PASTURE AND GRAZING MANAGEMENT

Besides being more productive, well-managed pastures can reduce emissions. In fact, they can be a net "sink" (holding and converting more greenhouse gases than they release). Well-managed pastures use nutrients more efficiently, and don't foster the anaerobic conditions that promote greenhouse gas emissions.

The higher quality forages from management-intensive grazing systems generate less methane from ruminants and result in a more efficient feed-to-product ratio. High quality forages lead to 50% lower methane emissions from grazing cattle. Legumes in pasture improvements lead to 10% lower methane emissions.

Poorly managed pastures can be a net source of greenhouse gas. Methane is produced from grazing ruminants and poorly drained pasturelands. Ammonia and nitrous oxide are emitted from deposited manures and soils. Over-grazing can destroy new growth and deplete root reserves.

Management-intensive grazing systems are more nutrient use efficient and generate less greenhouse gas than conventionally managed pastures.

PASTURE MANAGEMENT

A controlled grazing system improves forage quality.

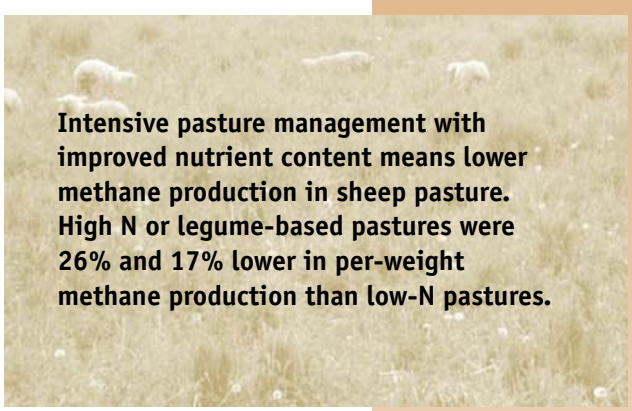
Continuous grazing results in wasted forage, decreased productivity and lower liveweight gains per acre of land.

Pasture management is a planned system of pasture production that includes establishment, improvement, grazing oversight, fencing, environmental protection, water supply, animal health and cost considerations.

Over-seeding is a pasture improvement practice that also helps to reduce emissions.

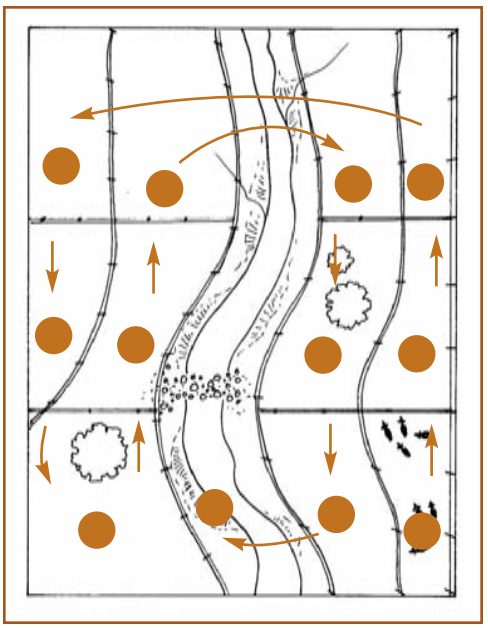
The goals of your pasture management system include:

- ▸ proper soil fertility
- ▸ careful pasture crop selection
- ▸ effective weed control
- ▸ sustainable grazing
- ▸ a well-planned fencing system (for intensive grazing management)
- ▸ planned water–shade–mineral supply
- ▸ attention to animal health, and
- ▸ protection of riparian areas.



Intensive pasture management with improved nutrient content means lower methane production in sheep pasture. High N or legume-based pastures were 26% and 17% lower in per-weight methane production than low-N pastures.

More efficient livestock gain and finer forage intake make for lower methane emissions from ruminants, less soil disturbance and less anaerobic conditions.



An effective managed intensive grazing (MIG) system requires careful attention to pasture quality, timing and grazing animal behaviour.

The aim of grazing management is to allow enough top growth and root reserves for regrowth following grazing, plus the ideal length of recovery time to meet that goal.

For many reasons, any grazing areas that approach riparian areas (i.e., around watercourses, wetlands, ponds and lakeshores) need protection. Riparian areas are important carbon sequestration zones and can use leached nitrates from cropland or pastures before they reach surface water. Total exclusion through grazing management and fencing when required will also help reduce greenhouse gas emissions.

Managed pastures, with the judicious use of fenced paddocks, are one of the most sustainable forms of agricultural crop production. Well-managed pastures, including cropland converted to managed pasture, can be more productive, profitable and environmentally responsible. Erosion rates are drastically reduced, and energy consumption is considerably less. Denitrification rates are substantially lower and soil carbon sequestration rates are higher. Surface and ground water quality is improved. Wildlife habitat and corridor opportunities are greater.

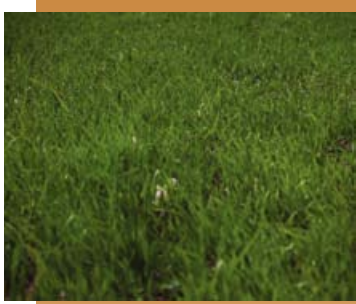
Well-managed pastures sequester more greenhouse gases than they emit.

BMPs FOR PASTURES

ESTABLISHMENT

✔ **Soil test!** Fertile pasture soils will help pasture crops become established, grow and compete with weeds.

- ▶ Test one year before establishment.
- ▶ Keep P+K levels medium – forage/pasture species are big feeders
  - ▷ P+K levels are most often the most limiting factors
  - ▷ higher P+K levels translate to improved NUE.
- ▶ Sample unique areas (e.g., eroded knolls for retirement) separately.



Use pasture mixes suitable for local site conditions.

SEEDING MIXTURE

✔ **Select a mixture** that meets its purposes for site conditions, growth, gain targets, and use. Species that are readily digestible, durable, fast-growing, and nitrogen and water efficient are more environmentally friendly.

SEEDING TECHNIQUES

✔ **Use companion crops** such as spring cereals only in areas prone to erosion.

✔ **Plant seeds less than 1 cm deep.**

✔ **Use no-till where possible.** No-till planting disturbs less soil. It can be used after a cover crop is killed and prior to establishment.

Use no-till planting equipment where possible – less soil is disturbed and this keeps carbon in the topsoil.

WEED CONTROL

✔ **Kill perennial weeds** prior to establishment.

✔ **Clip weeds** during early establishment and on an as-needed basis.

IMPROVEMENT

✔ **Rejuvenate, where appropriate, to improve undergrazed areas with low fertility.**

- ▶ Soil test and improve fertility to increase survival and production of desired species.
- ▶ Plan and follow a grazing management plan to sustain production.

✔ **Renovate to increase productivity by introducing pasture species without disturbing the soil.** Successful renovation depends on:

- ▶ proper pasture mix selection
- ▶ site preparation
- ▶ timing of seeding
- ▶ soil fertility and moisture levels during establishment, and,
- ▶ weed control during establishment.

Weed control during establishment will prevent long-term weed pressure problems.

BMPs FOR GRAZING SYSTEMS

The aim of grazing management is to allow enough top growth and root reserves for regrowth following grazing plus the ideal length of recovery time to meet that goal. The following measures help to maintain a sustainable, environmentally friendly pasture.

✔ **Spread manure evenly.** Keep pastures in excellent condition.
✔ **Encourage beneficial insects.**
✔ **Feed winter rations over a large area.**
✔ **Stockpile high quality pasture.**
✔ **Move bedding pile frequently.**
✔ **Feed on level ground or gentle slopes.**

BENEFITS OF CONTROLLED GRAZING

- ▶ more productive cows
- ▶ improved liveweight gains
- ▶ lower methane production/pound of meat – due to higher quality forages
- ▶ improved pasture = better SOC sink (CO_2)

MANAGEMENT PRACTICE	DESCRIPTION OF GRAZING SYSTEM	WHEN TO USE THIS PRACTICE	MANAGEMENT GUIDELINES	COMMENTS
SEASON-LONG	• stocking throughout the season • animals have maximum forage selectivity	• very-low stocking rates (hobby farms or very small operations) • minimal impact • observed livestock behaviour follows forage growth	• livestock should not spend too much time near floodplain or banks • requires management features such as salt feed, shade, water and barriers to encourage livestock away from sensitive areas	• forage species can be over-grazed – seasonal damage is not prevented • may work with corridor fencing where livestock are excluded with this system, particularly if near narrow-channel watercourses and drainage ditches • not suitable for pastures near wetlands and ponds • **not an optimal emission-reducing practice unless BMPs are employed to discourage congregation and pasture management practices help keep forage palatable**
TIME-CONTROLLED GRAZING (OR SHORT-DURATION)	• livestock are rotated through several paddocks over short intervals on a recurring basis • high stocking rates for short periods of time – with rest periods for recovery	• suitable for grassy pastures near riparian areas with fenced paddocks • useful for dairy and other high-production livestock operations	• in most riparian areas, livestock should be moved when 4-6 inches of forages remain • rate of rotation varies with the rate of plant growth • specialized timing and intensity of grazing can be used to control weed growth	• rest periods must be long enough for suitable recovery • grazing times must be short enough to prevent rapid re-grazing • possible damage in spring • **moderately effective for emission reduction as manure is well-distributed, wet areas are avoided and forage remains palatable**
SEASONAL ROTATION (OR DEFERRED ROTATION)	• grazing is delayed until key pasture plants have reached desired growth stage and when soil conditions are less prone to damage	• suited for low-density stocking near wide-channel streams and middle-reach rivers to avoid damage in spring and plant stress in mid-summer	• short grazing periods – not managed as intensively as time-controlled grazing • implement with alternative watering systems and other practices that encourage animals to congregate away from streambanks	• riparian areas should be in healthy condition prior to using this system • helps newly planted buffer areas get established • **emission-reduction friendly, this method helps perennial plants to become established**

MANAGEMENT PRACTICE	DESCRIPTION OF GRAZING SYSTEM	WHEN TO USE THIS PRACTICE	MANAGEMENT GUIDELINES	COMMENTS
THREE-PASTURE REST-ROTATION SYSTEM	• three-pasture rotation system • only two pastures grazed each year • rotation schedule for pastures: *year 1*: spring grazing; *year 2*: late summer and fall grazing; *year 3*: complete rest	• ideally suited for pasture systems near riparian areas – riparian areas can be favoured to allow for restoration or improved pastures to become established • inappropriate for use in shrub-dominated riparian areas since young woody plants do not have sufficient rest time to become established	• a semi-extensive grazing practice that rests each pasture area once every three years • needs to be managed to protect against streambank degradation in spring and forage depletion in fall • requires management features such as salt, feed, shade, water and barriers to encourage livestock away from sensitive areas	• if used in woody riparian areas, limit grazing time during the late summer rotation to when herbaceous crops are only half used – this will limit livestock feeding on woody plants • adding more pastures will increase the amount of time land is rested and will further protect woody species • allows for grazing restored areas during prolonged droughts • **emission-reduction friendly, as rest allows regeneration and carbon sequestration**
SITE-SPECIFIC MANAGEMENT	• paddocks are designed to maximize grazing efficiency and minimize risk – using pasture species, growing season and site position as factors	• in riparian areas where site differences are distinct (e.g., wet floodplain and degraded ravine slopes)	• drier sites are grazed early and for short durations; wetter sites are deferred and also grazed for short time interval	• acceptable low-density grazing in grassed ravines, floodplains and adjacent to wetland areas, where access can be controlled to the preferred (drier) season, and for very short periods to control weedy vegetation • **very emission-reduction friendly, as site conditions are grazed during ideal times to minimize impact**