Item 6: Methodology scope

6.1a Proposed project activity or management practice – Blue (Required)

Describe in detail the processes involved in implementing the project activity on the ground. The process must be described step-by-step. Note that details of sampling protocols and other prescribed measurement requirements are requested in Item 10 (Data collection) and are not required here. This item must be sufficiently detailed to allow project proponents to successfully implement the proposed activity by following these instructions. Refer to the Guidelines for a simplified example.

In order to implement Cell Grazing, grazing must be carried out in accordance with the following 6 Principals.

The first three principals are mandatory. The final 3 principles are not mandatory but are strongly recommended and an integral part of achieving high levels of carbon storage and emissions reductions and complementary benefits.

1. PLANTS NEED ADEQUATE REST.
2. STOCKING RATE is adjusted to match CARRYING CAPACITY.
3. PLAN, MONITOR and MANAGE GRAZING.
4. MANAGE LIVESTOCK EFFECTIVELY.
5. APPLY MAXIMUM STOCK DENSITY for minimum time.
6. MANAGE FOR BIODIVERSITY TO IMPROVE ECOSYSTEM SERVICES.

The steps that are required to implement this methodology are:

1. Identify the boundaries of the project area. Typically this is an existing grazing property but it may also be part of a property or an amalgamation of parts of, or whole properties.
2. Complete a bGMP as defined in Section 7. This involves selecting the appropriate baseline scenario and documenting the management of the project area under the baseline scenario.
3. Complete a pGMP as described below. The pGMP describes planned activities and management practices. Comparisons between the bGMP and pGMP are used to assess differences between project and baseline and to assess the significance of different emission and storage components as well as providing a framework for assessing the proper implementation of the Cell Grazing activity.
4. Implement required infrastructure changes. This typically involves
    a. Subdividing the project area into a number of paddocks per mob. The minimum varies depending on the landscape, climate and nature of the grazing enterprises. The minimum number of paddocks per mob is 4 but in most cases there will be 8 or more.
    b. Provide water to each paddock.
5. Measure the baseline soil and AWB stocks.
6. Initiate Cell Grazing in accordance with pGMP.
7. Plan and monitor the system and adjust rest and stock numbers according to seasonal and climatic changes and the local grazing conditions. A key component of this is maintaining a Grazing Chart or its equivalent.
8. Maintain records of livestock, pasture conditions and other parameters described in this methodology in order to make periodic estimates of emissions and storage.
9. Periodically review pGMP and bGMP to ensure they reflect actual conditions.
10. Undertake repeat measurements of soil and AWB stocks. The time intervals between sampling are expected to be 5 years during the sequestration phase and 10 or longer during the maintenance phase.

Project Grazing Management Plan pGMP

The pGMP documents the specific activities and management practices that are planned to be carried out to implement the project and in comparison to bGMP demonstrates the implementation of Cell Grazing activity. The pGMP provides a basis for estimating project emissions and storage but reported estimates of project emissions and storage shall be based on actual data and records, not planned operations.
The pGMP shall include.

- Land areas affected by different activities as defined in Section 9.
- Livestock management plans, including stock levels.
- Supplementation and feeding practices both during normal operation and specific events such as drought.
- Use of fertilisers.
- Management of above ground woody biomass (AWB).
- Fire management practices and expected fire patterns.
- Management actions in the event of different climatic scenarios. For example, stock levels maintained during drought.

6.1b Supporting information for Item 6.1a – Green (Required)

Provide any additional information required to support the process described in Item **6.1a** above. This should include peer-reviewed or other credible scientific evidence supporting the proposed activity. Justify any assumptions or estimations made under the proposed project activity. Diagrams, graphics and process flow charts can also be included to assist understanding of the activity description.

What is Cell Grazing

Cell Grazing is a holistic time controlled ~~rotational~~ grazing system based on adoption of at least the first three of the six principals listed in Section 6.1a

There are a number of grazing systems where stock are rotated. However, it is very important to recognise that there are significant differences between grazing systems where stock are rotated and all systems do not provide the same productivity or carbon sequestration benefits, due basically to level of intensity. Cell Grazing, which is derived from the rational grazing developed by Voisin (1958) is the result of continuous and ongoing development overseas and in Australia since the 1940's.

The nomenclature of grazing systems are summarised in the following table which describes the systems and discusses the good and bad points of each.

Source: (McCosker, 2000)

SYSTEM/METHOD	COMMON NAMES AND/OR SUB METHODS	DEFINITION	COMMENTS
Continuous	• Continuous grazing • Set stocking	Plants are continuously exposed to animals.	At high stocking rate, it causes widespread overgrazing of plants, is drought- and erosion prone, and has fluctuating animal performance due to variations in quantity and quality. At low stocking rate, it causes under grazing in patches and overgrazing in

			the remainder. May lead to woody weed ingress and overuse of fire. Animal performance is high and relatively stable
Rotational resting systems	• Spelling • Deferred rotation • Deferred grazing • Merrill system	One or two more paddocks than there are herds or flocks. Rest may vary from weeks to years	May defer effects of overgrazing. Leads to under grazing and can reduce animal performance. Common reasons for use include: burning, drought reserve, special animal needs, allowing plants to seed
Rotational grazing systems	• Rotational grazing • High intensity, low frequency grazing (HILF) • Short duration grazing	3-7 paddocks per herd on fixed calendar based moves.	There are many approaches using rest periods of 30-365 days. Suffers from lower animal production than continuous grazing in 43% of cases studied. Perpetuates patch grazing and consequent under and overgrazing effects. Can slow degradation in about 50% of cases. Can be used only on sweet country due to the effects of a long rest period on quality.

Multi-camp rotational grazing systems	• (a) High utilisation grazing (HUG)
	  ○ Acocks/Howell system
	  ○ Short duration grazing
	  ○ Non-selective grazing
	  ○ Crash grazing
	  ○ Mob grazing
	• (b) High performance grazing (HPG)
	  ○ Controlled selective grazing
		(a) HUG. > 7 paddocks/herd. Each paddock is severely grazed before moving to the next, generally on fixed calendar-based moves.
		
		(b) HPG. > 7 paddocks/herd. Each paddock is lightly grazed for a short period so that only the most palatable plants are grazed. Ungrazed undesirable plants eventually die out. Calendar-based moves.
			(a) Will reverse land degradation. High stock density and long grazing periods can lead to high utilisation and good animal impact. Suffers from very low animal performance. Usually uneconomic due to low gross margin.
			
			(b) Will reverse land degradation. Designed to increase palatable species. Has a short graze period and high animal performance. Has low stocking rate and is hence more wasteful of rainfall and sunlight energy than HUG. Usually uneconomic due to reduced turnover.

Time Control grazing methods	• (a)Production focus
	  ○ Block grazing
	  ○ Strip grazing
	  ○ Rational grazing (Voisin 1958)
	  ○ High density, short duration grazing
	• (b) Holistic focus
	  ○ Savory grazing method (SGM)
		> 7 paddocks/herd, but usually 20-40.
		
		Moves are based on the growth rate of the pasture and its physiological requirement for rest.
		
		It is not calendar-based.
		
		Requires high stock density.
		
		(a) Production: Focus on maximising plant and animal production.
		
		(b) Holistic: Focus on
			Recovery period is determined by plant growth rate. Paddock number and recovery period then determine graze period. Varying recovery period protects the plant. A short graze period maintains high animal performance. Combines the best features of HUG and HPG.
			
			Makes more effective use of rainfall and sunlight energy than other approaches.

	○ Cell grazing ○ Controlled grazing ○ Management Intensive Grazing (MIG) ○ Planned grazing ○ Ultra-High density grazing ○ Techno Grazing	ecosystem sustainability and optimising profit.

This methodology is for the implementation of **Holistic Focus Time Control Grazing** and covers each of the techniques listed under (b) Holistic Focus in the above table and are generically referred to as Cell Grazing throughout this document. Cell Grazing is a form of improved grazing management carried out in accordance with the following principles. The first three principals are mandatory.

1. **PLANTS NEED ADEQUATE REST.**
    a. Rest Period is a function of plant growth rate.
    b. Ensuring each paddock has adequate water and fence infrastructure to water and control large mobs.
    c. Manage grazing to maximise pasture growth and provide sufficient rest so as to promote greater root development and desirable pasture species.
2. **STOCKING RATE is adjusted to match CARRYING CAPACITY.**
    a. Carrying Capacity (ground up) is the amount of feed produced.
    b. Stocking Rate (top down) is the number of standard animal units used to consume the Carrying Capacity.
    c. Use a Grazing Chart or equivalent to plan and monitor both Stocking Rate and Carrying Capacity.
    d. Manage stock to avoid overstocking.
    e. Monitor herd structure, class and productivity.
3. **PLAN, MONITOR and MANAGE GRAZING.**
    a. Establish a grazing management plan where graze period is calculated based on rest period and number of paddocks resting, corrected for paddock area and inherent carrying capacity of each paddock.
    b. Monitor grazing period, cycle length, rest period, paddock yield, decision making and stocking rate using a Grazing Chart or equivalent.
    c. Plan for events such as drought, fire and flood and act on the plan. For example choose a date (known as a Critical Rain date) where destocking will commence if seasonal rains are lower or later than expected.
4. **MANAGE LIVESTOCK EFFECTIVELY.**
    a. Ensure sufficient water quantity and quality.
    b. Minimise the distance animals have to walk to feed.
    c. Monitor and manage animal health and nutrition and provide supplementation as required.
    d. Use low stress stock handling techniques for animal welfare and productivity.
    e. Optimise timing and duration of reproduction to match seasonal feed supply and demand.
    f. Match Stocking Rate to Carrying Capacity to optimize production.
    g. Don't over rest plants so as to avoid lignification which will result in lower productivity.
    h. Avoid grazing when pasture yield is low to avoid low production.
    i. Maintain low utilization rates at each graze to avoid low production.

5. **APPLY MAXIMUM STOCK DENSITY for minimum time.**
    a. Increased stock density is achieved by having high paddock numbers per herd.
    b. The higher the stock density (eg optimums are 60 head of cattle per ha or 450 sheep per ha), the shorter the graze period will be.
6. **MANAGE FOR BIODIVERSITY TO IMPROVE ECOSYSTEM SERVICES.**
    a. Cell Grazing is fundamentally based on improving Ecosystem health and Services.
    b. Improving energy flow from sunlight, improving the water cycle and soil health will lead to an increase in biodiversity, soil carbon and ecosystem services.
    c. Maximise number of desirable pasture species, including trees and shrubs and diversity of all subterranean elements.

Due to the small number of well managed Cell Grazing properties and a paucity of studies that fully assess grazing there are limited published papers on the effects of Cell Grazing. A number of the available papers are listed below.

- Comparisons of continuous and cell grazing in brigalow country show changes towards perennial pasture species and improvements in soil health under cell grazing (Alsemgeest & Alchin, 2003).
- Dr Judi Earl, in her PhD thesis, conducted the earliest work in Australia on the comparison of Cell Grazing to continuous grazing and showed significant changes in plant composition both during and after the drought in 1994-5 on the New England Tableland, NSW (Earl & Jones 1996)
- Gholamreza et al (2008) showed an increase in both soil carbon and nitrogen under cell grazing compared to continuous grazing in southern Queensland traprock country being grazed by sheep.
- Young et al (2009) demonstrated an increase in soil carbon under perennial grasses on the Liverpool Plains.
- DeRamus (DeRamus, Clement, Giampola, & Dickison, 2003) measured a 20% reduction in livestock CH4 emission when comparing continuous and time controlled grazing.

6.2a Project abatement – Blue (Required)

The methodology proponent must describe how the project delivers greenhouse gas abatement. No calculations or estimations are required here.

Explain precisely how the abatement activity or management practice described in Item 6.1 will:

- remove and sequester greenhouse gases from the atmosphere; or
- reduce or avoid emissions.

It is expected that the most significant outcome of the Cell Grazing Methodology in relation to carbon emissions and storage will be increased sequestration of atmospheric carbon dioxide into soil by:

- Improving net primary production by controlled livestock grazing.
- Increasing soil carbon storage by increasing organic matter input and by changing the partitioning of above and below ground biomass.
- Reducing negative impacts that can deplete soil carbon such as overgrazing, erosion and bare ground.

In addition to soil carbon there may also be a number of complementary benefits that have the potential to reduce emissions and increase storage of carbon including:

- Reducing livestock emissions by increasing animal productivity and through changes to feed quality, plane of nutrition and levels of activity.
- Changing carbon storage in AWB.
- Decreasing N_2O emission by changing application practices and quantities of fertiliser and

other inputs.

- Changing fire management practices.