

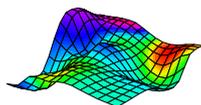
Report to
Australian Wool Innovation

Benefit Cost Analysis of AWI's Wild Dog Investment

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August 2012



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BACKGROUND

BDA Group was commissioned by AWI to complete a benefit cost analysis of their research & development investment into wild dog management and control. This investment was made under AWI's 2010-13 Strategic Plan, On-Farm R&D Strategy 1 Sheep Health, Welfare and Productivity, Program 2(d) Reduce Impact of Dog Predation. The analysis was completed with the primary purpose of providing a robust assessment of the potential returns to Australian wool growers from that investment.

The analysis reported here also includes a Program Investment Logic which provides a brief summary of the value of the investment to Australian Wool Growers, investment targets and activities and identified funding gaps that will aid in directing future funding in this area (Attachment).

INVESTMENT

In June 2011 AWI shifted its investment emphasis in wild dog control away from the support of the development of lower cost control technologies to supporting woolgrowers combat wild dog populations directly¹. A breakdown of the total investment cost by AWI is provided in the attachment over the life of the current strategic plan. For the purpose of this evaluation the focus is on the investment from July 2011 onwards. AWI Investment was estimated at \$1.5m year.

Investment in 2011/12 included:

- (1) Support of community groups undertaking wild dog control (WP538, WP509, WP474, WP479, WP448, WP485, WP514 & WP508).

AWI funds were allocated to community groups to support their efforts to reduce wild dog numbers. Investment funds are used for a range of activities including the purchase of meat for baiting, freezing equipment to prevent meat spoilage and the cost of engaging professional dog controllers. Support was also provided for the wool grower representatives on the National Wild Dog Management Committee and the National Wild Dog Facilitator who also acts as the Executive Officer for that committee.

- (2) Training (WP425, WP552, WP473)

AWI funds were provided for training of dog controllers and wool growers through a range of activities, and demonstration sites run by the Invasive Animal CRC at Glen Innes.

¹ AWI Position statement. Implication that previous investment by AWI and other parties on wild dog control has had limited effectiveness and hence value to Australian woolgrowers.

(3) Support of R&D into Lower Cost Control Alternatives (WP485)

AWI funds were allocated to the development of a lethal attachment to a padded dog trap.

(4) Control Efficacy (WP477)

AWI funds will be invested over 3 years to monitor the effectiveness of a reduced baiting rate as required by APVMA.

NATURE OF BENEFITS

There are two issues that are relevant to the estimation of benefits that can be attributed to AWI's investment.

- (1) Investment is made to reduce the losses (mortality, injury and wool discounts) from dog predation on wool growing enterprises.
- (2) Investment is made by other agencies and wool growers themselves and would continue to be made, to some extent, without AWI's contribution to the total investment.

1 Reduced Losses

Estimates have been made of the total cost of wild dog predation on wool growing and other livestock grazing industries, being based on the observed extent of stock losses in areas where dog predation is an issue (peri-urban, cattle grazing and mining areas and lands near state and national parks and reserves)². These studies typically look at control costs by private and public agencies and hypothesise a potential reduction in stock losses as a result of this control expenditure. At the individual farm level there would be some appreciation of the reduction in stock losses as a result of their own investment, made against a background of investment by other parties.

Various estimates have been made of the cost to wool growers from dog predation. A recent review by The Mackinnon Project³ estimated that wild dog predation was costing Victorian farmers in East Gippsland and North East Victoria \$1.50 per dse⁴ carried for every 1% of stock

² 2011 study by Tyne Group for Victorian DPI, 2009 Queensland study by Agforce and 2009 study by IACRC.

³ The Mackinnon Project 2011 (university of Melbourne) Quantify the benefits of wild dog control for farmers. Prepared as part of project WP508 milestone reporting to AWI.

⁴ Dry sheep equivalent

losses (dse basis using current wool and livestock prices). Average losses Australia wide have been estimated at \$9.40 per sheep carried⁵ (across 5m sheep affected by dog predation) and between \$1.40 and \$24 per dse carried across different regions in Victoria. It is clear that wild dog predation can inflict heavy losses on wool growing enterprises and that the extent of such losses will vary depending on the intensity of dog predation and farm level control undertaken.

Apart from the direct economic consequences of stock losses from dog predation there is also a recognised emotional impact on graziers⁶. On this basis, estimating stock losses solely on the basis of their economic value would understate the true value placed on wild dog control by graziers. The Hunt (2005) study reports that the cost per sheep saved is around \$475, which, if taken as the minimum benefit per sheep saved, would include the economic saving to growers as well as the emotional benefit.

There have also been reported losses from dog predation as a result of predation on native fauna and the transmission of diseases such as hydatids⁷.

2 Investment by Other Agencies

The second issue that is relevant to the estimation of benefits from AWI investment is the extent of investment that would be made by other agents in the absence of AWI funding. At the extreme, if AWI funding simply replaced funding by other parties then there would be no benefits that could be attributed to the AWI investment.

Wool growers in most states have an obligation to control wild dogs on their property as it is a declared pest species. However, because the species cannot be eradicated and populations exist outside their property they may not be able to cost effectively control the level of predation on their flocks. However, they will continue to invest in dog control if their investment delivers a net benefit to them.

Other landowners may have little incentive to control wild dogs as they do not significantly impact on the economic viability of their operations, or the environmental amenity value of the site.

From a government perspective there is a rationale for intervening in wild dog management because the optimal level of wild dog control would not be undertaken without intervention.

⁵ Economic Analysis of the National Wild Dog Facilitator Project, 2011, Invasive Animals Cooperative research Centre, Canberra, Australia.

⁶ Hunt, R. & Brindablla Wee jasper Wild Dog / Fox Working Group (2005), Proceedings of the third NSW Pest Animal Control Conference, July

⁷ 2009 Agforce study on costs of wild dogs in Queensland

Intervention has largely been in the form of subsidies provided for control activities (such as paying for dog controllers, building dog fences and providing bounties on dogs killed). Governments will continue to invest if the total benefits exceed total costs and the level of crowding out private investment is minimised. As an example, support provided by AWI for the National Wild Dog Facilitator project since 2007 (AWI only supported in 2009, 2010 & 2011) represented 18% of total funds⁸.

AWI investment in wild dog control is aimed at increasing the effectiveness of dog control achieved on investment by all parties, and also operates under the assumption that their investment does not crowd out investment that would have otherwise been made by wool growers or other parties. This is more likely to be for investment in direct dog control rather than for training and R&D aimed at delivering more cost effective of control.

Taking account of the two issues raised above it was decided that the benefit of the AWI investment, for the purpose of this evaluation, could be based on the reduced economic loss to wool growers from participation in community groups less the costs they and AWI incur. This includes AWI's investment both in direct support and training.

The extent of crowding out of private wool grower investment in wild dog control has been considered by AWI. Once community groups have been established and are operational AWI support is directed elsewhere. The establishment of new groups remains a priority for AWI as well as the periodic support for established groups to assist them to increase their effectiveness or to address short term financial or other issues that might restrict the on-going function of the group. The value of AWI's contribution to forming and supporting community dog control groups would result in benefits from more effective dog control being achieved than would otherwise be the case.

QUANTIFYING BENEFITS

1 Average Loss

As part of AWI funding arrangements information can be sought from participating wool growers on the impact that participation in wild dog management groups has had on their business, in terms of costs and stock losses. It is recognised that measuring reductions in stock losses might understate the impact of control as stock losses in any given year will depend on both control

⁸ Economic Analysis of the National Wild Dog Facilitator Project, 2011, Invasive Animals Cooperative research Centre, Canberra, Australia.

undertaken and the level of predation pressure. For example, the return to more normal seasonal conditions following the drought has seen an increase in dog numbers and the benefit of control has been to reduce stock losses from what they might have otherwise been. This potential reduction in impact would determine the level of control undertaken by wool growers, but little data has been collected to date on wool grower perceptions about the potential reduction in stock losses that have been achieved. However, anecdotal evidence across groups (and the fact investment continues to be made) suggests that control efforts have had some impact.

Assuming the average flock size of wool flocks is 2,500 dse and there are currently around 5m⁹ sheep at risk, the implied number of flocks at risk is estimated at 1,900.

The average loss from wild dog predation was estimated at \$8.90 per dse carried for affected wool growers¹⁰. On a per farm basis this would be equivalent to a business cost of \$22,250 a year. In terms of stock losses this is equivalent to an average mortality rate of 6% dse each year.

Participation in a wild dog management group enables a wool grower's expenditure on wild dog control to be effective as it is done in collaboration with neighbouring land owners. A reduction in stock losses of 75% has been achieved by past groups (Brindabella Wee Jasper group) and if this were achieved in other groups the average benefit would be \$16,700 per participating wool grower. Against this benefit would be the cost incurred in dog control. While this cost will vary from location to location, an average cost of \$2 per dse or \$6,000 per flock was assumed based on a requirement for 10km of fencing¹¹. This was taken as an upper bound for the cost of control, but it is recognised that more partial measures are used with the most common forms of control being aerial and ground baiting and trapping. The net annual benefit per flock was estimated at \$10,700.

2 Adoption

There are many wild dog community control groups operating across Australia and AWI supports the establishment of some groups and the periodic support of a number of established groups. An estimate was made in collaboration with AWI staff on the number of groups operating in Australia and those supported by AWI since July 2011. Estimates are provided in Table 1.

⁹ Average dse carried as a percentage of total sheep numbers is 95% and was determined on the basis of a 1,000 ewe self-replacement flock.

¹⁰ Based on an annual loss of around \$47.5m across 5m sheep.

¹¹ The Mackinnon Project 2011 (university of Melbourne) Quantify the benefits of wild dog control for farmers. Prepared as part of project WP508 milestone reporting to AWI.

TABLE 1: ESTIMATED WILD DOG COMMUNITY GROUPS AND AVERAGE PARTICIPATION.

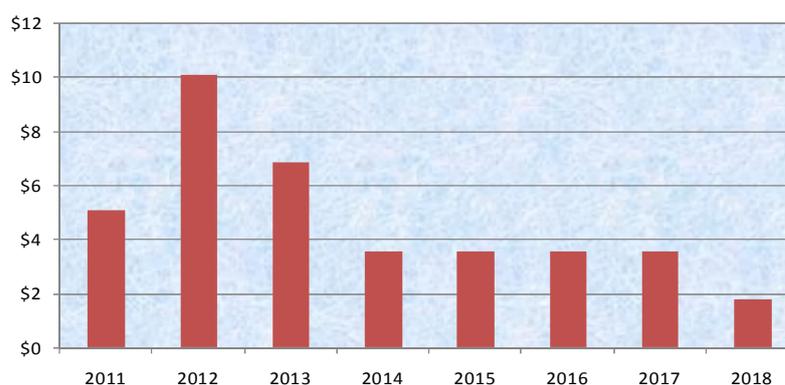
State	Existing Groups	Landowners per Group	Wool Growers per Group	New Groups Supported AWI	Existing groups Supported AWI
QLD	56	15	80%	2	17
NSW	27	30	60%	16	24
VIC	2	22	60%	4	0
WA	7	40	90%		3
SA	12	1	50%	2	0
Australia	104	19	73%	24	44

3 Benefits Generated

Benefits generated from AWI investment in wild dog management from 2011 to 2013 is shown in Figure 1. Benefits for the establishment of new groups are assumed to last for 7 years, at which time it would be expected that the success of other wild dog management groups would have prompted wool growers to establish similar collaborative plans. Benefits to existing groups are assumed to last for 2 years¹². Benefits are assumed to occur in the year in which support is provided as the formulation of control plans and coordination of activities can be done after one or two meetings.

Benefits shown in Figure 1 are based on a two year investment in the Wild Dog Investment by AWI. The total benefit to Australian wool growers from the two year investment is estimated to reach \$38m.

FIGURE 1: ESTIMATED BENEFITS FROM AWI INVESTMENT IN WILD DOG MANAGEMENT: \$M



¹² It is expected that there would be a wide range of response to AWI support, from ensuring the on-going operation of a group to a more modest increase in control effectiveness. A 2 year benefit period reflects an average of such responses.

PAYOFF

In this section the estimated pay off on the AWI investment is reported. Measures are reported in Table 2. It was estimated that the AWI investment will generate benefits to Australian wool growers of \$24m in present value terms¹³. This represents a return of \$8.60 on every dollar invested by AWI in the Wild Dog Investment program over the years 2011/12 to 2012/13.

Sensitivity analysis was undertaken on the period of time over which benefits have been attributed to the AWI investment. If benefits were only to be realized in the year that the investment was made (that is, there are no long term impacts), the return would still be positive, estimated at \$2.50 for every dollar invested. Consequently, the longer the AWI investment can maintain group effectiveness in terms of reducing wild dog impacts the greater the pay-off will be on funds invested.

TABLE 2: INVESTMENT PERFORMANCE MEASURES

Performance Measure	Value
Present value of Benefits (\$m)	\$24.0
Present value of Costs(\$m)	\$2.8
Net Present Value (\$m)	\$21.2
Benefit Cost Ratio	8.6

CONCLUSION

It was estimated that the AWI investment in wild dog management will deliver a positive return to Australia wool growers. The value of the AWI investment was deemed to be in supporting the establishment and on-going operation of wild dog management groups across Australia where collaborative control is undertaken by neighbouring land owners. This investment has also been supported with necessary training and support of dog controllers to ensure the on-going success of the groups. The benefits estimated in this evaluation do not consider any emotional impact that dog predation might have on wool growers.

¹³ Benefits were adjusted to reflect the level of capture of profit gains by Australian wool growers – estimated at 75%. A discount rate of 5% was used.

ATTACHMENT AWI PROGRAM INVESTMENT LOGIC

On-Farm Strategy	Strategy 1 – Sheep Health, Welfare and productivity		
Program	Program 2 (d) – Reduce Impact of Dog Predation		
Value to AWI <i>Why is AWI investing in this area? In what way will value be captured by Australian woolgrowers (metric)?</i>	At the start of the strategic plan the intent was to focus on preserving current control methods and to deliver alternatives. In 2010 the emphasis shifted to increasing the effective spend by all parties involved in wild dog control at the grassroots level to cost effectively reduce sheep productivity losses from dog predation and emotional stress placed on wool growers.		
Target market(s)	Australian wool growers facing high levels of wild dog pest pressure on their operations and in areas where profitable control cannot be achieved without wider community engagement.		
Measure <i>What could be measured to demonstrate that the value has been achieved?</i>	<p>The broad measure of success in this area will be:</p> <ul style="list-style-type: none"> • The number of woolgrowers engaged in community based wild dog control programs and the AWI cost per dollar contributed by wool growers. • Value of reduced stock losses in excess of total spend (AWI and woolgrowers) 		
Target(s) <i>For the measure selected what is the target change sought under the strategic plan?</i>	<p>(a) A number of new community groups established each year. (b) Number of operational community groups supported. (c) Value of avoided stock loss (sheep) is greater than costs to woolgrowers and AWI combined.</p>		
Investment Activities <i>What activities have been undertaken with AWI funds to achieve the target?</i>	<ol style="list-style-type: none"> 1. Support of community groups undertaking wild dog control 2. Provision of training to growers 3. Support of R&D to refine existing tools 4. Monitoring of wild dog populations and their impact on the environment 		
Investments	2011-12	2012-13	Total
AWI cash			
AWI overheads if any			
AWI total investment	\$1.5m	\$1.5m	\$3m
Co-funding by growers (a)	\$2.8m	\$2.8m	\$2.8m
Co-funding by others			
Gaps <i>What gaps currently exist in which AWI investment might be required in the future to ensure target is met?</i>	<p>(a) Impact of control on wild dog populations unknown (b) Details of reduced stock losses by participating wool growers is unknown (c) Understanding of the animal welfare effects of 1080</p>		

- (a) This is the estimated contribution made by wool growers in wild dog control who participate in groups (new and established) supported by AWI.