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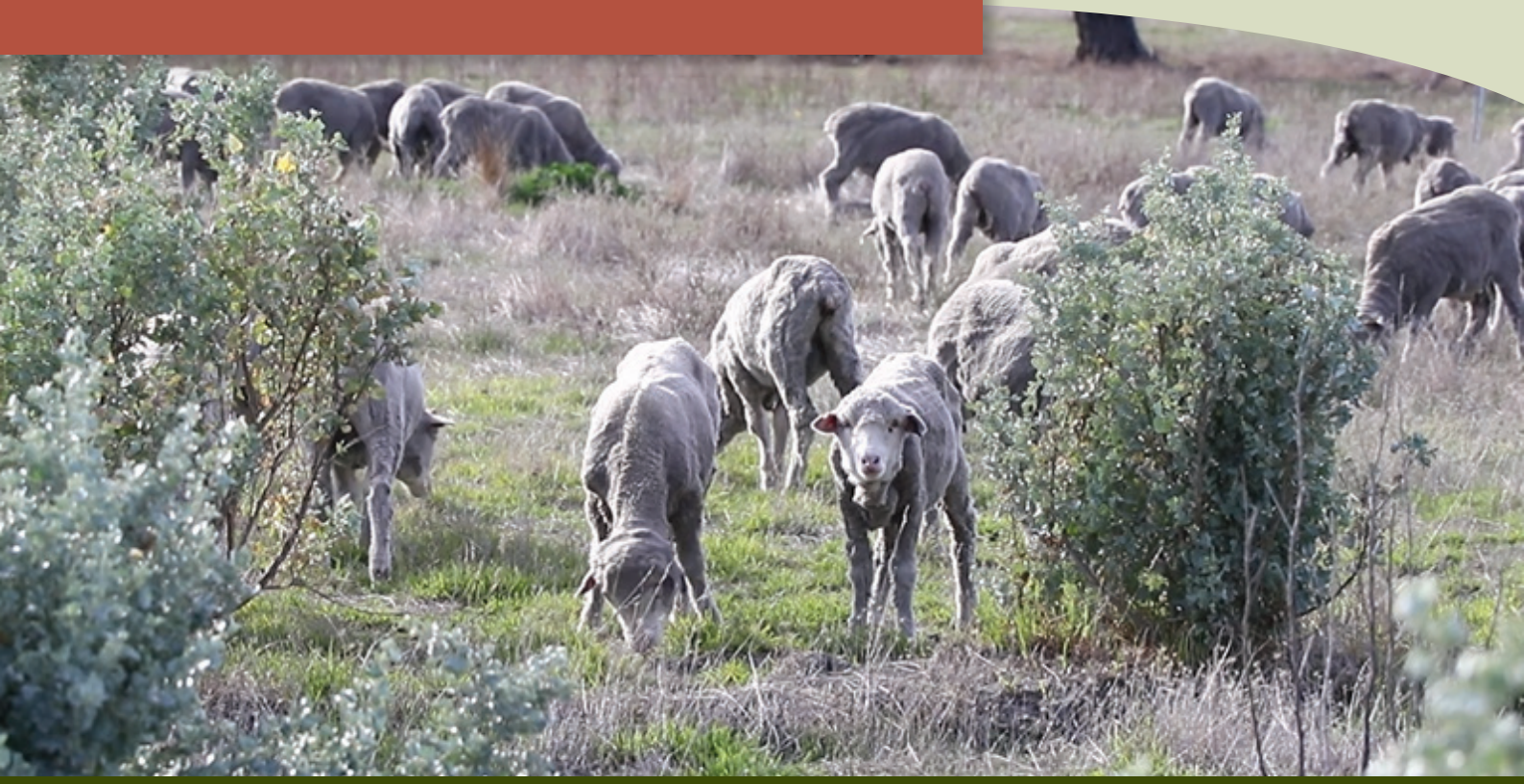
- Stories from the land -



Economics of grazing system options on marginal lands

NUTS & BOLTS

- In high to very high rainfall zone, kikuyu is generally about $10 to $20/ha/year more profitable than voluntary annual pasture.
- In the medium rainfall zone, kikuyu, improved annual pasture and voluntary annual pasture are profitable (indicative annual profit of about $55-65/ha/year).
- In low to medium rainfall zones with mild salinity, saltbush with annual pasture understorey is estimated to have annual profit of about $30/ha/year.
- In low to medium rainfall zones with moderate to high salinity, the preferred approach is saltbush with salt tolerant perennial pasture understorey with about $20/ha/year profit.
- Fencing marginal lands to prevent grazing is relatively low cost and low risk to increase groundcover and improve land rehabilitation in salt affected land.

SALTBUSH FAST FACTS

- Saltbush provides out-of-season feed to livestock that has high crude protein and a rich source of vitamin E (Norman, 2009, 2012)
- Saltbush can be established with direct seeding, the planting of seedlings, or both (LWWP and FFICRC 2015).
- Saltbush uses water over summer to dry out the soil and lower the water table so that salt in the surface soil can be leached readily. (LWWP and FFICRC 2015).

SALTBUSH IN THE SOUTH COAST OF WESTERN AUSTRALIA

Approximately 2.7% or 82,000ha of the south coast region in Western Australia is affected by salinity (van Gool et al., 2008). Salinity leads to a loss of pasture production by nutrient imbalances or deficiencies, an invasion of salt-tolerant weeds, soil structure decline and a range of environmental problems such as saline waterways that affect aquatic life (Cunningham and Sargeant 2013). Perennial forages such as saltbush have been introduced in such marginal lands to improve production.

ECONOMIC ANALYSIS OF GRAZING SYSTEM

Farming marginal land often includes a risk of establishment failure due to poor soil conditions. Although these areas are usually a small proportion of a farm area, uncertainty associated with costs and profit can be barriers to introducing suitable farming systems.

South Coast NRM Inc. and Advanced Choice Economics Pty Ltd conducted a cash flow economic analysis*1 to explore the profitability of grazing systems within the south coast of Western Australia.

These grazing systems were: annual volunteer pasture (native unimproved pasture), annual improved pasture, kikuyu*2 perennial pasture and saltbush-based forage systems; as a phase in cropping rotations or as a continuous pasture systems. Results suggested that profitability of grazing systems was generally higher with more crop phases in a rotation (Table 1). An exception was the very high rainfall zone where continuous pastures (System 4) are more profitable than a wheat-pasture rotation (System 3).

Cashflow Analysis*1: An assessment of the cost effectiveness and investment value of projects by discounting the future benefit and cost stream over a time horizon (in this case 10 years) using a discount rate (in this case 5%). An annual equivalent profit is calculated if a constant profit per hectare per year that can be earned over the 10 years, allowing for interest and tax.

Kikuyu*2: Kikuyu is one of the most widely adopted perennial pasture species on the south coast of WA (Master, 2013).

Table 1 Indicative equivalent annual profit for various rotations and continuous pastures ($/ha/year)

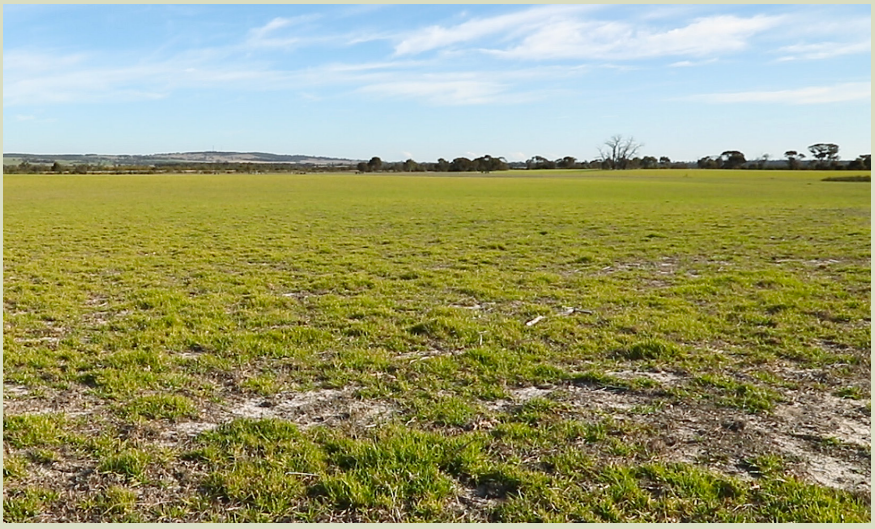
System	Rotations				Indicative annual profit			
					Rain fall zone (mm/year)			
					Low	Medium	High	Very high
					< 325	325 - 450	450 - 550	> 550
1	W	B	C	Av	$186 /ha/year	$323 /ha/year	$365 /ha/year	NA
2	C	B	Av	Av	$130 /ha/year	$233 /ha/year	$276 /ha/year	NA
3	W	Av	Av	Av	$47 /ha/year	$146 /ha/ year	$189 /ha/year	$216 /ha/year
4	Ai	Av	Av	Av	NA	$54 /ha/year	$111 /ha/year	$239 /ha/year
5	Av	Av	Av	Av	$2 /ha/year	$67 /ha/year	$115 /ha/year	$224 /ha/year
6	Pk	Pk	Pk	Pk	NA	$65 /ha/year	$126 /ha/year	$242 /ha/year

W=Wheat. B=Barley. C=Canola. Ai=Improved annual pasture. Av=Voluntary annual pasture. Pk=Perennial pasture kikuyu. NA=not applicable.

MEDIUM TO VERY HIGH RAINFALL ZONE

Analysis results showed that profitability of grazing system was generally higher with more crop phases in a rotation, in any annual rain fall zone (Table1). An exception was the very high rainfall zone where continuous pastures (System 4) are more profitable than a wheat-pasture rotation (System 3).

Among continues pasture systems, inclusion of kikuyu (System 6) was found to increase gross margins by 5-10% in the higher rainfall zones of the South Coast to 400% in the lower rainfall zones. This is approximately $10 to $20/ha/year more than annual volunteer pastures (System 5) in the high to very high rainfall zone, and is similar to improved pastures in the medium rainfall zone.



Kikuyu is one of the most widely adopted perennial pasture species on the south coast of WA

LOW TO MEDIUM RAINFALL ZONE

In this rainfall zone, including continuous pasture rotations showed a potential to be unprofitable. This reflects reality where landholders rarely use continuous pastures but are planting unproductive soils to other enterprise such as salt land pasture and saltbush.

Saltbush with understorey species is the most recommended option for saline sites with low to medium rainfall even though greater management is required compared to saltbush only. It is important to manage the understorey pasture carefully to ensure it persists to maintain the quality (to provide the bulk of the feed for livestock) and to provide groundcover (FFICRC 2014)

Saltbush with an understorey system has the potential to be unprofitable with low stocking rates and low output prices however the production and environmental benefits by revegetating these marginal lands is significant.

The analysis indicated the most profitable system depends on the salinity level (Table 2).

Table 2 Indicative estimates of the costs and indicative annual profit for saltbush with annual pasture understorey and perennial pasture understorey

Salinity level	Recommended system	Indicative estimates of the costs and annual profits			
		Additional green feed grazing	Establishment cost	Maintenance cost	Indicative net returns even-break after establishment
Mild	Saltbush with annual pasture understorey	120 days/year with 20 DSE/ha	$410/ha	$60/ha	In year 4
Moderate to High	Saltbush with salt tolerant perennial pasture understorey	120 days/year with 15 DSE/ha	$380/ha	$35/ha	In year 5
High	Fencing for land rehabilitation	NA	NA	NA	NA

Saltbush alleys on salt affected land

MILDLY SALINE LAND

On land with mild salinity where annual pasture understorey maintains the quality and quantity of feed, saltbush with annual pasture understorey is the recommended option.

MODERATE TO HIGHLY SALINE LAND

On land with moderate to high salinity that cannot support a strong annual pasture understorey, perennial pasture understorey using salt tolerant species such as tall wheat grass or puccinellia is recommended. The advantage of a perennial pasture understorey includes greater nutritive benefits complementing the lower fibre of saltbush and additionally, the potential to improve soil carbon storage. Due to fewer costs associated with perennials compared to annuals (Table 2), this system is expected to have less risk of being unprofitable compared with saltbush with an annual understorey.

HIGHLY SALINE LAND

Where soil is marginal due to high levels of salinity or waterlogging, the landowner may consider alternative land uses or fencing off the affected area and restoring the land. This is a case when: wheat yields are lower than approximately 0.8-1 t/ha, stocking rates are less than approximately 1.2-2.7 DSE/ha or intensive stocking rates for part of the year on saltbush with perennial pasture is less than approximately 12 DSE/ha.

Fencing has the advantage of being relatively low cost and low risk with the added benefits of improvements in groundcover and land rehabilitation. Exploring a variety of available native perennials on these areas can be an option to restore degraded land, with potential for land to be productive. Appropriately selected native perennial plants are generally more adapted to the local environment including salinity and waterlogging, than introduced species. If the right species are selected, marginal land can be drastically improved and prevent loss of potentially productive land (South Coast NRM, 2015).

Saltbush provides out of season feed to livestock

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A series of marginal land farming short films can be viewed on the South Coast NRM YouTube channel.

"Resilience through Perennials"
https://www.youtube.com/watch?v=moEUCBG3Z0Q

"Foraging for the Future"
https://www.youtube.com/watch?v=O5FTxmNSsLc

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