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1994 Wisconsin Grazing Dairy Farm Survey Report

An Overview Of Management Intensive Rotational Grazing In Wisconsin
September 30, 1999

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1994 Wisconsin Grazing Dairy Farm Survey Report

An Overview of Intensive Rotational Grazing in Wisconsin

Executive Summary

As a group, respondents to this survey (hereafter referred to as the Center for Dairy Profitability or CDP survey for ease of discussion) were positive about their choice of grazing as a strategy to participate in the Wisconsin dairy industry in the future. 99.3% indicated they would continue to graze.

From 560 graziers identified by County Agricultural Agents across WI, 146 (26%) usable responses were received from a mailed detailed questionnaire aimed at identifying production practices and characteristics of WI graziers in order to help farm families and those who work with farm families to evaluate the suitability of grazing as a dairy management system in WI. Collected data was from the year 1994.

While the CDP survey did not compile data from conventional confinement WI dairy farms, comparisons can be made to more conventional operations thanks to other studies. This is especially true for the study "Grazing in Dairyland" which is the title of Technical Report #5 from the Agricultural Technology and Family Farm Institute (ATFFI) of the University of Wisconsin, (now known as the Program on Agricultural Technology Studies or PATS). "Grazing in Dairyland" did survey several kinds of graziers plus conventional WI dairy farms. It categorized the 1675 responders into four categories: 1) confinement, 2) non-intensive graziers, 3) semi-intensive graziers, and 4) fully intensive graziers. Given the size of the average confinement herd in the study, it is probably fair to say that they are "traditional confinement" rather than "large modern confinement" farms.[1]

The average respondent to the CDP survey met the ATFFI definition of fully intensive grazier (moving the herd at least once per week). Comparisons are also made to data from a 1994 survey of 29 Minnesota graziers as reported in the University of Minnesota bulletin BU-6693-S titled "Knee Deep in Grazing" and to a 1997 survey of 874 Pennsylvania graziers.[2, 3]

It's not clear whether or not the average respondent to the CDP survey represents the typical WI dairy grazier or not. Their responses indicate many interesting similarities and differences with WI dairy farms in general. In terms of farmer characteristics, the average responder was younger, had more formal education, and was less likely to be operating a farm that had been operated by their parents than is the case for confinement farms. Yet, respondents are much more likely to own their land than is the case for the typical WI dairy farm.

The average respondent had been grazing for seven years and was likely to have farmed prior to grazing.

The data suggests that the typical respondent began with an investment structure intended for a confinement dairy. Switching from the investment structure of a confinement dairy to a grazing dairy would be expected to reduce the profitability of the operation during the early grazing years before the transition is complete. The main characteristic that the typical respondent has in common with graziers in New Zealand is the main characteristic that makes the typical respondent different from a traditional Wisconsin dairy farm. This characteristic is the harvesting of a significant amount of the forage needs by grazing.

In terms of labor, the CDP survey indicated that a typical "family size" grazing operation could fully employ at least two people. Respondents also reported working fewer hours per cow than any type of grazier or confinement farm in the ATFFI survey.

In terms of farm type, the average respondent was similar in business organization (sole proprietorship), had a few more cows and derived a higher percent of their income from milk sales compared to the average WI dairy farm.

In terms of land, a high percent of respondents own a high percent of the land they graze. Much of the land grazed by respondents could be quite productive in other cropping systems.

Comparing dairy herd management practices to the average WI dairy farm, respondents have a few more cows which are likely to be Holsteins but are a bit more inclined to show an interest in other breeds – especially Jersey and Brown Swiss. They use artificial insemination extensively although its not clear whether they use A.I. more or less than confinement dairy farmers do.

More of them are seasonal (milking facility completely shut down at least one day per year) in calving strategy but not as many as people might guess (14.1%).

They are a bit more likely to use a stanchion barn and milk twice each day, with about four out of five using stanchion barns for milking and housing cattle and almost all milking twice per day.

Most respondents graze about seven months beginning in April or May and continuing into October or November. They are likely to move this herd daily. 78% graze the milking herd separate from the other livestock and about half supply water in paddocks. Respondents to a Minnesota survey reported just a slightly narrower grazing season ("Knee Deep in Grazing"). [4]

Respondents are a bit less likely to provide protein and mechanically harvested forage than conventional farms but are nearly as likely to provide some grain, vitamins and minerals during the pasture season. The CDP survey did not attempt to determine the quantity of feed supplementation.

A majority of respondents indicate what most of them would consider to be a desirable change in five of the eight operational factors listed. These include herd health, grazed land crop quality, and family free time each of which increased and total labor requirements that decreased. The fifth one, grazed land crop yields was reported to increase by exactly half but an additional 27% indicated no change with 18.8% unsure and 4.3% that reported a decrease.

The remaining three factors, require more individual interpretation (see page 23).

In eight categories of operating costs, the number of respondents reporting decreases easily outnumber those reporting increases. Therefore the average respondent reports reduced operating costs since converting to grazing.

More respondents reported a decrease in pounds of milk per cow (29%) than an increase (22.5%). However, when combined with the percent that reported no change (39.1%) , 61.6% indicated a per cow production level as high or higher since starting to graze.

When asked to quantify milk production levels, respondents report production levels per cow that could average as much as 27% lower to about equal to the state average.

Almost half of the herds either increased in size (48.6%) or stayed the same size (47.8%) while barely more than 2% decreased in the number of cows.
The above changes were not correlated with any changes in cow numbers. However, since almost half of the respondents indicated an increase in herd size, it is likely that the reported reduced costs resulted from factors other than size.

It must be remembered that for any of the above results to be considered desirable, they need to contribute to the goals of the farm families, most of whom probably would like increased profitability from the application of fewer resources. One must also remember that cutting a cost doesn't help achieve those goals if income is cut by a greater amount as a result of the cost cut. The reverse is equally true. Increasing cow numbers or production doesn't automatically increase profitability.

Fully and semi-intensive graziers in the ATFFI study received more dollars of net farm income from operations per cow (NFIFO/cow), than confinement farms in the same study. Since the graziers in the CDP study were more labor efficient and generated more income per cow than the fully intensive graziers in the ATFFI study, they probably also had more dollars of NFIFO per cow than the ATFFI confinement farms.

In the combined answers to several questions about the financial impact of the use of the grazing system, a majority of respondents reported financial benefits from grazing.

Respondents have spent $3.41 in equipment purchases for every dollar of equipment sales since starting to graze but the average purchase amount has been rather small.

Respondents report using as much as 80% of the forage storage capacity available on their farms, raising some questions about what percent of their herds' needs are really being met by pasture. Overall, the average respondent appears to be using items (silos, barns etc) on their farms left over from confinement systems for the needs of their herds that aren't met via pasture. The average respondent appears to find that these assets can make valuable contributions to their financial success. Some, but not all, of those graziers paid little or nothing for some of these assets that "came with their farm."

The average respondent reports positive results in all categories of operating costs, dollars of milk sold per cow and satisfaction since switching to grazing. The data is not adequate to measure the impact any more precisely than this.

The five most important motivators in persuading respondents to graze were, in order of importance, the desire to reduce total labor required, increase profits, decrease costs, following one's own intuition, and personal preference. Interestingly, none of the 18 factors listed in the survey were ranked unimportant.

The five most influential tools used in making grazing management decisions were financial accounting records, dairy herd reproductive records, dairy herd health records, dairy ration balancing/analysis records, and financial management analysis records.

The three most important human influences listed in order as being most important in making grazing management decisions were grazier's networks, family, and other farmers. Next in importance were veterinarians and UWEX Agricultural Agents.

All other people, motivators, and tools were less important than the top five listed above in influencing management decisions.

Introduction

- What is **Management Intensive** rotational grazing (MIRG)?
- Why is there so much interest in it now?
- Is MIRG a profitable option for Wisconsin farms?

What is Management Intensive Rotational Grazing?

In order to characterize the prevalence and characteristics of MIRG dairy operations in Wisconsin, it is essential to offer a precise definition of what we mean by "management intensive rotational grazing." To begin with, most observers agree that MIRG operations can be usefully contrasted with the "confinement" system of dairying that characterizes most of the industry in Wisconsin and the rest of the United States. On confinement operations, the farmer typically mechanically cultivates, harvest, and delivers feed (usually hay, small grains, and corn) to a herd of dairy cattle that is kept in a relatively confined area (usually a barn and/or accompanying barnyard), and then mechanically returns their manure to the fields. By contrast, during the grazing months (in Wisconsin, late April or May through November), MIRG operations typically have their dairy herd out in improved pastures between milkings to harvest their own forage and, in effect, spread almost all of their own manure (Costello and Splett, 1996; Costello et al., 1996). Depending on the extent of MIRG adoption, pasture grasses and legumes can become the principal components of the milking herd's feed intake during the grazing season, while the mechanized production, harvest, and storage of feed and forage becomes less central to the operation.

While grazing operations all rely more heavily on pastures than do confinement operations, not all dairy farmers who put their cows out on pasture should be considered to be management intensive rotational graziers (Murphy and Kunkel, 1993; Pogue, 1987). For example, many Wisconsin dairy farmers turn their cows out into a large field between milkings during the summer months, but do not rely heavily on the forages cows might consume on non-managed pasture when calculating feeding rations. For many farmers of this type, pastures often amount to little more than large exercise lots where cows can go to get out of the barn when weather permits. Indeed, over a quarter of Wisconsin farmland consists of pastures, but the vast majority of these pastures are not intensively managed and are thus under utilized (Undersander et al., 1991).

How then to distinguish these casual graziers from the more intensive MIRG operations? Under MIRG, the principal management challenge becomes that of maximizing the nutritional intake obtained by the herd per acre of pasture. This is accomplished by *rapidly rotating groups of livestock among relatively small sections of subdivided pastures*. Undersander, et al. explain:

> Under rotational grazing, only one section of pasture is grazed at a time while the remainder of the pasture "rests." To accomplish this, pastures are subdivided into smaller areas (often referred to as paddocks) and livestock are moved from one paddock to another...For rotational grazing to be successful, the timing of rotations must be adjusted to the growth stages of the forage…
>
> *Intensive rotational grazing* involves a higher level of management with greater paddock numbers, shorter grazing periods, and longer rest periods. Generally, the more intense the management, the greater the livestock production per acre (1991:2; emphasis in original).

The term MIRG in this paper refers to several types of grazing systems including: Rotational grazing, intensive rotational grazing, intensive grazing, strip grazing, voisin grazing, controlled grazing, top grazing and mob grazing.[5]

The seasonal calving strategy is an independent practice that is used extensively in combination with MIRG in New Zealand and in some other places, but not so extensively in other places, such as Wisconsin and Argentina. In this paper, a herd is not considered seasonal unless the dry period of all the cows in the herd overlap enough to shut down the milking facility for more than a day and preferably for at least a few weeks. Defined as semi-seasonal are those herds that make a serious attempt to "bunch" their calving to one or two times of the year, but don't sacrifice healthy, highly productive animals that don't quite fit that mold. A semi-seasonal calving herd not only "bunches" calving, but also milks at least one cow every day of the year (and many more on most days). Semi-seasonal and year-round calving herds are sometimes collectively referred to as non-seasonal.

Why is there so Much Interest in it now?

Changes in the structure of the Wisconsin dairy industry are occurring due to the demands of increasing costs of producing milk while milk prices become more volatile in an apparent downward trend (at least in real dollars). To compensate for these trends, herds are becoming more specialized in practices and are matching methods of dairying to family and business preferences and goals. Grazing is a system of dairying which can, under good management conditions, decrease capital investment and input costs and thereby decrease the total cost of producing milk. Total confinement systems are another method to pursue the same goals. The goal of both methods is to decrease fixed and variable costs per unit of production while maintaining or increasing milk volume and components. Total confinement tends to be more capital and labor intensive compared with grazing systems and may require a willingness to acquire more debt and often increase herd size. Cow numbers can be increased with either type of system to decrease costs on a cow or per hundredweight basis. Both systems of dairying are important methods of producing milk profitably. The expectations of a more satisfying lifestyle and of providing economic success without enormous capital investment has advanced MIRG in Wisconsin from a novelty to a system that is gaining in popularity.

It is important for educators and researchers to understand the specialized needs of dairy producers regardless of system type. This is necessary so we can better satisfy their educational needs and develop research programs to better target and satisfy the needs of each group of farmers. It is also important to identify differences and similarities between farmers with different methods of doing business (for example, those farmers who use MIRG practices but differ in calving strategy).

Is MIRG a Profitable Option for Wisconsin Dairy Farms?

There are far too many farmers elsewhere and in Wisconsin who have practiced MIRG for too long to dismiss it as a fad or hobby. Several economic analyses in several states (including Wisconsin) have shown MIRG to be economically viable.[6]

Description of Rotational Grazing Study

Objectives

The aim of the CDP survey was to collect information on production practices used by those dairy producers practicing rotational grazing. This information will lead to enhancement of existing research and educational programs targeted to help this particular group of farm families achieve their goals.

Methods and Response Rate

A survey instrument was sent out to 560 dairy farmers in the state of Wisconsin in early 1995 to gather 1994 data. 220 surveys were returned. Of those surveys returned, 146 or approximately 26% of the 560 survey recipients were grazing a dairy herd to some extent. Therefore, useable responses were obtained from about 26% of the surveys that were sent.

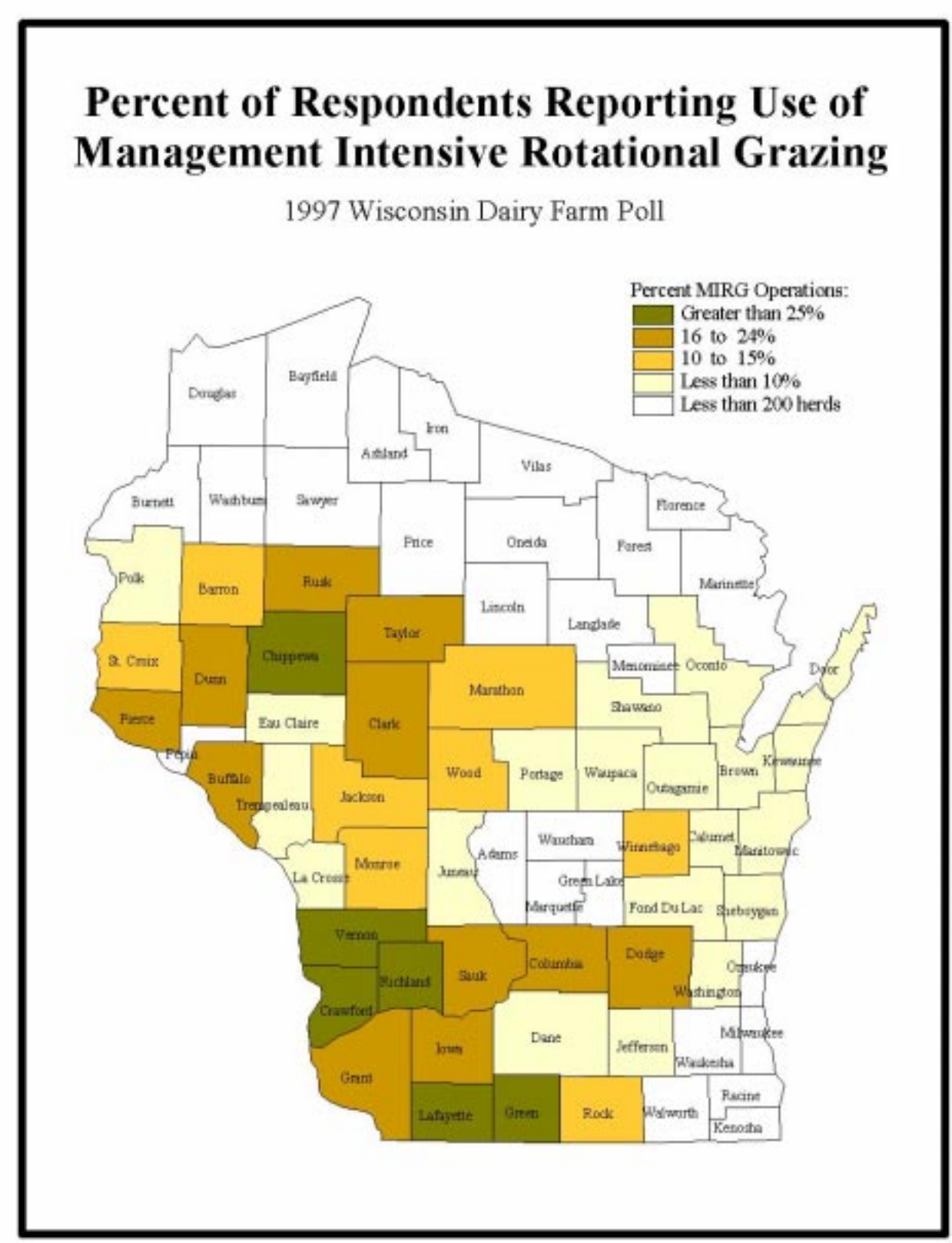
The CDP survey was not strictly a random survey as the target audience was primarily graziers. To get a large enough sample size it was necessary to target as many individuals from the grazier group as possible. Wisconsin County Extension Agricultural Agents, the Soil Conservation Service (now known as the Natural Resource Conservation Service or NRCS) and Grazier Networks all helped identify graziers. Their help is greatly appreciated. Frequency and distribution patterns were determined from graziers across specific areas of interest. The CDP survey was segregated into specific interest areas relating to the diversity of those farms and farmers practicing some type of rotational grazing in their dairy operations.

While the CDP survey did not compile data from conventional confinement WI dairy farms, comparisons can be made to more conventional operations thanks to other studies. This is especially true for the study "Grazing in Dairyland" which is the title of Technical Report #5 from the Agricultural Technology and Family Farm Institute (ATFFI) of the University of Wisconsin, (now known as the Program on Agricultural Technology Studies or PATS). "Grazing in Dairyland" did survey several kinds of graziers plus conventional WI dairy farms. It categorized the 1675 responders into four categories: 1) confinement (n=903), 2) non-intensive graziers (n=556), 3) semi-intensive graziers (n=81), and 4) fully intensive graziers (n=114). Given the size of the average confinement herd in the study, it is probably fair to say that they are "traditional confinement" rather than "large modern confinement" farms.[7]

The average responder to the CDP survey met the ATFFI definition of a fully intensive grazier (moving the herd at least once per week). Comparisons are also made to data from a 1994 survey of 29 Minnesota graziers as reported in the University of Minnesota bulletin BU-6693-S titled "Knee Deep in Grazing" and to a 1997 survey of 874 Pennsylvania graziers.[8, 9]

The CDP survey did not attempt to estimate the percent of Wisconsin dairy farms that are practicing MIRG or any other kind of grazing. However, the ATFFI study estimated that roughly 7 percent of Wisconsin farms were practicing MIRG in 1992 which increased to roughly 14 percent in 1994.

The ATTFI study also identified those Wisconsin counties with the highest percent of dairy farms that are grazing. These are shown in a map in figure 1 below which is reproduced from a 1997 update of figure 4.2 in "Grazing in Dairyland."



The 20 counties with less than 200 herds were not included in this ranking.

Grazing Survey Respondents By County

Its interesting to notice that there were no responders to the CDP survey from the following counties which are reported as being above average in graziers as a percent of all dairy herds in Figure 1 above: Columbia, Green, Lafayette, and Vernon. Three other counties with an above average percent of graziers produced only two or less respondents. These counties are Buffalo, Chippewa, and Richland.

Survey Information

Results from the grazing survey are categorized in the following areas:

A. Types of Farmers Grazing Dairy Cows
B. Labor Amounts and Sources
C. Types of Farms with Dairy Cows Grazing
D. Land and Land Tenure Characteristics
E. Combining and Comparing Some Grazier and Farmer Characteristics
F. Herd Management Practices (Other than Feeding)
G. How Grazing and Feeding Practices Vary Among Farmers
H. Harvesting, Storage, and Feeding System Used
I. Respondents Experiences with Grazing (On-farm Measures)
J. Financial Impact of Grazing
K. Factors Influencing Graziers Decisions
L. Goals with Respect to Grazing Systems

A. Types of Farmers Grazing Dairy Cows

On the average, respondents were younger (41.8 vs. 46.4 years old) and had more formal education (65.5% vs. 42.2% educated beyond high school) than reported for operators of Wisconsin confinement dairy farms in the 1995 survey conducted by the Agricultural Technology and Family Farm Institute (ATFFI) of the University of Wisconsin.

Graziers were asked how many years of combined dairy farm experience were possessed by their management team. Because the question was asked this way, it is difficult to conclude much about the experience level of the primary manager. However, since responders have grazed an average of seven years, have an average of 26 total combined years grazing experience, and less than half reported more than two operator/managers and/or household members contributing management or labor, this suggests that the average responder has been dairy farming as much as twice as long as they have practiced MIRG. The data doesn't indicate whether or not all the years of farming experience included years of growing up and working on the farm of parents in a non-management role. **This data also suggests that the typical respondent began with an investment structure intended for a confinement dairy. Switching from the investment structure of a confinement dairy to a grazing dairy would be expected to reduce the profitability of the operation during the early grazing years before the transition is complete.** The main characteristic that the typical respondent has in common with graziers in New Zealand is the main characteristic that makes the typical respondent different from a traditional Wisconsin dairy farm. **This characteristic is the harvesting of a significant amount of the forage needs by grazing**. Fully intensive graziers and confinement operators in the ATFFI study report having 21.2 and 22.2 years of farming experience, respectively.[10]

The 1993 ATFFI survey also reported that a higher percent of confinement operators purchased land from a relative (49.1% vs. 25.4%).

Probably as high or higher percent of them had non-farm income (wages?). 53% of the respondents in this study reported having non-farm income. 47.4% of the fully intensive graziers and 38.2% of confinement operators in the ATFFI studies reported that either the operator, spouse, or both work off-farm. Technically, interest from a personal savings account is non-farm income. It isn't known if responders to this study included such sources in addition to non-farm wages or not. Most probably didn't, but the fact the some might have, raises questions about this measure.[11]

The percent of single family operations was similar between the two types of operations in both studies.

While in another section of the survey, respondents report lower labor costs and more family time due to grazing, the number of reported hours suggest that they still have plenty of work to do.

Table 1. Farmer Characteristics

	CDP STUDY	**ATTFI STUDY** [12]	
	Fully Intensive Grazier	**Fully Intensive Grazier**	**Confinement**
1. Average years of grazing	7	na	na
2. Total years of combined experience among the management team	26 years	na	na
3. % single household operations	86%	na	na
4a. % with non-farm income	53%	na	na
4b. Operator or spouse works non-farm job (1995)	na	47.4%	38.2%
5a. Average age of primary manager (1993)	na	46.7%	48.1%
5b. Average age of primary manager (1995)	41.8	46.7	46.4
5c. Average age of secondary manager	38.2	na	na
5d. Average age of tertiary manager	32.7	na	na
6a. % of primary managers with education beyond high school (1995)	65.5%	29.5 %	42.2%
6b. % of secondary managers with education beyond high school	66.6%	na	na
7. Purchased farm from relative (1993)	na	25.4%	49.1%

Table 2. Frequency of Education Level among Managers and Their Ages

Education Level	**Manager 1** (n=145) (%)	**Manager 2** (n=54) (%)	**Manager 3** (n=9) (%)
No High School Degree	12.4	7.4	22.2
High School Degree	22.1	25.9	11.1
Technical School	24.1	18.5	33.3
Some College	17.9	11.1	22.2
College Graduate	16.6	29.6	11.1
Post College Education	6.9	7.4	0
Average Age	41.8	32.7	28
Age Range	17 – 83	22 – 78	12 – 63

B. Labor Amounts and Sources

The average respondent hired 672 hours of non-household labor during 1994. This figure varied substantially among herds, ranging from 0 to 23,500 hours.

Table 3. Hours of Household Management and Labor Used in 1994

Household Member	Mean (hours)	Range (hours)	Standard Deviation (hours)
Operator/Manager 1 (n = 112)	3236	365 - 6570	1084
Operator/Manager 2 (n = 47)	1729	10 - 4200	1185
Operator/Manager 3 (n = 10)	1793	10 - 4410	1580
Operator/Manager 4 (n = 4)	886	140 - 1500	572
Household Member 1 (n = 64)	892	25 - 3000	755
Household Member 2 (n = 39)	567	12 - 2555	522
Household Member 3 (n = 21)	462	12 - 1460	473
Household Member 4 (n = 6)	271	80 - 900	314
Household Member 5 (n = 1)	150	----	----
Household Member 6 (n = 1)	1095	----	----

The CDP survey also requested hours of household management/labor supplied to the dairy enterprise in 1994. Hours were variable by herd within manager and/or household member as table 3 shows. For operator/manager 1, approximately 3236 hours were used by the dairy enterprise in 1994. Total hours supplied to the dairy enterprise averaged 4910 hours and ranged from 450 to 12,380 hours. On a 365 day basis, the average herd was provided with 13.5 hours of paid and unpaid labor per day. In comparison, the 1993 ATFFI Family Farm Survey showed that fully intensive graziers were using 13.60 hours of labor from all sources per day on a 365 days per year basis. This compares with 20.8 hours of labor per day for confinement dairies in the same study (the confinement dairy herds reported 53% more labor although their average herd size was 73% larger than the fully intensive grazing herds in the same study and only 6.2% larger than the herds in the CDP study).

Because the average herd size varies between the types of farms, it is much more meaningful to measure labor on a basis of hours per cow for a period of time. Table four below summarizes this and other labor comparisons.

Table 4. Comparing Several Labor Values

Source Study	Hours of Labor/Cow/ Week [13, 14]	Herd Size	Lbs. Milk Sold/Year[15, 16]	Hours of Labor/Cwt of Milk Sold	$ NFIFO/Hour of Labor
ATFFI - 1993 (n=331) Confinement	2.50	58.3	N/A	N/A	$4.16
CDP Study (n=146) Fully Intensive	1.71	54.9	742,931	0.66	N/A
ATFFI - 1993 (n=20) Fully Intensive	2.83	33.7	N/A	N/A	$4.79
ATFFI - 1993 (n=18) Semi-Intensive	2.43	47.6	N/A	N/A	$5.35
ATFFI - 1993 (n=155) Non-Intensive	2.66	48.4	N/A	N/A	$3.81
NPM 1992-4 Labor Tally From One Farm	2.41	59	1,000,070	0.74	N/A

When hours of total labor per cow, per week were compared in the ATFFI study, non-intensive operations used the least (2.43 hours per cow) compared to 2.83 hours per cow for fully intensive graziers. Non-intensive grazing and confinement farms were in between at 2.66 and 2.50 hours per cow per week, respectively. Dividing the average number of hours of labor per week (94.5) by the average number of cows per farm indicates a total weekly labor use per cow of 1.71 hours in the CDP study. This is considerably lower than any of the hour per cow per week labor requirements in the ATFFI study.

It's not entirely clear why fully intensive graziers in the CDP study appear to be more labor efficient than confinement dairies in the ATFFI study while fully intensive graziers in the ATFFI survey were less labor efficient than the study's confinement dairies. It may be at least partially explained by herd size. The average responder in the CDP survey owned more cows (55 vs. 33.7) than the graziers in the ATFFI study, but fewer than the confinement herds (58.3) in the ATFFI study. Time, like costs, can be "fixed." In other words, it may not require any extra time to clean the milking parlor after milking 100 cows, for example, versus milking 50. This could help explain the labor efficiency difference between graziers in the two studies.

It's interesting to notice that graziers responding to surveys conducted in this country prior to 1994 tend to have fewer cows than more conventional farmers whereas graziers responding to surveys conducted in the US since 1994 tend to have about as many cows as their "conventional" counterparts.

Another part of the difference between the labor requirement of fully intensive graziers in the two studies is the difficulty of obtaining accurate labor information. Farmers work long and hard but don't punch time clocks. And since most Wisconsin farmers are owner/operators who live on their farms, the lines often get blurred between time spent on tasks that are primarily business and tasks that could be primarily personal (for example, mowing the lawn or tending the garden. Many non-farmers have gardens as well as lawns).

Neither survey was rigorous in gathering labor data but primarily relied on respondent's best estimates of hours worked.

Fortunately, one fully intensive Wisconsin grazier (Larry and Bridget Mundth) did keep detailed daily labor records during this time period. The hours of labor per cow per week from this farm was only slightly lower than those reported in the ATFFI study and 40% higher than those reported in the CDP study.

Another appropriate way to measure labor efficiency would be in hours per cwt of milk sold. Through extrapolation, values were calculated for hours of labor per cwt. of milk sold for the graziers in the CDP study and for the one NPM farm that maintained daily labor records for over a year. These numbers as reported in Table 4 above show the CDP study respondents to be slightly more labor efficient than the NPM farm. Unfortunately this extrapolation could not be done with the ATFFI data.

Dollars of net farm income from operations (NFIFO) per hour of labor would be an even better measure of labor efficiency. It can be calculated for the 1993 ATFFI farms, but it can't be determined for the farms in the CDP study or the NPM study using the available survey data. Measured this way and compared in Table 4 above, fully and semi-intensive graziers appeared more labor efficient than confinement farms with the semi-intensive group on top.

Whether a grazing system requires more or less labor than the confinement system, it is clear that the typical CDP grazing respondent's system requires a significant amount of labor (4910 hours per year) to operate well, especially when one considers that the "society standard" 40 hour work week amounts to 2080 hours per year.

Anecdotally, many graziers who have managed both confinement and grazing systems say that they enjoy the labor in their grazing operation more than the labor required by the confinement system they used to operate. The average grazier in the Minnesota study indicated reduced labor after switching to grazing, but didn't quantify the reduction in the amount of labor.[17]

C. Type of Farms with Dairy Cows Grazing

Table 5. Business Structure

Business Structure	% of Respondents	% of all Wisconsin farm businesses from the 1992 Census of Agriculture[18]
Sole Proprietorship	87%	85.8
Partnership	8%	10.2
Family corporation	4%	3.4
Non-family corporation	1%	0.3

In terms of business structure, respondents were quite similar to all WI farmers as Table 5 shows above.

The average number of cows in respondent's herds was 54.9, just a few more than the average size (51) dairy farm in WI. Herd size ranged from 7 to 480 cows.

While secondary enterprises may be significant to some individual respondents, their financial contribution to the average respondent is rather small. Respondents, like conventional WI dairy farmers, rely primarily on milk sales for most of their farm income. On the average, respondents indicated that 85% of their annual farm income comes from milk sales. It's not known what percent of WI dairy farm gross income comes from milk sales. However, 53% of WI farm gross income in 1994 was from milk sales. Another 10% of WI farm income came from the sales of dairy livestock. The percent of WI dairy farm gross income from milk sales is obviously higher than 53% but is not likely to be as high as 85%. Therefore, WI graziers may be even more specialized than their conventional counterparts since graziers tend not to raise grain crops. Table 6 below provides more information about other enterprises on the farms of respondents.[19]

Table 6. Other Enterprises on Respondent's Farms

Enterprise	# Farms	Units
Beef cow/calf	11	Averaged 10 head sold
Feeder Cattle	33	Averaged 19 head sold
Sows	4	Averaged 8 sows
Feeder Pigs	4	Averaged 22 pigs sold
Market Hogs	6	Averaged 91 hogs sold
Feed Crops	9	Averaged 91 acres sold
Vegetables	7	Averaged 63 acres sold
Custom Tilling/Planting	4	Averaged 25 acres planted
Custom Harvesting	10	Averaged 150 acres harvested
Tobacco	3	?
Custom Raising Heifers	2	?
Sheep	2	?
Buffalo	1	?
Emu	1	?
Honey	1	?
Fruit	1	?
Round Bales	1	?

To better understand the "unit" column above, recognize (for example) the statement "averaged 63 acres sold" means that of the seven graziers who sold vegetables, they averaged 63 acres sold for each of them. It turns out that this is a surprisingly high number, simply because a couple of respondents had many acres of cash crop vegetables (probably sweet corn).

D. Land and Land Tenure Characteristics

Graziers were asked how much land they owned and/or rented and what portion of each was suitable for tillage, grazing, and neither. The results appear below:

Table 7. Land Tenure Characteristics

Graziers who own all of their land	62%
Graziers who rent all of their land	7%
Graziers who own and rent land	31%

	Owned	Rented	Total
Percent of land that could be tilled	58.5%	11.3%	69.8%
Percent of land that could be grazed but not tilled	14.6%	3.3%	17.9%
Percent of land that can't be grazed or tilled	11.0%	1.0%	12.0%
Total	84.1%	15.6%	99.7%

Land and Land Tenure Characteristics Summary

84% of all the land grazed by respondents is owned and 93% of all respondents own at least some of their land. In comparison, the 1987 Census of Agriculture shows that 51.2% of operated farm acres in Wisconsin are owned by the operator.[20]

While grazing is occurring on land unsuitable for tillage, a fairly high percent of the land owned and rented by graziers is characterized by them as suitable for tillage (68.9%), less than 6 % in slope (60%), moderately to well drained (64.3%), and medium to moderately heavy in soil type (61.7%). Much of the grazing is occurring on very productive land. The USDA Natural Resources Conservation Services (NRCS - formerly SCS) categorizes soil/land into eight capability classes. Classes one through four are suited for "farming" with Class I being the most desirable. The above responses suggest that about 60% of the grazed land is Class I or II. In contrast, less than 31% of all land in WI is Class I or II.[21]

While some grazing is occurring on land unsuitable for tillage, much of it grazed by respondents is land that is as potentially productive as much of the land tilled in Wisconsin.

E. Combining And Comparing Some Grazier And Farm Characteristics

Table 8. Cross Study Comparison of Some Grazier Characteristics 1993 and 1995 ATTFFI Study[22]

	Fully Intensive Graziers CDP Study	ATFFI Study Fully Intensive Graziers	ATTFI Study Confinement
Acquired Farmland from Relatives	N/A	25.4%	49.1%
% Grew up on a farm	N/A	83.7%	93.4%
Years of Grazing Experience	7	N/A	NA
Years of Farming Experience	N/A	21.2	22.2
Age of Primary Manager	41.8	46.7	46.4 (1993) 48.1(1995)
% of operators who own all of their own land	62%	48.4%	26.3%
% of operators who rent all of their own land	7%	1.1%	6.6%
% of operators who own and rent land	93%	98.9%	67.1%
% of farmland owned by respondents	84.1%	N/A	NA
% of farmland in WI owned by the operator in 1987	N/A	N/A	51.2%[23]

Separately, the data above may be surprising. However, when examined together, they tend to support the image of the fully intensive WI grazier as someone who is more likely to think "outside the box" and to be a bit less traditional than their non-grazing neighbors.

In a more recent survey, (Parsons, Hanson, Luloff, and Winsten) researchers at Penn State made similar observations. Here's their description:

"With the highest percentage having attended college, being younger, and more likely to use farm plans, the intensive grazing group may be hypothesized to be particularly open to innovative ideas and production methods arising in the future."[24]

As Table 8 above shows, the typical respondent is younger, has more formal education, is less tied to a farm owned by a parent or other relative and is more likely to own a higher percent of the land they operate. Since its commonly believed that it's easier to "get into farming" via one's own family farm, why do the respondents with fewer "family farm takeovers" own a higher percentage of their land than confinement dairy operators in the ATFFI study? Here are two possible explanations. Confinement operations typically have a higher amount of investment per cow than an operation that is better suited for grazing (whether the typical operation was an obsolete confinement unit or a grazing operation at the time of sale). Since a confinement farm usually comes with a higher price tag, and since parents often reduce the sales price as an incentive for their children to continue the family farm, it is fairly likely that a higher percent of confinement dairies which continue as a confinement operation would do so via a family member.

A grazier may have been deterred from purchasing or renting their farm from a parent or a relative because the typical WI dairy farm is still a traditional confinement unit. In such a case, a young aspiring grazier faces not only the prospects of buying assets not needed for grazing but also the frequent disapproval of parents who may prefer that the operation continue as a confinement dairy. There may also be a greater reluctance of farm owners to rent to someone who will operate the farm as a grazing unit instead of operating it as the confinement unit operated by the owner before retirement.

F. Herd Management Practices (Other than Feeding)

Table 9. Respondents' Herd Sizes

	# Farms Responding	Ave. # of Head
Average number of dairy cows and springing heifers	142	54.9
Average number of younger dairy heifers and calves	135	37.2
Average number of dairy bulls	57	2.4

Table 9 above suggests that the average respondent is raising most of their replacements. Since only 40% of the farms report having a bull on hand, it also suggests that about 60% are using artificial insemination (A. I.) exclusively since renting or loaning of dairy bulls is uncommon in Wisconsin.

Somewhat in contrast, 89.3% of responders to the 1994 Hoard's Dairyman Continuing Market Study (from a survey sent to a random sample of 3,000 of Hoard's subscribers) say they used A.I. on at least one cow in 1994. Since having at least one bull on hand doesn't preclude the use of A.I. on at least one cow per year, responding graziers may or may not be using A.I. as extensively as other dairy farmers in the country.[25]

As expected, the predominant breed of dairy animal grazed, was Holstein (84.1%), and was followed by Jersey (9%), with other breeds in smaller proportions, (approximately one percent each). In comparison, the Wisconsin 1995 Dairy Facts reports that of the dairy cows on DHI test in Wisconsin in 1994, 93.6% were Holstein, 2.0% were Jersey, 1.8% were Guernsey, 0.5% were Brown Swiss, and 2.1% were other breeds. Respondents to the Minnesota survey indicated that 90.2% were Holsteins, 3.5% were Ayrshires, 3.5% were Jerseys, and 1% was Brown Swiss. Guernseys, Milking Shorthorns, and crosses each accounted for about 0.5%.[26, 27]

When asked which breed or mixes would be best suited to their specific grazing practice, 47% of respondents reported Holstein, 16% reported Jersey, 13% reported Holstein-Jersey mixes, while 9% reported Holstein - Brown Swiss mixes, 5% reported Brown Swiss, 2.5% reported Guernsey and 7.5% said unsure. In reality, over 50% of the graziers in the survey were unsure which breed or mixes would be best since only 79 of the 146 graziers in the survey answered this question.

Asked if they calve evenly all year or seasonally, 49.3% indicated seasonal calving. However, only 14.1% indicated a milking shut down period during the year. Since only those which have a milking shut down period can truly be called seasonal, it appears that about 35% of respondents are semi-seasonal. In the goals section of the CDP survey, 13 (about 9% of these) respondents stated they wanted to become seasonal. It's not clear how many really want to be semi-seasonal vs. seasonal. At least one grazier in the study handled part of their large herd seasonally and calved the other part throughout the year. In contrast,

6.3% of fully intensive graziers and 2.6% of confinement operators in the ATFFI study reported a milk shut down period during the year.[28]

Table 10. Lbs of Milk Sold or Produced Per Cow

	MIRG Lbs Milk Per Cow	# of Herds	Confinement Lbs Milk Per Cow	# of Herds
Average WI Dairy Cow (1994)[29]	N/A	N/A	15,001	28,641
Reported by Respondents to the CDP study (1994)	15,012	146	N/A	N/A
Calculated from average lbs milk sold per herd per year and average number of cows reported in the CDP study (1994)	13,508	146	N/A	N/A
ATFFI Study (1995)[30]	15,252	94	18,468	572
Penn State Study (1997)[31]	16,502	141	18,456	369

The average of the pounds of milk sold per cow as reported is 15,012 lbs. The reported lbs of milk sold per cow ranged widely from 5,802 to 28,862 lbs.

The average total lbs. sold per herd (742,931 lbs.) divided by the average total number of cows (55) suggests a lower annual average milk sold per cow of 13,508 lbs.

Whichever number is correct, the average per grazing cow production level is lower to slightly higher than the production (15,001 lbs.) per average dairy cow in WI for 1994 (the year reported in the survey). Both are lower than the 15,252 and 18,468 lbs. of rolling herd average (RHA) reported for fully intensive graziers and confinement dairies in Table 5.3, page 24 of the ATFFI Tech Report #5. Both are also lower than the lbs. of milk sold per cow in the Penn State study of 18,456 for confinement herds and 16,502 for intensive graziers.

It's not unusual for rolling herd average to be as much as 10% higher than the lbs. of milk sold per cow. It's possible that respondents in the CDP study on DHI reported RHA instead of lbs. of milk sold per cow but reported lbs. of milk sold for the herd since the difference between the two is about the expected difference between RHA and lbs. of milk sold.

The above milk per cow figures from graziers range from 10.6% to 26.9% lower than the RHA levels of confinement herds reported in the AFTTI study.

The majority of respondents milked cows in a traditional Wisconsin system of pipeline and stall barn (79.2%). A few herds used other milking systems, including, parlor (9%), bucket and carry (5.6%), dumping station (3.5%), and flat barn parlor (2.8%). In contrast, 5.2% of the fully intensive graziers and 12% of the confinement dairies reported having parlors in the ATFFI study.

The dairy housing system was predominantly a stanchion/tiestall system (81.9%). Approximately 6% of respondents reported housing dairy cows in a freestall system, while 4.2% used a combination of stanchions and freestalls. In addition, 7.7% of graziers reported using some other type of system for housing dairy cows. The majority of these housed cows outside with access to a pole shed and bedding pack.

By far, the majority of respondents reported milking cows only twice a day (97.9%). This high percentage is the same as reported by fully intensive graziers and only slightly more than (95.6%) reported for confinement dairy farms in the ATFFI study.[32]

Herd Management Summary

Comparing dairy herd management practices to the average Wisconsin dairy farm, the respondents have a few more cows which are likely to be Holsteins but are a bit more inclined to show an interest in other breeds – especially Jersey and Brown Swiss. They use artificial insemination extensively although its not clear whether they use A.I. more or less than confinement dairy farmers do. They are a bit more likely to use a stanchion barn and milk twice each day.

More of them are fully seasonal in calving strategies but not as many as people might guess (14.1%).

Extrapolated production per cow could average as much as 27% lower than that of confinement dairies.

G. How Grazing and Feeding Practices Vary Among Farmers

Most respondents start grazing in April (31%) or May (65%) and continue into Oct. (35.9%) and Nov. (51%). A few report grazing in March and December.

Most respondents (73%) move their cows daily with 12% moving cows every two to three days. Another 12% report waiting more than five days to provide fresh pasture.

Only 21.8% of the herds graze dry cows and heifers with the milking herd but a slightly larger number (22.5%) graze dry cows and heifers after milking the herd.

About half reported water in every paddock with the other half relying on a central location.

81% of the respondents mechanically harvest some hay from pastures.

51% of the respondents feed at least some stored forage during the grazing season. Of those that use some stored forage during the grazing season, they feed an average of 23% of their cow's forage needs from storage. Only 9% estimated supplying more than 50% of forage needs from storage during the pasture season. 30.9% (1993) to 43.8% (1995) of the fully intensive graziers in the ATFFI studies supplemented forage in the grazing season.[33]

Between 69% and 80% of the stored forage fed was home grown. Most of the stored forage was hay, haylage, or corn silage. Only six respondents indicated using one of the following forages – triticale and peas, oats and peas, oatlage, or sweet corn silage.

99% of respondents feed stored energy (grain) during the grazing season. Only 33% of the stored energy was home grown. 94.4% (1993) and 94.8% (1995) of the fully intensive graziers in the ATFFI studies feed stored energy during the grazing season.[34]

61% of the respondents feed supplemental protein during the grazing season.

98% of the respondents feed vitamins and minerals during the grazing season.

In comparison, 93% of the respondents in the Minnesota study supplemented energy, 48% supplied forage (hay, haylage or corn silage), 20% supplemented protein (all 20% indicated bypass protein), and all supplemented minerals during the grazing season. The Minnesota graziers fed anywhere from 7 to 20 pounds of grain dry matter per cow per day. Some reported feeding as much as 15 pounds of forage dry matter per cow per day. Fourteen percent used totally mixed rations and 21% used anti-bloat products.[35]

The forage mixture on the grazing land varied across farms. Most graziers reported the mixture grazed as a percent of legumes to grass. Of those respondents reporting specific legumes pastured, clover, alfalfa, and birdsfoot trefoil were most common. Specific grasses mentioned by respondents included blue grass, brome, timothy, and quack grass. As the table below shows, almost 30% of the graziers report pastures with less than 30% legume, and over 80% report less than 50% legume in their pastures.

Table 11. Percent of Grass and Legume in Pasture Forage Mix

Percent of Grass and Legume in Pasture Forage Mix	Percent of Farms
More than 80% Legume	0
70 – 80%	4.4
60 – 70%	5.1
50 – 60%	10.2
40 – 50%	35.6
30 – 40%	16.1
20 – 30%	17.5
1 – 20%	7.3
All Grass	3.6
Total	**99.8%**

The forage mixture best suited to grazing, according to respondents, also varied substantially across farms. Most respondents felt they had the mixture best suited to grazing based on the correlation between the mixture they reported having and the mixture they deemed ideal.

Grazing and Feeding Practices Summary

Most respondents graze about seven months beginning in April or May and continuing into October or November. They are likely to move this herd daily. 78% graze the milking herd separate from the other livestock and about half supply water in paddocks.

Graziers are a bit less likely to provide protein and mechanically harvested forage than conventional farms but are nearly as likely to provide some grain, vitamins and minerals during the pasture season. Grasses are far more common than legumes in respondents' pastures. The survey did not attempt to determine the quantity of feed supplementation.

H. Harvesting, Storage and Feeding Systems Used

The mean estimated market value of hay/forage related machinery/equipment inventory was $24,174. This value varied substantially among farms, ranging from $0 to $100,000.

Forty-eight respondents reported selling anywhere between $0 and $40,000 worth of machinery since starting to graze the dairy herd. Average value of hay, forage-related equipment sold was $2890.

Seventy-eight respondents reported purchasing anywhere between $0 to $37,000 worth of hay/forage related equipment since starting to graze. The average purchased amount, since starting to graze, for this group of respondents was $6,029.

Thirteen respondents reported both buying and selling equipment. Overall, for every dollar value of haying equipment sold, about $3.41 of equipment was purchased. At first this may seem surprising but on second thought it makes sense since most graziers do mechanically harvest much of their stored forage. In addition, since farms use but don't produce equipment, total purchase dollars are likely to exceed sales dollars.

Graziers were asked how they expected their hay/forage-related equipment inventory would change over the next five years. Sixty-four percent reported they would repair and maintain existing machinery, 14% reported they would replace and update based on tax depreciation, 10.3% reported they would sell and reduce machinery and equipment inventory, and 5.9% reported they would expand their machinery/equipment inventory. The remainder reported a combination of the above.

Graziers were also asked how they expected their supplemental forage needs would be met in the next five years. The majority of respondents reported they would raise and harvest their own (63.1%). A substantially lower frequency reported they would raise their own but custom hire the harvesting (15.6%). In addition, 9.2% reported they would purchase the majority of supplemental forage, and 10.9% reported they would provide supplemental forage using a combination of methods.

Graziers were asked for information on type of existing useable forage storage facilities, total capacity of the storage facility, and percent of total capacity used in a year.

Respondents' answers to questions about stored forage raised more questions than they answered. Here's why: In theory, a conventional confinement Wisconsin dairy farm has enough storage capacity for most if not all of the forage it uses in a year. Also in theory, a Wisconsin MIRG farm should only need half as much forage storage space per cow if the cows graze half of their annual forage needs. Since many if not most, graziers operate farms that once were used conventionally, one might expect the percent of capacity used by graziers in a normal year to be closer to 50% than something as high as the 80.5% reported by respondents.

Several factors could explain this somewhat surprising result. These include (not necessarily listed in order of likelihood) :

1. Graziers may be meeting much less than 50% of their forage needs from pasture.
2. Graziers may be feeding more cattle than the farm supported and had storage capacity for as a conventional farm.
3. Some of the storage capacity on many grazing farms that was available years ago may be unusable now.
4. Faulty estimates from participants.

Of the forage capacities estimated by respondents, over 60% of available stored forage capacity is in the silo form – both tower (52%) and bunker (9.7%). Of reported stored forage used, silage is an even larger percent of the total (70.2%). Conventional Wisconsin dairy farms probably were similar in terms of percent of the types of forage storage used in 1994.

Table 12: Stored Forage Facilities

Storage Type	Number of Farms Reporting	Estimated % of Capacity Used Normal Year	Approx. % of All Available Storage Capacity
Hay Loft	113	55.2%	12.3%
Pole Shed	37	71.9%	2.4%
Tower Silos	139	83.9%	71.8%
Bunker Silos	15	87.3%	13.5%
Combined % of capacity of above types used in normal year		80.5%	99.0%
Silo Bags	8	88%	NA
Round Bales	16		NA
Piles or Stacks	10		NA
Grain Bin	1		NA

Forage feeding facilities used by graziers are primarily stanchion/tiestall (51%) or pasture (23%). Other types reported, included paved or unpaved feedlot or silo feedbunk (18%), a free stall facility (5%), and a paddock or green chop (3%).

To summarize the harvesting, storage and feeding systems, the average respondent appears to be using items (silos, barn, etc) on their farms left over from confinement systems for the needs of their herds that aren't met via pasture. The average respondent appears to find that these assets can make valuable contributions to their financial success. Some but not all of those graziers paid little or nothing for some of these assets that "came with their farm."

I. Respondents Experiences with Rotational Grazing (On-farm Measures)

The physical impact of grazing to various factors was evaluated by respondents using the following indicators: increase, no change, decrease, or not sure. Frequency of response is provided in **Table 13** below.

Table 13. Frequency of Responses for the Physical Impact of Grazing on the Farm

Physical Impact	Increase (%)	No Change (%)	Decrease (%)	Not Sure (%)
Milk Production Per Cow	22.5	39.1	29.0	9.4
Average # of Cows	48.6	47.8	2.2	0.7
Herd Health	79.7	20.3	0.0	0.0
Grazed Land Crop Yields	50.0	26.8	4.3	18.8
Grazed Land Crop Quality	75.4	15.2	3.6	5.8
Chemical/Lime/Fertilizer Used	5.8	29.7	63.0	1.4
Total Labor Used	4.3	13.8	78.3	3.6
Family Free Time	61.3	27.7	3.6	7.3

In the above table, a majority of respondents indicate what most of them would consider to be a desirable change in five of the eight factors listed. These include herd health, grazed land crop quality, and family free time which increased and total labor requirements that decreased. The fifth one, grazed land crop yields was reported to increase by exactly half, but an additional 27% indicated no change, with 18.8% unsure and 4.3% that reported a decrease.

The remaining three factors, require more individual interpretation.

Almost half of the herds either increased in size (48.6%) or stayed the same size (47.8%) while barely more than 2% decreased in the number of cows.

63% indicated a decrease in chemical/fertilizer/lime use versus the 5.8% indicating an increase and 29.7% that reported no change.

More respondents reported a decrease in pounds of milk per cow (29%) than an increase (22.5%). However, when combined with the percent that reported no change (39.1%) , 61.6% indicated a per cow production level as high or higher due to grazing. When compared to milk production estimates in part F and table 10, it suggests either a contradiction, or the average respondent achieved below average milk production per cow when farming conventionally.

It must be remembered that for any of the above results to be considered desirable, they need to contribute to the goals of the farm families, most of whom probably would like increased profitability from fewer resources. One must also remember that cutting a cost doesn't help achieve those goals if income is cut by a greater amount as a result of the cost cut. The reverse is equally true.

J. Financial Impact of Grazing

Graziers were asked to estimate the impact of grazing on eight categories of cost plus milk production. The results are summarized in table 14 below.

Table 14. Frequency of Responses for the Financial Impact of Grazing

Financial Impact	Increase (%)	No Change (%)	Decrease (%)	Not Sure (%)
Chemical, Lime, Fertilizer Costs	5.1	32.4	61.8	0.7
Gas, Fuel, Oil Costs	1.5	16.7	80.3	1.5
Labor Costs	2.2	36.8	58.1	2.9
Veterinarian Costs	1.5	24.3	70.6	3.7
Seed Costs	8.1	36.0	52.2	3.7
Purchased Feed Costs	11.9	34.1	48.9	5.2
Repairs and Maintenance Costs	1.5	30.1	66.9	1.5
Supply Costs	4.4	54.4	37.5	3.7
Total $ of Milk Sold	35.3	40.4	19.1	5.1
Dollars of Milk Sold Per Cow	22.2	38.5	29.6	9.6

Approximately 80% of graziers reported reduced gas, fuel, and oil costs. 71% reported reduced veterinarian costs, 67% reported reduced repair and maintenance costs, 62 % reported reduced chemical, fertilizer, and lime costs, 58% reported reduced labor costs, and 52 % reported reduced seed costs. In addition, while the 49% and 37% of graziers reporting reduced feed and supply costs is less than half, only 12% and 4% reported increases in these costs respectively. Therefore the average respondent reports reduced operating costs since converting to grazing.

These changes were not compared with any changes in cow numbers. However, since almost half of respondents indicated an increase in herd size (only two percent reported decreased herd size), it is likely that the reported reduced costs resulted from factors other than downsizing.

Graziers clearly reported a reduction in operating costs. However, operating cost is not the whole equation. There is also the income side, represented by milk sales.

In terms of total dollars of milk sold, the percent of respondents who reported an increase (35.3 %) exceeded the percent reporting a decrease (19.1%). Added to the percent (40.4%) that indicated no change, 75.7% of respondents report total milk sale values as high or higher than experienced prior to grazing.

In terms of total dollars of milk sold per cow, the 35% that reported an increase is almost as many as those (40%) that reported no change and is nearly double the number 19% that reported a decrease. These responses are consistent with respondents answers to the question about milk production per cow and changes in herd size. Taken together, the data suggests that the average respondent is generating fewer lbs. and dollars of milk value per cow, but producing more lbs. and dollar value of milk per farm by increasing herd sizes.

Total dollars of farm production sales from the 1994 Schedule F of respondents ranged from $14,000 to $1,105,857. The average across 116 herds was $117,362. More specifically, dollars of milk sales from the 1994 Schedule F averaged $99,454 and ranged from $13,031 to $838,575. This compares with an average of $100,335.00 of milk sales for Wisconsin dairy herds in 1994 as calculated from the 1995 Wisconsin Agricultural Statistics.[36]

On the average, respondents indicated that 85% of their annual farm income comes from milk sales. It's not known what percent of Wisconsin dairy farm gross income comes from milk sales. However, 53% of Wisconsin farm gross income in 1994 came from milk sales. Another 10% of Wisconsin farm income came from the sales of dairy livestock. This also implies that respondents are more specialized in dairy production than the average Wisconsin dairy farm.[37]

Table 15. Financial Performance Indicators of Wisconsin Dairy Farms[38]

Results of 1993 ATFFI Family Farm Survey

	Dairy Farms by Grazing Management				
	Fully Intensive Graziers (n=20)	Semi-Intensive Graziers (n=18)	Non-Intensive Graziers (n=155)	Confinement Operations (n=331)	CDP Study (n=146)
Financial Performance Indicators (Mean Values)					
Total Farm Income	$69,379	$99,414	$105,368	$146,061	$117,362
Total Farm Expenses	$43,436	$67,197	$78,981	$115,066	n.a.
Net Farm Income from Operations (NFIFO)	$23,786	$32,217	$25,553	$31,528	n.a.
Opportunity Cost of Owner's Equity	$8,111	$19,478	$17,701	$20,648	n.a.
Total Returns to Labor and Management	$16,034	$12,739	$7,855	$10,680	n.a.
Total Farm Operation Assets	$190,842	$395,786	$380,128	$464,696	n.a.
Total Farm Operation Debts	$55,666	$71,151	$84,758	$120,419	n.a.
Returns to Total Farm Assets (Mean Percent)	-4.2	1.1	-3.9	-0.2	n.a.
Returns to Total Farm Assets, Excluding Charges for Labor and Management Time (Mean Percent)	17.8	11.9	9.1	9.6	n.a.
Farm Enterprise Debt-to Asset Ratio (Mean Percent)	29.8	19.9	22.8	27.3	n.a.
Herd Size (Cows)[39]	33.7	47.6	48.4	58.3	54.9
Income Per Cow	$2059	$2089	$2177	$2505	$2138
Net Farm Income from Operations/Cow	$706	$677	$528	$541	n.a.

On the basis of total income per cow, the performance of the fully intensive graziers in the CDP study was 14.7% less and the performance of the fully intensive graziers in the ATFFI study is 17.8% less than the performance of the confinement operations in the ATFFI study.

Income is only one, albeit an important part of profitability. The ATFFI survey gathered data for the other two parts, operating expenses, and investment. This allowed the calculation of profit per farm in the form of net farm income from operations (NFIFO). Since there is a considerable size difference between the farm types in the ATFFI study (range of 33.7 to 58.3 cows), a comparison of NFIFO per cow is probably a better way to compare the profit potential of each category of farming in the ATFFI survey. In this comparison, fully and semi-intensive graziers were substantially higher than the confinement operations ($706 and $667 vs. $541).

The CDP survey did not try to quantify respondents' operating costs, fixed costs, or investment. In theory, graziers should have lower investment levels and fixed costs per cow than confined dairies. Even assuming no advantage in fixed costs, reduced variable costs plus more dollars of milk sold (since switching to grazing as reported by respondents) should add up to increased profit for responding graziers.

If the respondents in the CDP survey experienced operating and fixed costs per dollar of income per cow in proportion to the graziers in the ATFFI survey, then the NFIFO/cow in the CDP study would be about $646 or about $105 per cow higher than the confinement herds.

The data in table 1 suggests that the typical respondent transitioned from a more traditional Wisconsin dairy system. If most of the respondents have not yet completed the transition, they may not have reached the full profit potential of the grazing system.

This data does suggest that MIRG can be at least as profitable as confinement dairies in Wisconsin. In addition, the answers provided by respondents indicate satisfaction with the economic impact of their grazing system.

K. Factors Influencing Graziers Decisions

The Importance of Various Motivators to the Decision to Practice Grazing

The importance of various motivators to the decision to practice grazing was evaluated using a ranking scale of 1 to 5. A value of one indicated the factor was very important to the initial decision whereas 5 indicated not very important. In addition, the eighteen factors were evaluated for overall relative importance. Results are provided in **Table 16.** Based on mean score, the top five factors in order of importance, included, reduce total labor (mean = 1.5), increase profits (mean = 1.5), decrease costs (mean = 1.5), your own intuition (mean = 1.6), and personal preference (1.6). Interestingly, all of the eighteen factors listed had an individual mean score of less than 3.3. According to the criterion evaluated, increasing crop yields was considered least important of the eighteen factors, although mean importance score was 3.2 with a standard deviation of 2.8. These values indicate that "increasing crop yields" was still an important factor in the decision to practice grazing for many farms.

Table 16. Factors Leading to Respondents' Choice of a Grazing System

Item	Rank	Number Observations	Mean	Standard Deviation
Reduce Total Labor	1	145	1.5	0.8
Increase Profits	2	145	1.5	0.8
Decrease Costs	3	142	1.5	1.0
Your own Intuition	4	142	1.6	1.0
Personal Preference	5	145	1.6	0.9
Maintain/Improve Herd Health	6	143	1.7	0.9
Hay Forage Harvesting Alternative	7	144	1.8	1.1
Family Goals	8	145	1.9	1.1
Suitability of Land	9	144	2.1	1.2
Stewardship of Resources	10	143	2.1	1.2
Reduce Chemical Use	11	144	2.2	1.4
Long Range Farm Business Plan	12	144	2.3	1.4
Size of Dairy Enterprise	13	145	2.5	1.4
Machinery Condition and Age	14	143	2.5	1.5
Maintain/Improve Water Quality	15	143	2.8	1.3
Increase Milk Production	16	144	3.0	1.3
Feed Storage Condition and Age	17	141	3.1	1.4
Increase Crop Yields	18	143	3.2	2.8

Information Tools Influencing Grazing Decisions

Several information tools were evaluated for importance to making grazing decisions, with a 1 indicating very important and 5 indicating not very important. Evaluated factors included cropping information, dairy cow health and production information, financial information, and publication resource information. Rank and mean response, based on a 1 to 5 scale for each factor, are in **Table 17**. Financial accounting records, dairy herd reproductive records, dairy herd health records, dairy ration balancing/analysis records, and financial management analysis records were the top five items selected as being most important for making grazing management decisions. Average response across all the top five factors affecting grazing decisions was 2.3 while mean response among the top five ranged from 2.1 to 2.7. Consolidated Farm Service Agency (CFSA) crop reporting records, crop marketing records, CFSA farm plan, and personal computer/software programs were considered least important to grazing management decisions. Each of these four factors had a mean importance of greater than 4.0 to grazing decisions, meaning they were not very important to the average respondent.

Table 17. Importance of Information Tools to Grazing Decisions

Item	Rank	Number Observations	Mean	Standard Deviation
Financial Accounting Records	1	142	2.1	1.3
Herd Reproductive Records	2	145	2.3	1.4
Herd Health Records	3	145	2.3	1.3
Ration balancing/analysis Records	4	142	2.5	1.4
Financial management Records	5	143	2.7	1.7
Agricultural magazines/publications	6	145	2.7	1.3
Dairy Production Records	7	145	2.8	1.5
Forage Test Records	8	145	2.8	1.5
Farm Business Plan	9	143	3.0	1.4
Crop input and yield records	10	142	3.4	1.3
Soil Test Records	11	145	3.4	1.3
Personal Computer/software	12	141	4.3	1.2
CFSA farm plan	13	143	4.3	1.1
Crop marketing Records	14	144	4.4	1.0
CFSA Crop Reporting Records	15	144	4.5	0.8

Role of Support and Service Personnel

The importance of various support and service personnel and organizations to making grazing decisions was also evaluated. Rank and mean response, as discussed above, are in **Table 18**. Of the twelve items, the top five in order of importance, included, graziers network, family, other farmers, veterinarians, and University of Wisconsin Extension. The first three appeared to be considerably more important than the last two, using mean importance as criterion. Both veterinarians and University of Wisconsin Extension had an average importance score of 3.6, meaning they were not nearly as important as the top three sources in grazing decision assistance. However, these two personnel groups were still considerably more important than most of the other options presented.

Table 18. Importance of Various Information Sources to Grazing Decisions

Item	Rank	Number Observations	Mean	Standard Deviation
Graziers Network	1	143	2.3	1.4
Family	2	144	2.3	1.4
Other Farmers	3	145	2.4	1.2
UW Extension Service	4	142	3.6	2.0
Veterinarians	5	143	3.6	1.4
Paid Consultants	6	138	4.1	1.4
Vocational Ag Instructors	7	142	4.2	1.2
VTAE	8	134	4.3	1.1
Sales/Service Representatives	9	142	4.5	1.0
Lenders	10	142	4.5	1.0
Local Cooperatives	11	142	4.6	2.6
CFSA	12	141	4.6	1.0

L. Goals with Respect to Grazing Systems

The majority of graziers reported they plan to make no changes to their current grazing practice (61.5%), while 38.5 percent plan to make changes to their grazing practice.

Major changes or goals for the grazing operation were fairly consistent for those respondents who plan changes. Primary goals/changes and number of responses are in **Table 19**.

Table 19. Goals/Planned Changes

Goals/Planned Changes	# Obs	Goals/Planned Changes	# Obs
Improve water access	15	Increase cross breeds/mixes	3
Change milking facilities	15	Increase family time	3
Increase acres grazed	14	Cut first crop/graze regrowth	2
Stockpile pasture to extend season	13	Clip pastures	2
Work on fences (permanent, temporary fencing)	13	Increase grass varieties	2
Move to seasonal calvings	13	Graze more animals	2
Increase cow numbers	12	Improve energy suppl to cows	2
Improve cow production	5	Improve general mgmt.	2
Improve pasture rotations	4	Increase supplemental forage	2
Increase length grazing season	4	Decrease planting row crops	2
Switch to or increase other enterprise	4	Custom harvest/purchase suppl. forage	2
Interseed legumes with grass	4	Cull cows on grazing ability	2
Improve cow lanes	4	Maintain cow numbers	1
Decrease pad size	4	Put in grazing peas and oats	1
Improve time of pad rotations	4	Graze hayfields after pads are dormant	1
Improve stocking rates	4	Use liquid N on pastures	1
Improve pasture yields	3	Better use of TMR with grazing	1
Improve knowledge of grasses	3	Decrease hired labor	1
Pasture younger heifers/heifers	3	Decrease rented land	1
Keep better records	3	Decrease off-farm income	1
Decrease forage harvest eqpt.	3	Intensively graze (rotate) heifers	
Improve nutrient/manure management of pads	3	Apply smaller, timed N applications	1
Put N on fields earlier in season	3	Increase pad size	1
Decrease cost of purchased feed	3	Improve pad design/layout	1

Conclusion

All of the comparisons in this survey must be tempered by several methodological and data limitations associated with this study. Even when seeking similar information, each survey asked its questions using different words. The surveys used for comparisons were conducted at different times and in different places. Still, at least one conclusion is quite clear. This relates to the satisfaction that respondents to the CDP study indicated about their grazing system. An overwhelming majority of producers reported they will continue grazing as a long term management practice (99.3%).

Endnotes

[1] More extensive definitions of the four categories of graziers are contained on pages 5-8 of the report titled "Grazing in Dairyland," which is also identified as the University of Wisconsin Agricultural Technology and Family Farm Institute (ATTFI) Technical Report # 5.
[2] University of Minnesota Bulletin BU-6693-S, "Knee Deep in Grazing." is a 42 page report summarizing personal interviews of 29 graziers located throughout Minnesota with the highest concentration being in the Southeastern region of the state. Data was collected during 1994. Farm business volume data is from 1993.
[3] This article resulted from a mail survey at Penn State University for much the same purpose as the CDP study. Responses to the survey were obtained from 141 intensive graziers, 361 traditional dairy farms and 369 confinement farms. The full report can be found titled as "Extension Outreach Opportunities Among Segmented Dairy Producers," in The Journal of Extension. August 1998, Volume 36, Number 4.
[4] "Knee Deep in Grazing." University of Minnesota Bulletin BU-6693-S, page 20.
[5] The entire preceding discussion titled "What is Management Intensive Grazing?" was reprinted from "Wisconsin Pastures for Profit, a Guide to Rotational Grazing." University of Wisconsin and Minnesota Extension Bulletin A3529. Bulletin A3529 has 36 pages of information on the production practices of managing pastures in a MIRG system.
[6] Included among the studies conducted in the U.S. that suggest that MIRG can be economically competitive if reasonably well managed are the following ones listed in the references in this report. These studies were conducted in eight states around the Midwest and Northeast: Michigan (Rotz, 1995); Minnesota (Rust et al., 1995); New York (Emmick and Toomer, 1991; Nichols and Knoblauch, 1996a, 1996b); Ohio (Miller and Schnitkey, 1992); Pennsylvania (Parker et al., 1991, 1992; Ford and Hanson, 1994; and Elbehri and Ford, 1995); Vermont (Winsten and Petrucci, 1996); Virginia (Carr et al., 1994); and Wisconsin (Tranel and Frank, 1991; Klemme et al., 1992; Frank et al., 1995,1996; Schraufnagel et al., 1997, 1998; and Kriegl, 1999). In contrast, a recent Michigan study (Nott, 1996) is among a smaller group of studies that suggest MIRG to be less economically competitive.
[7] "Grazing in Dairyland." ATFFI Technical Report # 5, pages 5-6, contains a more detailed description of types of farms in their study.
[8] "Knee Deep in Grazing." University of Minnesota Bulletin BU-6693-S.
[9] "Extension Outreach Opportunities Among Segmented Dairy Producers." Article in The Journal of Extension. August 1998, Volume 36, Number 4.
[10] All preceding references to the ATFFI study in the section regarding age, education, farm experience, and acquisition of the farm from a relative are from Table 5.1, page 20, ATFFI Technical Report # 5.
[11] All preceding references to the ATFFI study in the section regarding off-farm work, are from Table 6.3, page 40, ATFFI Technical Report # 5.
[12] All references to the ATFFI study in this table regarding age, education, farm experience, and acquisition of the farm from a relative are from Table 5.1, page 20. Experience regarding off-farm work, are from Table 6.3, page 40 ATFFI Technical Report #5. In a few cases the 1993 and 1995 ATFFI data is combined. More often they are not, partly because the two surveys were not identical. In table 1, lines 5a and 7 report 1993 data. Lines 4b, 5b, and 6a report 1995 ATFFI data. 20 fully intensive graziers and 331 confinement operators are in the 1993 data. 94 fully intensive graziers and 572 confinement operators are in the 1993 data.
[13] ATFFI labor data are from table 6.2, page 39 of ATFFI Technical Report #5. The ATFFI labor data was collected for 1993. When multiplied by 52 weeks, the annual hours of labor per cow per week reported in table 4 ranges from 89 to 147 among the types of operations. This is considerably higher than standard labor requirements often used for budgeting purposes. In contrast to these surveys, the labor values used in budgets typically only consider labor directly associated with the cows. The hours of labor per cow reported here for the ATFFI study includes all hours of labor used in the operation and result from a slight recalculation of the data to make it more consistent with the method of labor calculation in this study. The recalculation was done with the approval of the ATFFI study authors.
[14] The last row in Table 4 comes from two years worth of detailed labor records that were tabulated from 1992 to 1994 by graziers Larry and Bridget Mundth for a University of Wisconsin Nutrient and Pest Management (NPM) field trial conducted under the supervision of Kevin Shelly and Karl Hakanson. Other labor values were less careful estimates provided by respondents to the respective survey.
[15] NPM milk production figures are from Oct. 1, 1992 to Sept. 18, 1993 and verified from Larry and Bridget Mundth's dairy plant receipts.
[16] The average lbs. of milk sold per year as reported by respondents to the CDP study is 742,931. When respondents were asked to report lbs. of milk sold per cow per year, their answers averaged out to 15,012 lbs. When multiplied

by 54.9 cows, the annual lbs. of milk sold per herd per year would be 824,159 and the hours of labor per cwt. sold would be 0.58. The lbs. of milk sold per year is more likely to be accurate and therefore was the one used in Table 4. It would have been nice to extrapolate hours of labor per cwt. sold from the ATFFI data. Unfortunately, the reported 1993 ATFFI data contains labor information but not lbs. of milk sold. The reported 1995 ATFFI data contains rolling herd average but not labor data. Any results from using milk production from one group with labor estimates from another group would be unreliable.

[17] "Knee Deep in Grazing." University of Minnesota Bulletin BU-6693-S, pages 29-32.

[18] From the 1992 Census of Agriculture.

[19] The 1995 Wisconsin Dairy Facts, produced by the USDA Statistical Reporting Service provided the cash receipt from Wisconsin farm data used here.

[20] From the 1987 Census of Agriculture.

[21] From Carl Wacher at the Wisconsin office of USDA-NRCS.

[22] From Table 5.1, page 20, and table 5.4, page26, ATFFI Technical Report # 5. The ATFFI land ownership data is from 1993. The other data is from 1995.

[23] From 1987 Census of Agriculture. Its value is placed in the confinement column because most Wisconsin dairy farms were confinement in style in 1987, as most still are.

[24] "Extension Outreach Opportunities Among Segmented Dairy Producers." Article in The Journal of Extension. August 1998, Volume 36, Number 4.

[25] From the 1997 Hoard's Dairyman Continuing Market Study.

[26] From the 1995 Wisconsin Agricultural Statistics, page 5.

[27] "Knee Deep in Grazing." University of Minnesota Bulletin BU-6693-S, page 25.

[28] Table 5.2, page 21 ATFFI Technical Report # 5.

[29] 1995 Wisconsin Agricultural Statistics, page 5. Since all Wisconsin herds are included in the average, it includes all grazing herds too. However, they are a small part of this measure. The Wisconsin Agricultural Statistics uses the term production per cow but it excludes milk sucked by calves and probably excludes milk that gets dumped at the farm for such reasons as antibiotic residues. It does include the estimated amount of milk fed to (not sucked by) calves and milk consumed by the farm family. Consequently, it's probably less than 5% different from the lbs. of milk sold.

[30] Table 5.3, page 24 ATFFI Technical Report # 5. The ATTFI studies collected rolling herd average (RHA) data from the participants (60%) on a DHI testing program and lbs. of milk sold from the other herds. Both types of data were combined and averaged to extrapolate an average RHA for each type of farm. It's not unusual for the RHA to be about 10% higher than the actual lbs. of milk sold by the same herd, even though examples can be found where the difference is larger or smaller. Since about 60% of the ATFFI herds provided RHA, on the average this could cause the ATFFI herd production levels to be artificially 6% higher than the production levels reported in this study. This slight difference in procedure between the two studies is minor. In fact, it is likely to be far less significant than any reporting errors made by participants. ATFFI lbs. of milk per cow are from Table 5.3, page 24, ATFFI. Technical Report #5.

[31] "Extension Outreach Opportunities Among Segmented Dairy Producers." Article in The Journal of Extension. August 1998, Volume 36, Number 4. Participants in this Penn State study were asked to provide the pounds of milk marketed per cow.

[32] ATFFI statistics about milking systems, housing types and milking frequency are from Table 5.2, page 21 ATFFI. Technical Report # 5.

[33] Table 3.1, page 6, from ATFFI Technical Report # 5 reported the 1993 and 1995 data separately.

[34] Table 3.1, page 6, from ATFFI Technical Report # 5 reported the 1993 and 1995 data separately.

[35] "Knee Deep in Grazing." University of Minnesota Bulletin BU-6693-S, pages 26-7.

[36] The 1995 Wisconsin Agricultural Statistics is produced by the USDA Statistical Reporting Service. The $100.335.00 figure was calculated by dividing the total cash receipts from milk sales by the number of dairy farms in Wisconsin in 1994.

[37] The 1995 Wisconsin Agricultural Statistics is produced by the USDA Statistical Reporting Service

[38] Modified from Table 6.1, page 37, of the ATTFI. Technical Report #5.

[39] These last three lines were extrapolated and added by the authors of the CDP study from the data in tables 5.3, page 24, and table 6.1, page 37, of the ATTFI Technical Report # 5. The right most column was also added by the authors of the CDP study.

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