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A participatory evaluation of out-of-season beef cattle finishing systems in the lower North Island

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ABSTRACT

Beef cattle slaughter in New Zealand continues to be strongly seasonal, despite various initiatives by meat processing companies to alter the pattern of supply of cattle for slaughter. The farmer's perspective of out-of-season (OOS) production systems (August - October supply) and the biological and financial feasibility of these was investigated through a participatory approach to farm system modeling. Three case farms were modeled using STOCKPOL and alternative cattle policies that provided a greater proportion of cattle for slaughter in OOS and shoulder (November - December and June - July) months were investigated with the farmers. Even with premiums 20% above schedule, farmers were unwilling to change policies to OOS. They were concerned about increased business risk, poorer feed quality, increased pasture pugging, greater workload over the busy lambing/calving period, poorer overall suitability to the property and conflict with personal preference. They were more receptive to policies that would increase shoulder production and this factor combined with off-farm improvements in technology for delivering fresh products to overseas destinations may be sufficient to gain new or greater access to high value markets.

Keywords: Beef production; out-of-season; modeling; farmer participation.

INTRODUCTION

Beef cattle slaughter in New Zealand, despite various price incentives to farmers in the form of premiums, pool payments and contracts, continues to be strongly seasonal. Seasonal supply limits the development of higher priced markets that require short shelf-life beef cuts (Frith 1992) and lowers the utilisation of capital and human resources in meat processing plants (Sheppard 1982). While technology has enabled the shelf-life of chilled products to be extended, and therefore reduced the imperative for a more uniform supply of cattle for slaughter, inefficiencies in the processing and transport sectors remain. Off-farm, this problem can be addressed by rationalising plant capacity and labour management; on-farm a greater level of adoption of out-of-season production (OOS) systems would alleviate the seasonality of beef cattle presented for slaughter. Out-of-season supply refers to the August-October

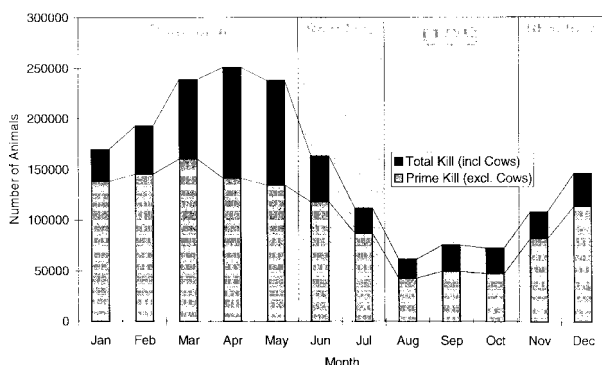
period, "Shoulder" supply is in June-July and November-December and "Traditional" supply occurs between January and May (Figure 1). This paper presents farm case studies of the physical and financial feasibility of implementing OOS production systems based on a participatory modeling analysis of alternative systems with three case farmers. The research reported here represents the third phase of a farming systems research design, an overview of which is presented in Sherlock *et al.* (1997).

METHOD

Modeling analysis

Farmer concerns about OOS production were investigated using STOCKPOL (Marshall *et al.* 1991) and interactive feedback from the farmer. The present production system and alternative beef finishing policies, that incorporated OOS and shoulder production options, were simulated with STOCKPOL. The model output describing farm pasture cover, pasture quality, live weight changes, final carcass weights and the gross margin (GM) was discussed with the farmer and modifications were made to better meet personal expectations and to address concerns not clearly reflected by the model. Once the farmer was satisfied with the realism of the various policy simulations for the farm, the possibility of them being adopted was discussed. The discussion covered premiums, production and price risk (Martin 1994), workload, required management expertise and the "fit" with other components of the farm business. For all policies, the non-cattle enterprise remained fixed and the same quantity of feed was grown to identify the effect of cattle policy, rather than other, changes to the

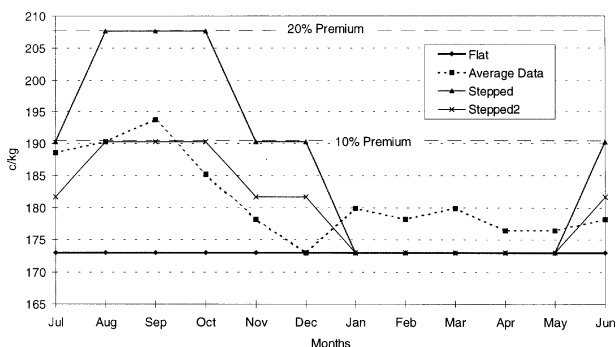
FIGURE 1: Definition of OOS, Shoulder and Traditional beef production periods relative to the average number of beef cattle slaughtered between 1991-1994.



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system. The pasture growth sub-model within STOCKPOL accounts for pasture cover effects on pasture quality through rates of senescence and decay. Thus, the relative efficiency of the cattle policies in matching the normal pattern of pasture growth for the farm was assessed. The number of cattle and patterns of liveweight gain were modified in discussion with the farmer to ensure biological feasibility, approximately the same total consumption of DM by cattle and the best possible level of pasture utilisation for each cattle policy. Premiums above schedule were applied to cattle sales as presented in Figure 2.

FIGURE 2: Beef schedule price patterns used in the case farm gross margin analysis.



Case farm descriptions

Characteristics of the three case farms are summarised in Table 2. The farming systems reflected the climate and topography of each property. On Farm A ca. 70 steers, purchased at 18 months of age, are sold before Christmas at an average carcass weight (cwt) of 310 kg. Seventy bulls are sold at a similar time and cwt after being purchased as calves in the spring (some), or as weaners in the autumn (the majority). On average 60% of the cattle are sold in the OOS months and 40% are sold during the shoulder months. The cattle policies investigated with the farmer were: finish 126 cattle at 295 kg cwt and 100% OOS (ALL OOS1); finish 115 cattle at 316 kg cwt and 100% OOS (ALLOOS2); finish 139 cattle at 316 kg cwt and 100% in shoulder months; and finish 161 cattle at an average of 308 kg cwt with 50% in traditional months of supply and 50% during shoulder months.

TABLE 1: Summary of case farm characteristics.

Farm	A	B	C
Locality	Manawatu Lowland	Northern Manawatu Hill Country	Taihape Hill Country
Rainfall (mm)	900	900	800
Soil Drainage	Poor	Medium	Medium-good
Area (ha)	100	370	500
Flat Land (ha)	100	80	80
Cash Crop (ha)	55	-	16
Sheep:Cattle (Winter)	20:80	70:30	60:40

The cattle policy comprises ca. 100 rising two year (R2yr) steers bought each autumn and sold the following December - February at ca. 325 kg cwt weight. The alternative cattle policies investigated for this farm were:

finish 94 steers (50% traditional and 50% shoulder) at 326 kg cwt weight (Base); finish 153 steers at 30 - 40 months of age from January - May for an average cwt weight of 307 kg (Traditional); finish 107 steers at 40 months of age, all OOS, at 324 kg cwt (All OOS); finish 106 cattle at 36 - 40 months, 50% OOS and 50% traditional, at a cwt weight of 325 kg (OOS/Trad); and finish 153 cattle at 30 - 36 months of age at 292 kg cwt (OOS/Trad2).

Case C - Taihape easy hill country

The 500 ha Taihape farm is situated 620 m asl and comprises 80 ha of flat land; the balance is hilly. The ash-greywacke soils have medium to good natural drainage. Annual rainfall averages 800 mm. Winters are cold and wet; dry summers are infrequent. Some (16 ha) of the flats are planted in barley each year and 50% of this area provides a winter fodder crop for lambs and young cattle. The flock of 2500 Romney ewes lamb from 8 September and have produced a 115% lambing in recent years. Non-replacements lambs are drafted at 16.5 kg cwt weight from January - April. The beef enterprise includes 115 cows and replacements. Heifers are mated at 15 months and calving commences 30 August. A 90% calving is usual. Non-replacement calves are wintered and finished at ca. 18 months of age at a cwt weight of 225 and 305 kg, respectively, for the heifers and steers. Around 170 steers are bought in late spring for sale from late February - June at an average cwt weight of 335 kg. The cattle policies evaluated on this property included: the base shoulder/traditional supply (as described above); 100% OOS supply of 177 cattle as 2 and 3 yr olds at a 326 kg cwt weight (OOS); finish 241 cattle at 20-34 months of age at 307 kg cwt weight, all in the shoulder months (Shoulder); as for "Shoulder" but finish 283 cattle in the traditional supply period (Traditional); and a "Composite" supply of 245 head as 30% OOS, 20% Shoulder and 50% Traditional at 319 kg cwt weight.

RESULTS

Case Farm A

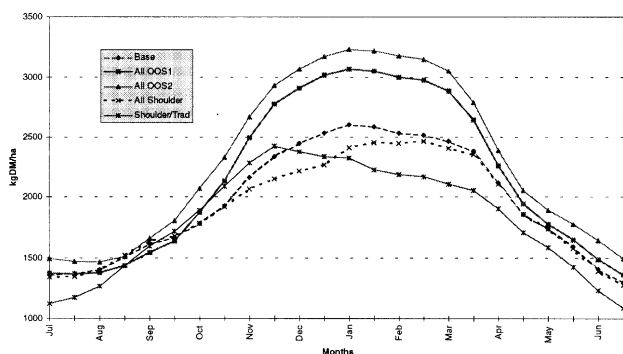
The effect of changes in the cattle policy on pasture cover, production parameters and various expressions of the farm GM are shown in Figure 3 and Table 2, respectively.

OOS production increased summer - autumn pasture covers significantly because fewer cattle were on the farm over these months. The proportion of dead material in the sward increased by 20% to 45% in February with the OOS options. Pasture utilisation ranged from 90% for 100% shoulder supply to 72 % for the OOS supply of 139 head at 321 kg cwt. Overall, pasture supply:feed demand was matched less efficiently when OOS production was increased. The GM at a constant schedule price was greatest for a Shoulder/Traditional policy mix, but with a 20% OOS premium, all Shoulder production at a GM of \$714/ha was the most profitable. Farmer A continued to prefer the existing policy because it best complemented the cropping enterprise which he wished to continue. Soil damage with OOS was a concern and the risk of being unable to

TABLE 2: Comparison of meat production and efficiency, and gross margins for alternative beef production systems on case farm A. (See Figure 2 for definition of premiums).

Price Pattern	Base	All OOS1	All OOS2	All Shoulder	Shlder/ Trad
Feed Conversion Efficiency (kg cwt sold/1000kg pasture)	79.6	80.9	83.8	79.7	84.1
Total Meat Production (kg cwt)	42,648	37,178	36,386	44,610	49,517
Average Data					
Beef GM/1000kg DM	\$55	\$51	\$65	\$55	\$58
Total Farm GM/ha	\$610	\$554	\$597	\$620	\$653
Stepped 1					
Beef GM/1000kg DM	\$69	\$68	\$83	\$67	\$62
Total Farm GM/ha	\$678	\$626	\$668	\$681	\$677
Stepped 2					
Beef GM/1000kg DM	\$58	\$52	\$65	\$59	\$57
Total Farm GM/ha	\$626	\$557	\$599	\$639	\$650

FIGURE 3: Comparison of monthly pasture covers for alternative beef production systems on case farm A.



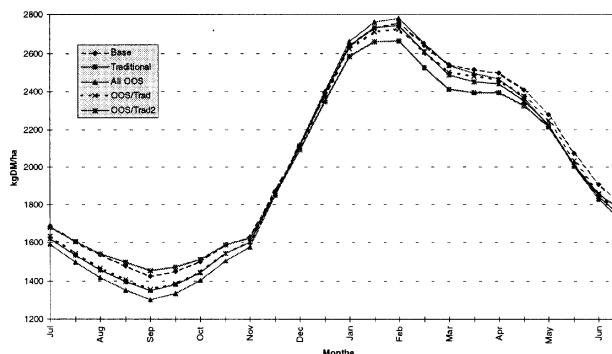
meet winter demand was perceived to be greater, despite the STOCKPOL analysis suggesting otherwise because of the reduced number of cattle wintered.

Case Farm B

Changing beef cattle policies had relatively little impact on the monthly pattern of pasture cover on Farm B, because of the low cattle:sheep ratio (Figure 4). For all policies summer pasture utilisation was poor and wastage in February ranged from 43 to 47% for the existing policy to 100% OOS supply. The Traditional cattle policy gave a marginally better fit of feed supply:demand (utilisation was between 68 and 72% for the five options). The profitability of the policies varied by up to \$19/1000 kg DM at a constant schedule and by up to \$25/1000 kg DM for the 20% OOS premium (Table 3). The farmer considered the property was best suited to a traditional finishing policy. Winter pugging, the need to buy and sell cattle on different markets, the effects of the late spring ‘grass’ market on cattle prices, and less efficient pasture control were concerns with OOS production, despite the modelling analysis suggesting this could improve overall farm profitability. The decision to adopt OOS came down to “....management preferences and how you [the farmer] perceives the diffi-

culties of producing OOS and the premium at that time of the year”. His preference was to adopt more shoulder production when premiums, though smaller, were usually available and it was “.. easier to get cattle ready to kill..”.

FIGURE 4: Comparison of monthly pasture covers for alternative beef production systems on case farm B.



Case Farm C

Altering the cattle policy would have a noticeable effect on the pattern of pasture cover from November through to May on Farm C (Figure 5). Overall OOS provided a less efficient fit with pasture supply: utilisation of pasture was estimated to be 85% for 100% Traditional vs. 79% for 100% OOS supply. The GM/1000 kg DM varied by up to \$13 at the 20% premium for OOS cattle, but overall differences in farm GM/ha between policies were small (Table 3). The farmer continued to favour the base policy of 60% Traditional: 40% Shoulder supply of cattle for slaughter. The OOS system would increase the risk of winter feed shortages and pasture damage by pugging and would probably, in his opinion, require more conservation of late spring feed and a greater area of winter crop. Pasture quality in the summer would decline (as shown by STOCKPOL). The margin for error in grazing management during the winter would be reduced and more time would need to be spent on feed budgeting and monitoring.

TABLE 3: Comparison of meat production and efficiency, and gross margins for alternative beef production systems on case farm B. (See Figure 2 for definition of premiums).

Price Pattern	Base	Trad	All OOS	OOS/Trad	OOS/Trad2
Feed Conversion Eff. (kg cwt sold/1000kg pasture)	53.8	67.5	62.9	58.1	76.4
Total Meat Production (kg cwt)	30,653	46,971	34,668	34,514	44,676
Average Data					
Beef GM/1000kg DM	\$42	\$51	\$61	\$53	\$54
Total Farm GM/ha	\$256	\$281	\$277	\$272	\$272
Stepped 1					
Beef GM/1000kg DM	\$47	\$47	\$74	\$57	\$57
Total Farm GM/ha	\$262	\$274	\$293	\$277	\$276
Stepped 2					
Beef GM/1000kg DM	\$44	\$47	\$61	\$51	\$51
Total Farm GM/ha	\$258	\$274	\$277	\$269	\$268

Increased subdivision to control cattle intake would probably be necessary. Overall, he considered the “Combination” strategy (30% OOS: 20% Shoulder: 50% Traditional) would spread risk, improve cashflow and enable premium schedules to be accessed.

DISCUSSION

In general, OOS would decrease the biological efficiency of the farming systems investigated, both in terms of pasture utilisation and conversion of pasture into saleable meat. The latter effect occurs because of changes in maintenance requirements to support cattle grown at different rates, particularly over the winter - early spring (McRae & Morris, 1984). Poorer pasture utilisation occurred mainly because of higher farm pasture covers in summer. Altering ewe feeding levels and lamb finishing dates may resolve this problem profitably.

Without premiums OOS was less profitable than other policies, except on Farm B. This related to the high rates of liveweight gain modelled for OOS supply. Even where 20% premiums were assumed OOS production was \$111 to \$101/ha less profitable on Farms A and C than shoulder and traditional sale patterns. Published schedule prices between 1991 and 1994 showed that August - October premiums averaged only 5-10% more than the schedule in April - unofficial premiums offered to indi-

FIGURE 5: Comparison of monthly pasture covers for alternative beef production systems on case farm C.

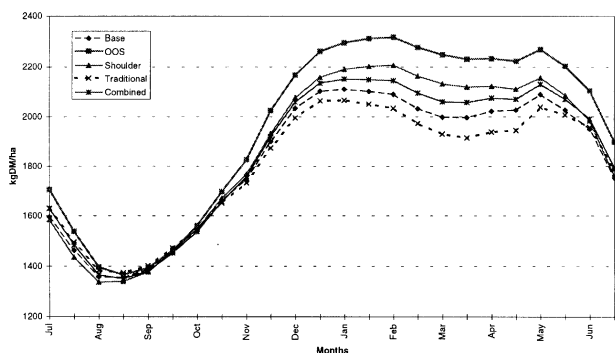


TABLE 4: Comparison of meat production and efficiency, and gross margins for alternative beef production systems on case farm C. (See Figure 2 for definition of premiums).

Price Pattern	Base	OOS	Shoulder	Trad	Combined
Feed Conversion Efficiency (kg cwt sold/1000kg pasture)	25.9	25.1	25.5	26.3	24.0
Total Meat Production (kg cwt)	25,032	17,864	23,219	26,512	21,675
Average Data					
Beef GM/1000kg DM	\$70	\$68	\$70	\$71	\$70
Total Farm GM/ha	\$449	\$415	\$433	\$457	\$440
Stepped 1					
Beef GM/1000kg DM	\$71	\$79	\$76	\$68	\$73
Total Farm GM/ha	\$450	\$439	\$449	\$448	\$448
Stepped 2					
Beef GM/1000kg DM	\$69	\$68	\$70	\$68	\$69
Total Farm GM/ha	\$445	\$415	\$434	\$448	\$436

vidual farmers may have been greater than this. Nevertheless, processing spokespersons suggested that even with a more uniform through-put of cattle it would be difficult to recover the cost of OOS premiums of 20% or more above schedule (Sherlock *et al.* 1997).

Each of the case farmers thought OOS was less suited to their property. In addition to winter feed shortages and pasture pugging, they were concerned about increased risk, the ability to achieve target winter liveweight gains, poorer summer feed quality and increased workload around the busy lambing/calving period. Personal preferences concerning the "way they would like to farm" was an overriding factor. The latter meant some of the farmers would not change from a policy they were experienced with even if OOS was shown to be more profitable. Nevertheless, the case farmers were seeking to reduce the number of cattle sent for slaughter in the peak supply months and in this respect greater shoulder production of beef was attractive to them. This shift in production, combined with off-farm improvements in storage and transport technologies, may be sufficient to meet market requirements for fresh product.

The participatory approach adopted in this study allowed farmers to assist in calibrating the model to the farm and contribute to and discuss cattle policy design, as well as offer their personal perspective, preferences and

experience. Their input and responses explain why a number of payment initiatives by meat processing companies have failed to stimulate increased OOS production by farmers.

ACKNOWLEDGMENTS

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