Carrying on farming: how New Zealand's sheep/beef farmers continue to farm

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Farmers and change

- Everyone wants to change farmers!
- Farm extension, technology transfer, diffusion of innovation, farmer decision making, best practice, farmer types, farmer orientation etc.
- “Good” farmer
- ‘Real’ data of what farmers have done and results of that over a period of up to 8 years.

Outline

- The topic
- ARGOS
- Pathways to sustainability – analysis of transdisciplinary data
- 5 pathways followed by farmers
- Overall strategies of ‘survival’
- What is a sustainable landscape?

Pathways to sustainability

- 2003/4-2008/9, ARGOS compared different management and audit systems – organic, integrated, conventional
- Now, what can we say about farmers and their farms independent of management system?
- How have farmers ‘managed’ through the time of ARGOS? What strategies have been used with what results? What characterises a sustainable, resilient farm/farmer?

ARGOS data

- Financial data from 2002/3 to 2009/10 (8 years)
- Production data 2006/7 to 2009/10
- Lambing % 2004/5 to 2009/10
- Soil sampling (2003, 2005, 2007)
- Farm management – 2003/4 to 2009/10 (7 years), fertiliser application – 2004/5 to 2009/10
- Bird intensity (2004/5, 2007/8, 2009/10)
- Attitudes (2008 survey)
- Interviews, field research managers' insights
- Measures used: average, annual trend, variability (s.d.)

Method

1. Chose core variables associated with:

- **Intensification**: two measures of profit, production (carcase weight sold/ha), % farm enterprise that is cropping
- **Capital/resources**: effective farm area, % equity, soils (3 attributes)
- **Efficiency**: Farm working expenses/gross farm revenue, profit/stock unit, lambing %
- **Financial sustainability**: profit/farm

Method cont.

2. Carried out PCA then cluster analysis to produce differing groups.
3. Compared other variables across these groups – income, expenses, fertiliser use, bird intensities, attitudes (averages, trends, variability)

PCA analysis

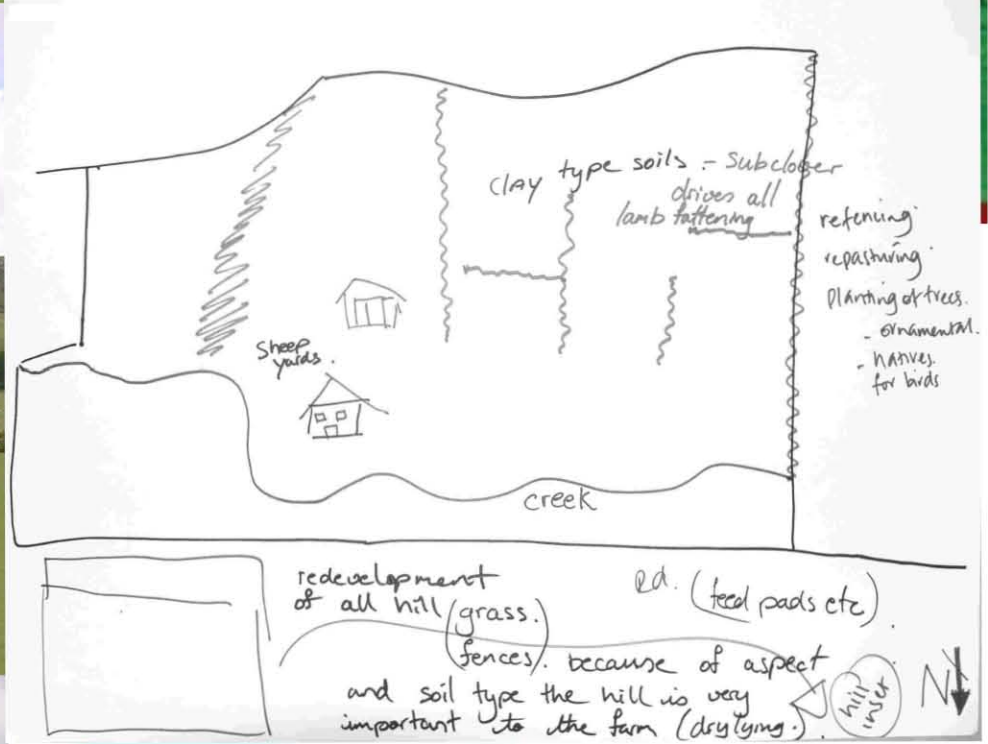
	Variable	PC1	PC2	PC3	PC4
Intensification	EFS/ha ($)	0.82	-0.04	0.37	0.33
	NFPBT/ha ($)	0.34	0.69	0.44	0.32
	Crop %	0.81	0.31	-0.18	-0.02
	Carc wgt/ha	0.09	0.19	-0.03	0.85
Capital	Equity %	-0.43	0.67	0.28	0.03
	Effective area (ha)	-0.00	-0.79	0.08	0.01
	Olsen P	-0.03	-0.37	0.15	0.52
	N %	-0.69	-0.20	0.19	0.30
	pH	-0.08	0.07	0.77	-0.06
Efficiency	FWE/GFR	-0.32	-0.23	-0.76	-0.22
	EFS/su ($)	0.80	-0.10	0.35	0.37
	NFPBT/su ($)	0.23	0.81	0.34	0.24
	Lambing %	0.18	0.41	0.09	0.76
Sustainability	EFS/farm ($)	0.84	-0.13	0.37	0.24
	NFPBT/farm ($)	0.33	0.52	0.54	0.43

The cluster groups

Cluster PC	Group1 (n=6)	Group 2 (n=3)	Group 3 (n=4)	Group 4 (n=3)	Group 5 (n=7)
1 – EFS, cropping & N	-0.74	+1.97	-0.07	-0.10	-0.13
2 – NFPBT, equity & area	-0.25	-0.33	+0.99	-1.60	+0.47
3 – efficiency & pH	-0.83	-0.41	-0.16	+0.82	+0.63
4 – production, lambing & Olsen P	+0.06	+0.21	-1.55	-0.35	+0.90

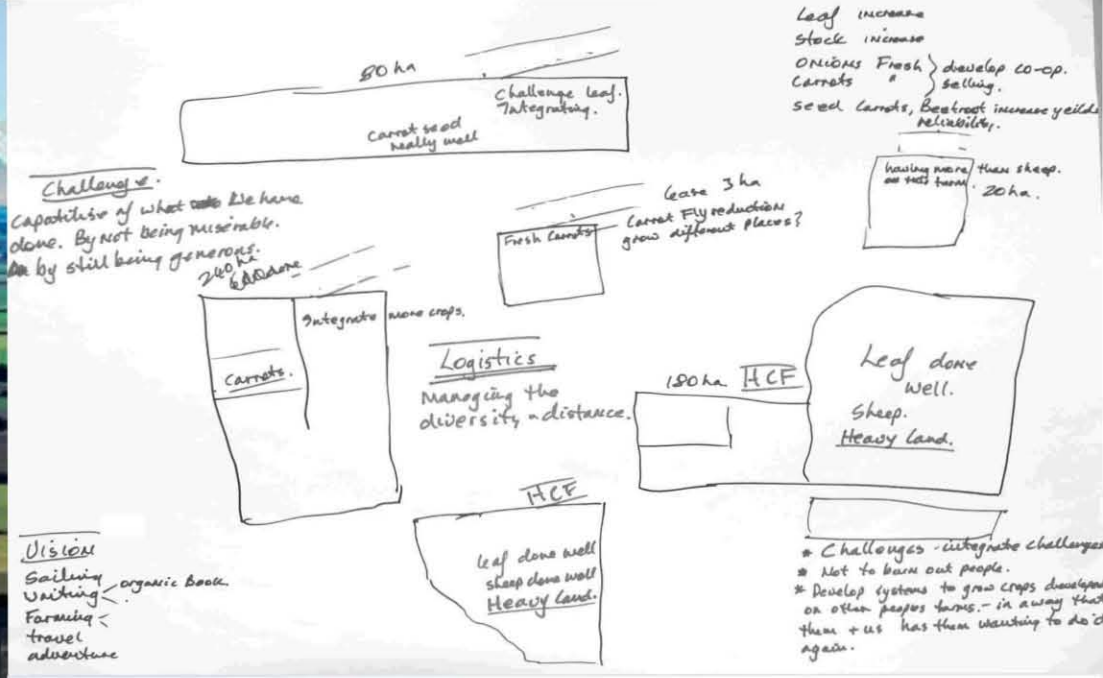
Group 1: developers/low performers – least profitable, least efficient

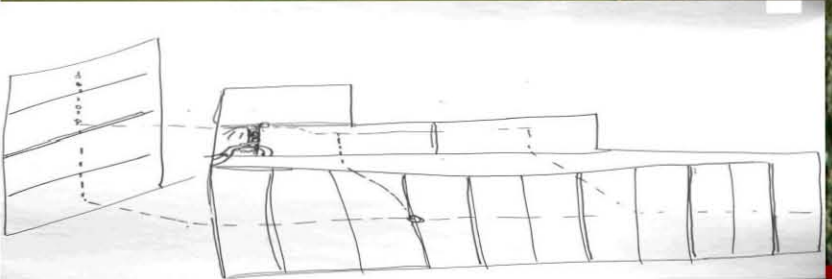
- Lowest profit (/ha, /su, /farm) – possibly working at a loss, least efficient → not financially sustainable, possibly in development phase or hooked into spending on projects.
- Soil N increasing → development
- Most variable Olsen P, Soil N and efficiency (FEW/GFR) → put on fertiliser when can afford it.
- Spent most on stock expenses → bring in feed
- Highest density of birds – natives and introduced, granivorous and insectivorous → location, hard country farms, altitude.
- Less likely to deviate from farm plans → committed to a project, less adaptable?


clay type soils - Subclover drives all lamb fattening
retencing
repasturing
Planting of trees.
- ornamental.
- natives for birds
Sheep yards.
creek
redevelopment of all hill (grass. fences). because of aspect and soil type the hill is very important to the farm (dry lying).
Rd. (feed pads etc)
hill inset
N

Group 2: Adaptable risk takers – most profitable, least consistent

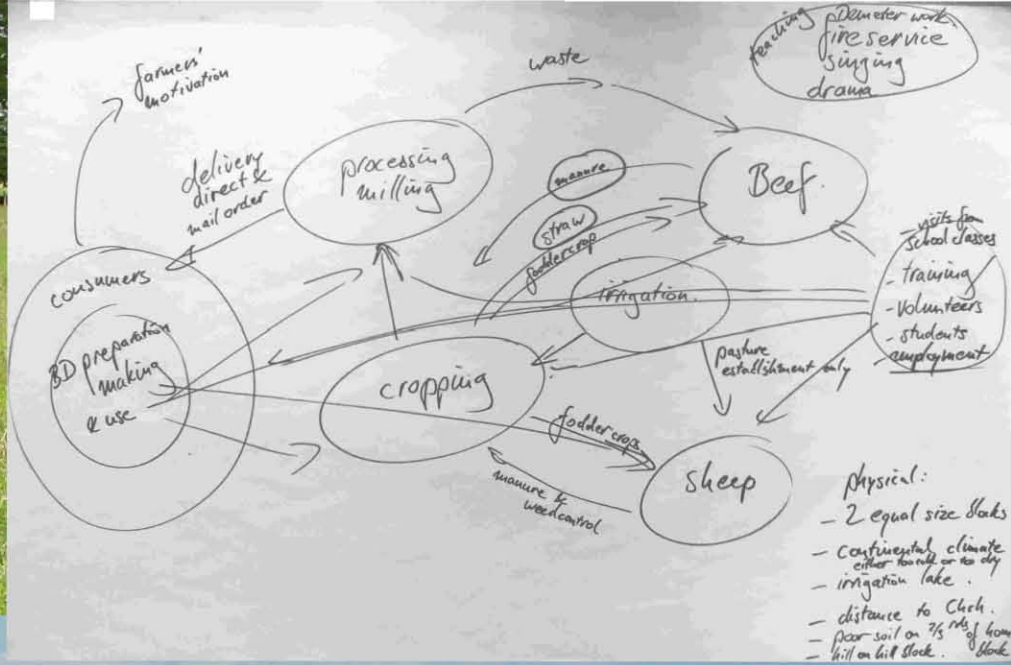
- Most intensive, most profitable – cropping, irrigation → lowest soil N.
- Least equity → developing, buying more land, infrastructure, equipment (tractors etc.)
- Profit most variable, highest working expenses and most variable → risk takers, adaptable
- Olsen P, soil N least variable, highest applied fertiliser and most variable → strict fertiliser programme responding to soil tests
- Most variable stock units/ha, more likely to deviate from farm plans → adaptable/resilient, not sustainable?

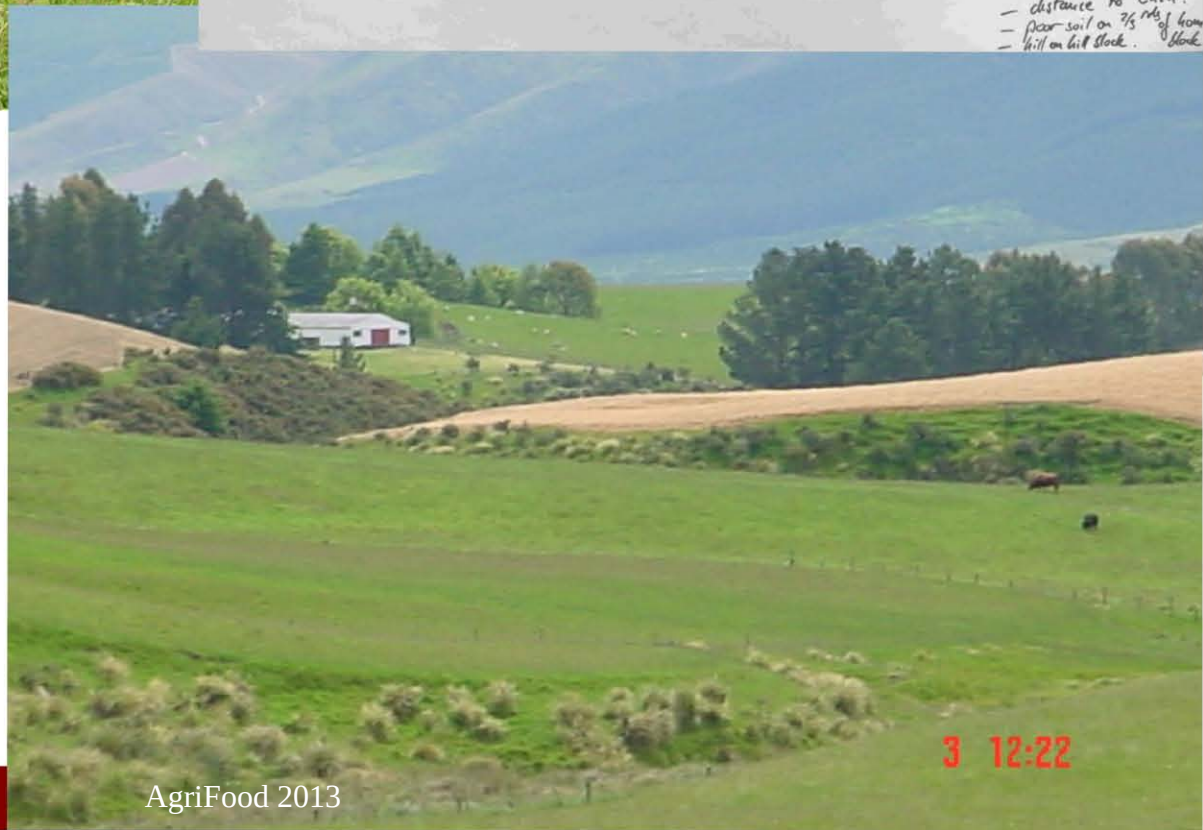

Leaf increase
Stock increase
Onions Fresh } develop co-op.
Carrots " } selling.
seed Carrots, Beetroot increase yields
reliability.
80 ha
Challenge leaf.
Integrating.
Carrot seed really well
having more than sheep.
on this farm. 20 ha.
Challenges
Capabilities of what we have
done. By not being miserable.
& by still being generous.
240 ha
Lease 3 ha
Fresh Carrots
Carrot Fly reduction
grow different places?
Integrate more crops.
Carrots.
Logistics
Managing the
diversity + distance.
150 ha HCF
Leaf done
well.
Sheep.
Heavy land.
HCF
Leaf done well
sheep done well
Heavy land.
Vision
Sailing
Visiting
Farming
travel
adventure
organic Book.
* Challenges - integrate challenges
* Not to burn out people.
* Develop systems to grow crops developed
on other peoples farms - in a way that
them + us has them wanting to do it
again.



Group 3: The organic conservers – low input, low producers with high equity

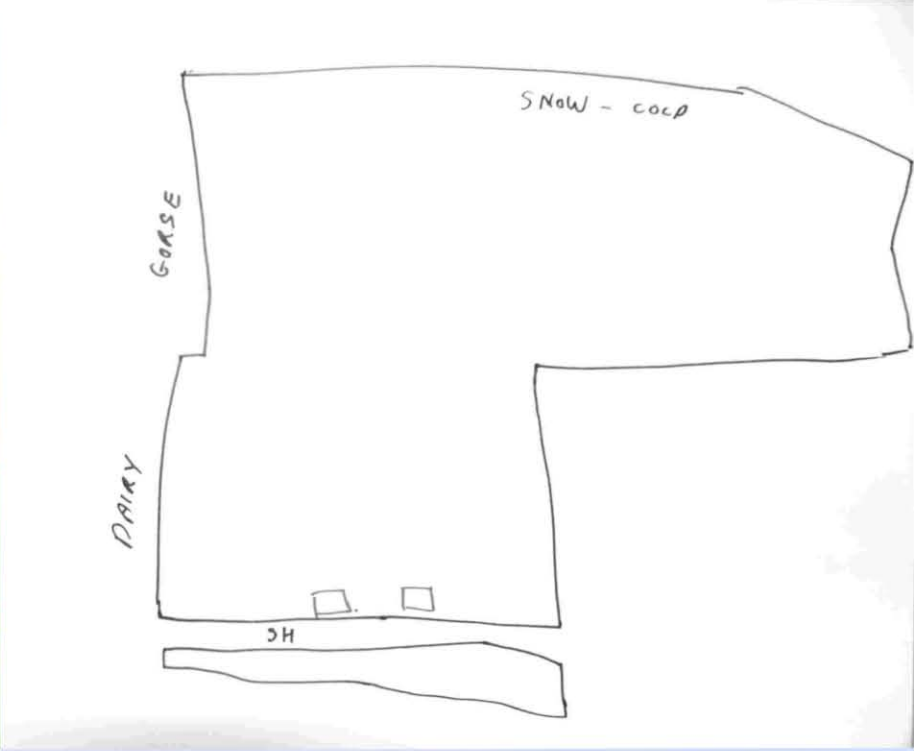
- Low production, soil resource, stock expenses, fertiliser application, high labour expenses (chargeable and non-chargeable) → organic
- Fewer years on current farm and fewer years farming → more open to alternative systems?
- Add value on-farm
- Family labour, off-farm work, generational family farms → high equity, manage low profit
- Resilient and sustainable?

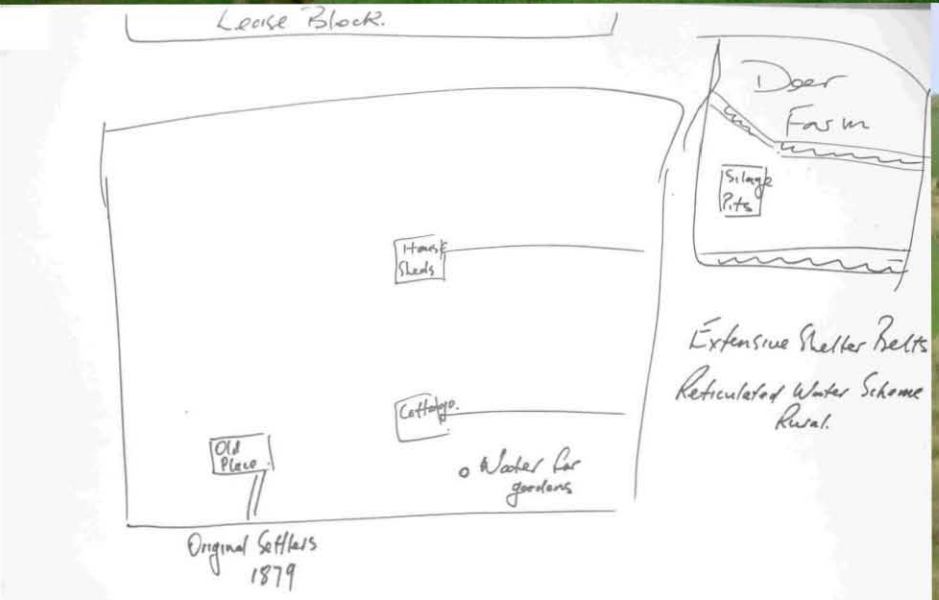

farmers' motivation
waste
delivery direct & mail order
processing milling
Beef
consumers
cropping
irrigation
sheep
fodder crops
manure & weedcontrol
pasture establishment only
- visits from school classes
- training
- volunteers
- students
- employment
physical:
- 2 equal size stocks
- continental climate
- irrigation lake
- distance to Chch.
- poor soil on 2/3 rds of hom
- hill on hill stock.


3 12:22

Group 4: extensive, low production, high soil resource

- Largest farms → lower production, lambing %, profit measured /ha
- High soil resource → high but variable maintenance fertiliser application
- Greatest change in Repairs and Maintenance, stock and pasture expenses (and this is /ha) → development out of profit?
- High density of introduced birds
- ‘Good’ citizens → ‘most agreeable’ responses in farm survey, cautious, traditional values
- Moving to Group 5?


SNOW - COLD
GORSE
DAIRY
SH


Leoise Block.
Deer Farm
Silage Pits
House Sheds
Cottages.
Old Place
Water for gardens
Extensive Shelter Belts
Reticulated Water Scheme Rural.
Original Settlers 1879

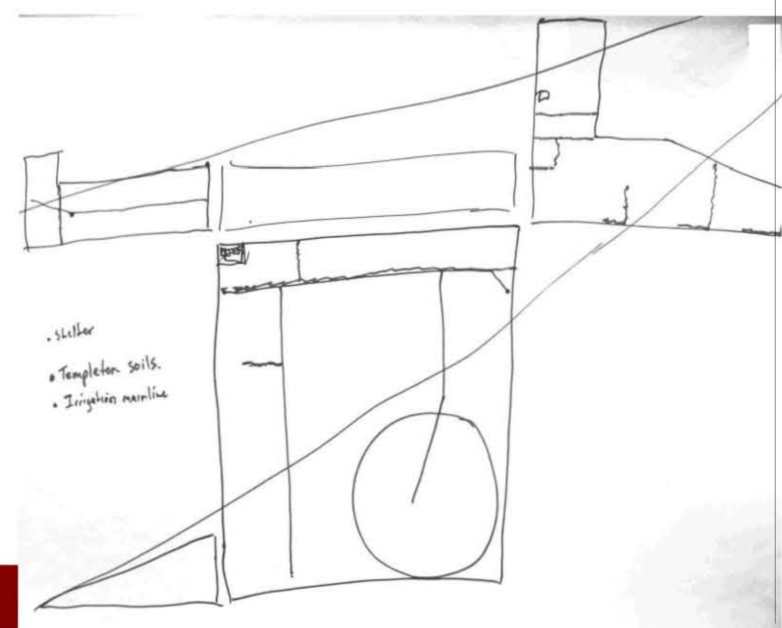

10 9:48

Group 5: Stable, continuous improvers – most efficient, consistent and profitable

- Highest level of profit (NFPBT) → importance of unpaid labour and feed stored
- Highest production
- Most efficient – FWE/GFR, lambing, profit/stock unit → belt tightening?, high lambing %
- Consistency over the years – profit, efficiency
- Low expenses except for consistently high pasture expenses →consistent input into pasture improvement and replacement
- Low bird density


trees (shelter)
cattle yards
sheep yards, work shop, garage
house
Impliment shed
hayshed
cultivated
sheep
scrub position
N
Bush
Bush
Neighbours
regeneration (gravel)


School
Close to Town
Wait-Rose $ land.
New Zealand $
Dairy out. pay
$ Lucerne. Baylage.
OFF Farm income.
House. Family.
Holidays.
Lanes. ease of mangement and fit stock.
Weather.
pay debt off
Lanes.
Very good soil.
Tree Block
Cow's
Good natural shelter.
lay of land.
Sheep genenic's
Wool
New grasses
Fertiliser
Tree Block.
Next egg


• Shelter
• Templeton soils.
• Irrigation mainline

How are these two properties different?

Overall strategies – managing complexity or providing choices?

- Diversification of sources of income – breeding, finishing, changing sheep/beef ratio, cropping, dairy support, emphasis on wool, differing selling options.
- Land use/environmental management: cropping ←→ sheep/beef, purchase of run-off land, irrigation, high/low input.
- Division of labour – paid/unpaid.
- Management system – organic/conventional/differing audit requirements.
- Interaction between efficiency and investment – belt tightening vs expenditure, unexpected environmental benefits for biodiversity.
- Consistency and variability – sustainability and/or resilience.

Sustainability and resilience of rural landscapes and the people who live in and off the rural landscape

- Change happens!
- Is it all about money? What is the role of financial success in the resilience and sustainability of landscapes?
- Sustainable intensification?
- Does keeping costs low mean that resources/landscapes become run down?
- Emergence and choice – possibilities, diversification, freedom to be different, modelling difference.

How would you advise farmers to be resilient and sustainable?

How would you advise farmers to keep their land resilient and sustainable?

How would design policy which maintains or increases landscape sustainability and resilience?

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Thanks to ARGOS team, Funders – FRST/MSI/MBIE, and others

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