Which are the critical dairy business performance characteristics that will provide profitability and sustainability for the next 5-10 years

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KwaZulu-Natal, South Africa

Standard Bank

Presentation outline

- ❑ Background to the data & statistical analysis
- ❑ Start reviewing some graphs…and discuss these
- ❑ Review some more graphs
- ❑ Review some more graphs
- ❑ Review even more graphs
- ❑ Summarise conclusions for South Africa over the next 5-10 years

Sources of data – all processed through Red Sky

Australia data

207 Australian dairy farms from a unique unbiased dataset of a single year (2005/06)

Huge range of production systems and environments due to industry-wide funding of data collection

Milk price, supplement prices & weather all within 'norms'

South Africa data

244 South African dairy farm datasets across 4 years from 2014/15 to 2017/18…plus a further 60+ from 2018/19 reviewed

Biased to KZN and a single consultancy business (Intelact)

2017/18 & 2018/19 'extreme' conditions in milk price and weather (?)

Over 140 relationships were statistically reviewed for each country

South Africa annual variation in key ratios

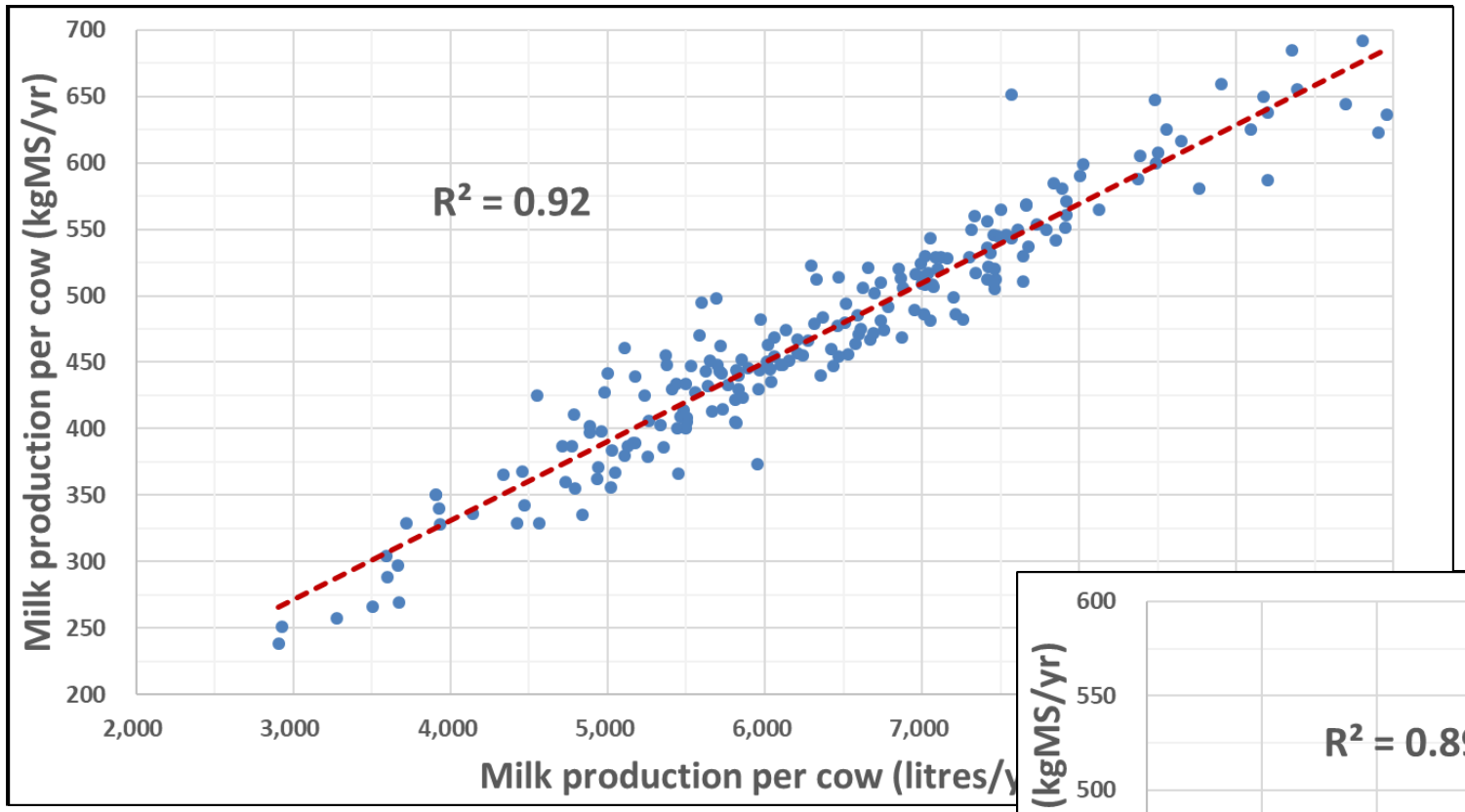
KZN VARIATION IN KEY RATIOS ACROSS YEARS					
	2014/15	2015/16	2016/17	2017/18	2018/19
Milk price (R c/litre)	**418**	**407**	**468**	**485**	**427**
Milk price (USD c/litre)	36.3	28.0	34.4	37.7	30.1
Pasture harvest (tDM/ha)	**12.2**	**10.2**	**10.5**	**11.6**	**11.5**
Concentrate price (R/ton)	**R3,788**	**R3,941**	**R4,376**	**R3,897**	**R4,021**
Concentrate price (USD/ton)	$329	$271	$322	$303	$283
Forage price (R/tDM)	**R1,255**	**R1,333**	**R1,331**	**R1,342**	**R1,416**
Forage price (USD/tDM)	$109	$92	$98	$104	$100
Total expenses (R c/litre)	**352**	**378**	**415**	**392**	**409**
Total expenses (USD c/litre)	30.6	26.0	30.5	30.5	28.8
Cost of production (R c/litre)	**323**	**345**	**382**	**354**	**366**
Cost of production (USD c/litre)	28.1	23.7	28.1	27.5	25.8
Forex rate - ZAR/USD	11.50	14.56	13.60	12.85	14.19

First question

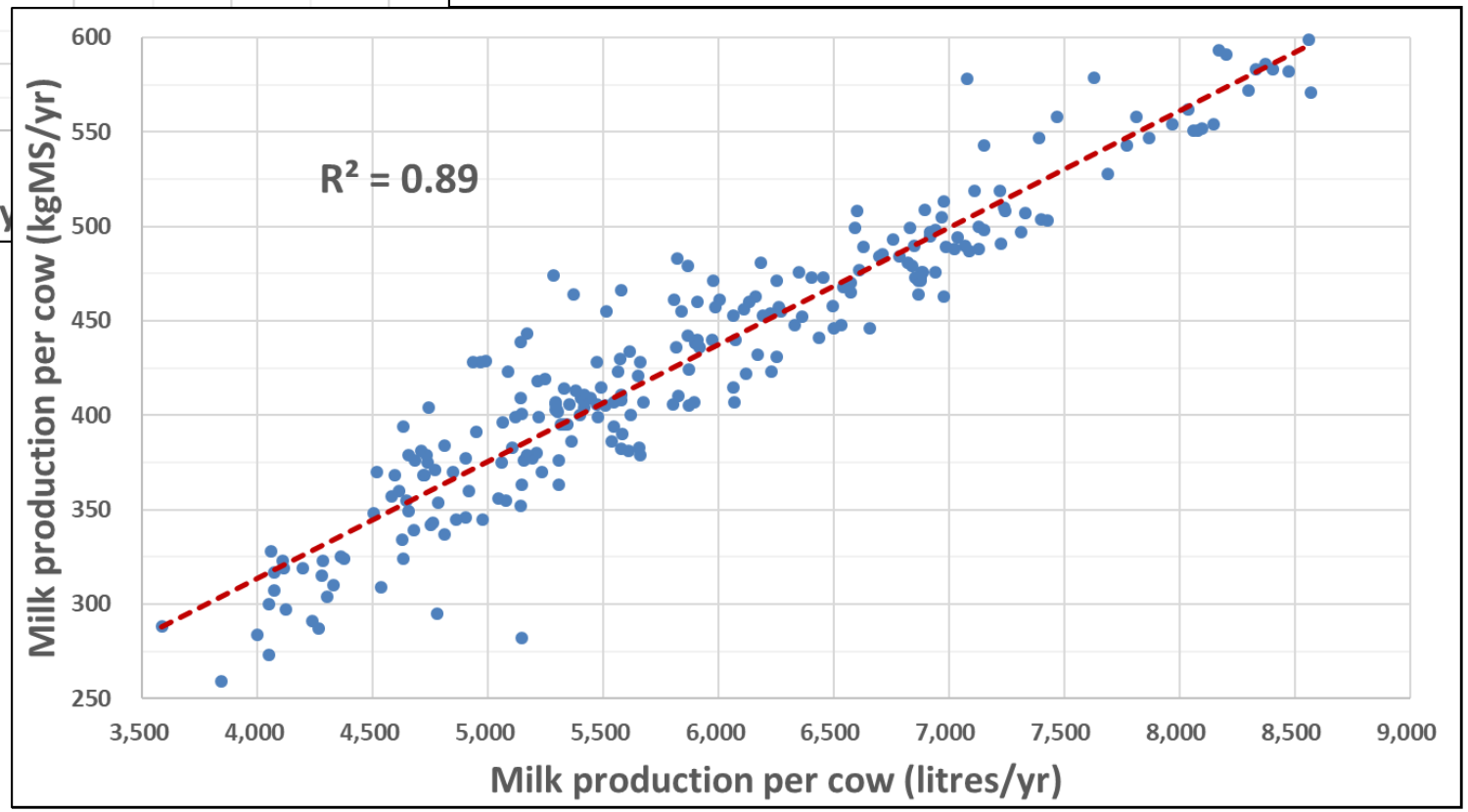
Should we be talking litres or milksolids (fat + protein)…does it matter what you use in your performance ratios?

The kiwis always say it is only milksolids that should be discussed…or is this only relevant to them maybe?

Litre production per cow *impact on* milksolid production per cow



Australia



South Africa

Next question

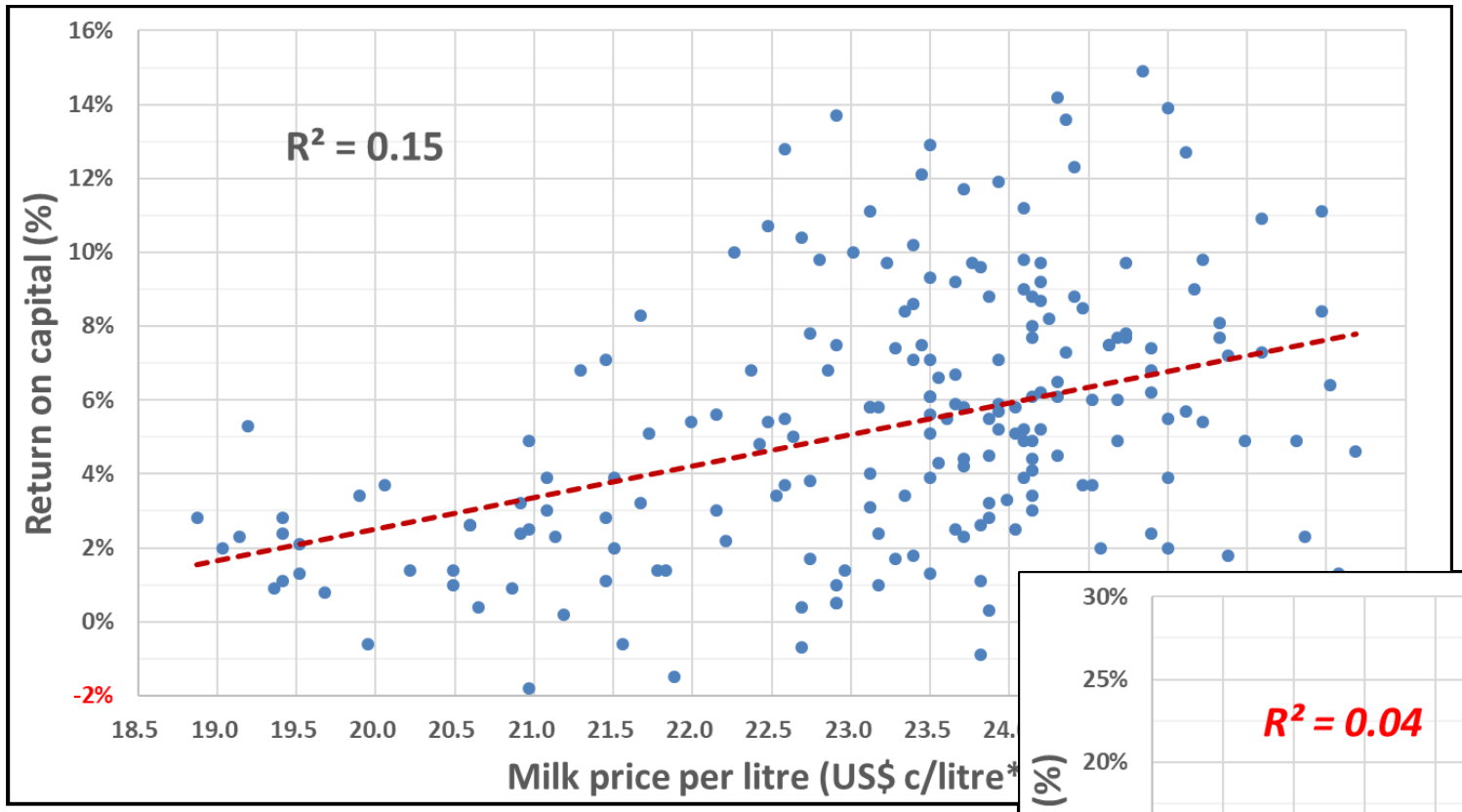
Should we be talking **cows per hectare** or **kilograms of liveweight per hectare** when comparing ‘stocking rates’?

…and next question

How influential is comparative **milk price** to the level of dairy farm profitability?

Milk price per litre

impact on profit



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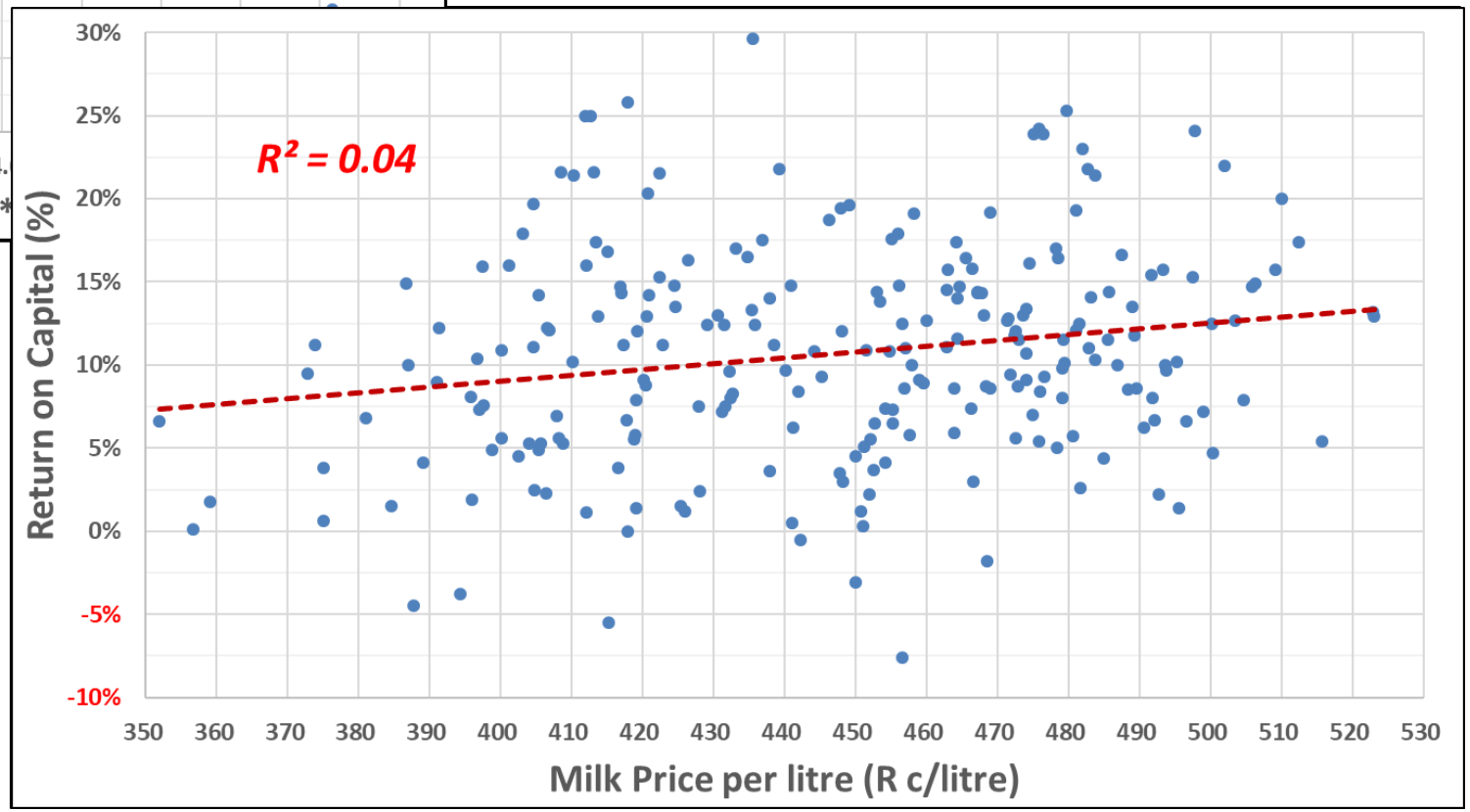


South Africa

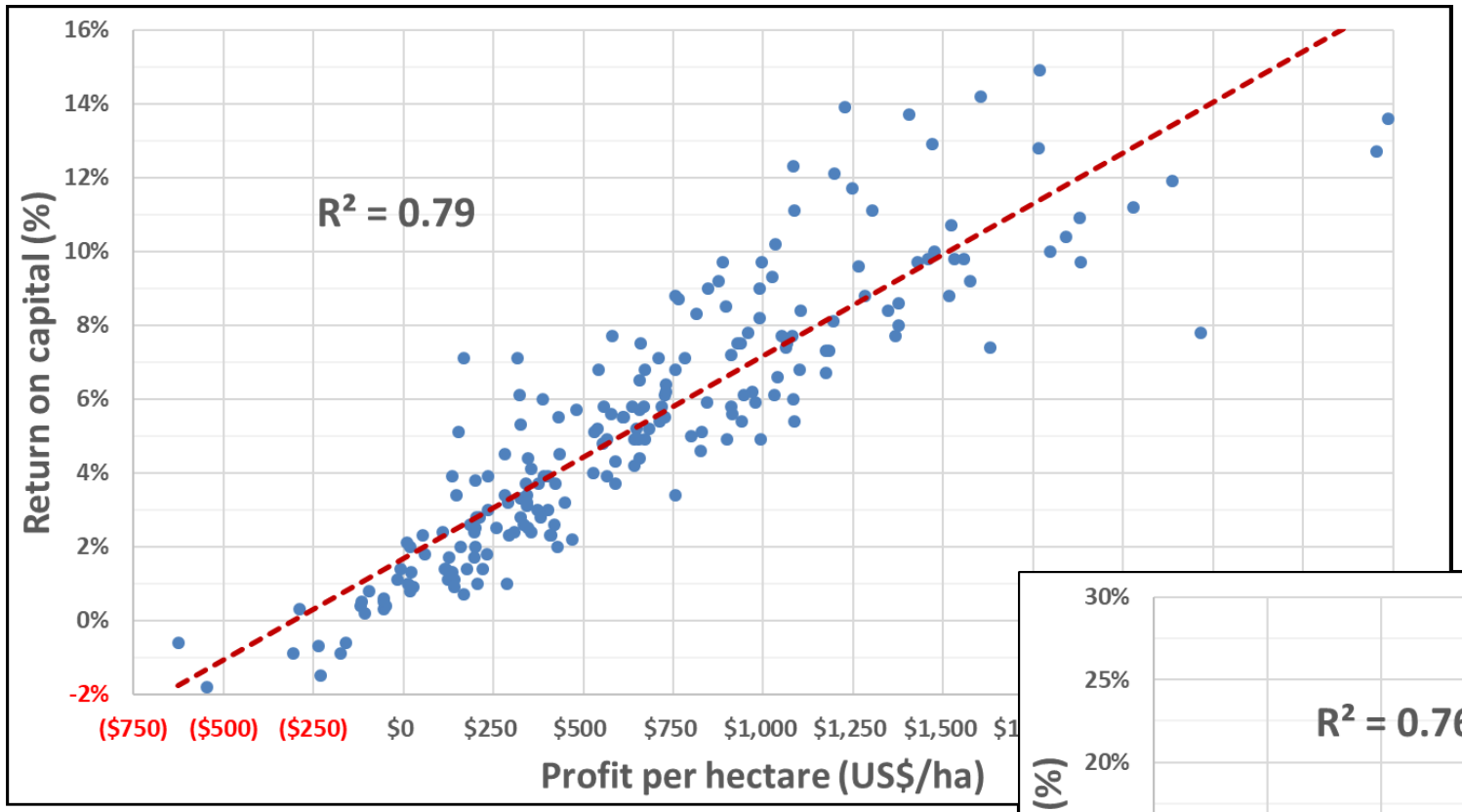
Next question

How influential is comparative size of farm to the level of dairy farm profitability?

…and next question

Economists advise that return on (total) capital is the most complete measure of profitability for comparative purposes. Do you agree…and how significant is the difference between using return on capital and profit per hectare or profit per cow?

Profit per hectare *impact on* profit (return on capital)



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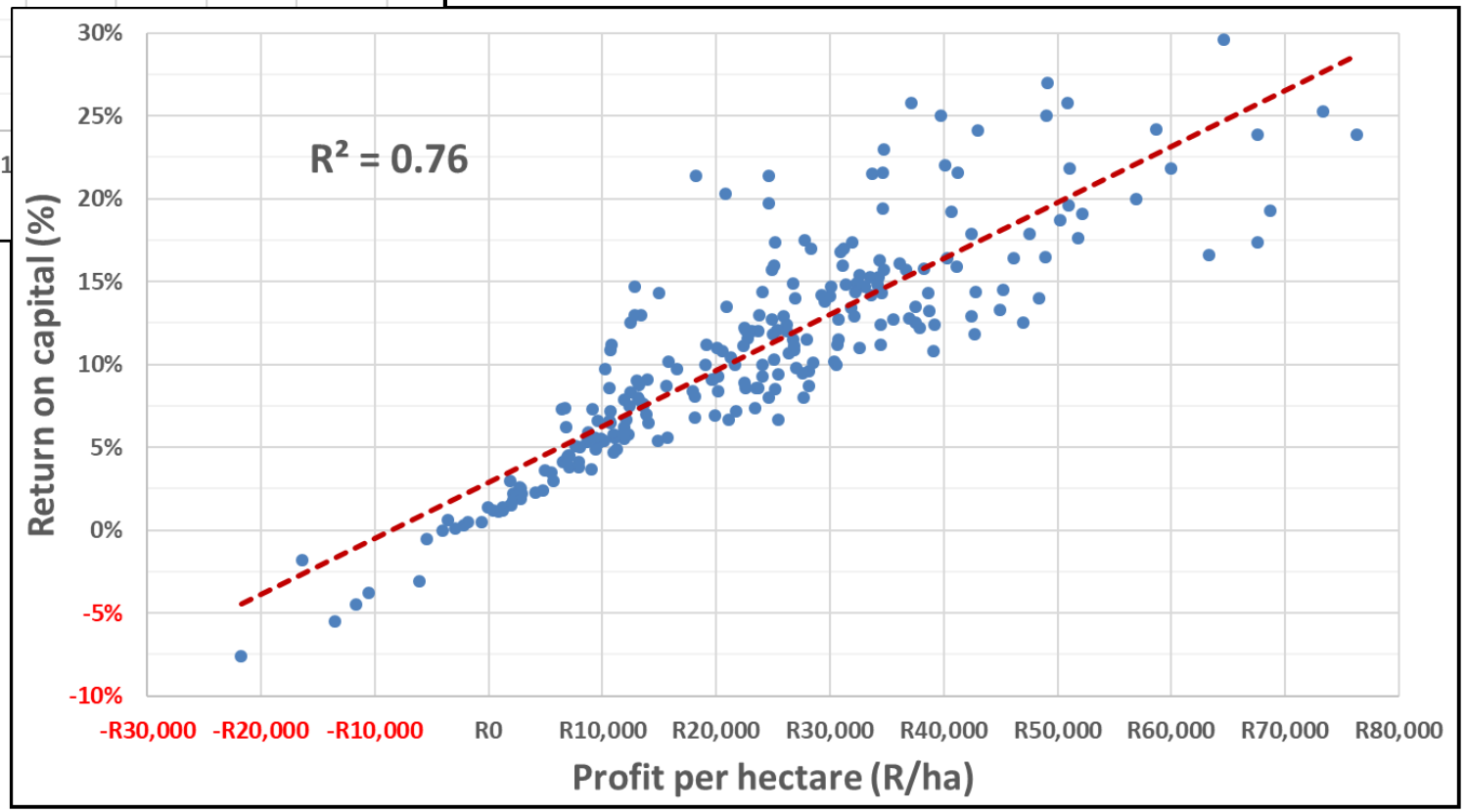


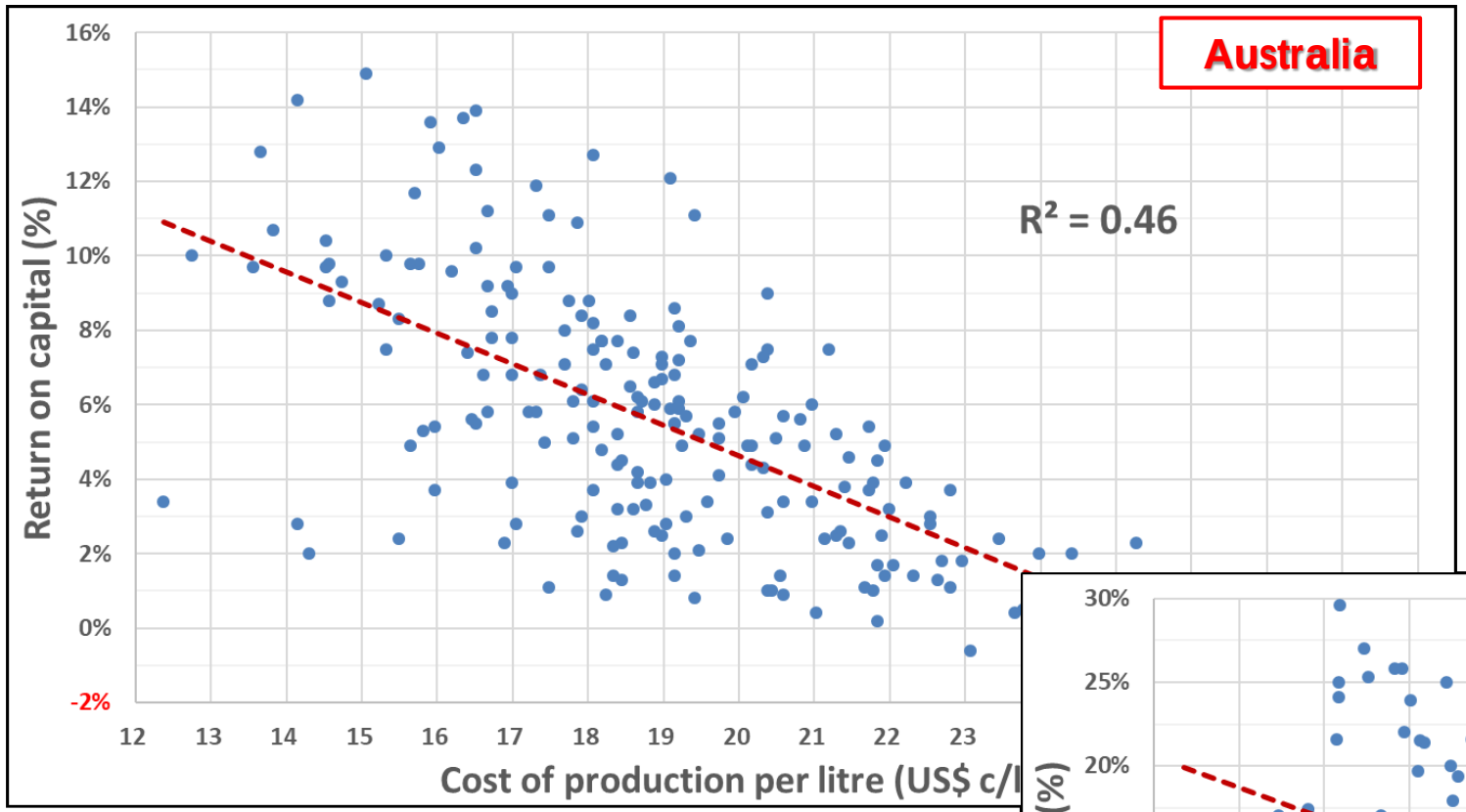
South Africa

Next question

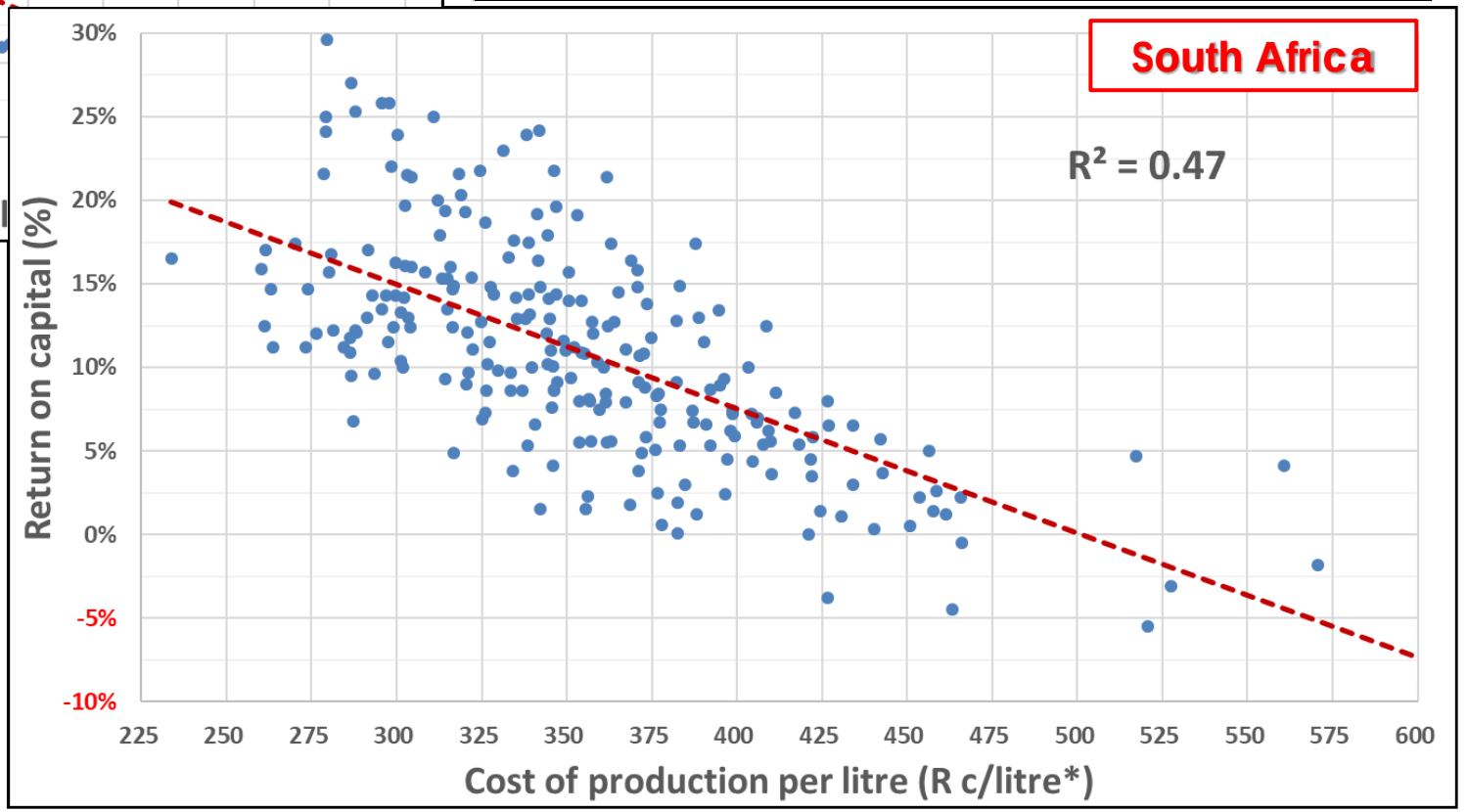
How relevant is cost of production to predicting variances in profitability?

How might this change year-on-year and might these changes be used to adjust production systems to optimise profit?

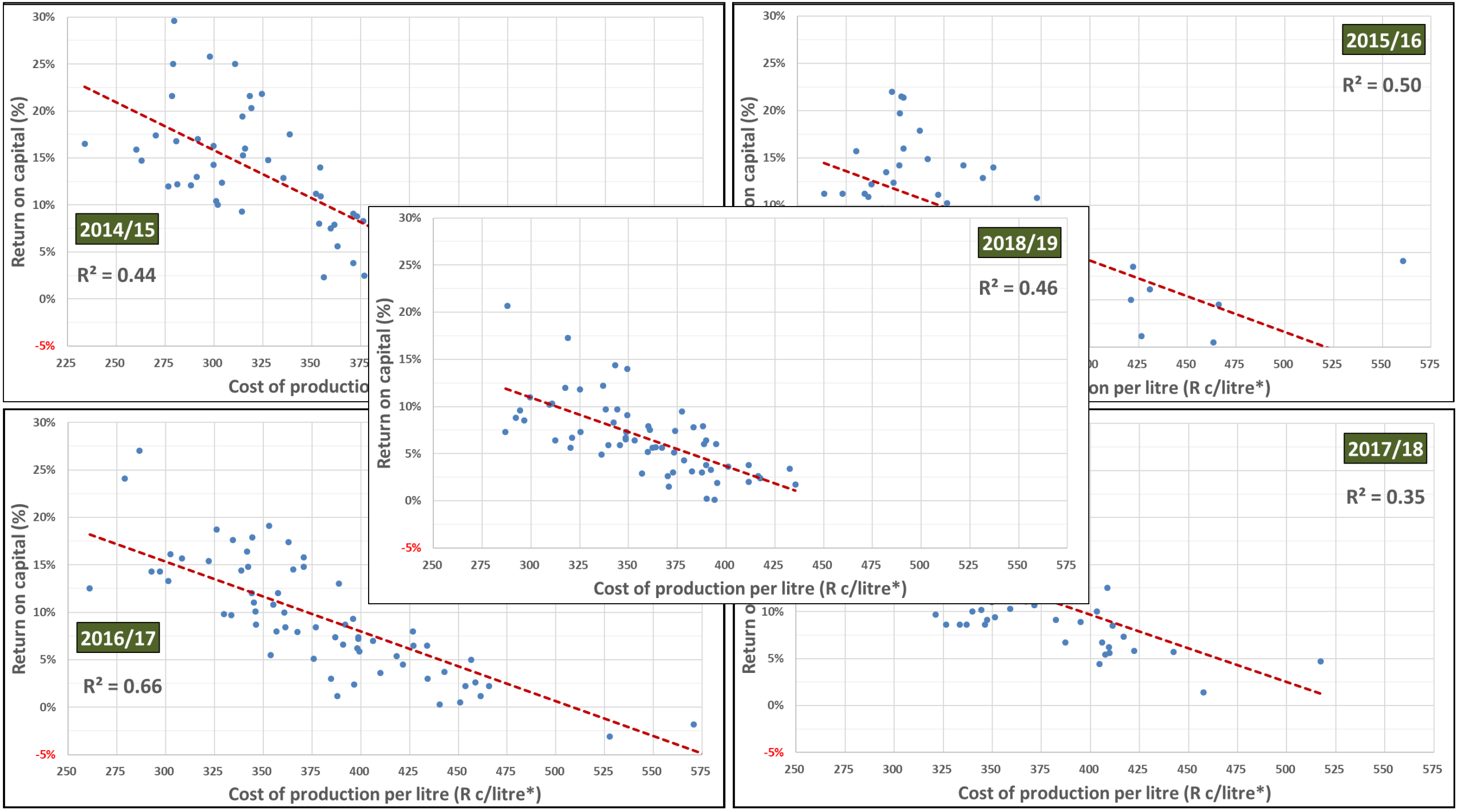
Cost of production per litre *impact on* profit



Cost of Production Calculation	c / litre	$ / kgMS
Total Expenses	31.0	$ 4.31
Minus Livestock Revenue	2.7	$ 0.38
Minus Other Revenue	0.3	$ 0.04
Equals **COST of PRODUCTION**	**28.0**	**$ 3.89**
Compare with **Milk Price**	33.0	$ 4.58
Variance	**5.0**	**$ 0.69**



Operating Profit Calculation	c / litre	$ / kgMS
Milk Revenue (= Milk Price)	33.0	$ 4.58
Livestock Revenue	2.7	$ 0.38
Other Revenue	0.3	$ 0.04
Total Revenue	**36.0**	**$ 5.00**
Direct Operating Expenses	26.0	$ 3.61
Indirect Operating Expenses	3.5	$ 0.49
Depreciation	1.5	$ 0.21
Total Expenses (excl. leases/interest)	**31.0**	**$ 4.31**
OPERATING PROFIT (LOSS)	**5.0**	**$ 0.69**

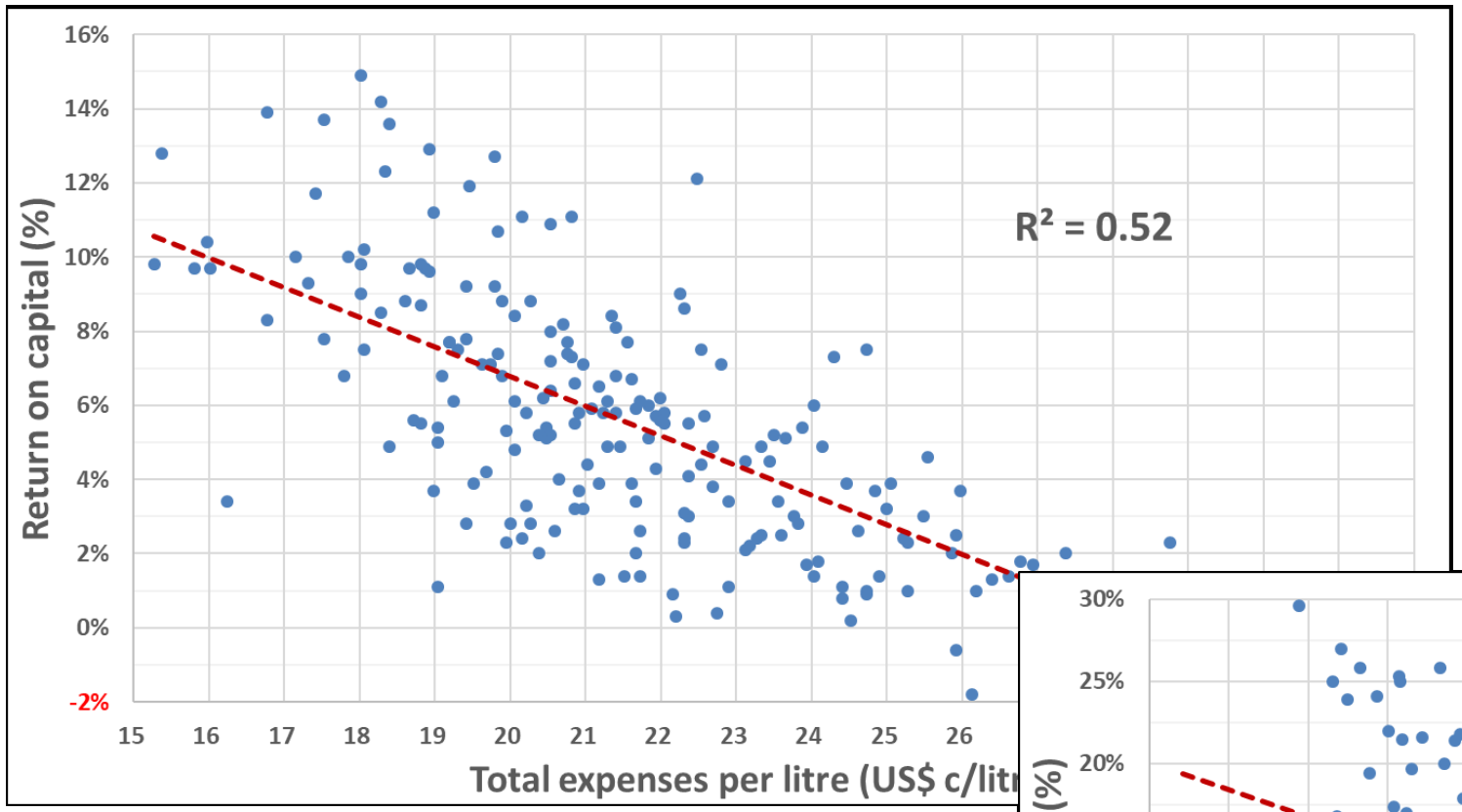

2014/15
R² = 0.44
2015/16
R² = 0.50
2016/17
R² = 0.66
2017/18
R² = 0.35
2018/19
R² = 0.46
Return on capital (%)
Cost of production per litre (R c/litre*)
30%
25%
20%
15%
10%
5%
0%
-5%
225
250
275
300
325
350
375
400
425
450
475
500
525
550
575

Next question

How relevant is total expenses per litre to predicting variances in profitability?

How might this change year-on-year and might these changes be used to adjust production systems to optimise profit?

Total expenses per litre *impact on* profit



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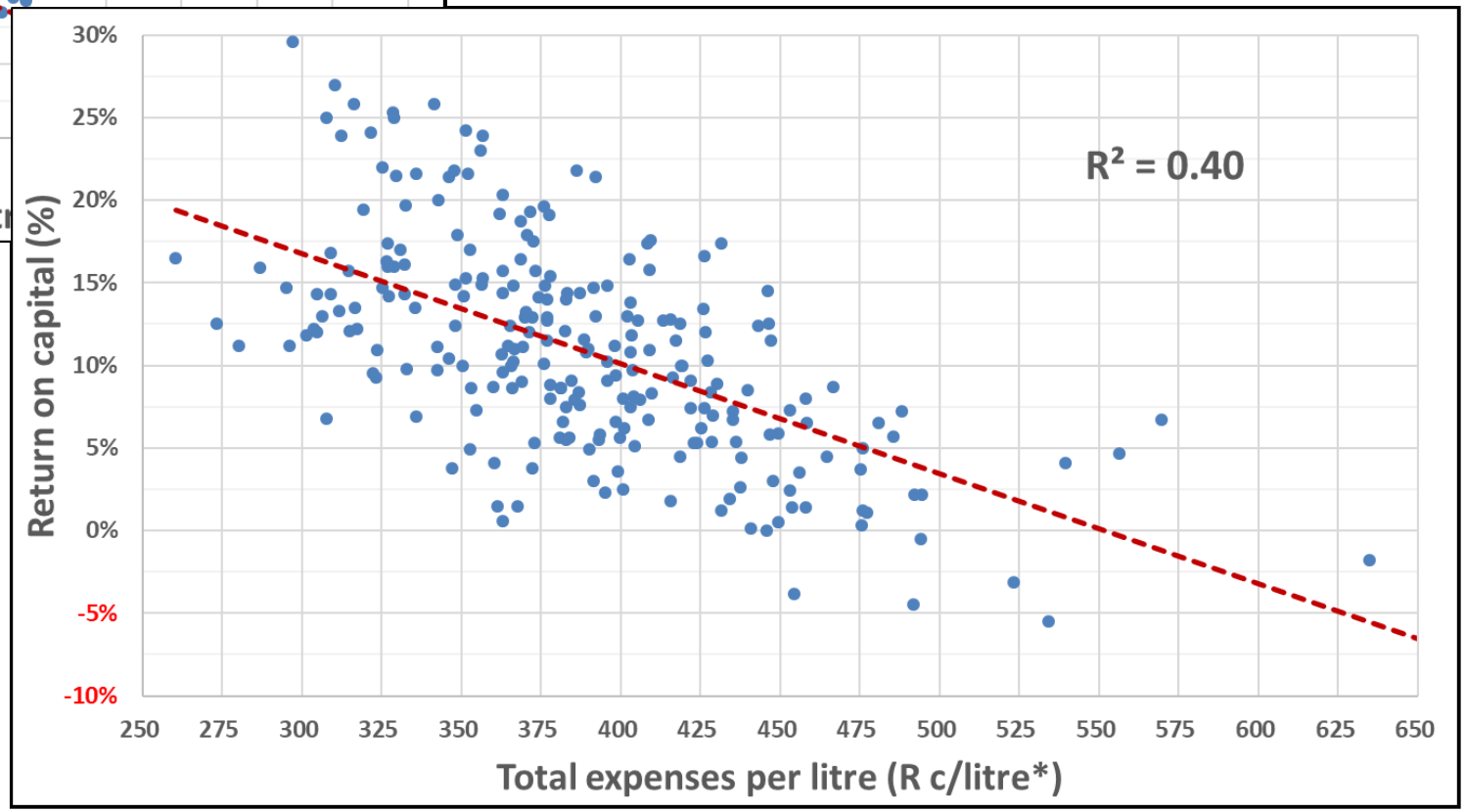


South Africa

Next question

If **total expenses per litre** has a high degree of reliability in predicting variances in profitability, then might **total expenses per cow** and/or **per hectare** also have relevance in predicting variances in profitability?

…and next question

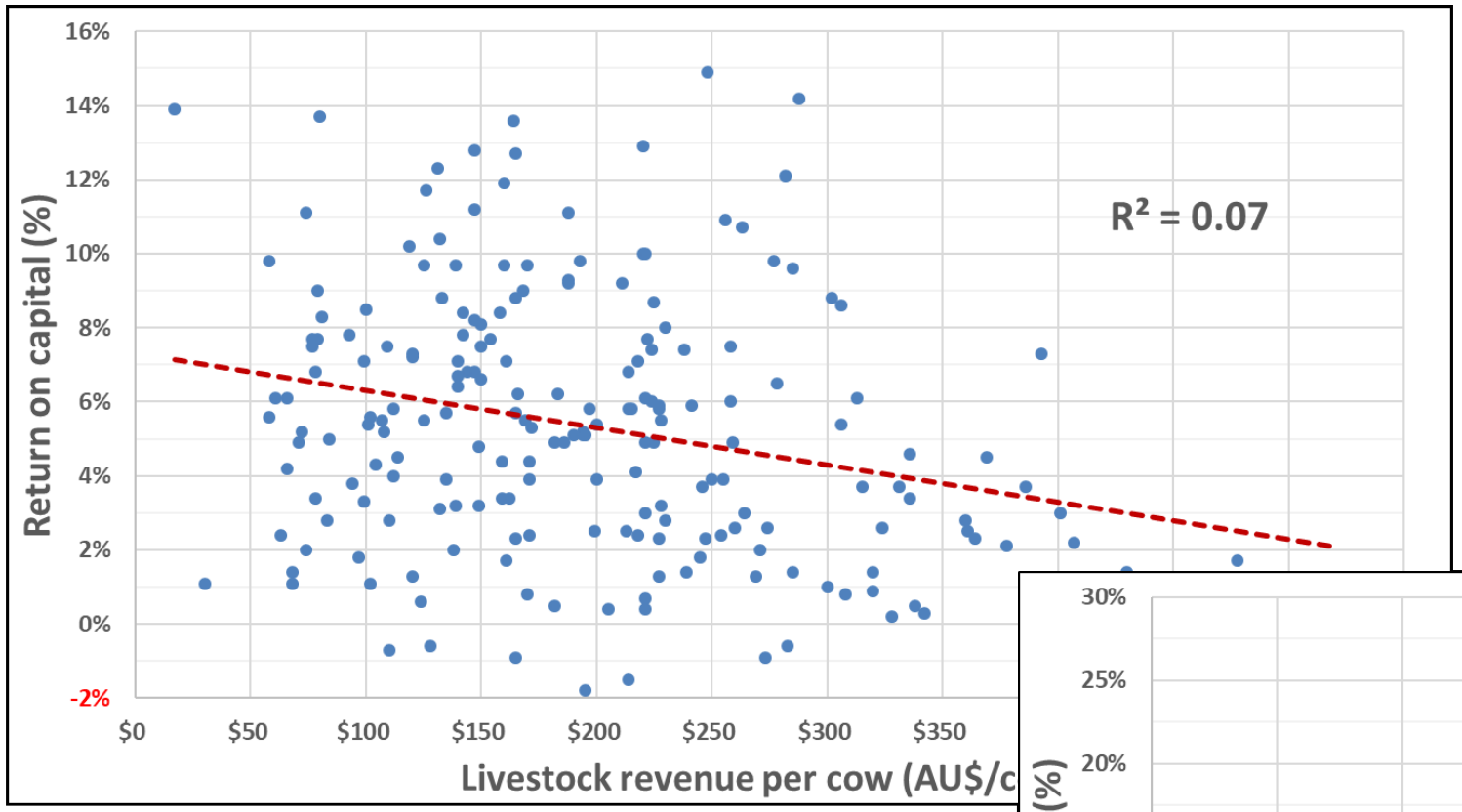
How relevant is **milk production per hectare** (and **total revenue per hectare**) to predicting variances in profitability?

…and next question

How relevant is **livestock revenue** to predicting variances in profitability?

(Net) **livestock revenue** includes sales, purchases and net change in herd numbers, and is impacted on by death/loss rates and reproductive performance.

Livestock revenue per cow *impact on* profit



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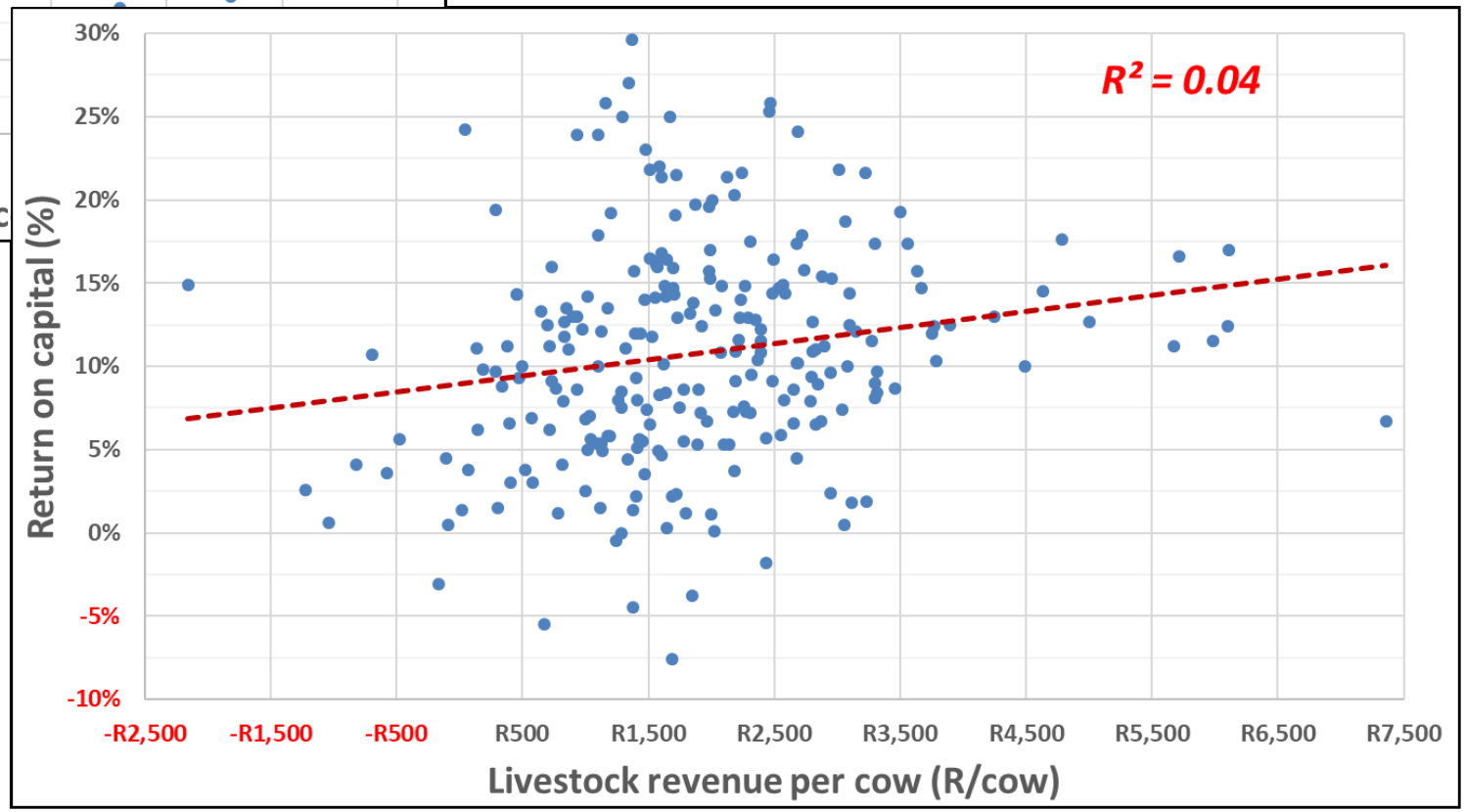


South Africa

Next question

Total expenses per cow had some relevance to predicting profitability in the AUS data but not in the RSA data. How relevant might **core per cow cost** be to predicting variances in profitability?

Core per cow cost is a ratio developed by Red Sky. It includes the following cow-related expense codes:

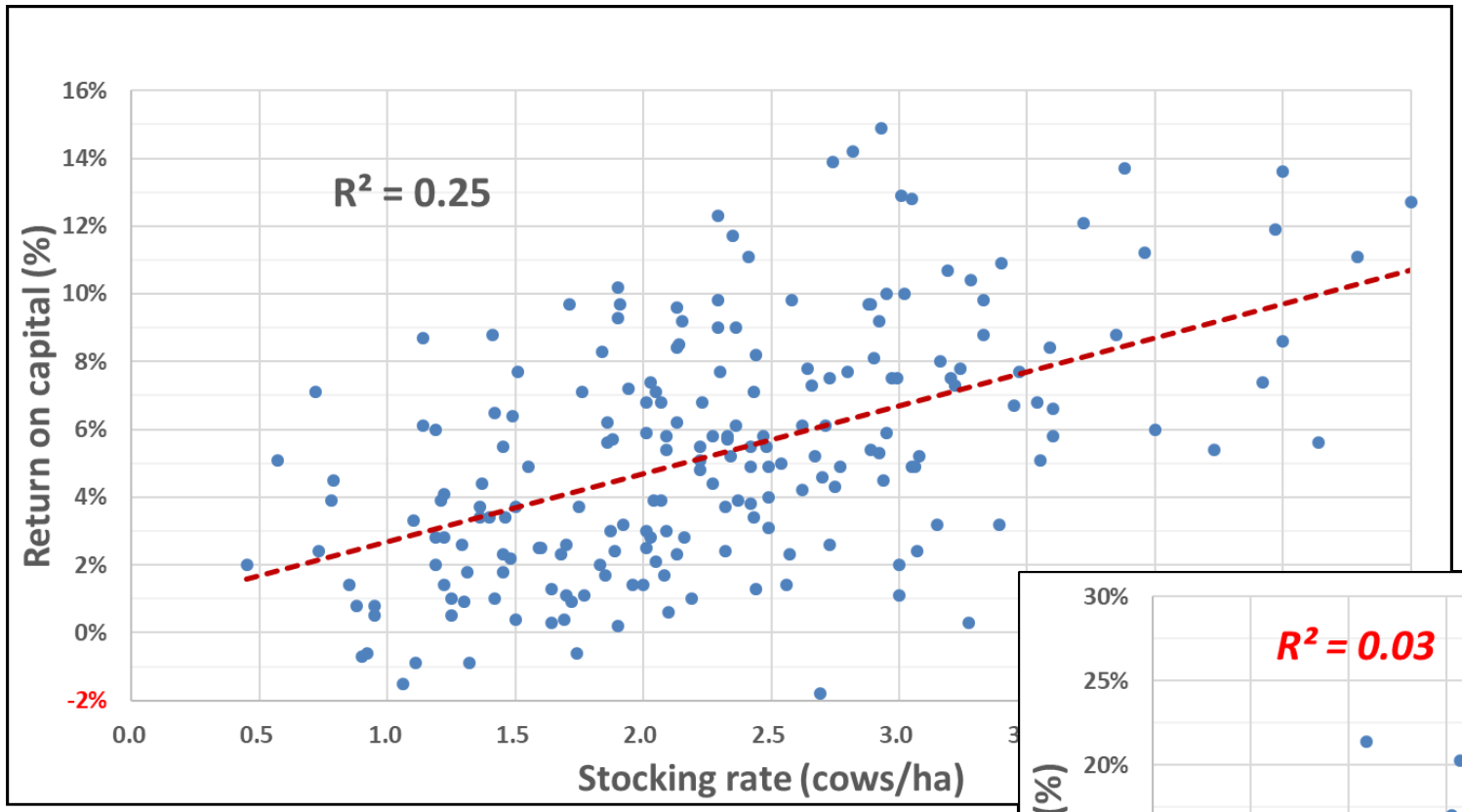
Costs incl. in Core per Cow Costs	Percent
Animal Health	100%
Breeding	100%
Dairy Shed Expenses	100%
Electricity / Energy	100%
Freight	100%
Support / Youngstock	100%
Repairs & Maintenance	50%
Vehicle Expenses incl. fuel & oil	70%
Industry Levies	100%
Depreciation	50%

Exploring potential bias in the data

Can we define the bias in the South African data given it is primarily drawn from a ‘selected’ group of farmers?

The following 9 slides can be utilised to identify the bias in one set of data and demonstrate the predominant absence of bias in the other set of data…

Stocking rate *impact* *on* profit



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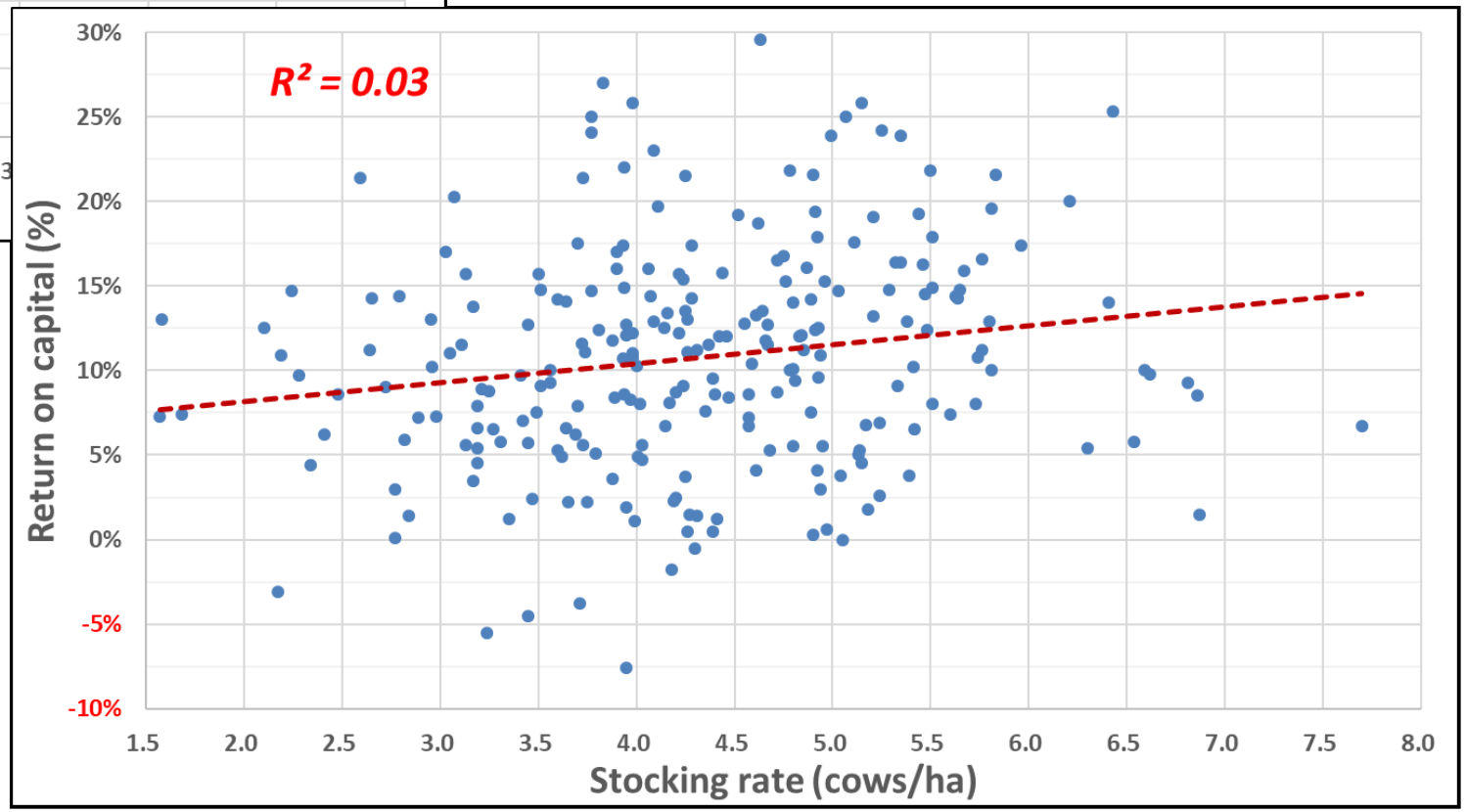
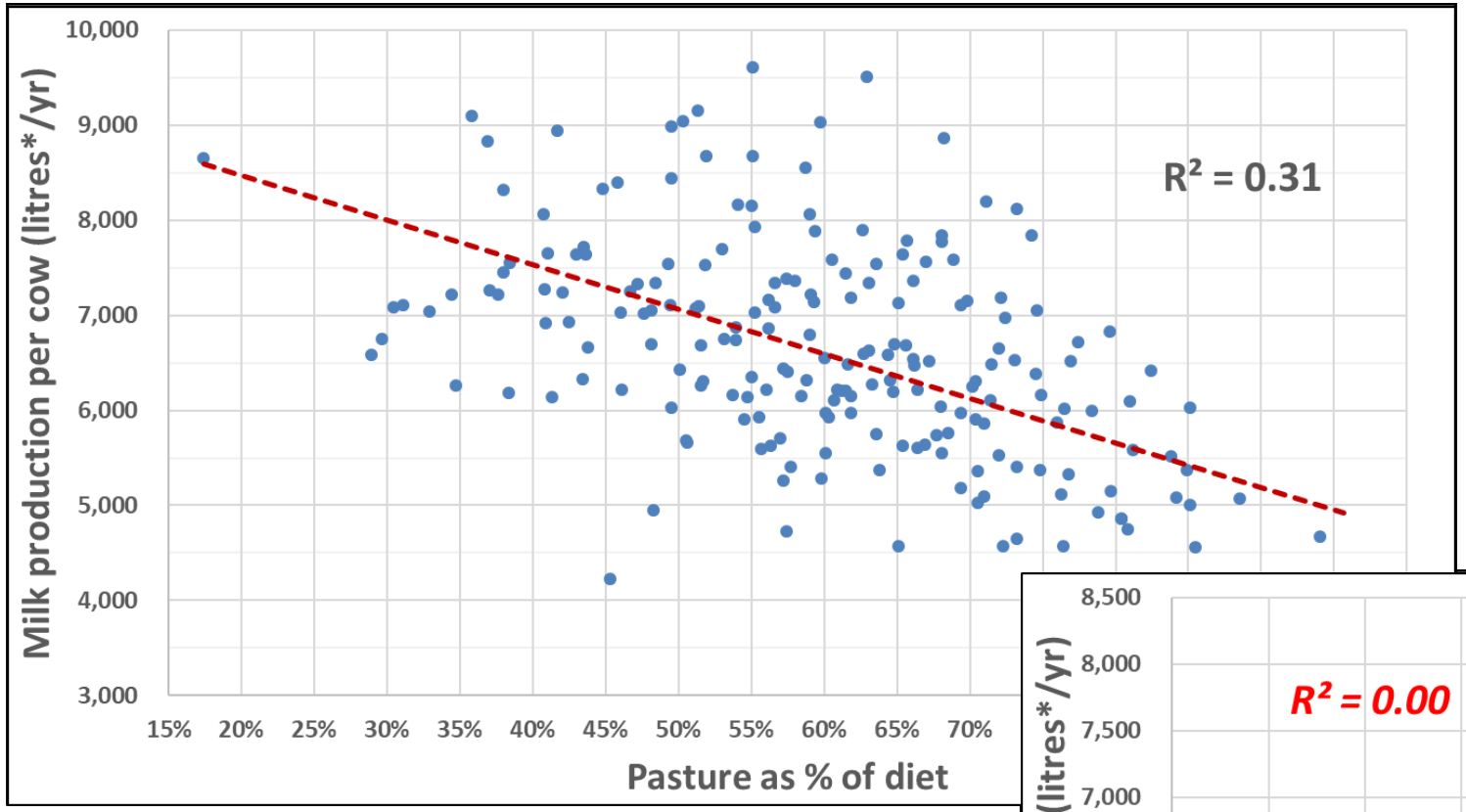


South Africa

Pasture as % of diet *impact on* milk production per cow



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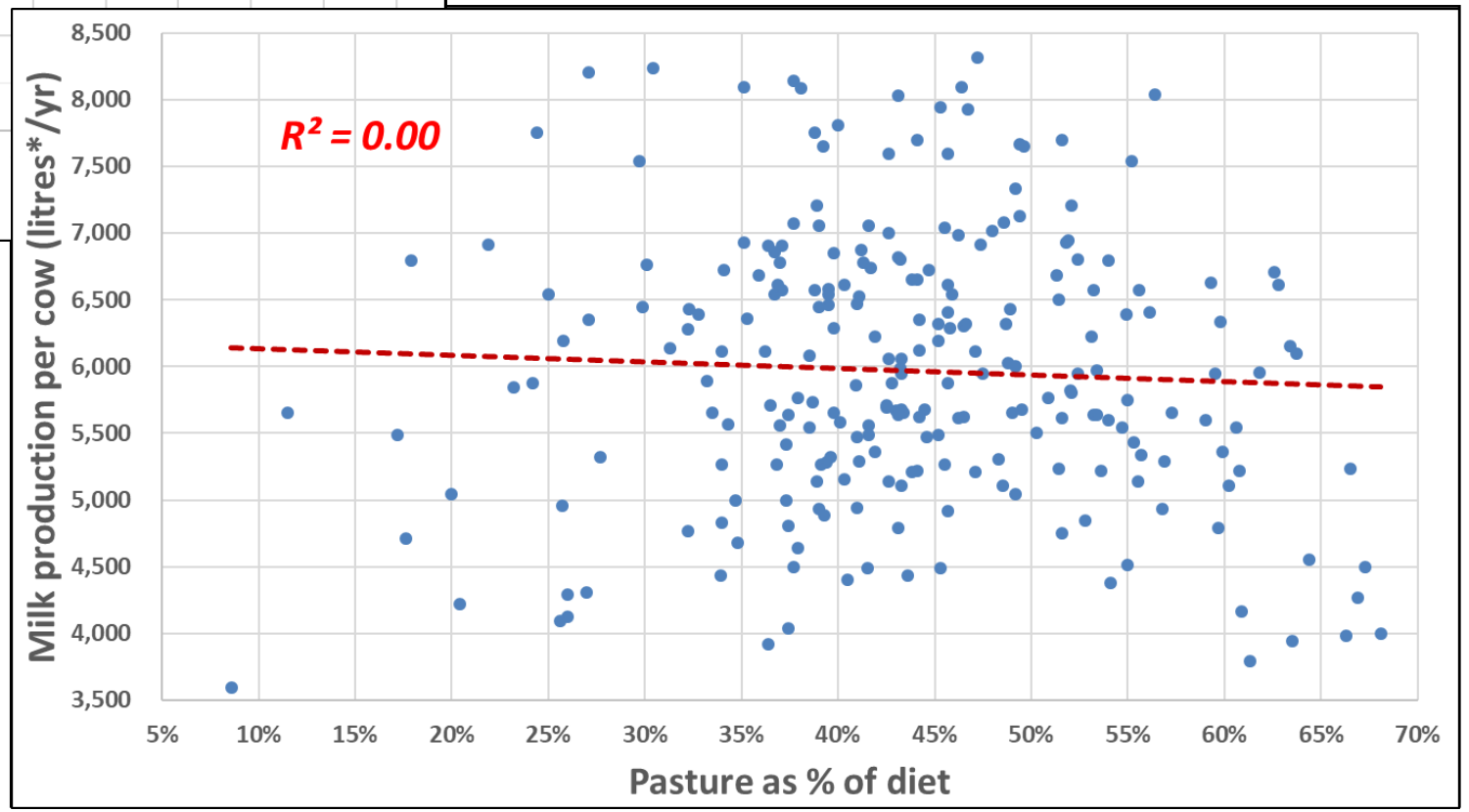


South Africa

Next question

Total expenses per hectare had no relevance to predicting profitability in the AUS or RSA data. How relevant might **core per hectare cost** be to predicting variances in profitability?

Core per hectare cost includes the following land area-related expense codes:

Costs incl. in Core per Hectare Costs	Percent
Cropping (greenfeed)	100%
Fertiliser excl. Nitrogen	100%
Pasture Maintenance & Renewal	100%
Repairs & Maintenance	50%
Vehicle Expenses incl. fuel & oil	30%
Administration	100%
Insurance, Land Taxes, Licenses	100%
Professional fees	100%
Depreciation	50%

Next question

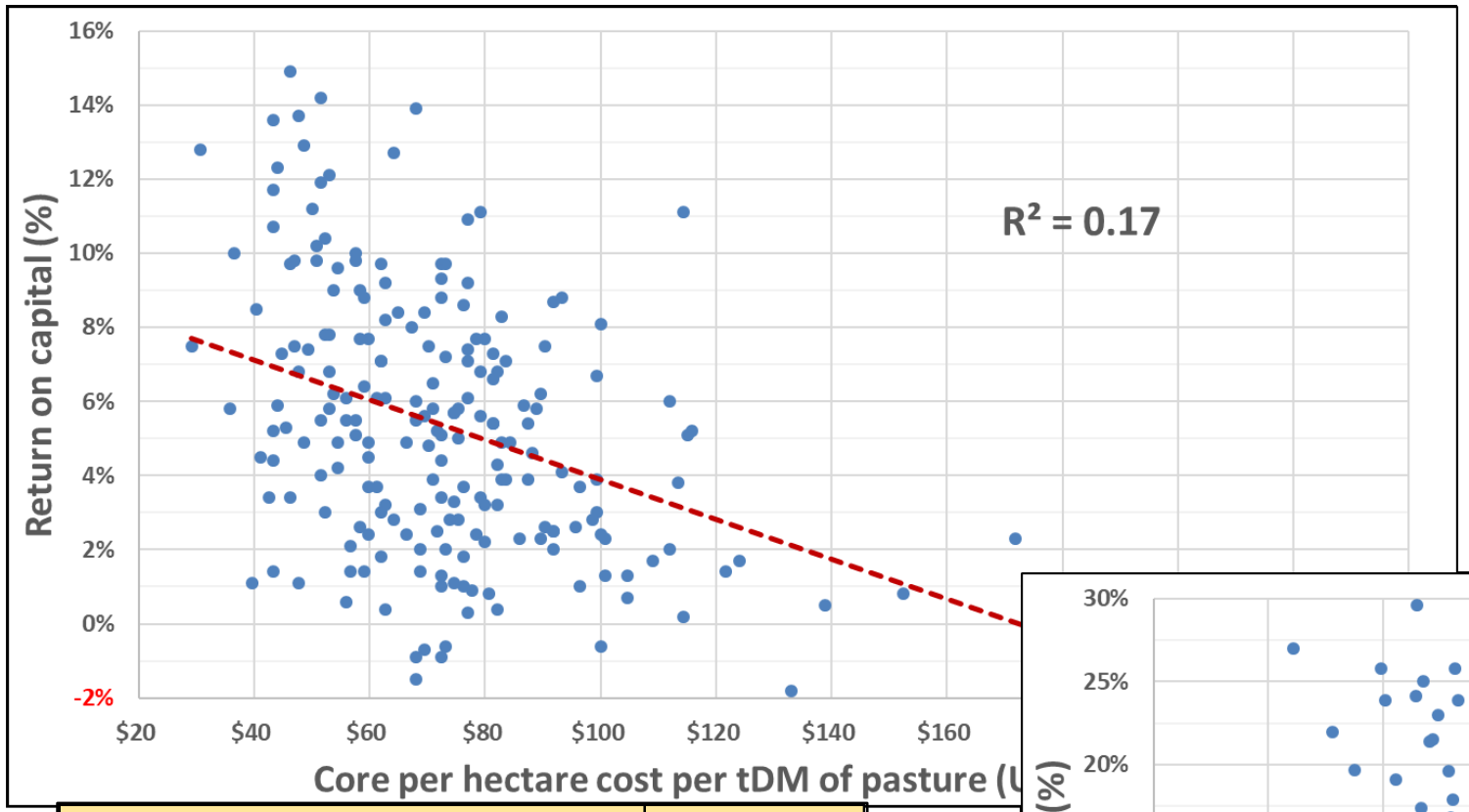
How about if core per hectare cost is divided by ton dry matter pasture harvest per hectare?

Core per hectare cost per tDM is a ratio developed by Red Sky. It also includes the following land area-related expense codes :

Costs incl. in Core per Hectare Costs	Percent
Cropping (greenfeed)	100%
Fertiliser excl. Nitrogen	100%
Pasture Maintenance & Renewal	100%
Repairs & Maintenance	50%
Vehicle Expenses incl. fuel & oil	30%
Administration	100%
Insurance, Land Taxes, Licenses	100%
Professional fees	100%
Depreciation	50%

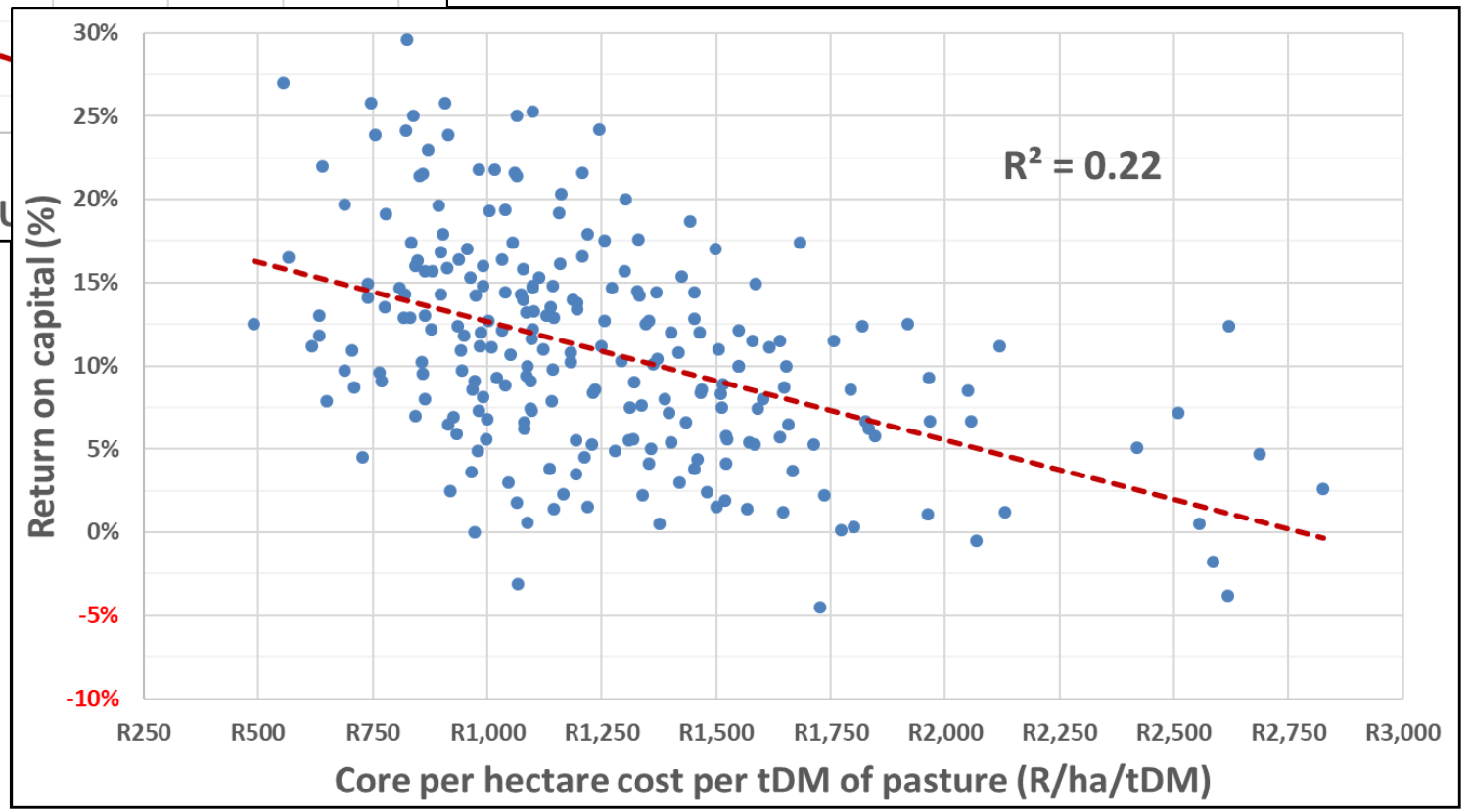
Core per hectare cost per ton dry matter of pasture *impact on* profit

Australia



Costs incl. in Core per Hectare Costs	Percent
Cropping (greenfeed)	100%
Fertiliser excl. Nitrogen	100%
Pasture Maintenance & Renewal	100%
Repairs & Maintenance	50%
Vehicle Expenses incl. fuel & oil	30%
Administration	100%
Insurance, Land Taxes, Licenses	100%
Professional fees	100%
Depreciation	50%

South Africa



Next question

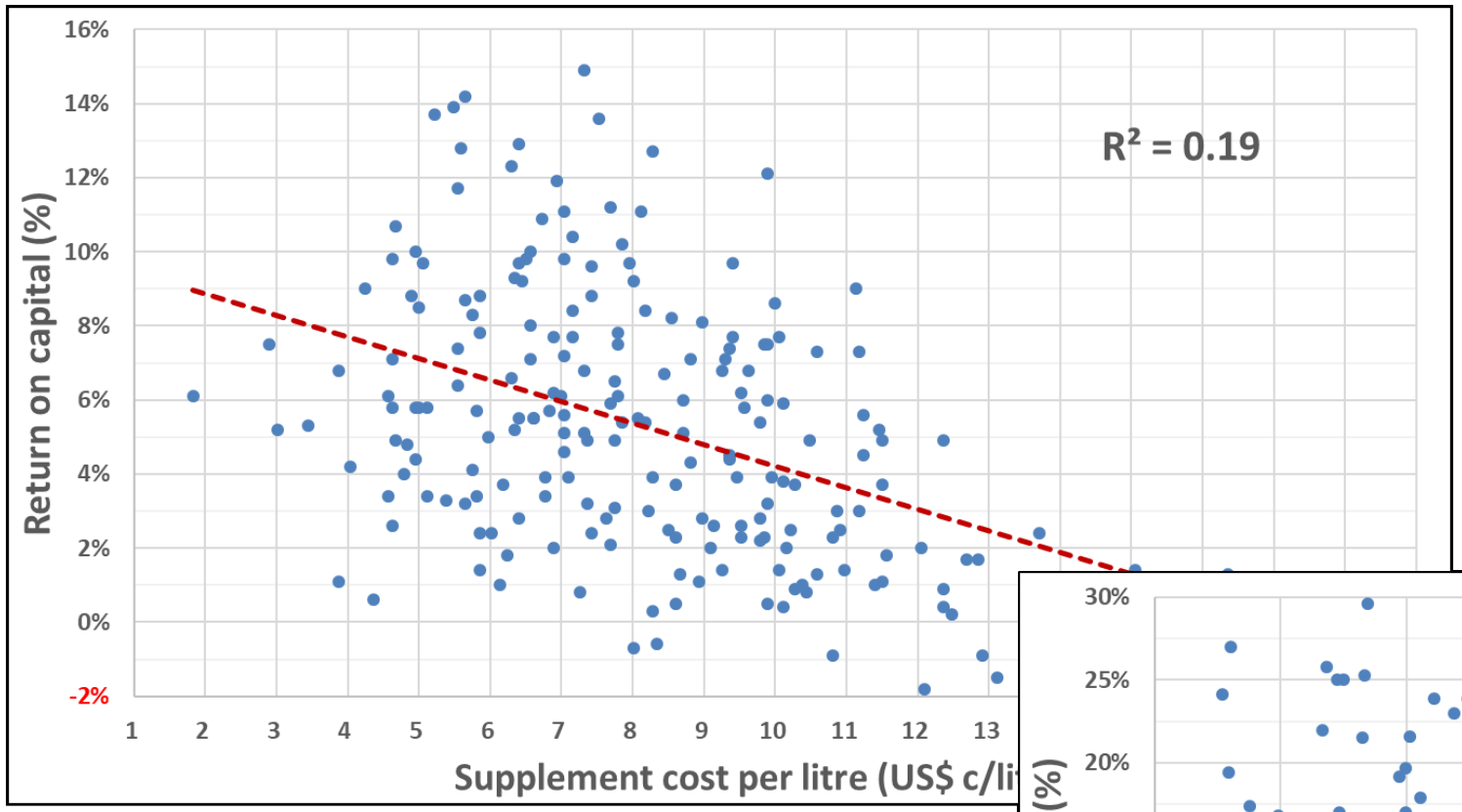
What might be the most relevant people or labour ratios for predicting variances in profitability?

…and next question

How relevant is supplement cost per litre to predicting variances in profitability?

How might this change year-on-year and might these changes be used to adjust production systems to optimise profit?

Supplement cost per litre *impact on* profit



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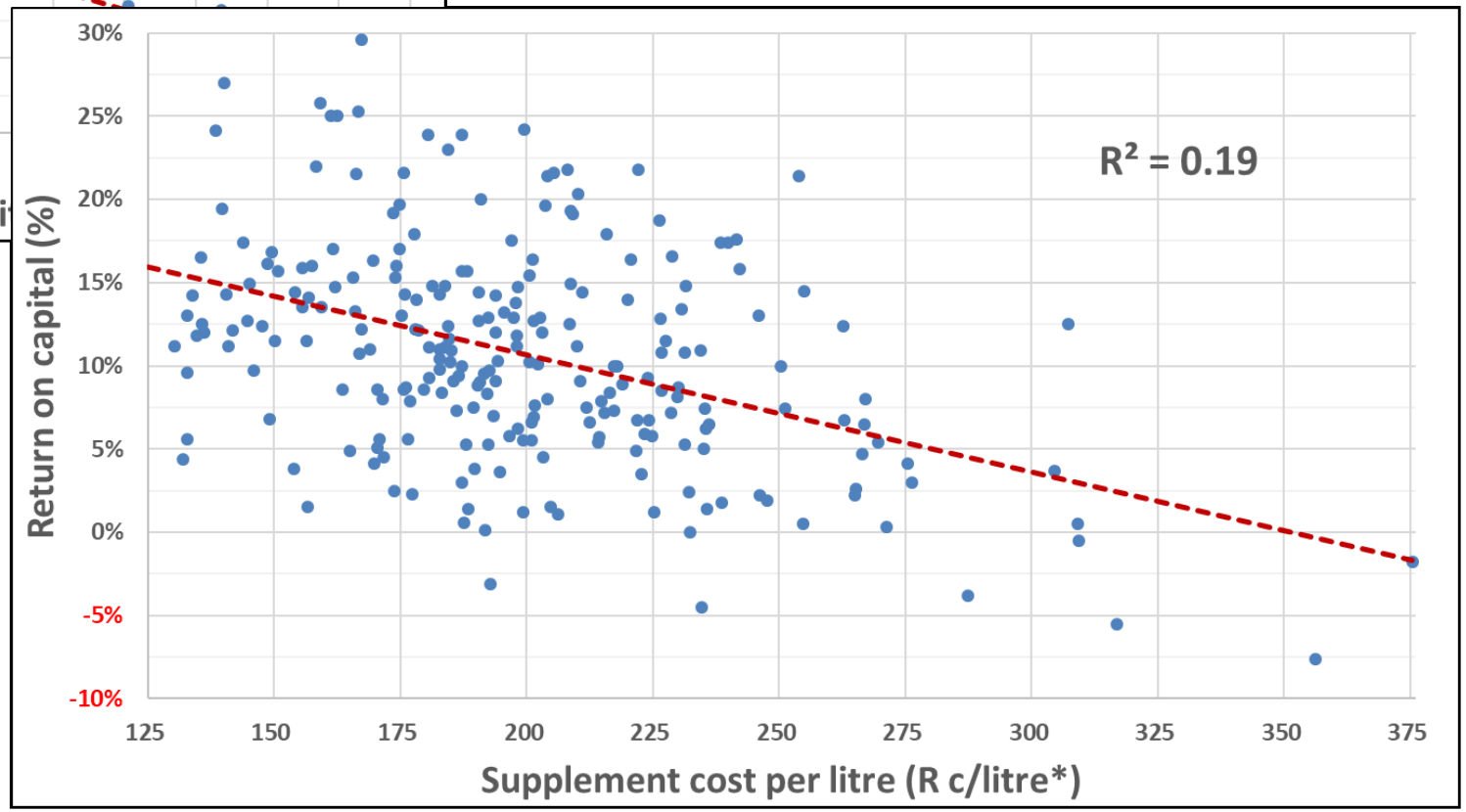


South Africa

Next question

If supplement cost per litre has a high degree of reliability in predicting variances in profitability, then might supplement cost per cow and/or per hectare also have relevance in predicting variances in profitability?

Next question

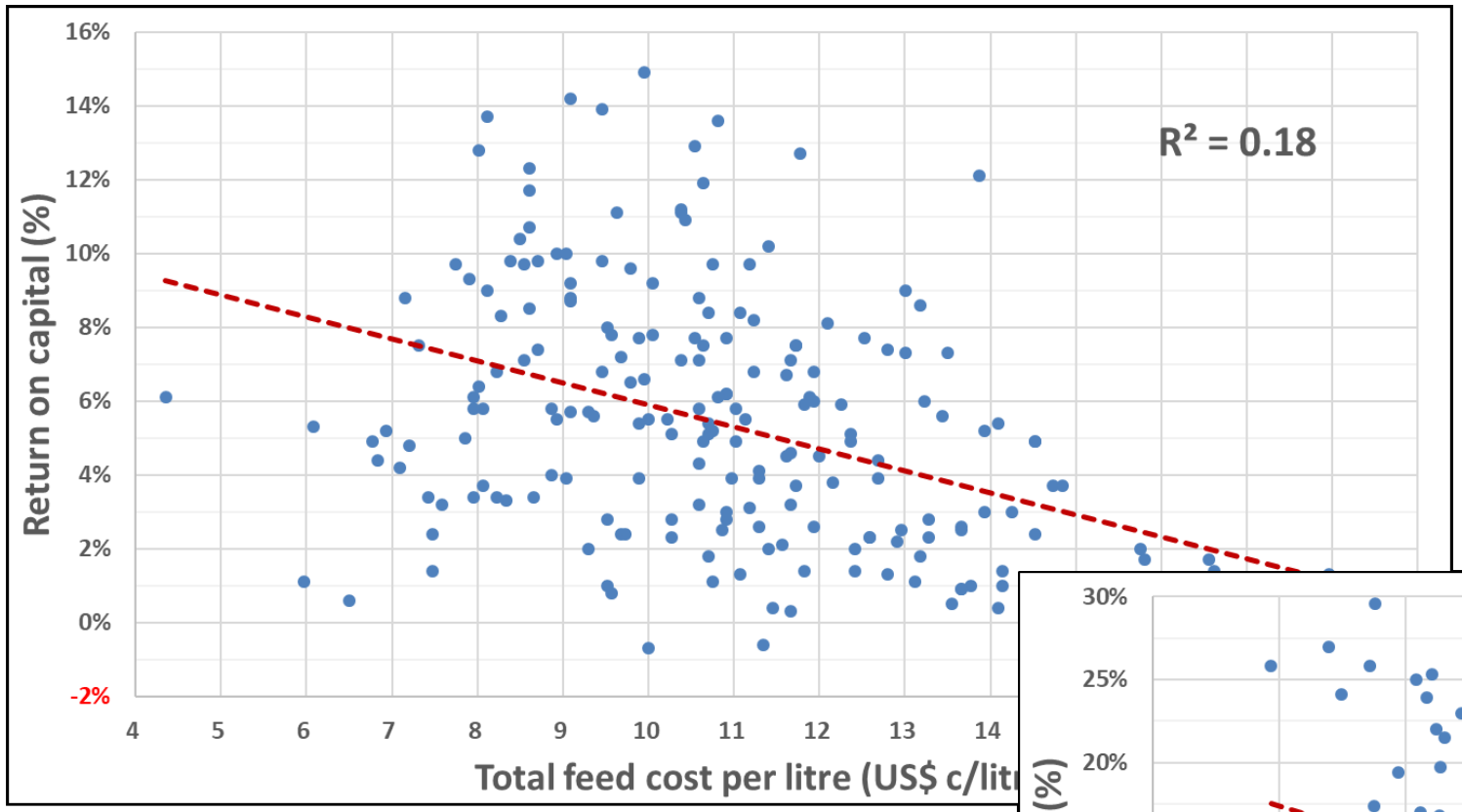
How relevant is total feed cost per litre (which includes both supplement and pasture expenses) to predicting variances in profitability?

How might this change year-on-year and might these changes be used to adjust production systems to optimise profit?

Costs included in Total Feed Cost	Percent
Concentrates/grains	100%
Forages (incl. byproducts)	100%
- incl. Silage & Hay Conservation	100%
Cropping (greenfeed)	100%
Youngstock / Support Area	100%
Pasture Maintenance & Renewal	100%
Fertiliser incl. Nitrogen	100%
Irrigation	100%

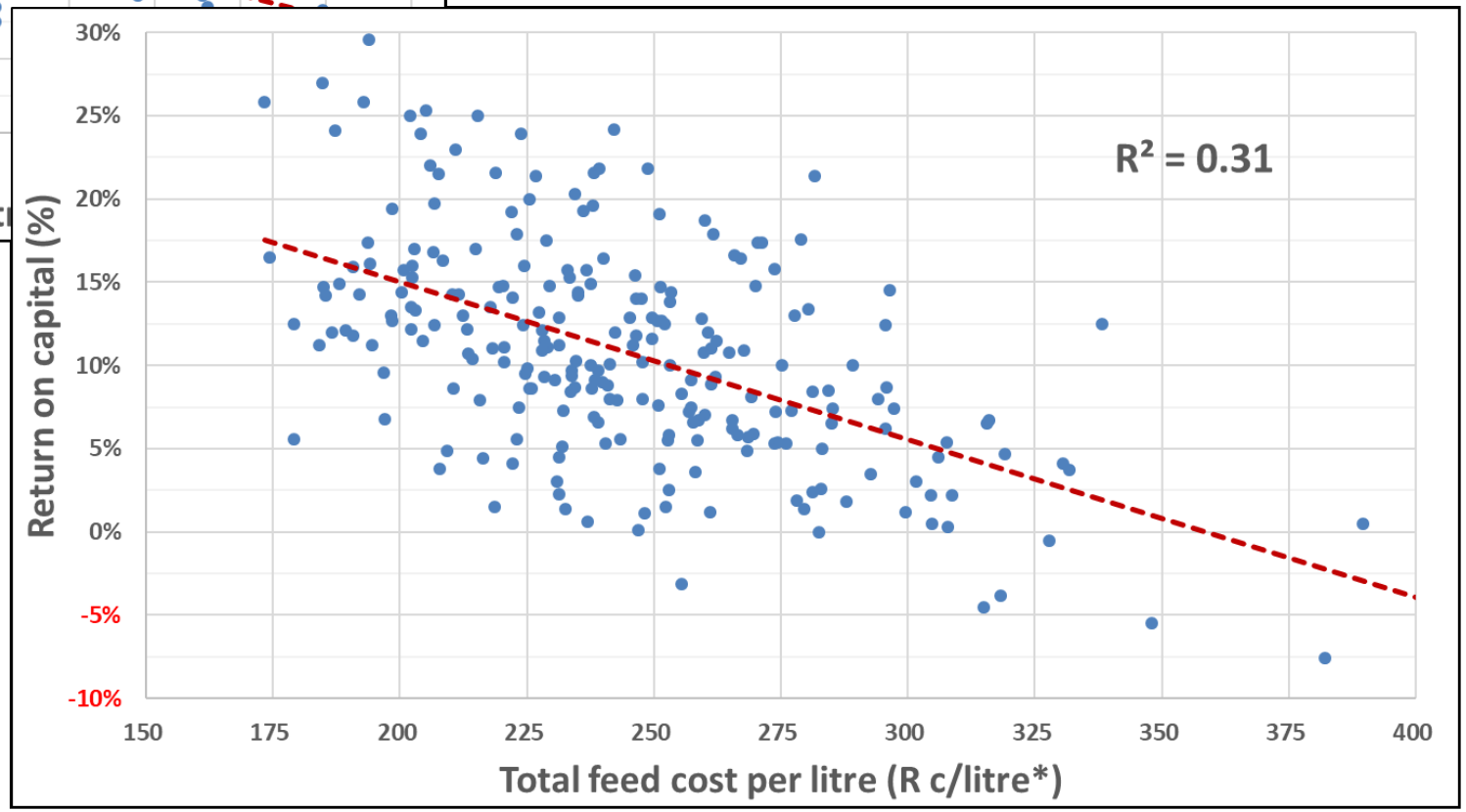
Total feed cost per litre *impact on* profit

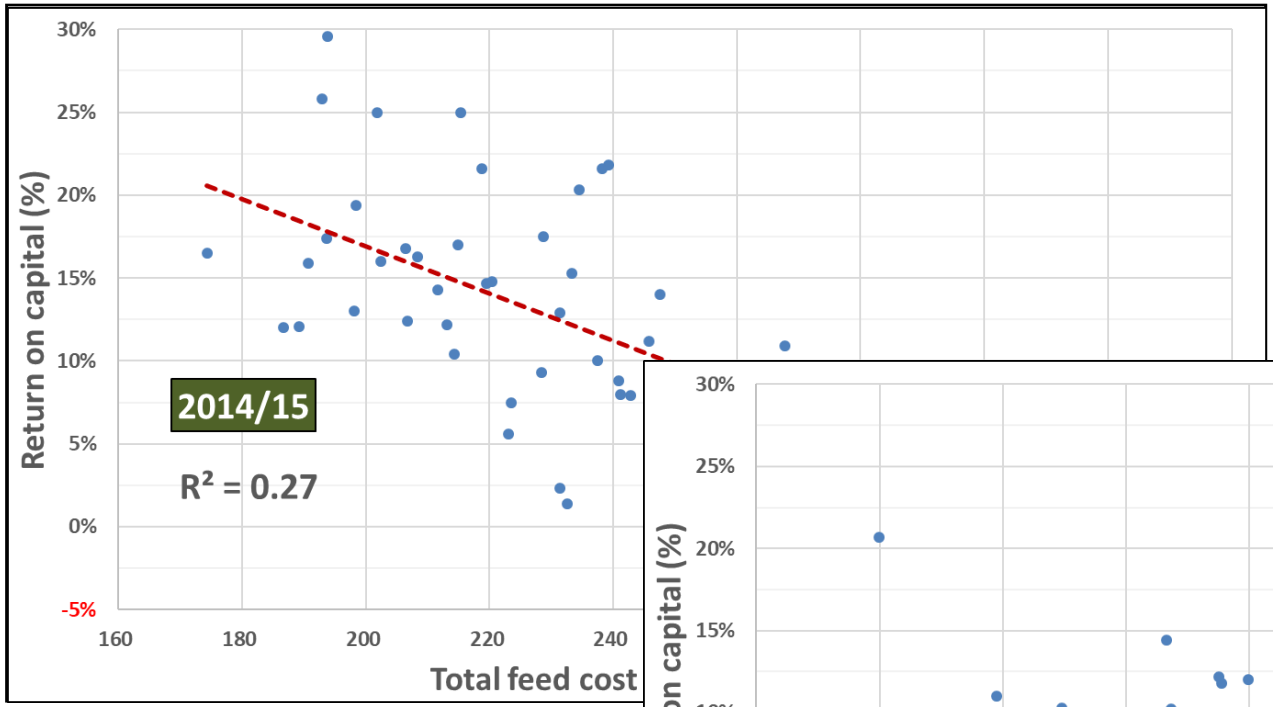
Australia

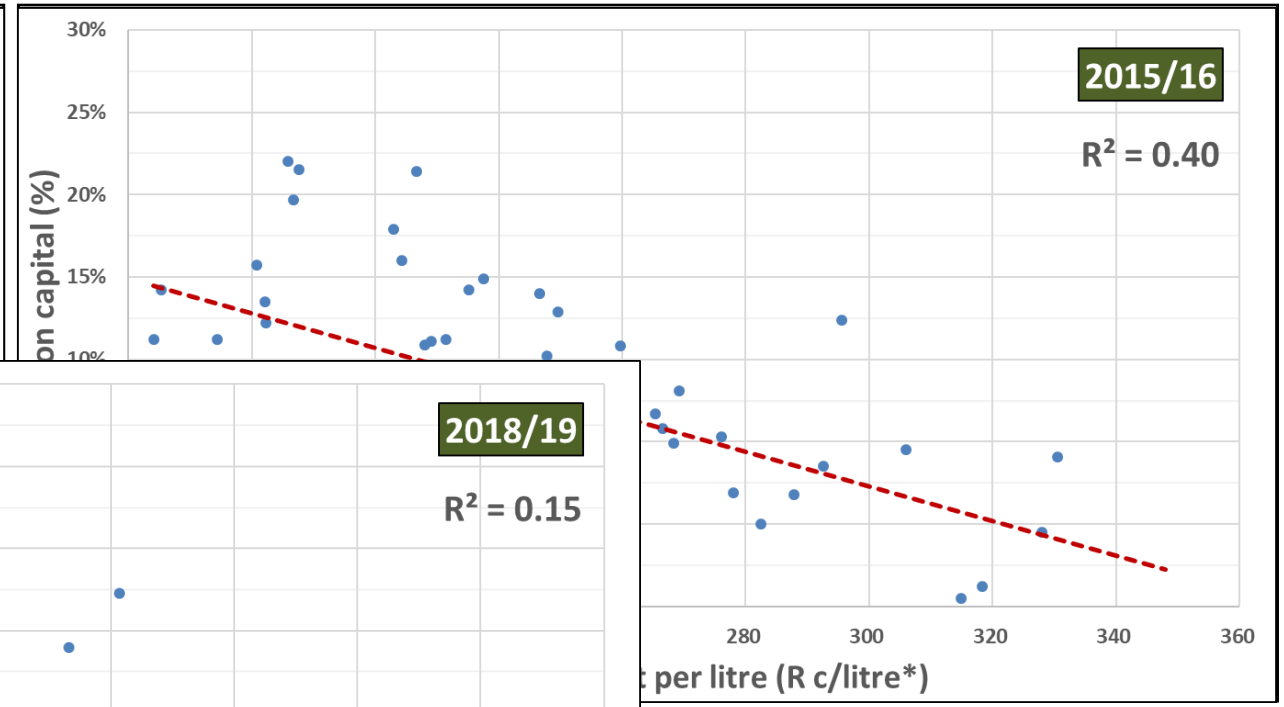


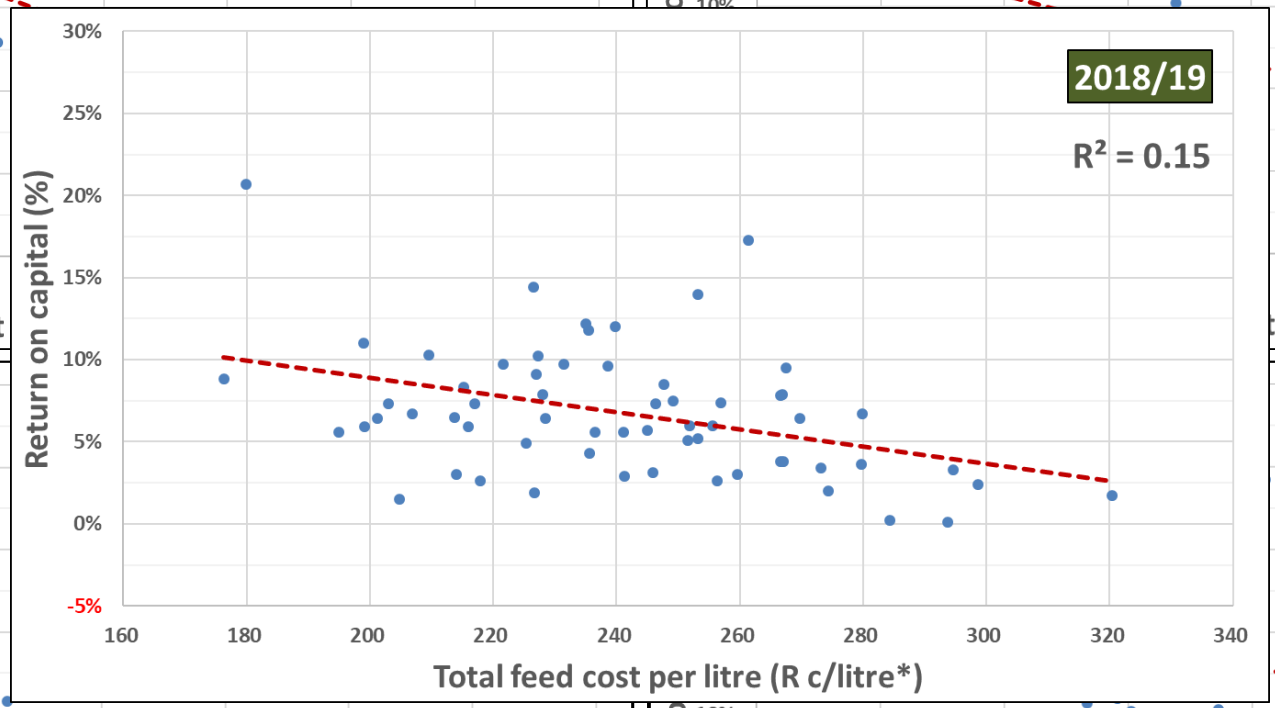
Costs included in Total Feed Cost	Percent
Concentrates/grains	100%
Forages (incl. byproducts)	100%
- incl. Silage & Hay Conservation	100%
Cropping (greenfeed)	100%
Youngstock / Support Area	100%
Pasture Maintenance & Renewal	100%
Fertiliser incl. Nitrogen	100%
Irrigation	100%

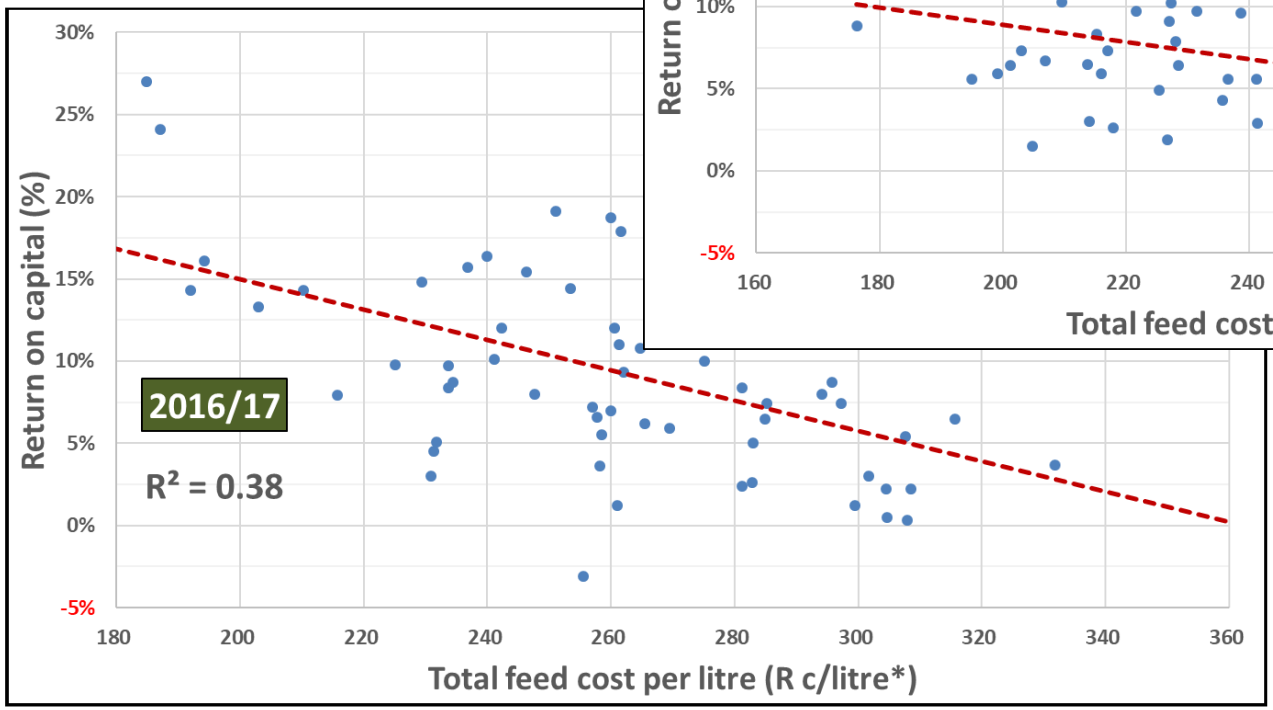
South Africa

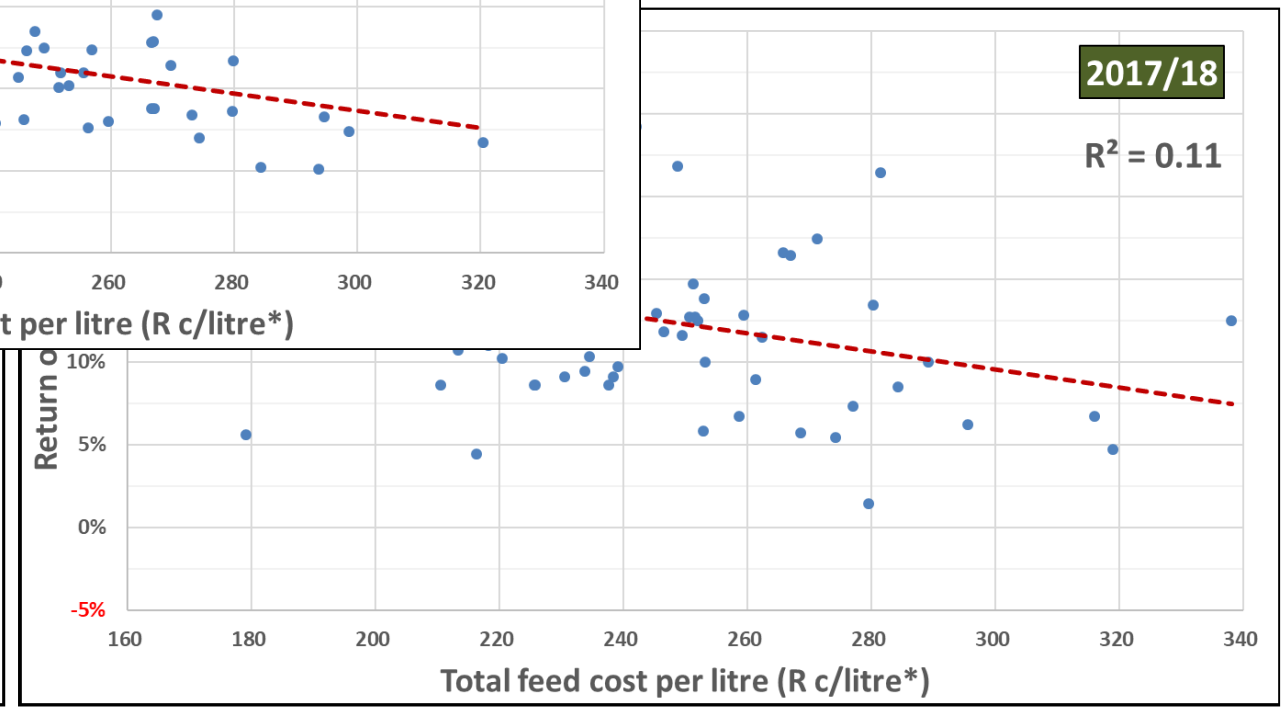



2014/15
R² = 0.27
Return on capital (%)
Total feed cost


2015/16
R² = 0.40
Return on capital (%)
per litre (R c/litre*)


2018/19
R² = 0.15
Return on capital (%)
Total feed cost per litre (R c/litre*)

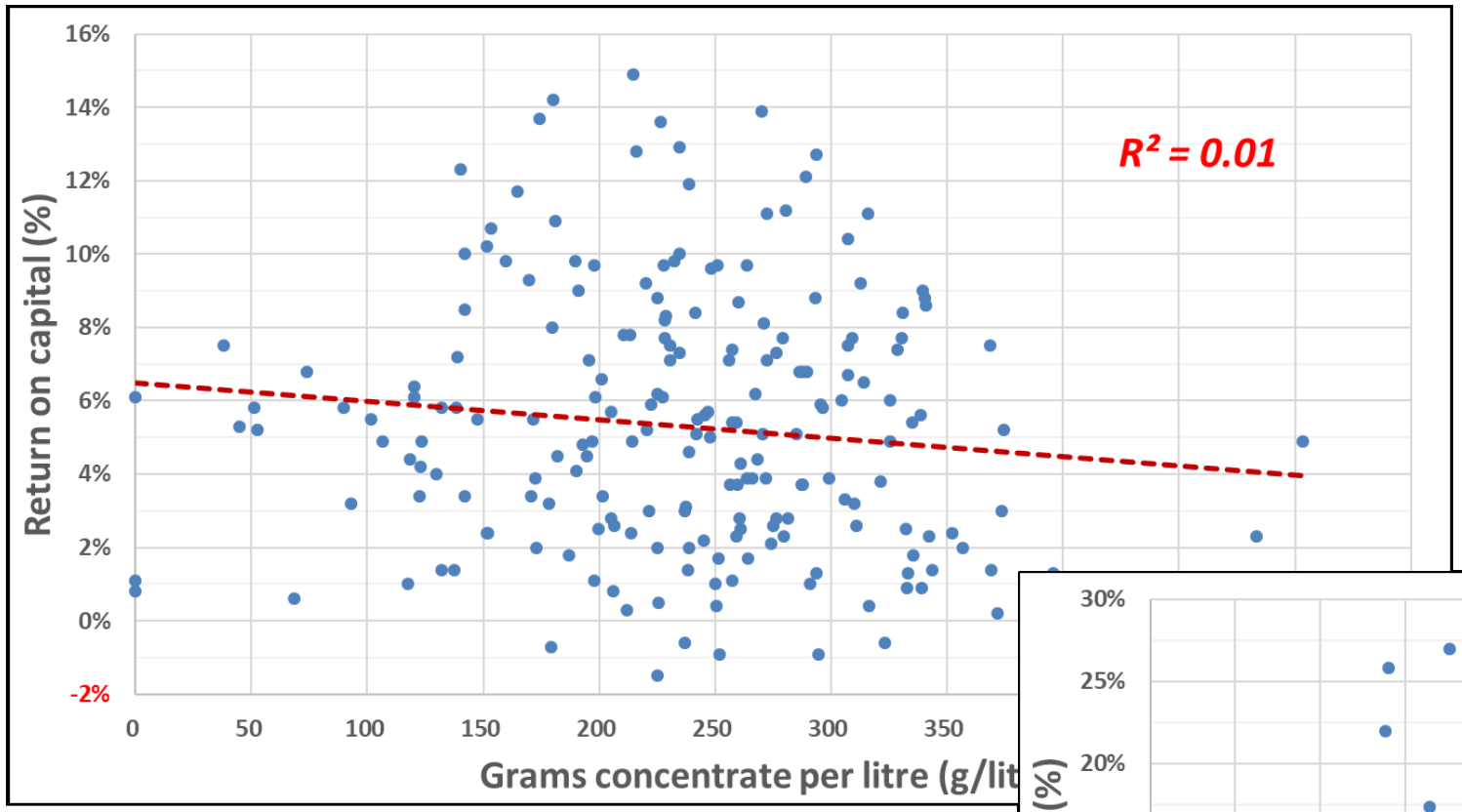

2016/17
R² = 0.38
Return on capital (%)
Total feed cost per litre (R c/litre*)


2017/18
R² = 0.11
Total feed cost per litre (R c/litre*)

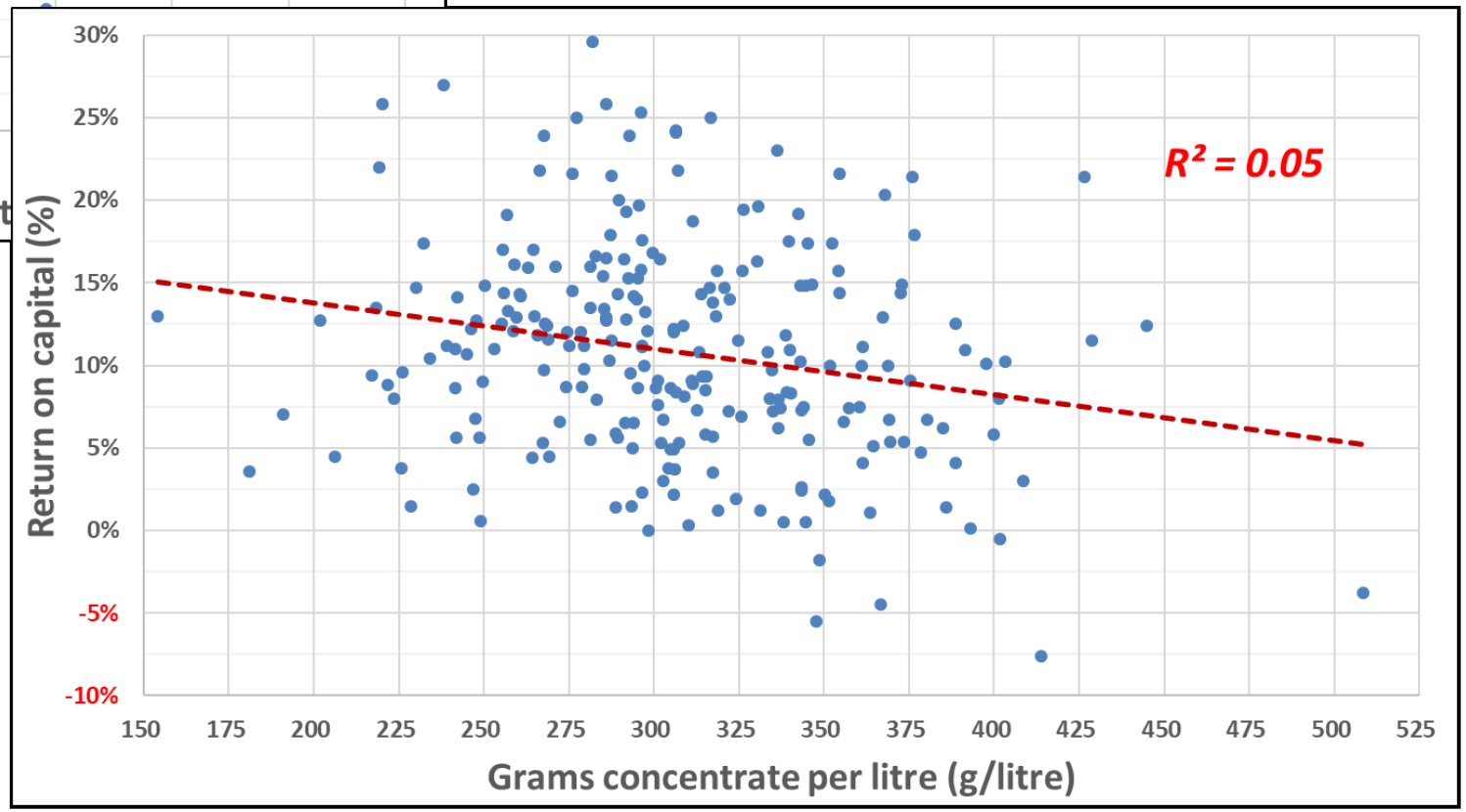
Some other ratios to consider utilising…?

- Concentrate cost per ton?
- Forage cost per ton dry matter?
- Pasture cost per ton dry matter?
- Pasture cost per litre?
- Grams concentrate per litre?

Grams concentrate per litre *impact on* profit



Australia



South Africa

Some other ratios to consider utilising…?

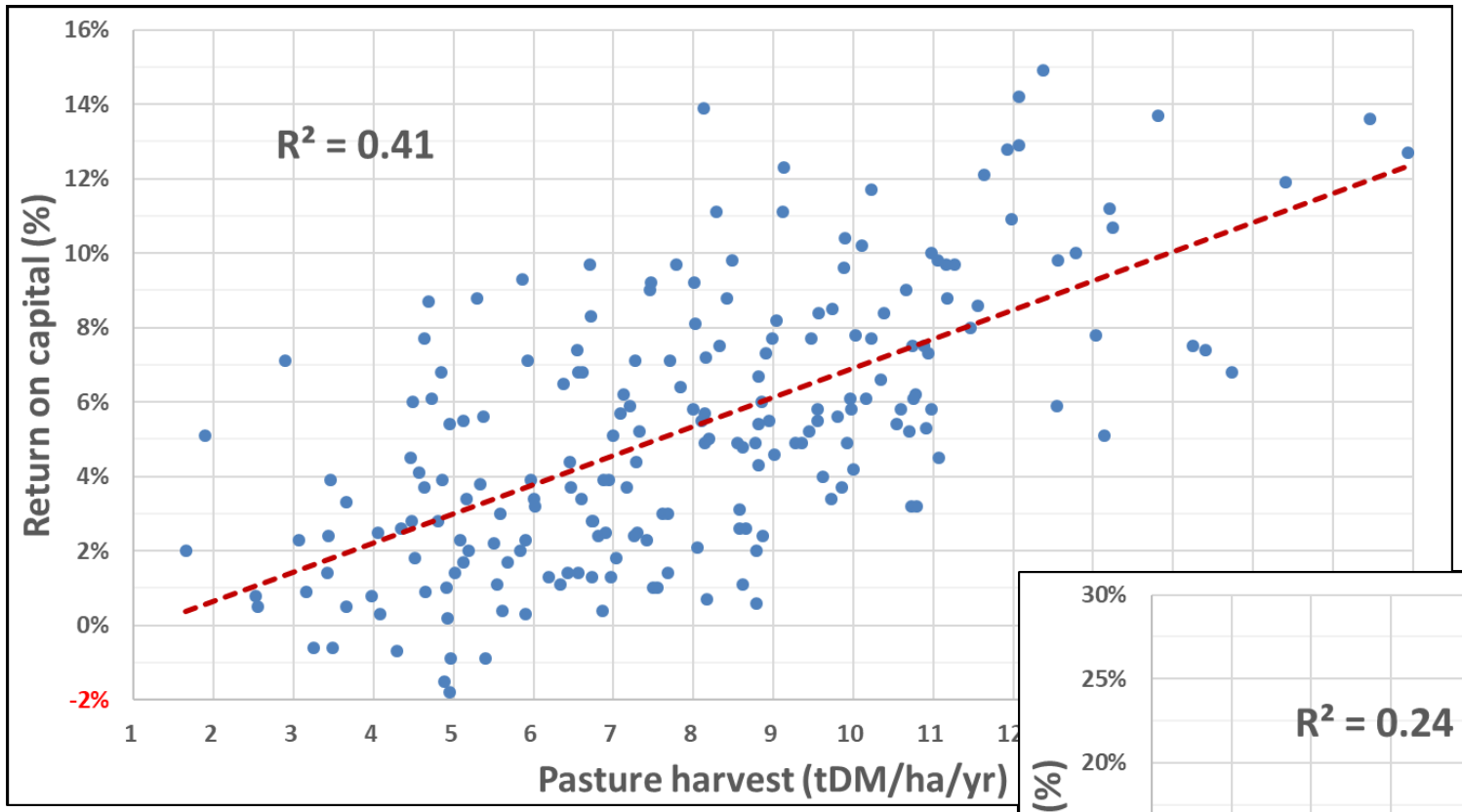
- Concentrate cost per ton?
- Forage cost per ton dry matter?
- Pasture cost per ton dry matter?
- Pasture cost per litre?
- Grams concentrate per litre?
- Grams supplement per litre?
- Income over feed costs per litre?
- Income over feed costs per cow per day?
- Milk production (milksolids) as % of cow liveweight?

Next question

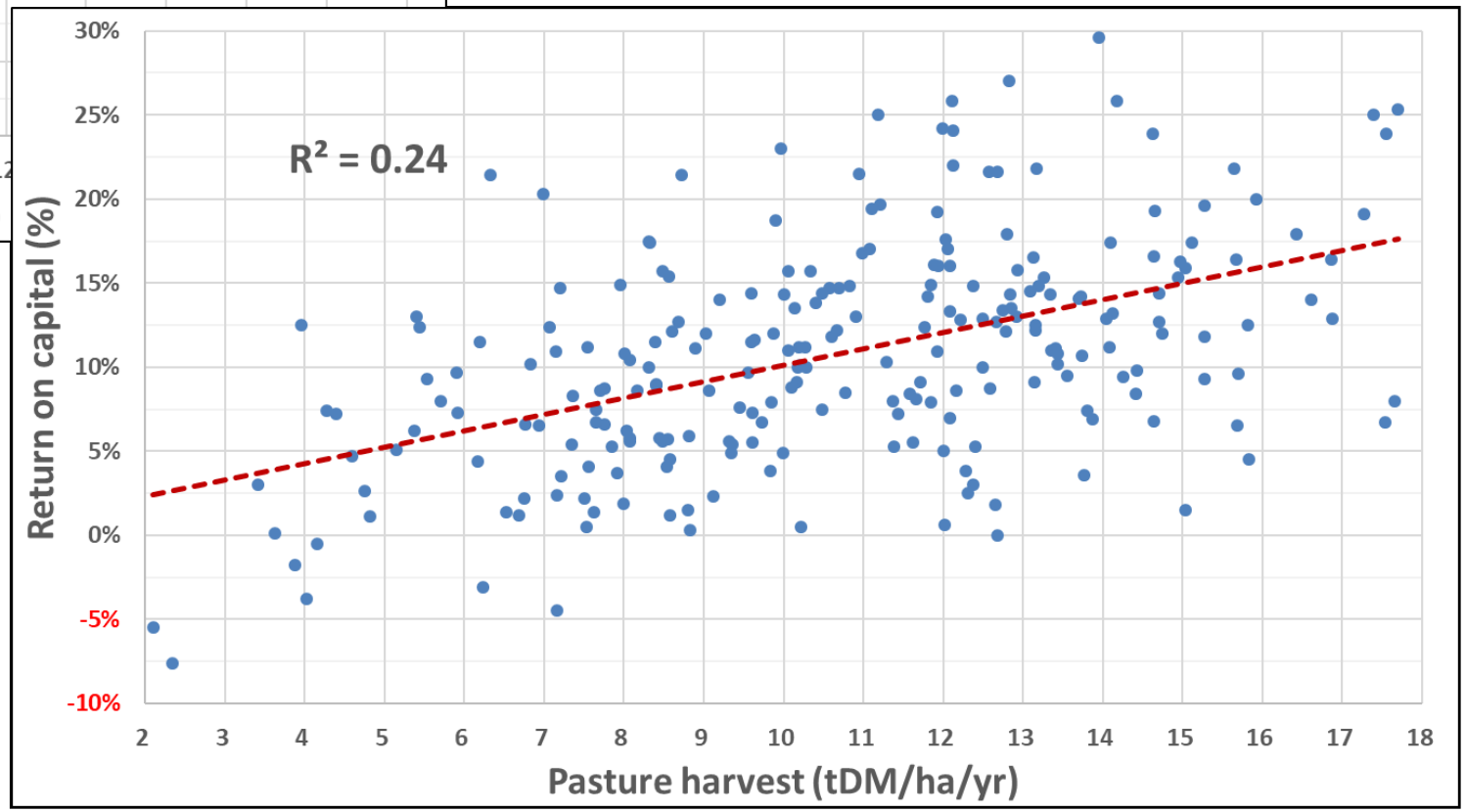
How relevant is pasture harvest to predicting variances in profitability?

How might this change year-on-year and might these changes be used to adjust production systems to optimise profit?

Pasture harvest *impact on* profit



Australia



South Africa

Next question

How relevant is pasture harvest to predicting variances in profitability?

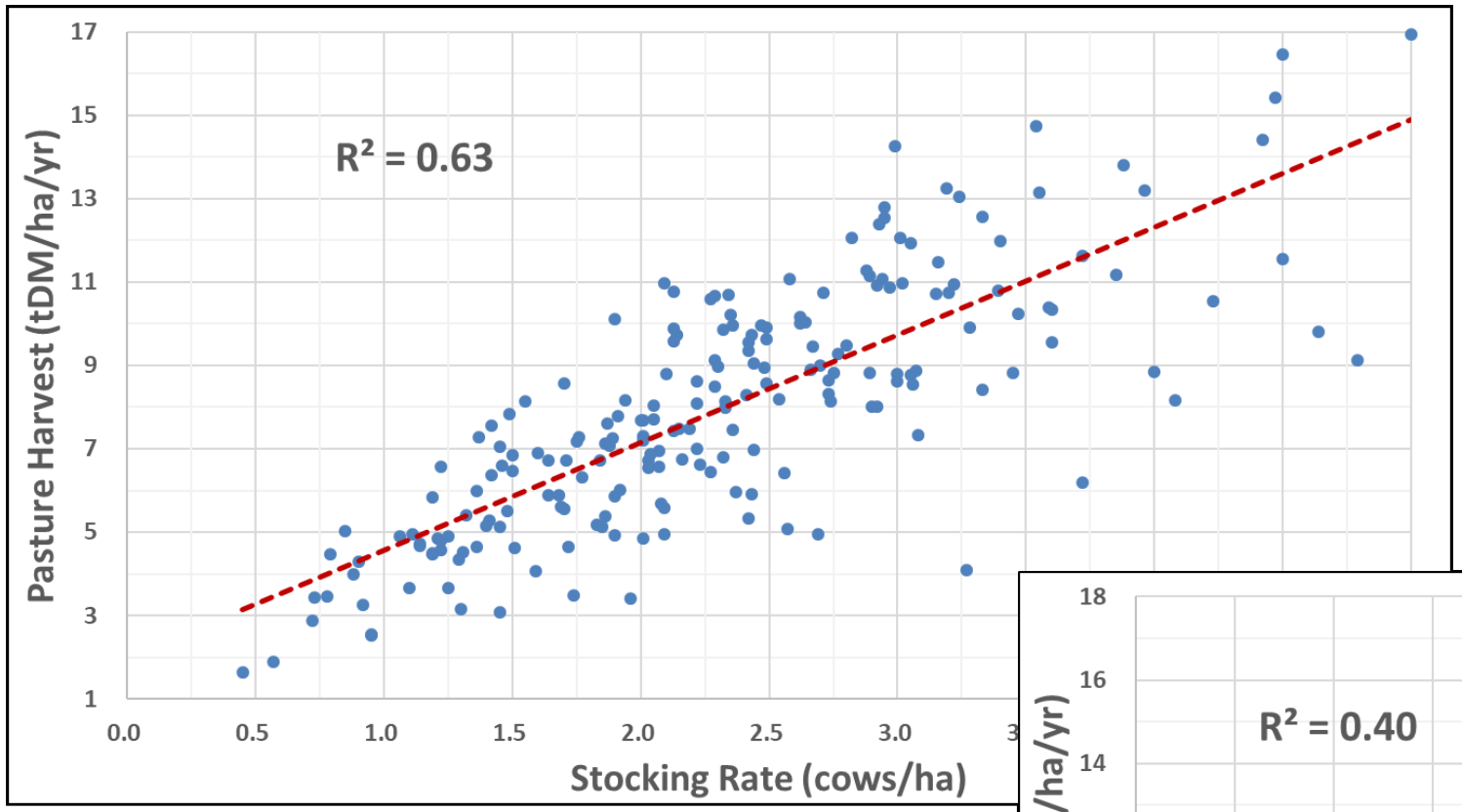
How might this change year-on-year and might these changes be used to adjust production systems to optimise profit?

…and pasture harvest's relevance to predicting variance in profit per ha?

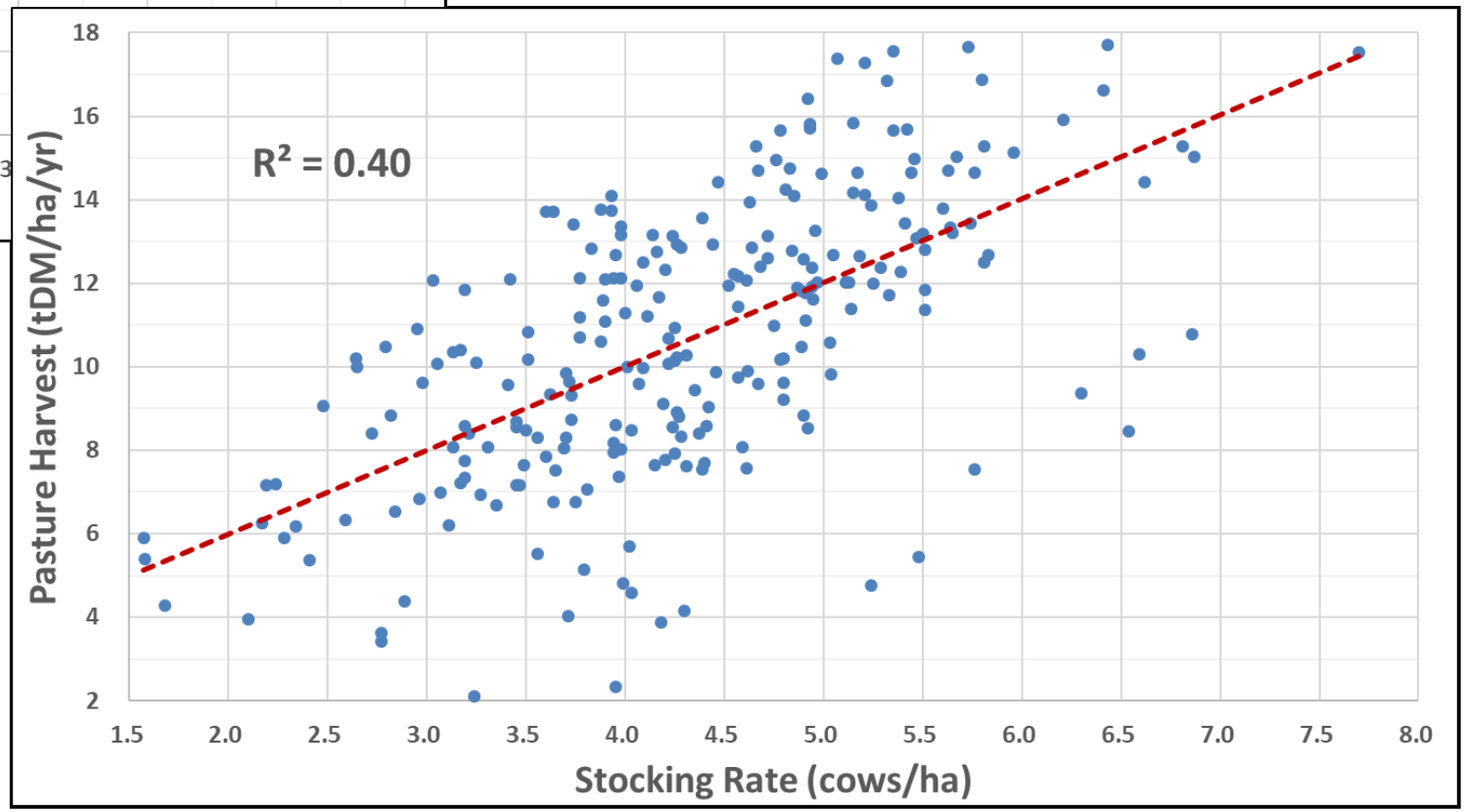
…and profit per cow?

…and the impact of stocking rate on pasture harvest?

Stocking rate *impact* on pasture harvest



Australia



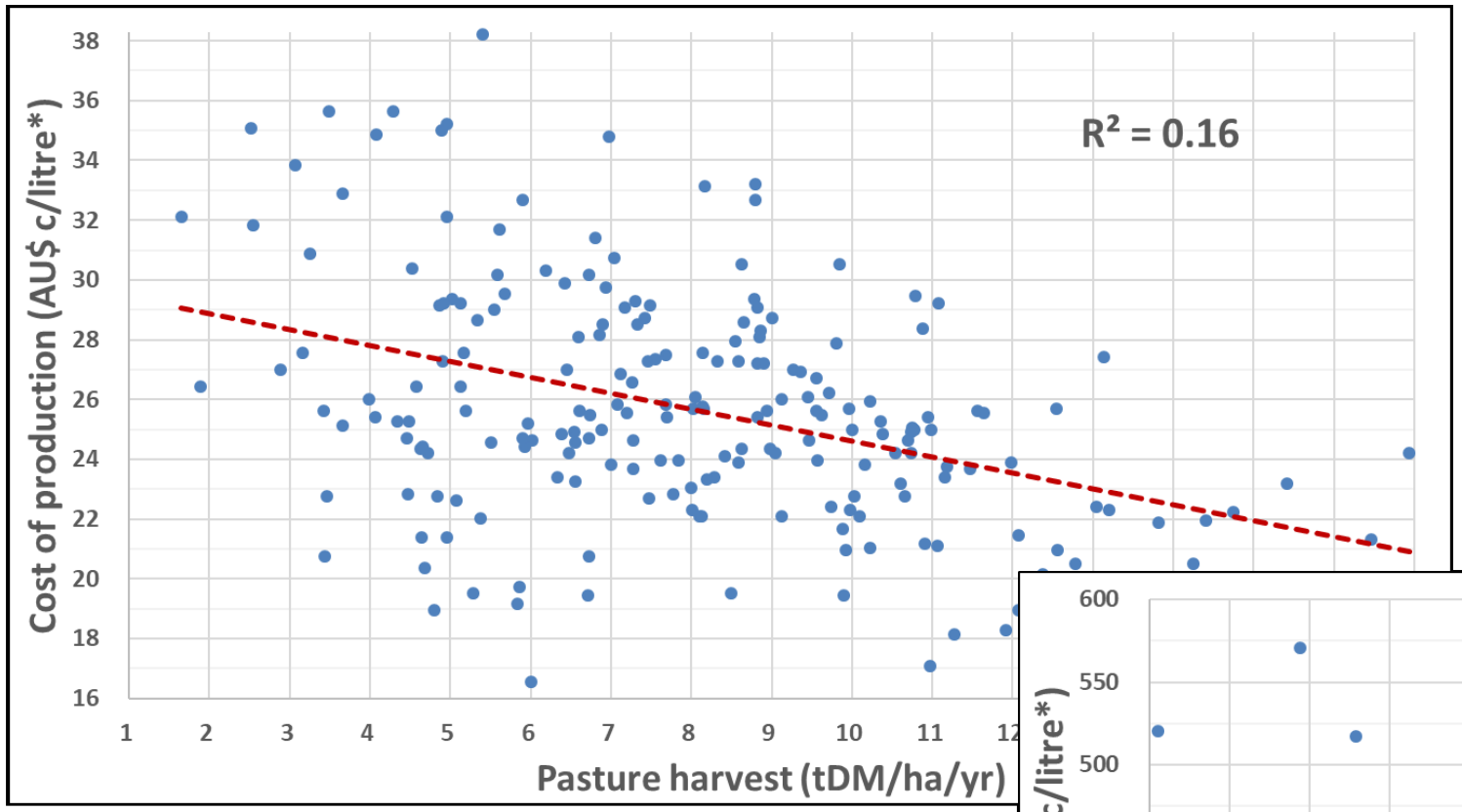
South Africa

Further supporting data…

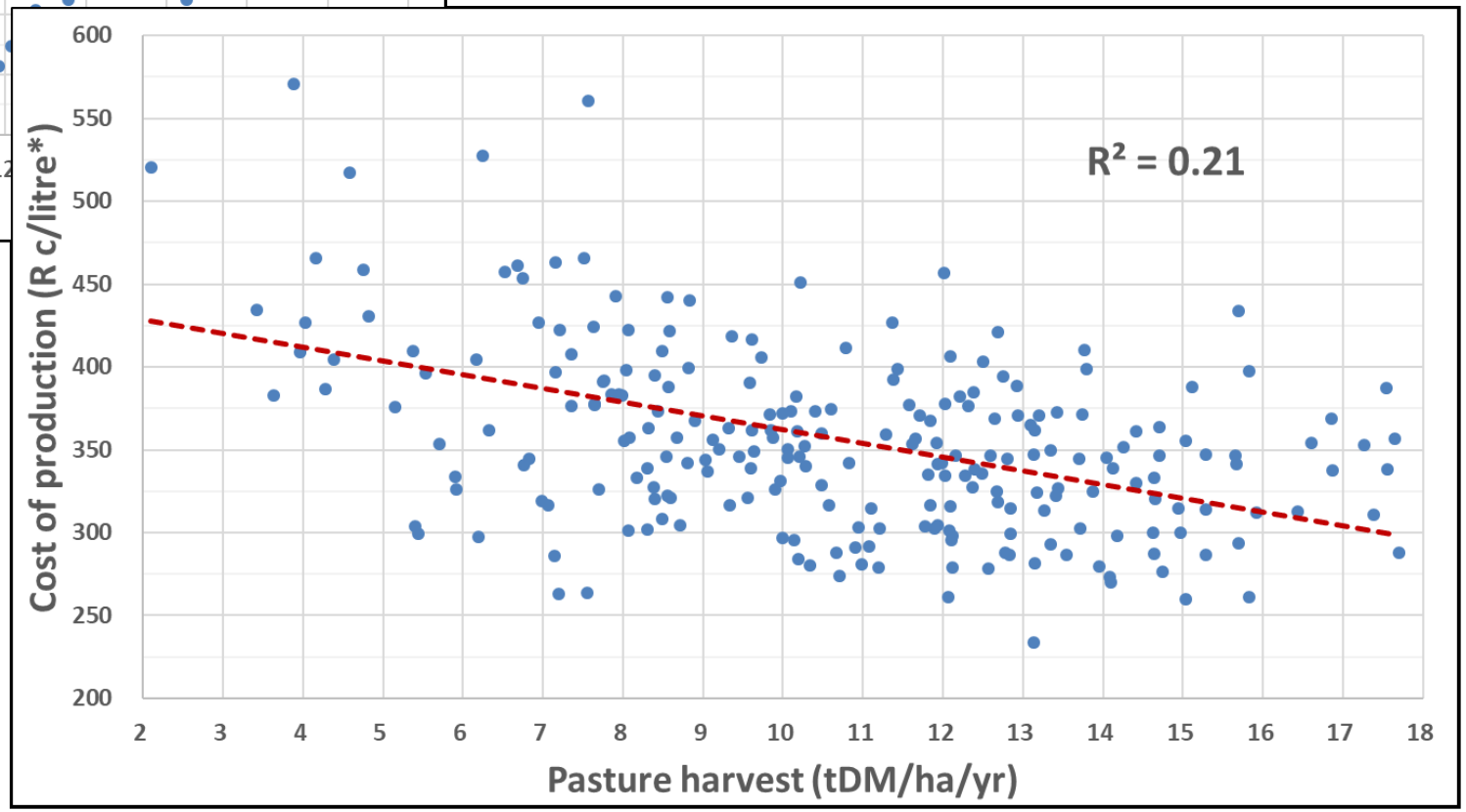
Pasture harvest has an impact on almost all key ratios…

- **Cost of production**

Pasture harvest *impact on* cost of production



Australia



South Africa

Further supporting data…

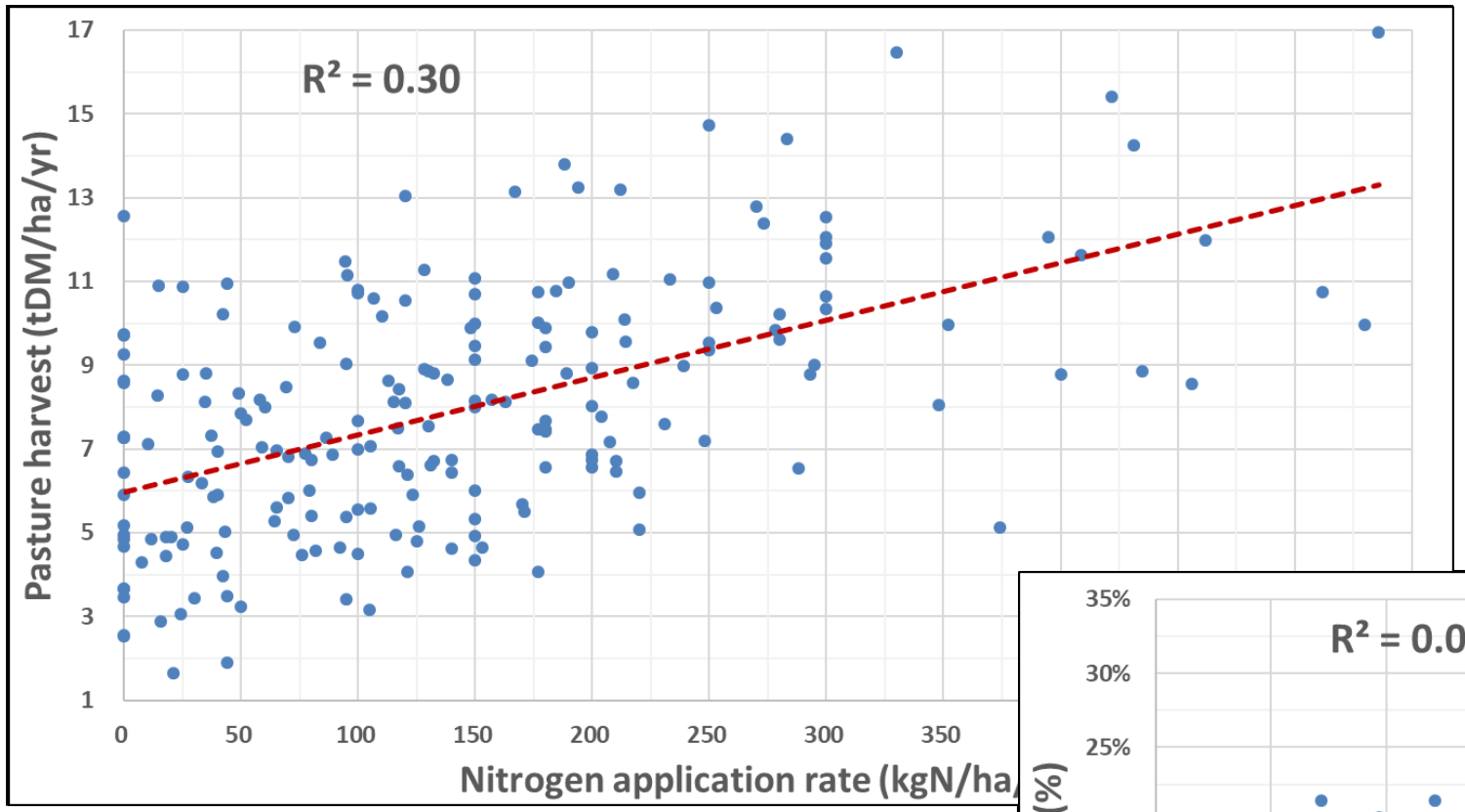
Pasture harvest has an impact on almost all key ratios…

- Cost of production
- Pasture cost per ton dry matter
- Core per hectare cost per ton dry matter of pasture
- Supplement cost per litre
- Total feed cost per litre
- Core per cow cost
- Labour cost per cow
- Labour efficiency (cows per person)

Next question

How do nitrogen application rates impact on pasture harvest?

Nitrogen application rate *impact on* pasture harvest



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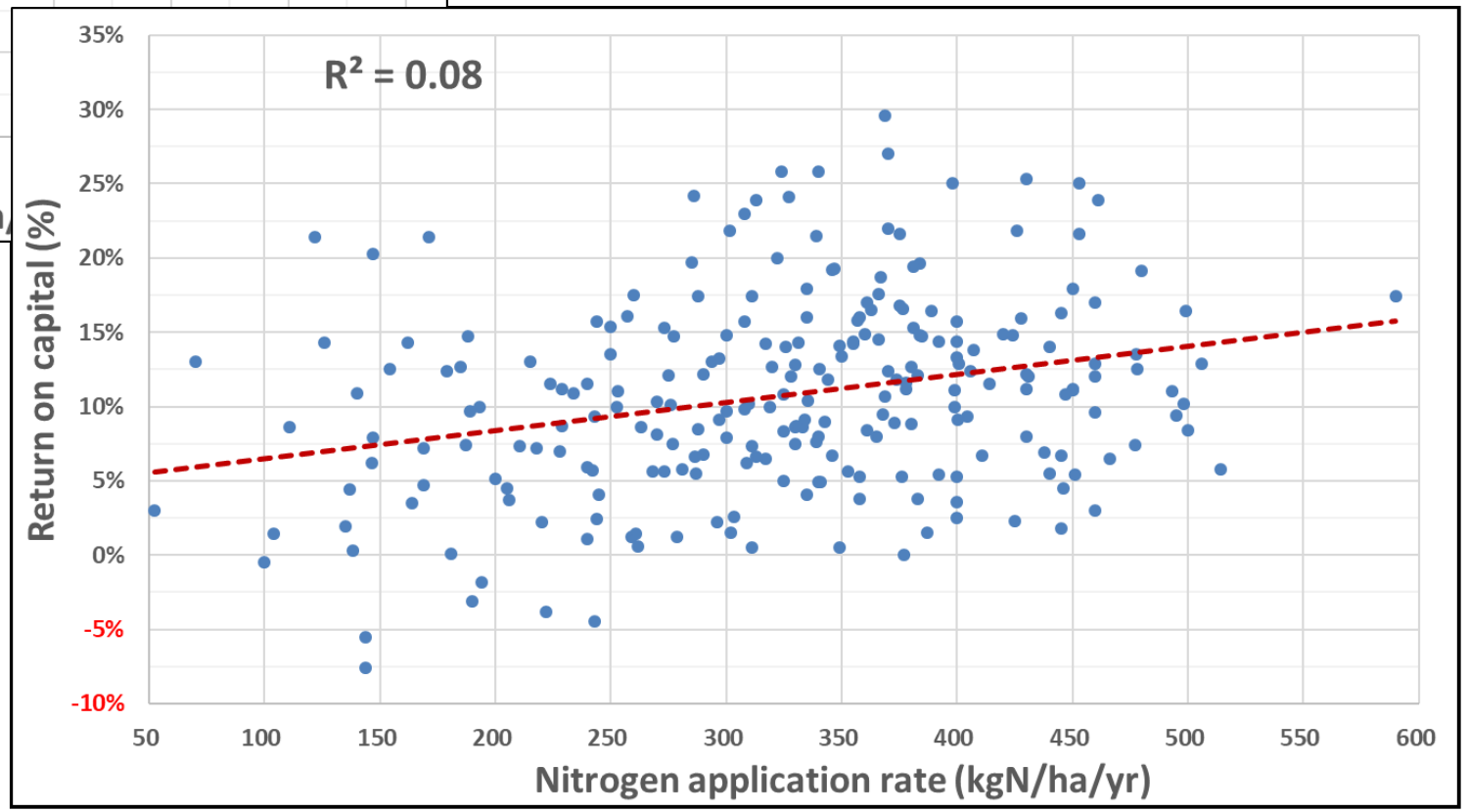


South Africa

Next question

How do nitrogen application rates impact on pasture harvest?

…and next question

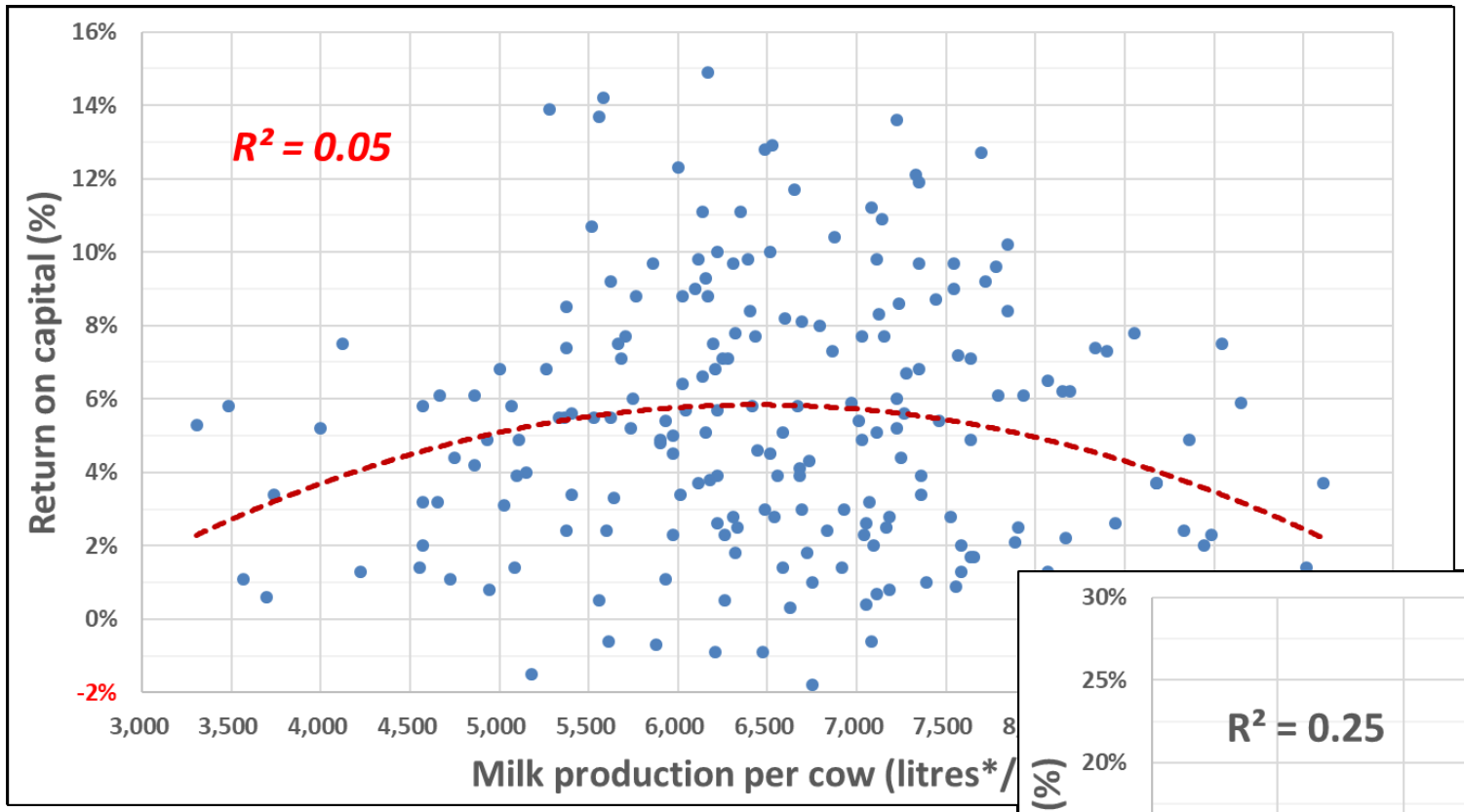
How do nitrogen application rates impact on profit?

Next question

How relevant is milk production per cow to predicting variances in profitability?

How might this change year-on-year and might these changes be used to adjust production systems to optimise profit?

Milk production per cow *impact on* profit



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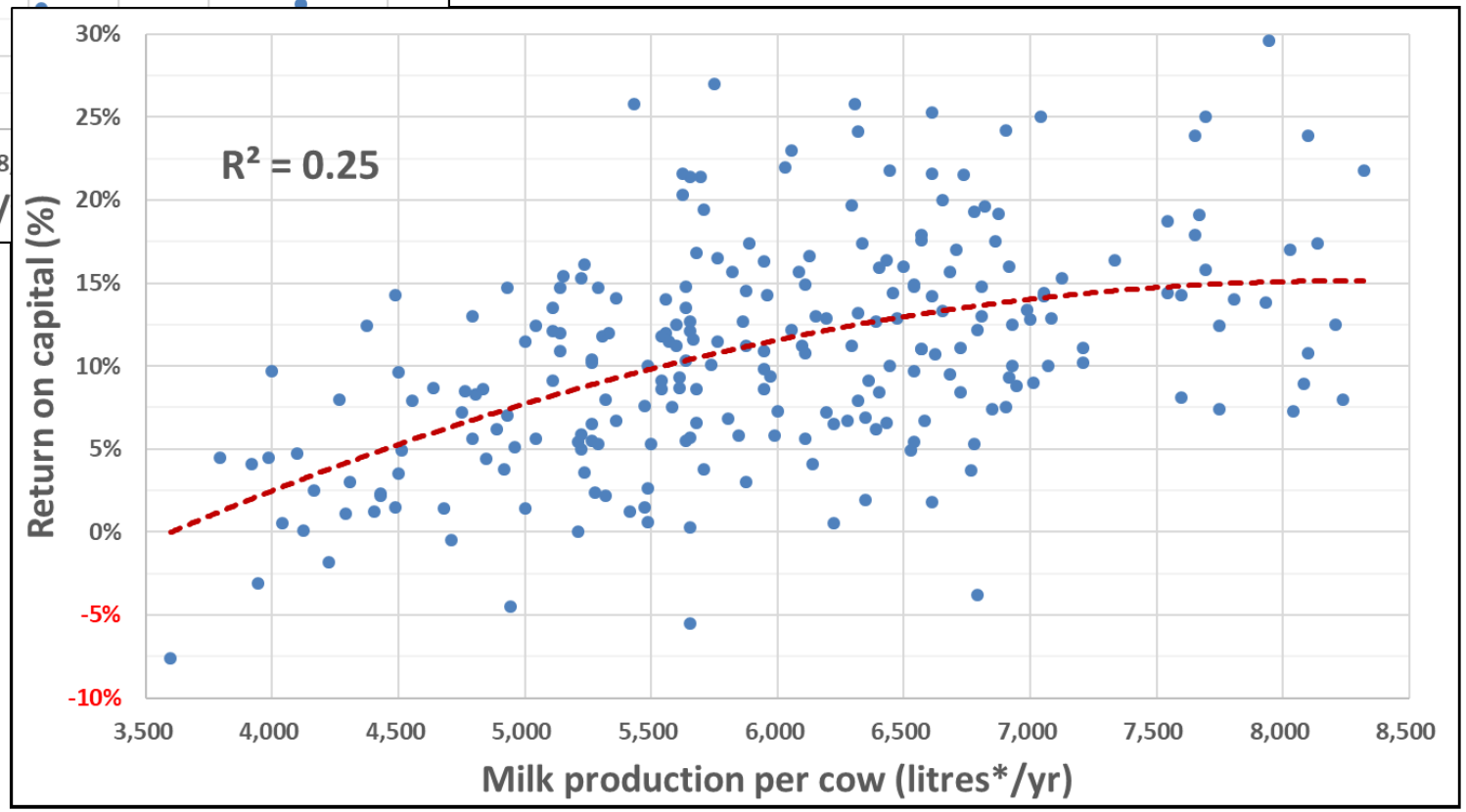
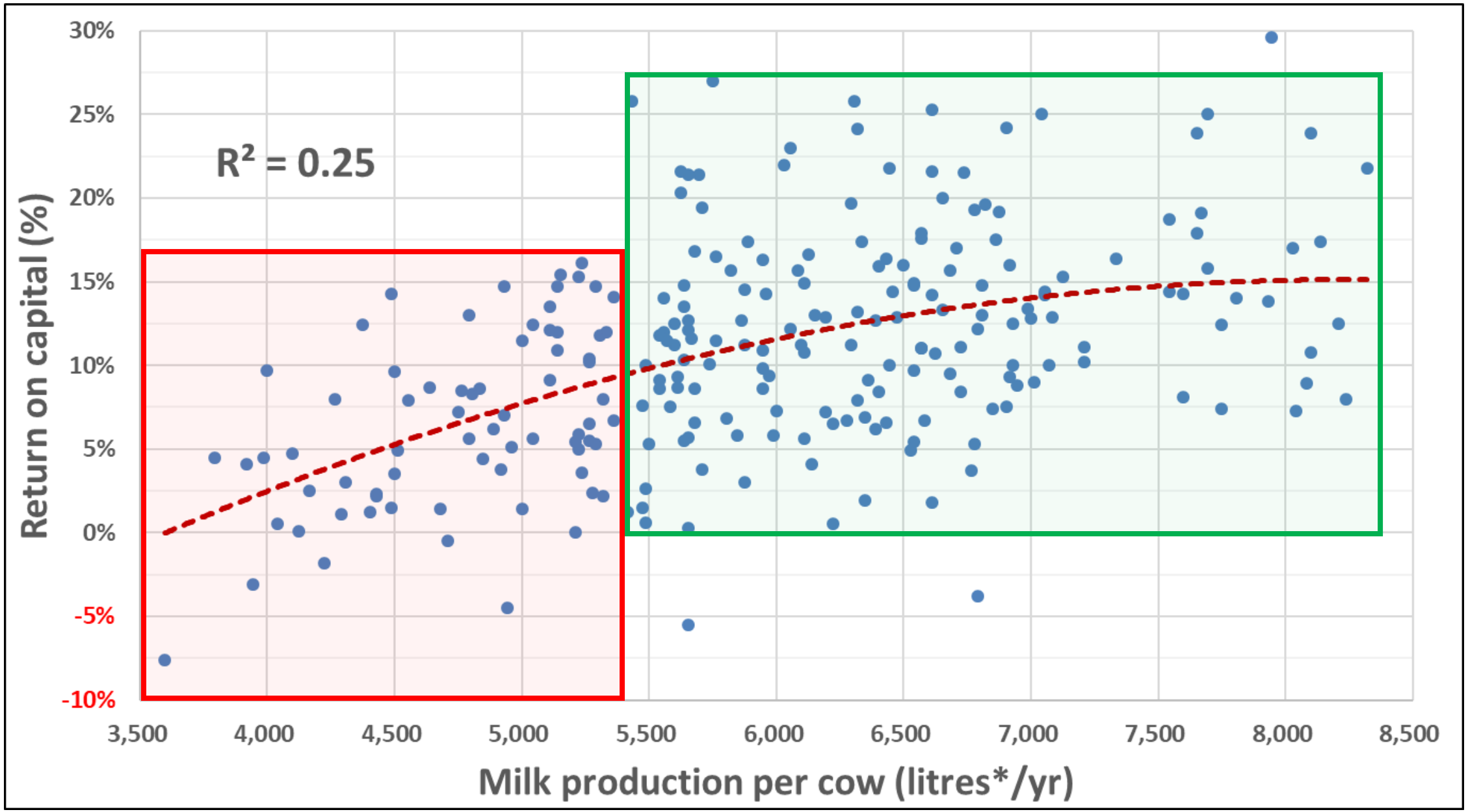


South Africa

RSA – Milk production per cow *impact on* profit

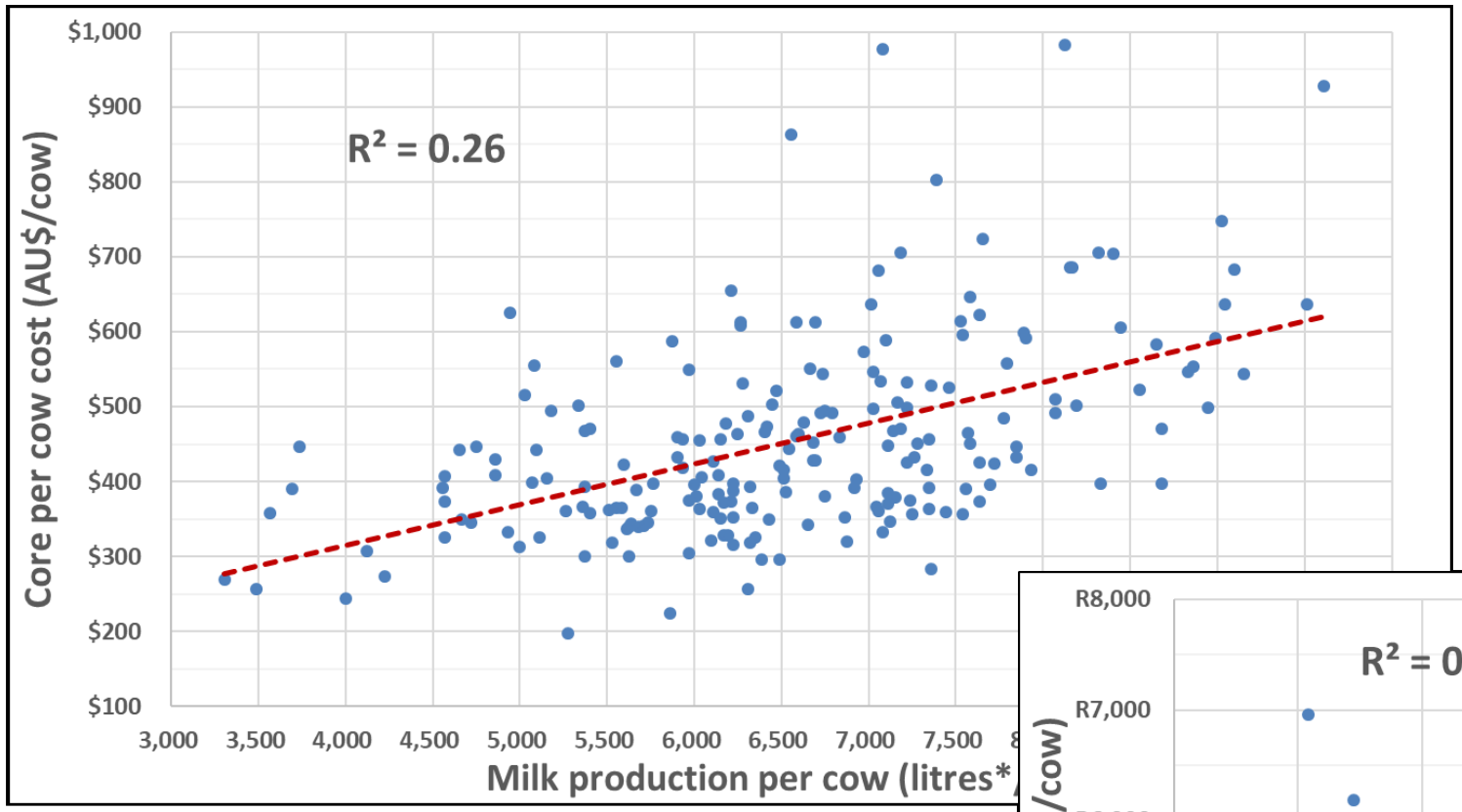


Further supporting data…

Milk production per cow has an impact on many other ratios…

- Cost of production
- Core per cow cost

Milk production per cow *impact on* core per cow cost



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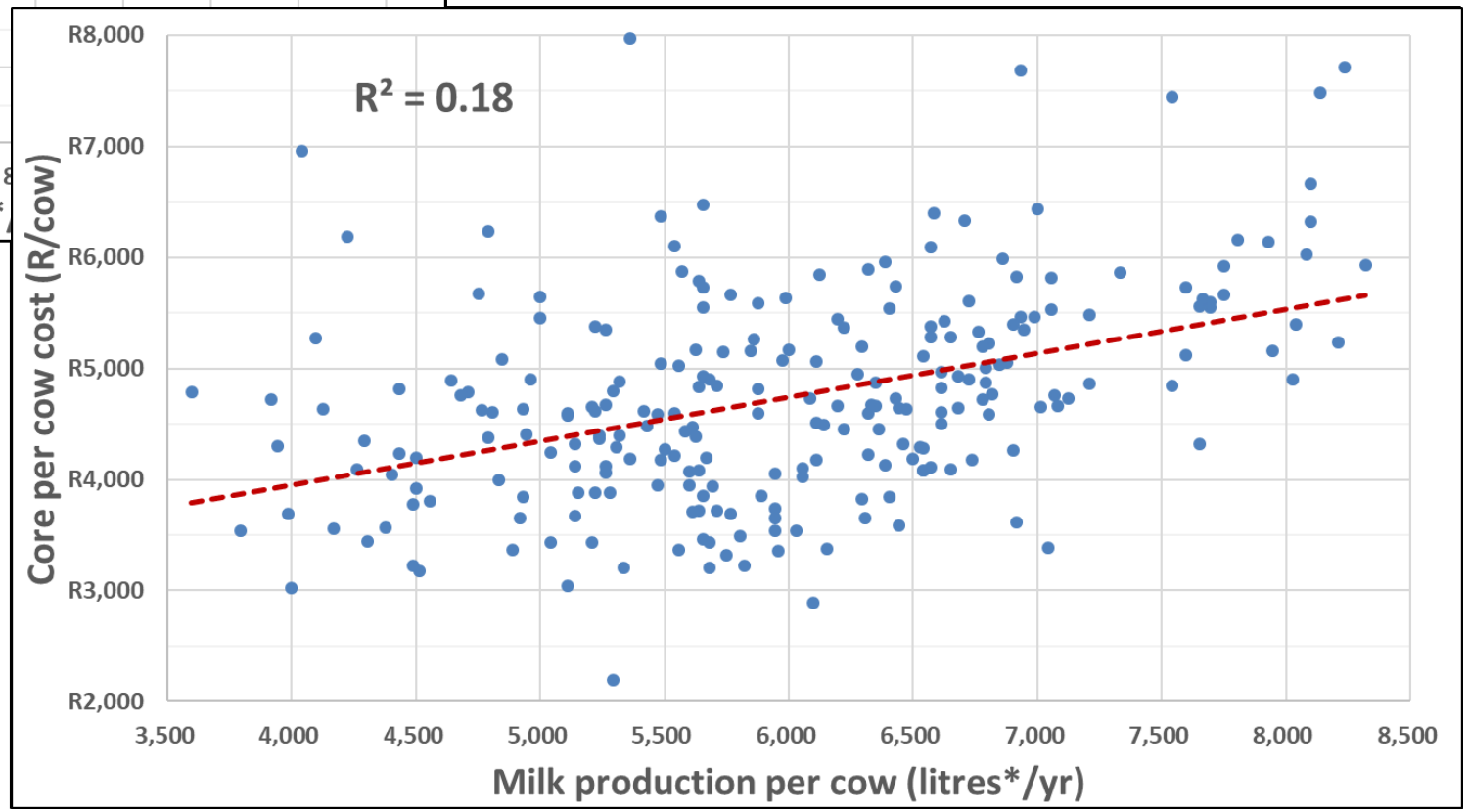


South Africa

Further supporting data…

Milk production per cow has an impact on many other ratios…

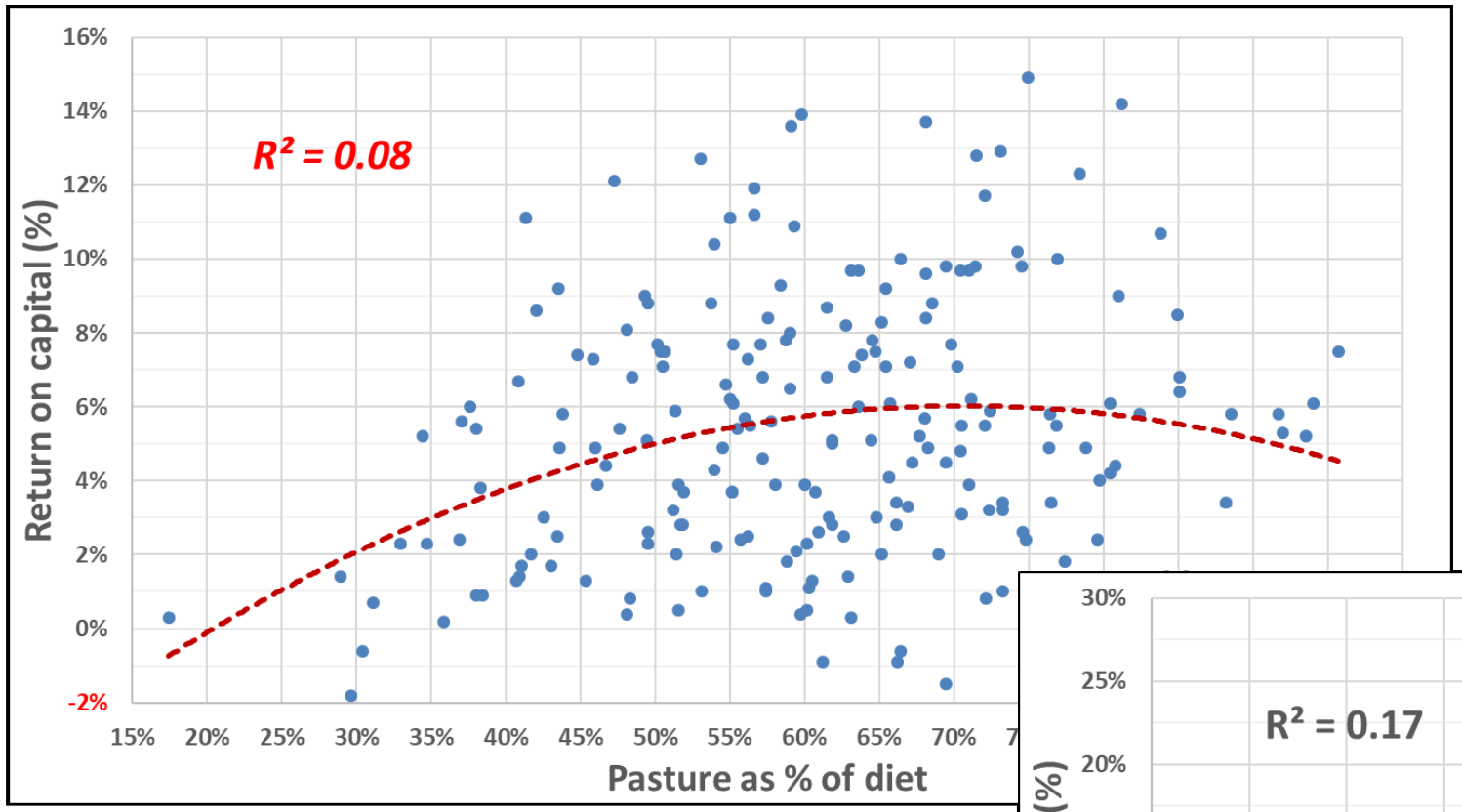
- Cost of production
- Core per cow cost
- Labour cost per cow
- Supplement cost per litre
- Total feed cost per litre
- Pasture cost per ton dry matter

Next question

How relevant is pasture as % of diet to predicting variances in profitability?

How might this change year-on-year and might these changes be used to adjust production systems to optimise profit?

Pasture as % of diet *impact on* profit



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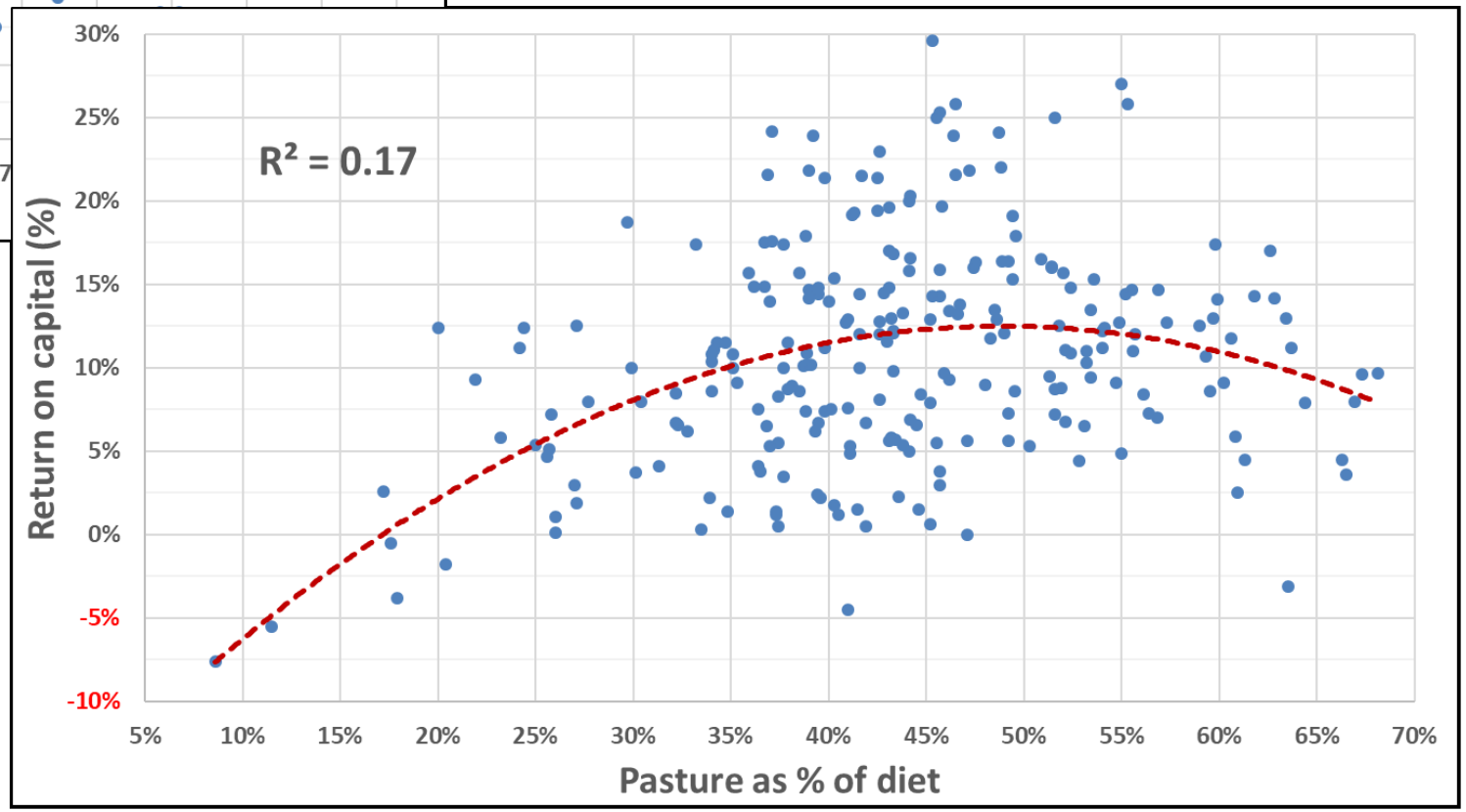


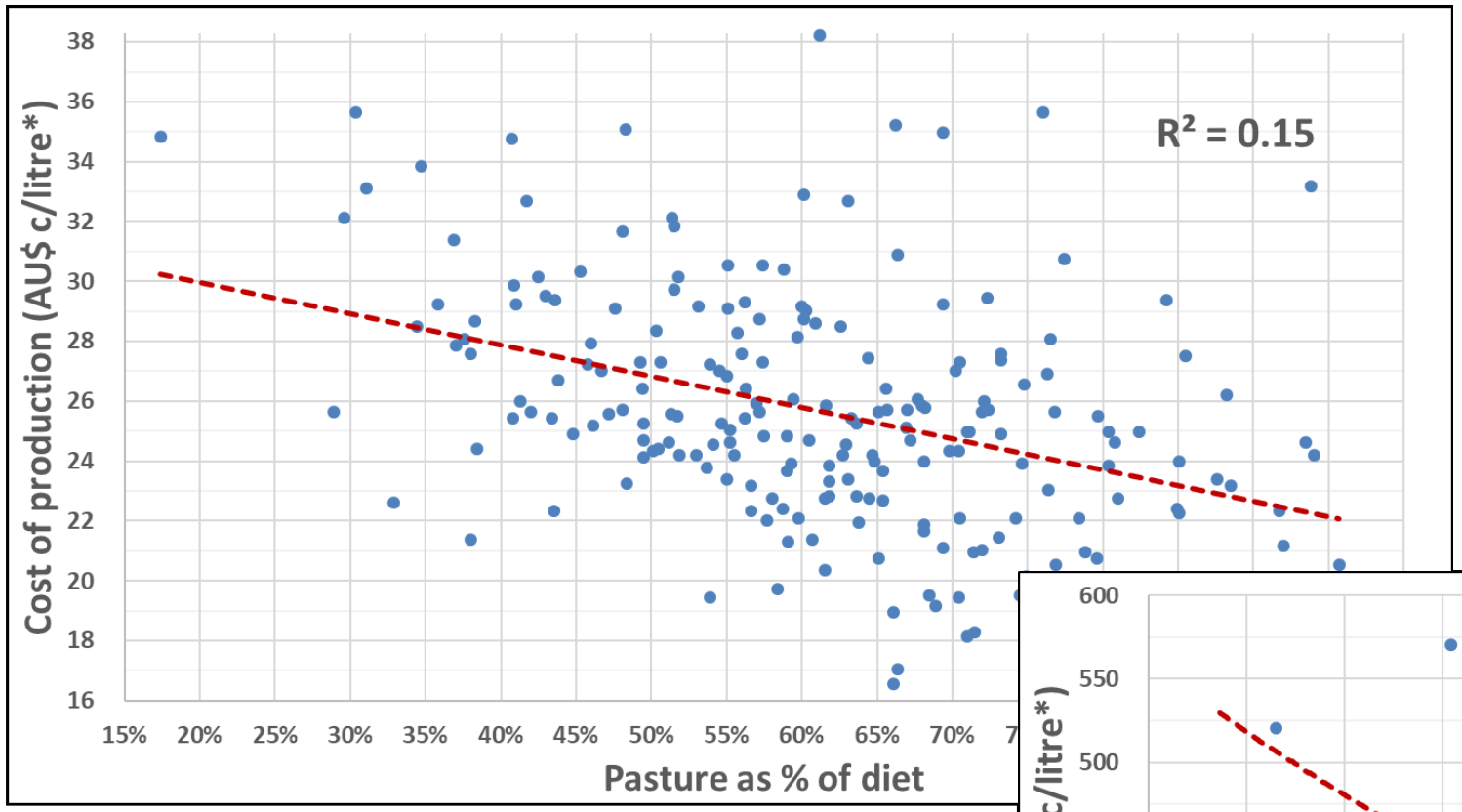
South Africa

Further supporting data…

Pasture as % of diet has an impact on many other ratios…

- **Cost of production**

Pasture as % of diet *impact on* cost of production



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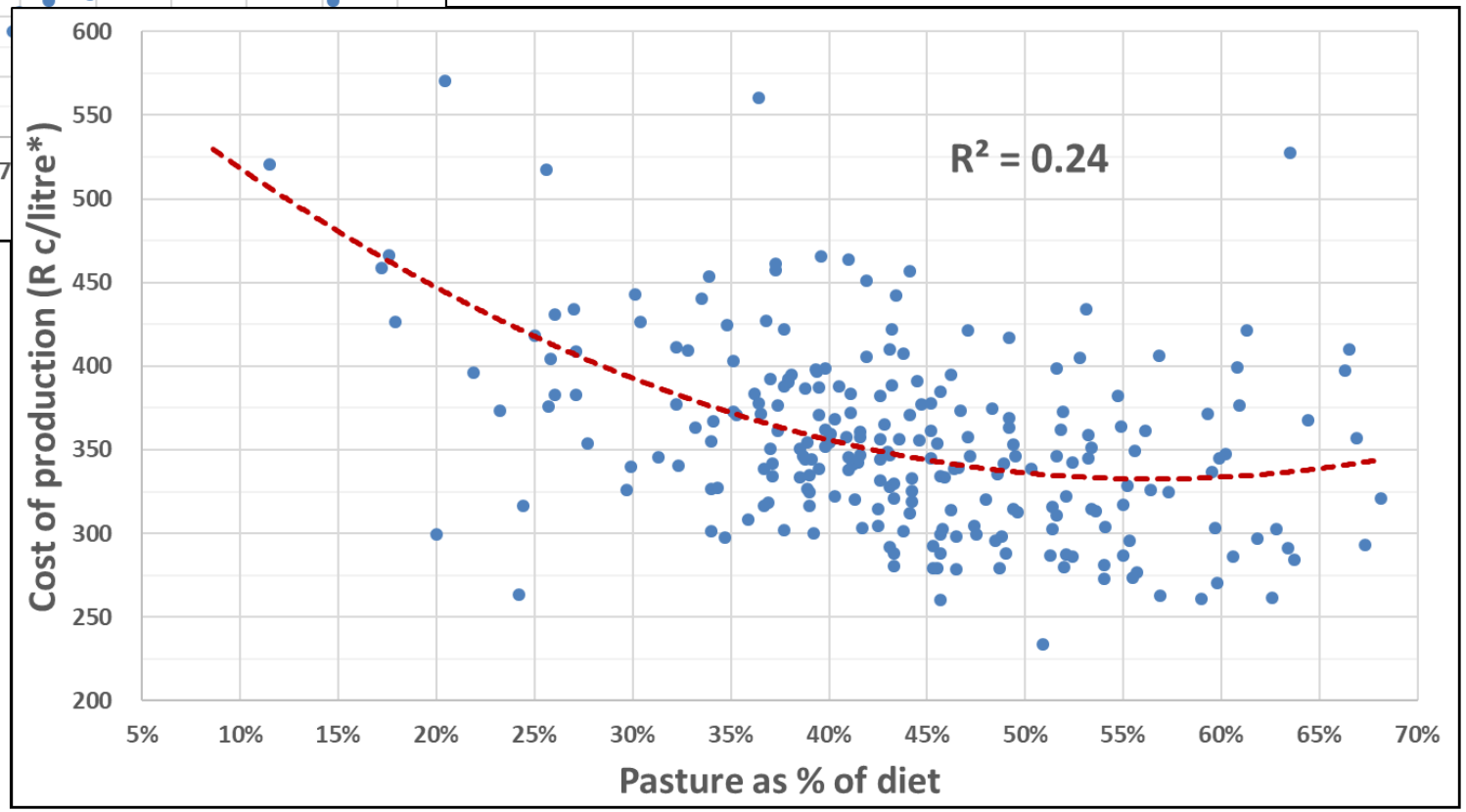


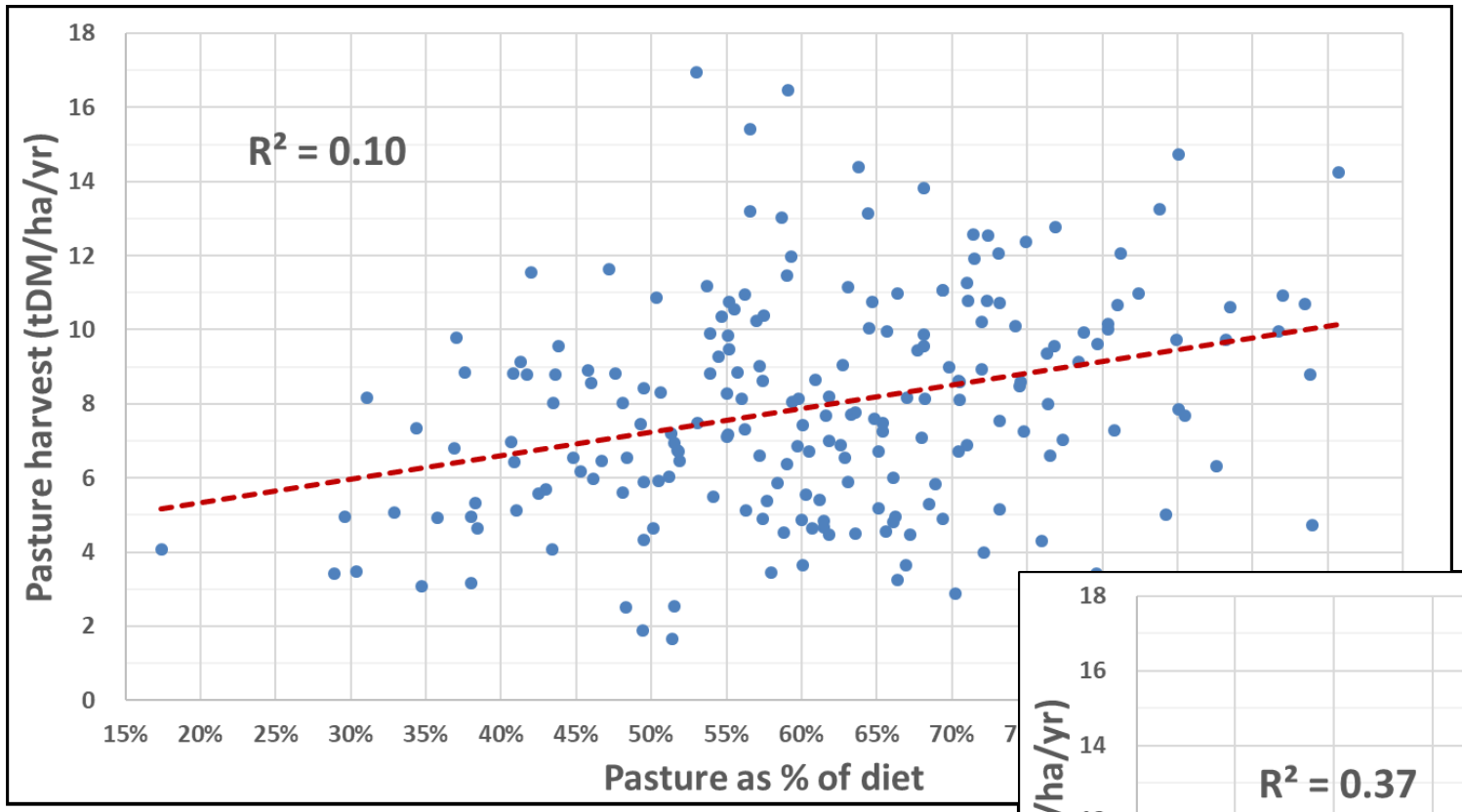
South Africa

Further supporting data…

Pasture as % of diet has an impact on many other ratios…

- Cost of production
- Pasture harvest

Pasture as % of diet *impact on* pasture harvest



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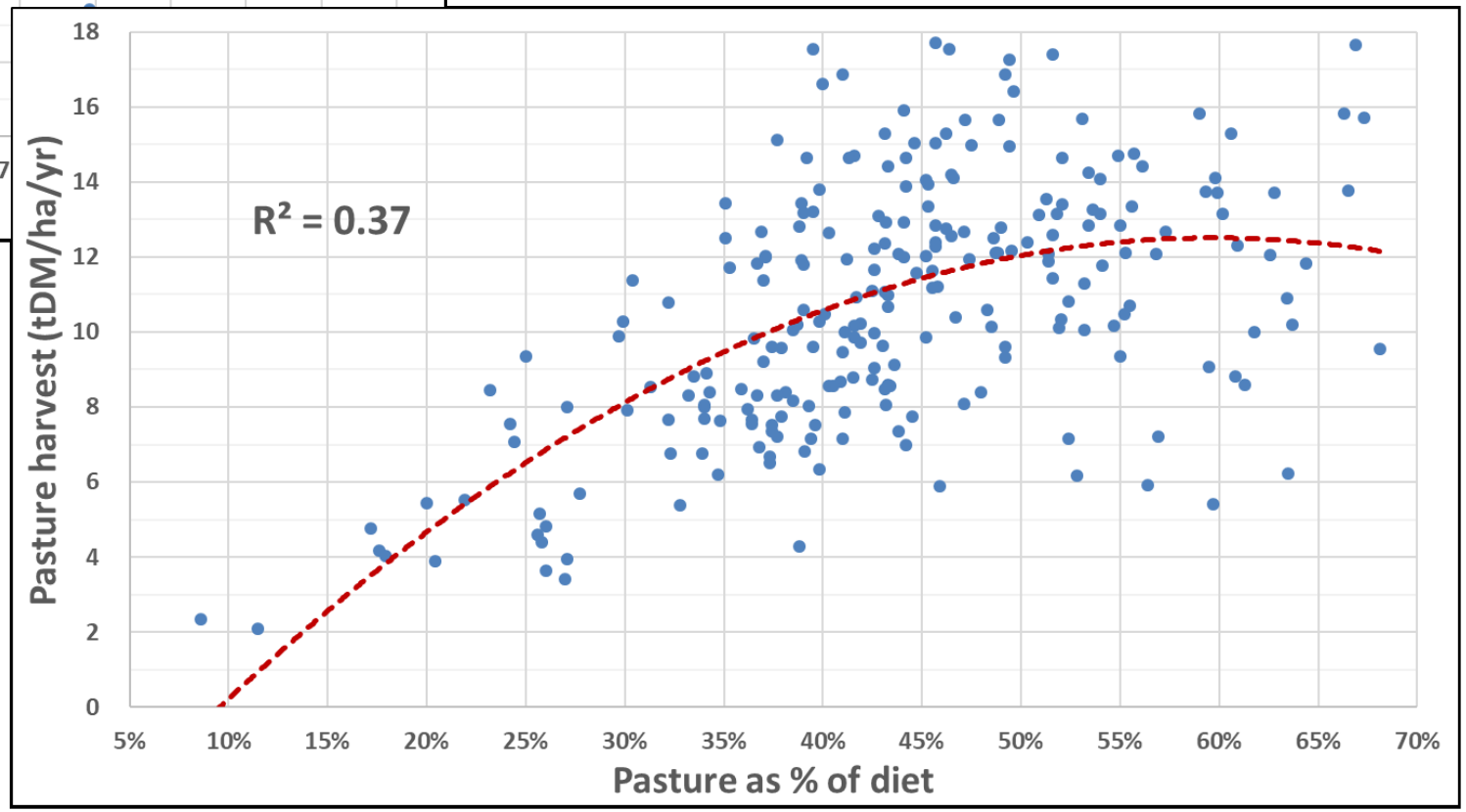


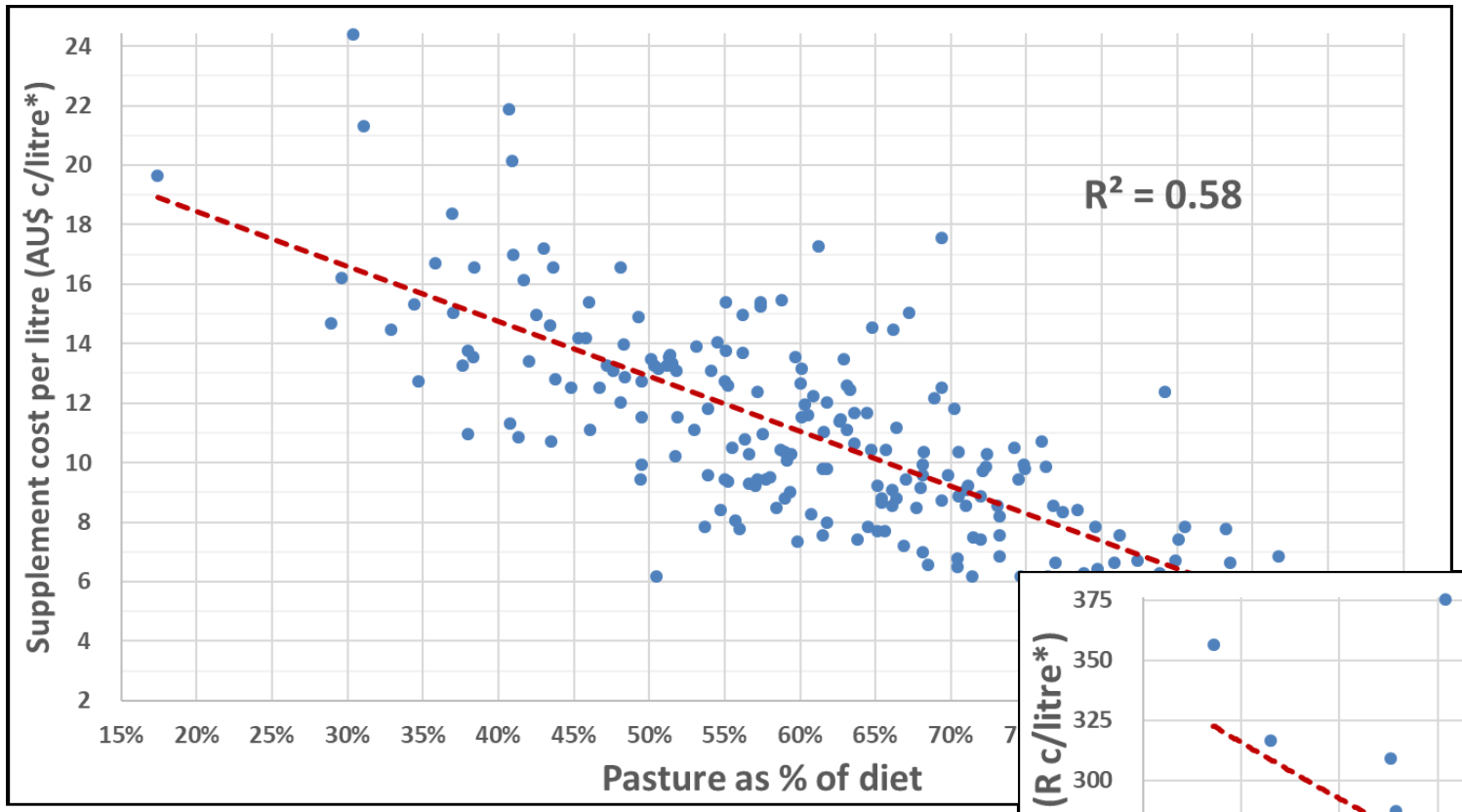
South Africa

Further supporting data…

Pasture as % of diet has an impact on many other ratios…

- Cost of production
- Pasture harvest
- Supplement cost per litre

Pasture as % of diet *impact on* supplement cost per litre



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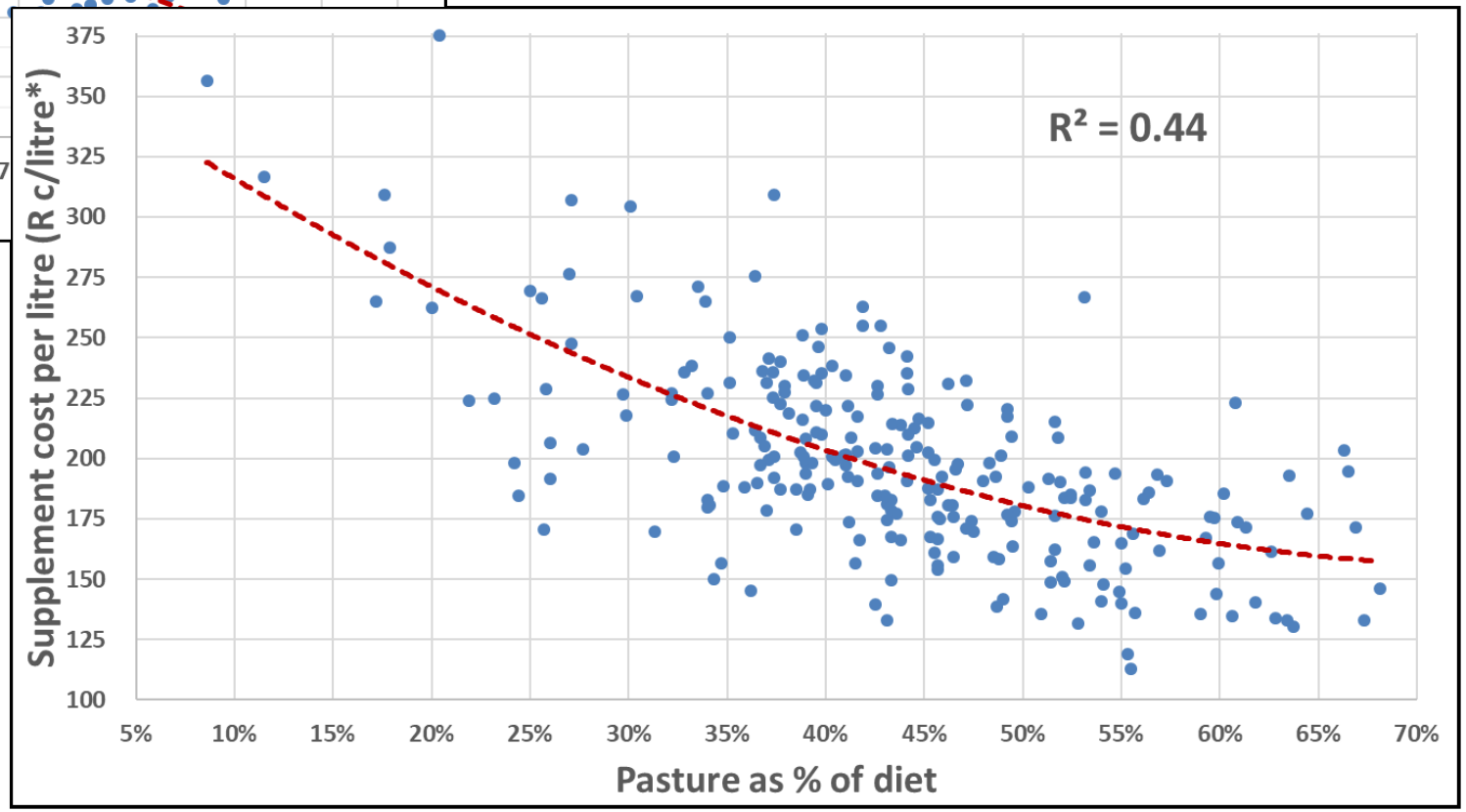


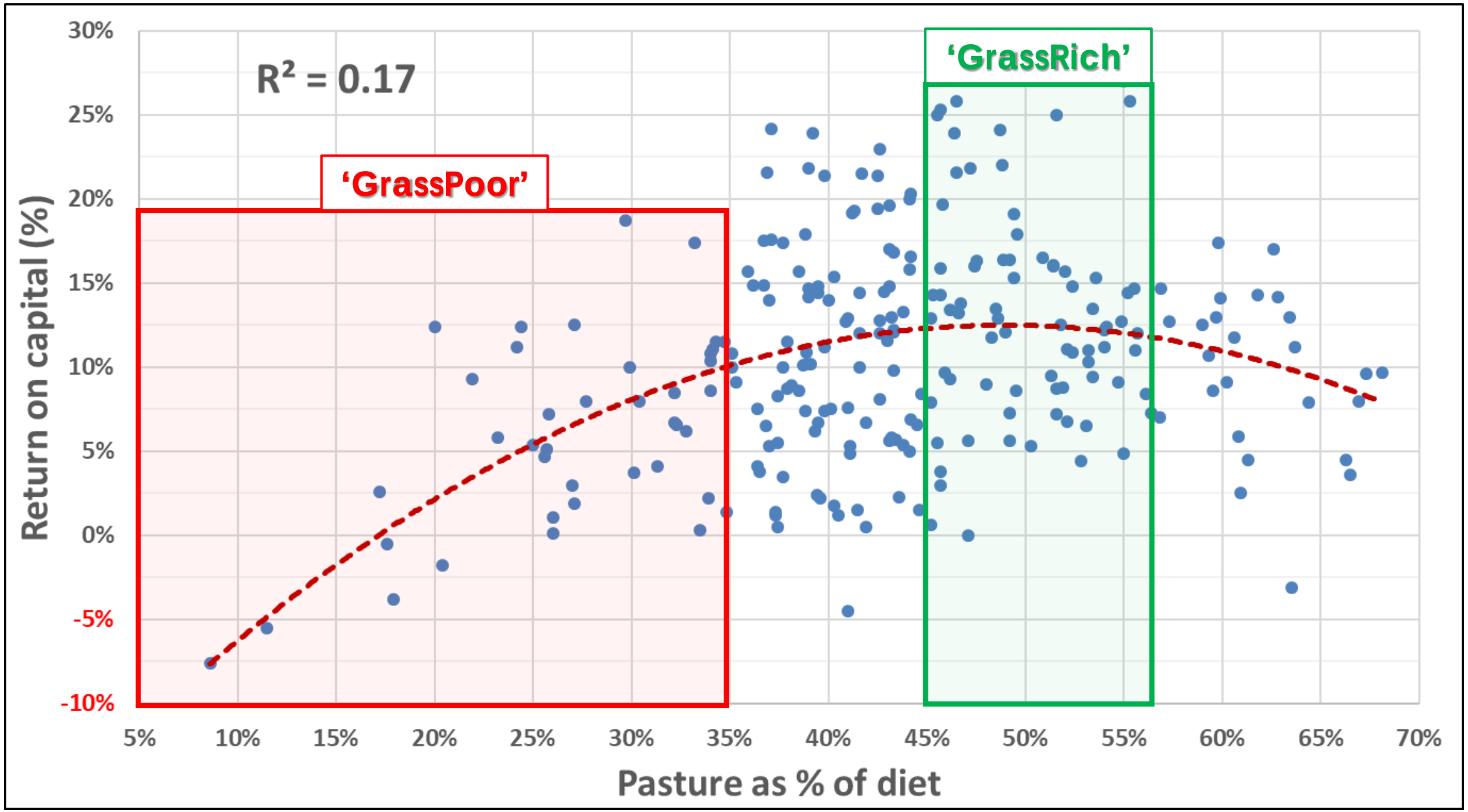
South Africa

Further supporting data…

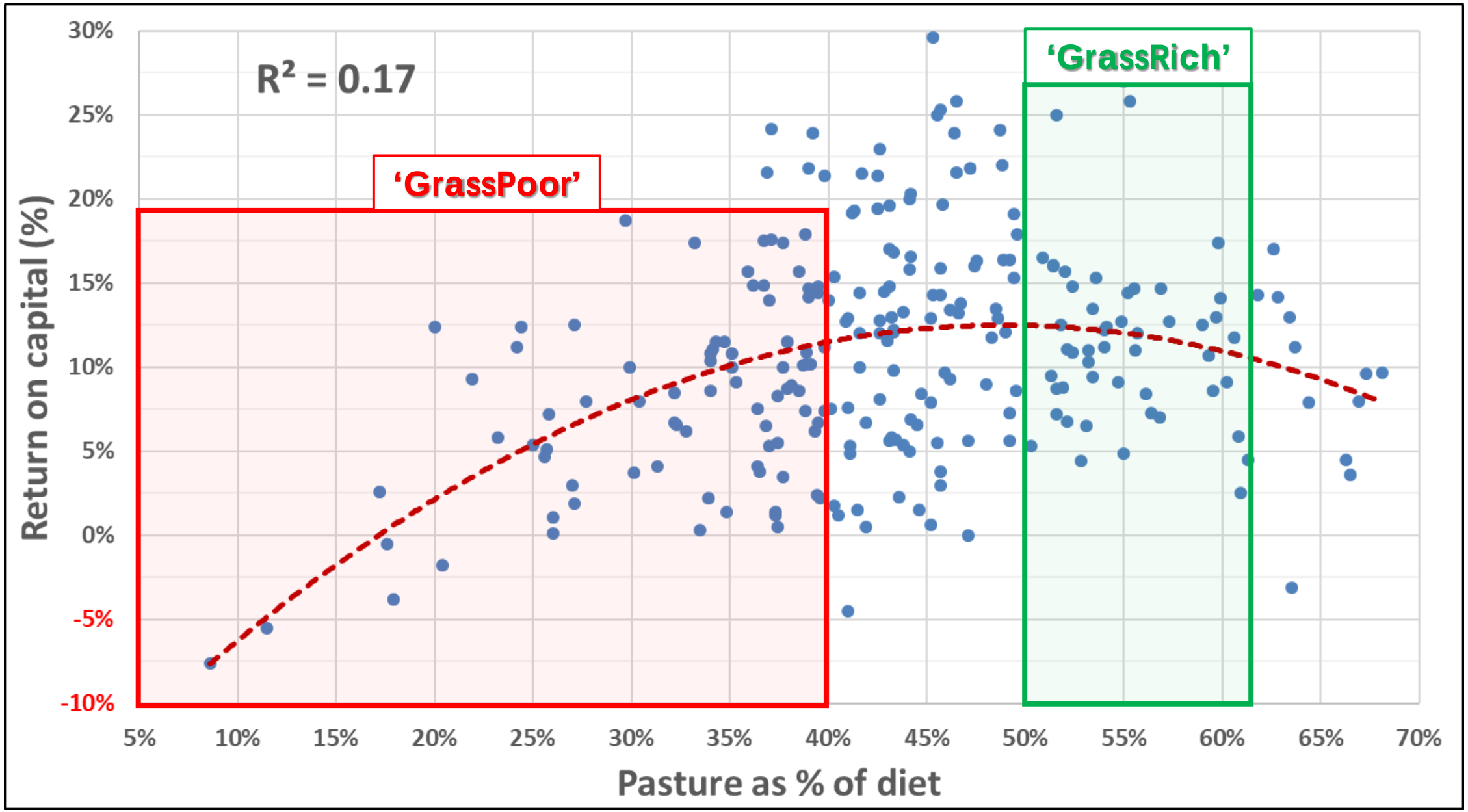
Pasture as % of diet has an impact on many other ratios…

- Cost of production
- Pasture harvest
- Supplement cost per litre
- Total feed cost per litre
- Pasture cost per ton dry matter
- Milk production per cow
- Core per hectare cost per ton dry matter of pasture
- Core per cow cost
- Labour cost per cow

RSA – Pasture as % of diet *impact on* profit – 2015-2018



RSA – Pasture as % of diet *impact on* profit – next 5-10 years?



Key ratios determining profit outcome

- **Cost of production** and **total expenses per litre**
- **Supplement cost per litre** and **total feed cost per litre**
- **Pasture harvest** and **cost of pasture per ton dry matter**
- **Concentrate cost per ton *** and **forage cost per ton dry matter ***
- **Labour cost per cow** and **labour efficiency (cows/person) ***
- **Core per hectare cost per ton dry matter of pasture**
- **Core per cow cost ***
- **Milk production per cow – *but only a concern if (very) low!***
- **Pasture % of diet – *key production system determinant!***

Other ratios such as stocking rate and milk production per hectare are determined by optimising the above ratios

Summary

1. Main goal – to maintain (or improve profit) and to decrease risk i.e. make profits more sustainable
2. Only reliable and consistent way to do this is to reduce cost of production
3. Only reliable and consistent way to reduce cost of production is to reduce total expenses per litre
4. Only reliable and consistent way to reduce total expenses per litre is to reduce total feed cost per litre
5. Only reliable and consistent way to reduce total feed cost per litre is to reduce supplement cost per litre
6. Only reliable and consistent way to reduce supplement cost per litre is to increase pasture as % of diet

Summary continued…

7. So increase pasture as % of diet by 10%...from say 40%-50% to 50%-60% or for the industry from an average of say 45% to 55%
8. Reduce amount of forage/silage fed per cow, so stocking rates will need to be somewhat lower on average…
9. …though maintain strong focus on pasture harvest as NZ has done
10. Reduce amount of concentrate being fed per cow in many instances…
11. …though this will require some changes to cow genetics so milk production and reproductive performance remain strong even with a higher pasture intake and lower supplement intake

The potential **PRIZE** – an internationally competitive dairy industry with secure growth prospects and the opportunity to export milk products

Possible long term competitiveness in cost of production...?