The direct economic impact

The direct economic impact comprises the losses in agriculture, including horticulture, and the expenditures on management, administration and research. The nationwide results are:

Economic impact	$m
Agriculture	620.8
Expenditures	122.7
Total	**743.5**

We were unable to collect all the data on control costs from all government agencies. Also, estimates of the environmental loss in Australia as a whole are not possible because of lack of data. So, this annual total of $743.5m underestimates the impact of invasive pests in Australia.

Discussion

The estimates of the welfare losses in agriculture are estimated against a no-pest baseline. They are therefore the potential total gains if there were no pests. They cannot be used to determine exactly what should be done or how much should be invested because these decisions need estimates of potential net gains. However, they can be used for the prior (equally important) steps in decision making, namely: raising general awareness, drawing attention to specific issues, demonstrating the size of the problem, defining broad problem areas and formulating broad policies.

Because they are potential total gains, the results assume that the total welfare loss in each industry can be avoided. To explore the possibility that only a portion of these totals can be avoided, a benefit–cost analysis of a range of scenarios concerning investment in research and management to better control pests was undertaken. With a pessimistic scenario that only 2.5% of the losses can be avoided, the benefit–cost ratio of the investment still has a ratio of over 1.0, so the benefits of further research exceed the costs.

References

McLeod R (2004). *Counting the Cost: Impact of Invasive Animals in Australia.* Cooperative Research Centre for Pest Animal Control, Canberra.

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The economic impacts of vertebrate pests in Australia

Summary

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The economic impacts of vertebrate pests in Australia

Invasive animal pests have a wide variety of impacts on the economy, the environment and society. There is considerable information on these impacts for individual cases and regions, and McLeod (2004) attempted to value them nationwide for a whole range of pest animals. However, there appear to be no Australia-wide estimates of agricultural losses measured with the economist's concept of welfare and no national or statewide estimates of environmental loss based on the same concept.

In the present report, the direct economic impacts of invasive animals on agriculture in Australia, and the nationwide expenditures by governments and landholders on pest management, administration and research are estimated. The values of agricultural losses are measured through the concept of economic welfare. The overall impact of pests is calculated here as the sum of the effects on agriculture plus the expenditures on management.

The estimates cover the impact on agriculture of four introduced invasive pest animals, namely: foxes, rabbits, wild dogs and feral pigs. The analysis also includes estimates, taken from literature, of the impact of birds on horticulture and mice on grains.

Method

Economists define an impact as a change in the welfare of consumers and producers, and measure the impact as a change in economic surplus. The welfare or surplus of consumers is the difference between what they are willing to pay and what they have to pay to acquire a good or service. The welfare or surplus of producers is the difference between market price and the cost of production. The economic surplus is the sum of these two individual surpluses.

When invasive animals cause agricultural losses, they reduce welfare. So, the impacts on agriculture should be defined in terms of losses in welfare and measured through losses in economic surplus.

The agricultural loss is measured for a five-year period ending in 2001–02, so 2001–02 is the base year for these values. These losses are estimated separately for foxes, rabbits, wild dogs and feral pigs, and for the main agricultural industries (beef, wool, sheep meat and grains).

Data on the expenditures by governments and landholders on management, administration and research are presented for the year 2007–08.

Impacts on agriculture

The losses in agriculture were estimated from the impact of pests on the marketable quantities of agricultural commodities, and from the abundance and distribution of the pest animals. Losses were estimated as the net annual loss in economic surplus due to the pests.

The annual losses by industry totalled $284.9m:

Industry	$m
Beef	187.7
Wool	71.3
Lamb	20.0
Grains	5.9
Total	**284.9**

Note that the losses in the grain industry are higher than this value of $5.9m per year when there are mouse plagues. McLeod (2004) estimated the yearly cost of these mouse plagues to be $22.8m as the annual equivalent of a plague every 10 years in the mouse-prone regions.

The losses in horticulture were estimated as the losses of production plus the associated management costs. They were adapted from Tracey et al (2007). The annual losses totalled $313.1m, and the losses incurred by industry were:

Industry	$m
Wine/grape	120.8
Pome fruit	85.0
Stone fruit	58.4
Nut	48.9
Total	**313.1**

The overall loss in agriculture, including horticulture, is therefore $620.8m (284.9 +22.8 + 313.1). This overall loss can be attributed to the following individual pests:

Pest	$m
Birds	313.1
Rabbits	206.0
Wild dogs	48.5
Mice	22.8
Foxes	21.2
Feral Pigs	9.2
Total	**620.8**

Expenditure on management, administration and research

The expenditures on management, administration and research by Commonwealth, state, and territory governments were collected directly from staff of the relevant government agencies for the year 2007-08. The techniques to estimate the impact on agriculture and horticulture already include the costs of control that vary with quantity of pest and quantity of production. The landholders' costs were therefore estimated as the costs of management that are fixed and occur anyway irrespective of the quantity of production. The total Australia-wide expenditures were:

Expenditure by	$m
Commonwealth	12.6
States and territories	75.5
Landholders	34.6
Total	**122.7**