

(Rotational) grazing systems that suit your environment

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Introduction



- Veld (grassland and savanna) provides low cost forage for the livestock industry
- Veld also provides a range of ecosystem services to society
 - Biodiversity / conservation
 - Soil protection
 - Water provision (hydrological cycle)
- Sustainable management is essential:
 - Livestock industry
 - Society



Grazing management variables

- **Animal type**
- **Animal numbers**
 - Stocking rate (number of animals on total area over one year)
 - Matching supply and demand
- **Animal movement**
 - Inter-seasonal (summer / winter) – seasonal grazing
 - Intra-seasonal (paddocks, grazing areas) – regular or irregular rotational grazing
 - Density (number of animals on specific area being grazed at any one time)
- **Fire**
 - Influences quality in high rainfall sourveld areas
 - Higher frequency in high rainfall areas
 - Can reduce quantity

Stocking rate vs density

E.g. 100 animals on 100 ha farm
grazing a 1 ha paddock today

Stocking rate 100 animals/100 ha
or 1 animal/ha per year

Density 100 animals per ha today

Current & historical grazing management practices

Forage quality	High Continuous grazing Livestock have freedom of selection Graze short, actively growing grass Sustainability questions if implemented continually for many years or decades Uncomplicated	
Low		High
	Low	Forage quantity

Current & historical grazing management practices

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<p>Low</p>	<p>Traditional rigid rotational grazing systems Fixed cycle length (weekly movement) e.g. 3 paddock, 4 paddock, 8 paddock Rigid = lack of adaptive decision making Livestock graze tall grass after absence No real quantity benefit Uncomplicated</p>	
	<p>Low</p>	<p>High</p>

Forage quantity

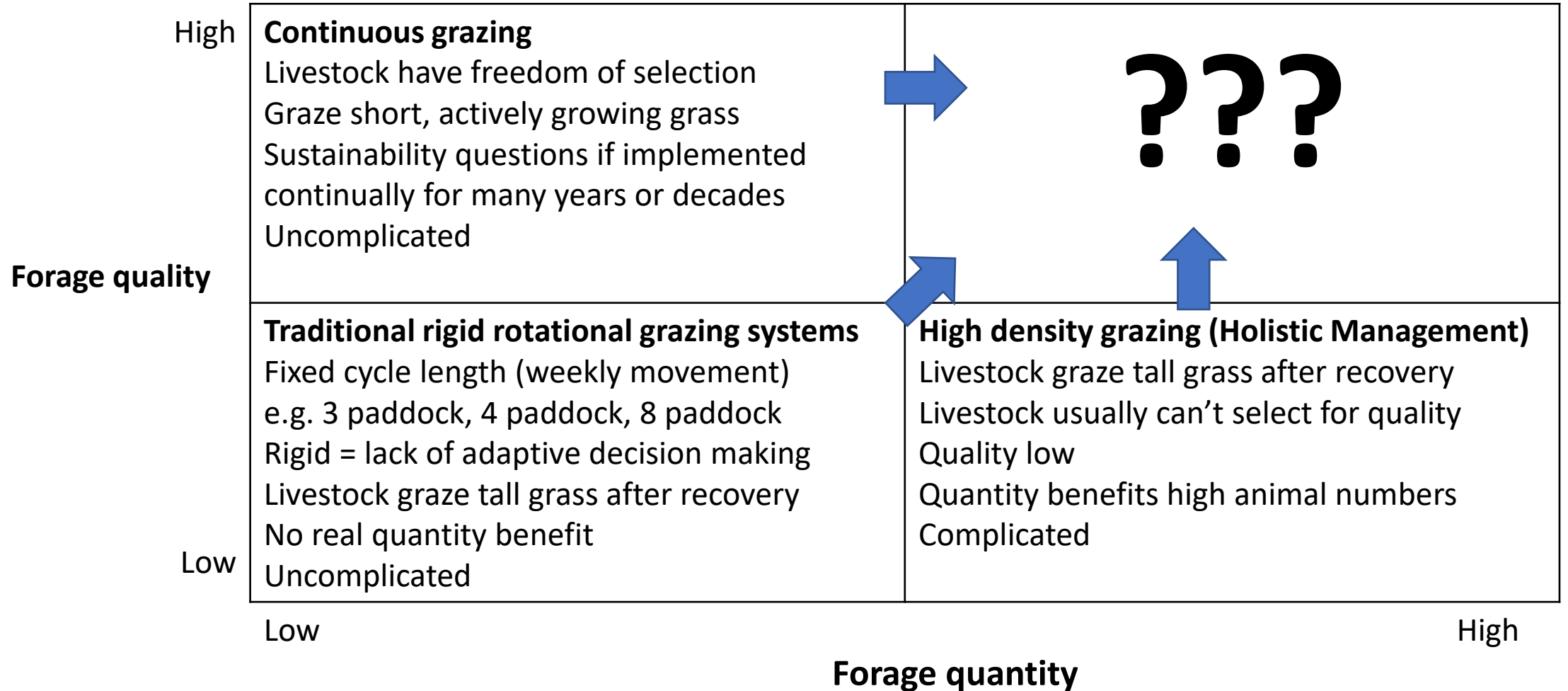
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	<p>Low</p>	<p>High</p> <p>Forage quantity</p>

What is the ideal strategy?

<p>High</p> <p>Forage quality</p>	<p>Continuous grazing Livestock have freedom of selection Graze short, actively growing grass Sustainability questions if implemented continually for many years or decades Uncomplicated</p>	<p>Grazing management ideal scenario High quality High quantity Profitability Uncomplicated / logical Sustainability Ecosystem services</p>	
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<p>Low</p>	<p>Forage quantity</p>		<p>High</p>

How do we get there?



Quality & quantity forage throughout the year

- Quality
 - Available in summer
 - Seasonal quality differences more pronounced in higher rainfall areas (sourveld vs sweetveld)
- Quantity
 - Summer rainfall and growth provides quantity for full year
 - Summer rainfall and growing period varies
 - Sourveld ~ 6 months
 - Sweetveld ~ 4 months
 - Do traditional rotational, continuous or high density grazing make explicit provision for winter grazing?
 - Not usually!

Quality & quantity forage throughout the year

- Quality
 - Synchronise mating, calving, weaning to make use of summer quality
- Quantity
 - Calculate dry season quantity requirements
 - Set aside adequate area for dry season
 - Protect from fire and grazing
 - Sourveld
 - ~ Half of total area (6 month growing season)
 - Sweetveld
 - ~ Two thirds of total area (4 month growing season)

Summer grazing management

- Grass actively growing throughout summer
- Sourveld
 - Sustained growth, slowing down towards autumn
 - Maturing grass rapidly loses quality
 - Management for quality important
- Sweetveld
 - Erratic growth, dependent on rainfall frequency and intensity
 - Mature grass maintains reasonable quality
 - Management for quality less important

Summer grazing management - quality

- Graze short, actively growing regrowth
 - Emulate natural, unmanaged systems e.g. Serengeti
- Movement
 - With paddocks – actively make decisions on paddock/area grazing based on maintaining quality
 - Without paddocks (or with few paddocks) – same principles but using alternate means of controlling movement (herders, fire, water)
 - Irregular “rotation” based on quality focus

Summer grazing management

- Priority / indicator paddock (alternating in different years)
- Select appropriate sized paddock or area for initial spring grazing
 - High rainfall areas – may be recently burnt
 - Graze – move to next suitable paddock / area – keep moving
 - Continually evaluate priority paddock and return as soon as ready for grazing – still short and high quality (not tall and flowering)
 - Maintain grazing quality gradient in summer grazing area, with as much as possible of the area kept short and actively growing
 - Less grazed, taller, lower quality paddocks / areas act as forage reserve
- High rainfall areas – strong focus on quality
- Low rainfall areas – quality focus less important



Winter grazing management

- No regrowth after grazing
- Move through area sequentially (not rotationally)
- Manage for quantity
- Aim to finish winter grazing at the time to switch to summer grazing
- Winter grazing comprises removal of senesced material – negligible impact
- Supplement for quality as and when necessary

Fire management

- Fire is ecologically important in high rainfall grasslands
- Frequency related to rainfall and amount of carry-over material
- Priority paddock areas (high quality side of quality gradient) unlikely to have enough material to warrant burning
- Lightly grazed summer areas (buffer or forage reserve – low quality side of quality gradient) may benefit from fire
- Winter grazed paddocks may or may not have enough carry-over material to warrant burning at the end of winter
- Fire decisions based on amount and acceptability of carry-over material – low intensity “cool” fires

Soil disturbance - trampling

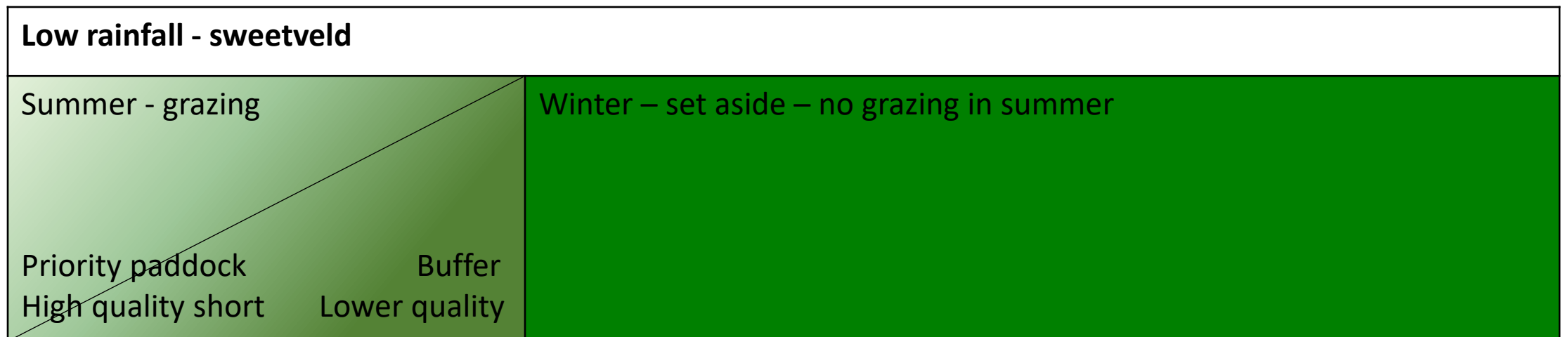
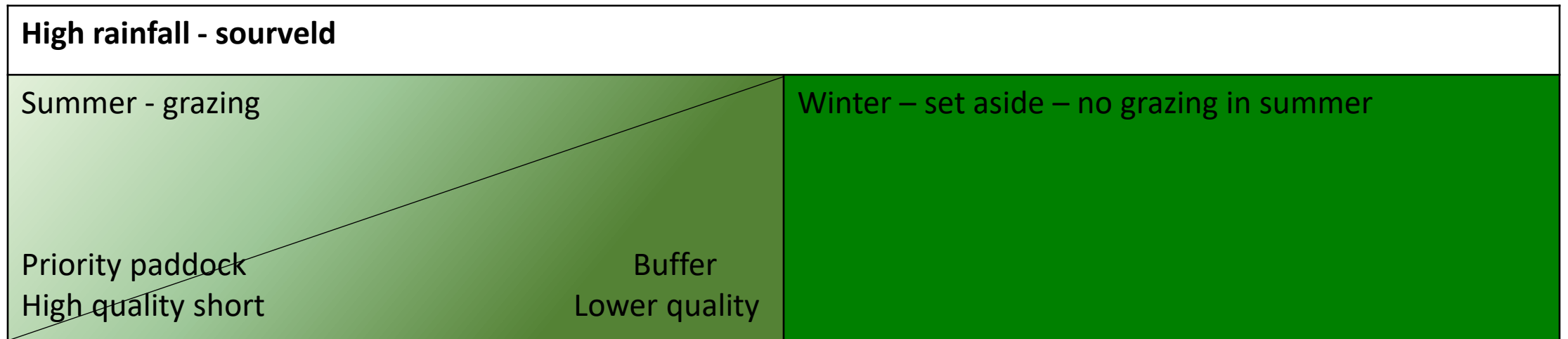
- Soil disturbance and trampling increase with increased animal numbers, and in areas of high animal density
- High rainfall areas
 - Most desirable grasses reproduce vegetatively (tillering) – not by seed
 - Killing of tufts by trampling results in species composition shift to undesirable pioneer grasses
 - Recovery very slow (decades to centuries)
- Low rainfall areas
 - Reproduction by seed more important
 - Soil disturbance at strategic times may enhance seed germination
- Targeted trampling (kraaling) may be useful for rehabilitation
 - Imports nutrients from rest of farm

Trampling vs fire

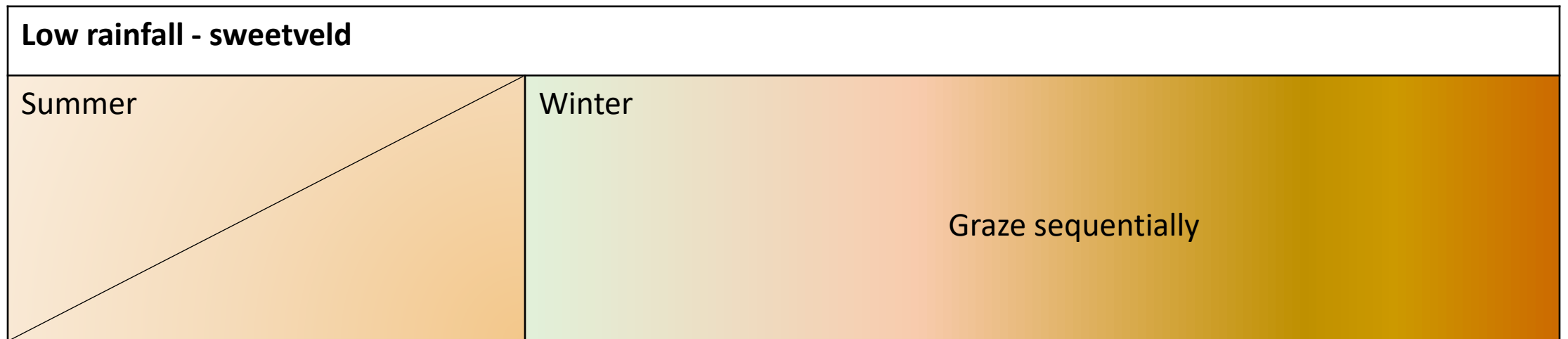
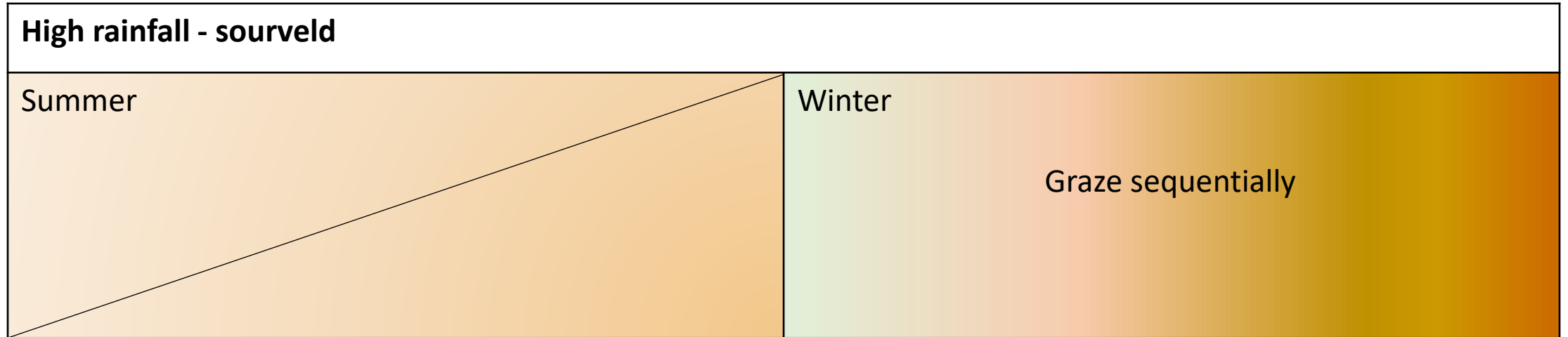


- Purposeful trampling of dead grass material can create excessive “thatch” on the soil surface
 - Might increase soil moisture and moderate soil temperature
 - Often results in soil compaction
 - Creates physical barrier for seedling emergence and for tillering of grass tufts (interferes with grass reproduction)
 - Reduces light availability at the soil surface – negatively affects tillering and seed germination / emergence
 - Commonly reduces tuft basal area – bigger bare areas between tufts
- Impacts greater in high rainfall areas
- Thatch in low rainfall areas frequently gets eaten rapidly by termites

What does this look like in practice? Summer



What does this look like in practice? Winter



Ideal strategy? Combination of seasonal, irregular rotation (summer), sequential (winter) grazing

Forage quality	High	<p>Continuous grazing Livestock have freedom of selection Graze short, actively growing grass Sustainability questions if implemented continually for many years or decades Uncomplicated</p>	<p>High quality forage in summer ✓ High quantity forage throughout year ✓ Profitability (fodder flow cycle) ✓ Logical (requires active decisions) ✓ Sustainability (variation over time) ✓ Ecosystem services (spatial & temporal variability) ✓</p>
	Low	<p>Traditional rigid rotational grazing systems Fixed cycle length (weekly movement) e.g. 3 paddock, 4 paddock, 8 paddock Rigid = lack of adaptive decision making Livestock graze tall grass after recovery No real quantity benefit Uncomplicated</p>	<p>High density grazing (Holistic management) Livestock graze tall grass after recovery Livestock usually can't select for quality Quality low Quantity benefits high animal numbers Complicated</p>
		Low	High
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(Rotational) grazing systems that suit your environment

- Seasonal grazing
- Irregular grazing movement
- Sequential grazing
- Resting



- Maybe time to move away from the simplistic term “rotational grazing”



Grassland Society of Southern Africa Sundowner Webinar Series

- **Wed 28 October 17h00**
 - Dr Sam Fuhlendorf – Oklahoma State University
 - Animals, fences and fires: Heterogeneity and grassland management
- **Thursday 26 November 17h00**
 - Dr David Briske – Texas A&M University
 - Reflections on 40 Years of Holistic Grazing Management Assessment
- **Webinars are free, but require registration on the GSSA website prior to joining**
- <https://2020gssa.dryfta.com/>