no shelter, 37 percent provided winter shelter, and 28 percent provided year round shelter.

The next chapter will summarize the findings of this study. Recommendations for further research and extension activities will also be presented.

CHAPTER VI

SUMMARY AND RECOMMENDATIONS

A. Summary

This chapter will summarize the results of the survey designed to characterize small beef cow-calf producers, ascertain motivations and degree of satisfaction, and determine sources of information used by beef cow-calf producers. It will also present recommendations for consideration.

Chapter III, Methodology, described the processes and problems of collecting and analyzing data for the study. Mail questionnaires were sent to 4,200 in the states of Michigan, New York, Ohio, Pennsylvania, Virginia, and West Virginia, and 503 usable forms were returned. The highest return rate occurred in Virginia, where forms were returned to local extension agents, rather than to Pennsylvania State University.

Problems in sampling and questionnaire design undermined the validity of the results discussed in Chapter IV and Chapter V. The sampling pool may have been biased towards the better-than-average producer, but data was not collected to enable comparison of the actual sample group with the intended target group. The questionnaire was not pretested on a subsample, and consequently contains logical inconsistencies, ambiguities, format problems, and omissions of crucial questions. Goals, hypotheses, and data requirements were not carefully

and precisely defined. Nevertheless, the data collected is useful in describing the sample beef cow-calf producers and suggesting alternative communicative media for educational extension activities.

A large amount of data were collected which enabled characterization of the beef cow-calf producers and their enterprises. The typical producer was 50.4 years old, had lived on the farm for 26 years and had had a beef cow-calf enterprise for 18 years. As might be expected, the larger herd owners had the most experience with beef cattle and the longest tenure on their farms.

There are several possible measures of size. The major one used in this study is number of cows over two years of age. Producers were divided into herd-size groups of less than or equal to 25 cows, more than 25 cows and less than or equal to 50 cows, and more than 50 cows and less than 100 cows.

Producers were also divided into the six state subsamples of Michigan, New York, Ohio, Pennsylvania, Virginia, and West Virginia. Chapter IV presented production and marketing data for the size and location breakouts. In general, the results confirm the findings of other research on beef cow-calf producers.

Beef cow numbers have been steadily increasing in the United States over the last 20 years, and the typical producer in this survey is increasing herd size. However, economic studies have indicated that the enterprise has a low economic return. This paradox suggests that beef cow-calf producers may have objectives other than economic return for keeping beef cows.

Alternative motives mentioned in the literature for having a beef cow-calf enterprise are low labor requirements, potentially low capital requirements, low management skill requirements, and utilization of available land, buildings, and feed for which there is only limited alternative employment.

In this survey, a list of probable motivations were prepared, which the producer was asked to rank in order of importance. "Utilization of available land and buildings" was the most important reason for selecting the beef cow-calf enterprise. Desire to "earn more income from the farm" was the second most important reason except in Virginia and West Virginia, where the desire to earn more income was ranked highest. "Keep land cleared" was the third ranked reason.

A closely related question asked respondents to rank reasons for their decision to have a beef cow-calf enterprise. In all state and herd-size breakouts, "fulfilling a personal desire" was ranked as the most important reason. "Previous experience" and "farm adopted to beef cattle" were next in order of importance. The "other" response was ranked next, and included write-in responses such as "replacement of dairy enterprise," "enterprise started by father," "low labor requirement," and "profit."

Sense of satisfaction by the sample group was also determined. Approximately two-thirds of the respondents indicated that the enterprise fulfilled their expectations while only one-third was satisfied with economic returns over the years. About 40 percent of the respondents who indicated that their expectations were fulfilled also indicated that the economic returns were not satisfactory. It is probable that the percent dissatisfied with economic returns was abnormally high because of

the depressed price of beef in the early part of 1975 when most of the questionnaires were completed.

About 90 percent felt that the cow-calf enterprise provided the producer and his/her family with personal satisfaction and a sense of achievement. However, less than one-half of the total respondents indicated that they would recommend a beef cow-calf enterprise to a beginning farmer in their area. A typical qualification to this question was that the cost-price squeeze was too severe to initiate a cow-calf enterprise.

Slightly more than one-half of the respondents indicated that they were satisfied with their production practices. Of those that were not satisfied, many mentioned symptoms of problems such as "poor weight gains" and "low price" rather than actual problems. It is clear from the data collected on production practices and from the high level of dissatisfaction with economic return that most producers are not as efficient as they might be. Many producers have not been able to pinpoint, or even recognize their inefficiencies.

A major objective of this study was to determine effective communication channels for reaching the small beef producer. In order to do this, the importance of existing channels of information was explored. Respondents were asked to rank in order of importance their principal sources of information concerning the management of the enterprise. Extension personnel and farm magazines were the most important except in the New York sample, where friends ranked second. In general, friends with beef cows, cattle breeders, and neighbors ranked third, fourth, and fifth in order of importance as sources of information. In a West

Virginia study, a veterinarian choice was also listed and ranked third by questionnaire respondents.

In that study, each farmer also ranked the three persons whom he/she would contact if there was a problem concerning the beef herd. In order of importance, veterinarian, extension office, neighbor-cattle farmer, feed dealer, university, and relative were ranked.

The literature on the problems of reaching and motivating small farmers stressed the importance of using extension personnel in face-to-face situations. It was felt that this motivation is an effective way to increase the producers' knowledge about the opportunity to participate. In order to extend extension resources, it was often suggested that para-professionals might be used. Demonstration was also stressed as an essential ingredient in convincing the clientele of the feasibility and appropriateness of improved production practices.

Information was collected from the questionnaire on farm magazines read by the respondents. In general, state farm magazines such as the Ohio Farmer and the Michigan Farmer reached the widest audience in their respective states. The Farm Journal was the most widely read magazine for the group as a whole, and had a remarkably broad reach across both geographic area and herd-size groups. The Progressive Farmer was found almost exclusively in Virginia and West Virginia, and Successful Farming was found only in the four states of New York, Michigan, Ohio, and Pennsylvania.

Over 100 different farm magazines were read by the sample group, and only four respondents in the entire sample indicated that they did not read any magazines.

B. Recommendations

Four types of recommendations are drawn from the information obtained from this study. They are 1) suggestions for an improved methodology; 2) recommendations derived from the literature on small farmers in the United States and from expert opinion; 3) suggestions derived from the questionnaire pertaining to motivation and means of access; and 4) recommendations derived from the survey on production practices which need emphasis among small farmers.

1. Suggestions for an Improved Methodology

1. Questionnaires should be pretested on a field subsample in order to identify and correct logical inconsistencies, ambiguities, format problems, omissions of crucial questions, etc., before distribution to the sample population.

2. The participation rate of the sample group will be increased if the survey is identified with local extension personnel rather than more distant state university staff.

3. Length and complexity of mail questionnaires should be curbed if relatively accurate and complete data is to be gathered.

4. Target groups should be precisely defined and information gathered which enables comparison with pertinent bodies of literature.

5. Sampling techniques and the survey vehicle should be carefully reviewed in order to assess effectiveness in reaching the target group. Data should be collected which enables comparison of actual sample group with intended target group.

6. Goals and hypotheses should be carefully and precisely defined prior to construction of the questionnaire. The data requirements to

test the hypotheses and fulfill the goals should be carefully delineated, and extraneous data collection eliminated.

7. Means of facilitating the coding process should be explored when constructing a questionnaire.

8. Where possible, questions should be constructed in such a way as to lessen the likelihood of missing value responses.

2. Recommendations From the Literature and From Expert Opinion to Enhance Extension Activities

The following recommendations were collected and synthesized from a wide range of publications, letters, and conversations. These recommendations are suggestive but not exhaustive of methods to improve the educational assistance activities of the Cooperative Extension Service.

1. Traditional extension programs have had limited effectiveness in reaching the small, limited resource and part-time farmer. New approaches to identify and reach these producers need to be developed.

2. Lack of motivation hinders the educational process and may be a result of lack of knowledge about the opportunity to participate. Extension programs should increase clientele's knowledge about the opportunity to participate.

3. An effective way to increase the clientele's knowledge about the opportunity to participate is through personal face-to-face contact with extension personnel.

4. In order to extend extension personnel and financial resources and to facilitate two-way communication, para-professional agricultural assistants may be useful.

5. Demonstration is an essential ingredient in convincing clientele of the feasibility and appropriateness of selected improved production practices.

6. Goals other than economic return should be recognized and accommodated. Entire families, rather than head-of-household, should be consulted.

3. Recommendations Pertaining to Motivation and Means of Access

1. On the whole, producers were satisfied with all specified aspects of their beef cow-calf enterprise except economic return. Economic return should be emphasized as a motivational force in analyzing and suggesting improved production practices (although other aspects should not be ignored).

2. More than one-half of the sample population was satisfied with production practices. However, judging from production data gathered from the survey, much more than one-half of the sample group could improve economic return by improving production practices. New alternatives should be presented, and current deficiencies detailed, so that producers may fully understand the choices available to them.

3. The most important motive of the sample group for a beef cow-calf enterprise was that of utilization of relatively fixed resources--land and buildings. Extension should suggest improved production practices in the context of fuller utilization of fixed assets.

4. Another important motive was to earn more income. The economic potential of innovations should be carefully delineated.

5. Extension personnel were the most important source of information of the sample group. More extension personnel in face-to-face situations may increase the adoption rate of improved practices.

6. Magazines, especially the Farm Journal, Progressive Farmer, Successful Farming, and the state farm magazines, reach a wide audience and should be used to disseminate and reemphasize improved production techniques.

7. Areas of need were identified by the sample group. Some of these were too general to receive explicit attention (need more profit) and some were outside the realm of extension (need more capital). However, areas of needed extension efforts could be ascertained including:

a. assistance in obtaining financing--where to go (PCA, FHA, etc), how to prepare financial statements, how to determine debt carrying capacity of enterprise, etc.

b. assistance in developing small-scale, low risk, labor saving technology for part-time producers.

c. assistance in identifying areas where costs could be reduced--especially in feeding management.

d. assistance in designing inexpensive handling facilities appropriate for a small enterprise.

4. Recommendations Pertaining to Production and Marketing Practices

1. Reported calving and weaning percentages were relatively respectable, but can always be improved.

2. Length of breeding season for one-third of the sample group was year around. A controlled breeding season is one of the most elemental management techniques; it results in improved labor and marketing

efficiency, and in more timely arrival of calves. It was one of the most frequently mentioned areas of needed improvement by producers. The advantage of a short breeding season should be explained, and methods of attaining it suggested.

3. It is widely recognized that heterosis from crossbreeding can result in improved vigor and weaning weights in commercial beef cattle. Although the breeds in the F_1 generation are not known, assuming most producers raised their own replacement stock, 81 percent of producers with straight bred cows indicates limited utilization of the crossbreeding management technique. More educational assistance should be given on crossbreeding management, especially as it is low risk and does not require substantial capital outlay.

4. Only 21 percent of pasture grazed in 1974 was improved. Cost of fertilization and reseeding should be compared with increased yields and carrying capacity.

5. Several producers indicated that winter forage management was one aspect of their enterprise that needed improvement. Specific recommendation for winter management of pasture, crop residue, tall fescue, stock piles, and livestock should be disseminated.

6. Small beef cow-calf producers usually have only a limited range of feed resources available. Alternative rations appropriate for different feed resource situations need to be developed and disseminated.

7. Hay was much more commonly used as a roughage than corn silage. If the land is suitable for corn silage production and protein supplement is not too expensive, corn silage may be the more economic roughage

source. The trade-off between corn silage and hay should be explained. Simple break-even formulas or tables with varied supplement prices might be developed.

8. Easy methods of comparing the costs and returns of creep feeding calves should be developed. Grain prices, feeder calf prices, milking levels of cows, and the disposition of the calves should be considered.

9. Especially in small operations, custom hire services may be cheaper than owned equipment services because of high fixed costs. Easy methods of comparing costs and returns of custom hire and ownership should be developed.

10. Less than one-third of the sample group was using borrowed capital. It should be determined whether this is a result of the inaccessibility of credit or a result of the lack of desire to borrow. Advantages and disadvantages of using borrowed capital should be delineated. Assistance in the determination of debt carrying capacity, potential price and yield risk, appropriate repayment period, and the pros and cons of potential credit sources might be useful.

11. Facilities such as fence, holding pens, loading chutes, and head gates were often inadequate, a fact widely recognized in the sample group. Suggestions for low-cost, easy-to-build, simple and small scale facilities should be developed and disseminated.

12. Successful artificial insemination as a breeding tool requires excellent management, and several of the sample group were having difficulties. Risks, costs, and labor requirements should be carefully explained and compared with expected returns.

13. Performance records are an important management tool, and should especially be emphasized as an important decision criteria in selecting bulls.

14. Small producers are often faced with a poor market for their nonuniform and small lots of feeder calves. The structural link between small feeder calf producers and large feeders should be improved, possibly through an increased use of feeder calf sales.

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APPENDICES

APPENDIX A

PROJECT PROPOSAL

DRAFT NO. 1
9/7/73

SPECIAL PROJECT PROPOSAL

MANAGEMENT SYSTEMS FOR SMALL BEEF, (COW-CALF) PRODUCERS

STATES SUBMITTING: Pennsylvania
New York

BY: Harold E. Cranmer
PROJECT LEADER

Thomas B. King
STATE DIRECTOR

Dennis D. Fox
PROJECT LEADER

Donald L. Call
STATE DIRECTOR

DATE OF TRANSMITTAL: _____

MANAGEMENT SYSTEMS FOR SMALL BEEF (COW-CALF) PRODUCERS

JUSTIFICATION

Importance of the Problem

Beef is the United States' number 1 agricultural commodity. Sales of cattle and calves have been nearly double that of any other farm commodity in recent years. Also beef consumption per capita in the United States has increased steadily for many years, from 1962 to 1972 per capita consumption of beef in the United States increased by more than 30 percent (89-116 lbs. per capita). In 1973, beef production has not kept pace with demand and per capita consumption will drop approximately four percent to around 111 lbs. per capita. At the same time prices have increased dramatically and are expected to be up more than 20 percent from 1972.

In order to meet the great demands for beef in this country and for potential customers overseas in the future, it will be necessary to utilize more fully the resources involved in beef production. One set of basic resources used in beef production is the approximately 1.2 million small beef (cow-calf) operations which contain less than 50 cows. Latest available census data indicate that in the United States nearly 90 percent of all beef herds have less than 50 cows and these herds account

for approxaimtely 45 percent of all beef cows in the country. Thus, nearly half of our basic beef production originates from these small herds.

Reasons for Undertaking the Project

The need for expanded beef production is readily apparent. Inasmuch as a considerable proportion of the basic production comes from small herds of less than 50 cows, it is imperative that Extension have a definite program designed to reach this group of producers and help them improve the use of their resources.

Most small beef herds are supplementary to the main source of income for the family. The major source of income may be from off-farm work, retirement income, or other farm enterprises. Also, many farmers keep beef for non-economic reasons. A recent West Virginia study concluded that the use of available forage; satisfaction derived from raising beef cattle; and fewer management problems with beef than other enterprises tended to be more important than expected economic return for many beef producers.

For these reasons, Extension has not always been able to reach the small beef (cow-calf) producer with traditional programs aimed at improving economic return. In short, there has not

been the proper incentive for the small beef producer to take the risk of adopting new technology such as artificial insemination, better forage production, cross breeding, pregnancy testing, etc.

This project will attempt to develop new methods of reaching and motivating the small beef (cow-calf) producer to adopt new technology, improve the use of his resources, and contribute to the development of his rural community.

OBJECTIVES

1. Determine the factors which would motivate small beef herd owners to (a) adopt new technology, (b) improve use of available resources, and (c) consider new marketing techniques that would improve the movement of cattle to market and reduce assembly and transportation costs.

2. Formulate and begin the testing of systems of management (production and marketing) for the beef-cow herds of less than 50 cows. These will be designed to enable producers to improve productivity from available resources by 10 to 20 percent over a five-year period.

3. Develop and test delivery systems for reaching large numbers of producers with the management systems developed.

4. Make available results of pilot tests and materials developed to other States where small herds are a significant factor in beef production (this would include all sections of the country with exception of the Mountain and Pacific States which contain about 18 percent of all beef cows).

PROCEDURES

1. An advisory committee will be selected to serve in helping to develop the details of the project; periodically review the progress of the project; and critique the final report before publication. This advisory committee will be selected from related disciplines within several universities, from various parts of the U.S., industry representatives and ES-USDA.

2. A study will be undertaken to determine what motivates and characterises small beef-cow herd owners. This will include a field survey and the solicitation of expert opinions.

3. Secondary data will be utilized to define logical audiences such as low resource farmers; part-time farmers with non-farm sources of income; and farmers with small beef herds as a supplementary or complementary enterprise to other farm operations.

4. Research will be reviewed to assemble the best available information on beef production and marketing, forage production, etc. From this information management systems will be designed for the small cow-calf operator.

5. The management systems developed will be reviewed by knowledgeable personnel in addition to the advisory committee and, if possible, pretested under actual farm situations.

6. An innovative delivery system will be designed to present this information to the small beef-cow herd owner and secure a high rate of adoption.

7. Test of the delivery system will be conducted among various potential audiences.

8. Appropriate educational materials will be prepared. These will include, but not limited to, (a) a leader's instruction manual, (b) program aid manual, (c) operator's handbook, and (d) slides, cassettes and other appropriate educational devices.

9. A final report on the results of the project and copies of materials will be prepared for use by ES-USDA and for inspection by other States.

10. At an appropriate time a national workshop will be held to acquaint other Extension workers with techniques developed; materials prepared; and results obtained as a result of this pilot project.

EVALUATION

Rate of acceptance of and use of the program and materials by other state extension services and their clientele will be used in short-range evaluation.

The project will ultimately be evaluated by the amount of progress made by producers who have adopted management systems developed through this project. The factors considered will include, but not be limited to, (1) total pounds of beef produced per cow, per farm, per acre, per dollar feed fed, per hour of labor, etc., (2) percent calf crop, (3) net cash returns from the beef enterprise, (4) degree of satisfaction on the part of the producer, and (5) critique by the advisory panel.

PERSONNEL

The administrative contact will be: Dr. Thomas B. King, Associate Dean and Associate Director of Extension Service, Pennsylvania State University, University Park, Pennsylvania.

Project co-leaders will be: Danny Fox, Animal Science Specialist, Department of Animal Science, Cornell University, Ithaca, New York and Virgil Crowley, Farm Management Specialist, Department of Agricultural Economics and Rural Sociology, Pennsylvania State University, University Park, Pennsylvania.

DURATION OF THE PROJECT

The duration of the project will be two years.

BUDGET
(Per Year)

	Cornell	P.S.U.	ES USDA	Total
A. Staff Input				
Six months Ag Economist	$	$ 6,000	$ 6,000	$12,000
Six months Animal Scientist	5,000	1,000	6,000	12,000
Three months Secretarial	800	800	1,600	3,200
One month Agronomist	500	500	1,000	2,000
One month Veterinarian	500	500	1,000	2,000
Six months Graduate Student	1,000	1,000	2,000	4,000
Fringe benefits	600	800		1,400
Total personnel	$ 8,400	$10,600	$17,600	$36,600
B. Computer Use		2,500	2,500	5,000
C. Travel Expenses	500	500	3,000	4,000
D. Supplies	200	200	400	800
E. Publications & Visual Aids			3,000	3,000
Total Direct Costs	$ 9,100	$13,800	$26,500	$49,400
Indirect	$ 5,575	$ 9,075	$	$14,650
TOTAL	$14,675	$22,875	$26,500	$64,050

APPENDIX B

QUESTIONNAIRE

Questionnaire

Beef-Cow and Calf Operations

Section A

1. Name of operator _____ Age _____

2. Address _____

3. Marital status: Married _____ Not Married _____

4. No. of Children at home: 0-6 yrs. age _____ 6-12 yrs. age _____
12-18 yrs. age _____ over 18 _____

5. Operators education (No. of years of schooling completed) circle the number

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

6. Number of years you have lived on this farm _____

7. Total number of years you have had beef cows on this or some other farm _____

8. Was your decision to have a beef cow and calf enterprise primarily the result of: (if more than one applies, please rank (1-2-3) in order of importance)

(1) previous experience _____

(2) suggestions from friends already in the business _____

(3) information from an agricultural advisor _____

(4) your neighbors having beef cow and calf enterprises _____

(5) fulfilling a personal desire _____

(6) you consider farm adapted only to beef cattle _____

(7) a 4-H or FFA project of the children _____

(8) other _____

9. Has the enterprise fulfilled your expectations? (check)

Yes _____ No _____

10. Are you satisfied with the economic returns from beef cattle over the years you've had the enterprise? (check)

Yes _____ No _____

11. Has the project provided personal satisfaction for you and your family? (check)

Yes _____ No _____

12. Has the enterprise provided you and your family with a sense of achievement? (check) Yes _____ No _____

13. Did you select a beef cow and calf enterprise because you desired to: (If more than one applies please rank them 1-2 etc.)

(1) earn more income from the farm _____

(2) utilize land and buildings that were available _____

(3) provide a source of high quality meat _____

(4) utilize family labor and provide an opportunity for relaxation while earning additional income _____

(5) use for income tax advantage _____

(6) keep land cleared _____

14. What is your principal source of information concerning the management of the enterprise? (Rank the 3 most important in order of their use)

(1) feed dealer _____

(2) neighbors _____

(3) friends that have beef cows _____

(4) the county extension agent _____

(5) magazines _____

(6) cattle breeders _____

(7) Breed Association personnel _____

15. Are you satisfied with your present production practices? (check)

Yes _____ No _____

16. If no, what would be of the greatest help to you in improving them?

_____

17. Please list 3 farm publications which you subscribe to and read regularly.

(1)_____ (2)_____ (3)_____

18. Do you receive a Market News Report? (check)

Yes _____ No _____

19. If yes, do you use it as a marketing guide? (check)

Yes _____ No _____

Section B

20. Total acres in your farm operation _____

21. Acres owned _____ Acres rented _____

22. Rent paid per acre for cropland _____ pasture _____

23. Tax per acre on owned land excluding dwelling _____

24. Acres of crops in 1973:

Crops	Owned land	Yield/acre (in bu or T)	Rented land	Yield/acre (in bu or T)
Corn (ear, shelled)				
Small grains (oats, barley, wheat)				
Alfalfa hay				
Mixed hay				
Grass hay				
Corn silage				
Grass silage				
Fertilized & reseeded pasture				
Grasses used: (check)	orchard _____ timothy _____ bluegrass _____ brome _____ tall fescue _____ other _____			
Native pasture				
Grasses used: (check)	orchard _____ timothy _____ bluegrass _____ brome _____ tall fescue _____ other _____			

25. The principal source of farm income is from: (check) grain sales _____ forage (hay) sales _____ swine production _____ sheep _____ poultry _____ beef feeding _____ beef cow and calf enterprise _____ fruit _____ tobacco _____ vegetable _____ other _____

26. Approximate percent of farm income from the cow and calf enterprise.

_____

27. Custom operations hired in 1974. (check)

(1) hay baling _____ Est. cost per bale _____

(2) grain harvest _____ Est. cost per bale _____

(3) silo filling _____ Est. cost per bale _____

(4) corn picking _____ Est. cost per bale _____

(5) hay making _____ Est. cost per bale _____

Section C

28. Number of beef cows over 2 yrs. of age on farm _____

29. Number of beef heifers 12-24 months of age on farm _____

30. Number of beef steers 12-24 months of age on farm _____

31. Number of bulls on farm _____

32. Number of beef cows bull turned in with in 1974 _____

33. Number of calves born from these cows _____

34. Number of these calves weaned _____

35. Number of cows that died in 1974 _____

36. Is the number of beef cows on the farm presently greater than was on hand in 1971: (check) _____ same _____ less than _____ greater than

37. If less than, or greater than - why? _____

_____

_____

38. The calves from the beef herd are sold as:

	Wt. at selling	Age in mo.	Price received per cwt 1973	Price received per cwt 1974
feeder steer calves	_____	_____	_____	
feeder heifer calves	_____	_____	_____	
yearling feeders	_____	_____	_____	
slaughter cattle	_____	_____	_____	
a. steers	_____	_____	_____	
b. heifers	_____	_____	_____	

39. The beef calves are sold: (check)

(1) at the local auction sale ____

(2) a feeder calf sale ____

(3) to a livestock dealer ____

(4) at a central livestock market ____

(5) to a farmer feeder ____

(6) other (please specify) ____

40. Are calves creep fed? Yes ____ No ____ (check)

41. Purchased feed fed to beef cows and calves in 1974:

Feed	Amount	Cost per unit	Total $ Value
Corn (ear or shelled)	____(cwt)	____	____
Small grain (oats, barley, wheat)	____(cwt)	____	____
Hay	____(cwt)	____	____
Protein supplement	____(cwt)	____	____
Minerals	____(cwt)	____	____
Salt	____(cwt)	____	____
____	____(cwt)	____	____

42. Raised feed fed to beef cows and calves in 1974:

Feed	Amount (Est.)	Total $ Value
Mixed hay	____	____
Alfalfa hay	____	____
Grass hay	____	____
Corn silage	____	____
Grass silage	____	____
Corn	____	____
Oats	____	____
Barley	____	____
Wheat	____	____

43. Acres of native pasture used by the beef cow and calf enterprise in 1974 _____ 1973 _____

44. Acres of fertilized and reseeded pasture used by the beef cow and calf enterprise in 1974 _____ in 1973 _____

45. What fertilizer materials were used and what was the cost per acre? _____

_____

46. Acres of crop residue used for beef cow enterprise in 1974 _____. (Include small grain stubble, aftermath from hay, corn stalks)

47. Veterinary and drug expenses for the beef cow and calf enterprise for 1973 ____.

48. Are the breeding animals (cows and bulls) insured? (check) Yes _____ No _____

49. Value of buildings and equipment used only for the beef cow and calf enterprise.

	Original cost	Age	Annual depreciation
buildings			
equipment			
machinery			

50. Marketing costs:

	Hauling costs		Commission	Other
	Own truck	Hired		
calves				
yearlings				
slaughter cattle				
cull cows				
breeding stock				

51. Do you use artificial breeding for beef herd? Yes _____ No _____

52. What breed of cows make up the cow herd: _____

53. What breed of bull is used? _____

54. What is the length of your breeding season: 60 days _____ 90 days _____ 120 days _____ All year _____

55. What do you consider when selecting your herd bull/bulls? (rank in order of importance)

(1) reputation of breeder _____

(2) conformation _____

(3) performance record _____

(4) size _____

(5) pedigree _____

(6) cost _____

(7) breed _____

(8) other _____

56. When do most of your cows calve? Mar. Apr. May _____ June July Aug. _____

Sept. Oct. Nov. _____ Dec. Jan. Feb. _____

57. What did you pay for your last bull? _____

58. Where do you purchase your bulls: (check)

(1) Purebred breeder _____

(2) Local auction _____

(3) Registered breed sales _____

(4) Bull Testing Station Sales _____

(5) Other _____

59. Age at which heifers calve for first time _____

60. Estimated monthly hours of labor required for the beef cow and calf enterprise exclusive of crops during:

(1) the spring quarter (Mar. Apr. May) _____

(2) the summer quarter (June July Aug.) _____

(3) the fall quarter (Sept. Oct. Nov.) _____

(4) the winter quarter (Dec. Jan. Feb.) _____

61. Shelter is provided for the beef cow herd during winter _____

summer _____ year around _____ no shelter _____

62. Do you use winter pasture including field stored hay (round bales or stacks)

(check) Yes _____ No _____

63. Approximately how many miles of fence are used for the beef cow and calf enterprise:

Fencing material	Miles	Original cost	Est. annual repair cost
barbed wire	_____	_____	_____
woven wire & 2 strands barbed wire	_____	_____	_____
board fence	_____	_____	_____
electric fence	_____	_____	_____

64. Are special facilities available for handling cows and calves when sorting, marketing and treating for disease, etc. Yes _____ No _____

If yes, do the special facilities include: (check) (1) loading chute _____ (2) scales _____ (3) holding pen _____ (4) catching chute with headgate _____ (5) cutting gates _____

65. Is hay stored in barns? Yes _____ No _____

66. How is hay fed? (check) in hayrack in barn _____ in hayracks outside _____ on the ground _____ in feed bunks outside _____ round bales in field _____

67. Is borrowed capital used in the beef cow-calf enterprise? Yes _____ No _____

If yes, what is your principal credit source. (check)

(1) commercial bank _____
(2) Production Credit Assn. _____
(3) Farmers Home Administration _____
(4) individuals _____
(5) other (please specify) _____

68. What factors, if any, prevent expansion of the beef cow-calf enterprise?

_____

_____

69. Would you recommend a beef cow-calf enterprise to a beginning farmer in your area? (check) Yes _____ No _____

APPENDIX C

ASSUMPTIONS USED AND PROBLEMS ENCOUNTERED IN CODING AND PROCESSING SURVEY RESULTS

APPENDIX C

Assumptions Used and Problems Encountered In Coding and Processing Survey Results

The following information gives the details of the assumptions, problems, precoding screening checks, postcoding consistency and error checks, and aggregating procedures used in the analysis of the data. Also discussed are the reasons for the elimination of certain questions from the text. Pertinent facts discussed in the text will not be repeated here--only supplementary information is provided. This appendix is organized with reference to the questions as numbered in the questionnaire, found in Appendix B. Key words also identify each question which is discussed.

Blanks, or missing values were not incorporated into the statistics and for some numeric variables (identified in the discussion) zero values were not averaged in the statistics.

(1) Operator

If the operation was a partnership, personal characterization questions were left blank, unless a major partner could be identified.

(4) Children

The questionnaire asked for the number of children in each of four age categories. There were a large number of missing values, and many checked rather than quantified the individuals in each age category. If the purpose of the question was to determine labor availability it was hampered by the aggregation of the sexes of the children. Because of these problems, the results of the question were not reported.

(5) Education

It is probable that many respondents circled the age at which they finished school rather than their years of education. The calculated average years of education was over 14 years, a figure so improbably high that it was not reported in the text of this paper.

(6) Years on Farm

If the respondent indicated that he/she worked on the farm for X years, but live elsewhere, a zero value was assigned to the question. An error consistency check was ran to make sure that no one lived on the farm more than they were old.

(7) Years with Beef

An error-consistency check was made to make sure that no one had beef cattle for more years than they were old.

(8) Decision for Enterprise

If the respondent checked rather than numbered more than one choice, with no indication of ranking, then those spaces were assigned missing values and those spaces that were left blank were assigned a zero value. Aggregation of the different ranks was as follows: A weight of 8 was multiplied by the frequency of the "1" ranking. A weight of 7 was multiplied by the frequency of the "2" ranking. This was done with each value, so that a weight of 1 was multiplied by the frequency of the "8" rank (the smallest possible). The weighted frequencies were then summed and compared with the summed weighted frequencies of the other selections, so that an ordinal ranking was obtained.

(13) Selection of Enterprise

The same aggregation technique was used as described in question 8 of this appendix. However, the maximum weight was six rather than eight.

(14) Source of Information

The same aggregation technique was used as described in question 8 of this appendix. However, the maximum weight was seven rather than eight.

(17) Publications

If more than three publications were listed, the first three were recorded, and the remainder ignored. If less than three publications were listed, it was ssumed that the respondent read only one or two journals, and zero value(s) assigned to the extra space(s).

(18 and 19) Market News Report

The questions were eliminated because of ambiguity. Market News Reports could refer to radio and newspaper reports, as well to publications specifically designed to assist farmers in marketing management.

(20 and 21) Owned, Rented, and Total Acres

Many respondents gave inconsistent answers to these questions. The following were common discrepencies and arbitrary corrections.

a) If owned acres and total acres were the same, but rented acres were also reported, total acres were coded as the sum of rented and owned acres rather than as reported.

b) If owned acres were more than total acres, all values were coded as given on the assumption that some owned acres were rented out.

c) If one of the three questions were not answered, the probable answer was calculated from the other two responses and coded. If two of the three questions were not answered, only the given value was coded.

(22) Rent

If no values were given, but land was rented, then all values were left blank. If no land was rented, then the cash-rent columns were assigned "0" values.

(23) Tax

If tax was a large dollar value and division of this value by total owned acres yielded a reasonable per acre tax charge, then this smaller value was coded (on the assumption that the taxes on dwellings were not included in the lump sum figure.)

(24) Crops

If no land was rented, all rented land spaces, including rented pasture spaces, were assigned a "0" value. The same applied if no land was owned. If more than one small grain was indicated, and the yield was specified for each, a weighted average was calculated. Pasture acres, as determined by this question, are not reported because of their inconsistency with questions 43 and 44.

(25 and 26) Major Enterprise

If the percent of farm income from the cow-calf enterprise was 50 percent or more, then the beef cow and calf code was recorded despite what was given. If the respondent checked more than one category, and the above was not true, then the source columns were left blank.

(27) Custom Hire

If the first part of each category was affirmative, a "1" or "yes" value was assigned. The affirmative could be indicated by a check, a "yes," or by a value in the second part of the category.

The negative code, "2", was appropriate when "none" was indicated for the entire section, or for individual categories. The negative was also assumed for those categories which were left blank in the midst of affirmative categories. An error checking computer program was run on the coded data to make sure that the first and second parts of each question were consistent. Boundary checks were placed on cost data. Hay baling costs of more than $.75 per bale, grain harvest costs of more than $20 per acre, silo filling charges of more than $50 per acre, and corn picking cost of more than $25 an acre were reassigned as "missing values." A minimum boundary of $15 per acre was placed on hay making charge per acre.

(31) Bulls

If breeding bulls and bulls intended for slaughter could not be clearly distinguished, the appropriate columns were assigned a "missing value." A boundary check was placed on this data so that if "cows/bulls" was greater than 40, a "missing value" response was reassigned. If number of bulls were more than two and "cows/bulls" were less than 8, a "missing value" was assigned.

(38) Marketed Animals

If the age of either feeder steer calves or feeder heifer calves was given as more than 10 months, then they were aggregated if necessary, and placed in the yearling feeder category. Conversely, if the age of yearling feeders was given as 10 months or less, missing values were assigned to the calf columns, and "0" to the yearling columns. If feeder steer calves and feeder heifer calves were lumped together, then all values for both categories were assigned missing values. If slaughter steers and slaughter heifers were

aggregated, the result was recorded in the "slaughter cattle" columns. If cull cows were sold, they were recorded in the "slaughter cattle" columns. In many cases it was obvious that not all sold animals were recorded. For instance, in many cases, no females were sold, but herd size did not increase. Perhaps cull and breeding categories should have been explicit. The question is such that some respondents may have answered it as, "In general, I usually sell. . . " rather than, "In 1974, I sold. . . . ."

An indicator of the percent of respondents marketing at least some of each type of animal was calculated. For each type of animal in each breakout, the sample size of the weight variable (zero values excluded) was divided by the sample size of the weight variable (zero values included).

(41) Purchased Feed

Boundary checks were placed on the cost figures. If prices fell outside the boundaries, units were reconsidered and "missing values" assigned:

1) If price of corn per cwt. was more than $6.30 or less than $2.70.
2) If price of hay per cwt. was more than $5.00 or less than $ .80.
3) If price of supplement per cwt. was more than $20.00 or less than $1.00.
4) If price of mineral per cwt. was more than $15.00 or less than $3.00
5) If price of salt or mineralized salt per cwt. was more than $8.00 or less than $1.50.

(42) Raised Feed

Boundary checks were placed on cost figures. If prices fell outside the boundaries, units were reconsidered and "missing values" assigned:

1) If the value of mixed hay per ton was more than $75.00 or less than $15.00.
2) If the value of alfalfa hay per ton was more than $100.00 or less than $15.00.
3) If the value of grass hay per ton was more than $75.00 or less than $15.00.
4) If the value of corn silage per ton was more than $50.00 or less than $10.00.
5) If the value of grass silage per ton was more than $40.00 or less than $7.00.
6) If the value of corn per bushel was more than $3.50 or less than $1.50.
7) If the value of oats per bushel was more than $2.00 or less than $ .90.
8) If the value of barley per bushel was more than $5.00 or less than $2.00.
9) If the value of wheat per bushel was more than $5.00 or less than $2.00 per bushel.

(43 and 44) Pasture

A boundary check was made on the data. If "(1974 Native Pasture + 1974 Improved Pasture)/cows" was more than 15 acres/cow or less than one acre/cow, "missing values" were reassigned to the pasture columns.

A consistency check was made comparing the 1973 data with the pasture information obtained from question 24. If "Improved Owned Pasture Acres + Improved Rented Pasture Acres" was less then "Improved 1973 Pasture Acres Used by Beef Cow and Calf Enterprise" an error message was printed by the computer. If "Native Owned Pasture Acres + Native Rented Pasture Acres" was less than "Native 1973 Pasture Acres Used by Beef Cow and Calf Enterprise" an error message was printed by the computer. A total of 139 error messages were given. Because of the large number of error messages, it was decided to eliminate the pasture information collected in question 24. It was the subjective opinion of the researcher that the data of questions 43 and 44 were much more complete and accurate than the data of question 24.

(45) Fertilizer

A boundary check was placed on the cost per acre data. If the cost was more than $25.00, a "missing value" was assigned. Consistency checks compared the data of question 44 and question 45. If fertilizer data was given and zero improved pasture acres were recorded, then the fertilizer columns were reassigned "missing values." The same was done if it was reported that no fertilizer was used, but improved pasture acres were reported. If more than one type of fertilizer was mentioned, a rough composite was estimated and recorded. If cost per pound was given, and no application rates were given, the cost columns were assigned missing values. If application rates were given, cost per acre was calculated and recorded. If the cost of lime was aggregated with the cost of fertilizer, the entire cost figure was ignored.

(49) Buildings, Equipment and Machinery

An attempt was made to code only the actual age of buildings, machinery, and equipment. Arbitrary rules were established to screen out those who gave expected life (as in a depreciation schedule). If "original cost/annual depreciation" was more than age, the age figure was given. If it was less than or equal to reported age, age was assigned a "missing value." If annual depreciation was reported as zero, age was coded as given. If annual depreciation or original cost was not reported, age was not recorded (unless age was more than 30 years).

(50) Marketing Costs

No units were specified in this question, and few respondents bothered to supply them. No aggregation was possible without a common unit, and therefore the question was discarded. For each type of animal a single column code was assigned for the type of transportation. Commission and "other" information was ignored when given (which was very infrequently).

(52 and 53) Breeds

It was often difficult to distinguish between crossbreds and straightbreds. "Hereford and Angus" was interpreted as two different breeds. "Hereford Angus" was interpreted as one breed. "Hereford Angus" was interpreted as two breeds. "Hereford-Angus" was interpreted as one breed. The results are obviously somewhat arbitrary.

(55) Selection of Bulls

The aggregation technique used in this question was that described in question 8 of this appendix.

(56) Calving Season

If two out of the three months were specified for any category, then the code for that category was assigned. If the different categories were ranked, then that category with the heaviest weight was recorded.

(57) Price of Bull

If the operator indicated that he/she borrowed a bull from the neighbor, or rented one, the price columns were assigned a missing value. If the operator raised his/her own bull, then a "0" value was assigned.

(60) Labor

Boundary checks were placed on this data. The labor hours in each season were divided by number of cows to obtain "labor per cow per month" for each season. The maximum boundary was 3.3 hours per month in the spring, summer, and fall and 5 hours per month in the winter. The minimum boundary was .5 hours per month for all four seasons. Of the approximately 1,800 items of coded labor data, approximately 600 error messages were printed by the computer. It was obvious that many respondents misinterpreted the question, and therefore no analysis was done on the labor data.

(66) Method of Feeding

See question 62 of this appendix.