

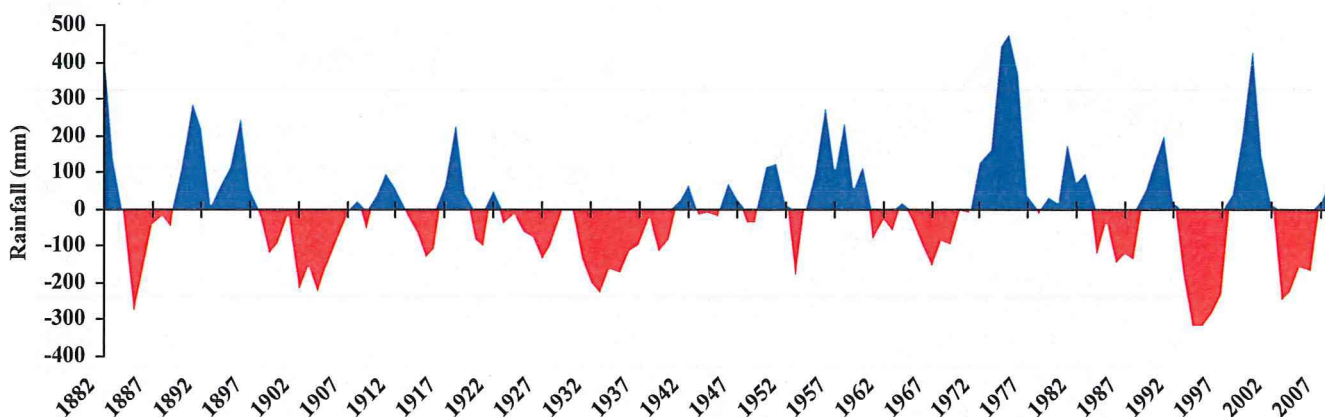


**THE WAMBIANA GRAZING TRIAL:
TESTING THE LONG TERM
ABILITY OF DIFFERENT GRAZING
STRATEGIES TO COPE WITH
RAINFALL VARIABILITY**

October 2009



Fig.1 : Historical sequence of 'above' and 'below' average rainfall periods for Charters Towers (3 year moving mean)



Introduction

- Rainfall in north Queensland is historically extremely variable (Fig.1).
- In dry years, overstocking can result in pasture degradation, soil erosion and financial loss.
- Sustainable grazing strategies like light and variable stocking are not widely adopted due to a belief that they are unprofitable.

Trial Objectives

- Objectively assess the ability of different grazing strategies to cope with rainfall variability.
- Develop new, practical grazing strategies to manage for this variability.
- Demonstrate the benefits of sustainable management.

General Trial Features

- **Location:** Wambiana Station
~ 75km S of Charters Towers
- **Area:** 1100 ha composed of 3 soil types.
- **Start date :** 19 December 1997
- **Average rainfall:** 630 mm
- **Vegetation:** tropical savanna woodland
- **5 Treatments** replicated twice
- **Paddock sizes:** 93 to 117 ha and fenced so that soil types are in the same proportion in each paddock.
- **Cattle:** Brahman-X steers 18 and 30 months old
- **Compudose HGP**s used since 2003.
- **Supplementation:**
Dry season : Urea (32%) & Salt
Wet season : Urea (22%) & Aliphos (15%P)
M8U drought feeding when needed



- Above: The Wambiana Grazer Advisory Committee has played a critical role in the management of the trial since its inception.

Grazing strategies

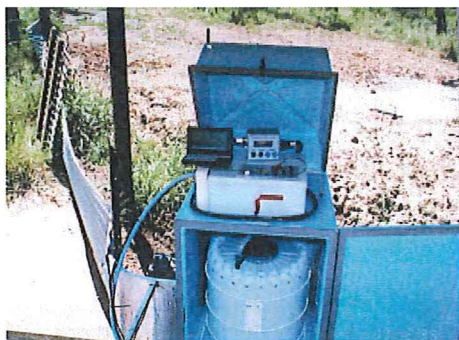
1. **Heavy stocking (HSR)** : Set stocking at about twice the Long Term Carrying Capacity (LTCC) i.e. 4 ha/AE.* [*LTCC: 25 % utilisation of the pasture expected to be produced in 70 % of rainfall years*]
2. **Moderate stocking (MSR)** : Set stocking at LTCC (8 ha/AE).*
3. **Rotational Wet Season spelling (R/Spell)**: Set stocking at 6 ha/AE with a third of the paddock rotationally spelled each wet season (Dec to June). In 2000 and 2001 fire was also used prior to spelling.
4. **Variable stocking (VAR)**: Stocking rates adjusted in May based on available pasture to ensure animals have sufficient dry season feed and leave a minimum residue of 800-1000 kg/ha (range: 3- 12 ha/AE)*
5. **SOI-Variable stocking (SOI)**: Stocking rates adjusted in November based on available pasture and Southern Oscillation Index (SOI) seasonal forecasts (range: 3-12 ha/AE)*

*(1 AE = 1 Adult Equivalent weighing 450 kg)

NB: Stocking rates chosen based on LTCC, district averages and discussion with the Grazier Advisory Committee

Measurements

- **Animal Performance**
Weight gains, condition score & skeletal growth
- **Biodiversity**
Faunal and floral diversity
- **Pasture condition and production**
- **Soil Loss and Runoff**
- **Economics**
Sales, carcass grades, input costs, margins
- **Land Type Selection**
- **Woodland Structure and Fire**



Above: Automatic samplers collect water samples from paddock runoff.



Left: Rotational wet season spelling



Right: Fauna surveys assess biodiversity responses to grazing treatments.



Right: Determining pasture growth relationships with rainfall and soil



Right: A 'hot' fire was used to manage woodland structure and density in October 1999.

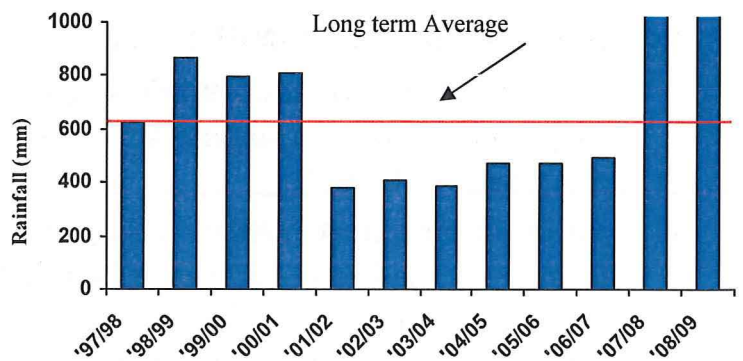


First...some history

Rainfall was good for the first 4 years, but for the next 6 years was below average and very poorly distributed. The last 2 years have been reasonable with unusual winter rains (Fig.2)

Rainfall

Fig.2 Wambiana June/May Rainfall: 1997-2009

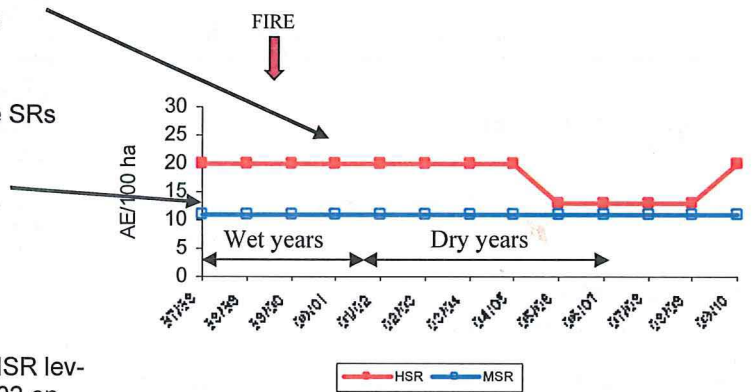


Stocking rates

HSR: Heavy stocking rates (SR) were maintained without problem through the early wet years, but from 2003 to 2006 drought feeding was required in the dry season. In May 2005 SRs had to be cut by about 1/3 due to an obvious drop in carrying capacity (Fig.3)

MSR: The MSR had no problem maintaining moderate SRs across all years irrespective of rainfall.

Fig 3: HSR & MSR : Stocking rates 1998-2009



VAR: Initially lightly stocked but SRs increased above HSR levels in the wetter years. SRs were cut sharply from 2001/02 onwards but overgrazing still occurred in the transition to drier years. The VAR is currently at a higher SR than the MSR (Fig.4).

SOI: Followed a similar trend to the VAR but using the SOI allowed stocking rates to be reduced 6 months earlier than in the VAR

Fig 4: VAR & SOI : Stocking rates 1998-2009

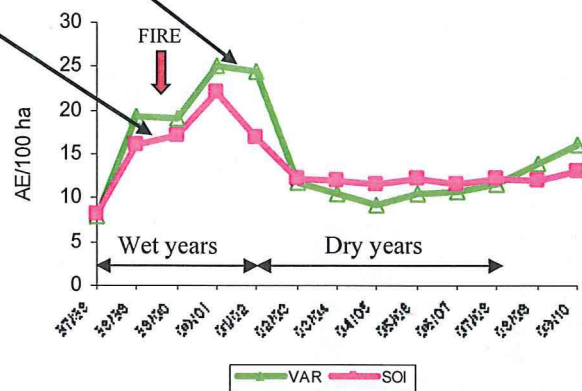
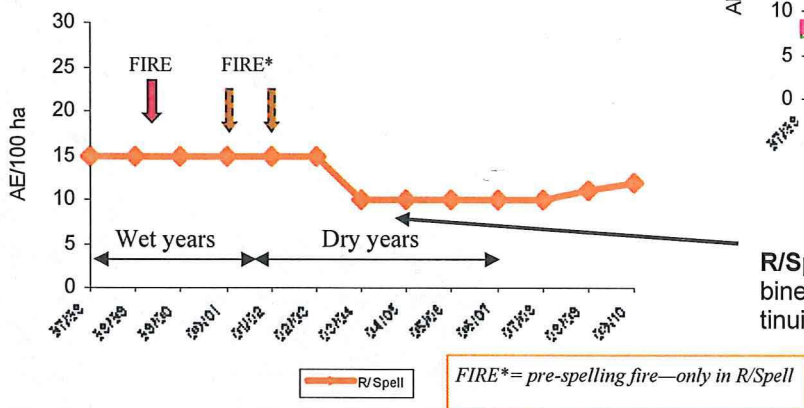


Fig 5: R/Spell : Stocking rates 1998-2009



R/Spell: SRs had to be cut in 2004 due to the combined effects of the 2001 pre-spelling fire and continuing below average rainfall (Fig.5)

FIRE* = pre-spelling fire—only in R/Spell

Pasture condition

After 11 years pasture mass is by far the lowest in the HSR with the availability of 3-P grasses about 3 to 5 fold lower than in the other treatments (Fig. 6). 3-P's in HSR have recovered from 8 to 10 fold lower due to lowering the HSR stocking rate in recent years (see Fig 3)

Fig 6: May 2009: Pasture composition after 11 years

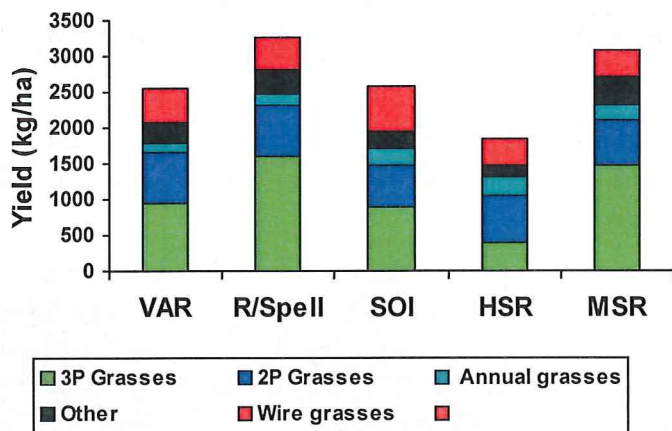
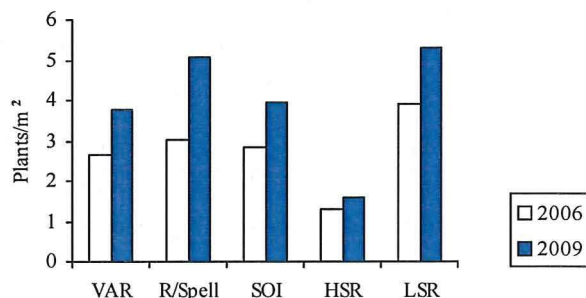
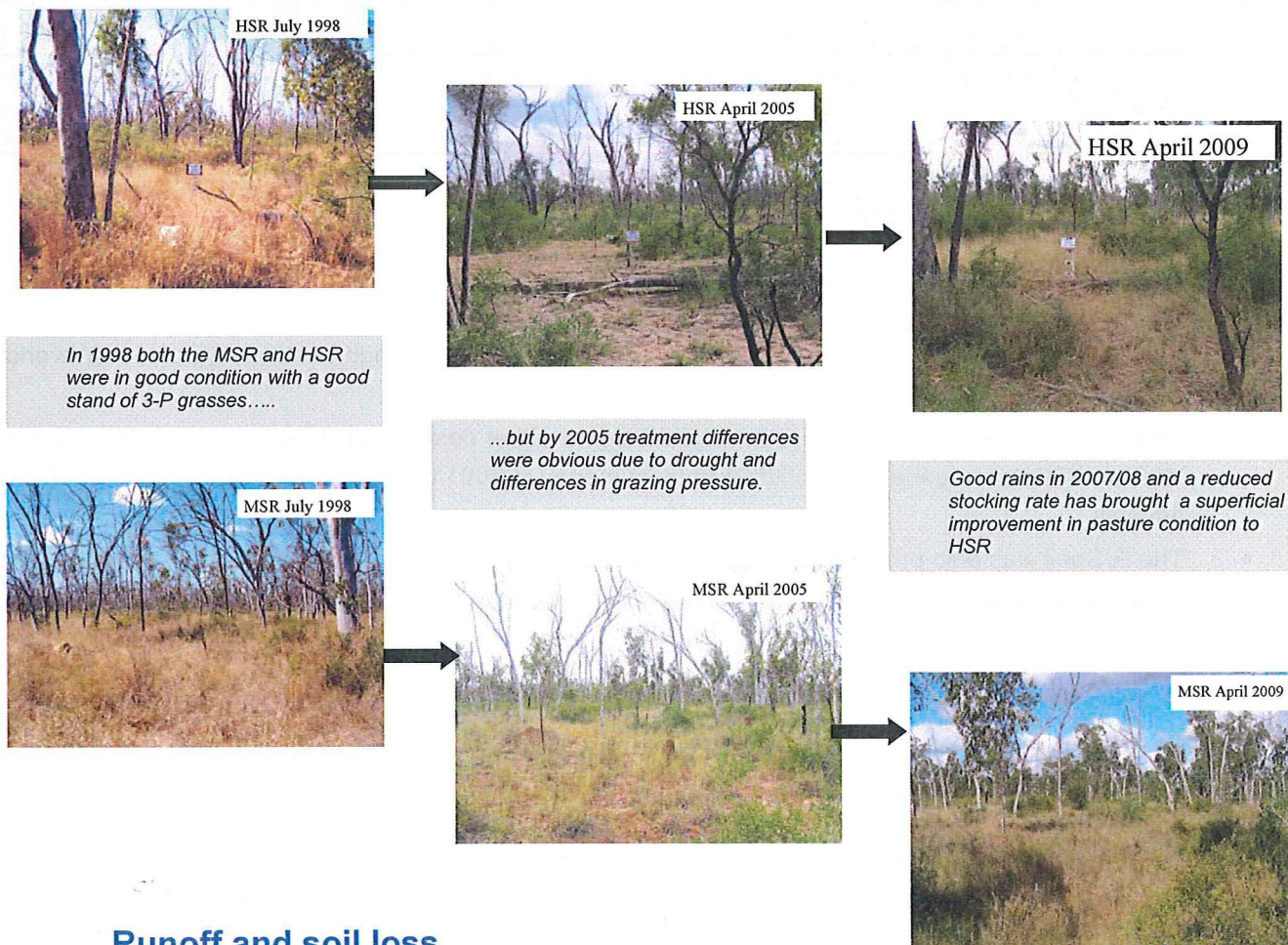


Fig 7: 3-P grass density: 2006 & 2009



There are also big differences in the density of 3-P grasses between treatments. The slightly lower density in the VAR and SOI reflects the heavy grazing pressure inflicted in the lead up to the drier years (Fig.

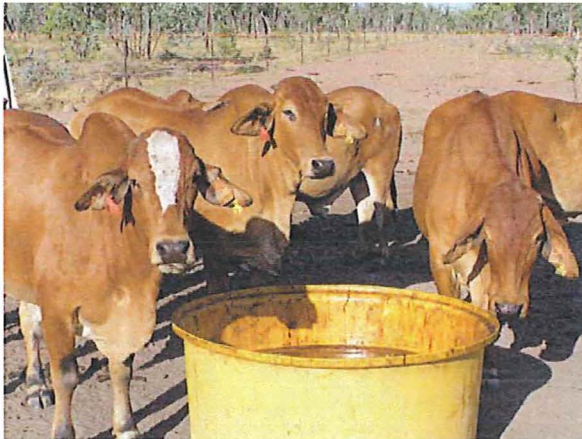


Runoff and soil loss

- Heavy stocking caused a marked decline in ground cover and soil condition.
- Collaborative work with CSIRO also showed a reduction in soil health and infiltration rates due to a decline in the abundance and activity of soil macro-fauna such as termites.
- As a result, heavy stocking led to an increase in the frequency and intensity of runoff.

Animal Production

- **Light to moderate stocking at about LTCC gave the best individual live weight gain (LWG).** These steers were 60-100 kg heavier after 2 years and had a greater carcass value compared to the HSR..
- Average LWG over 12 years was highest in the MSR (115 kg/hd/yr), intermediate in the R/Spell (105 kg/hd/yr) but lowest in the HSR (93 kg/hd/yr). Average LWG was 111 kg/hd/yr in the VAR and 108 kg/hd/yr in the SOI but in both strategies it depended strongly upon the stocking rate applied.
- **LWG/ha was greatest in the HSR (21 kg/ha) but drought feeding was needed in 4 of 12 years.** Although LWG/ha was lower in the MSR (15 kg/ha), R/Spell (15 kg/ha), VAR (18 kg/ha) and SOI (17 kg/ha): drought feeding was not required.



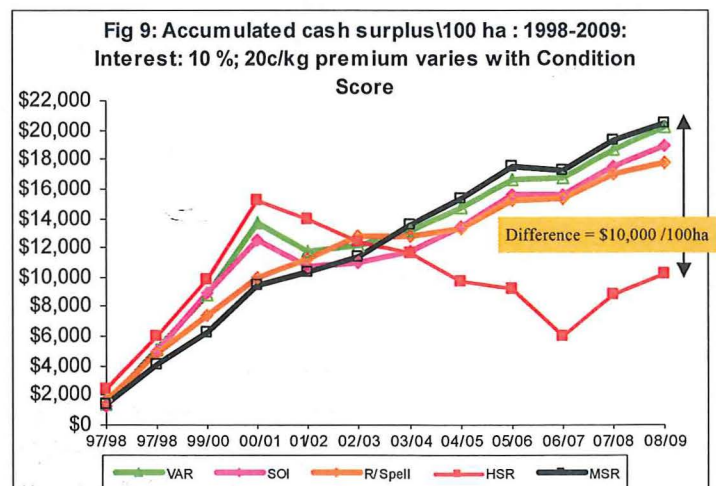
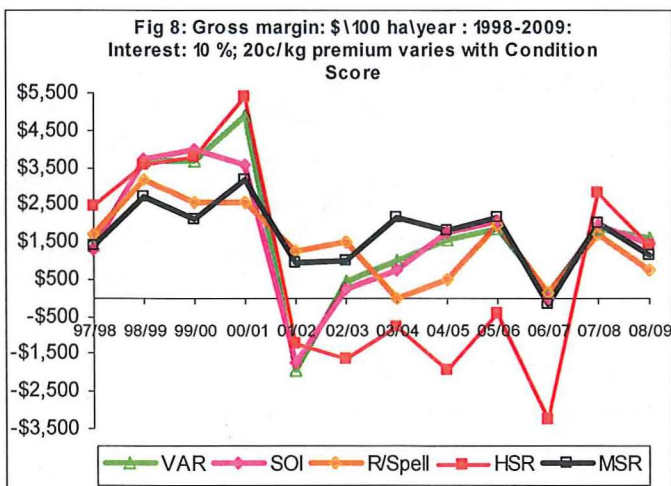
Left: HSR steers had to be drought fed in 4 out of 12 years.



Above: In all years steers from light to moderately stocked paddocks grew fastest and achieved the best condition.

Economics

- The HSR was initially profitable but lost money in dry years due to high costs and poorer meatworks grades (Fig. 8).
- MSR gross margins* were positive in all years due to lower costs and higher returns per animal. The VAR and SOI were generally profitable but lost money in 2001/02 through the sale of poor condition animals.
- The R/Spell was also profitable but was undermined by the ill effects of the 2001 fire.
- **After 12 years accumulated cash surplus was highest in the VAR and MSR and lowest in the HSR (Fig. 9).**



* Gross margins calculated using a 10% interest cost on livestock capital and a \$0.20/kg meat works premium based on condition score.

Some conclusions after 11 years....



Moderate constant stocking

- Consistently good individual animal production and economic performance
- Lower costs and low drought risk.
- Maintained or improved land condition and reduced runoff.
- **Sustainable and profitable**
- *Potential issues: Patch grazing and/or over stocking in very dry years.*

Variable stocking (VAR and SOI)

- Performed well in most years.
- Generally gave good animal and economic performance but increased drought risk
- Pasture condition good but still recovering from delayed destocking in 2001/02.
- *Potential issues: Patch grazing could be problematic.*

Rotational wet season spelling

- Gave good animal and economic performance in most years
- Land condition was largely maintained but...
- The treatment was undermined by the 2001/02 fire and the subsequent drought.

*Issues: Spelling does not appear to allow increased stocking rates
Flexibility with stocking rates required in dry years.*

Constant heavy stocking

Initially performed well in good years but

- Reduced individual animal performance and condition and increased drought risk
- Gross margins declined in dry years due to market penalties and high costs
- Land condition declined, runoff increased and carrying capacity dropped by about 30% in the later drier years
- **Unprofitable and unsustainable.**

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Lyons Family,
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Natural Heritage Trust
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Wambiana Grazing Trial - Site Map

