THE DEVELOPMENT OF MOTIVATIONAL INCENTIVES FOR FARMERS TO ACHIEVE TUBERCULOSIS CONTROL IN NEW ZEALAND

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The Australian brushtail possum (*Trichosurus vulpecula*) is the main wildlife vector for bovine tuberculosis (TB) in New Zealand.[1] Conventional eradication programs, based on test and slaughter of cattle, have been unsuccessful in many areas due to failure to control TB in feral animals. In 1996/97 $26 million were spent on possum control, funded through the industry and government.[2] Where TB is endemic in feral possum populations, continuous control efforts are needed to keep TB incidence in livestock at low levels. Cattle and deer are tested annually, and all animals suspected to be infected must be slaughtered. Infected herds are placed under Movement Control (MC) restrictions, where all animals sold to markets must be specifically identified, and therefore are often sold at a discount.

As the number of infected herds declines, the marginal return on investment in large-scale possum control will decrease, and farmers increasingly will be expected to contribute more to TB control. Grazing management and localised possum control are the principal control measures available to farmers. These 2 measures are expected to reduce direct contact between livestock and infected, moribund possums, which is the predominant mode of TB transmission between possums and livestock.[3] Given the narrow financial margins of current livestock farming, adoption of control measures by farmers will be influenced by their expected financial impact. Partial budgeting, which considers only those items of revenue and costs that are a consequence of adopting alternative methods, is a useful method for analysing specific financial effects on the farm enterprise.

Materials and Methods

Partial budget analyses were performed for dairy farms, sheep/beef-breeding and sheep/beef-finishing farms, using the average farm sizes and production parameters of the Wairarapa region (a TB Vector Control Area in New Zealand). Additional returns from adopting control measures included increased animal value (as all animals can be sold to market without special identification and discount) and increased milk production for dairy farms (as no reactors would be culled during lactation). Because current compensation for reactors is 65% of market value, adopting control measures would reduce costs by 35% of the value of reactor animals. Additional costs include costs associated with localised possum control and grazing management in terms of poison, fencing off of high-risk areas, and labour (Table 1). Three different incentive programs (existing 65% compensation system; zero

compensation; zero compensation plus a subsidy for all poisons and materials for possum control) were evaluated for each of 4 different outcome scenarios: Reduction from 5 reactors to 2 reactors per year; Reduction from 5 reactors to zero reactors per year; Reduction from two reactors per year to one every second year; and Reduction from two reactors per year to zero reactors. Only if the reactor rate was reduced to zero and the herd was removed from MC would the additional returns of increased animal value be captured.

	Dairy farm	Beef-breeding	Beef-finishing
Increased milk production (kg milk solids/ cow not having to be slaughtered)	142.8	--	--
Discount TB reactors (slaughter)	35%	35%	35%
Annual cattle sales	50 cows 6 rising 2yr heifers 10 rising 1yr heifers	17 cows 42 weaner steers 21 weaner heifers	70 slaughter beef
Discount 'white tagged' (live animals)	10%	15%	--
Animal value > 2yrs	$ 425	$ 348	$ 485
Animal value 1 – 2 yrs	$ 375	$ 348	$ 348
Animal value 6wks – 1 yr	$ 188	$ 158 steers to 18mths $ 248	
Additional labour cost	100 hrs/yr	110 hrs/yr	55 hrs/yr
Additional fencing cost	--	$500/yr	$250/yr
Trapping/poisoning cost	$90/yr	$435/yr	$215/yr

Table 1. Parameters used for the 3 farm-types for partial budget analyses of implementing on-farm control measures for TB (in US dollars)

Results

Table 2 summarizes the expected financial outcomes from the partial budget analyses.

	Dairy			Beef-breeding			Beef-finishing		
Reactor reduction	65% comp.	0% comp.	0%+ poison subsidy	65% comp.	0% comp.	0%+ poison subsidy	65% comp.	0% comp.	0% + poison subsidy
5 -> 2	534	1,363	1,453	-1,230	-553	-118	-286	660	875
5 -> 0	3,875	5,269	5,359	1,903	3032	3467	54	1630	1845
2 -> 0.5	-78	337	427	-1,413	-1074	-639	-541	-68	148
2 -> 0	2,664	3,216	3,306	1,538	1990	2424	-456	175	390

Table 2. Financial gains in various outcome scenarios for the three farm types under 65% compensation for reactors, zero compensation, or zero compensation plus poison subsidy (in $US).

For dairy farms it was financially beneficial to implement control measures in almost all situations. In contrast, for beef-breeding farms adoption of control measures was only beneficial if the herd came off movement control.

Discussion

Declining margins in livestock farming have brought increasing scrutiny by farmers of all financial and management decisions, including investments in TB control. Farmers are more likely to adopt control programs that are expected to realise a substantial net gain. Under the current provision of 65% compensation for reactor animals, it is almost always beneficial for dairy farmers to implement on-farm TB control programs, and particularly if the herd is freed from MC. If all compensation for reactors were abandoned, then implementation of control would always be beneficial, regardless of whether the herd avoids MC. Providing a subsidy for poison and bait stations would have little effect on the net gain for dairy farms.

Beef-breeding farms obtain substantial income from selling live animals to market instead of slaughter. Under the current regulations, implementation of on-farm control programs by beef-breeding farms results in a net benefit of around $ 1500 to 2000 US only if the herd achieves zero reactors and is freed from MC. If the herd remains on MC, the implementation of the control measures results in a net loss. In this situation, the farm invests money on control, but is unable to capture increased value for live animals. Even if compensation were removed and poison supplied, there would still be a net loss from possum control for herds that remain infected.

Beef-finishing farms sell animals only to slaughter and therefore do not capture increased animal value if they are removed from MC. Implementation of on-farm control measures on these farms would incur a higher net loss than for beef-breeding farms. With the current 65% compensation, beef-finishing farms have to save at least five animals from becoming reactors to make it financially beneficial to implement on-farm control measures. If compensation were removed, a net gain would result in most situations. However, if poison were provided free, then control would be financially beneficial in all scenarios.

In recent years, many beef-breeding farms in the Wairarapa region changed their stock management and selling policies towards sale for slaughter. They reduced breeding stock numbers and shifted towards finishing all stock to slaughter weight. This reduced the impact of TB status on farm income, which did not depend on selling live animals at markets. Thus herds could remain infected and only incur the costs of reactors, achieving an equivalent situation to that of beef-finishing farms. Removal of compensation and provision of free supplies of poison and bait stations could provide sufficient incentive for beef-farmers to implement on-farm control measures and achieve the eradication of TB from their herds.

References

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