# CHAPTER 4: GRAZING PRODUCTION



**These cows, ready for fresh pasture, are eyeing the paddock next door.**

## Background

Dairy cows scattered across pastureland were once a common sight in the upper Midwest. However, pasturing dairy cows fell out of favor. In part, this was because grazing often meant placing cows on a parcel of fenced land and allowing them to graze for an unlimited period. Overgrazing resulted in the destruction of grasses and plants, and ultimately meant more work and frustrations for dairy producers. In addition, a trend toward more specialized farms, availability of inexpensive grain, and increased emphasis on increasing production drove the adoption of confinement systems.

Eventually, research and information sharing produced greater understanding about grazing management and helped revive the practice. Publications shed light on effective grazing management. One of these was *Grass Productivity*, a book about rotational grazing, written by French author Andre Voisin in 1959 and reprinted in 1989. In the 1980s, prolific authors like Allan Nation, Alan Savory, and Joel Salatin promoted a management-intensive approach to the practice. University bulletins like *Pastures for Profit*, publications like *Stockman Grass Farmer* and *Graze*, meetings and conferences, and grazing groups or clubs are more current resources for graziers and provide new technical information on the management of grazed lands and animals. Now, a growing number of dairies in the Upper Midwest incorporate grazing as a successful method of feeding cows and producing milk.

Most graziers in the Upper Midwest rely on management-intensive rotational grazing (MIRG) to keep pastures productive and control the composition and quality of what their cows are eating. In this system, farmers rotate the animals from one paddock to another within a prescribed period of time, usually after each milking. The practice allows the root systems of the grasses and legumes to regrow, creating a self-sustaining pasture.

Grazing offers a low-cost method of producing milk. Animals harvest a significant percentage of their own feed, reducing machinery, storage, and labor expenses. Facility costs can also be lowered considerably. For some producers, the method offers a change in lifestyle that they find to be a positive one. There are graziers who feel they are growing a healthy food, and point to studies that show higher levels of beneficial fats in milk from grazed cows (Dhiman et al., 1999).

**For complete information on new and refurbished milking centers, see Chapter 8, *Milking Center Options*.**

### Housing and bedding

In grazing operations, keeping overhead costs low is an integral part of making the operation profitable (Nott, 2003). Animals are usually provided with minimal shelter using existing buildings. There are many options for housing. In Minnesota and Wisconsin, farmers may continue to use tie stall buildings for harsh winter weather. In Michigan, an older free stall barn may be used. Others keep animals outside on a bedded pack, providing some sort of windbreak. Pole buildings without an inner stall structure may also serve as protection against the wind and cold. Cold weather is generally well tolerated by dairy animals that have been allowed to acclimate. Wind presents the greatest risk; therefore windbreaks provide protection and comfort to cows housed outside.

### Feeding

In the Upper Midwest, grazing can begin in April or May, depending on the farm's location. Many producers continue to graze cows until October or November, depending on summer rainfall and temperatures. Depending on the supplemental feed used and the forage productivity of the pasture, a grazing herd needs approximately one to two acres of pasture per cow milked. Most farms use two acres per cow. Pasture should be within one mile of the milking parlor because productivity depends on the animals getting quickly from the parlor back to the pasture, maximizing their opportunity to eat forage, while minimizing energy expended in walking. (Johnson, 2005; Nott, 2003) Added grain or supplements may be fed at milking time or delivered to the paddocks for the cows to eat there.

Diet management is important for graziers. Some herds use grazing without any additional feed and are successful. Others experience problems with body condition and reduced milk yield and fat content as a result of the grazing diet. Adding supplementary feed may offer improved performance compared with a grazing-only diet. Well-managed pastures provide more protein and energy than poorly managed pastures, but are generally lower in fiber. If the pasture is not properly supplemented, farmers may observe loose manure, reduced milk fat and milk yield and a lowered body condition score (Muller et al., n.d.).

**TABLE 6:** ***Characteristics of forage legumes***

| Legume | Heat/ drought | Wet | Winter injury | Frequent cutting/ grazing | Soil salinity | Soil acidity | Soil alkalinity | Seedling vigor | Ruminant bloat-inducing? |
|---|---|---|---|---|---|---|---|---|---|
| **Alfalfa** | **E** | **P** | **G** | **F** | **F** | **P** | **F** | **G** | **Yes** |
| **Alsike clover** | **P** | **E** | **P** | **P** | **F** | **G** | **G** | **G** | **Yes** |
| **Birdsfoot trefoil** | **F** | **E** | **F** | **G** | **F** | **G** | **G** | **P** | **No** |
| **Cicer milkvetch** | **G** | **F** | **E** | **F** | **F** | **F** | **E** | **P** | **No** |
| **Crownvetch** | **G** | **P** | **F** | **P** | **F** | **G** | **P** | **P** | **No** |
| **Kura clover** | **F** | **G** | **E** | **E** | **F** | **F** | **F** | **P** | **Yes** |
| **Red clover** | **F** | **F** | **F** | **F** | **F** | **G** | **P** | **E** | **Yes** |
| **Sweetclover** | **E** | **P** | **E** | **P** | **G** | **P** | **E** | **G** | **Yes** |
| **White clover** | **P** | **G** | **F** | **E** | **F** | **G** | **P** | **G** | **Yes** |

**E = EXCELLENT | G = GOOD | F = FAIR | P = POOR**

*Source: Sheaffer et al., 2003. Used with permission.*

### Grazing pasture management

Beginning graziers may convert land that is difficult to farm because of uneven terrain, land that is currently productive cropland, or woodland (Loeffler et al., 1996). A number of graziers use frost seeding and winter their cows on pasture to improve soil and develop the pastures. A variety of forage grasses and legumes can be used (see Table 6). Often, paddocks are planted to different species and mixtures because forage species grow and mature at different times during the season. Cool season grasses predominate in the spring, early summer, and fall. Warm season species and annual grasses provide forage during hot summer months. Sometimes, a complement of perennial legumes and annual grasses is planted.

A significant percentage of a grazing dairy producer's time is spent observing and maintaining pasture. Often, MIRG means cattle graze when pasture growth reaches a certain height — for example, 6 to 10 inches tall. Then the farmer moves the animals to a fresh pasture when the cows have reduced the height down to 2½ to 3 inches (Sullivan, et al., 2000). Many producers move the animals to a new paddock after each milking. This means moving animals to two fresh pastures each day.

Management changes with the seasons. In the spring, when grass production is flush and highly nutritious, managers may reduce paddock size. Dairy operators mechanically harvest hay on part of the acres during this productive growing period and store it for the dry periods of the summer or for winter when grazing is no longer possible. Sometimes the forage is stored in long plastic bags. High-moisture hay — baled and wrapped — has become more popular in recent years and is an effective, low-cost method of storing quality forage.

Graziers monitor the differing rates of growth between plant species. They also watch for selective grazing which can cause a decline in pasture quality over time. Production is often tracked, to correlate grazing with levels of milk output. Many producers consider the cows' stages of production and give individual attention to diet. Some also cater to the different nutritional requirements of high- and low-producing animals.

Some graziers are satisfied with the production and economic results of using rotational grazing as the sole source of feed for the herd. The result may be milk production that is about one-half that of cows on a conventional dairy diet (Dennis Johnson, personal communication, 2005). Feed choices are made based on the goals and objectives of the farm. Depending on the level of feed supplementation, graziers could see lower feed costs during the grazing season relative to confinement dairies (Margot Rudstrom, personal communication, 2005). In spite of decreased production commonly associated with grazing, reduced production costs can translate into satisfactory profits. Producers should calculate the profitability of additional supplementation, taking into account changing milk and grain prices.

Grain and other supplemental feed may be grown on the farm or purchased. Some farms provide silage for winter months using preexisting silos, bags, or piles. In the interest of keeping overhead costs to a minimum, graziers often opt for the least costly method of providing feed.

### Fencing and watering

Fencing and watering options abound and are as individual as the farms themselves. Fencing is an integral part of pasture rotation (Nott, 2003). Well-maintained fencing systems are critical to keeping cows "in" and preserving good relations with neighbors. One option uses high-tensile wire, with posts no more than 60 ft apart. High tensile perimeter fences provide an electrical as well as a physical barrier. The cost of this fence ranges from 15 or 20 cents per foot to $1.25 per foot, including installation, depending on the wire and post configuration (Daniel Hall, personal communication, 2006; Vance Haugen, personal communication, 2004).

**Permanent perimeter fence, portable electric fence, and watering systems are important components of most grazing operations.**

Most operations include a moveable system that allows pastures to be subdivided into smaller paddocks as needed. The fences that subdivide the pastures into paddocks use one light wire on a portable spool. They are moveable, have step-in posts, and carry electricity. Farmers may be eligible for state or federal grants to defray the cost of adding fences, lanes, and watering stations. State departments of agriculture, the USDA Natural Resources Conservation Service, and Extension offices can all direct farmers to available assistance and can help producers create grazing plans like the one shown in Figure 1. Each state has laws with specifications for fence requirements along property boundaries.

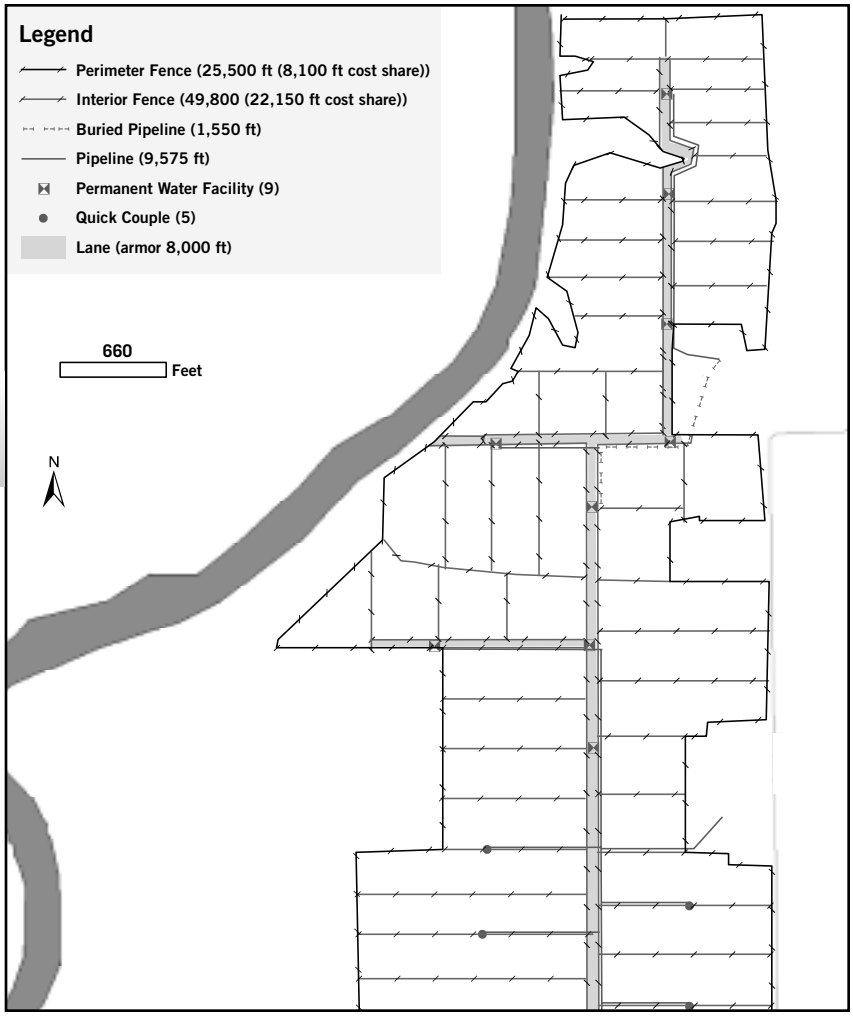


**FIGURE 1:**
***A grazing plan created by staff at the Minnesota Department of Agriculture***

Water is the lowest-cost essential component of a cow's diet (Dennis Johnson, personal communication, 2005). Watering systems vary from farm to farm. Some graziers position watering stations between paddocks. This method provides cows water in every paddock. Usually, a valve system allows producers to run water from a main line to the paddock that is in use. A float shuts off water when the tanks are full. Many factors, including the topography and elevation of the land, determine the cost of watering systems. A 50- to 100-cow dairy employing a simple system can cost $2,000–$3,000. The cost includes a ¾ inch to 1 inch line with valves to shut off various parts of the system, movable tanks, and a couple of float valves (Vance Haugen, personal communication, 2004). Other options include mobile water tanks that can be moved from paddock to paddock along with the cows.

**Portable watering systems ensure that cows have access to water, the lowest-cost essential component of a cow's diet.**

Well-built lanes are important for moving cows from place to place. Appropriate drainage and solid footing for the cows will help keep the herd healthy and simplify the transition from paddock to paddock. A small herd (100-head or fewer) usually uses an 8 ft-wide lane, for which the cost of liner and gravel is between 75 cents to $1.50 per linear foot (Vance Haugen, personal communication, 2004). When choosing materials for lane construction, farmers have many options: Sand, aggregate lime, and paving materials such as concrete may be used. Wider lanes are not necessary, but they allow larger vehicles to use them. As herds grow and corresponding traffic increases, lanes will require more management and attention.

### Herd health and biosecurity

Grazed-herd biosecurity often differs from confinement operations. Replacement heifers and bull calves may need more shelter, shade, or water than the cows require, depending on the season.

Health issues also differ for grazing animals. Farmers who have grazing herds report that grazing results in lower stress on the animals, which helps to reduce the cows' vulnerability to disease and infection.

In general, feet and leg problems are significantly less common than in confinement systems. Cows with mobility problems before a transition to grazing are culled from the herd. On sod, the hooves wear normally, and there is often no build-up of manure. Exercise benefits the animals' overall health (Dave Wolfgang, personal communication, 2004).

To prevent the animals from overheating, shade is usually provided to the cows during hot weather. Shade may be provided by moving cows to a shaded area on the hottest days or by providing a moveable shade.

Grazed herds are often closed and provide their own replacement heifers, reducing the opportunity for outside pathogens to enter the system. Good sanitation, dry bedding, and careful management of animals is also a factor in healthy herds with lower somatic cell counts. In addition, pastured animals are less likely to lie in manure, and thus have less exposure to the pathogens that can cause bacterial mastitis.

Bloat, while infrequent, can be devastating in grazed herds. Fresh legumes like clover and alfalfa are most likely to cause bloat. In addition, grazed herds are potentially exposed to more parasites than confined cows. However, a number of graziers say they do not find parasites to be a health issue. Many strategies to reduce parasites can be employed. For example, some producers cut hay to strategically keep the cattle out of pastures for a period, denying a host to the parasite for its life cycle (Dave Wolfgang, personal communication, 2004). Parasite loads should be monitored before implementing a control program.

Seasonal dairies need their cows to calve during a short window of time and so may use hormone injections to synchronize estrus for breeding. However, since one of the primary goals of many graziers is to reduce the cost, most don't use hormone treatments.

### Genetics and breeding

Breeding can be accomplished through artificial insemination; however, some graziers use bulls for natural breeding. While some farms still rely on Holsteins to produce milk, many graziers are crossbreeding with breeds like Jersey, Brown Swiss, Ayrshire, Normande, Shorthorn, Dutch Belted, Scandinavian Red, and Montbeliarde in order to boost reproduction, health, and longevity (Hansen, 2005).

### Performance and scale

Grazed herds are often small; usually, they have fewer than 200 cows. Many have fewer than 100. However, herds can be considerably larger. Productivity varies widely. Management decisions, including adding water to paddocks and supplements to diet, play a significant role in influencing milk output. A seasonally calving farm dependent on grass alone may yield 11,000 to 14,000 pounds of milk per cow per year. Herds that are fed additional grain supplements have higher yields and can achieve 17,000 pounds per cow per year (Johnson, 2005 and UMN-CFFM). When herds are moved from confinement to pasture, a farm may see changes in milk yield, with a production decrease most common. In a survey of dairy herds using the grazing method, 29 percent reported a decrease in production, while 22.5 percent reported an overall increase in production (Kriegl et al., 1999).

**Some grazing operations offer supplemental feed and minerals along fence lines.**

Production does not always translate to profit, however. While lower input systems result in lower milk production, many graziers report the system is profitable. The economic performance of a grazing herd is impacted by several factors. Most graziers see lower vet bills than their conventional counterparts. For 354 dairies reporting their expenses to the University of Minnesota Center for Farm Financial Management between 2002 and 2004,

the average vet cost was $43 per cow compared to a non-grazing average of $100 per cow (UMN-CFFM). Some dairy graziers report bills as low as $12 per animal per year (Forgey, 1996).

Fertilizer, seeding, fuel, machinery, and equipment costs are also reduced. Overhead costs such as buildings and manure-holding facilities are generally considerably lower for a grazing herd. Small cost savings in numerous areas of production add up to compensate for reduced milk production. Low culling rates allow many graziers to sell their young stock for added income. Because of these savings, rolling herd averages are not the best indication of the profitability of grazed dairy farms.



### Manure management

Manure management costs are relatively low for a herd on pasture. Few grazing systems have the overhead cost of a manure-holding unit. Cows deliver most of the manure to the fields as they graze. Depending on the type of housing used and the type of bedding used, there may be straw or some other organic material from winter bedding that may need to be incorporated into crop or pasture fields as fertilizer. Manure management and waste management plans focus on manure and water from milking parlors or other holding areas.

### Social and environmental concerns

Many graziers say the kind of outdoor work that grazing requires is healthy and enjoyable. Nutrient management may be simplified on a grazed farm, but bedding and wastewater from the milking parlor must still be applied to land in an environmentally responsible way in accordance with local and state regulations.

Because pastures are most often planted to perennial forages, water quality in local streams can benefit from reduced erosion. Chemical use is minimal on grass-based operations, and the soil and root structure of pasture plants can help trap nutrients and improve groundwater quality as well. In addition, the water holding capacity of the soil usually increases. Some farmers report improved soil health. Research, including water sampling, has demonstrated that grazed land reduces nutrient and chemical runoff and silt erosion dramatically (DiGiacomo et al., 2001). In addition, pastures are attractive to and provide habitat for wildlife. In particular, meadow birds are a common sight on pastureland.

*Photo by Robin Martinek*

**While many people find the sight of cows on pasture picturesque, conflicts with neighbors can still occur.**

Neighbors who see cows outside usually find the sight pleasing. Grazing does not ensure that all relations with neighbors will be rosy, however. When the cows get out — as they occasionally do, even with the best maintained fencing system — they can cause destruction to neighbors' property, souring relations. Some neighbors may be intolerant of waiting for cows to cross the road, or may complain about delays in cleaning up manure that is left behind. The neighbor's dogs may find out that it's fun to come onto your property and chase your cattle. Disagreements about fences and fencing can also be a problem (Kevin Stuedemann, personal communication, 2005).

**TABLE 7:** ***Cost of production for grazing farms (per cow), Minnesota, 2002-2004***

| | |
|---|---|
| **Total number of farms reporting** | **34** |
| **Feed and bedding** | **$868.25** |
| **Labor and custom hire** | **$107.37** |
| **Hauling and marketing** | **$76.34** |
| **Health and breeding** | **$65.30** |
| **Total direct costs** | **$1,277.99** |
| **Average number of cows** | **233.4** |

Detailed report available at: http://www.finbin.umn.edu/output/52758.htm

*Note: Because there are relatively few grazing farms in FINBIN at present, we did not split this report into top and bottom 40% of net return, as has been done in other cost of production tables in this book.*

*Source: University of Minnesota Center for Farm Financial Management FINBIN*

Note: Costs of production for tie stall, free stall, and grazing systems are compared in a summary table at the end of Chapter 4 (Table 9). Note that these records do not necessarily predict results on any one farm or in all areas for all farmers.

To find current cost of production records for your state, contact:

**Michigan**
Department of Agricultural Economics
Michigan State University
Christopher Wolf (517) 353-3974 wolfch@msu.edu or
Stephen Harsh (517) 353-4518 harsh@msu.edu

**Minnesota**
Center for Farm Financial Management
University of Minnesota
(612) 625-1964 or (800) 234-1111
cffm@cffm.agecon.umn.edu

**Wisconsin**
Center for Dairy Profitability
University of Wisconsin
Bruce Jones (608) 265-8508 bljones1@wisc.edu

**TABLE 8:** ***Capital start-up investment for grazing system***

| | |
|---|---|
| **PADDOCK WATERING** | **$2,000-$3,000** |
| **PADDOCK FENCING – movable and internal fencing** | **15 to 20 cents/linear foot** |
| **BOUNDARY FENCING** | **$1/linear foot** |
| **EIGHT-FOOT-WIDE GRAVEL LANE** | **$.75 to $1.50/linear foot** |

*Source: Vance Haugen, personal communication, 2004*

**If you are considering adding or changing a facility, see the *Resources* section at the end of this book.**

### Resource people

The following people contributed information for this chapter. You will find complete contact information in the *Resources* section the end of this book.

Kathy Arnold, grazing dairy, Truxton, NY

Ben Bartlett, grazing specialist, Michigan State University

Dave Combs, professor of dairy science nutrition (dairy nutrition, forage utilization, and grazing systems for dairy cattle), University of Wisconsin

Darrell Emmick, state grazing land management specialist, USDA – Natural Resources Conservation Service, New York

Dave Engel, organic grazing dairy, Soldiers Grove, WI

Daniel Hall, Southwest Minnesota K-Fence

Les Hansen, professor of dairy cattle genetics, University of Minnesota

Vance Haugen, grazier and extension agriculture agent, University of Wisconsin Extension

Karen Hoffman-Sullivan, animal scientist, Natural Resources Conservation Service, New York

Dennis Johnson, professor and dairy specialist, University of Minnesota

Florence and David Minar, organic grazing dairy with on-farm processing, New Prague, MN

Joe Molitor, grazing dairy, Saint Cloud, MN

Margot Rudstrom, agricultural economist, University of Minnesota

Kevin Stuedemann, organic grazing dairy, Belle Plaine, MN

Art Thicke, grazing dairy, La Crescent, MN

Francis Thicke, organic grazing dairy with value-added processing, Fairfield, IA

Dave Wolfgang, extension veterinarian, The Pennsylvania State University

# A Hybrid Confinement-Grazing System

**The Konkel and Johnson Families**
**Silver Sky Dairy**
**Hesperia, Michigan**

After debating the merits of grazing compared to confinement feeding for their dairy herd, the partners at Silver Sky Dairy made a decision — and chose both. That was 10 years ago, and today, they say, it works great and they love it.

Frank Konkel said it's like having a summer vacation. When the cows go out to pasture in May, there comes a welcome reduction in scraping, manure hauling, and feed handling after the long Michigan winter.

"People thought we were nuts when we started this," Frank said. "But now they see us having more free time for our families." They also have cows to sell because the animals are healthy and they don't cull as many.

Frank's brother-in-law and partner Lance Johnson sees these benefits even more clearly. Lance became a partner with his own father on the Johnson family farm and worked in the labor-intensive 75-tie stall barn. "I didn't want a whole lifetime of that," Lance said.

Lance's life really changed in 1994, when he and his wife Nancy formed a partnership with Lance's sister

**Silver Sky Dairy is a hybrid confinement-grazing operation that uses both pasture and stored feed.**

**Lance and Nancy Johnson (l) and Frank and Shari Konkel (r) co-own Silver Sky Dairy.**

Shari and Shari's husband, Frank Konkel. They devised a new ownership structure and expanded the herd size to about 150 cows. They also built new facilities—free stall barns and a milking parlor — on a flattened ridge in the middle of 140 acres of rolling ground they intended to devote to grazing.

Right from the start, they wanted to get the best of both worlds. "The New Zealand grazing model doesn't work here," Lance said. "They have lots of grass year-round, and we don't." In Hesperia, Michigan, winter — and sometimes a dry summer — ends pasturing. "Unlike the New Zealanders, we have cheap grain," he noted. Production benefits from grain, so it makes sense to feed it.

What's more, in the northern U.S., few graze all twelve months. Instead, graziers sometimes aim for seasonal dairying — drying off the cows in late winter and feeding a low-powered hay ration as they wait for spring calving and fresh grass. This approach to grazing takes top skills in both forage and breeding management.

Few dairy farms try to get the best of both grazing and confinement. At Silver Sky, production in early 2004 was rolling along at 23,700 pounds per cow. The operation now milks about 280 cows, double where they were when the partnership started.

To protect the farm as a business, the families formed a limited liability company (LLC) in 2002. An LLC structure allows owners the tax advantages of a partnership, but provides corporation-like protection from the private actions of individuals.

# FARM PROFILE: **CONFINEMENT-GRAZING OPERATION**


**Lance and Frank use a cart to monitor pasture, check fences, and bring in cows.**

## Benefits of grazing

"The cows are definitely healthier," said Frank. "It shows up in lower culling rates and greater longevity. The cows have better feet and legs with fewer calving difficulties."

"Getting cows off concrete, even just part of the year, really helps," said Shari. She is a frequent morning milker in the double-10 milking parlor, relieving herd manager Mark Sumner, who does most of the milking.

"Fresh air and sunlight will turn cows around, and green grass will right a lot of wrongs," Frank said. "A cow that's not feeling well will lay depressed in a free stall, but she'll get up and walk around on pasture."

"Our cows breed back and we don't cull many for fertility reasons," Frank said. "We think grazing is partly responsible for that." The Johnsons and Konkels agree keeping bulls is dangerous and impedes genetic progress. The farm has relied on AI for more than 30 years.

## Isn't it costly to maintain two forage systems?

"We spent about $11,000 for the fences and water system," Lance said. "A part of that, $3,600, was cost-shared under a government program." Silver Sky's equipment is used less and lasts longer. Plus, they invest less in manure spreaders, scrapers, and loaders, and they don't have to use mowers, rakes, and balers on the pasture.

Pasture is made up of a mixture of orchardgrass, native grasses, and clovers. "The sod seems to get thicker every year," Lance said. Efforts to improve pasture by planting more palatable grasses, such as ryegrass, were frustrating since the grasses didn't persist as well.

Their pastures are productive in terms of tons of feed produced. When cows do the harvesting, the farm doesn't have the same harvest losses and weather damage as with machine harvesting. Making dry hay results in leaf loss during raking and baling, leaving the highest quality portion of the forage crop in the field.

## FARM PROFILE: **CONFINEMENT-GRAZING OPERATION**

### Cows in groups

Cows are divided into five groups, two of which are pastured. One 80-acre pasture is divided into 12 paddocks for the 60 to 90 dry cows and bred heifers. These are moved from paddock to paddock every day or two, and watched for impending calving. "We don't let them calve in the pastures," Frank said.

These cows get some supplemental feed, fed along a fence line, but no shelter. They stay in the pasture and get some corn silage mostly as the mineral carrier, according to Frank. "Self-feeding from mineral tubs hasn't worked well for us," he explained.

All pastures are served with aboveground plastic water lines. Quick-attach couplers take water to lightweight tanks that are easily moved from paddock to paddock using a golf cart. Float valves control water flow.

**A garden hose carries water from main lines to tanks in individual paddocks. Lance appreciates quick-attach couple technology.**

Five strands of electrified high-tensile wire surround the pasture. Inside the perimeter, paddocks are divided by single hot wires.

The second cow group is composed of those that have been milking 180 days or more. These cows move daily through 10 paddocks. They are fenced in and get access to additional feed inside the barn when they are brought up for the twice-daily milkings.

Stored feed is flexible. If the summer is hot and dry and the pasture dries up, the cows eat more feed inside. "For two winters, we kept our dry cows outside, but that was too much trouble," Lance said. Typically, cows go out in May and come back in November.

Other groups are made up of cows that are in the most productive part of their lactation. They are kept in free stalls and fed a total mixed ration (TMR) composed of haylage, corn silage, dry hay, ground shelled corn, soybean meal, and other commodities like wheat middlings or soybean hulls. The content of the TMR is different for different groups.

Heifers are not pastured until after they are about 20 months old and within four months of calving. Earlier in life, they move in groups from pen to pen in the calf and heifer barns as they grow.

"We bid for a year's supply of feed at a time," Lance said. That includes corn grain. Silver Sky plants 250 acres of corn each year for silage but the rest of the farm's 880 acres is hay or pasture. Additional corn is purchased.

They went to the bidding system when they discovered, as Frank put it, "If you're not complaining, you're paying more." He found there is not one price for anything from a supplier — big farms are able to beat down supplier prices and "the suppliers then charge us more."

The old tie stall farm buildings are no longer used, except as a feed center. The concentrates are stored in seven bins capable of handling truckload lots. Corn silage and haylage are stored in the eight upright silos there.

### Quality milk

The system has worked well at Silver Sky. The land is rolling and the soil erosive, so keeping it in sod helps. They use strip cropping, alternating 120-foot-wide hay-corn strips. Every three or four years, land in alfalfa goes to corn, and corn land rotates back to alfalfa.

Silver Sky was the co-op's top milk quality award winner in 1999 — producing the best milk among more than 2,000 co-op member farms. The quality measure is an indication of herd health, including low levels of bacteria and a low level of somatic cells. While grazing contributes to cow cleanliness and udder health, Silver Sky's quest for quality began when they brought their cows to the new facility in 1994.

### Quality lifestyle

"Sometimes as herds get larger the owners lose contact with the cows, but we won't let that happen here," Frank said.

Each person relates to the cows in different ways. Lance is oriented to crops and feed. Mark Sumner is herd manager and milker. Shari milks some mornings as well as coordinating Dairy Herd Improvement Association technician visits, veterinary checks, and weekly dry cow sorting and vaccinations. She works with the computer and cow records.


**Silver Sky Dairy supports two Michigan farm families.**

Shari described Frank as "the unlicensed vet of our operation" who treats sick cows, delivers calves in difficult births, reads ultrasounds to diagnose pregnancies, and infuses hard breeders.

A herd of 280 cows isn't huge by today's dairy standards, but Silver Sky supports two families and one full-time hired employee, and keeps the family atmosphere. The pastoral approach contributes to that flavor.

"We love living on the farm and think it is a great place to raise children," she said. Lance and Nancy have two and Frank and Shari have five. Several of the kids work on the farm and are paid wages for their work.

# Seasonal Calving

**Dan and Ruth Vosberg**
**South Wayne, Wisconsin**

In 1991, when Dan and Ruth Vosberg moved to their newly purchased, 158-acre southwestern Wisconsin farm and started milking 18 cows, the popular view of dairy grazing was laid-back, low-input, and "graze what grows." The Vosbergs saw managed grazing and seasonal milk production as the ticket to reaching their dream of making a full-time living milking cows. They felt they could manage a relatively small dairy herd, and not deal with such worries as planting crops, or maintaining a fleet of machinery. "Starting out, we thought grazing was simpler than conventional," Dan relates.

**Dan Vosberg feels that grazing is the best way to manage a relatively large herd on his hilly farm.**

Grazing and breeding all cows and heifers to calve during the spring weeks have indeed proven to be the means for fulfilling the Vosbergs' goals. The cost and labor savings offered by managed grazing has allowed them to make facilities improvements, purchase additional land, and build a new house.

Yet reaching that dream has taken quite a different path from the original vision. The herd is not small: In 2003 they milked 170 cows and produced 2.5 million pounds of milk while running the farm with slightly more than two full-time labor equivalents. The Vosbergs have done far more pasture tilling and re-seeding than originally planned, and have experimented with a large number of grass and legume varieties. They found that profits increased markedly along with per-cow production when they provided more supplemental feed to their cows. And their equipment inventory has grown far beyond what they had anticipated.

### Pasture

The Vosbergs originally planted "salad bar" mixes of various grasses and legumes to their hilly pastures. Dan said they made the mistake of grazing pasture stands too frequently, which encouraged many of the seeding mixes to evolve into nearly pure orchardgrass. A large share of this grass suffered leaf diseases, and cows often refused to graze these stands properly. Dan has since experimented with a wide variety of legumes and both annual and perennial grass species, including some newer orchardgrass varieties. The mix has evolved to include Kentucky bluegrass, reed canarygrass, tall fescue, bromegrass, quackgrass, and perennial ryegrass. The Vosbergs have also planted red and kura clover. "I believe in diversifying the farm rather than the paddock because it's too hard to manage a wide variety of grasses with a wide variety of growth characteristics," Dan said. In this way, some paddock is always ready for grazing.

Dan often applies up to 150 pounds of nitrogen per acre each summer and early fall to boost grass growth. In order to allow pastures to rest and stockpile additional dry matter that the cows can graze for several weeks after the growing season ends, he increases supplemental feeding in late summer, reduces grazing allocations, and limits haying of surplus grass. "To achieve the full benefits of grazing, I feel it's very important to have cattle out grazing as many days as possible each year," Dan said. The fall rest period also allows plants to accumulate the root energy reserves that help them survive the winter and produce well the following year.

He is experimenting with feeding cattle on specific pasture paddocks each winter, and then resting those paddocks through the middle of the following growing season. Dan is seeing signs that the combination of hoof pressure, manure, and rest is improving both the production and quality of the grass stands on his steep, thin-soiled farm.

# FARM PROFILE: **SEASONAL CALVING OPERATION**

**The Vosbergs constructed two canvas hoop sheds to provide shelter on bedded packs during the worst winter weather.**

During the design of the pasture and fencing, Dan planned paddock size and shape to fit topography. To avoid erosion, he didn't want to put lanes on steep hills. In the spring, he follows a two-week rotation among his 25 paddocks, sometimes subdividing them with polywire. In the fall, he extends the rotation to 40 days and feeds supplemental hay if needed.

## Facilities

In 1997, the Vosbergs built a pit parlor within a single-story tie stall building. A row of 12 milking units hangs over the center of the milking pit. The units are moved from one row of cows to the next, with units placed between the hind legs of each cow. During milking, cows consume a grain ration from a concrete manger filled by a lightweight auger controlled from the parlor pit. The parlor was built to allow expansion to 16 milking units. The rear portion of the building was converted into a covered holding area for cows waiting to be milked. In 2003 the Vosbergs used federal cost-share funds to build a concrete manure lagoon that holds run-off from the milking facility and a nearby barnyard. Also in 2003, they installed new milking equipment that makes it easier for one person to do all of the milking.

Not counting the manure lagoon and the new milking equipment, the Vosbergs spent about $65,000 to retrofit the old barn into a milking facility that allows one person to milk 150 cows in an hour and a half. "We wanted a milking facility that would not be hard on us physically, and wouldn't be a bottleneck to expansion," Dan explains.

The original farm plans did not include housing, but it became obvious that the farm's lack of natural shelter could lead to serious problems during severe weather spells and harshest winter months. The Vosbergs built two canvas hoop buildings, one 38 ft by100 ft, the other 50 ft by 120 ft, that house cattle on bedded packs. The larger one includes a feeding area. The hoop houses are also used in the early spring to house cows and heifers that are approaching calving.

In their early years, the Vosbergs fed groups of heifer calves milk replacer and whole milk from barrels equipped with nipples. But after suffering a serious outbreak of Johne's disease, they switched to raising calves individually in pens within large hutches. After weaning, calves are fed in a small lot with access to a shed. Yearling heifers graze as a group, often following the milking herd into a paddock to clean up excess forage.

Rather than add water lines and tanks to paddocks, or invest in portable tanks, the cows are given access to water during milking and at mid-day during summer. This choice reduced the overhead costs associated with developing the grazing system.

# FARM PROFILE: **SEASONAL CALVING OPERATION**

## Seasonal milk production

Because seasonal milk production means that all cows calve in the spring and dry off by January, the Vosbergs felt it would be best to match the production cycles of grass and cows, along with allowing a few weeks' time off from milking each year. "Eventually, we also realized that seasonal calving matched the way our farm is set up," Dan explains.

The Vosbergs have been successful in attaining their seasonal goal. Out of 184 cows and heifers that calved in 2003, 159 did so between early March and mid-April. In 2004, 140 out of 156 calved over a four-week period beginning in early March. Between 1996 and 2003, the milking herd grew from 91 to 184 head without buying a single animal, even though the Vosbergs culled Johne's-infected animals, and sold cows that did not calve between March 1 and June 15 each year.

Years ago, the Vosbergs tried various drugs and hormones in an effort to get their cows to breed for freshening in a short spring time frame. "What we ended up finding was that with our herd, less is best," said Ruth. The Vosbergs attained better success through concentrating on cattle nutrition, dry cow care, and heat detection.

They favor Jerseys, but have crossed a substantial portion of the herd with Dutch Belted, Milking Shorthorn, Ayrshire, Normande, New Zealand Friesian, Norwegian Red, and German Red Angler genetics. "When we choose a bull, we look at what he has to offer to our breeding program more than what breed he is," Dan explained. The Vosbergs' goal is to work with small- to mid-size cows with broad muzzles, sound feet and legs, and bodies that can hold large volumes of forage. Cows that produce high levels of milk fat and protein are also preferred since the Vosbergs sell their milk to a cheese plant that pays premiums for milk solids.

Cows are bred artificially for at least three weeks while bulls breed heifers and any cows that do not settle with artificial insemination. Dan said a 60 percent first-service conception rate is required to meet their goal of having the great majority of the herd freshen within six weeks. In recent years the Vosbergs consistently achieve that mark, which is well above the industry average.

Dan said that his farm's emphasis on strictly seasonal milk production won't work for people who cannot deal with intense periods of work and stress, such as during calving season. "It takes a certain mindset," he said.

**The Vosbergs have crossed a large number of breeds into their Jersey herd with the goal of improving grazing efficiency.**

"We like the lifestyle, but someone else might not." Seasonal producers must be willing to work to avoid cash flow problems, he said. Overall, Dan believes that seasonal production reduces his costs compared to year-round production.

### Feeding

The Vosbergs' original feeding plan was definitely "low input": pasture, supplemented primarily with only a small amount of grain. The strategy worked, but the Vosbergs were disappointed in per-cow milk production, cow body condition scores, and overall profits.

In the mid-1990s they began adding some feed inputs. They started feeding wilted, wrapped baleage, which increased feed intakes compared to dry hay. They added more byproducts to the grain ration, such as cottonseed and distillers grains. Then they started feeding corn silage at a rate of about 15 pounds per day. Most early afternoons on summer days, the milking herd is brought in to the farmstead feed bunk for corn silage and water. Dan estimates that pasture provides no more than half the cows' total daily dry matter intake even during the prime growing season. Yet his informal trials have shown that cows will consume more total dry matter if given more feed choices. "It's better to err on the side of spending more for feed than to let the cows go hungry," Dan asserts.

The cows have responded. Milk shipped per cow rose from 11,500 pounds in 1998, to 15,500 pounds in 2003. Total milk shipped increased from 1.1 million pounds to 2.5 million pounds over the same period. Breeding performance improved, as did the farm's financial performance.

He said the additional supplemental feeding adds to his total costs and machinery needs, even though the silage is planted and harvested by custom operators. After starting with one tractor, a manure spreader and a skidsteer, the Vosbergs now own a substantial line of tractors and haymaking and manure handling equipment. However, Dan said that compared to most confinement dairies, his equipment costs are much lower.

### Financial performance

While profit margins have varied based on milk prices, "We've always been profitable," Dan said. The farm's rate of return on assets has been above 10 percent each year since 1995. Net operating income has averaged in the $800 to $1,400 per cow range in recent years, while total net farm income has been above $100,000 in five of the past six years. In 1998 the Vosbergs were able to purchase a neighboring 130 acres to provide forage for more cows. In 2002 they built a new house. Ruth and Dan say the combination of managed grazing to control costs, feeding cows well to produce more milk, and an efficient milking system has been key to that success.

### Labor

Dan said they needed to work hard to establish their farm during uncertain times in the dairy industry. "We always had a sense of urgency, so we pushed hard," he explains. It has been difficult to raise small children while also dealing with the demands of a growing dairy enterprise. As they reach middle age, the Vosbergs want to take some steps to reduce labor requirements while still maintaining profitability. In late 2003 and early 2004 they sold 82 cows and heifers. Rather than hauling feed, they now rent neighboring acreage for grazing and nearby feed sources. Dan and Ruth want to show their three children that the dairy farm can be a worthwhile place to make a living, both from financial and lifestyle standpoints.

### Words of advice

The Vosbergs say that dairy farmers who use managed grazing must be willing to explore ideas and make well-informed decisions about what will or won't work on their particular farms. Dan admits that he and Ruth were naïve in their early days of farming, and bought into some grazing ideas that cost them money. "When you're gathering information, you must be careful not to assume anything," Dan said. Financial planning and goal setting are important to this process. "You're not just a cow man. You're not just a grass farmer. You're not just a businessman. You have to be good at all three," he adds. "If you're not, you have to be working with someone who's strong in the area where you're weak."

# SUMMARY TABLE



**TABLE 9:** ***Cost of production summary for three dairy systems (per cow), Minnesota, 2002-2004***

| | TIE STALL | FREE STALL | GRAZING |
|---|---|---|---|
| Total number of farms reporting | 106 | 118 | 34 |
| Feed and bedding | $1,093.05 | $1,204.88 | $868.25 |
| Labor and custom hire | $142.60 | $271.49 | $107.37 |
| Hauling and marketing | $79.81 | $73.56 | $76.34 |
| Health and breeding | $130.23 | $141.63 | $65.30 |
| Total direct costs | $1,625.83 | $1,826.09 | $1,227.99 |
| Average number of cows | 67 | 160.2 | 55.8 |

*Note: Figures for tie stall and free stall systems reflect top 40% of operations in terms of net return. Figures for grazing system reflect all operations reporting.*