

Demonstration farms – what was done, what are we learning?

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The acid test

- the work discussed today has identified options for farm improvement designed to:
 - ↳ improve farm incomes
 - ↳ help rehabilitate the grasslands
- this paper presents some initial results, testing what can be done on farms
- an aim is to develop a methodology that can then be applied on a larger scale

The challenge

Changing farm practices is one of the bigger challenges we face

- ➔ farmer behaviour is conditioned by many factors, of which improving income is only one and improving grassland may be low on their priorities
- ➔ how do we help farmers move from subsistence to being a farm business?

Farmer development

- grassland farmers / herders are moving from a subsistence economy
user ➔ keeper ➔ producer ➔ breeder[#]
- few seem to be “producer / breeder”, where better management of grasslands and livestock to improve system output is more common, and open to changing practices

Luke (1989), Neidhardt *et al.* (1996)

Farm improvement

- a step by step continual process
- only the initial steps considered here
 - ↳ aim is to initiate changes that can be built upon over time to:
 - improve household net incomes &
 - rehabilitate the grassland resource

Participants & sites

- Inner Mongolia Agricultural University
 - ↳ Siziwang, desert steppe
- Grassland Research Institute (CAAS)
 - ↳ Taipusi, typical steppe

Design

- in each village
 - ↳ 3 control farms
 - ↳ 3 demonstration farms
- Monitoring
 - ↳ June 2007 – all animals (4,500) assessed
 - ↳ August 2007 – animals to cull or keep determined
 - ↳ October, December 2007, and April 2008 all animals weighed and assessed

FARM STRATEGY

Plans: Finance

1. to minimise transition costs to a more productive state
 - ➔ culling unproductive animals can provide income to purchase more, better quality fodder and better replacement livestock
2. once farms in a more productive state to consider options for improving market power

Plans: Grassland management

1. reduce stocking rates and only graze in summer above a minimum herbage mass and when the grass is green
 - ➔ typically graze June to September, inclusive
 - ➔ do not graze through autumn, winter and spring when the grass is frosted
2. when reduced stocking rates are in place then investigate options for better grassland management by grazing

Plans: Animal management

1. cull the unproductive animals and keep a nucleus group of animals that will produce the products required
 - ➔ often up to half the animals can be culled
 - ➔ aim to move from survival to maintenance
2. once unproductive animals removed then resolve objectives
 - ➔ breeding Vs finishing
 - ➔ fibre Vs meat or milk
 - ➔ aim to move from maintenance to production

Plans: Animal nutrition

1. feed supply per head should increase as animal number decreases
 - ➔ pen feed through autumn, winter & spring
 - ➔ use better quality feed at critical times *e.g.* lambing
 - ➔ purchase more quality fodder
 - ➔ aim to move from subsistence to maintenance
2. investigate growing or purchasing more quality fodder
 - ➔ to move from maintenance to production

Improving sheep survival feeding

Month	Animal calendar	Good feed (<i>e.g.</i> corn) (g/hd/day)	Medium feed (<i>e.g.</i> silage) (kg/hd/day)	Poor feed (<i>e.g.</i> hay) (kg/hd/day)	Minerals
9. September	selling, mating				
10. October	mating, vet			1	
11. November				1	
12. December			1 (or 0.5 +	0.5)	add
1. January		150	1		add
2. February	lambing, kidding	400	1		add
3. March	lactating	400	1		add
4. April		(200)	(0.5)	1	
5. May	vaccine, drench			1	
6. June	selling			1	
7. July					
8. August					

Plans: Infrastructure

1. use greenhouse sheds for livestock through autumn, winter and spring
 - ➔ modify yards with fencing and races to ease livestock management
2. improve boundary fencing and investigate subdivision fencing and watering points to better manage grasslands

Precision livestock management

- selecting the animals to keep
- inspection of animals on farms found:
 - ↳ many were old and arguably unproductive
 - ↳ condition of teeth and udders often poor
 - ↳ little consideration of lifetime productivity
- developed a tool to value each animal on a farm
 - ↳ estimated production functions as Chinese sheep and goats seem more robust than Australian or European

Valuing animals

based on

- ability to produce saleable product in the next year (or two for maiden ewes and does)
 - ➔ lambs / kids meat value, wool and cashmere yield
- lambing ability related to teeth, udder condition, liveweight and condition score
- used average values for inputs and outputs
- a gross margin for each animal was then estimated
 - ➔ animals then ranked from best to worst to derive a cumulative gross margin for the farm

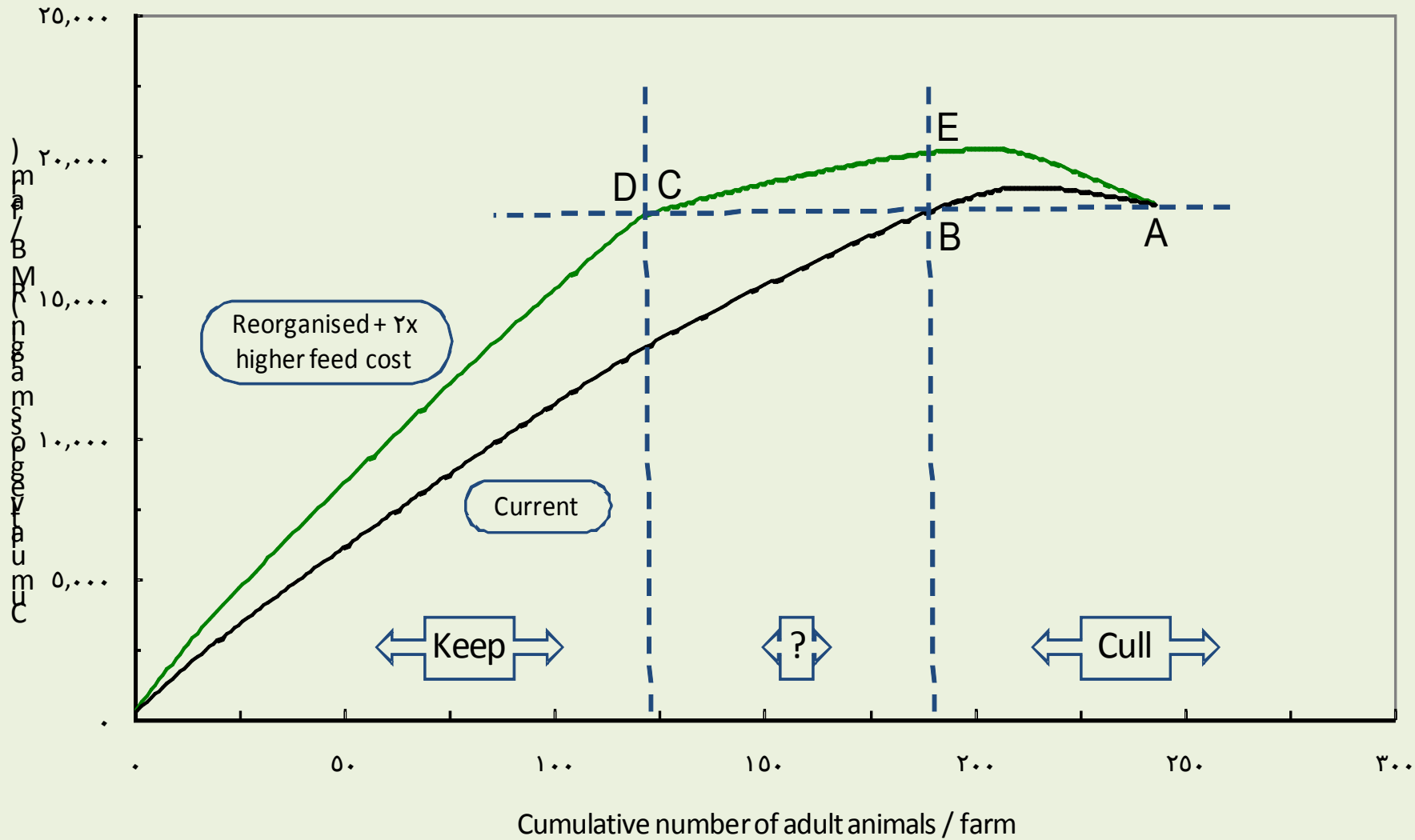
Valuing reduced stock numbers

to estimate the value of reduced stock numbers it was assumed that the feed supply would be increased with benefits for animal production

a doubling in supplementary feed per head for animals that were typically losing weight could increase annual productivity per head by 50%

- some limits varied depending upon what farms did
- increased feed supply applied to better animals

SEY Demonstration Farm: all livestock > 1 year old



Animal categories

1. keep – considered to be profitable
2. check – marginal, check if they could produce a positive net income next year
 - ➔ use this group to have a discussion with farmers about what to keep or cull
3. cull – doubtful they would return a positive net income

Model assumptions

- model is driven by estimates of lambs weaned
 - ↳ which depends upon teeth, liveweight, udder and fat score
 - ↳ could not use relationships developed in Australia
- predictions of lambing was significantly correlated with what happened in following year

What did farmers do?

- Finance

- ↳ did sell animals that would provide extra income
 - demonstration farms sold more than controls

- Grassland Management

- ↳ did reduce stocking rates after summer, even in common grazing lands
- ↳ but kept grazing through autumn, winter and spring

What did farmers do (2)?

- Animal management
 - ↳ animal numbers were reduced
 - ↳ did not keep the best and cull the worst
 - Taipusi farmers sold more of the larger animals
- Animal nutrition
 - ↳ did support plan to feed appropriately
 - ↳ but didn't buy more quality fodder, nor enough to feed through the whole autumn, winter, spring
 - ↳ one farmer split his flock and those that did not graze in winter were larger in spring

What did farmers do (3)?

- Infrastructure
 - ↳ did use greenhouse sheds
 - ↳ but still grazed on cold days
 - ↳ no yard improvements

Consequences: Siziwang farms

Scenario	Feeding rate / head	Animal number / farm	Total / feed cost / farm	Net income / farm	Cull sales	Net income + sales
No change	current	249	11,472	15,460	0	15,460
Actual cull	current	153	6,957	10,631	23,040	33,671
Actual cull	improved	153	11,465	12,060	23,040	35,100
Recommended cull	current	134	6,127	12,441	27,680	40,121
Recommended cull	improved	134	11,451	15,497	27,680	43,177

Consequences: Taipusi farms

Scenario	Feeding rate / head	Animal number / farm	Total / feed cost / farm	Net income / farm	Cull sales	Net income + sales
No change	current	103	2,053	8,146	0	8,146
Actual cull	current	54	1,073	4,436	11,760	16,196
Actual cull	improved	54	2,032	5,734	11,760	17,494
Recommended cull	current	41	813	5,250	14,880	20,130
Recommended cull	improved	41	2,060	8,516	14,880	23,396

What did we learn in year 1?

- farmers appreciate the need to reduce animal numbers:
 - ➔ Siziwang farmers supported recommendations better than the poorer farmers at Taipusi
 - ➔ **but** traders demanded the better animals rather than farmers offering cull animals
 - ➔ often sold the bigger and better animals – a short-term view – what was done with income?
 - ➔ precision livestock management is a new concept

What did we learn in year 1 (2)?

- early summer grazing bans are accepted, but a winter grazing ban is not
 - ↳ belief that any 'pick' is better than nothing
 - ↳ poor understanding of energy balance
- they do understand better feeding regimes but are wary of expense; unfamiliar with responses
- effective use of greenhouse is poorly understood
 - ↳ need rules *e.g.* based on temperatures and wind speed *etc.*, as to when to graze

What next?

- revise the demonstration farm plans in the light of results from year 1
 - ↳ need more regular visits from senior staff to farms
- develop additional training material to explain key concepts in precision livestock management to collaborators, to officials and to farmers

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