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Economic evaluation of new sheep and wool industry technologies

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Australian Sheep Industry CRC

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Successful research and development (R&D) investments allow for the creation and adoption of new technologies that lead to increases in productivity (Alston, Norton and Pardy 1995). In the Australian sheep meat and wool industries, R&D investments are made by the Australian Sheep Industry CRC and other research providers throughout the different sectors of the production, processing and marketing chain. These investments are funded by government and the private sector along with producer contributions generated from levies on wool and livestock sales.

Knowledge about the size and distribution of returns from alternative broad types of research investments permit strategic level decisions about resource allocation, within and across research programs, to be made. Zhao et al(2000) provide an example of this type of work for the Australian beef industry.

An equilibrium displacement model of the Australian sheep meat and wool industries was developed to account for the close cross commodity relationships that exist between these industries. The potential annual returns and their distribution among the various industry sectors were estimated from six different hypothetical R&D scenarios to demonstrate the model's relevance to R&D policy and decision-making. The six scenarios were (1) genetic technology in breeding sheep, (2) quality improvement in producing merino wool, (3) wool warehousing/sale technology, (4) quality improvement in producing prime lamb, (5) lamb slaughtering and processing technology, (6) lamb domestic retail sales technology. Base values in the model were specified using 2002–03 aggregate prices and quantities.

Table 1. Potential Annual Returns (in $ million) and Percentage Shares of Returns to Various Industry Groups (in %) from Six Hypothetical Sheep Industry R&D Scenarios

	Sheep Breeding $m (%)	Wool Quality $m (%)	Wool Warehousing $m (%)	Lamb Quality $m (%)	Lamb Processing $m (%)	Lamb Retailing $m (%)
Sheep Producers	13.4 (47)	14.5 (42)	0.5 (38)	9.5 (36)	0.4 (33)	4.0 (32)
Processors/ Marketers	0.8 (3)	1.0 (3)	0.1 (8)	1.6 (6)	0.1 (9)	1.0 (8)
Export Consumers	11.0 (39)	14.6 (43)	0.6 (46)	8.1 (31)	0.4 (33)	3.5 (27)
Domestic Consumers	3.0 (11)	4.1 (12)	0.1 (8)	6.9 (27)	0.3 (25)	4.1 (33)
Total	28.2 (100)	34.2 (100)	1.3 (100)	26.1 (100)	1.2 (100)	12.6 (100)

Preliminary results indicated that wool quality improvement generated the greatest potential additional annual returns to the sheep and wool industries ($34.2 million). Sheep producers received the largest share of benefits (47%) from a genetic technology. In the same scenario export consumers gained 39% of the additional returns, domestic consumers 11% and processors and marketers 3%. The lowest overall industry returns were associated with a lamb processing technology. All of these results are based on hypothetical 1% shifts in demand or supply curves. The costs of achieving these shifts are not taken into consideration and the results are conditional on the price, quantity and parameter values used in the model.

Alston, J. M., Norton, G. W. and Pardy, P. G., 1995. Science Under Scarcity: Principles and Practice for Agricultural Research Evaluation and Priority Setting, Cornell University Press, Ithaca and London.

Zhao, X., Mullen. J. D., Griffith, G. R., Griffiths. W. E. and Piggott. R.R., 2000. An Equilibrium Displacement Model of the Australian Beef Industry, Economic Research Report No. 4, NSW Agriculture, Orange.