



## Foraging for the Future

### Growing perennial forages on marginal lands

#### FARMER PROFILE

**Name:** Ian and Joan Walsh, Michael and Mindy Walsh

**Location:** Cranbrook

**Average Annual Rainfall:** 400-425 mm

**Enterprise mix:** Livestock (sheep) and cropping (canola, barley and oats)

**Property size:** 1600 hectares

**Soil Type:** Sandy duplex (Yellow sands Uc5.22)



#### NUTS & BOLTS

- Perennial shrubs as part of the farming system can make a major contribution to increasing livestock productivity while lowering methane emission intensity.
- Grazing perennial shrubs enabled sheep to gain weight in summer/autumn and helped get them to market weight quicker compared to sheep that grazed stubbles.
- The production benefit from grazing perennial shrubs is due to a better nutritional balance as shrubs provide higher protein, higher digestibility and improve feed conversion efficiency.
- Additional benefits of perennial shrubs on marginal lands include increased ground cover, better ground water management, reducing runoff and the potential for carbon sequestration.
- Inclusion of perennial shrubs on marginal land gives farmers the ability to be opportunistic and make farming systems more robust against future climate variability.

## HOW SALTBUSH FITS THE FARM SYSTEM ● ● ●

Establishing saltbush and salt tolerant perennial grasses was a breakthrough for Ian Walsh to convert his saline land into a productive component of his farm.

Ian's family moved into the Cranbrook property in 1957 where later they found it had a critical water problem with a shallow water table. The knowledge of management of salt affected land was very limited in the 1960's and by the time they began to understand the issue, productivity had been affected.

To address this problem, Ian introduced perennial systems which include saltbush and other salt-tolerant perennials. Introducing perennial forages increased the area of productive land, provided green feed in autumn and increased the sheep carrying capacity while he still maintained the cropping area.

Ian is passionate about exploring the potential of salt land perennial systems and how they can be a productive part of the whole farm system.

*"WE needed to change the way we managed the farm." he said, "Lots of people wouldn't think you could produce off this land but we've been farming it sustainably for two generations. And we plan on keeping it that way."*

"If we are going to meet the demand for food in the coming years... I believe farmers like myself need to become more productive in a sustainable way and possibly modify the way we farm. We have to try and achieve this for future generations.... We only have stewardship of the land for a short period" he said.

Over the last couple of years, he has been working closely with CSIRO to improve the nutritional management of



*Saltbush provides out of season feed to livestock that is a rich source of protein and vitamin E.*

livestock using saltbush. Improving nutrient provision at key points in the year can have significant outcomes especially if breeding animals or young growing animals are targeted, as their subsequent performance can be improved over the longer term. The key to the success of this strategy is the complementarity of the saltbush with the available pasture understorey. Alone neither one can support good livestock growth.

Saltbush has low fibre and high crude protein with high salt and sulphur content, which are essential for wool growth. Under arid and saline environments, saltbush accumulates minerals and produces a range of secondary compounds such as vitamin E which is vital for animal health. This nutrient aspect of saltbush is important for young sheep as they are often deficient in vitamin E during autumn when on dry feed (Norman, 2009, 2012).

Therefore if saltbush provides additional nutrition to livestock for a longer period of time, it would shorten the time taken for livestock to reach market weight and also reduce methane emission intensity.\*

\*Methane emission intensity (g CH<sub>4</sub>/g LWG): Amount of methane produced per unit of product (Liveweight gain (LWG))

## SALTBUSH AND METHANE EMISSIONS ● ● ●

The enteric methane produced by ruminants is generally related to the amount and quality of feed they consume.

Production of methane has a negative impact on animal productivity as it is a loss of feed energy from the diet and represents inefficient utilisation of the feed, resulting in lost energy ranging from 2% to 12% of the animal's gross energy intake (Broucek, 2014).

Agriculture currently accounts for approximately 13 per cent of Australia's total greenhouse gas emissions and 72 per cent of these are methane emissions from sheep, cattle and other ruminants (Department of the Environment and Energy, 2016).

Inclusion of saltbush in the farming system would allow farmers to contribute toward effective mitigation of greenhouse gas as well as to adopt a best practice management system for land use.

Ian's most recent trial of saltbush with CSIRO was to find how saltbush increases sheep production and reduces methane emission intensity for more efficient productivity.

A variety of perennial shrub species including Atriplex shrubs (Old Man Saltbush) and other commonly used species were established and then grazed by merino sheep for 35 days. Oat stubble was used as the control for comparison.

The methane produced by the lambs was measured by placing the animals into an inflatable polytunnel for 3 hours after their morning graze.



Polytunnel setup for sheep methane emissions measurement.



Sheep in the polytunnel ready for measurement of methane emissions after their morning graze.

## INCREASED PRODUCTIVITY WITH PERENNIAL SHRUBS ●●●

By day 35, sheep grazing the shrub plots were 2.5 kg heavier with almost a 3 fold difference in the rate of growth relative to the sheep grazing the stubble.

The shrub group gained liveweight for the first 35 days of grazing and lost liveweight in the last fortnight indicating the feed supply in the paddock was becoming limiting. The stubble group only gained weight for the first fortnight and then gradually lost weight. (Figure 1).

Peak methane emission intensity was almost 39% lower for the shrub group compared to the stubble group. There was a gradual linear decline in methane emission for the shrub group which indicated a decline in rumen substrates available for digestion and methane production (Figure 2).

This pattern is typical of feeds with higher digestibility and lower rumen retention times. For the stubble group, there

was little change in methane levels after peak emissions, typical of diets with a slower digestion rate that limit daily feed intake. The mixed shrubs, provided a boost in protein and vitamin E intake to the sheep and improved the digestibility and feed conversion efficiency of the mature volunteer grasses in the inter-row.

These results support the idea that inclusion of perennial shrubs in salt land as part of the farming system can make a major contribution to livestock productivity while reducing methane emission intensity. It takes off pressure from other productive areas of the farm, while increasing the options to minimise feed gaps without the need for significant supplementary feeding. It also has the potential to mitigate greenhouse gases where farmers may find additional economic benefits through participation in the carbon economy.

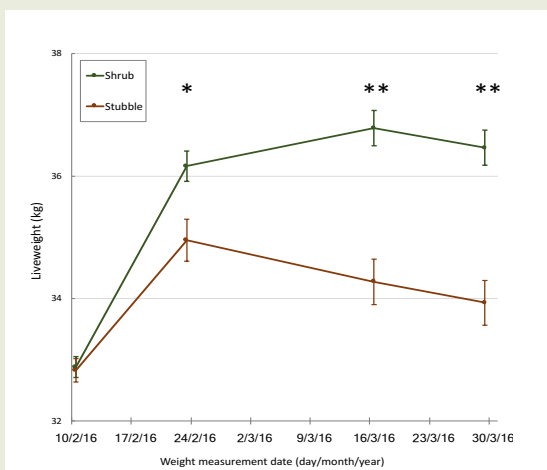


Figure 1 Liveweight (Mean ± s.e.) of ewes grazing the shrub mix (Treatment) or the crop stubble (Control). (\*P<0.05; \*\*P<0.01).

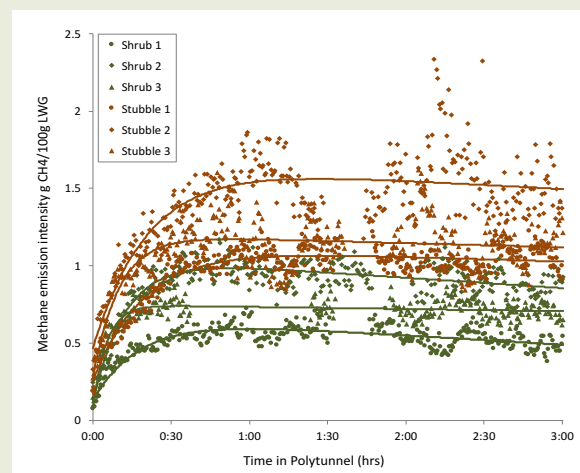


Figure 2 Methane emission Intensity (g CH<sub>4</sub>/hr/ 100g LWG) and fitted curves for the 6 sheep groups measured in the Polyntunnel over a period of 3 hrs.

"It's my belief, we as farmers have a responsibility to look after our land."

- Ian Walsh, Cranbrook, WA, 2017



## References

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## Produced by Kanako Tomita (South Coast NRM)

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

"Foraging for the Future"

<https://www.youtube.com/watch?v=O5FTxmNSsLc>

"Resilience through Perennials"

<https://www.youtube.com/watch?v=moEUCBG3Z0Q>

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