What Farm System Maximises PROFITABILITY on Pasture-Based Dairy Farms?

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May 2019

Update to previous presentations with statistics completed on individual farm performance data

Presentation outline

Review of FOUR possible primary drivers of profitability:

1. Higher milk production per cow
2. More cows per hectare (higher stocking rate)
3. More intensive farm systems (less pasture per cow)
4. Higher pasture harvest

Development of dairy industry over time

Summary

Any milksolids on graph axis can be replaced with litres

Data source

207 sets of dairy farm data from 5 States including Victoria, Tasmania, South Australia, Western Australia & southern New South Wales

All data processed through Red Sky including industry projects data from Tasmania (DPIWE), South Australia (PIRSA) and Western Australia (DAFWA)

Data from 2005/06; year of sound milk prices, and weather within reasonable norms

Wide range of farm systems from almost ‘all’ pasture and under 4,000 litres/cow through to highly intensive farm systems and over 9,000 litres/cow

All data statistically analysed with p values determined to confirm if relationships significant

Hypothesis #1

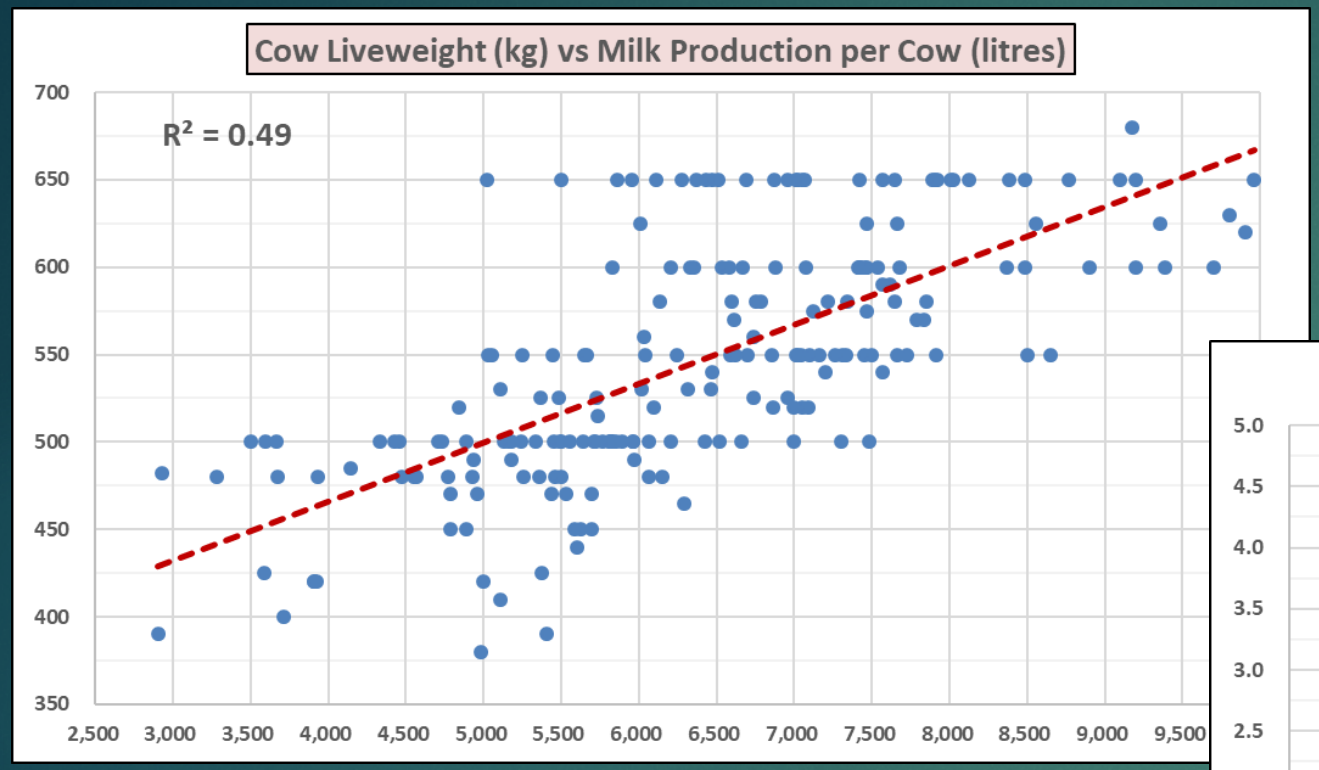
Milk production per cow is a primary driver of profitability on pasture-based dairy farms

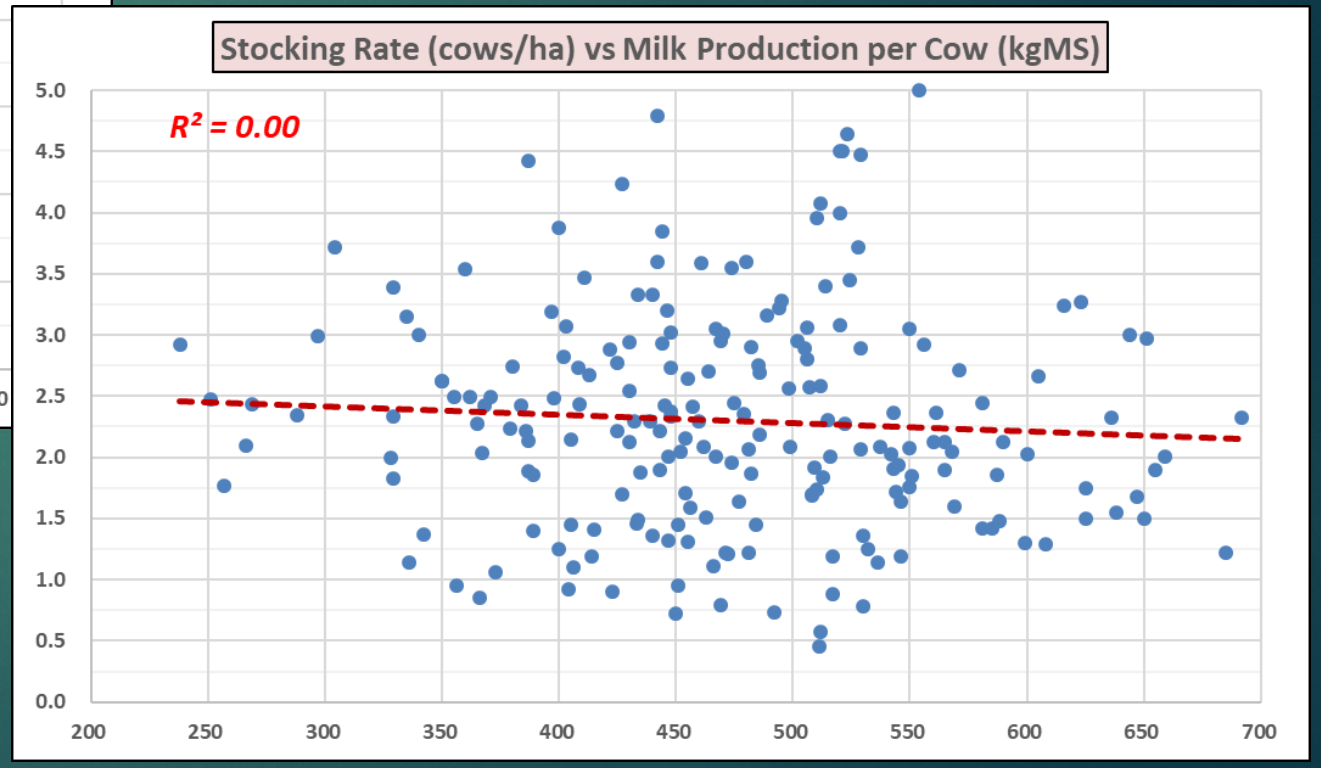
Common comments / presumptions

Given cows need a set amount of energy for maintenance, if we increase their intakes then more energy will go into milk production, and the higher milk production per cow will average down the 'fixed' costs per cow

In short; higher biological efficiency = higher economic efficiency and higher profitability

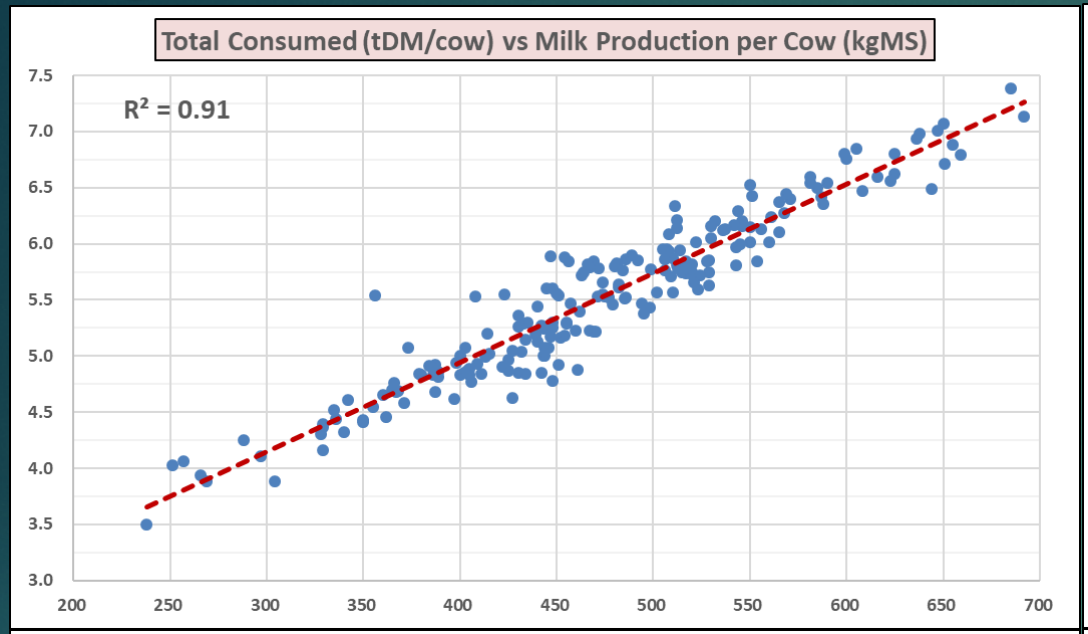
Higher milk per cow farm systems

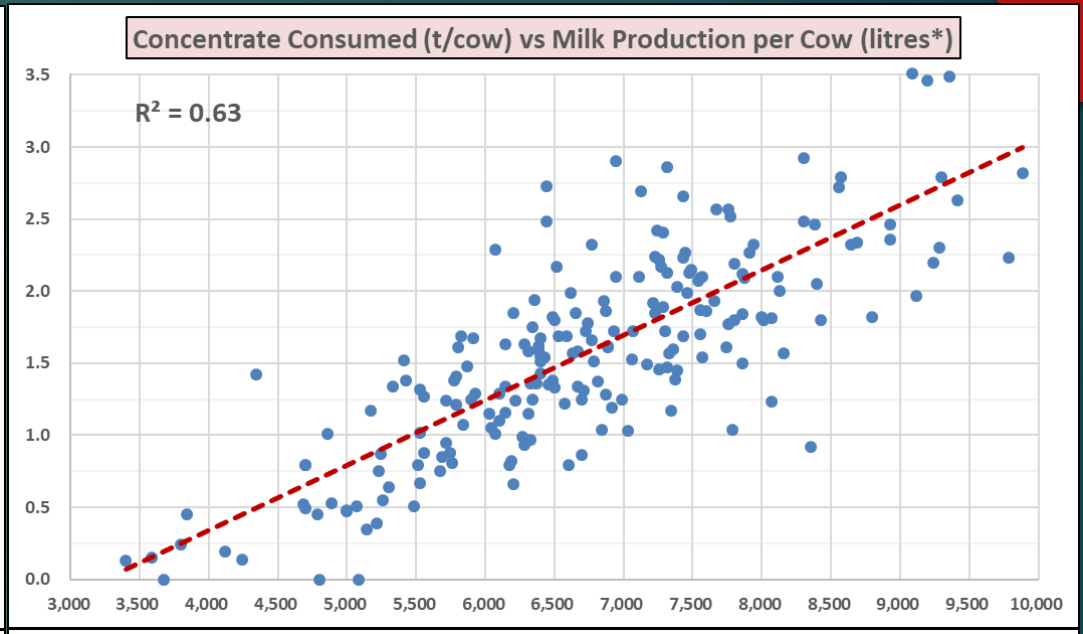


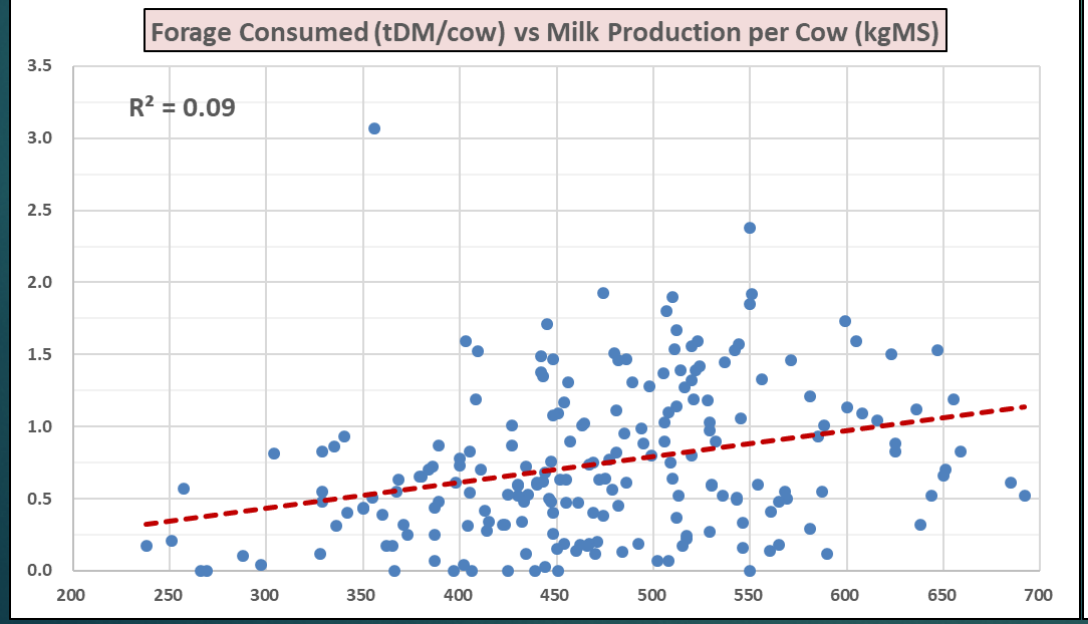


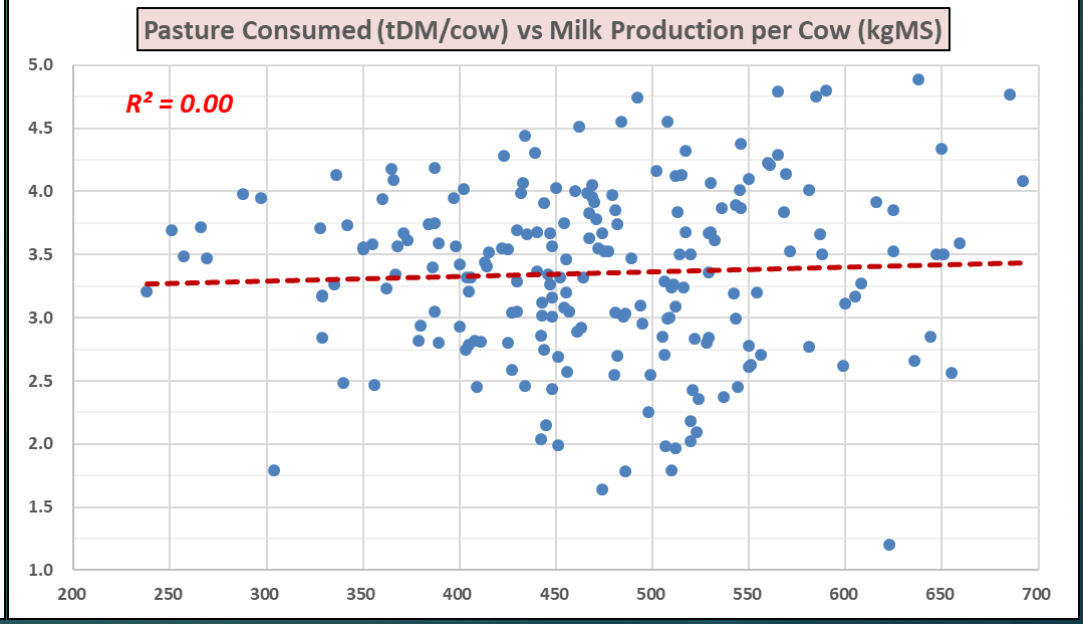
Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Higher milk per cow farm systems

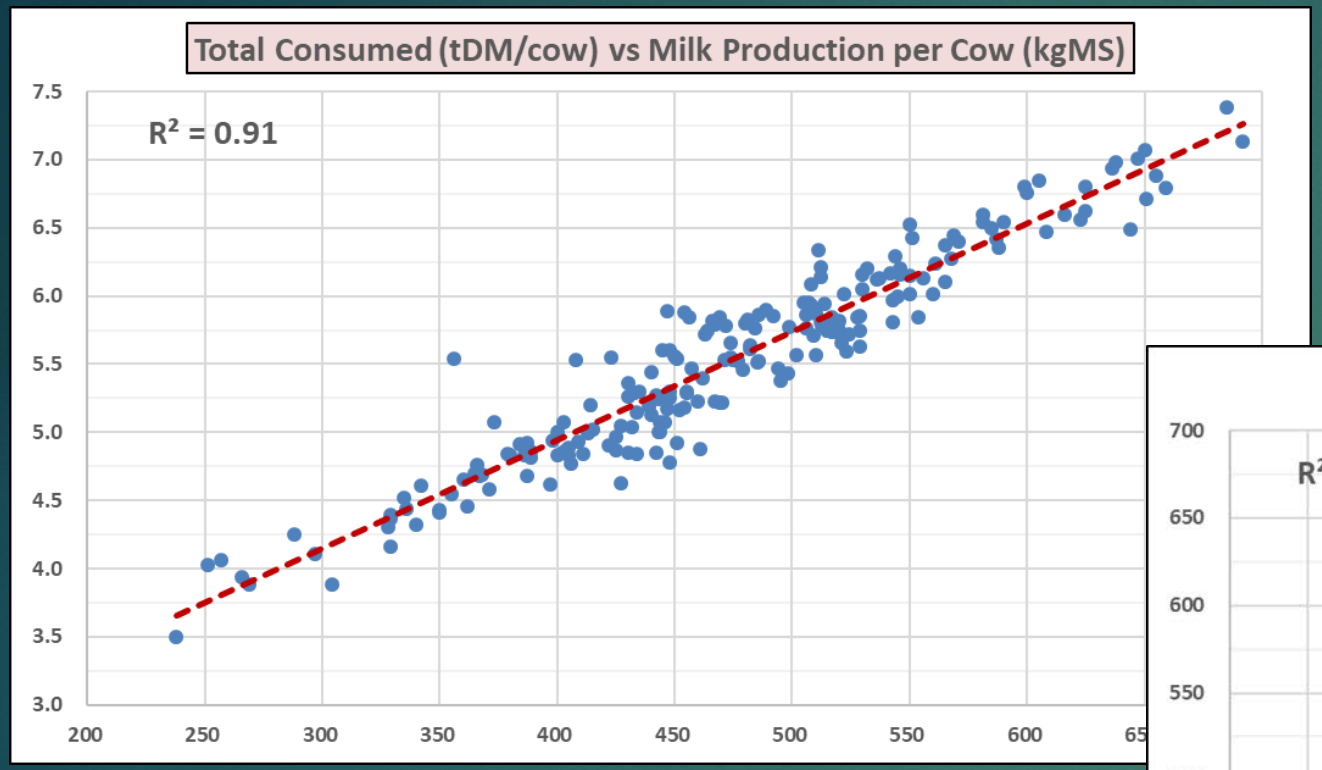


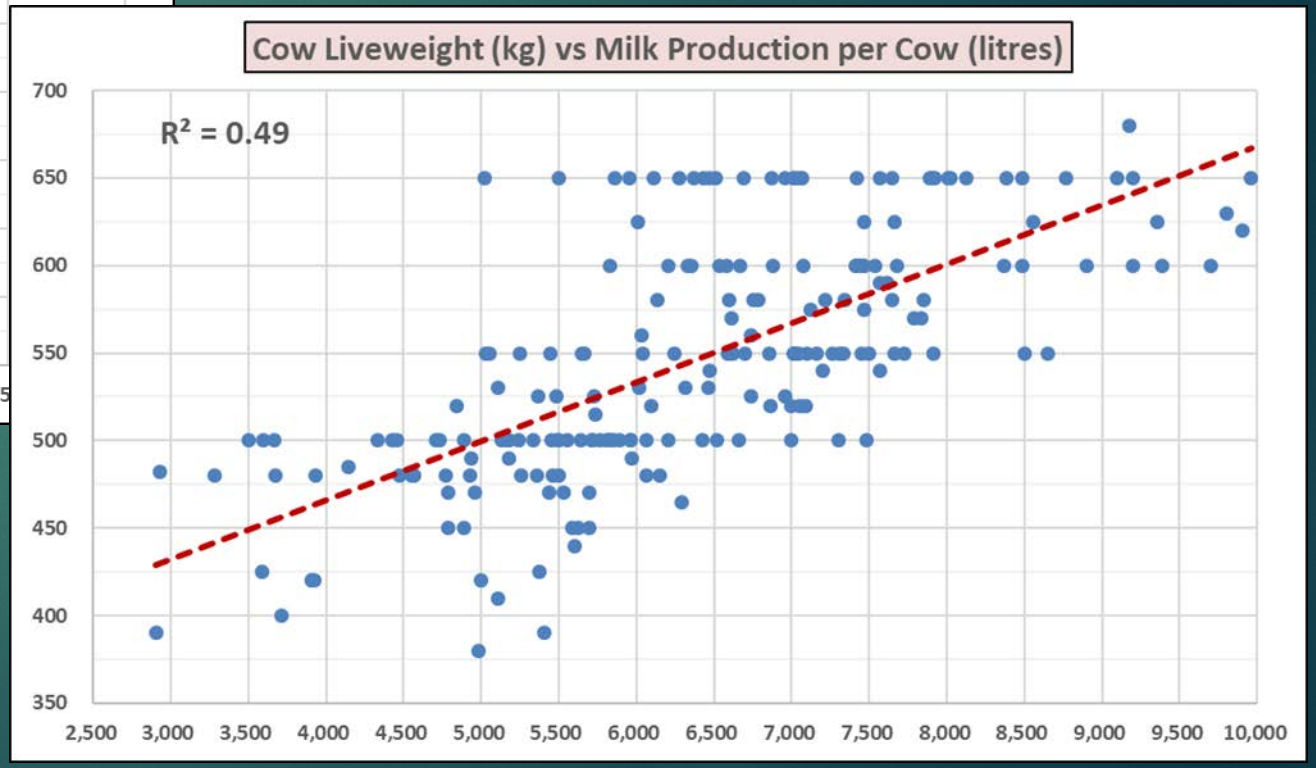






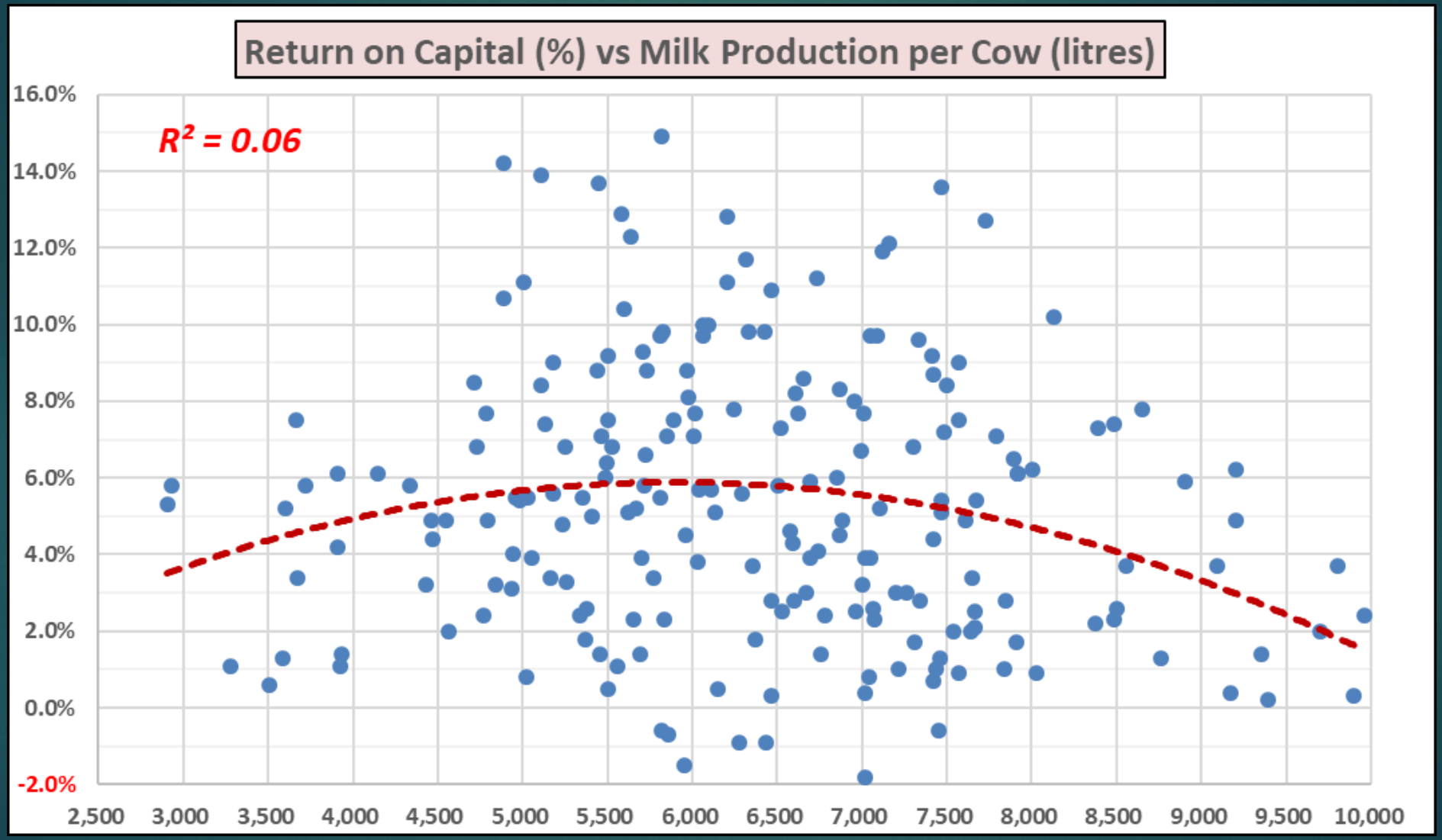
Increasing cow ‘efficiency’ with increasing litres





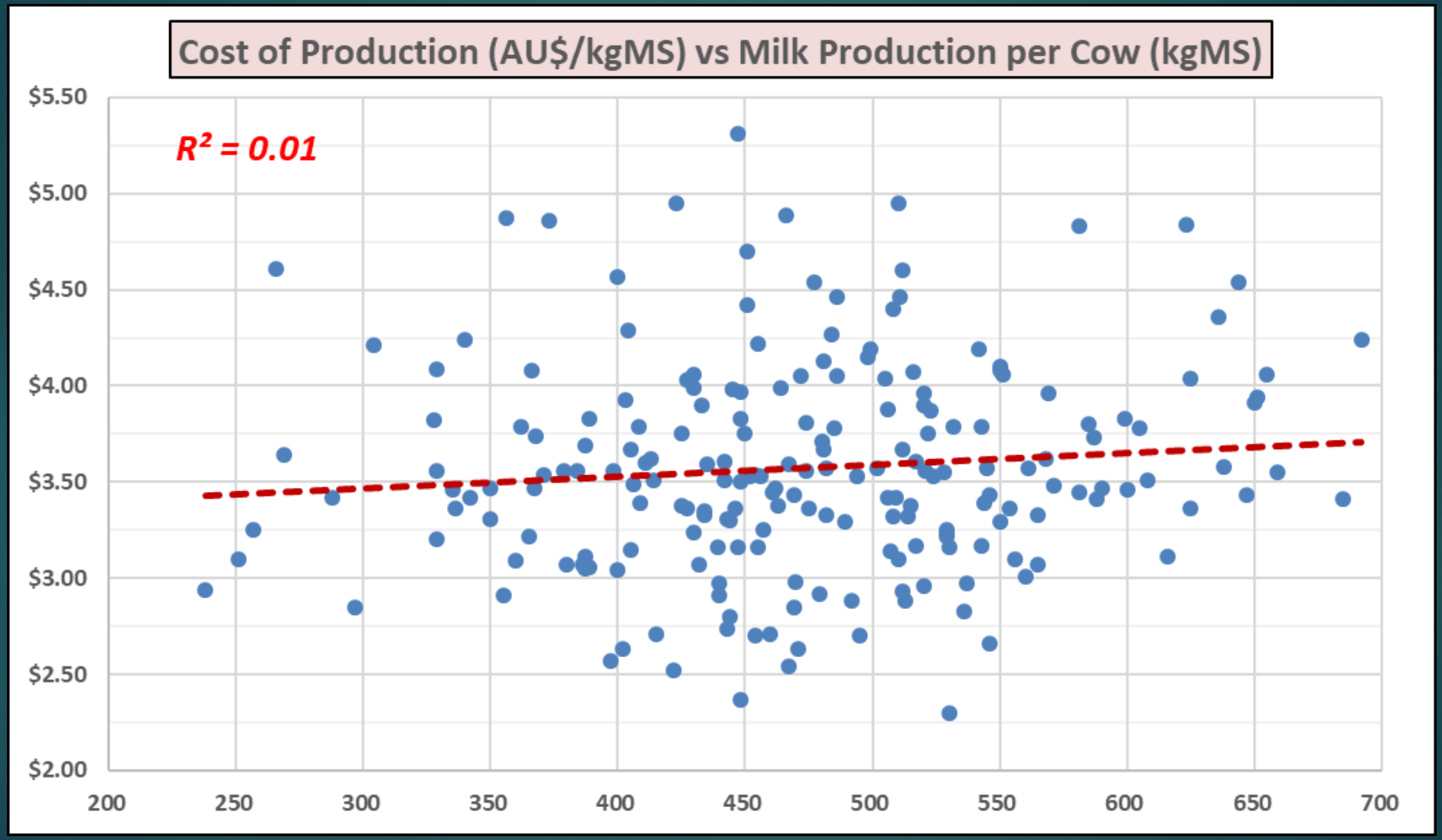
Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Profit (ROC) vs Litres per cow



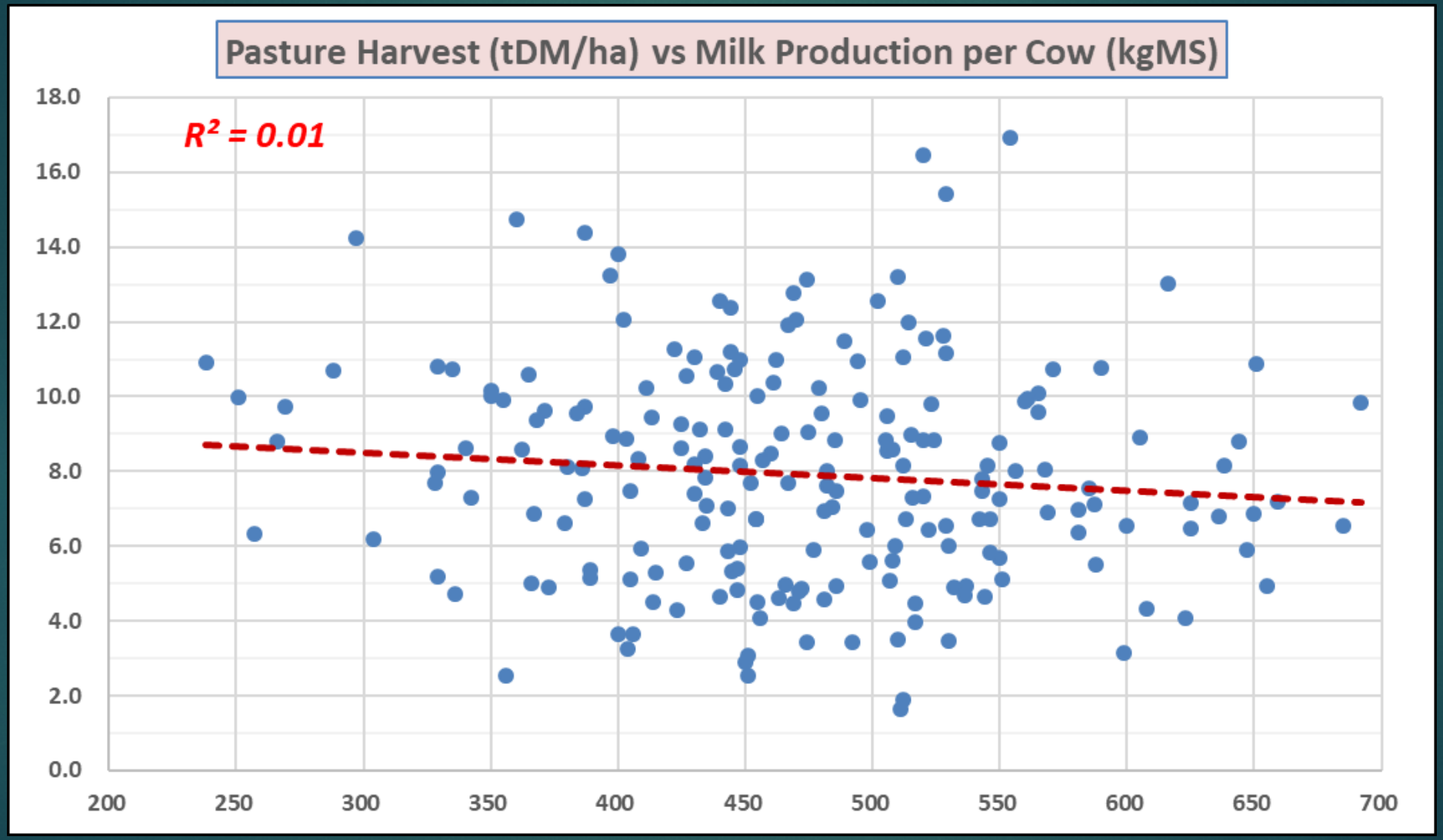
Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Cost of production ($/kgMS) vs Litres per cow



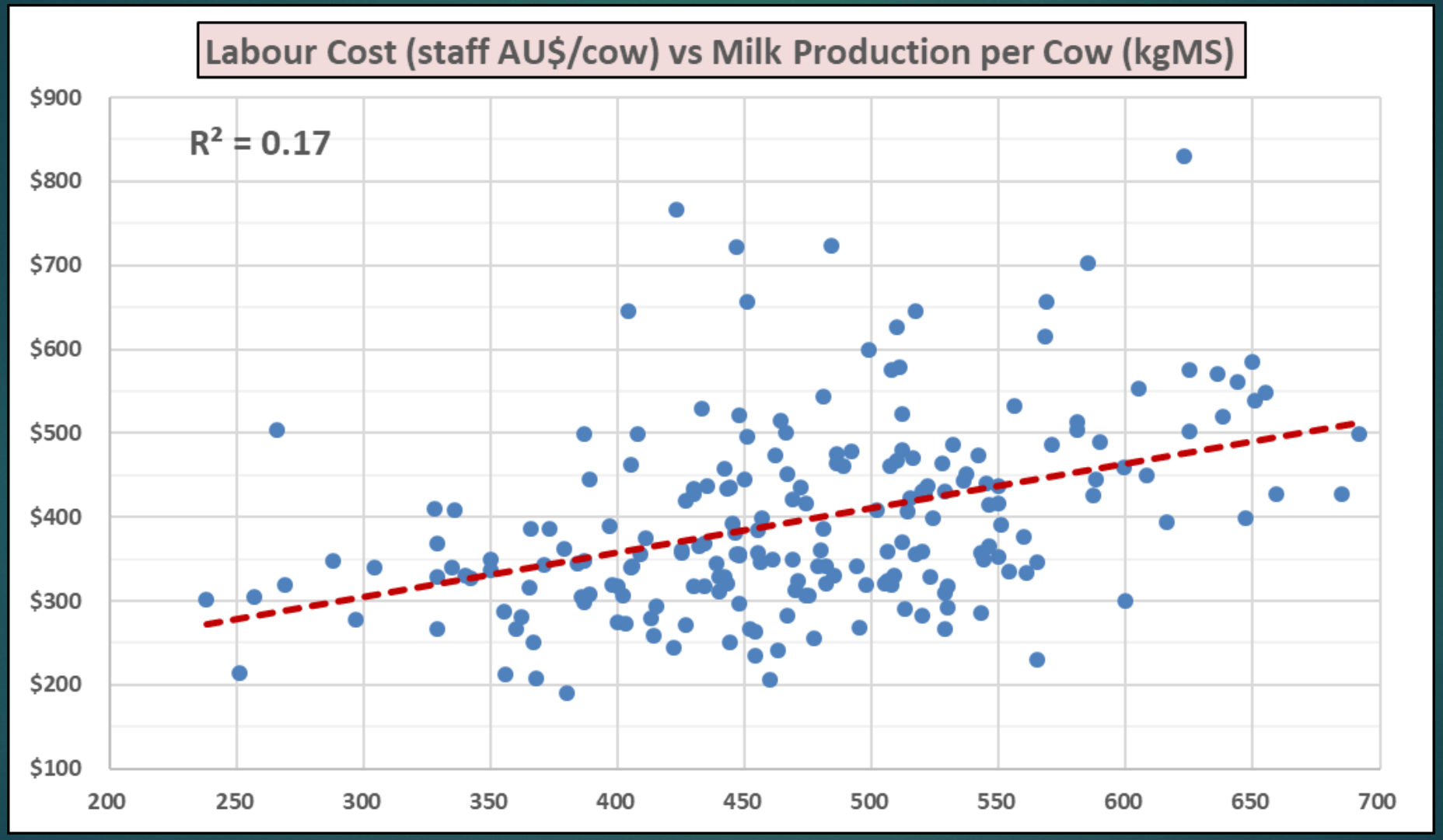
Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Pasture harvest (tDM/ha) vs Litres per cow



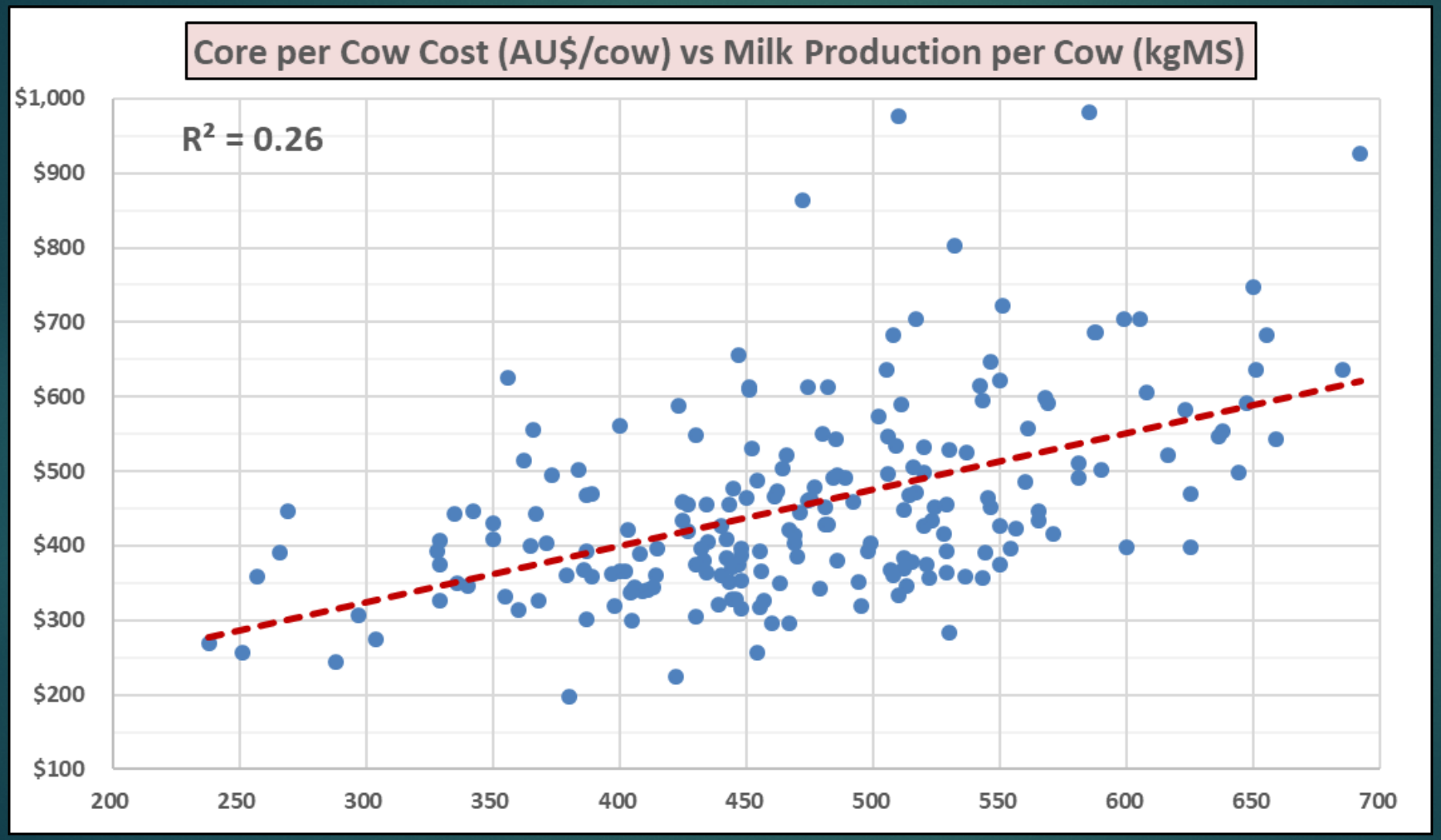
Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Labour costs (AU$/cow) vs Litres per cow



Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Core per cow costs* vs Litres per cow



*** Core per Cow Costs =**

(Animal Health +

Breeding +

Dairy Shed Exp. +

Electricity +

Grazing/Agistment +

Freight +

50% Repairs&Maint. +

70% Vehicles +

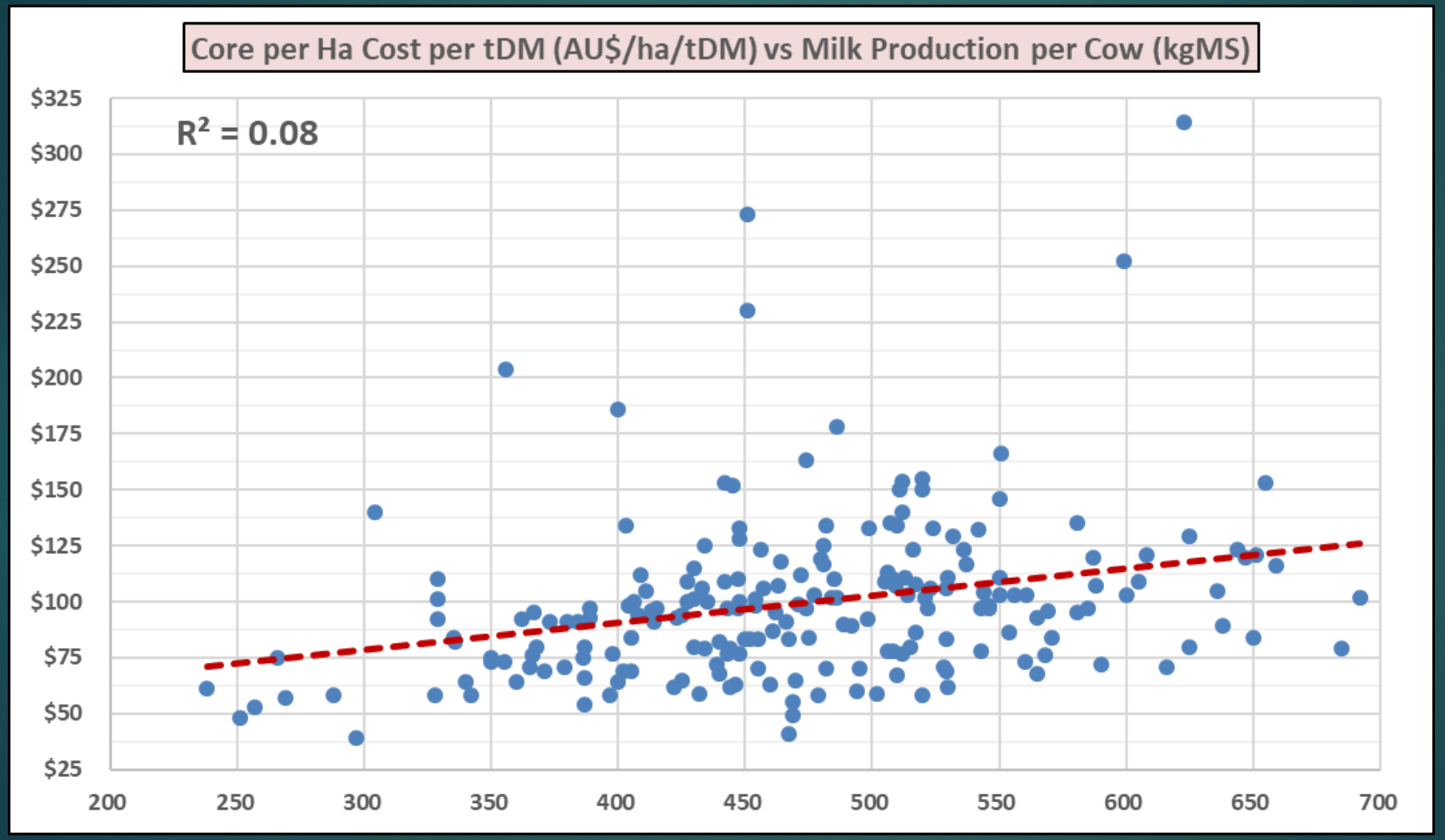
30% Standing Chgs. +

50% Depreciation **) /**

Milking Cows

Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Core per ha costs per tDM* vs Litres per cow



*** Core per Ha Costs per tDM =**

(Fert excl. nitrogen +

Pasture Maint. & Renewal +

Cropping (greenfed)+

50% Repairs&Maint. +

30% Vehicles +

Administration +

70% Standing Chgs +

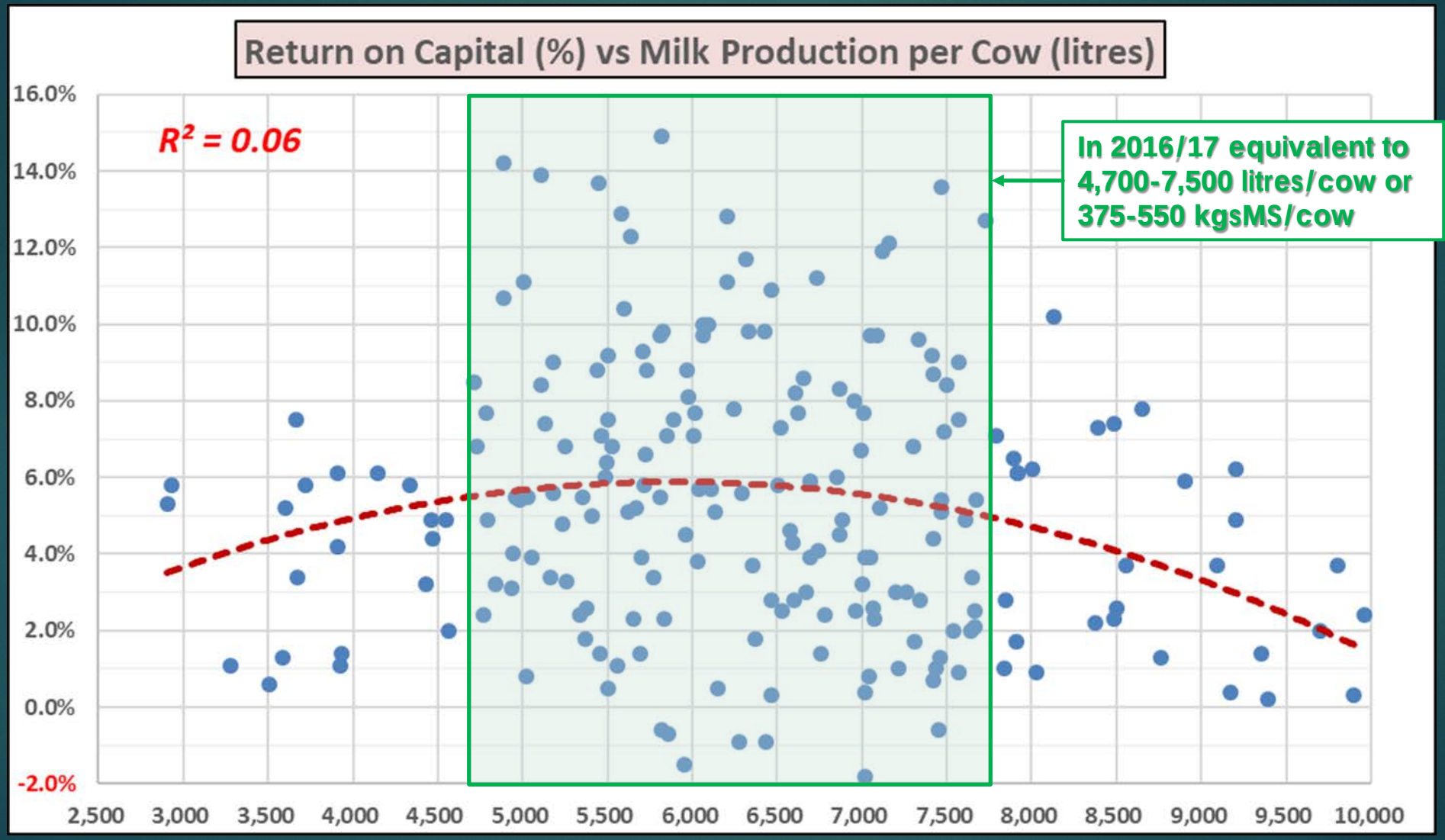
50% Depreciation **) /**

Milking Hectares /

tDM/ha Pasture Harvest

Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Profit (ROC) & Cost of prod'n vs Litres per cow



Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Hypothesis #1 Summary

Milk production per cow is **NOT** a primary driver of profitability on pasture-based dairy farms

Targeting higher milk production per cow from higher dry matter intakes of supplement/concentrate above moderate levels (say above intakes that result in milksolids production of 75%-90% of bodyweight) will most probably **reduce** profit due to lower labour efficiency, and higher core per cow and core per hectare per tDM costs

Highest levels of profitability based on low cost of production will most probably come from:

1. Friesian/crossbred cows of 470-570 kgs liveweight
2. Total intakes that result in milksolids production of 75%-90% of bodyweight
3. Milk production of 375-550 kgsMS/cow (approx 4,700-7,500 litres/cow)
4. Cows consuming over 3 tDM/cow of pasture
5. Cows consuming no more than 1.8 t**AF**/cow of concentrate in Victoria, AUS *

Hypothesis #1 Summary continued…

Converting cows consuming no more than 1.8 tAF/cow of concentrate in Victoria to target levels including for other latitudes:

- 1.5-1.8 tAF/cow (5-6 kgAF/day) Victoria, Australia
- 1.1-1.4 tAF/cow (3.5-4.5 kgAF/day) Tasmania, Australia
- 0.6-0.9 tAF/cow (2-3 kgAF/day) North Island, New Zealand
- 0.3-0.6 tAF/cow (1-2 kgAF/day) South Island, New Zealand
- 1.9-2.2 tAF/cow (6-7 kgAF/day) New South Wales & Queensland, Australia
- 1.9-2.2 tAF/cow (6-7 kgAF/day) Argentina & Uruguay
- 1.9-2.2 tAF/cow (6-7 kgAF/day) South Africa

All of the above feeding rates need to be interpreted with caution given the varied farm systems, cow types and environments within these regions

Hypothesis #2

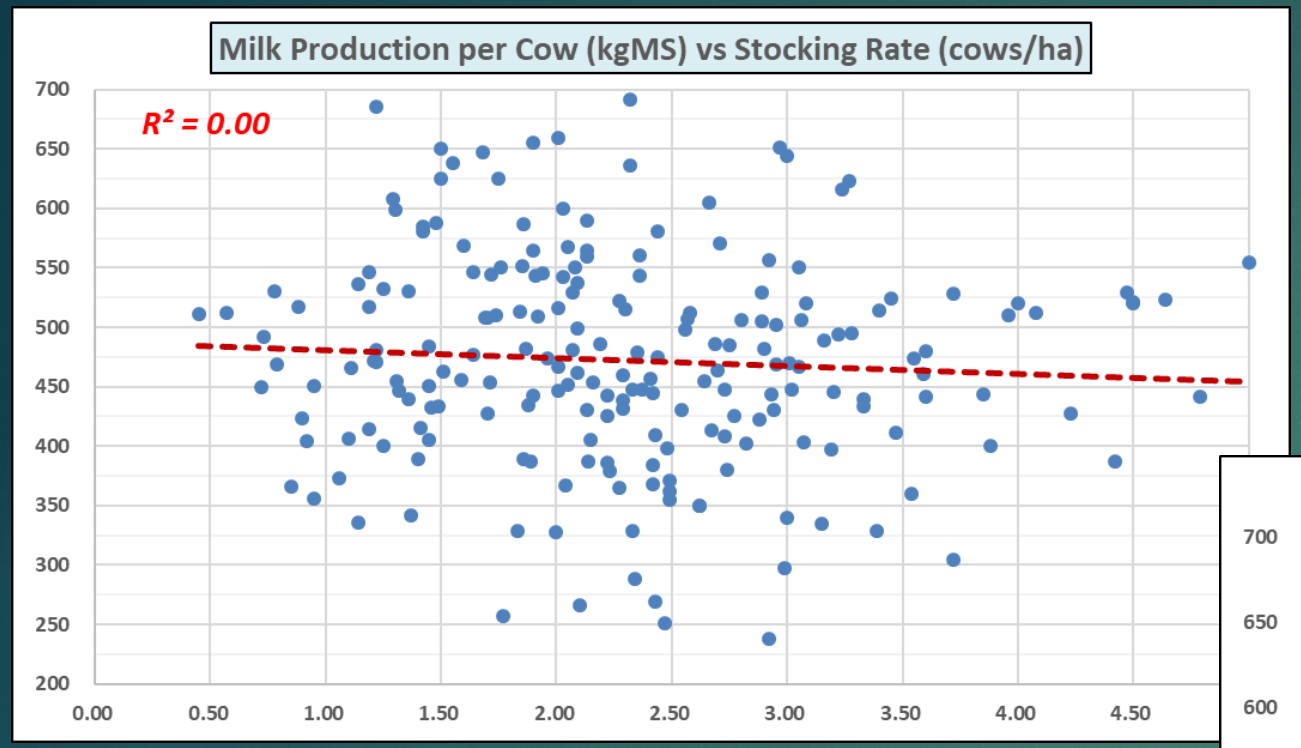
Stocking rate (milking cows per hectare) is a primary driver of profitability on pasture-based dairy farms

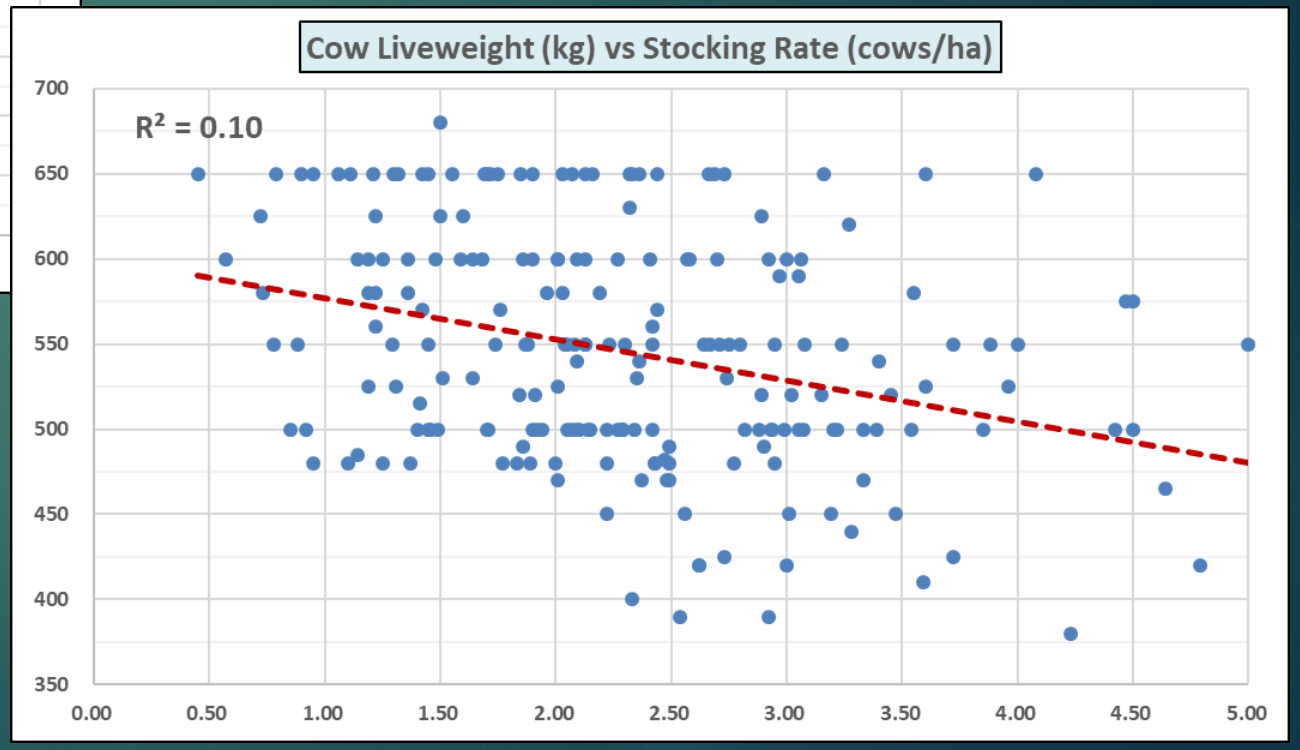
Common comments / presumptions

Running more cows per hectare can help improve pasture harvest and should also result in more milk being produced per hectare, which in combination will lead to higher profitability

Running more cows per hectare can be positive but over-stocking the farm will result in poorer results

Stocking rate (cows/ha) farm systems





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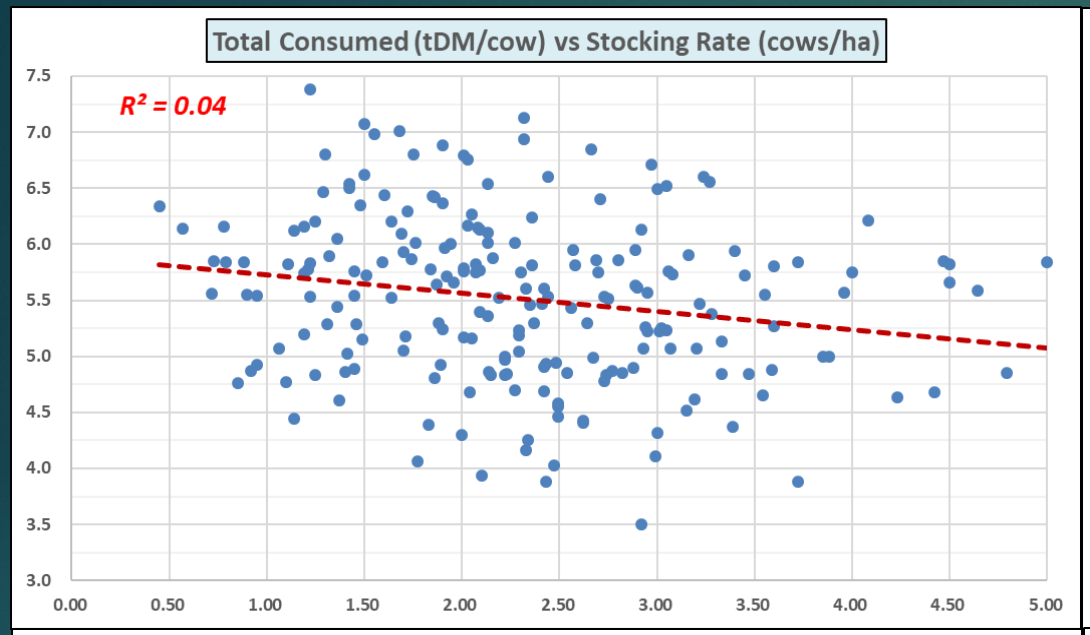
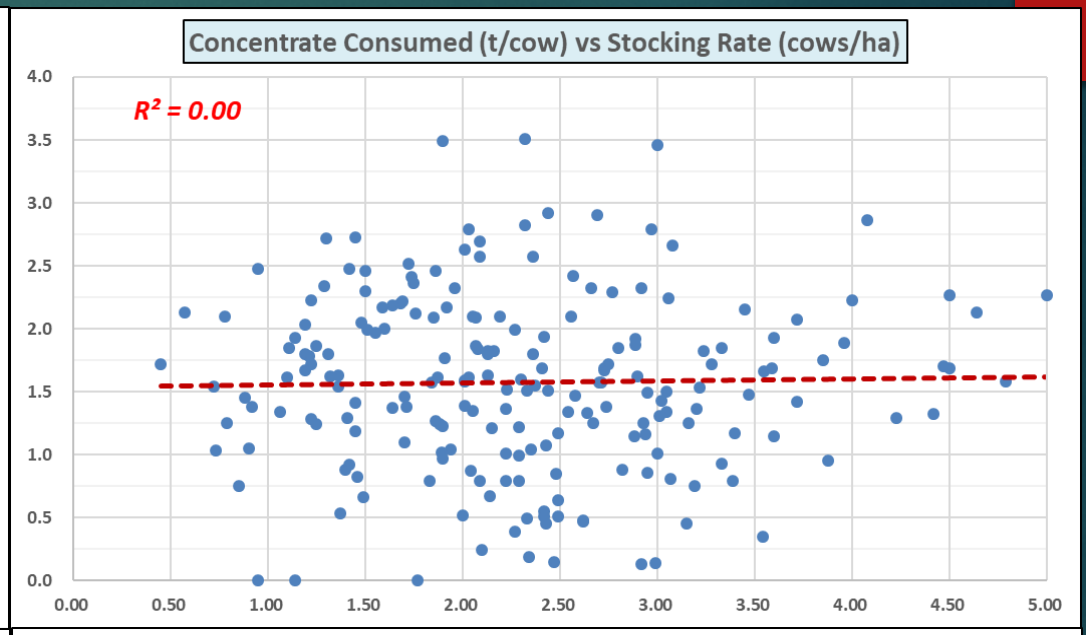
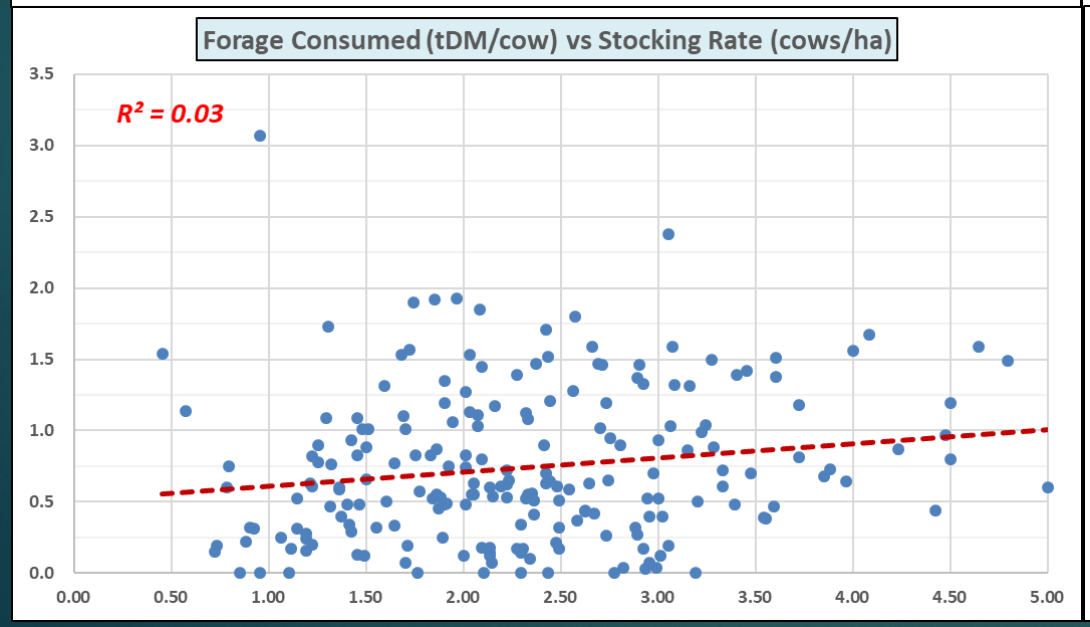
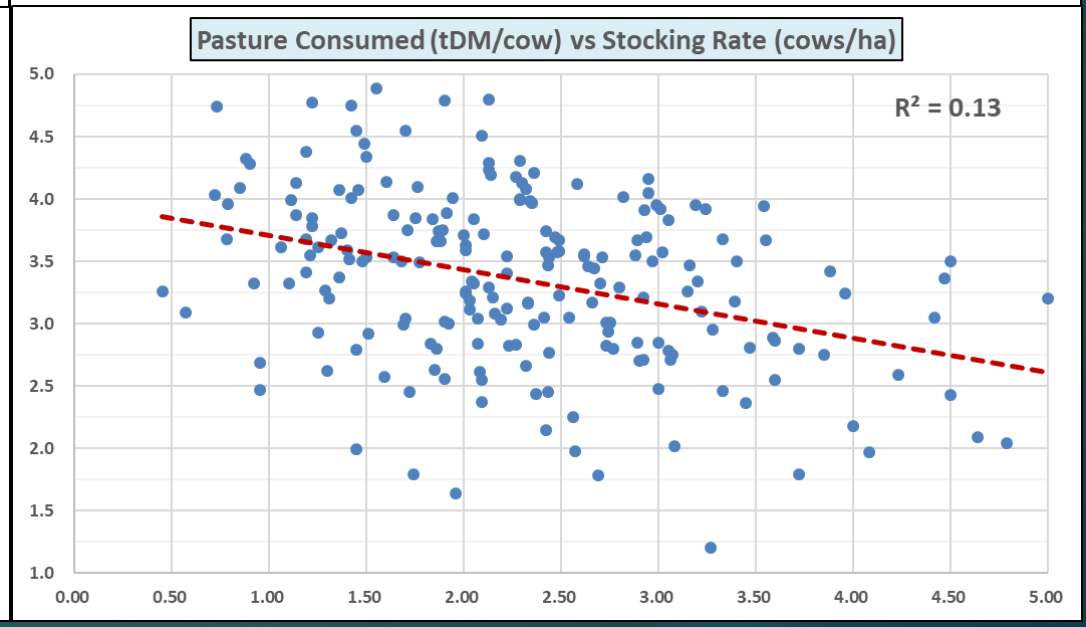
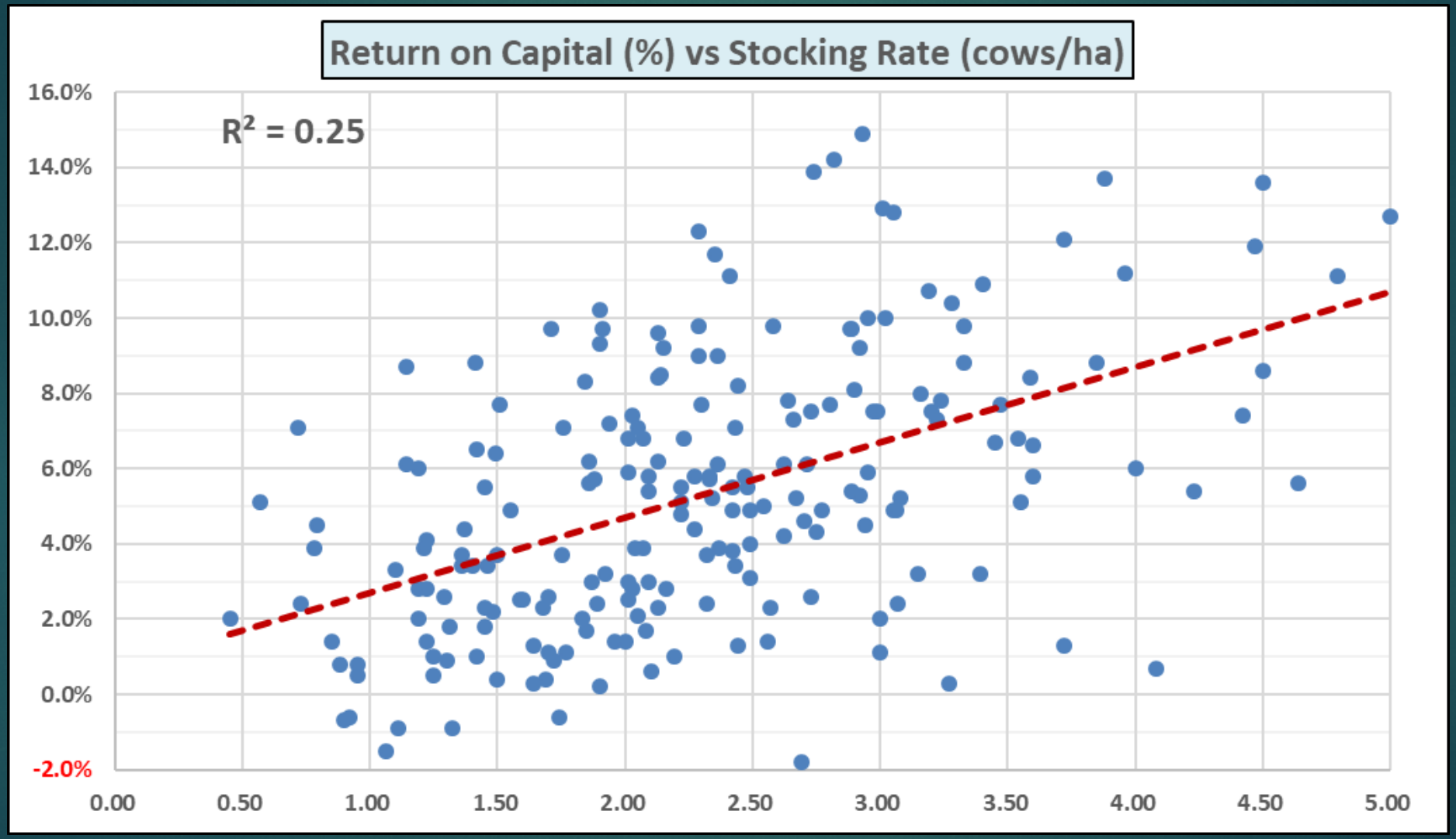








Profit (ROC) vs Stocking rate



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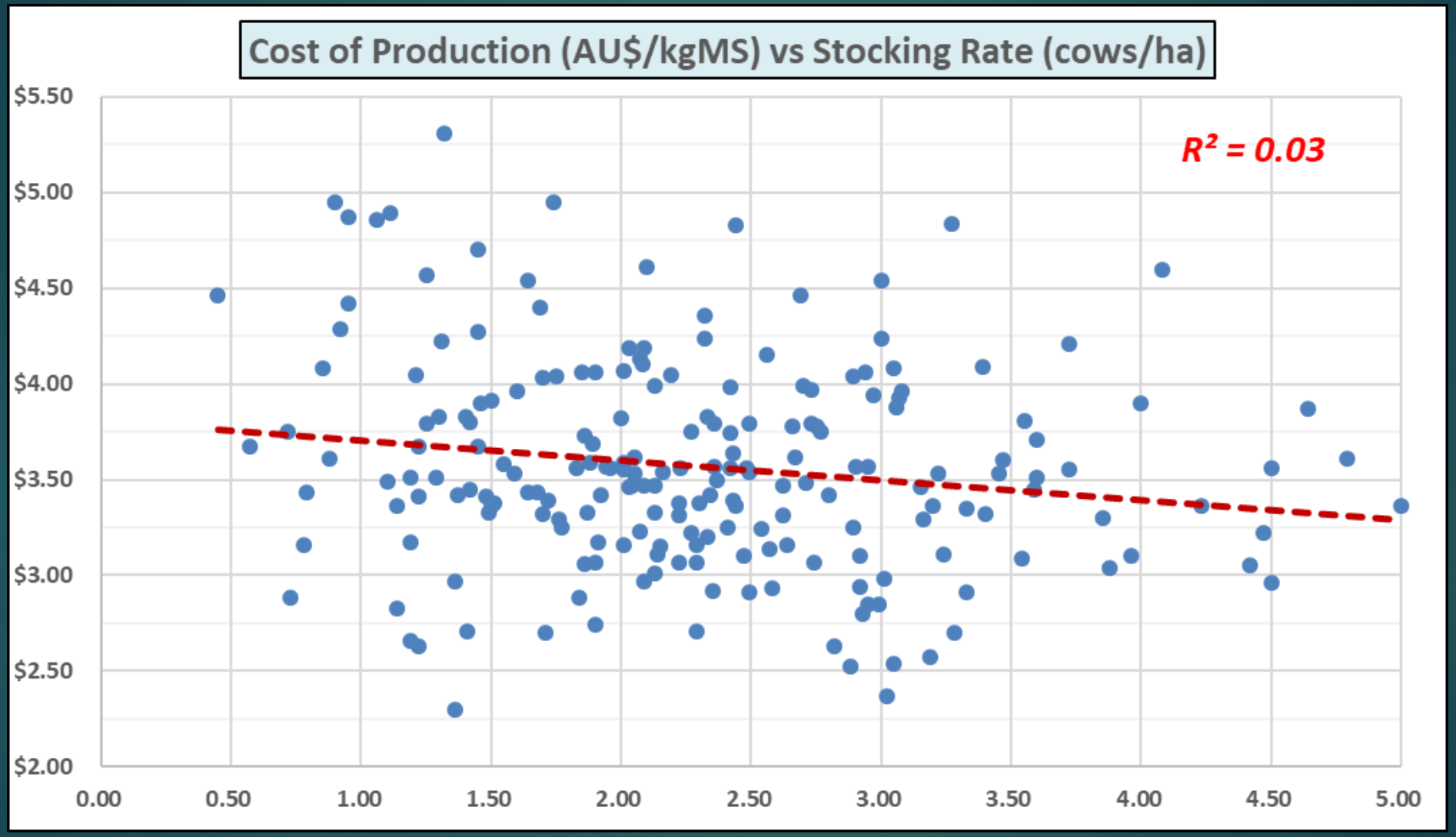
Cost of production ($/kgMS) vs Stocking rate



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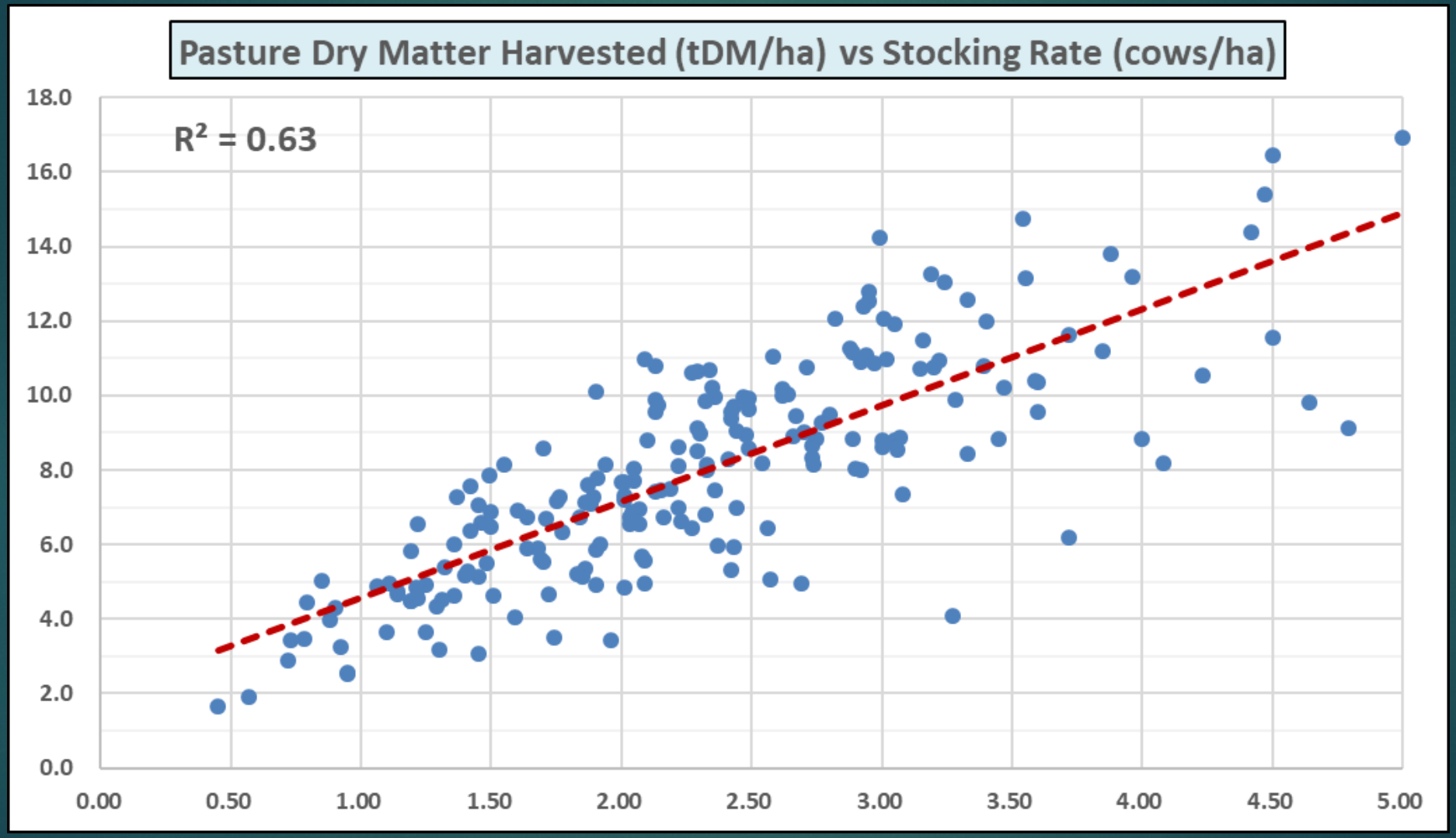
Pasture harvest (tDM/ha) vs Stocking rate



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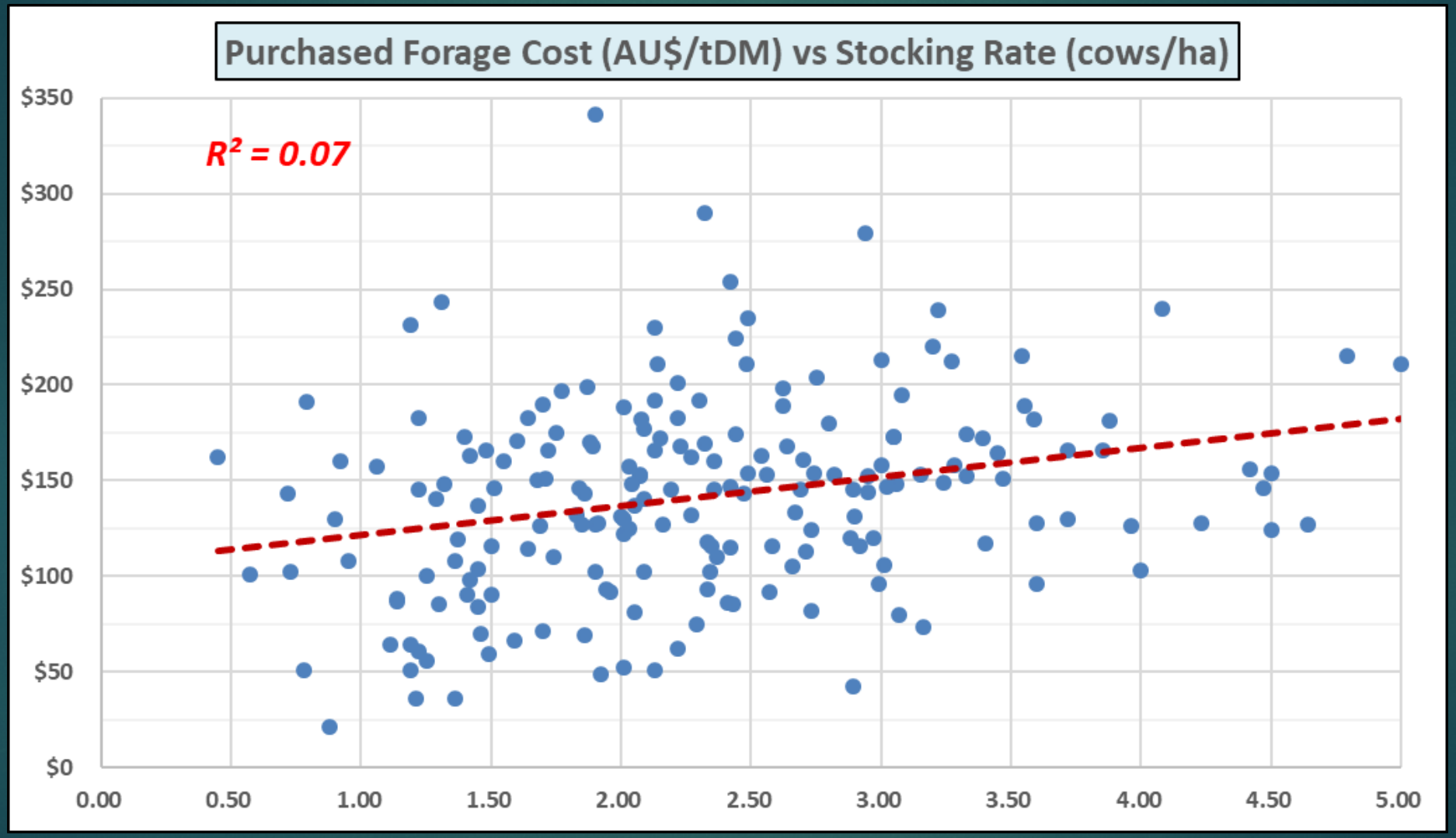
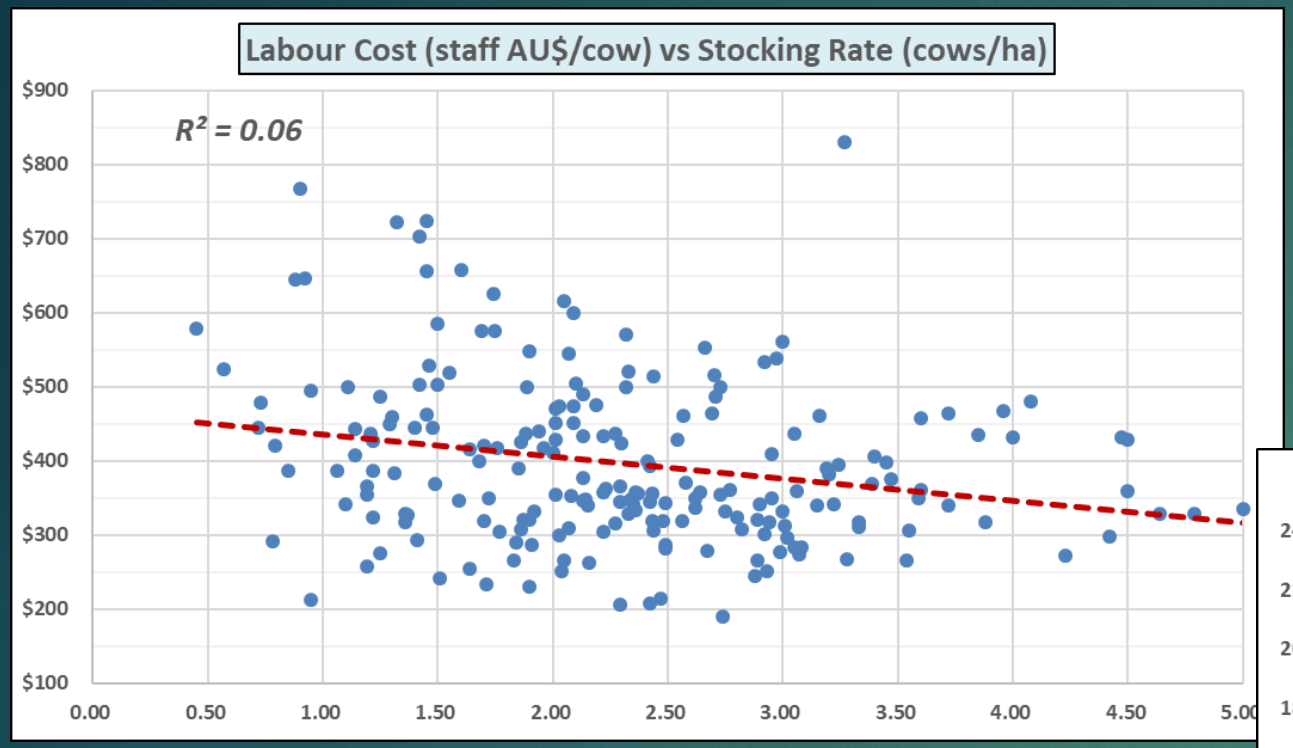
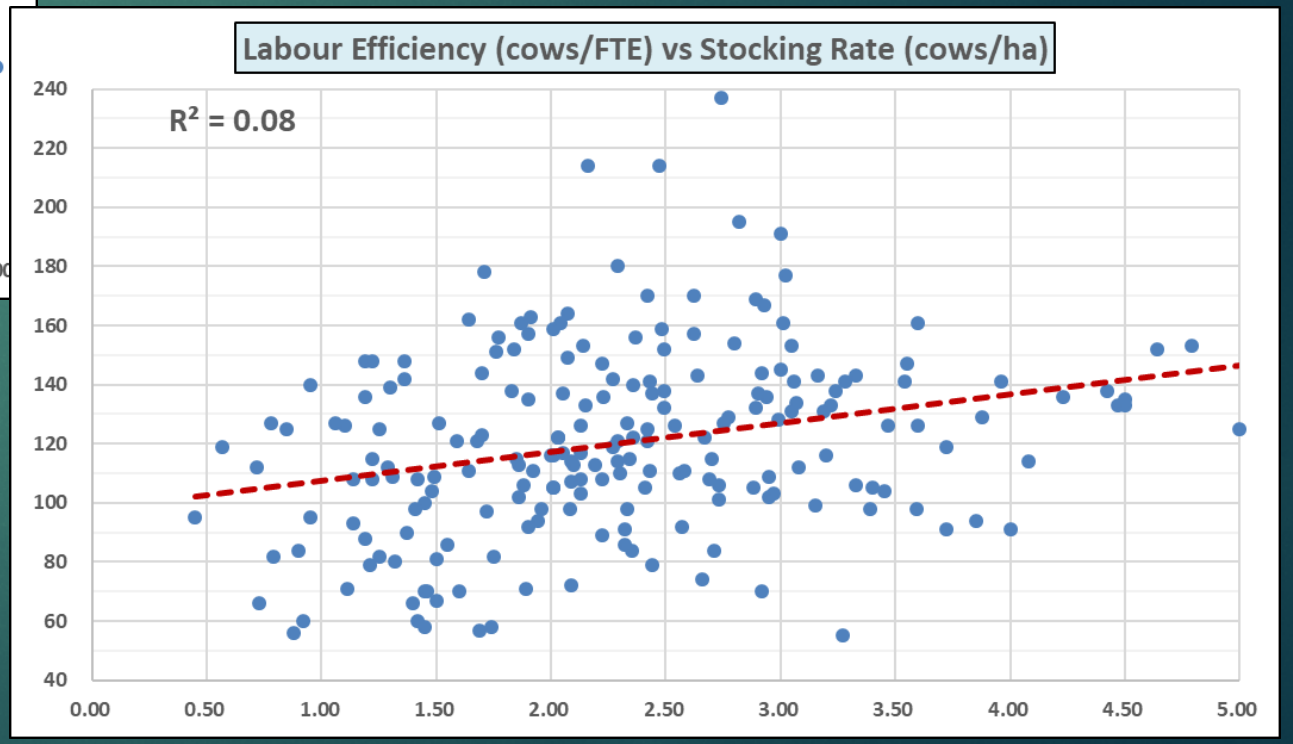
Forage cost ($/tDM) vs Stocking rate



Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Labour cost &efficiency (cows*/FTE) vs Stocking rate

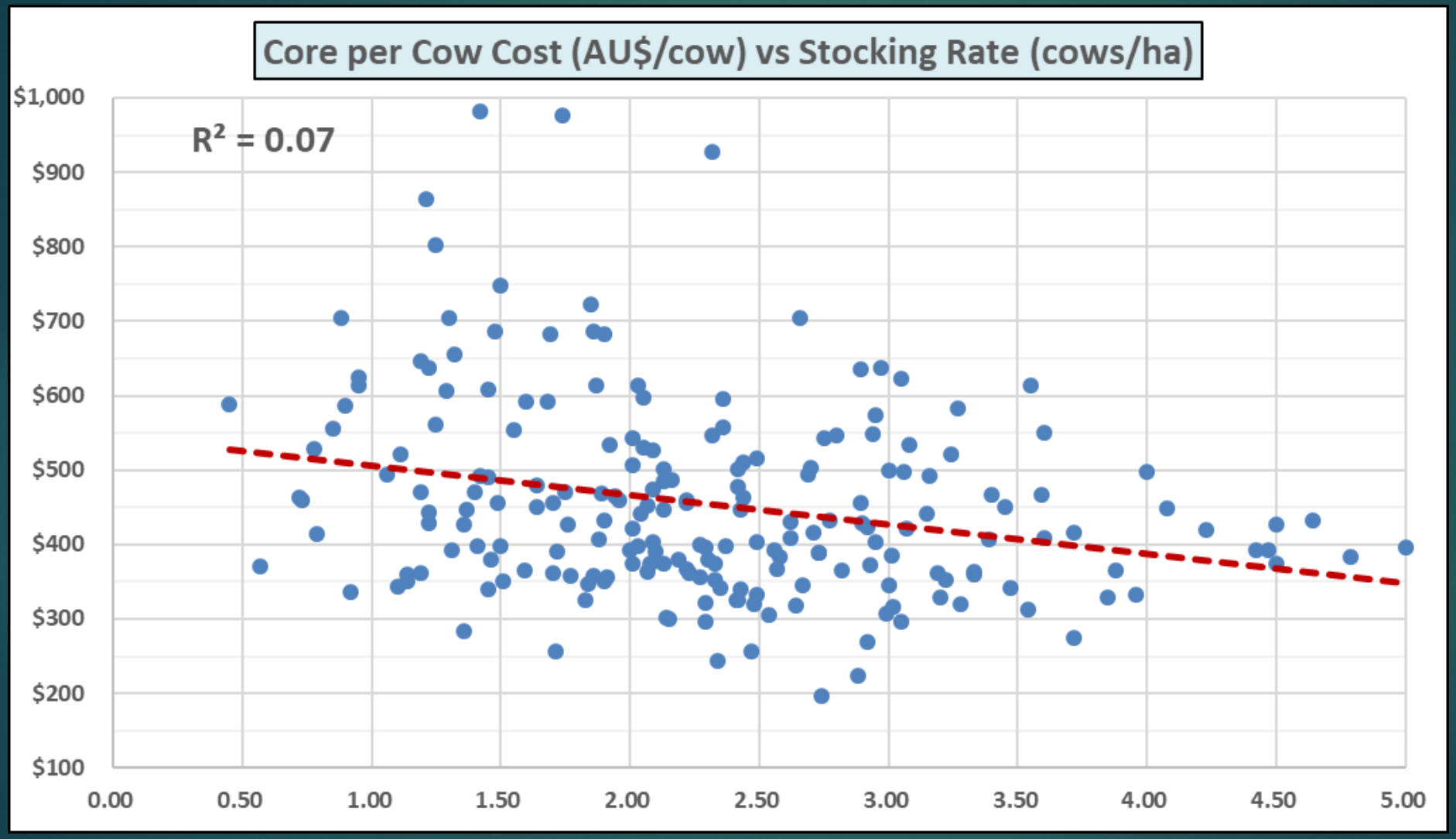




* FTE = 50-hour full time equivalent

Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Core per cow costs* vs Stocking rate



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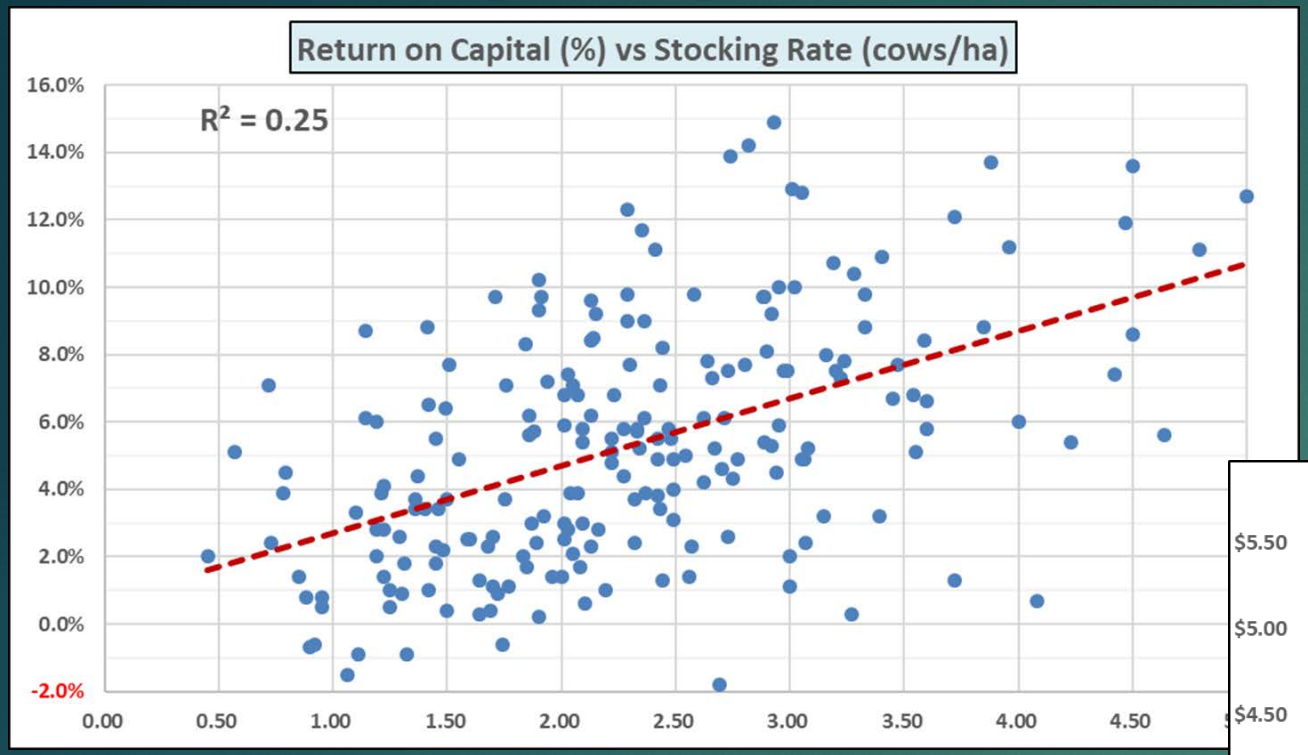
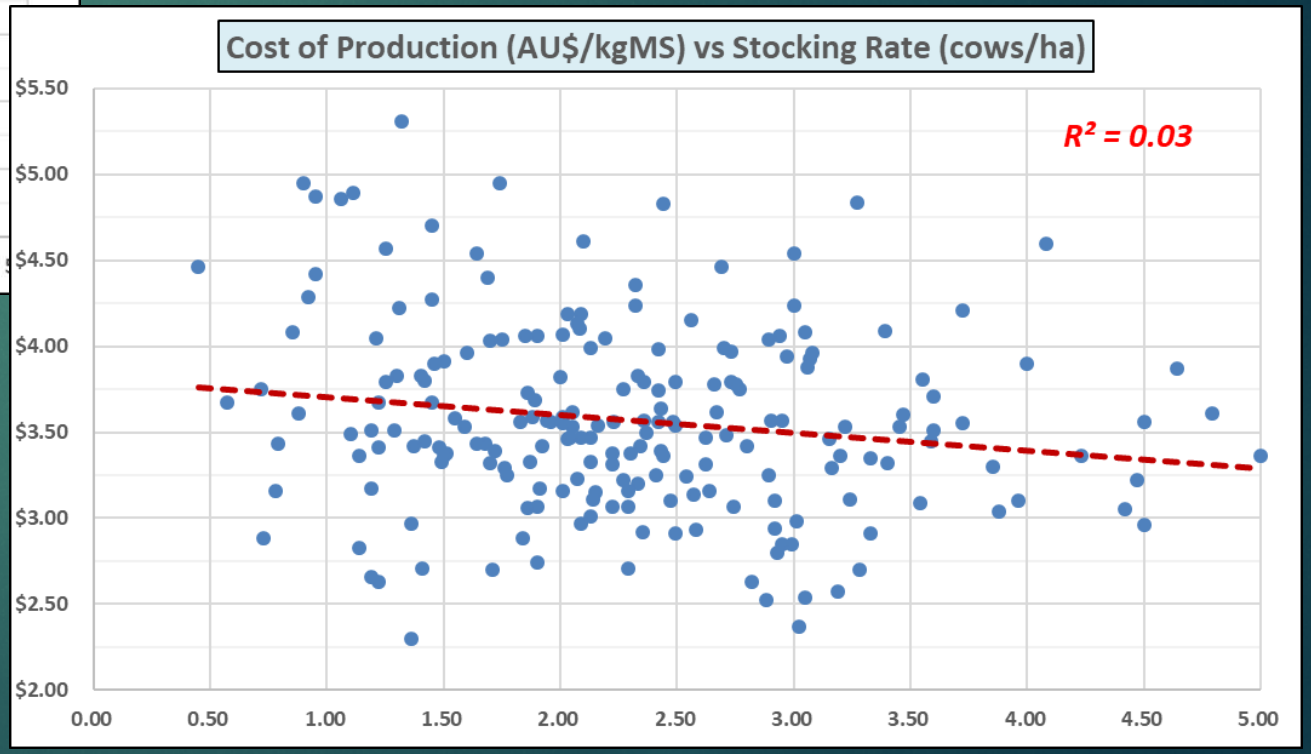
Profit (ROC) & Cost of prod'n vs Stocking rate





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Hypothesis #2 Summary

Stocking rate is a primary driver of profitability on pasture-based dairy farms

The most critical causal link for stocking rate to deliver higher profitability is to increasing pasture harvest

Higher stocking rates provide opportunity to increase labour efficiency and reduce core per cow costs

Forage costs ($/tDM) may increase with higher stocking rates as there is less opportunity to conserve home-grown pasture

Important to match stocking rate with actual/potential pasture harvest to avoid over-stocking and reducing pasture percent of diet (see next ‘Hypothesis #3’)

Hypothesis #3

Intensifying farm systems, where pasture comprises a lower percentage of the diet, is a primary driver of profitability on pasture-based dairy farms

Common comments / presumptions

With the comparative scarcity and higher cost of land and/or water, it will necessary to generate more milk and revenue from this higher capital base, which will lead to improvements in profitability

As irrigation water becomes more costly, this will need to be used on higher yielding crops rather than ryegrass, which struggles to perform in the heat in any event

Higher milk per cow should be an outcome of these more intensive systems, which will average down fixed costs and improve profitability

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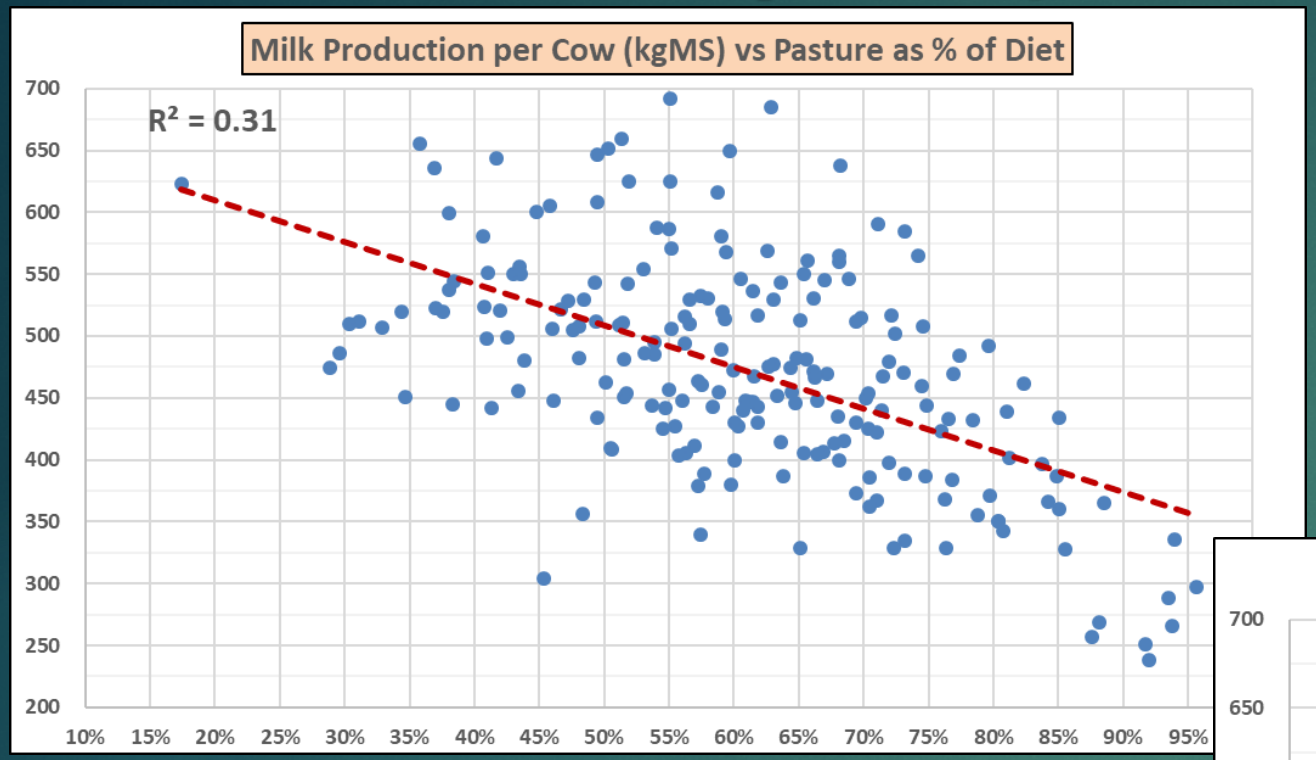
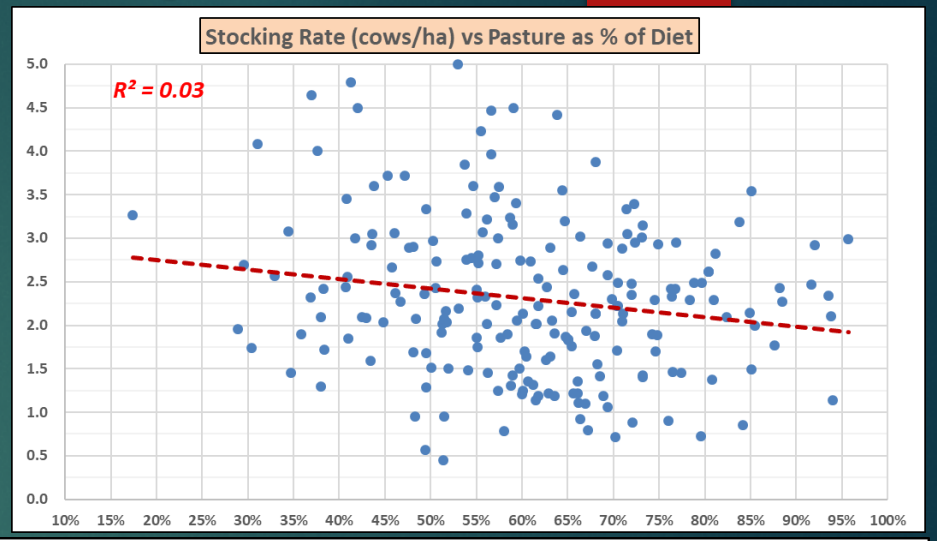
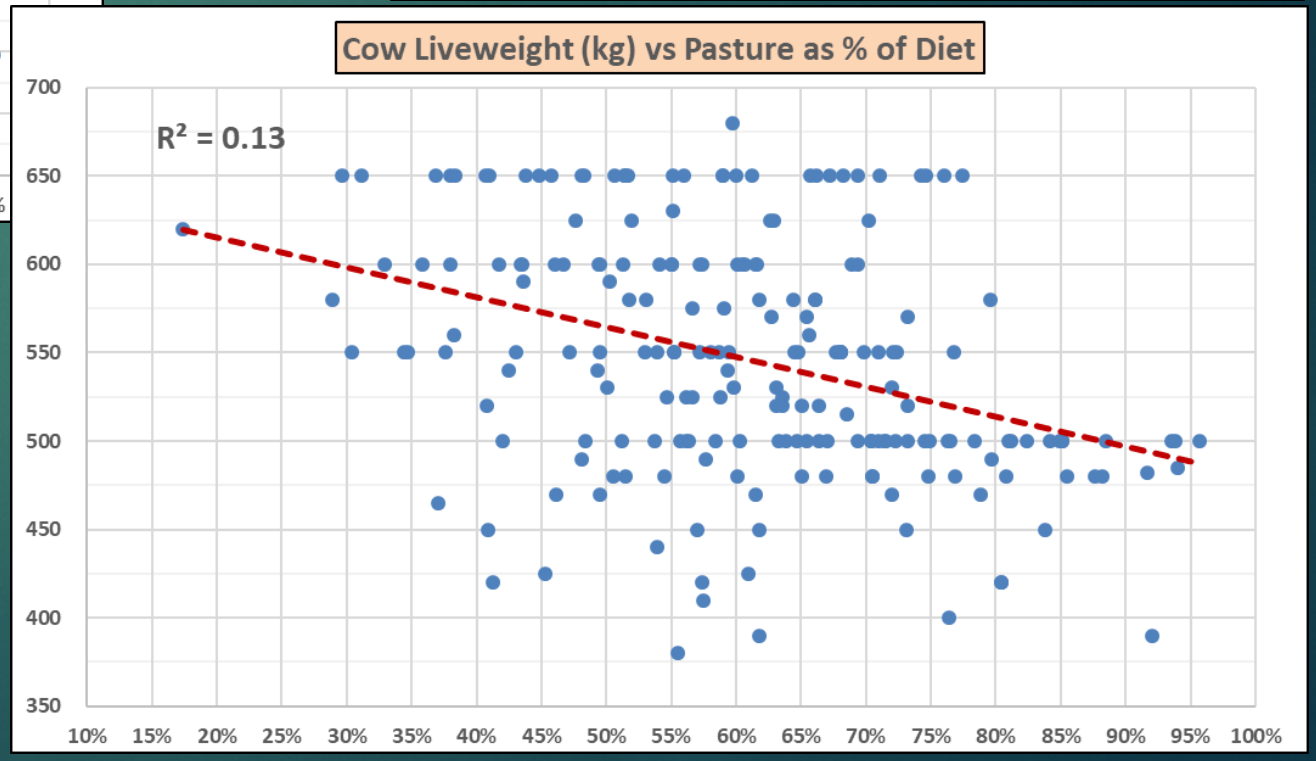
~~Higher milk per cow should be an outcome of these more intensive systems, which will average down fixed costs and improve profitability~~ XXX (see Hypothesis #1)

More intensive (lower pasture %) farm systems







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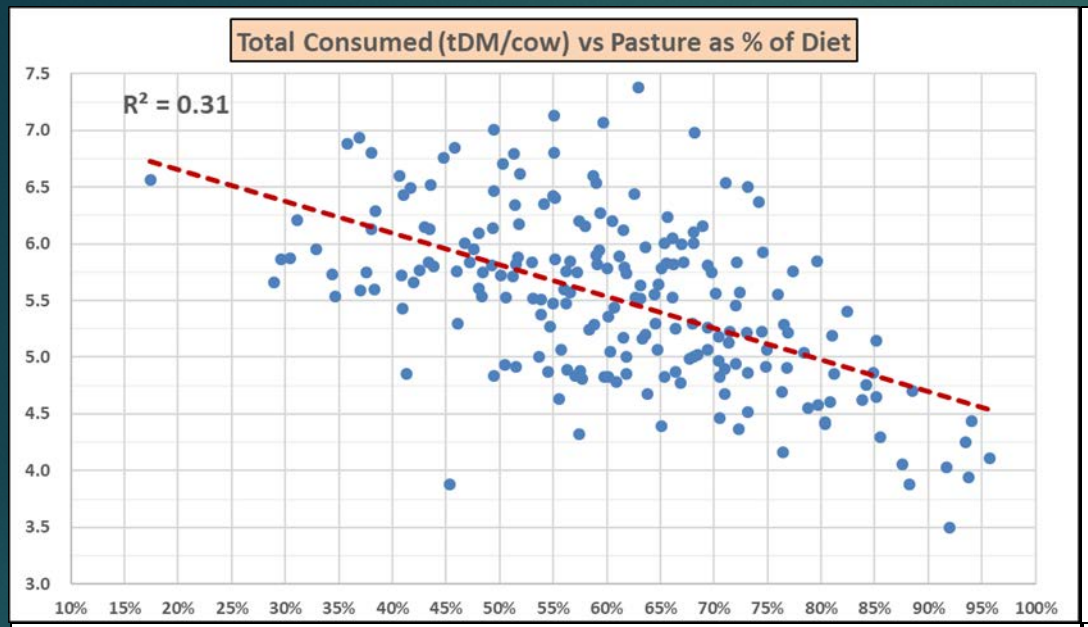
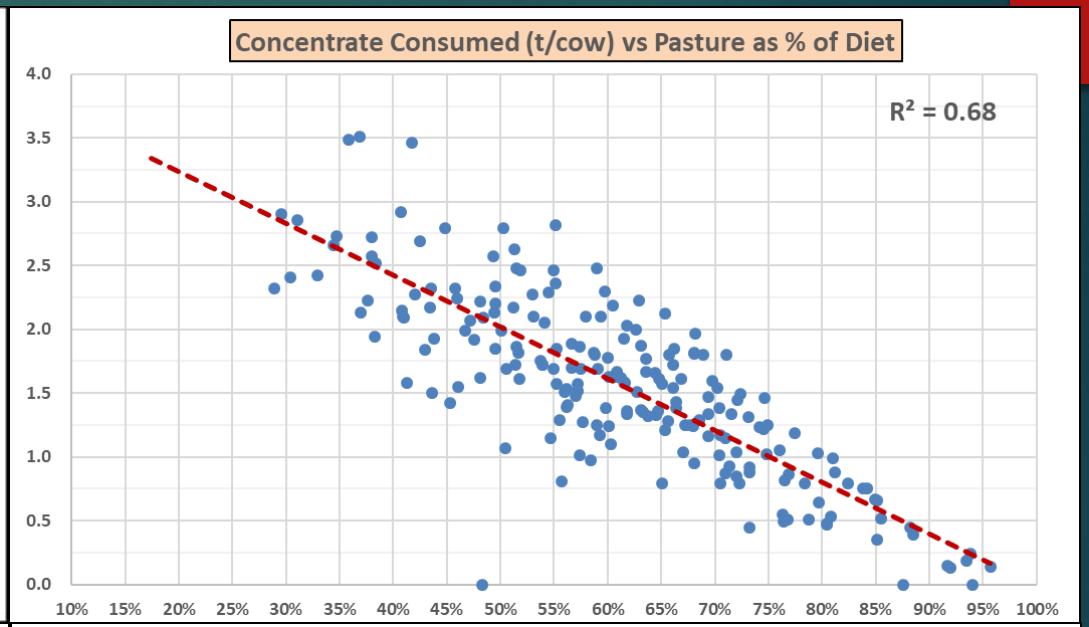
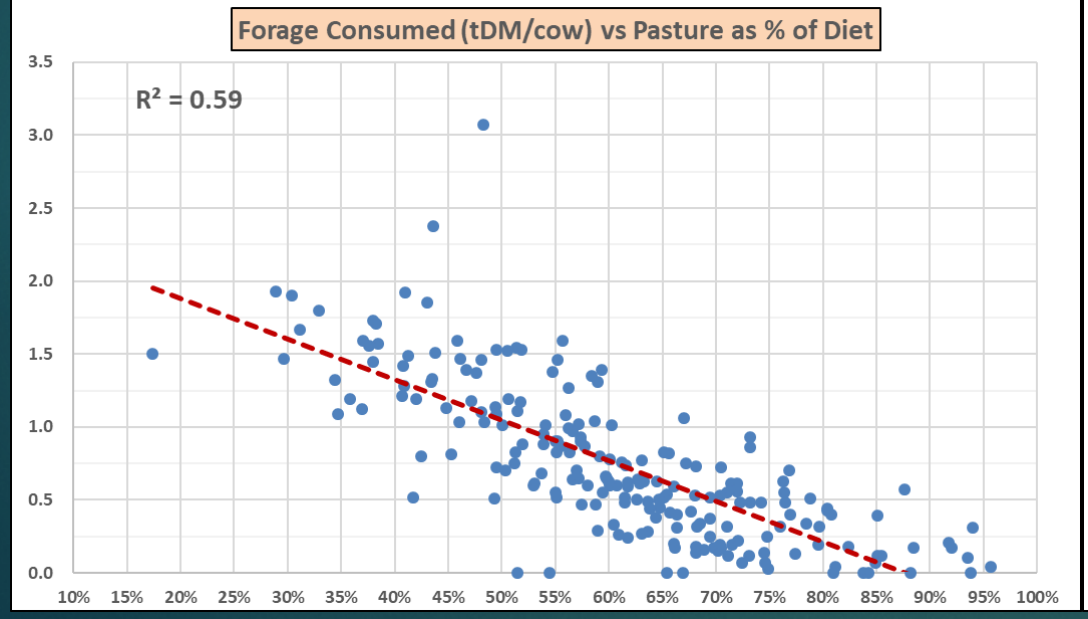
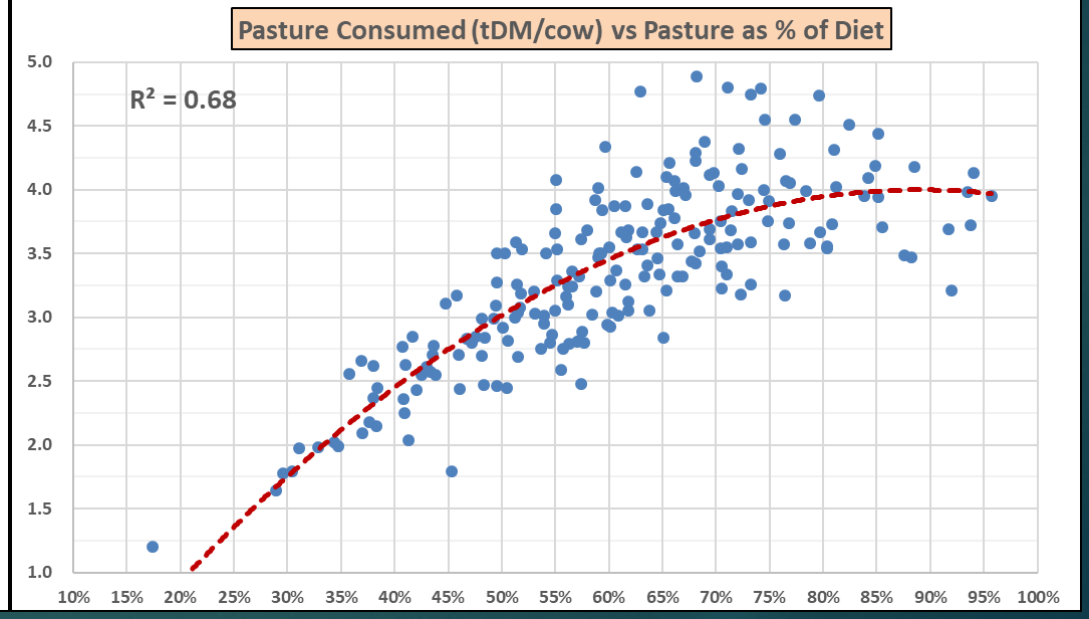
More intensive (lower pasture %) farm systems

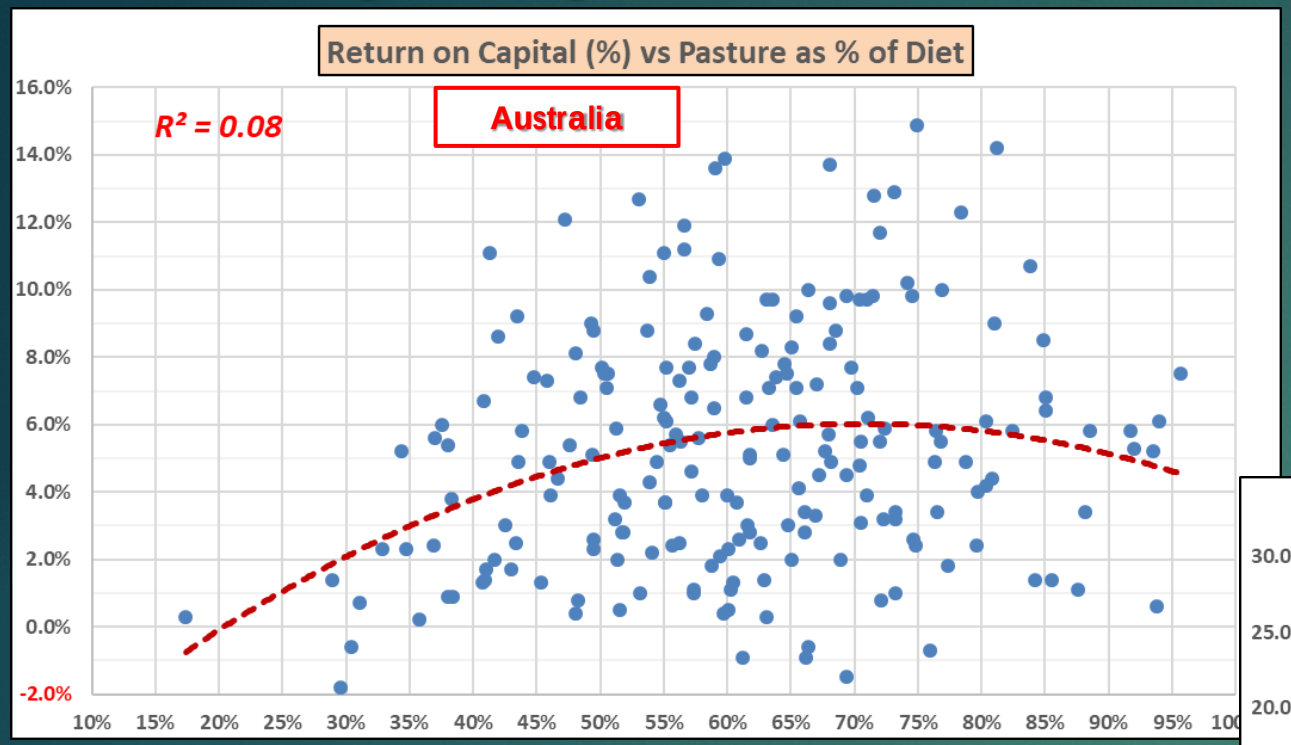


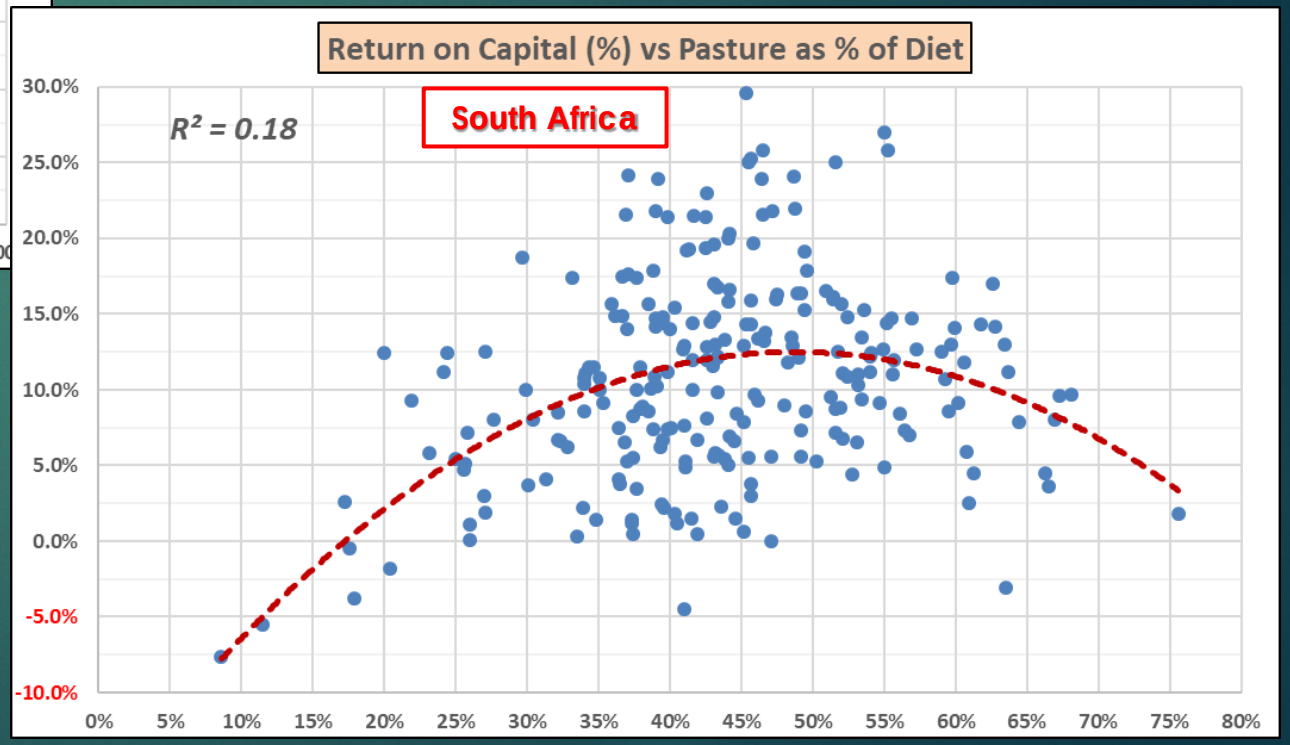






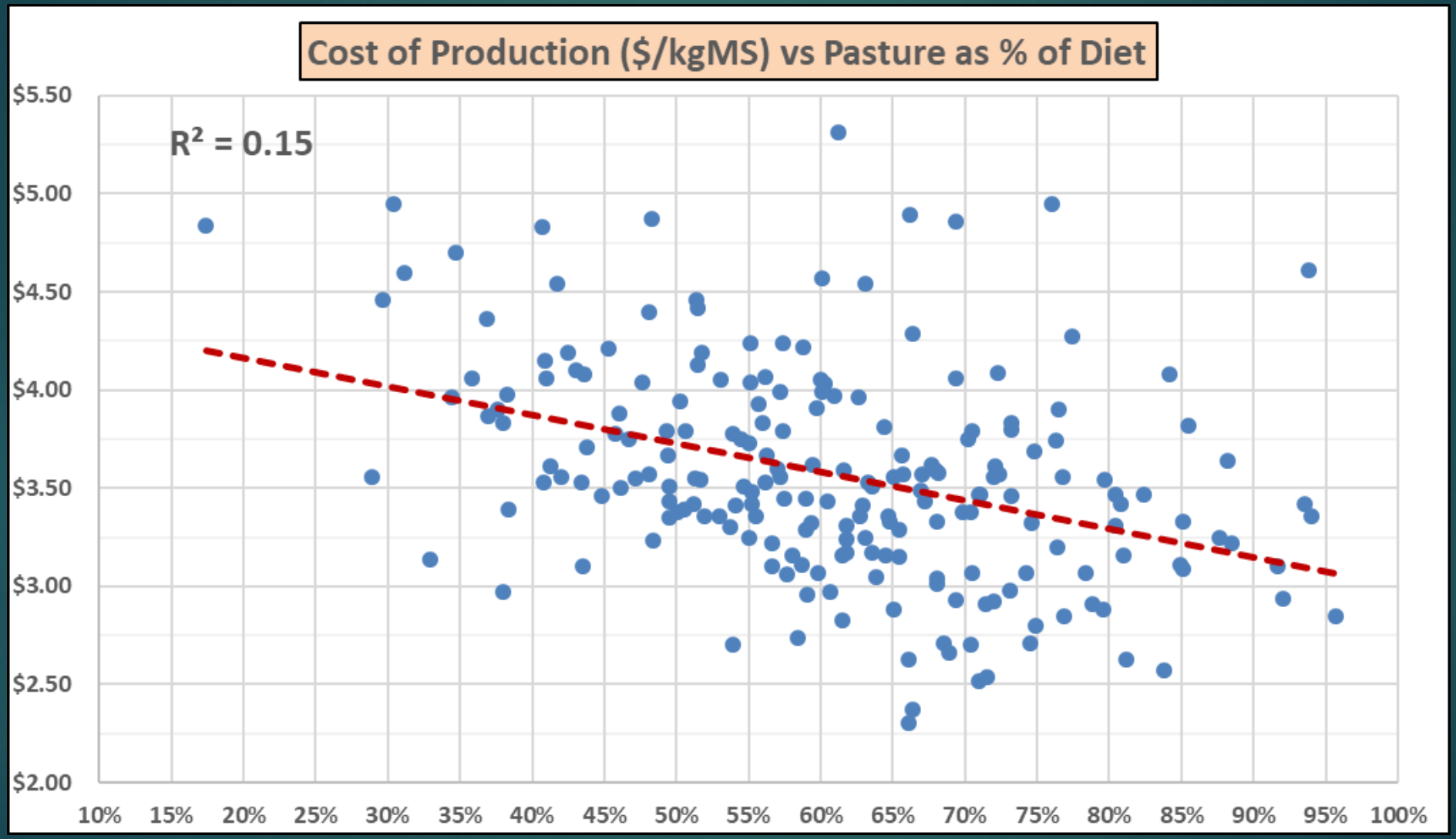
Profit (ROC) vs Percent pasture in diet





Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Cost of production vs Percent pasture in diet



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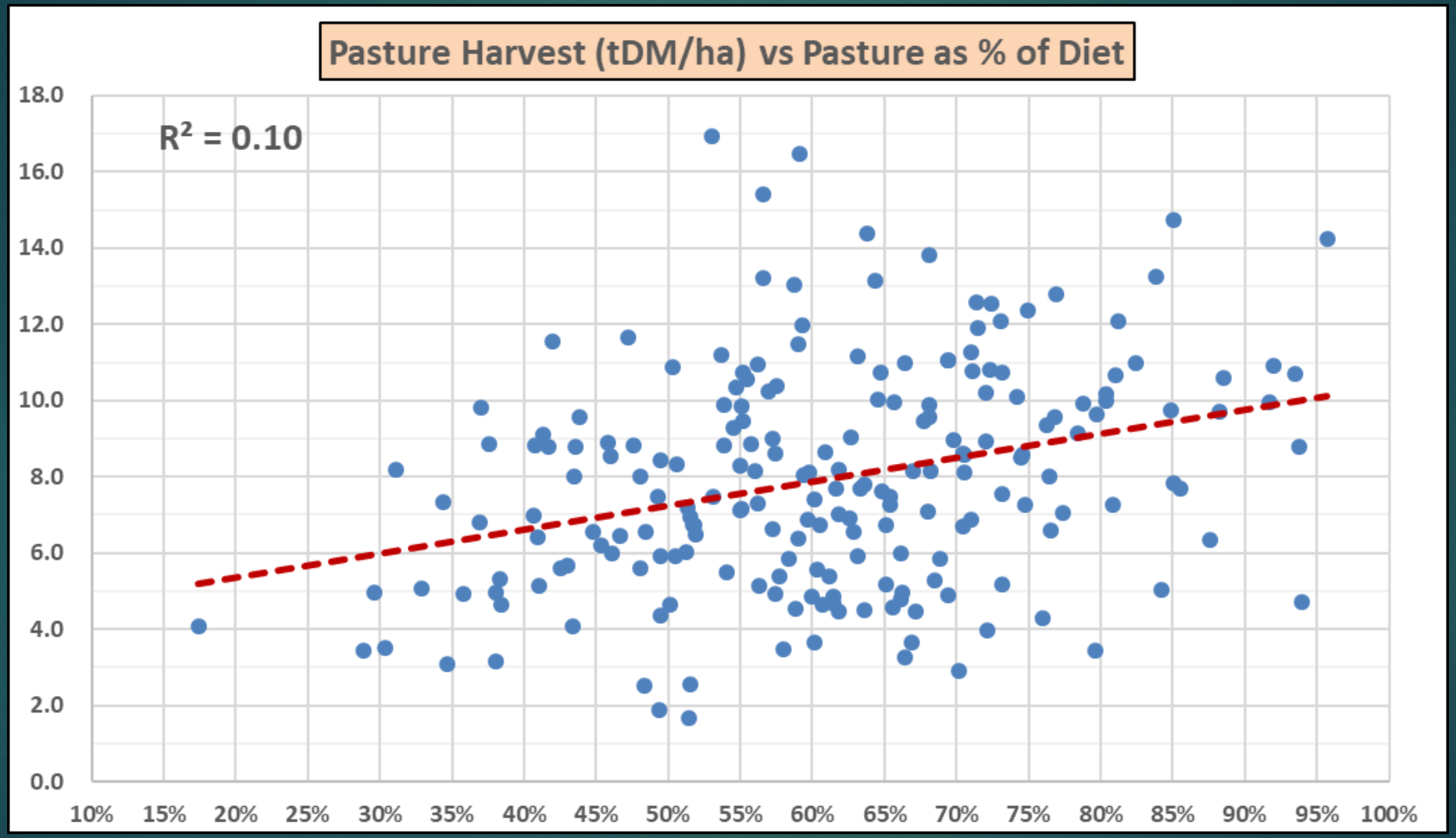
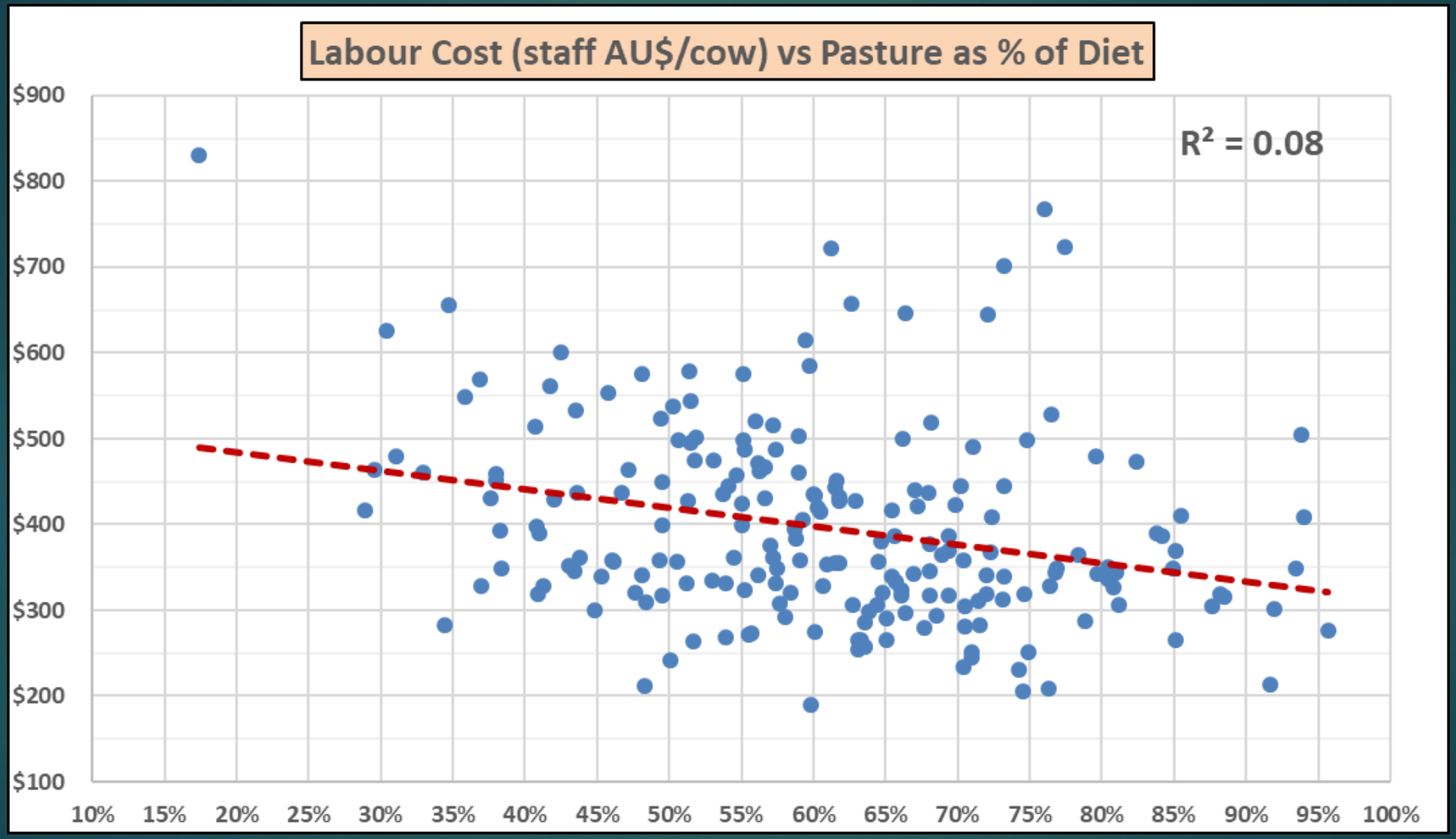
Pasture harvest (tDM/ha) vs % pasture in diet



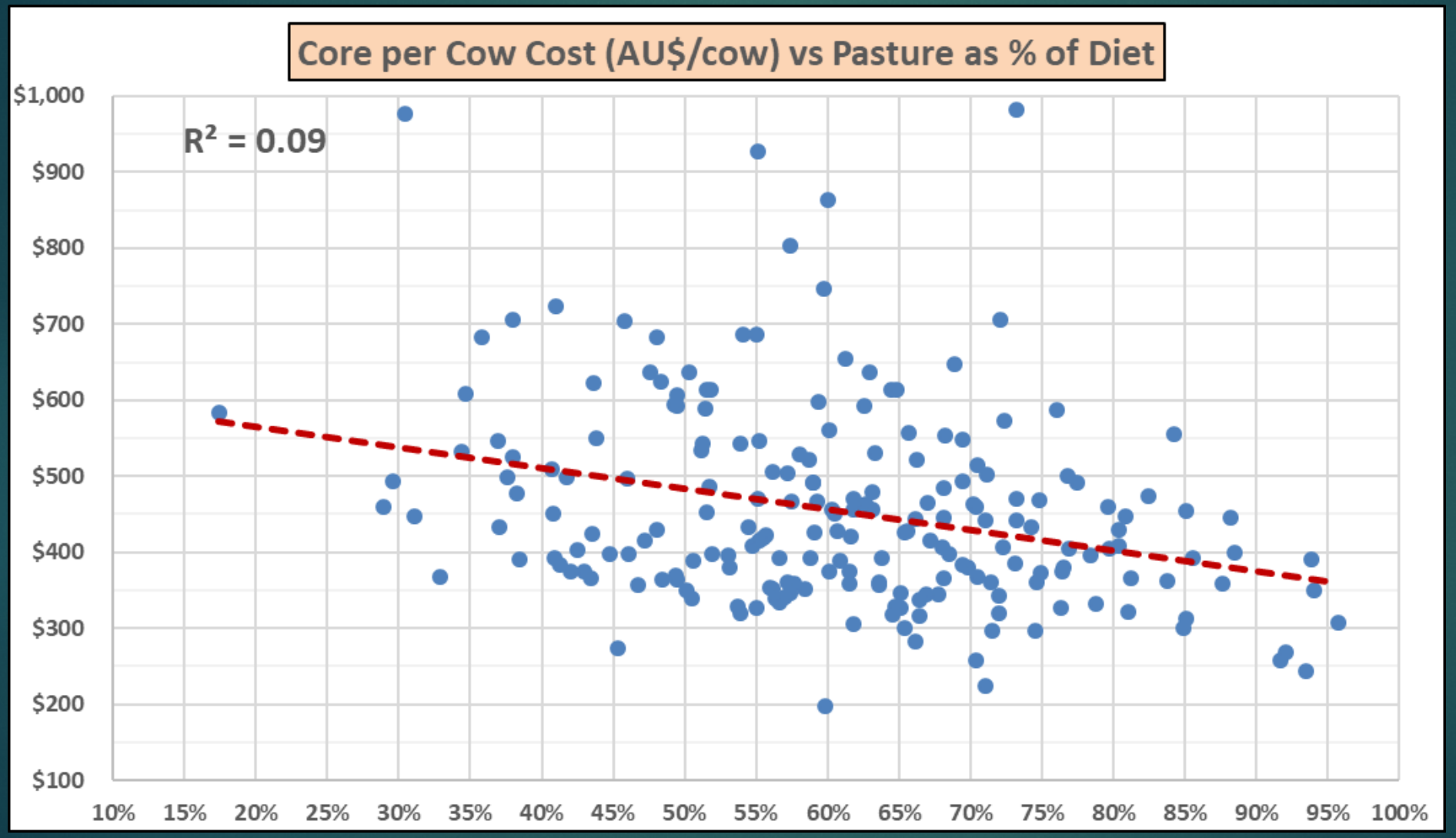
Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Labour cost (AU$/cow) vs % pasture in diet



Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Core per cow costs* vs % pasture in diet



*** Core per Cow Costs =**

(Animal Health +

Breeding +

Dairy Shed Exp. +

Electricity +

Grazing/Agistment +

Freight +

50% Repairs&Maint. +

70% Vehicles +

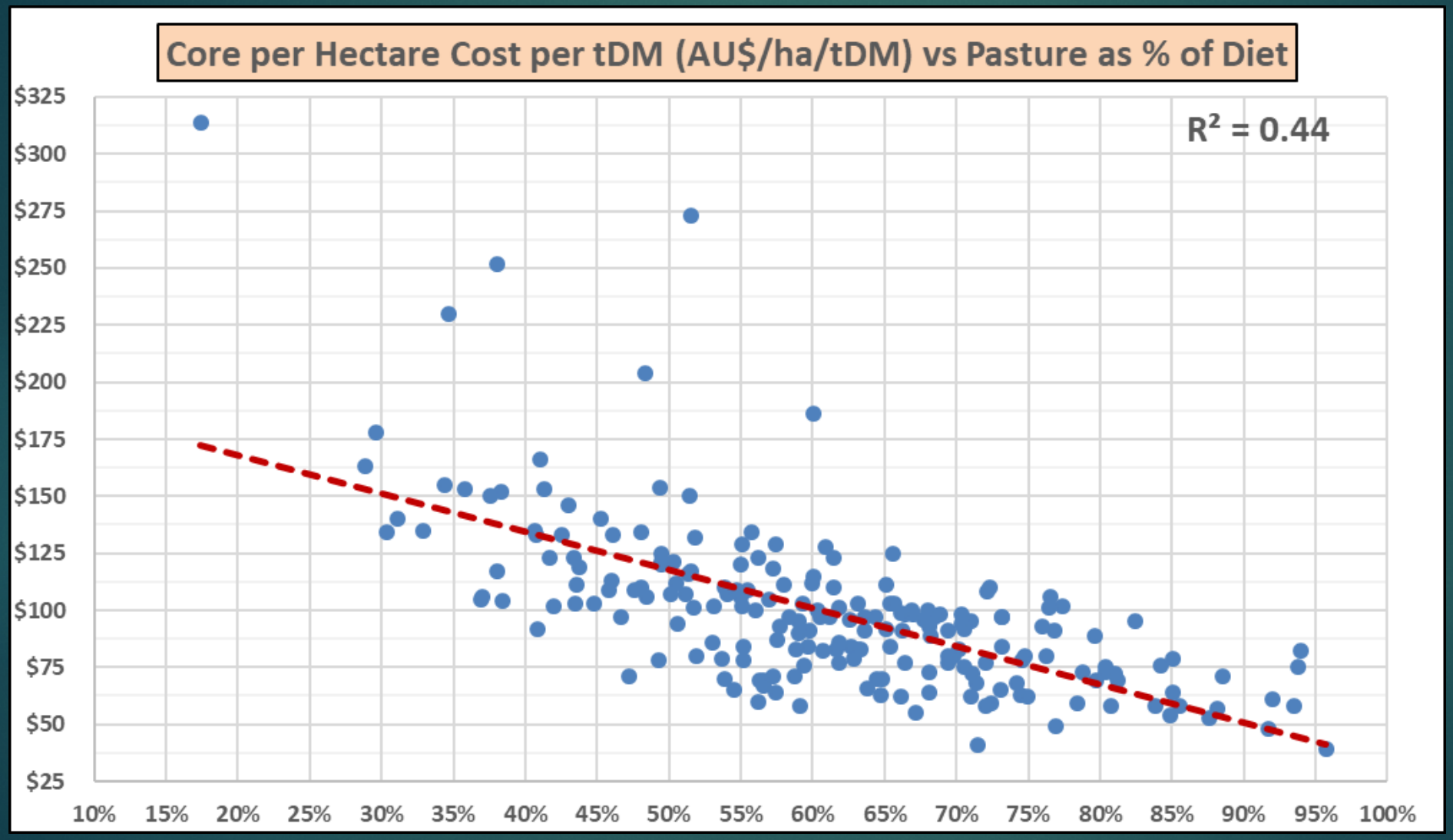
30% Standing Chgs. +

50% Depreciation **) /**

Milking Cows

Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Core per ha costs per tDM* vs % pasture in diet



*** Core per Ha Costs per tDM =**

(Fert excl. nitrogen +

Pasture Maint. & Renewal +

Cropping (greenfed)+

50% Repairs&Maint. +

30% Vehicles +

Administration +

70% Standing Chgs +

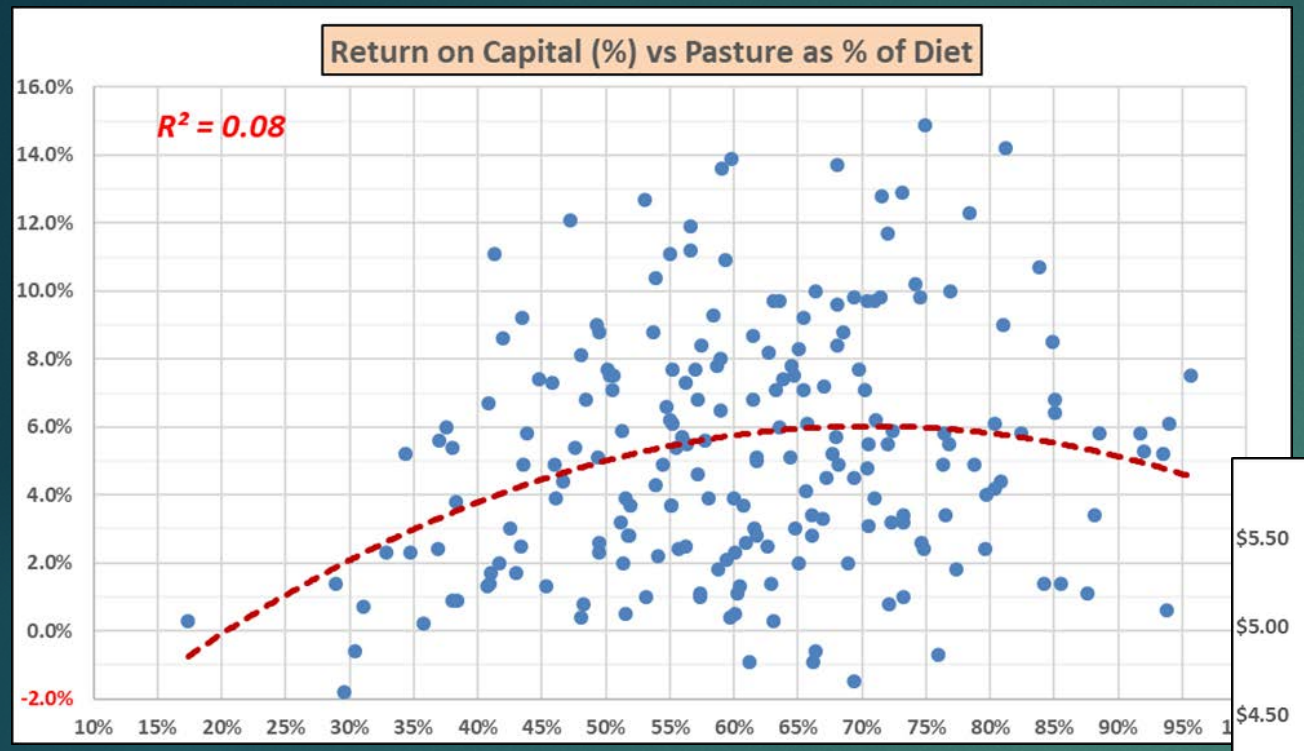
50% Depreciation **) /**

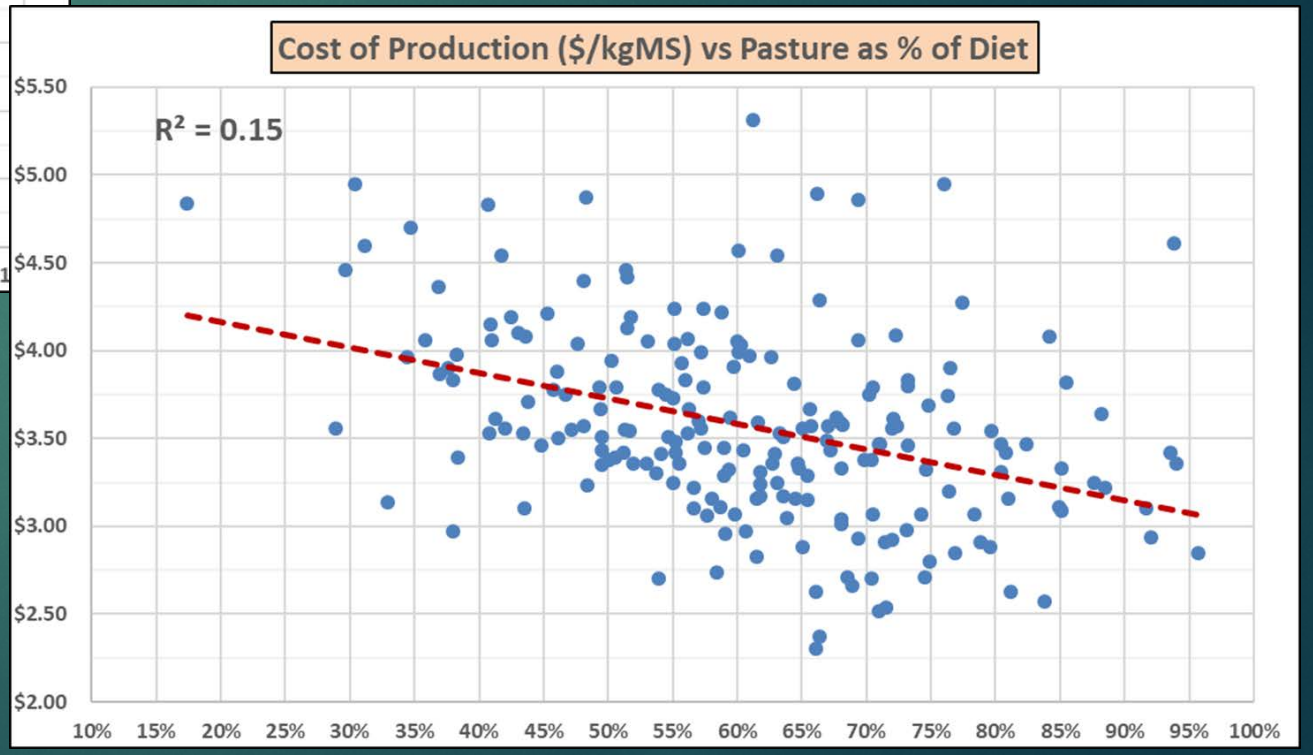
Milking Hectares /

tDM/ha Pasture Harvest

Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Profit (ROC) & Cost of prod'n vs % pasture in diet





Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Hypothesis #3 Summary

Intensifying farm systems is **NOT** a primary driver of profitability on pasture-based dairy farms

Targeting more intensive farm systems where pasture compromises a lower percentage of the diet will most probably **reduce** profit due to cost of production increasing at a greater rate than milk production

The increase in cost of production will most probably be due to lower pasture harvest, higher labour costs, and higher core per cow and core per hectare per tDM costs

Higher levels of profitability (founded on low cost of production) will come from maintaining more than x% pasture in the diet, where 'x' will be relative to regional climate, cost structure and milk price

Hypothesis #3 Summary continued…

So for **Northern Victoria**…

Pasture-based ryegrass (temperate) farm systems will remain the backbone of the dairy industry ***OR***

Dairy farming will further contract in this region as it loses its competitiveness with other regions and farmers move to these more profitable regions

And for **New Zealand**…

Regardless of high land prices, farmers must (and are) retaining their focus on high percentage pasture-based farming systems

New Zealand has retained it's position internationally as the lowest cost producer of milk and substantially increased it's advantage over Australia

Hypothesis #4

Pasture harvest is a primary driver of profitability on pasture-based dairy farms

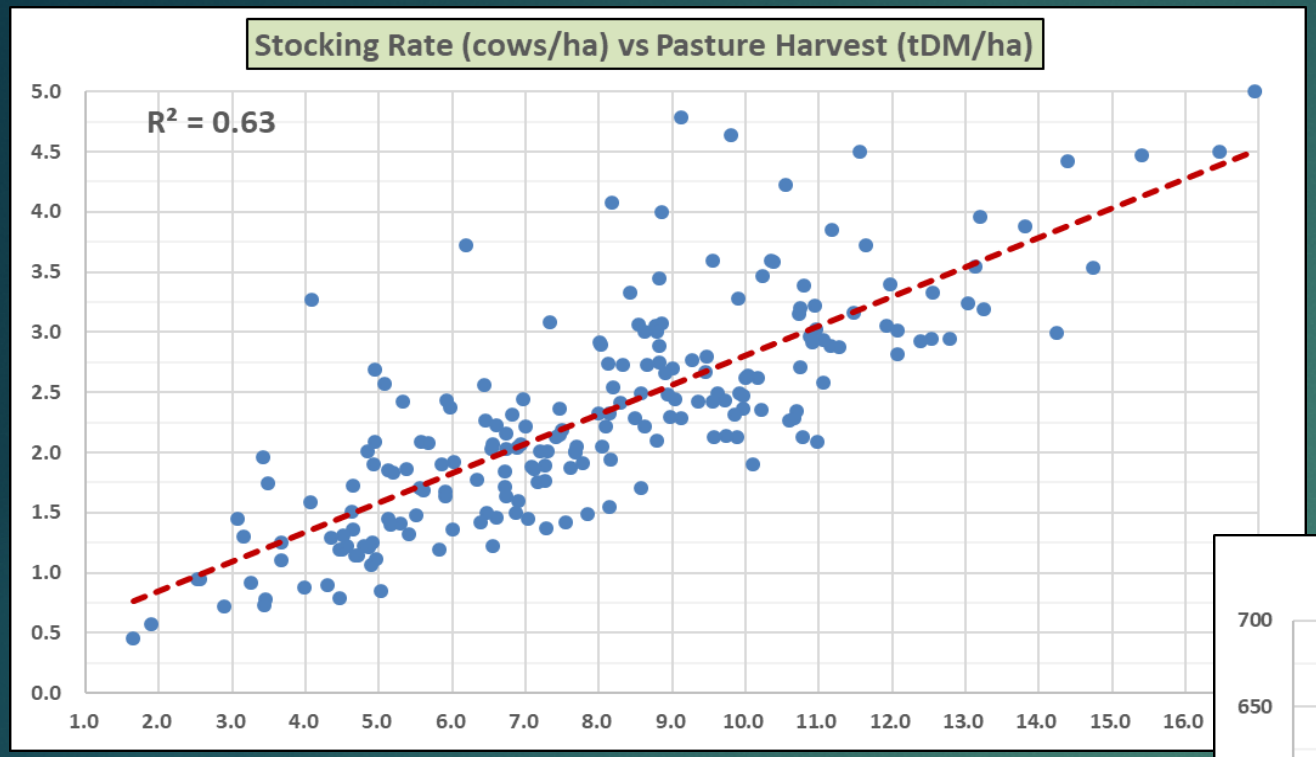
Common comments / presumptions

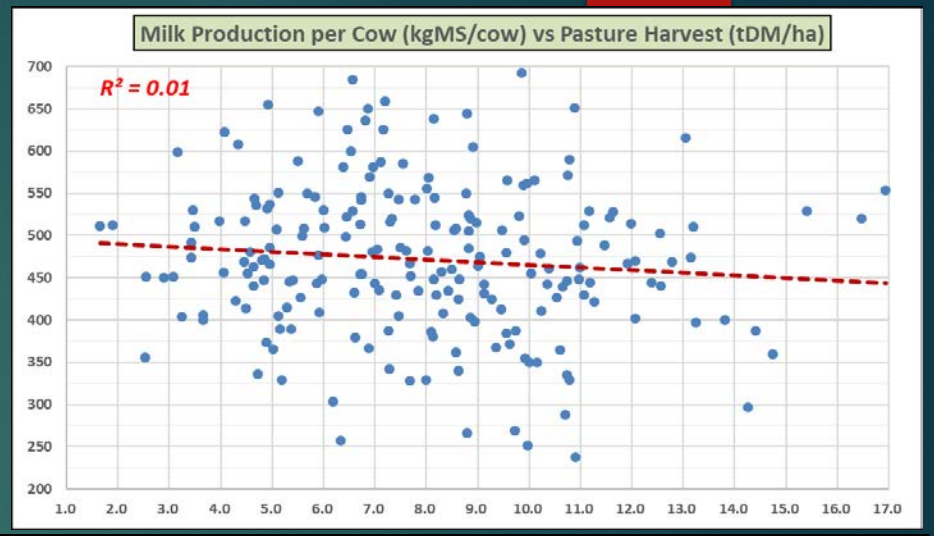
Pasture is important to Australia's international competitiveness BUT it limits cow performance due to it's nutritional weaknesses

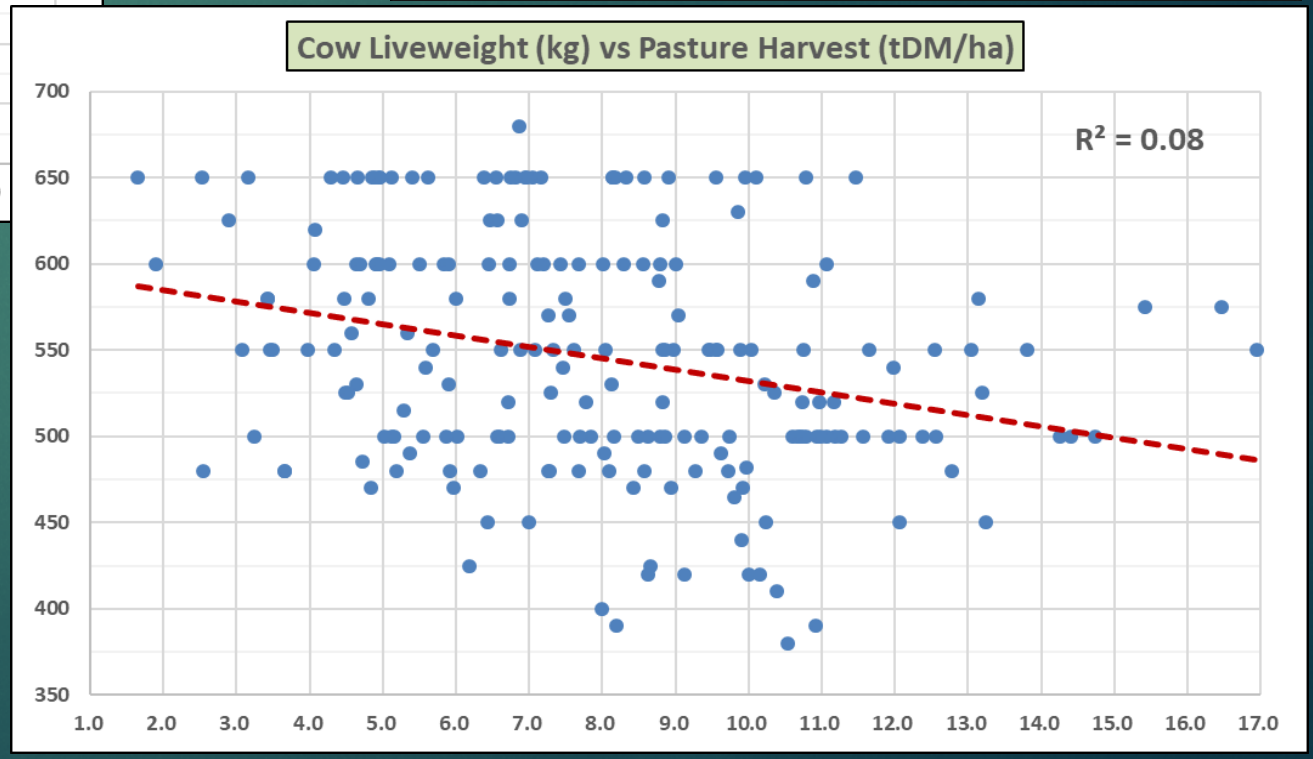
High pasture harvest is a good goal BUT farmers must be careful not to apply too much grazing intensity (potentially undermining pasture harvest) as this limits cow performance

Increasing stocking rate (more cows per hectare) may be important to increasing pasture harvest BUT this creates too much risk for the business given unreliable weather patterns

Pasture harvest (tDM/ha) farm systems

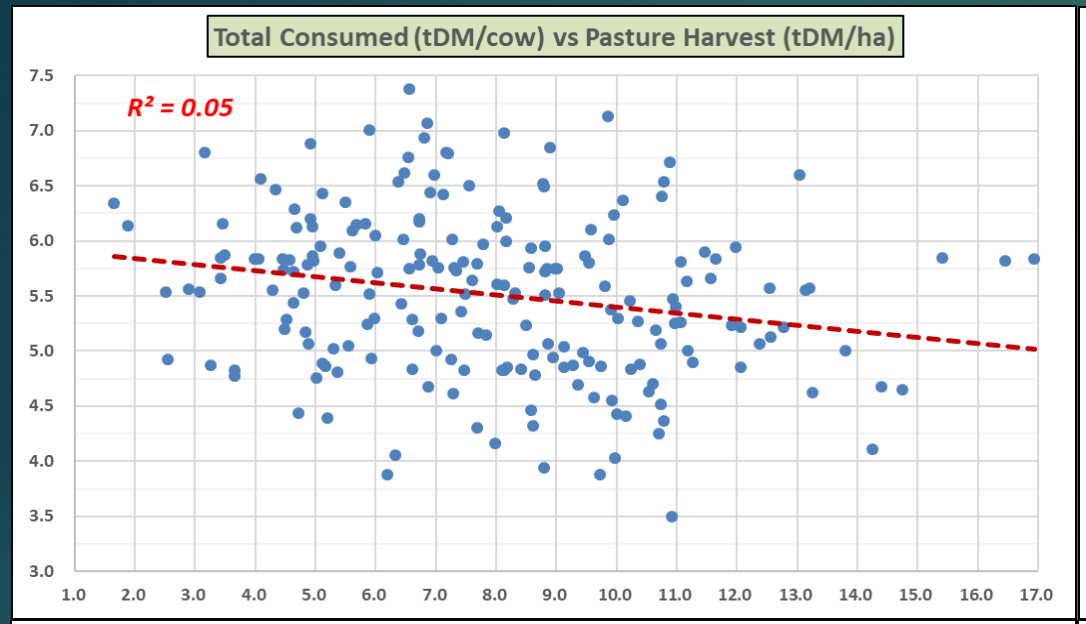


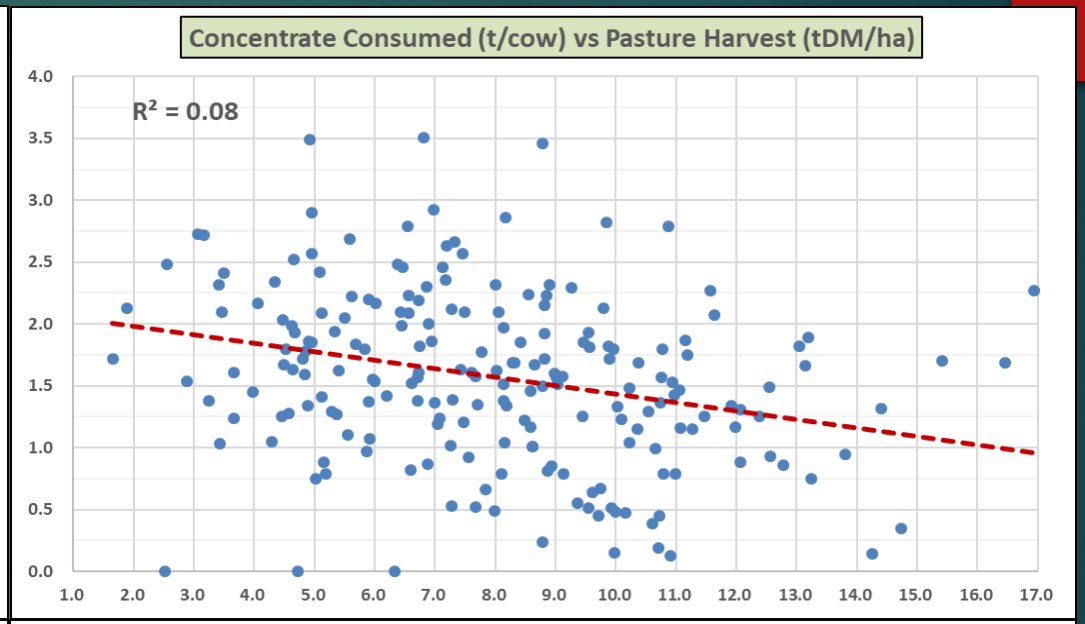


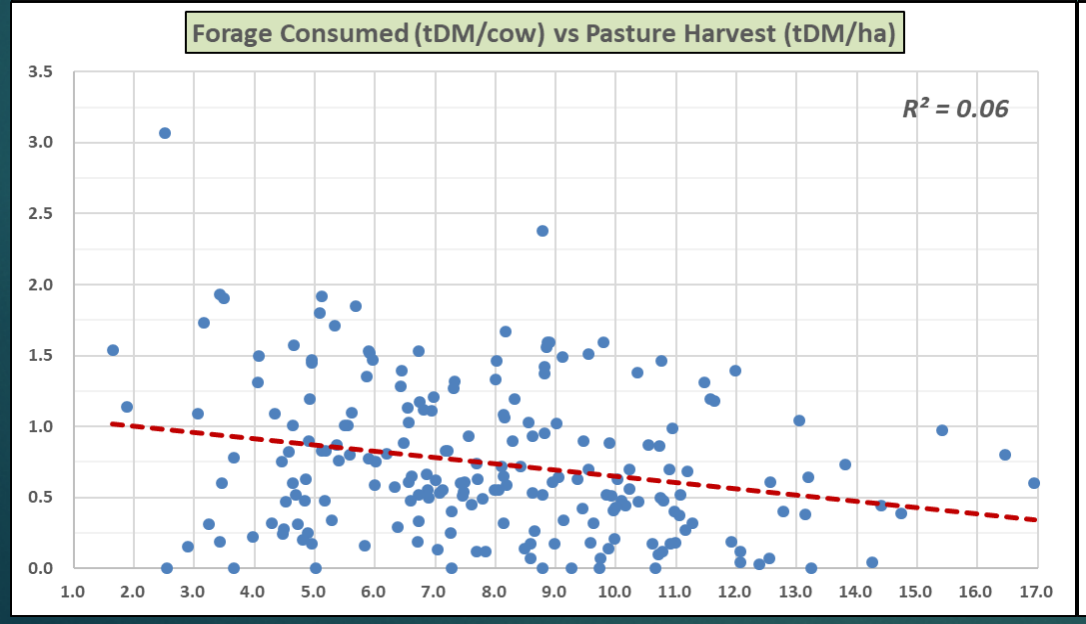


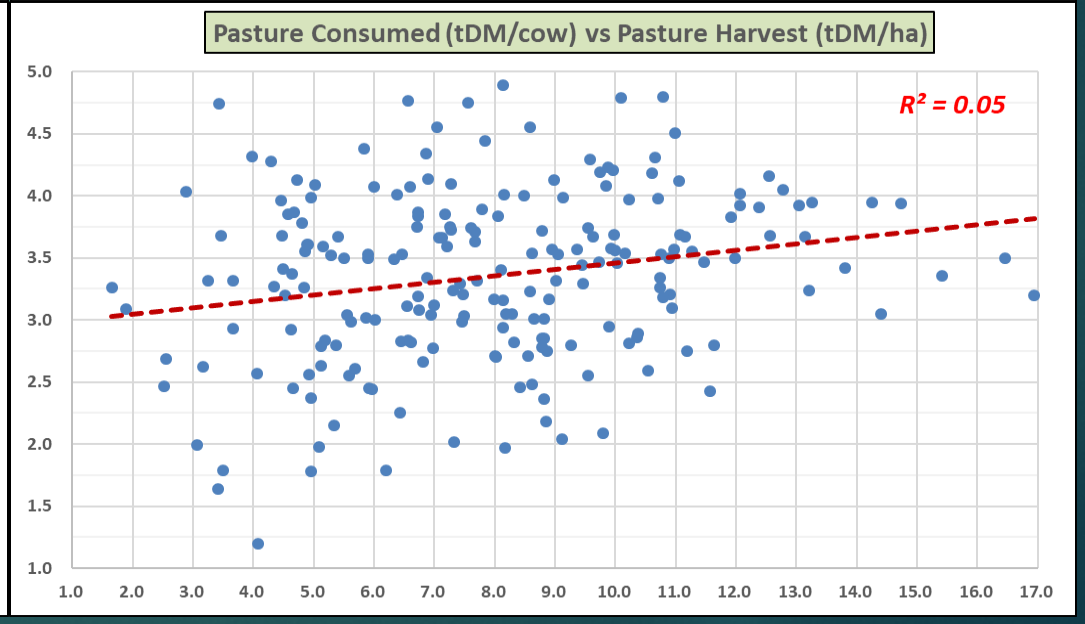
Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Pasture harvest (tDM/ha) farm systems

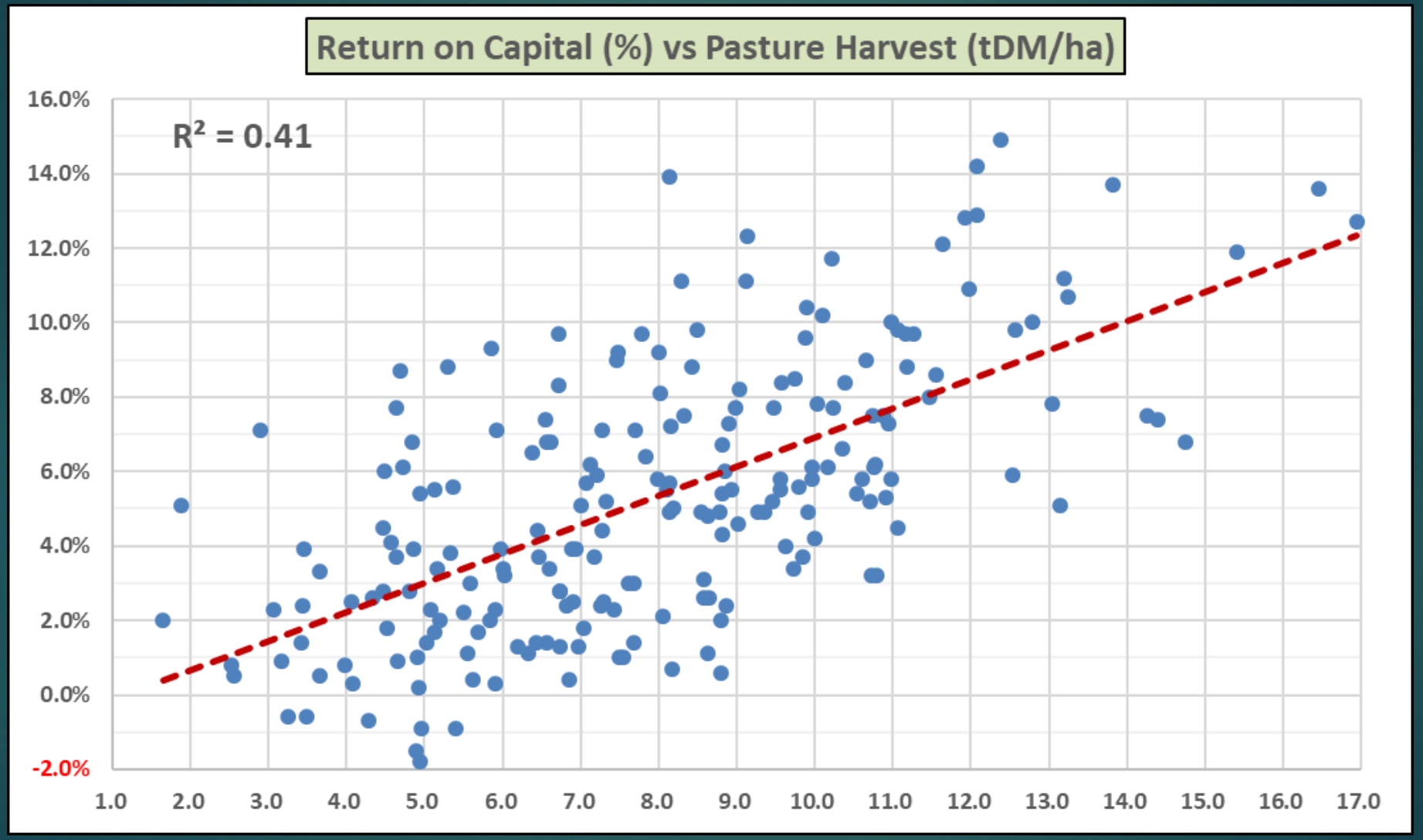






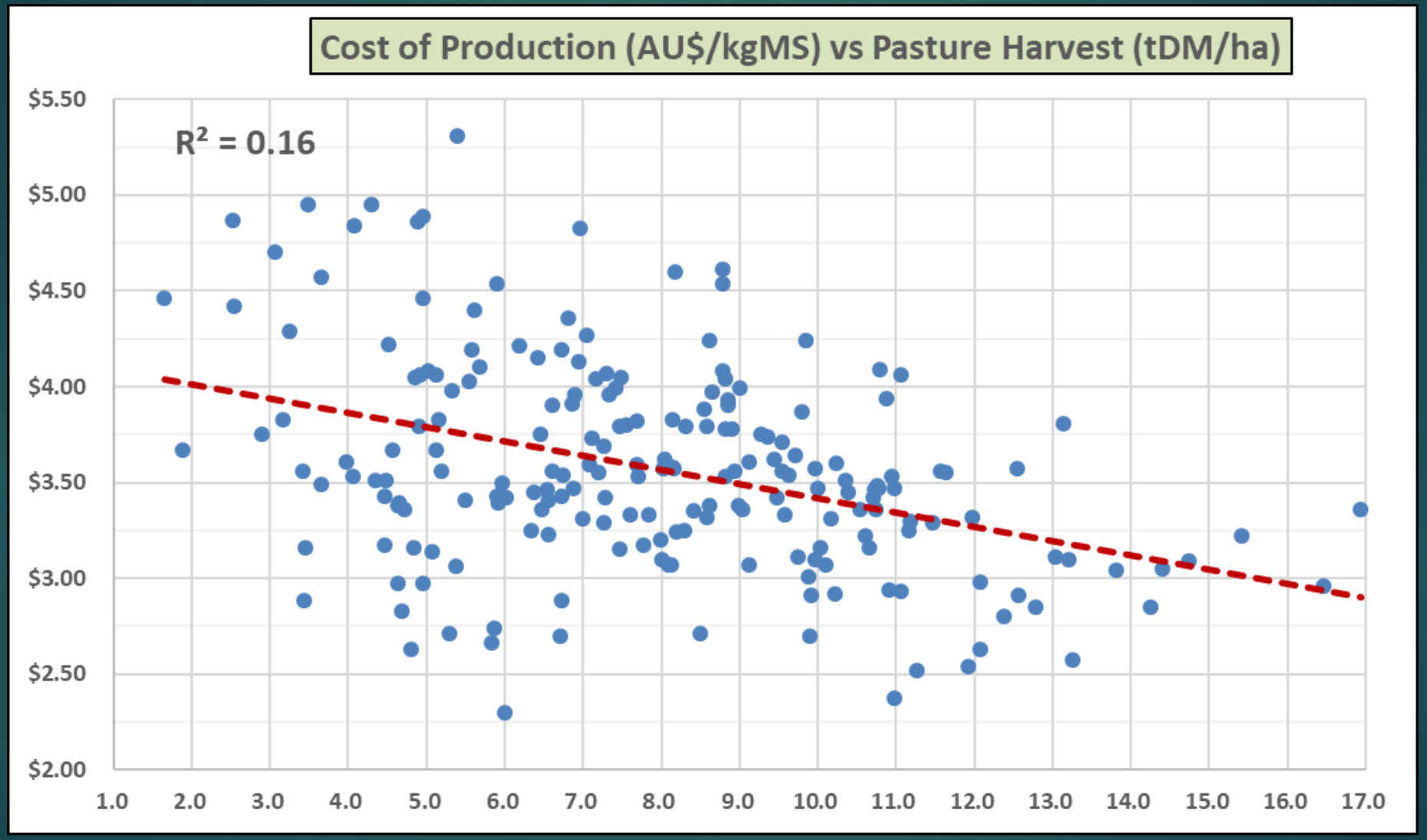


Profit (ROC) vs Pasture harvest (tDM/ha)



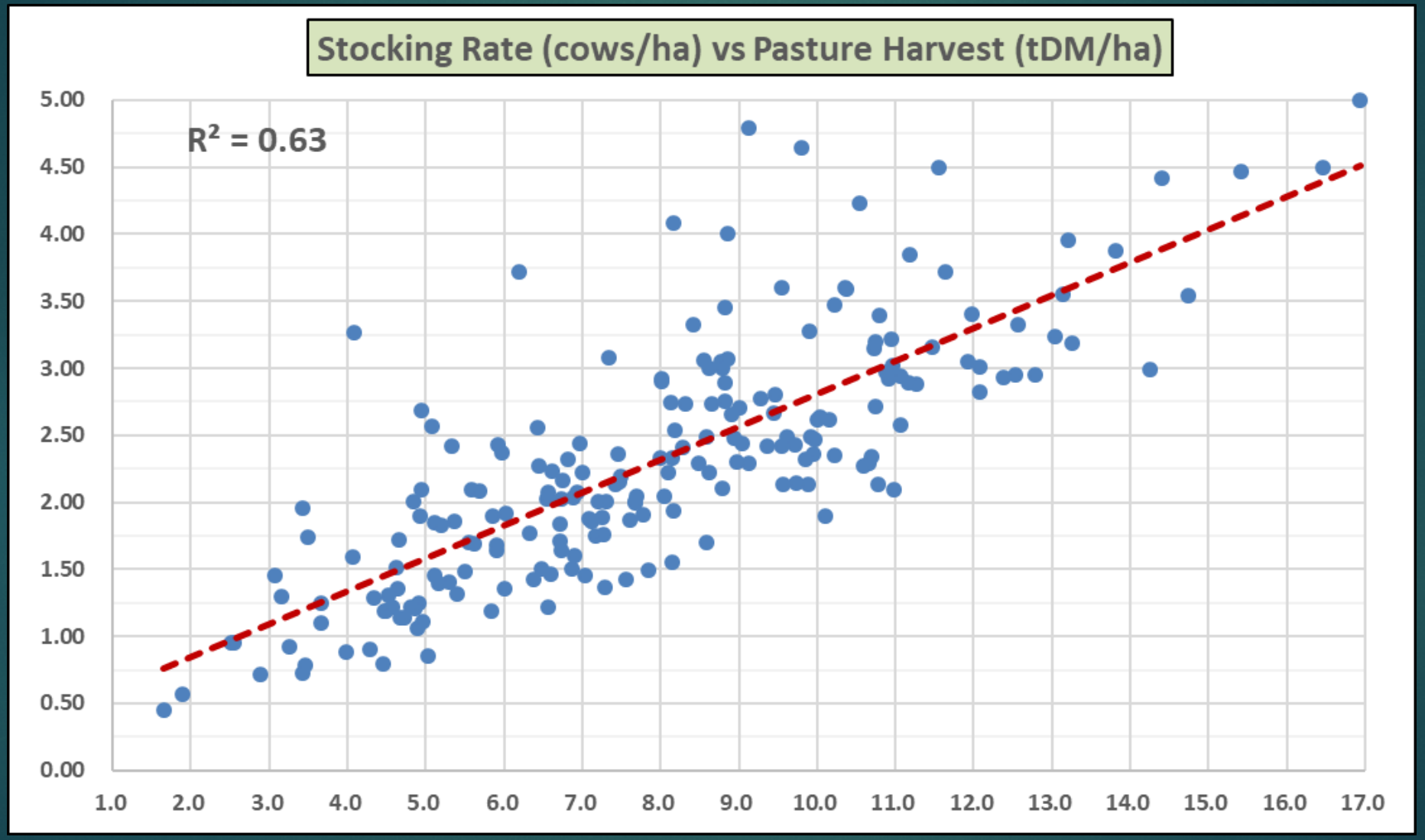
Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Cost of production ($/kgMS) vs Pasture harvest



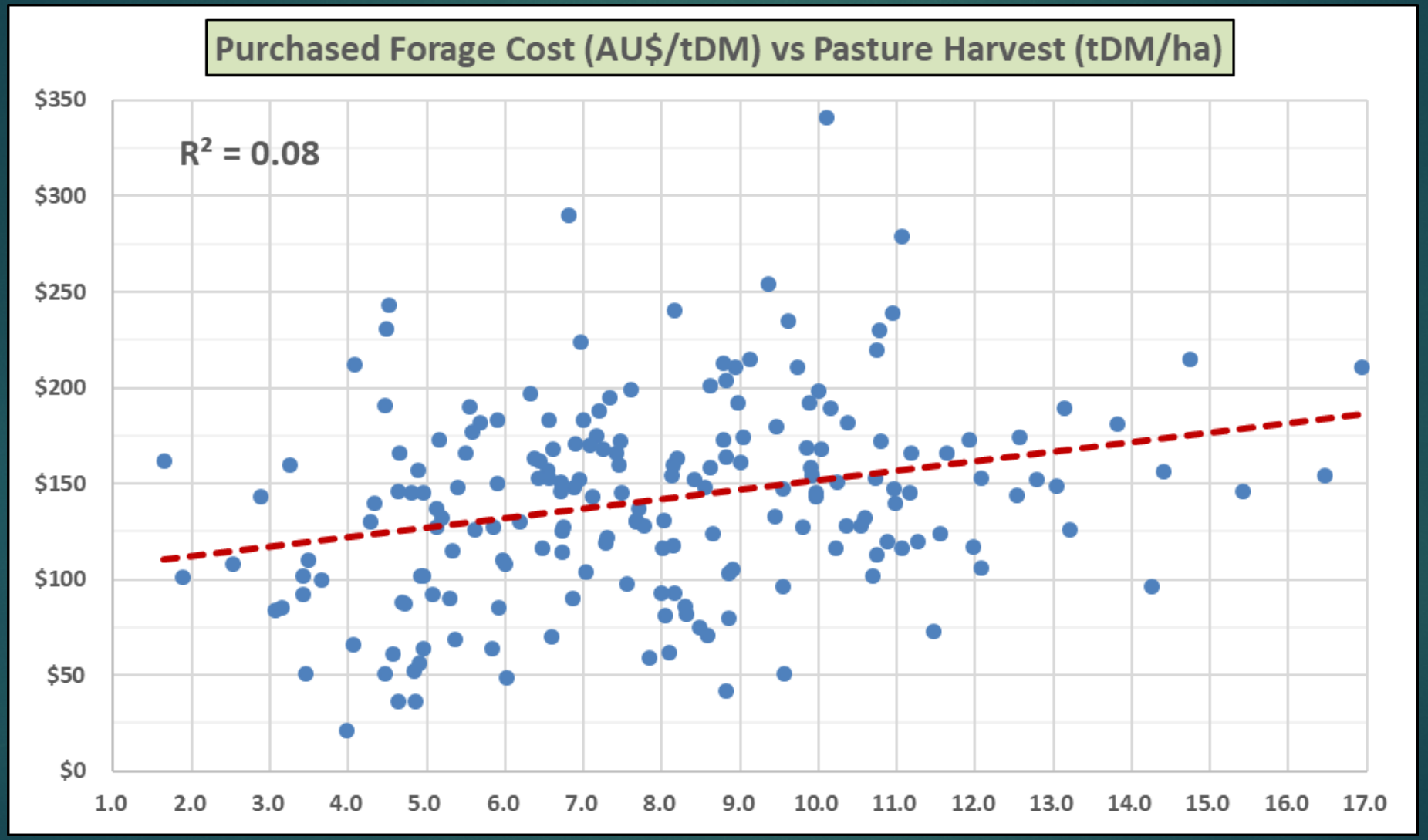
Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Stocking rate (cows/ha) vs Pasture harvest



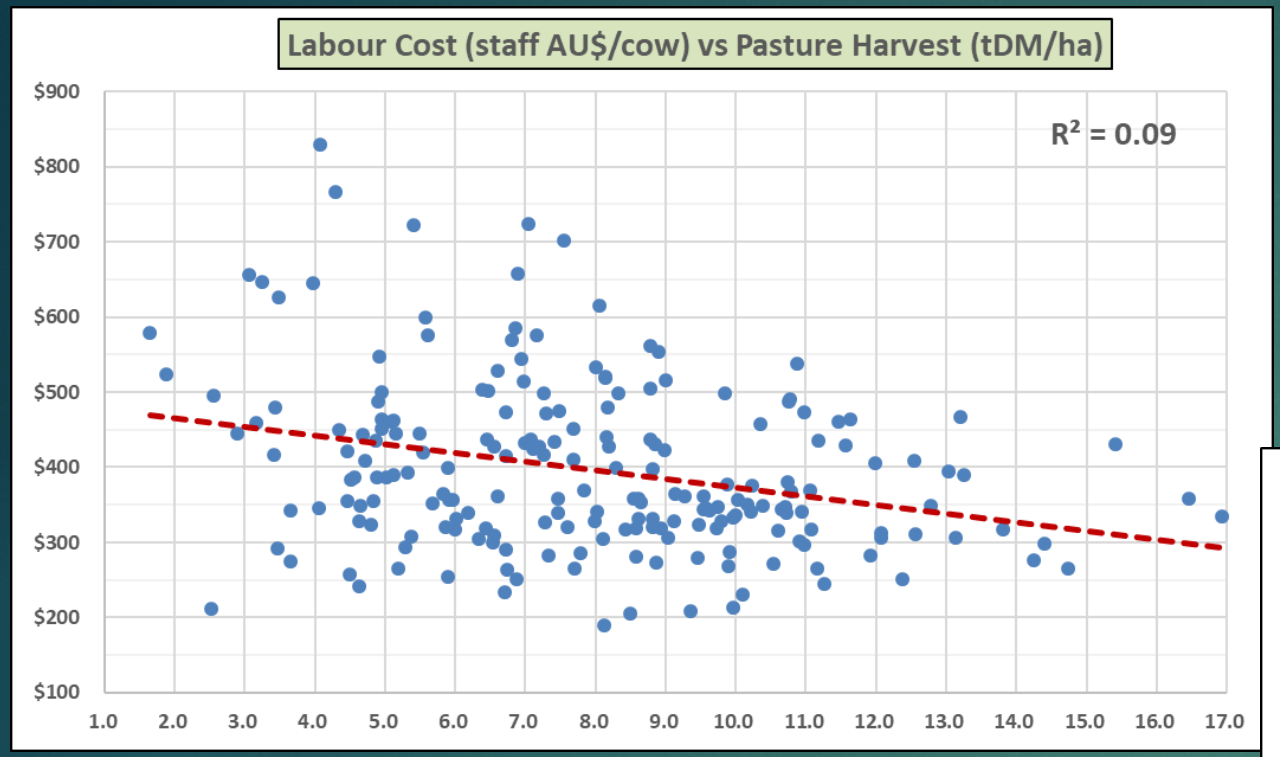
Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

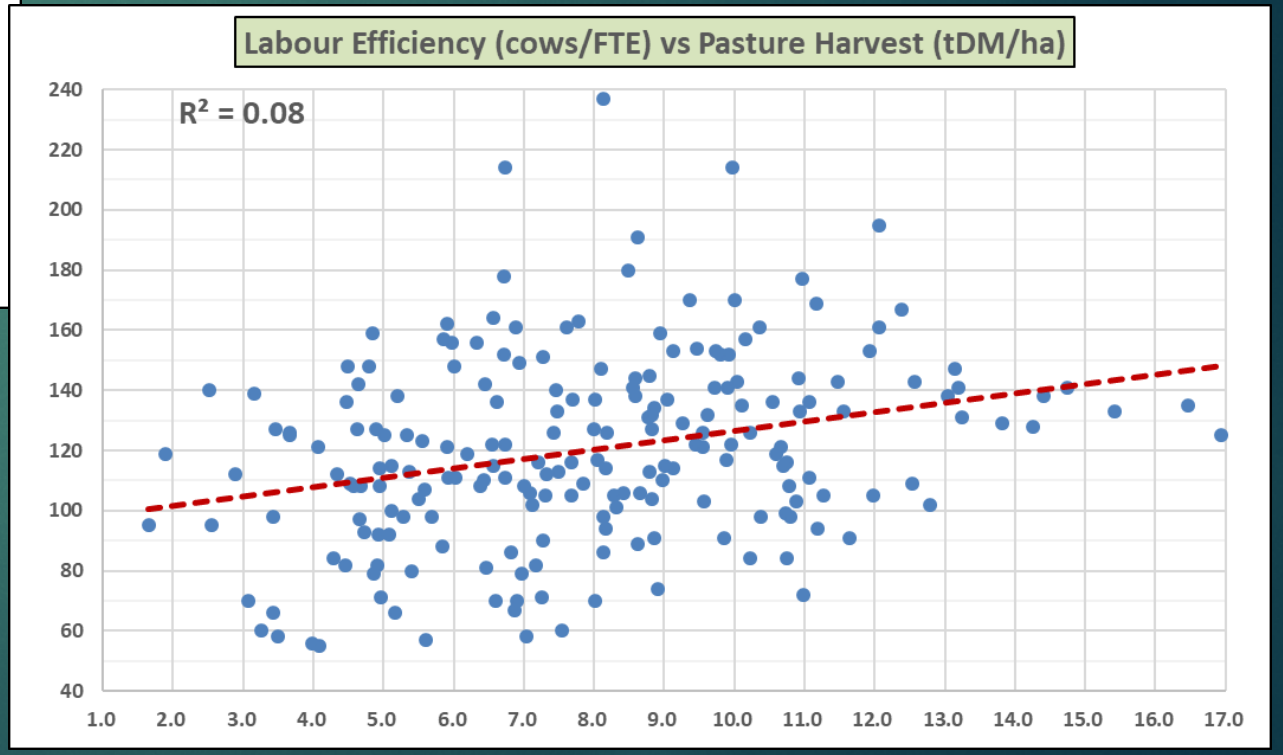
Forage cost ($/tDM) vs Pasture harvest



Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Labour cost &efficiency (cows*/FTE) vs Pasture harvest

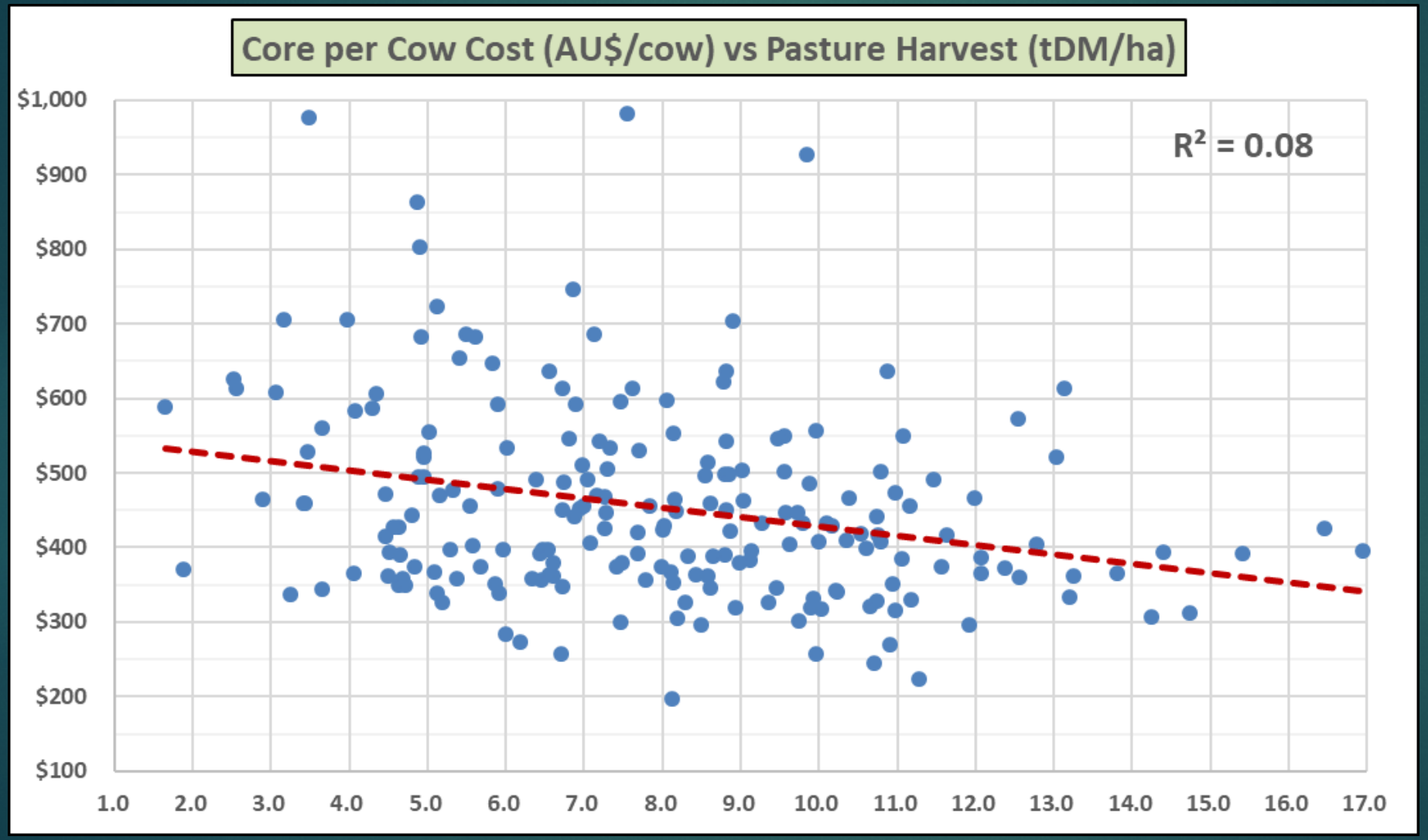




* FTE = 50-hour full time equivalent

Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Core per cow costs* vs Pasture harvest



Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

*** Core per Cow Costs =**

(Animal Health +

Breeding +

Dairy Shed Exp. +

Electricity +

Grazing/Agistment +

Freight +

50% Repairs&Maint. +

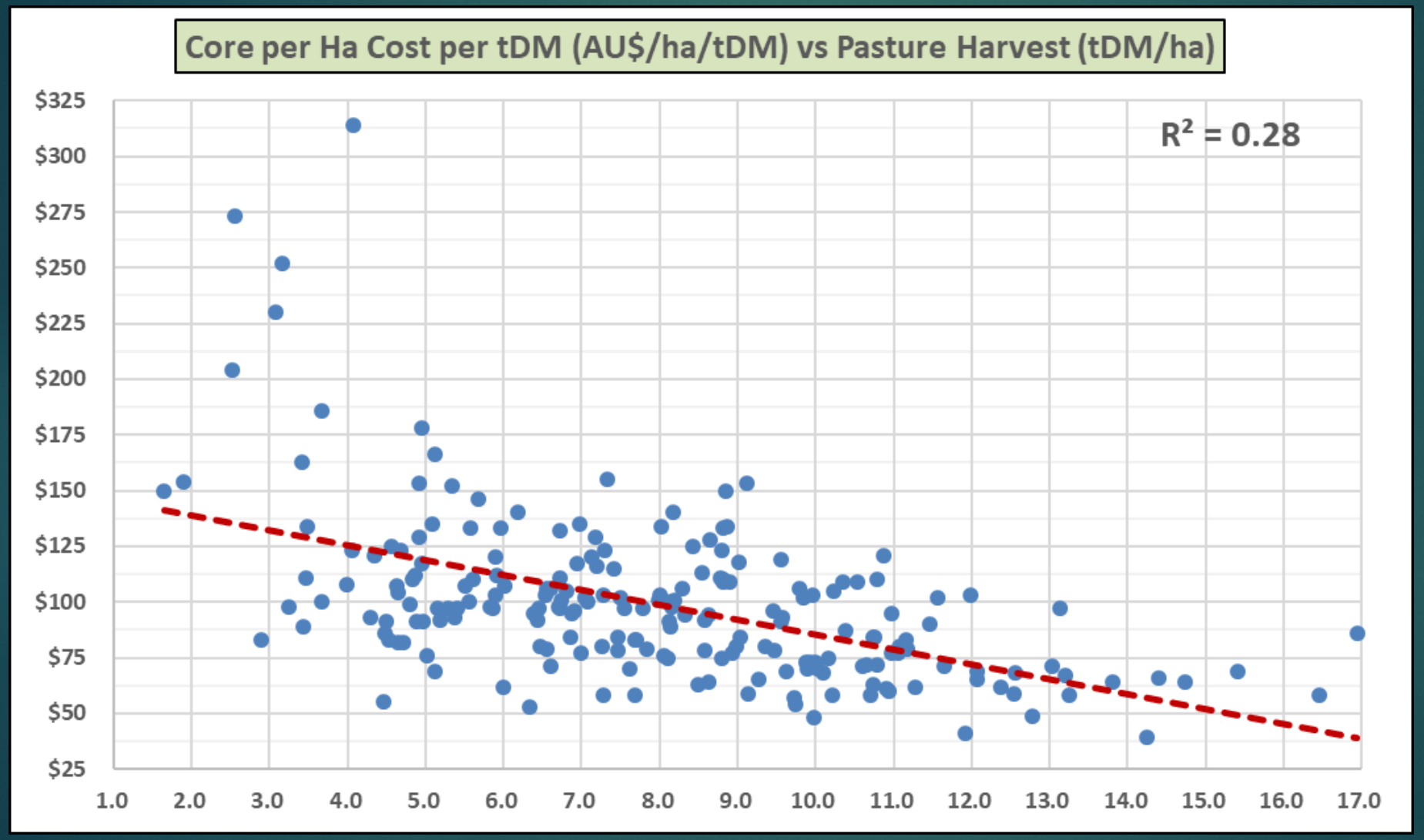
70% Vehicles +

30% Standing Chgs. +

50% Depreciation **) /**

Milking Cows

Core per ha costs per tDM* vs Pasture harvest



*** Core per Ha Costs per tDM =**

(Fert excl. nitrogen +

Pasture Maint. & Renewal +

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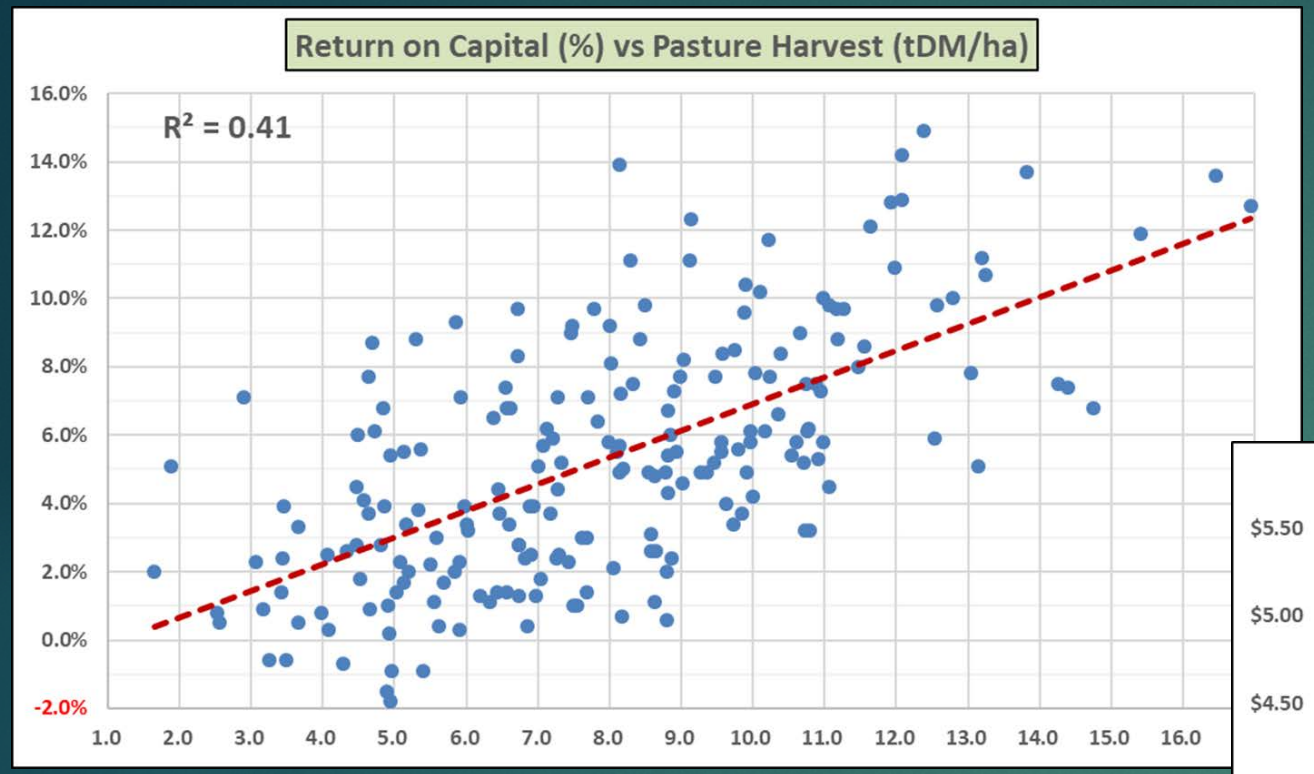
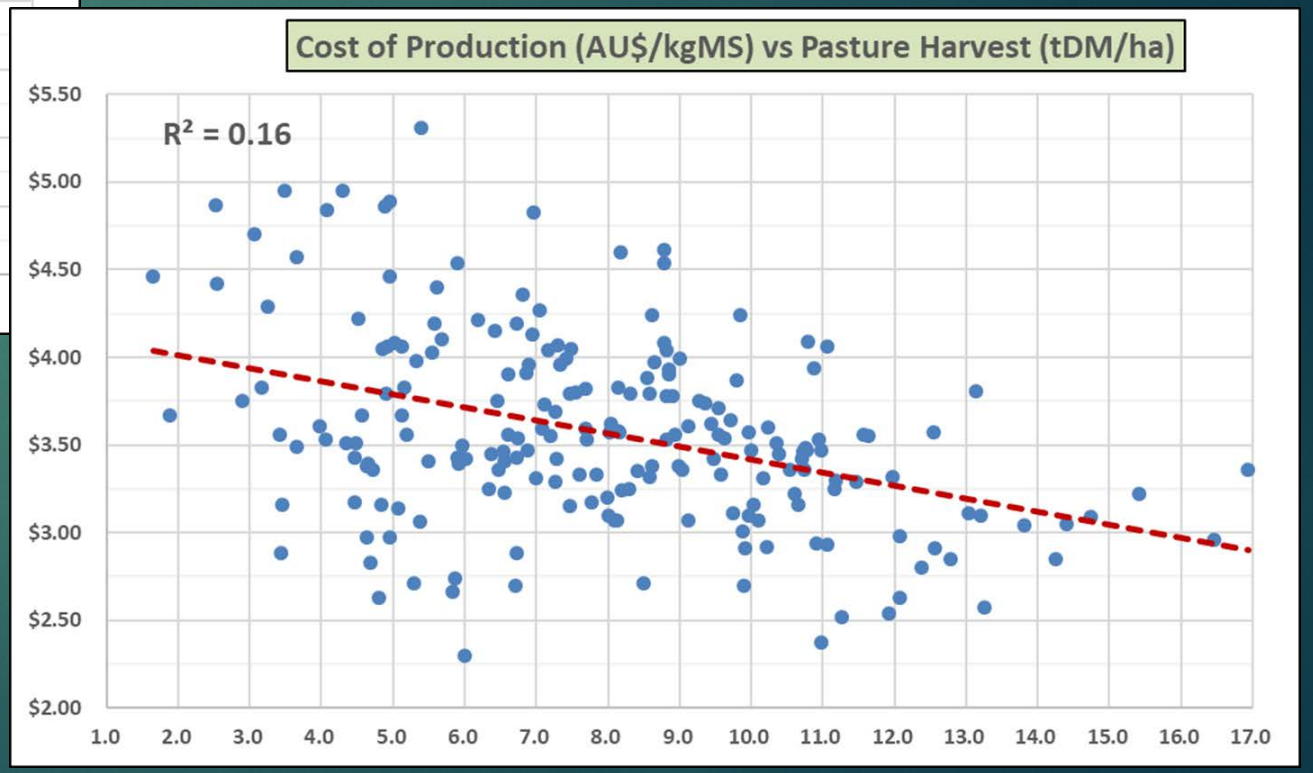
Milking Hectares /

tDM/ha Pasture Harvest

Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Profit (ROC) & Cost of prod'n vs % Pasture Harvest





Source: Red Sky, DPIWE (Tasmania), PIRSA (South Australia), DAFWA (Western Australia)

Hypothesis #4 Summary

Pasture harvest is THE primary driver of profitability on pasture-based dairy farms with higher pasture harvest generally resulting in a lower cost of production

The most critical causal link to increasing pasture harvest is increasing stocking rate

Higher levels of pasture harvest provide opportunity to increase labour efficiency, and reduce core per cow and core per hectare per tDM costs

Forage costs ($/tDM) are likely to increase with higher pasture harvest as the higher stocking rates provide less opportunity to conserve home-grown pasture

So does the farm system matter?

The **MYTH**

"It's not important what farm system you choose, it's only important that a farmer manages the system well as all farm systems can be equally profitable"

The **REALITY**

Choosing the "right" farm system for each farm, based on milk pricing, input unit costs, and particularly potential pasture harvest, is the second critical component determining profitability alongside farm management

There is lots of data that confirms farm system selection is an essential component in determining cost of production

Australian dairying has "lost it's way" in recent years…

Overall summary

High pasture harvest critical aspect of profitability and derived from high comparative stocking rates and management excellence

Farm system design must be targeted at lowest cost of production for sustainable, internationally competitive business

Highest levels of profitability based on low cost of production will most probably come from:

1. Friesian/crossbred cows of 470-570 kgs liveweight
2. Total intakes around 75%-90% of bodyweight
3. Milk production of 375-550 kgsMS/cow (approx 4,700-7,500 litres/cow)
4. Cows consuming over 3 tDM/cow of pasture
5. Cows consuming no more than 1.9-2.2 tAF/cow (6-7 kgsAF/day) in Victoria ***OR*** 1.1-1.4 tAF/cow (3.5-4.5 kgsAF/day) in Tasmania