Less Fossil Fuel Use

A tremendous amount of energy is required to feed animals on conventional operations. Tractors are used to till soil, plant, fertilize, cultivate, harvest, transport and ensile crops. Tractors then bring feed from storage to confined animals. Manure must be collected and pumped or hauled back to the fields. Large amounts of electricity are also used, for example, to dry corn and soybeans for bin storage or to ventilate dairy cattle barns.

When cows graze, tractors stay parked. Pasture systems require 20 Mcal of energy per ton of animal feed. Feedlots require 1,343 Mcal of energy per ton of feed concentrate.[xvii] *Jim Munsch, a beef farmer (and statistician) who uses MIG, recounts a National Geographic article which reported that it took 283 gallons of crude oil used in all facets of production to finish 1,250 lb. steer - or about 1¾ gallons per pound of sellable meat.*[xviii] *This prompted him to conduct his own study. Through careful record-keeping, he calculated that his actual input of refined petroleum products, plus an inferred input equivalent of electricity used, was about ¾ pint per pound of sellable meat.*[xiv] *In another case study, a WI dairy farm switched to MIG and reduced fuel use from 8,000 gallons per year to 3,200 gallons per year. The ratio of milk production (in gallons of milk to one gallon of fuel) went from 17:1 to 46:1.*[xx]

More Biodiversity and Wildlife Habitat

Managed grazing for conservation mimics natural prairie ecosystems and creates habitat for native wildlife. When ruminants graze intensely in one area and then are moved off until the next grazing cycle, they reduce the regeneration of invasive shrubs, restore diverse native plant species, provide manure for invertebrates (which are then eaten by birds and other animals) and leave sites undisturbed for ground-nesting birds. MIG provides habitat to a variety of other wildlife. Small mammals that inhabit pastures, such as meadow voles and meadow jumping mice, are an important food source for many birds of prey and red foxes. Butterflies, such as tiger swallowtails, monarchs and fritillaries, as well as bees and other native pollinators can be found in fields feeding on clover and wildflower nectar.

Managed grazing results in greater amounts of nutritious forage than continuous grazing in pastures and increases habitat for diverse species of beneficial insects, reptiles, amphibians, birds and mammals. An early study published by the Wildlife Society found that grazing strategies may be tailored to suit the type of habitat required for a desired species, while minimizing wild deer contact with grazing cattle.[xxi] *According to a 2006 study, rotational grazing may be used to create habitat that supports many species.* [xxii]

A 2001 CA study found that careful, conservation-minded MIG can: 1) increase the vigor of native plants, 2) increase the vegetative cover of stream banks, 3) expand wetlands, 4) hasten decomposition of cow manure and 5) extend the growing season on the grassland.[xxiii]

According to NRCS, rested MIG paddocks in MN and WI provide undisturbed nesting habitat for ground nesting birds, such as upland sandpipers, bobolinks and meadowlarks, which have declined significantly in number within the past 50 years.[xxiv] *A study in SW WI found that rotational grazing with refuge areas is the best agricultural practice for ground nesting birds.*[xxv] *Careful implementation of MIG also allows ducks and other shorebirds to nest successfully in adjacent wetlands.*

The Sierra Club recommends grass-fed products because MIG farmers tend to be "keen stewards of the land, concerned with proper grazing techniques and the nurturing of native grasses."[xxvi]

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The Voice of Sustainable Farmers

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Earth Friendly Farming

Environmental Benefits of Grazing

Recreational activities, like swimming, fishing, bird watching, hiking and hunting, depend on healthy natural ecosystems. All of our ecosystems are seriously impacted by agriculture. Grazing is a way to farm that lessens the impacts and can actually improve environmental health.

Management Intensive Grazing (MIG) is a sustainable farming method in which cattle, poultry, sheep, goats or pigs graze through paddocks of high-quality legumes and grasses in controlled rotations or cycles of pasture harvest, then rest and re-growth. MIG protects soil and water, reduces the use of fossil fuels and synthetic inputs, sequesters carbon, encourages plant biodiversity and creates wildlife habitat.

MIG Conserves and Builds Soil Resources

The world's soils have formed over thousands of years. Healthy soils consist of a complex web of biological life that builds soil organic matter. The living organisms (bacteria, fungi, protozoa, nematodes, arthropods and earthworms) are critical for decomposition and nutrient cycling. These cycles, in turn, affect plant growth, water infiltration and air quality. Better nutrient cycling means less fertilizers need to be applied to land. Organic matter stabilizes soil, absorbing and retaining rainwater, much like a sponge. Healthy soils, built through grazing, mean less soil loss and less polluted agricultural run-off.

Annual row crops such as corn and soybeans require tillage that disturbs topsoil. Rain and wind on plowed, bare soil dislodge particles that become run-off pollution. Each year the U.S. loses 3 billion tons of rich topsoil.[i] WI cropland loses 3.3 tons of soil per acre (T/A) due to rainfall erosion. MN cropland loses 2.1 (T/A) due to water erosion and another 5.8 (T/A) due to wind erosion.[ii] The USDA considers 2 to 5 (T/A) "tolerable" soil loss. *When soil stays covered with pasture, there is less environmental damage. Stewardship-minded graziers work to improve soil quality and have zero soil loss.*

A study in southeastern MN compared soil in rotationally grazed pastures to soil from neighboring farms that produced corn, soybeans, oats or hay. After four years of monitoring, researchers concluded that land under MIG had 53% more soil stability, 131% more earthworms, substantially more organic matter in the top 12" of soil, better stream quality and more wildlife habitat.[iii]

Another study compared a MIG pasture to a cornfield during a heavy rainstorm and found that the pasture, despite its steeper slope, lost only .026 (T/A). Neighboring fields under moldboard plow lost 5 (T/A) and those under chisel plow lost 10 (T/A).[iv] *In WI, researchers found that, compared with MIG pasture, gently sloped land planted with corn and soybeans lost 6 times more topsoil each year.*[v]

MIG Protects and Improves Water Quality

Agriculture uses 70% of the world's water resources. Agriculture impacts both the **quality** and **quantity** of water. Surface waters and ground water are diverted for irrigation or may become polluted by conventional practices. In the U.S., run-off chemicals, silt and animal waste have polluted more than 173,000 miles of waterways.[vi]

On most non-grazing farms with more than 50 cows, the cows are confined to a shed or dry lot. Cows are concentrated, usually on concrete so that they can be fed from a silo and their manure and urine can be collected easily. Manure is flushed or scraped into a man-made lagoon for storage. Pits or lagoons are typically sized to hold six months' accumulation of manure slurry. Manure pit equipment failure is typically the cause of manure slurry spills and fish kills in streams. *In MIG, cows are dispersed across well-sodded pastures where they deposit manure. They are moved to a new paddock before manure begins to concentrate. This eliminates the risk of a manure spill.*

Cows in **continuously** grazed sites can cause manure-related problems. A SE MN study found that waterways adjacent to these sites have comparatively high levels of fecal coliform as well as more particulate matter, turbidity and exposed streambank soil.[vii] ***Rotationally*** *grazed cattle do not trample and denude streambank vegetation. Wis. Discovery Farms studies show that MIG cattle improve streams and do not cause heightened coliforms or turbidity.*

Surface water quality is diminished by row cropping (i.e. corn and soybeans) when phosphorous fertilizer bound to soil particles runs off into streams and rivers and causes algae blooms and oxygen deprivation. Soil silting makes waters shallow and warmer and ruins aquatic habitat. According to David Vetrano, a biologist with the WI DNR, 85% of sediment in waterways is due to streambank erosion, which can be rectified by managed grazing.[viii] *When fields are rotationally grazed, they are carpeted by perennial grasses. Rain infiltrates and is retained in soil organic matter, so less soil and phosphorus washes away and enters surface water and streams. Because it buffers heavy rainfalls, MIG helps control flooding.*

Row cropping can leave soil open and vulnerable to erosion.

MIG along primary streams opens canopy to needed sunlight and fosters lush vegetation along the streambank (as in photo above) to retain the soil. Vetrano states that "In well-managed grazing systems soil erosion, manure, pesticide and herbicide runoff is reduced to almost zero."

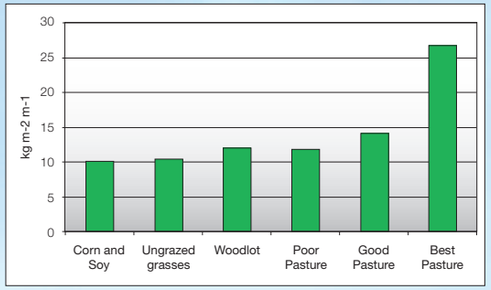
Groundwater quality is degraded when nitrogen fertilizer used to grow corn leaches downward. About 1 in 10 wells in Wisconsin test high for nitrate. In some areas, 60% of wells are contaminated with more than 10mg/liter of nitrate. Levels of 10mg/liter are dangerous for infants and can cause poor performance in livestock. Even low levels of nitrate are dangerous for frogs, amphibians and fish. *MIG pastures do not require large amounts of nitrogen fertilizer. Pastures also reduce harmful nitrates in groundwater through a natural process called denitrification. A 2006 UW-Stevens Point study found 70-90% denitrification efficiency under pasture compared to 10-15% under corn.*[ix] *Another study found that, under MIG pastures, both nitrogen and phosphorous in groundwater were within acceptable limits and suggested that MIG is a Best Management Practice for dairy farming.*[x]

Better Carbon Sequestration with MIG

According to James Hansen, Ph. D., NASA Godard Institute for Space Studies, human activity has increased CO2 in the atmosphere to dangerous levels, from 280ppm to 385ppm. But it is possible to reduce CO2 levels to 350ppm by modifying our agricultural practices and putting carbon back where it came from ~ into the earth.[xi] Rangelands occupy nearly 50% of the world's land area and are estimated to contain more than two-thirds of the world's carbon reserves.[xii] Good grazing management has been shown to enhance carbon sequestration in rangeland soils and help mitigate elevated atmospheric carbon levels.

Plants capture carbon and store it in their root systems. When a plant's leaves are grazed its roots also die back, leaving carbon (and organic matter) in the soil. Roots re-grow along with shoots, capturing more carbon. Grazed pastures have more rapid annual shoot turn-over and more diverse plant species, which results in greater redistribution of carbon within the plant-soil systems.

A 2002 Iowa State University study showed that well-managed pastures are the most effective land use for storing carbon.[xiii]



Another environmental study on the effects of livestock grazing on carbon content found that the soil of grazed pastures had significantly higher carbon content compared to non-grazed enclosures.[xiv]

According to the ISU study (see table above), MIG pastures are better at carbon sequestration than cropland, woodlot, poorly managed pastures and un-grazed grasses. Note that the best management practices double the capacity of pasture to sequester carbon.

Research at the High Plains Grasslands Research Station has shown that 11 years of grazing significantly increased soil organic carbon in the surface 30 cm (12 inch) of the soil.[xv] *A Duke University study found that the vast underground root systems of native grasses store more carbon than tree and shrubs. MIG is one way to make expanding native grasslands financially feasible.*[xvi]

GrassWorks is a membership organization dedicated to education, advocacy and the practice of Managed Grazing.
For more information: www.grassworks.org