

2000

# The Use and Performance of Intensive Rotational Grazing Among Wisconsin Dairy Farms in the 1990s

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## Recommended Citation

Ostrom, M., and D. B. Jackson-Smith. 2000. The Use and Performance of Intensive Rotational Grazing Among Wisconsin Dairy Farms in the 1990s. PATS Research Report No. 8. Madison: Program on Agricultural Technology Studies, University of Wisconsin- Madison, August. <http://www.pats.wisc.edu/pubs/38>

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*The Use and Performance of Management  
Intensive Rotational Grazing Among Wisconsin  
Dairy Farms in the 1990s*

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**PATS Research Report No. 8**

August, 2000

*by Marcia R. Ostrom and Douglas B. Jackson-Smith*



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## Executive Summary

Growing numbers of Wisconsin dairy farmers have reported success using management intensive rotational grazing (MIRG) techniques that rely on pastures as the primary source of forage for their milking herds. The Program on Agricultural Technology Studies (PATS) has been tracking the use and performance of MIRG systems in Wisconsin since the early 1990s through periodic, large-scale, random sample surveys and on-farm interviews with Wisconsin farmers. Utilizing recent results from the PATS 1997 and 1999 Wisconsin Dairy Farm Polls, this report provides an important update to previous PATS reports.

In our surveys, the dairy farmers who report utilizing pastures for forage are a diverse group. Grazing practices ranged from moving livestock several times a day through an extensive network of improved pasture paddocks to grazing the same large field all summer long. For purposes of maintaining consistency, in analyzing our data we defined MIRG as *a system in which dairy farmers rely on pastures for at least part of the forage ration of their milking cows and move these cows to fresh pastures at least once a week*. Farms that utilized pastures to obtain forage for their milking cows, but did not rotate their cows to a fresh pasture at least once a week, were classified as *non-intensive grazing operations*. Farm operations that did not rely on pasture for any part of their forage ration were categorized as *confinement systems*. On our 1999 survey, 22 percent of farmers reported using MIRG systems, 22 percent used pastures non-intensively, and 56 percent used full confinement systems.

This PATS grazing research report focuses on four key questions:

1. How widespread is the adoption of MIRG among Wisconsin dairy farmers?
2. Are there distinctive patterns in the adoption of MIRG across Wisconsin?
3. What are the characteristics associated with operations that utilize MIRG?
4. How are MIRG systems performing (in economic and social terms)?

### ***The prevalence and growth of MIRG on Wisconsin dairy farms***

The use of MIRG practices by Wisconsin dairy farmers has increased sharply since PATS' first Wisconsin Farm Poll was conducted in 1993. While in 1993 just over seven percent of the dairy farms surveyed by PATS were utilizing MIRG systems, by 1995 this number had doubled to 14 percent, and by 1999, it had tripled to 22 percent of all dairy farms. The use of intensive grazing practices varies significantly around the state, with the higher rates of adoption tending to correlate with lower-priced farmland and more rolling topographies.

In addition to increases in overall rates of MIRG adoption, our data suggest that farmers who use pastures may have become more successful at maximizing the total feed they obtain from them. Since 1993, growing numbers of farmers report utilizing pasture as their primary source of total feed for their milking cows during the grazing months. Among MIRG farmers surveyed in 1999, roughly a third moved their cows once a day or more, a third moved them every 2-6 days, and a third moved them weekly.

### ***Characteristics associated with MIRG dairy farms***

While MIRG operators tend to be roughly the same age as other types of dairy farmers, they are slightly less likely to have a farm background or to have acquired farmland from a parent. In comparison with the typical confinement operation, intensive grazers generally operate substantially fewer acres and have smaller average herd sizes. While MIRG farms tend to be smaller than average, there are a handful of very large grazing operations that suggest it is possible to implement such systems at a large scale. MIRG farms are significantly less likely to utilize such output-maximizing technologies and management practices as herd production testing programs, TMR machinery, regular feed ration balancing, parlor milking systems, and rBST in comparison with statewide averages. However, when data are controlled for size, many of these differences in technology adoption are minimized. Indeed, when compared with other farms of similar sizes, MIRG farms are the most likely to have a milking parlor.

Beginning farmers appear to utilize MIRG practices at dramatically higher rates than dairy farmers as a whole. Among a sample of recent dairy farm entrants surveyed in 1996, nearly 30 percent were employing MIRG systems (nearly twice the adoption rate of other dairy farms at that time). Moreover, when questioned about their future intentions, nearly 46 percent of these new farmers indicated that they planned to use improved pastures to obtain feed for their milking herd in the future.

### *The Performance of MIRG Over Time*

The combined results of a number of research projects undertaken in recent years suggest that MIRG systems have the potential to improve farm labor efficiencies. MIRG farms appear to require less total hours of farmwork per week, as well as less total hours of work by farm household members. When the hours of labor required per cow are compared across farms, the results show that MIRG farms are at least as efficient, if not slightly more efficient, than other types of operations. Finally, research results suggest that farmers who have converted to MIRG are able to milk higher numbers of cows without having to increase their land and labor base.

Initial financial indicators also suggest that MIRG systems can be economically profitable. By such measures as “net farm income per cow” and “investments required per cow” intensive grazing systems compare favorably with other types of management systems. When asked to evaluate the impact of grazing on various farm expense categories, the majority of grazers reported substantial cost savings. Surveys of farmers who had converted to MIRG from confinement systems indicate that for the majority, net farm income had either stayed the same or increased. In addition, most respondents reported that their total household income had increased since converting to MIRG.

Despite this largely positive economic profile, MIRG farms appeared to rely more on off-farm income than other types of dairy operations. When surveyed in 1999, over twice as many MIRG operators had off-farm jobs as confinement operators. Spouses on MIRG farms were only slightly more likely to work off-farm than spouses on other types of dairy farms. Intensive grazers were more likely to report that they obtained most of their income from off-farm sources. It is not clear whether MIRG operators are more likely to work off the farm out of necessity or because the greater labor efficiencies and lower fixed costs on their farms allow them to take advantage of other income-generating opportunities. Having the option to take employment off the farm may be especially valuable given the favorable off-farm economies in many areas of Wisconsin in recent years.

Analysis of recent data confirm the perception that MIRG systems offer opportunities for farm families to improve their quality of life. In comparison with confinement operators, MIRG operators were more likely to report feeling “very satisfied” with their family’s quality of life and more likely to state that their family’s quality of life had “become better” over the past five years. When MIRG farms were sorted according to the frequency with which they moved their cows, those who rotated their cattle most frequently (presumably the most intensive pasture users) reported substantially higher rates of satisfaction with their quality of life than all other categories of farmers. Finally, when grazers were questioned about the impacts of converting to a MIRG system, the majority of respondents reported gaining increased days of vacation.

This study concludes by emphasizing the implications of the widespread growth in the adoption of MIRG systems for farmers, agricultural policy makers, and for the direction of university research and extension programs. As the U.S. dairy industry continues to experience long-term transformation, those concerned with the sustainability of Wisconsin’s family dairy farm sector need to recognize the opportunities afforded by grazing systems. Well-managed MIRG systems appear to offer significant economic and lifestyle opportunities for family-scale farmers wishing to improve their operations.

# The Use and Performance of Management Intensive Rotational Grazing Among Wisconsin Dairy Farms in the 1990s

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## I. Introduction

Over the last decade, growing numbers of Wisconsin livestock operations have employed management intensive rotational grazing (MIRG) systems as an alternative to conventional confinement farming systems. In contrast to traditional management practices where feed is mechanically harvested and transported to livestock kept in confinement, in MIRG systems the livestock obtain a substantial portion of their feed through the intensive use of improved pastures during the grazing season. Many MIRG operators attempt to boost the profitability of their operations through reducing overall capital investments in facilities and equipment and decreasing expenditures on a wide range of inputs. In addition to cost savings, grazing-based management systems are frequently credited with offering significant labor, lifestyle, herd health, and environmental advantages.

The rising popularity of grazing-based management systems among livestock farmers in Wisconsin raises important questions for policy makers, government agencies, and public agricultural research and extension personnel. As the name suggests, MIRG systems are highly management intensive, requiring the development of a complex set of skills and knowledge on the part of the farmer in order to be implemented successfully. In the past, MIRG operators in Wisconsin have primarily relied on farmer-to-farmer learning networks to meet their extensive informational and educational needs (Hassanein 1999, Paine et al. 1999). As farmer interest in MIRG continues to build, it is important to examine the role played by public agricultural institutions and agencies in supporting these farmer networks and in conducting MIRG-related research and outreach.

Studies (PATS)<sup>1</sup> at the University of Wisconsin has been tracking the use and performance of MIRG systems on Wisconsin dairy farms since 1993. Based on combined data from two statewide, random sample surveys conducted in 1993 and 1995, PATS published a report titled *Grazing in Dairyland* (Jackson-Smith et al., 1996) which looked at the characteristics of MIRG adopters, how the use of MIRG practices might relate to farm and household economic conditions, and what future trends might be expected for this dairying system. Utilizing more recent findings from PATS' 1997 and 1999 Dairy Farmer Polls, this report provides an update to the key questions examined previously; including the prevalence and growth of MIRG in Wisconsin, the characteristics associated with operations that utilize MIRG, and the performance of MIRG systems over time.

As in any study of grazing, there is ambiguity about just what constitutes "Management Intensive Rotational Grazing." While in 1999 around 44 percent of Wisconsin dairy farmers reported using pasture as a source of forage for their milking cows, those who utilize pasture forage are a diverse group. At one extreme, milking cows are moved 2 to 3 times a day through a network of upwards of 50 or 60 individual improved pasture paddocks. At the other end of the spectrum, the entire milking herd is turned out into the same 40 acre field every day throughout the summer months. In analyzing our mail surveys, we defined MIRG as *a system in which dairy farmers rely on pastures for at least part of the forage ration of their milking cows and move these cows to fresh pastures at least once a week.*

## *Methodology*

Questions about grazing management practices were included in a series of large-scale, state-wide surveys administered by PATS. The 1993 Wisconsin Family Farm Survey consisted of in-person interviews with nearly 1,000 farmers statewide, of whom about 530 were dairy farmers. Two other surveys, the 1995 Wisconsin Dairy Farm Poll and the 1997 Wisconsin Dairy Farm Poll, were each mailed to roughly 2,000 Wisconsin dairy farmers. The 1999 Wisconsin Dairy Farm Poll was sent to over 1,600 dairy farmers. In each case, dairy farmers were randomly selected from the statewide list of dairy farm operations maintained by the state Department of Agriculture, Trade, and Consumer Protection and a modified Dillman technique, consisting of repeated contacts with non-respondents over a 3 month period, was employed. The mail survey response rates were 58 percent in 1995, 52 percent in 1997, and 50 percent in 1999. To complement the mail survey data, in-depth on-farm interviews were conducted with approximately 40 dairy farmers in each of three selected Wisconsin dairy farming regions during the early spring of 1998. These interviews were part of a national project known as the National Dairy Community Study.

An additional survey was administered by PATS in the spring of 1996 which specifically targeted farmers who began new dairy enterprises between 1993 and 1995. As part of this dairy entrant project, survey responses were received from 321 beginning dairy farmers identified from the statewide list maintained by the state Department of Agriculture, Trade, and Consumer Protection.

Finally, PATS staff distributed surveys to farmers attending the 1996 Wisconsin Grazing Conference (a very large event that draws attendees from throughout the upper Midwest). Of the roughly 300 dairy farm operators present at that event, 72 completed the two-page questionnaire. Of these, a total of 53 surveys were returned by dairy farmers who lived in Wisconsin and were currently utilizing MIRG. These data are used at the end of this paper to look at how adoption of grazing has affected the lives of farmers who have used both conventional and MIRG practices.

In an attempt to maintain consistency and

eliminate confusion among various forms of pasture-use, we categorized dairy enterprises into the following groups based on whether they relied on pastures as a source of feed for their milking herd and how often they moved their milking herd to fresh pastures.

**Confinement operations** are dairy farms that did not rely on pastures for any part of their forage rations for their milking cows.

**Non-intensive grazing operations** relied on pastures to provide forage for their milking cows, but did not move their cows to a new paddock at least once a week.

**Management intensive rotational grazing (MIRG) operations** relied on pastures to meet some portion of their milking herd's forage needs during the grazing season and moved their cows to a new paddock at least once a week.

In analyzing survey data over the years, the most reliable indicator of grazing management practices has been the frequency with which farmers report moving their cows to fresh pastures. Analysis of the 1997 and 1999 survey results, which included questions about the frequency of pasture rotation, suggests that roughly a third of the MIRG farmers in our mail samples moved their cows at least once a day, another third moved them every 2-5 days, and the remainder moved them roughly once a week. Thus, while our survey results provide a consistent benchmark against which to compare the prevalence of a range of grazing management practices among Wisconsin dairy farms over time, our MIRG grouping may include a subgroup of somewhat less intensive grazing operators than those who might normally identify themselves as grazers. In some cases, separating out those who managed their pastures most closely, presumably those who moved their cattle to fresh pastures once a day or more, from those who only moved their cattle every two to seven days made the data easier to analyze. The group of dairy farmers who moved their cows once a day or more often stood out as distinct from those who practiced other forms of grazing management.

## II. How Widespread is the Practice of MIRG in Wisconsin?

The rate of MIRG use among Wisconsin dairy farms has increased sharply throughout the 1990s. Figure 1 displays the prevalence and growth of MIRG practices among Wisconsin dairy operations based on the results of four major random sample surveys carried out from 1993 to 1999. While in 1993 just over seven percent of the dairy farms surveyed were utilizing MIRG systems, by 1995 this number had doubled to 14 percent, and by 1999 it had more than tripled to 22 percent of all dairy farms. Projecting from the proportion of MIRG farms in our survey results and the total number of licensed dairy farms in Wisconsin, Table 1 shows that there were roughly 4,700 Wisconsin dairy farmers using MIRG practices as we defined them in 1999. The most rapid increase in MIRG adoption occurred during the period between 1993 and 1995 when rates of MIRG use doubled and the number of farms utilizing MIRG increased by 74 percent.

In addition to steady growth in the overall rate of MIRG adoption during the 1990s, our data suggest that grazers have become more successful at maximizing the total feed they obtain from their pasture systems. In 1997, more than 10 percent of WI dairy farmers reported utilizing pasture as their primary source of total feed for their milking cows during the grazing months in contrast to less than four percent in 1993 (see Figure 2)<sup>2</sup>. This change may indicate that over time operators of MIRG farms have become more proficient at supplying their milking herds with sufficient quantities of high quality pasture forage for continuous periods of time.

Thus, recent survey findings highlight two trends. First, the use of MIRG has continued to increase since the early 1990s, with just around 22 percent of total dairy farm operations in Wisconsin currently utilizing such practices. Second, among those farmers who utilize grass-based management systems, many have become more successful at obtaining high quality feed from their pastures. The steadily rising popularity of MIRG is reflected in increased levels of credibility and acceptability among dairy farmers at large. In our 1999 Dairy Farm Poll, nearly half of all dairy farmers agreed with the statement that “intensive rotational grazing is a viable alternative,” while just under 22 percent disagreed (see Figure 3). Even among operators of confinement systems, more than a third agreed that rotational grazing was a viable alternative.

### *MIRG Use Highest Among Entrants*

Survey results indicate that rates of MIRG use vary substantially across different subsectors of the dairy industry. Beginning farmers appear to utilize MIRG practices at dramatically higher rates than dairy farmers as a whole. Among a sample of dairy farm entrants surveyed in 1996 (Buttel et al., 1999), nearly 30 percent were using MIRG practices (see Table 2). When compared with overall MIRG usage rates at that time of 14.6 percent in Wisconsin, beginning dairy farmers were nearly twice as likely to employ MIRG systems. Moreover, when questioned about their future intentions, Table 2 shows that nearly 46 percent of dairy farm entrants indicated that by the year 2000 they planned to use improved pastures to supply feed to their milking herd during the grazing months. Just over 38 percent of entering farmers planned to rotate their cows to a new paddock at least once a week.

**Figure 1. Percent of WI Dairy Farms using MIRG**

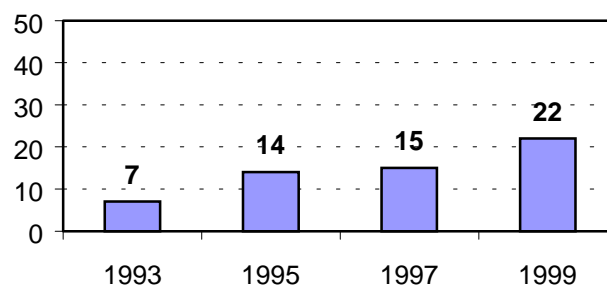


Table 1. Importance of MIRG among Wisconsin Dairy Farms, 1993-1999

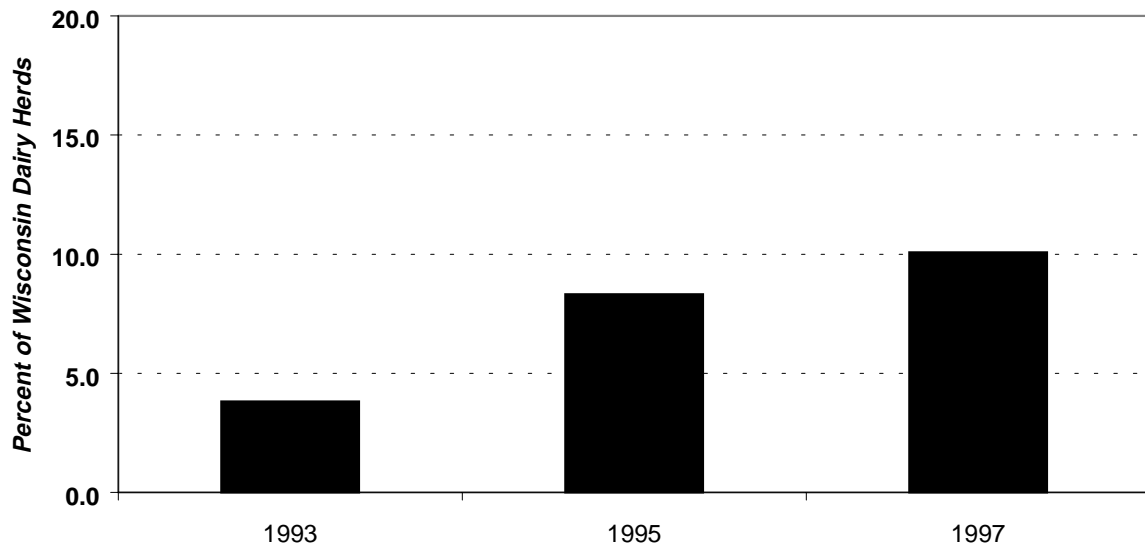
|   | <b>Dairy Farms by Grazing Management<sup>1</sup></b> |                                  |                        | All Dairy Farms |
|---|--|----------------------------------|------------------------|-----------------|
|   | Management Intensive Grazing Operations              | Non-Intensive Grazing Operations | Confinement Operations |                 |
| <b>1993 Wisconsin Farm Poll</b>           |  |                                  |                        |                 |
| Number of respondents                     | 38   | 155                              | 331                    | 524             |
| (Percent of sample)                       | (7.3)  | (29.6)                           | (63.2)                 | (100.0)         |
| Estimated size of population <sup>2</sup> | 2,191  | 8,939                            | 19,088                 | 30,218          |
| <b>1995 Wisconsin Dairy Farm Poll</b>     |  |                                  |                        |                 |
| Number of respondents                     | 157  | 401                              | 572                    | 1,151           |
| (Percent of sample)                       | (13.9)   | (35.5)                           | (50.6)                 | (100.0)         |
| Estimated size of population              | 3,818  | 9,752                            | 13,910                 | 27,480          |
| <b>1997 Wisconsin Dairy Farm Poll</b>     |  |                                  |                        |                 |
| Number of respondents                     | 146  | 310                              | 547                    | 1,019           |
| (Percent of sample)                       | (14.6)   | (30.9)                           | (54.5)                 | (100.0)         |
| Estimated size of population              | 3,601  | 7,646                            | 13,492                 | 24,739          |
| <b>1999 Wisconsin Dairy Farm Poll</b>     |  |                                  |                        |                 |
| Number of respondents                     | 171  | 173                              | 440                    | 804             |
| (Percent of sample)                       | (21.8)   | (22.1)                           | (56.1)                 | (100.0)         |
| Estimated size of population              | 4,714  | 4,779                            | 12,131                 | 21,624          |
| <b>Percent Change in Population</b>       |  |                                  |                        |                 |
| 1993-1995                                 | 74.2   | 9.1                              | - 27.1                 | - 9.1           |
| 1995-1997                                 | - 5.7  | - 21.6                           | - 3.0                  | - 10.0          |
| 1997-1999                                 | 30.9   | - 37.5                           | - 10.1                 | - 12.6          |
| 1993-1999                                 | 115.1  | - 46.5                           | - 36.4                 | - 28.4          |

<sup>1</sup> Subgroups will not add up to total since grazing management information was missing on a small number of cases.

<sup>2</sup> Population estimates obtained by multiplying the percent of the sample in each subcategory by the total number of dairy farms licensed in the state on March 1st of the year of the survey.



**Figure 2. Dairy Farmers using Pasture as Primary Source of Total Feed during Grazing Season, 1993-1997**



**Figure 3. Percent of Wisconsin Dairy Farmers Agreeing that "Intensive rotational grazing is a viable alternative to conventional dairy practices," 1999**

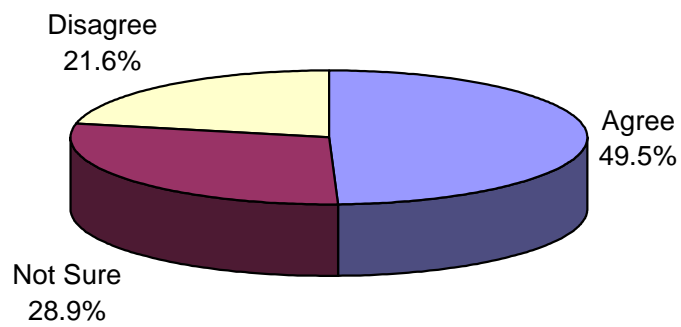


Table 2. MIRG Use Among Recent Dairy Farm Entrants<sup>1</sup>.

| Characteristic  | Percent |
|---|---------|
| <b>Percent of recent entrants using MIRG</b>  | 29.6    |
| <b>Percent of recent entrants who plan to use various practices by the year 2000:</b> |         |
| Use improved pastures for most of my milking herd's feed during grazing months.       | 45.9    |
| Move grazing cows to a new paddock or field at least once a week.                     | 38.4    |
| <b>Percent MIRG use by farm background</b>  |         |
| <b><i>No Family Farm Background</i></b>   |         |
| Does not own any farmland   | 26.7    |
| Currently owns farmland   | 41.7    |
| <b><i>Has Family Farm Background</i></b>  |         |
| Does not own any farmland   | 25.9    |
| Currently owns farmland -- not family land  | 33.0    |
| Currently owns farmland -- originally family land                                     | 27.0    |

<sup>1</sup> Based on 1996 Survey of Wisconsin Dairy Entrants.

Clearly, MIRG systems offer attractive entry opportunities for new farmers. The lower capital requirements and the cost savings associated with such farming practices can potentially reduce the funds needed for start-up, maximize returns on investment, and decrease overall levels of risk exposure. Interestingly, among new entrants into dairy farming, those who did not originally grow up on a farm and those who owned their own farmland at the time of the survey were the most likely to utilize MIRG (see Table 2). This finding suggests that both secure access to land and a lack of previous experience with traditional management systems may be important factors in the decision to employ MIRG practices.

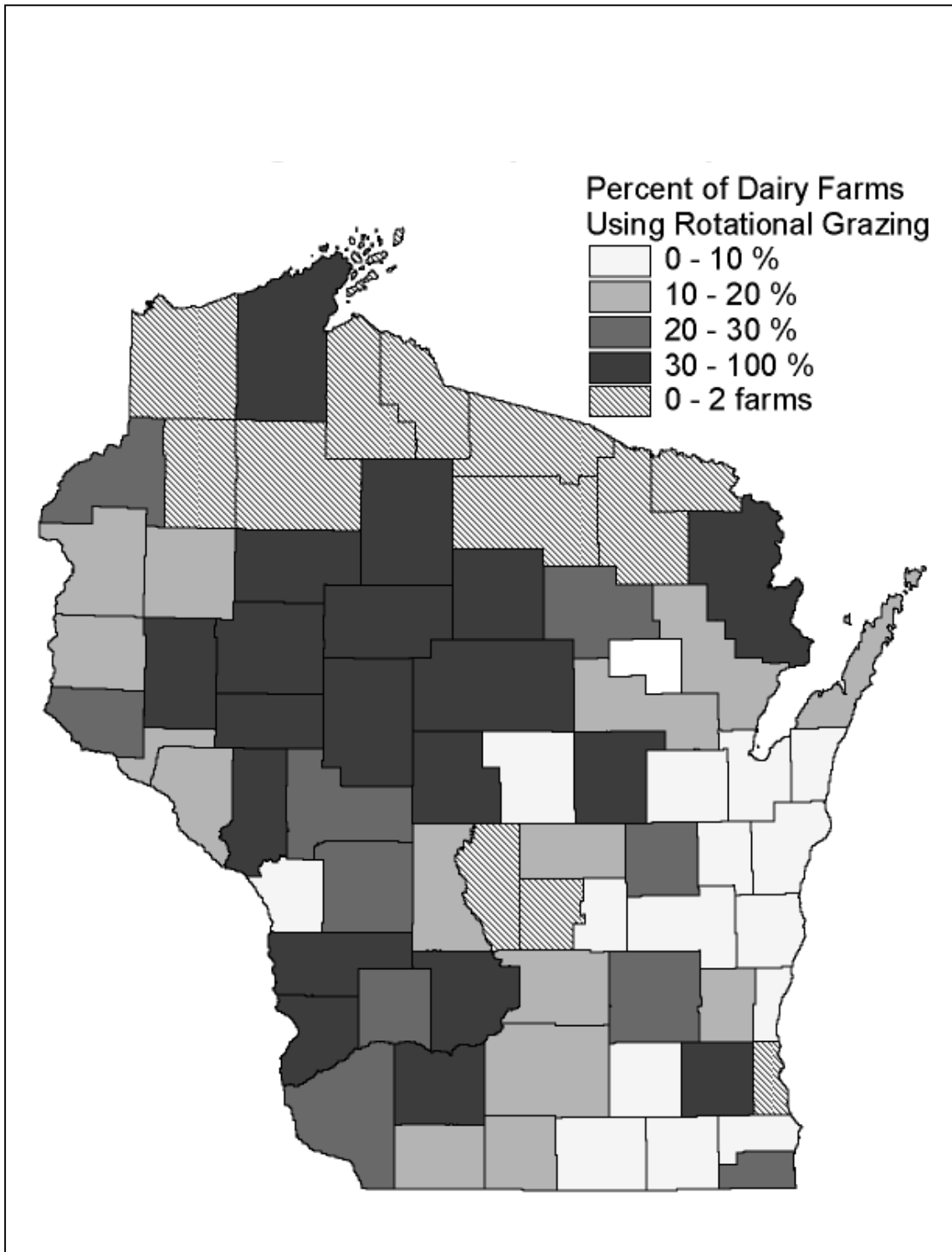
#### ***MIRG Use Varies by Region***

Geographical factors appear to exert a strong influence on the spread of rotational grazing among Wisconsin farmers. Clear regional differences in patterns of MIRG adoption are observable across the

state. Consistent with the PATS survey results reported in 1996, MIRG operations continue to be clustered in the southwest, the west central, and the north central portions of the state. Rates of MIRG adoption continue to be lowest in the east central and southeastern portions of the state. Figure 4 shows that in many counties, the frequency of MIRG use (as a percent of all dairy farmers in the county) exceeds the statewide average of 22 percent.<sup>3</sup> Indeed in several counties, the rate of MIRG adoption among dairy farms is well above 30 percent, while in other counties MIRG use is relatively rare, with adoption rates well below 10 percent of dairy farms.

The uneven regional adoption of grazing-based management systems in the state of Wisconsin can probably be attributed to a variety of factors. First, grazing-based dairy operations appear to be most concentrated in the geographical regions of the state with more rugged topography and generally lower-priced farmland. In areas where the biophysical

**Figure 4. Percent of Respondents Using MIRG by County**



resource base limits the possibilities for other forms of crop production, MIRG systems may offer a particularly competitive option.

The social and institutional factors that determine whether or not farmers have access to the assistance and knowledge required to implement grazing systems also play an important role in regional patterns of MIRG adoption. Because the grazing movement has been driven primarily by farmer-to-farmer knowledge exchange; the presence of grazing networks, the levels of institutional and financial support for these networks, and the leadership of individual farmers all appear to play key roles in farmer decision-making about MIRG (Hassanein 1999, Paine et al. 1999). Finally, the importance of contact with relatives, neighbors or other local farmers who have successfully implemented grazing

systems on their farms cannot be overstated (Hassanein 1999).

### III. What Kinds of Farms are using MIRG?

#### *Characteristics of MIRG Farms*

How do the characteristics of MIRG farms compare with non-intensive grazing and confinement operations? To provide a sense of the types of dairy farms that employ MIRG systems, Table 3a presents selected characteristics of Wisconsin dairy farm operators and their enterprises based on their type of management system. Drawn from the 1999 Wisconsin Dairy Farm Poll, the results suggest that intensive rotational grazers tend to be roughly the same age, as

Table 3a. Characteristics of Wisconsin dairy farms by grazing management practices, 1999

|   | <b>Dairy Farms by Grazing Management</b> |                                  |                        | All Dairy Farms |
|---|--|----------------------------------|------------------------|-----------------|
|   | Management Intensive Grazing Operations  | Non-Intensive Grazing Operations | Confinement Operations |                 |
| Farmer age (mean)                               | 46.3                                     | 45.6                             | 47.4                   | 46.8            |
| Percent who grew up on a farm                   | 84.2                                     | 89.5                             | 91.9                   | 89.7            |
| Percent who acquired any farmland from a parent | 58.6                                     | 67.3                             | 65.3                   | 64.1            |
| Acres operated (mean)                           | 248.4                                    | 252.2                            | 388.8                  | 326.7           |
| Acres operated per cow                          | 5.2                                      | 5.7                              | 5.0                    | 5.2             |
| Acres cropland operated per cow                 | 3.7                                      | 4.0                              | 4.4                    | 4.1             |
| Size of milking herd (mean)                     | 51.5                                     | 47.0                             | 96.2                   | 75.0            |
| <b>Distribution of herds by size (percent)</b>  |  |                                  |                        |                 |
| Under 50 cows                                   | 59.1                                     | 57.2                             | 26.5                   | 41.0            |
| 50-99 cows                                      | 33.9                                     | 40.5                             | 47.4                   | 42.4            |
| 100 cows or more                                | 7.0                                      | 2.3                              | 26.1                   | 16.6            |
| <i>total</i>                                    | <i>100.0</i>                             | <i>100.0</i>                     | <i>100.0</i>           | <i>100.0</i>    |
| Pounds of milk sold per cow per day (mean)      | 54.0                                     | 55.7                             | 62.6                   | 59.2            |
| Rolling herd average (mean) <sup>1</sup>        | 18,333                                   | 18,943                           | 21,022                 | 20,192          |
| <b>Percent using various farm practices</b>     |  |                                  |                        |                 |
| Dairy herd production testing                   | 44.4                                     | 43.3                             | 64.5                   | 55.5            |
| Total Mixed Ration (TMR) machinery              | 16.2                                     | 14.6                             | 38.9                   | 28.6            |
| rBGH (on all or part of herd)                   | 9.6                                      | 4.6                              | 21.9                   | 15.3            |
| Parlor milking system                           | 11.2                                     | 2.3                              | 17.2                   | 12.6            |

<sup>1</sup> Rolling herd averages were only collected from farms utilizing herd production testing.

non-intensive grazers or confinement operators. However, when compared with other types of dairy farm operators, fewer MIRG operators grew up on farms or acquired farmland from a parent. Also, when contrasted with full confinement operations, on average, MIRG farms tend to operate fewer total acres (248 acres versus 389 acres for confinement farms). When the number of acres operated per cow is calculated, however, the amount of land utilized by MIRG farms appears similar, if not slightly higher, than confinement farms. MIRG farmers report operating an average of 5.2 acres per cow, while confinement operators report 5.7 acres per cow. These numbers are reversed when looking at cropland, with the confinement facilities reporting 4.4 acres of cropland operated per cow, and the intensive grazers reporting 3.7 acres of cropland operated per cow.

Grazing operations tend to have smaller average herd sizes than full confinement operations. MIRG operators report an average milking herd size of 51 cows and non-intensive grazers report an average of 47 cows in contrast to confinement operators who report an average of 96 cows. While MIRG farms have smaller herd sizes than state averages, there are a handful of very large grazing operations in the state of Wisconsin that suggest it is possible to operate at a variety of scales. In our 1999 study sample, around 7 percent of MIRG operations milked over 100 cows. Herd sizes for MIRG operations in this sample ranged from 9 to 300 cows.

On average, MIRG operations tend to report somewhat lower levels of productivity than are typical for the state. While Table 3a shows that production averages on MIRG farms are well below those found on confinement operations, they are only slightly lower than the production averages reported by non-intensive grazing operations. Finally, there is a substantial amount of variability in the productivity levels reported by MIRG operators. The range in pounds of milk sold per cow by MIRG operators was quite similar to the range reported by confinement operators. In our sample, pounds of milk sold per cow per day ranged from 25 to 100 on MIRG operations and from 30 to 100 on confinement operations. These data suggest that MIRG operators may differ from each other with respect to the goals they set for productivity levels on their farms.

### *Technology Usage by MIRG Farms*

As MIRG farming systems have evolved over the past decade, distinctive patterns of technology usage have begun to emerge. Examining the use of a range of management practices, it is evident that MIRG farms as a whole utilized relatively few output-maximizing technologies or practices, such as herd production testing, TMR machinery, or rBST (see Table 3a). On average, MIRG operators were also less likely to have a parlor milking system in place. However, developing a profile of technology usage by MIRG farms is more complex than it first appears. Many of the lower rates of technology adoption observable on MIRG farms can be accounted for by the relatively smaller scale of most MIRG operations. Rates of adoption for most emerging dairy technologies and management practices are highly correlated with the size of the dairy operation (Buttel et al. 1999). With the exception of grazing techniques, adoption rates for most new technologies increase with the size of the operation.

When compared with other dairy farms of similar sizes, MIRG operators are using new technologies at comparable or, in some cases, even higher rates than other farmers (see Table 3b). For example, among dairy farms with herd sizes from 25 to 99, MIRG farms were more than twice as likely to have a parlor milking system as other types of operations. Within this size group, MIRG farms were as likely to utilize regularly scheduled veterinary visits as the average Wisconsin dairy farm and far more likely to utilize them than were non-intensive grazing farms. While MIRG farms did not utilize rBST as frequently as confinement facilities of similar sizes, they did adopt it twice as frequently as non-intensive grazing operations. MIRG farms were adopting rBST at rates close to the statewide average for this size group.

When controlling for size, the profile of technology use among MIRG farms suggests that in many cases they are more similar to the full confinement operations than the non-intensive grazing operations. The main exception to this pattern of technology use occurs with TMR machinery. Both the MIRG farms and the non-intensive grazing farms utilized TMR machinery at rates well below the confinement farms and the statewide average, even when controlling for size. This is not surprising given the greater reliance of MIRG farms on grazing as a

Table 3b. Technology use on Wisconsin dairy farms with herd sizes of 25 - 99 cows, 1999

|   | <b>Dairy Farms by Grazing Management</b> |                                  |                        | All Dairy Farms with Herds 25-99 |
|---|--|----------------------------------|------------------------|----------------------------------|
|   | Management Intensive Grazing Operations  | Non-Intensive Grazing Operations | Confinement Operations |                                  |
| <b>Percent using various farm practices</b> |  |                                  |                        |                                  |
| Regularly scheduled veterinary services     | 67.4                                     | 56.5                             | 72.3                   | 67.5                             |
| Dairy herd production testing               | 49.3                                     | 52.6                             | 61.7                   | 56.7                             |
| Total Mixed Ration (TMR) machinery          | 15.3                                     | 16.9                             | 27.4                   | 22.1                             |
| rBGH (on all or part of herd)               | 10.6                                     | 5.1                              | 15.3                   | 11.8                             |
| Parlor milking system                       | 11.3                                     | 2.2                              | 4.8                    | 5.7                              |

source of feed. The results do show, however, that as MIRG farms get larger they become increasingly likely to rely on TMR machinery. Among MIRG farms with more than 100 cows, 54.5 percent utilized TMR equipment.

It is also worth noting that advocates of MIRG in Wisconsin have often emphasized the compatibility of a grazing-based feeding system and a seasonal milking program (where the timing of herd breeding is coordinated to allow all cows to be dried off in the depth of the winter when feed is most expensive). Although MIRG operations were significantly more likely to be milking seasonally than other dairy farms, our 1997 survey results show that only 14 percent of MIRG farms have implemented this practice.<sup>4</sup>

Taken as a whole our research results on technology usage among MIRG farms suggest that these operators are selectively utilizing modern technologies and management practices in keeping with their particular farming goals and strategies. Milking parlors clearly contribute to goals of achieving greater labor efficiencies, while incorporating other production-enhancing practices such as TMR and herd production testing into grazing-based management systems may offer fewer advantages to the average-sized grazer.

#### IV. The Performance of MIRG Over Time

##### *Labor Requirements on MIRG Farms*

Survey results tend to confirm the labor savings commonly attributed to grazing-based farming systems. To our knowledge, the 1993 Wisconsin Farm Poll is the only recent random-sample survey that has gathered detailed (and reliable) information about dairy farm labor activities. However, this survey was conducted at a time when MIRG was just emerging as a force in the dairy farm sector. As displayed in Table 4, the 1993 survey found that, on average, MIRG operations required only about two-thirds as many total hours of labor per week as confinement operations (Jackson-Smith et al. 1996:38). The average hours of farm work reported from all sources (including household and hired labor) was 102.1 hours per week on the intensive grazing farms compared with over 148 hours per week for confinement operations.

When viewed from the perspective of the average number of hours worked per cow, the 1993 survey data show that the average hours of labor required per cow on MIRG farms is slightly less than on non-intensive grazing farms and slightly above that required per cow on confinement operations (see Table 4). However, when the data are controlled for size, MIRG farms appear as efficient as the confinement farms. Indeed, these data suggest that when farms of similar sizes are compared, MIRG farms

Table 4. Farm and Off-Farm Labor Force Participation on Wisconsin Dairy Farms

| <b>Dairy Farms by Grazing Management</b>          |  |  |                           |                       |
|---|--|--|---------------------------|-----------------------|
|   | Management<br>Intensive<br>Grazing<br>Operations | Non-intensive<br>Grazing<br>Operations | Confinement<br>Operations | All<br>Dairy<br>Farms |
| <b>1993 Wisconsin Farmer Poll</b>                 |  |  |                           |                       |
| Mean hours of farmwork per week                   |  |  |                           |                       |
| OPERATOR  | 70.5   | 73.5                                   | 75.4                      | 74.5                  |
| SPOUSE <sup>1</sup>                               | 17.6   | 23.3                                   | 23.4                      | 22.9                  |
| Other adults in household                         | 9.1  | 15.4                                   | 19.1                      | 17.2                  |
| <b>Total for all household members</b>            | <b>97.0</b>                                      | <b>112.2</b>                           | <b>118.0</b>              | <b>114.7</b>          |
| Non-household hired laborers                      | 5.0  | 19.1                                   | 30.2                      | 24.9                  |
| <b>All sources of farm labor combined</b>         | <b>102.1</b>                                     | <b>131.3</b>                           | <b>148.3</b>              | <b>139.7</b>          |
| Hours of farm labor (all sources) per cow milked  | 3.03   | 3.39                                   | 2.87                      | 3.05                  |
| <b>1997 Wisconsin Dairy Farm Poll</b>             |  |  |                           |                       |
| Hired any regular, non-family farm employees      | 19.3   | 15.6                                   | 33.8                      | 25.9                  |
| Participation in off-farm labor markets (percent) |  |  |                           |                       |
| OPERATOR  | 23.9   | 18.1                                   | 11.2                      | 15.2                  |
| SPOUSE <sup>1</sup>                               | 49.2   | 40.9                                   | 41.5                      | 42.7                  |
| Proportion of Total Household Income from Farming |  |  |                           |                       |
| All from farming                                  | 45.1   | 52.8                                   | 57.9                      | 54.2                  |
| More than half from farming                       | 31.7   | 31.8                                   | 28.3                      | 30.1                  |
| Evenly split                                      | 9.9  | 9.5                                    | 6.9                       | 8.1                   |
| Most from off-farm                                | 13.4   | 5.9                                    | 6.9                       | 7.6                   |
| <b>1999 Wisconsin Dairy Farm Poll</b>             |  |  |                           |                       |
| Hired any regular, non-family farm employees      | 19.4   | 14.0                                   | 27.8                      | 22.8                  |
| Participation in off-farm labor markets (percent) |  |  |                           |                       |
| OPERATOR  | 20.5   | 23.8                                   | 9.0                       | 15.1                  |
| SPOUSE <sup>1</sup>                               | 51.1   | 48.4                                   | 49.4                      | 49.5                  |
| Proportion of Total Household Income from Farming |  |  |                           |                       |
| All from farming                                  | 38.8   | 48.3                                   | 53.7                      | 48.7                  |
| More than half from farming                       | 39.4   | 34.9                                   | 30.8                      | 33.7                  |
| Evenly split                                      | 10.6   | 10.5                                   | 7.9                       | 9.1                   |
| Most from off-farm                                | 11.2   | 6.4                                    | 7.6                       | 8.5                   |

<sup>1</sup> Percent of farms where spouse is present.

require slightly less hours of work per cow.

While the total number of hours of farmwork required per week was higher on confinement dairy farms, the total hours of farmwork reported by the principal operator in 1993 was similar for various farm operations. What differed most is the mean number of hours other household adults and non-household hired labor contributed. On the intensive grazing operations, for example, other adults and non-household hired laborers account for an average of just under 9 hours of farmwork a week. By contrast, on confinement operations they account for over 47 hours a week. In summary, the labor time (by the “operator” and “spouse”) reported by the grazing operations is less than on the other operations, but the big difference in farm labor use is the lower level of labor derived from other sources, especially non-family hired labor, on intensive grazing farms.

Table 4 also presents information from the 1997 and 1999 Wisconsin Dairy Farm Polls. Recent survey results continue to show that MIRG farms employ less non-family labor than confinement farms. In addition, these results confirm that off-farm employment is more common among the MIRG households. While spouses were just as likely to work off the farm on all types of dairy farms, MIRG operators were more likely to hold off-farm jobs than other types of operators. Around 20 percent of MIRG farm operators had regular off-farm employment in 1999, compared to just 9 percent of the confinement dairy operators. Just under 50 percent of all dairy farm spouses worked off the farm in 1999, up from 43 percent in 1997.

Grazing operators reported higher levels of reliance on off-farm income than did other dairy operators. When asked what proportion of their household income came from farming in 1999, roughly 22 percent of the intensive grazers reported receiving half or more of their income from off-farm sources, compared to around 17 percent of the confinement farm households. Reliance on farm income by grazers appeared to be slightly higher in 1999 than in 1997 when more than 25 percent said that one-half or more of their income came from off the farm. This difference in the proportion of off-farm income to on-farm income persisted even when the data were controlled for size. It is unclear

whether families with grazing operations tend to require more off-farm income than confinement operators, or whether they have more available time to work off farm and thus are able take advantage of the opportunity. Having time available to work off the farm could be especially valuable to farm families in recent years given the favorable off-farm economies in many areas of Wisconsin. The financial data presented below will help examine the profitability of grazing farms in greater detail.

### *Financial Profiles of MIRG Farms*

Financial data gathered in recent years by three different projects tend to support the claims of grazing proponents that MIRG offers a viable economic alternative to large-scale, confinement dairy farming systems. Further, these studies point up the benefits of the economic flexibility associated with less capital-intensive farming strategies.

In the **Wisconsin Grazing Dairy Farm Survey** carried out by the University of Wisconsin—Extension in 1994 (Kriegel et al. 1999), a group of 560 grazers identified by county extension agents was surveyed. A total of 146 usable surveys were returned. This survey asked respondents to estimate the financial impact of grazing on eight categories of expenses and on milk production. The results from this set of questions show that implementing a grazing system can be associated with reductions in operating costs. For example, around 80 percent of respondents reported reduced expenses in the areas of gasoline, fuel, and oil costs; 71 percent cited lower veterinary costs; 67 percent had reduced repair and maintenance costs; and 58 percent reported reduced labor costs. In each category, more farmers reported decreases in costs than reported increases.

On the income side, just over a third of the respondents reported an increase in the total value of milk sold, while 40 percent reported no change and 19 percent reported a decrease. In total, around 76 percent of respondents found that their milk sales had remained the same or higher after implementing a grazing system.

In the **Wisconsin Grazing Dairy Profitability Analysis** conducted at the University of Wisconsin



sin Center for Dairy Profitability (Kriegl 2000), actual farm financial records of grazers were analyzed in depth over a period of four years (1995-1998) in order to assess the economic viability of MIRG systems. A total of 45 grazers participated in the study, although only 19 of the participants had usable records for the entire four-year period. In analyzing the farm financial records, grazers were divided into two groups:

- (1) *Low capital grazing operations* were defined as farms having the assets appropriate for a grazing operation. These operators likely entered farming with the intention of implementing a grazing system and had no need to make investments beyond those necessary for a grazing operation.
- (2) *High capital grazing operations* were defined as largely transitional farms with assets originally purchased to farm conventionally. These farms generally have the investment structure typical of a conventional farm with land, buildings, and equipment obtained at standard prices.

Data obtained from these two groups of MIRG farmers were contrasted with data collected from over 800 conventional farms through the Fox Valley and Lakeshore Farm Management Associations. In order to control for the size of the farming operation, calculations were made based on the farm income generated per cow on the different farms.

Despite the relatively small sample of grazers in this study, the research results are quite striking. Using the measure of *net farm income from operations per cow* averaged over a 4-year period, low capital grazers made \$837/cow, while high capital grazers made \$850, and conventional farms made \$587/cow. Alternately, when viewed by another measure, *investment per cow*: low capital grazers averaged \$4,864 invested per cow in 1998, while high capital grazers had \$6,477 invested per cow, and conventional farmers had \$7,291 invested. The per cow investment of grazers ranged from a low of \$3,561 to a high of \$9,973.

Finally, when analyzed in terms of *debt per cow*, in 1998, low capital grazers had the lowest debt/cow ratio. Low capital grazers had an average of \$1,636 in debt per cow, while high capital grazers had \$2,301 in debt per cow and conventional farmers had \$2,849 in debt per cow. Grazers ranged from 0 to

\$4,364 in debt per cow.

These research results confirm that the MIRG farms participating in the study can compete favorably with other types of farms in terms of net farm income, investment requirements, and debt loads. Kriegl concludes that MIRG farming systems can provide a reasonable living for a family-sized dairy operation whether they are transitioning from a conventional system or starting out as MIRG farm. He identifies three factors as critical to success: income generation, operating expense control, and investment control, cautioning that grazers should not emphasize cost control to the neglect of income generation.

The **PATS Survey Data**, while less detailed, offer the advantage of being large-scale and based on a random sample. The 1993 Wisconsin Farmer Poll contained the most detailed farm financial information of the PATS surveys. The results from this survey, as reported in detail in 1996 (Jackson-Smith et al: 37), suggest that while average total farm income was significantly lower on intensive grazing operations (\$69,379) in comparison to full confinement operations (\$146,061), total farm expenses were also significantly lower on these farms. Total farm expenses for fully intensive grazers averaged \$43,436 versus \$115,066 for full confinement operations. When the opportunity cost of the farmer's equity is factored into the analysis, the 1993 survey results indicate that total returns to labor and management on intensive grazing operations outperformed those on non-intensive grazing operations and confinement operations. Second, while total income per cow was higher on confinement farms, when costs were accounted for, the net income per cow calculated on the MIRG farms was higher.

It is also possible to compare the debt structure of MIRG farms with confinement farms utilizing more recent data from the PATS 1999 Farmer Poll. When farmers were asked to indicate the ratio of their farm debts to the value of their farm assets, the findings were somewhat mixed. Table 5 shows that a higher percentage of farms in the MIRG category have less than a 10 percent ratio of debts to assets when contrasted with the confinement operations (44 percent versus 33 percent). At the same time, however, the MIRG category shows higher numbers of farms with a farm debt-to-asset ratio above 40 percent (23 percent for MIRG farms versus 17

Table 5. Debt Characteristics of Wisconsin Dairy Farms by Grazing Management System, 1999

|                                       | Dairy Farms by Grazing Management       |                                  |                        |                 |
|---------------------------------------|---|----------------------------------|------------------------|-----------------|
|                                       | Management Intensive Grazing Operations | Non-Intensive Grazing Operations | Confinement Operations | All Dairy Farms |
| <b>1999 Wisconsin Dairy Farm Poll</b> |   |                                  |                        |                 |
| <i>Debt to Asset Ratio</i>            |   |                                  |                        |                 |
| <i>(percent within grazing group)</i> |   |                                  |                        |                 |
| No Debts Reported                     | 23.8                                    | 31.5                             | 19.9                   | 23.4            |
| Debts < 10% of asset values           | 20.8                                    | 11.9                             | 14.0                   | 15.0            |
| Debts from 10% to 40% of asset values | 31.0                                    | 44.0                             | 49.3                   | 44.1            |
| Debts > 40% of asset values           | 24.4                                    | 12.5                             | 16.8                   | 17.5            |

percent for confinement farms). It should be kept in mind that the higher debt-to-asset ratios observable on some MIRG farms may be a reflection of below average capital investments rather than sizeable debt loads; an examination of debt-to-asset ratios alone cannot determine the actual extent of a farm's debt load. Our 1993 survey, which gathered a wide range of farm financial data, found that total farm operation debts on intensive grazing operations averaged well below those on other types of dairy farms (Jackson-Smith et al: 37).

### *Quality of Life*

In examining the PATS 1999 survey data related to quality of life, the most important distinctions emerged when those who rotated their cattle to fresh pastures at least once a day, presumably the "most intensive" grazers within our MIRG category, were separated out from farmers who only moved their cattle every two to seven days or managed their pastures even less intensively. When dairy farmers were asked directly to evaluate their level of satisfaction with their family's quality of life, those who rotated their cattle once a day or more were more likely to report being "very satisfied" than were those who moved their cattle to fresh pastures less frequently or utilized confinement systems (see Table 6a). The most intensive grazers were also the least likely to report being "very unsatisfied" with their quality of life in comparison with operators of other

types of dairy systems. On the other hand, those who utilized pastures, but utilized them less intensively, appeared to be the least satisfied with their family's quality of life in comparison with the other groups.

Survey results from 1999 also indicate that MIRG farmers view the changes that have taken place on their farms over the past five years in a positive light. When questioned about how their family's quality of life had changed during this time period, the most intensive grazers again stood out as being the most positive. Those who rotated their cows at least once a day were twice as likely as the average farmer to state that their life had "become much better."

Viewed from another angle, satisfaction with one's quality of life may be influenced, in part, by the "fit" between one's occupation and one's personal goals and ambitions. Presumably, the degree to which the management system used on a dairy farm (e.g., grazing versus confinement feeding) is compatible with one's farm management goals would have an influence on perceptions of well-being. The 1997 mail survey of Wisconsin dairy farms included several questions aimed at better understanding the different goals and priorities that lead farmers to adopt different management strategies.

Table 6b includes a summary of the results

Table 6a. Indicators of Well Being and Quality of Life on Wisconsin Dairy Farms, 1999

|  | Dairy Farms by Grazing Management        |                          |                                  |      |                 |
|--|--|--------------------------|----------------------------------|------|-----------------|
|  | Management Intensive Rotational Graziers |                          | Non-Intensive Grazing Operations |      | All Dairy Farms |
|  | Move Cows Once a Day or More             | Move Cows Every 2-7 Days | Confinement Operations           |      |                 |
| How satisfied are you with your family's quality of life?<br>(percent within grazing group)            |  |                          |                                  |      |                 |
| Very satisfied   | 49.1                                     | 36.0                     | 34.5                             | 31.8 | 34.0            |
| Somewhat satisfied   | 40.0                                     | 43.0                     | 45.8                             | 48.0 | 46.5            |
| Somewhat unsatisfied   | 7.3                                      | 16.7                     | 12.5                             | 13.7 | 13.4            |
| Very unsatisfied   | 3.6                                      | 4.4                      | 7.1                              | 6.5  | 6.1             |
| During the past 5 years, how has your family's quality of life changed? (percent within grazing group) |  |                          |                                  |      |                 |
| Become much better   | 18.2                                     | 9.6                      | 5.3                              | 9.0  | 8.8             |
| Become somewhat better   | 32.7                                     | 31.3                     | 24.9                             | 29.4 | 29.4            |
| Remained the same  | 32.7                                     | 39.1                     | 50.9                             | 40.5 | 41.8            |
| Become somewhat worse  | 12.7                                     | 17.4                     | 14.8                             | 15.7 | 15.6            |
| Become much worse  | 3.6                                      | 2.6                      | 4.1                              | 5.3  | 4.4             |
| How many years would you estimate you will be able to continue farming?                                |  |                          |                                  |      |                 |
| Already out of farming   | 1.8                                      | 0.9                      | 3.0                              | 1.2  | 1.8             |
| One more year  | 9.1                                      | 7.2                      | 5.4                              | 7.8  | 7.5             |
| 2 to 5 years   | 10.9                                     | 33.3                     | 22.0                             | 24.2 | 24.0            |
| 6 to 10 years  | 18.2                                     | 15.3                     | 18.9                             | 21.4 | 19.7            |
| Sufficient farm returns to farm indefinitely   | 45.5                                     | 30.6                     | 34.1                             | 37.9 | 36.5            |
| Sufficient off-farm returns to farm indefinitely   | 14.5                                     | 12.6                     | 16.5                             | 7.5  | 10.5            |

<sup>1</sup> Based on 1997 Wisconsin Dairy Farm Poll.

from this set of questions asking farmers to rate the importance of a range of factors in their farm decision-making. MIRG farm operators were less likely to say that maximizing productivity was important, and more likely to emphasize the goals of avoiding debt and reducing costs of production (particularly the cost of producing feed). Interestingly, there were few differences between MIRG and confinement farmers with respect to the goal of reducing the use of purchased inputs, a finding that is inconsistent with the qualitative data. Overall, a large proportion of all types of farmers expressed support for goals identified with both types of management systems.

### Future Expectations

Another way of assessing the long term outlook for MIRG is to explore the expectations and plans that MIRG farmers have for the future. As a final indicator of satisfaction and well-being, dairy farmers were asked to indicate whether they were

likely to disperse their herd within the next one to five years, within the next 10 years, or whether they had sufficient income to farm indefinitely. As indicated by the response patterns displayed in Table 6a, clear differences emerged across the different categories of grazing management systems. And, just as in analyzing the results from the quality of life questions, the group of farmers who rotated their cows most frequently stood out as distinctive from the other groups.

The dairy farmers who moved their cows most frequently, presumably the most intensive managers, were slightly more likely than other farmers to say that they planned to go out of farming within the year. However, when their future plans were examined over the next five years, this group of frequent movers was the least likely to say that they would be getting out of farming. Only 21.8 percent of those who moved their cows once a day or more said

Table 6b. Goals of Operators on Wisconsin Dairy Farms by Grazing Management Practices, 1997

|   | Dairy Farms by Grazing Management        |                          |                                  |      |                 |
|---|--|--------------------------|----------------------------------|------|-----------------|
|   | Management Intensive Rotational Graziers |                          | Non-Intensive Grazing Operations |      | All Dairy Farms |
|   | Move Cows Once a Day or More             | Move Cows Every 2-7 Days | Confinement Operations           |      |                 |
| How Important are each of the following goals to you when you make important farm decisions? (percent indicating "very important") <sup>1</sup> |  |                          |                                  |      |                 |
| Maximize productivity (milk output) per cow   | 35.1                                     | 37.5                     | 42.7                             | 55.1 | 48.9            |
| Maximize productivity (milk output) per worker  | 26.3                                     | 14.3                     | 18.3                             | 28.1 | 23.7            |
| Minimize the use of purchased inputs  | 39.5                                     | 43.2                     | 39.8                             | 42.0 | 41.4            |
| Avoid taking on new debt  | 57.9                                     | 63.0                     | 54.2                             | 44.9 | 50.3            |
| Reduce the costs per hundredweight of producing milk  | 71.1                                     | 54.4                     | 52.4                             | 55.6 | 55.2            |
| Reduce the per-unit costs of producing feed   | 60.5                                     | 45.6                     | 39.6                             | 46.5 | 45.0            |

that they would be getting out of farming in the next one to five years as compared to 41.4 percent of those who moved their cows every two to seven days, and 33.2 percent of confinement operators.

In addition, this group of frequent movers was the most likely to say that they had sufficient returns from farming to farm indefinitely. Table 6a shows that 45.5 percent of this most intensive group of grazers reported sufficient farm returns to farm indefinitely versus an average of 37.9 percent for confinement operators. If off-farm returns are taken into account, this difference in those who said that they could farm indefinitely becomes even more pronounced. As discussed previously, MIRG operators are more likely to have sources of off-farm income, perhaps due to the lower labor requirements on their farms. When off-farm income and farm income are combined, 60 percent of the most intensive grazing group reported sufficient income to farm indefinitely, while only 45.4 percent of the confinement operators said they had enough income to farm indefinitely.

Considered as a whole, PATS survey findings indicate that the group of MIRG farmers who utilize pastures most intensively, those who rotate their cattle once a day or more, have the most positive outlook towards the future and the long-term viability of their farms. Other dairy farmers who utilize pastures, but do so less intensively, have less optimistic expectations about the futures. When less intensive pasture users are compared with confinement operators their

future expectations are quite similar.

### *Experiences of Farmers who "Converted"*

Despite the direct comparisons between MIRG and confinement dairy operations noted above, an assessment of the impacts of MIRG on quality of life is difficult to make since one doesn't really know what would have happened on those same farms if they were to employ a different management system. In other words, it is likely that some of the differences (in performance or satisfaction) between the various types of farms are the result of the scale of operation, individual personalities, work experiences and financial assets accumulated prior to farming, and other factors. If one were to take a typical confinement farm and convert it to a MIRG operation, it may not necessarily assume the characteristics listed in the tables above.

One way to assess the relative impact of two contrasting management systems on a farm family's quality of life is to explore how a change in management system on a particular farm is evaluated by the farm family. One survey in Wisconsin attempted to do this with a group of MIRG dairy operators who had recently converted from a confinement system to a MIRG-based operation. The 1996 Wisconsin Grazing Conference survey involved short 2-page questionnaires distributed to participants at the annual state grazing conference. Fifty-three active Wisconsin dairy operators who were using MIRG practices (by our definition) filled out the questionnaire, and

roughly three-quarters of these (39) indicated they had converted to MIRG after dairying using confinement practices for a number of years.<sup>5</sup> These farmers were asked how their farm enterprises had changed since they had switched to MIRG. The results of this effort are summarized in Table 7.

The results suggest that most of those who had converted to MIRG were now milking more cows on roughly the same amount of acreage. Moreover, net farm income on almost a third of these farms was reported to have increased (in fact it decreased on only 8 percent of the MIRG farms). MIRG households had become somewhat more involved in off-farm employment since the switch from confinement farming. Overall, total household income tended to be higher, and most of the respondents reported having taken more days of vacation with their family members since converting to MIRG. Not surprisingly, the value of the farm machinery owned by a significant fraction of the farms declined.

Taken together these research results evaluating the relative performance of MIRG farms over time are quite promising. On the whole, operators of MIRG farms appear satisfied with their choice of management system. The available data tend to support the claims by MIRG proponents that well-managed grazing systems can offer financial, labor,

and quality of life benefits. The long term outlook for MIRG appears bright given the number of MIRG farms who plan to continue farming indefinitely and the increasing acceptance of MIRG by the farm community as a whole.

## VI. Conclusions

Wisconsin dairy farmers adopted MIRG practices in increasing numbers throughout the 1990s. Current estimates place the proportion of MIRG dairy farmers statewide at around 22 percent, with the greatest concentrations found in the north central and western portions of the state. Although recent studies show steady growth in the rate of MIRG use, there is evidence that Wisconsin grazers are also intensifying their reliance on pastures as a primary source of feed for their milking herds. Moreover, results from a study of recent entrants into dairy farming show that nearly 30 percent reported utilizing grazing-based systems. Still greater numbers of beginning dairy farmers reported plans to implement grazing practices in the near future.

In comparison with other Wisconsin dairy farm operators, MIRG farmers tend to come from similar age groups and farm backgrounds. However, when compared to full confinement operations, MIRG farms had fewer total acres and smaller average herd

Table 7. Farm Enterprise Changes Since Respondents Started Using MIRG

|   | Increased<br>Significantly<br>(> 25%) | Increased<br>a Little | About<br>the Same | Decreased<br>a Little | Decreased<br>Significantly<br>(> 25%) | Not<br>Sure |
|---|---------------------------------------|-----------------------|-------------------|-----------------------|---------------------------------------|-------------|
| <b>1996 WI Grazing Conference Survey</b>              |                                       |                       |                   |                       |                                       |             |
| <i>Percent of dairy farmers who converted to MIRG</i> |                                       |                       |                   |                       |                                       |             |
| Total acres operated                                  | 10.5                                  | 15.8                  | 63.2              | 5.3                   | 5.3                                   | 0.0         |
| Number of cows milked                                 | 18.4                                  | 39.5                  | 34.2              | 5.3                   | 0.0                                   | 2.6         |
| Net farm income                                       | 15.8                                  | 52.6                  | 23.7              | 7.9                   | 0.0                                   | 0.0         |
| Off-farm employment<br>by household members           | 2.6                                   | 21.1                  | 60.5              | 2.6                   | 7.9                                   | 5.3         |
| Total household income                                | 15.8                                  | 47.4                  | 31.6              | 5.3                   | 0.0                                   | 0.0         |
| Vacation days taken by household                      | 15.8                                  | 52.6                  | 31.6              | 0.0                   | 0.0                                   | 0.0         |
| Value of farm machinery                               | 0.0                                   | 15.8                  | 34.2              | 31.6                  | 15.8                                  | 2.6         |

sizes. These differences in the amount of acreage operated by farmers within the different management categories became less pronounced when farmland was analyzed in terms of the acres operated per cow.

Most MIRG farmers reported lower production averages than those for the state as a whole. As a group, MIRG operations were less likely to employ output-maximizing technologies, such as TMR machinery, rBST, or herd production testing. However, when the data were controlled for size, MIRG operations were just as likely or even more likely than other semi-confinement types of operations to utilize many recent technologies. Among farms of similar sizes, MIRG farms were more likely than any other type of farm, including full-confinement operations, to have constructed milking parlor systems. MIRG farmers appear to be selectively utilizing modern production-maximizing technologies in diverse ways in accordance with their individual management strategies. These research data suggest that MIRG operators are emphasizing production levels to varying degrees, confirming that there is no “one” correct way to implement MIRG systems.

When their performance is evaluated over time, existing evidence suggests that MIRG dairy farms are realizing significant labor savings. Survey respondents from MIRG farms report lower total numbers of labor hours required. When analyzed in terms of the weekly labor hours required for each milk cow, MIRG farms appear just as efficient, if not more efficient than other types of dairy farms. In addition to averaging less total hours of farmwork, many MIRG families report that the vacation days taken by their household have increased since converting to a MIRG system. More research is needed to determine the significance of the greater participation by MIRG operators and family members in the off-farm labor force.

Preliminary financial data on the economic viability of MIRG as a management strategy appear promising. Selected MIRG farms show higher net farm income per cow and lower levels of investment per cow when contrasted with other types of farms. In addition MIRG farming systems, because of their lower investment and labor requirements, offer the advantage of economic flexibility. When asked to evaluate their financial situation since converting MIRG, the majority of grazers reported that their net farm income had increased.

Finally, from the standpoint of lifestyle considerations, MIRG systems appear to offer significant benefits. When questioned about their family’s quality of life, MIRG operators reported higher levels of satisfaction than dairy farmers who used pastures less intensively or used full confinement systems. Further, among those who utilized MIRG systems, significant differences emerged between those who rotated their cattle more and less frequently. The more rigorously the farmers managed their pastures, the more likely they were to report satisfaction with their quality of life. The group of grazers who reported moving their cows to fresh pastures once a day or more were distinctive in their substantially higher tendency to say that they were “very or somewhat satisfied” with their family’s quality of life and that their quality of life had improved over the past five years. These findings suggest that obtaining the highest benefit from MIRG systems is highly dependent upon management decisions.

The grazing research conducted by PATS and others during the 1990s has important implications for farmers, policy makers, and university research and extension workers in the state of Wisconsin and elsewhere in the country. The widespread adoption of MIRG practices throughout Wisconsin confirms that intensive rotational grazing can no longer be viewed as a fad or a niche form of production. In the face of continual transformations in the dairy industry, MIRG offers a viable option for family-scale dairy farmers concerned about improving their long-term profitability and their family’s quality of life. The expertise required for successfully implementing MIRG systems, however, is quite specialized and distinct from conventional livestock management strategies. As documented by Paine et al. (1999), even limited amounts of agency support can have a far-reaching impact on the effectiveness of farmer-based grazing networks and knowledge exchange systems. Increased institutional support for MIRG-related research needs and farmer-to-farmer learning networks could help ensure that all interested farmers have access to the information and assistance they need to make sound management decisions.

## Endnotes

<sup>1</sup> Prior to 1997, PATS was known as the Agricultural Technology and Family Farm Institute (ATFFI).

<sup>2</sup> Please note that this question was not asked on the 1999 Wisconsin Dairy Farm Poll.

<sup>3</sup> Counties with less than 200 dairy herds were not highlighted as our results were not statistically significant for these regions.

<sup>4</sup> This question was not asked in 1999.

<sup>5</sup> The others had entered dairy farming directly as a MIRG operator.

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