

A PROPERTY LEVEL ECONOMIC ASSESSMENT OF PRICKLY ACACIA (*ACACIA NILOTICA*) ON THE MITCHELL GRASS DOWNS OF QUEENSLAND

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Summary A survey of landholders with prickly acacia on the Mitchell grass downs of central western Queensland was undertaken. A range of landholders were interviewed and property situations assessed including: owners/managers, small to large holdings, light to dense infestations, minor to major control operations, sheep and/or beef properties, and pro/anti prickly acacia.

An assessment of the benefits and costs of prickly acacia was completed and property level impacts are presented. All benefits and costs were identified and quantified where possible. Medium to dense infestations of prickly acacia were found to be a net cost to landholders in general although the level of impact varied from property to property.

INTRODUCTION

An economic survey of the impact of prickly acacia (*Acacia nilotica*) at a property level was undertaken in late 1995 and early 1996. Overall, 16 landholders were interviewed in a band of country bounded by Hughenden, Julia Creek, Winton and Aramac. Properties were chosen specifically to cover a range of situations such as country type, property size, business structure, duration of ownership, enterprise mix, density of prickly acacia, level of control undertaken and attitude toward prickly acacia.

The country type for most properties was Mitchell grass downs but some also had areas of woodland, river frontage and spinifex country. Property sizes ranged from 8000–40 000 ha with an average of about 20 000 ha. Business structure ranged from husband and wife partnerships through family partnerships to managed properties of large family run aggregations.

Duration of ownership of properties ranged from one year to almost 90 years with an average ownership of about 30 years. A range of properties were chosen having sheep, beef and sheep-beef enterprise mixes. Some properties had very little prickly acacia while others had very dense infestations across most of the property but most had a mix of densities.

Likewise, a number of landholders had undertaken some prickly acacia control while others had almost totally controlled the woody weed on their properties.

Finally, a range of opinions towards the weed were covered ranging from totally against it to very much in favour of it. Alternatively, some landholders believed

prickly acacia to be a liability but were also happy to utilize its beneficial aspects.

The range of opinions across all the parameters mentioned above were considered when choosing properties to be surveyed. They were chosen to be representative of the region based on the summary statistics provided in the Woody Weed Survey publications undertaken for Landcare (March 1995b).

A review of current biological knowledge of prickly acacia may be found in Mackey *et al.* (1996) and latest control recommendations in March (1995a).

INTERVIEW TECHNIQUE

Interviews generally lasted between one and two hours. Landholders were asked a number of questions relating to their attitude toward prickly acacia and what they believed were its main benefits and costs. The benefits and costs were then quantified where possible.

Interviews did not follow a regimented set of questions. Rather, landholders were encouraged to discuss their views on what the benefits and costs of prickly acacia were, within a basic survey framework. Interviews were recorded to improve the efficiency of information transfer.

IDENTIFICATION OF BENEFITS AND COSTS

There are a number of benefits and costs associated with prickly acacia. These were identified during interviews with landholders and other key stakeholders and are listed in Table 1.

From Table 1 it can be seen that the benefits and costs were divided into two categories: priced and unpriced. The priced parameters were able to be valued in dollar terms while the unpriced parameters could only be qualitatively assessed in this survey. This does not mean that they are excluded from the analysis. Valuations and discussions of each benefit and cost are provided below.

VALUATION OF BENEFITS AND COSTS

Benefits and costs were assessed and quantified where possible based on landholders perceptions. Estimates are of a preliminary nature only and will be revised for the final report which is due out later in 1996. All costs and benefits were converted into financial year 1995/96

dollars for ease of comparison. The following indicate the range of estimates that were provided at interview.

Increased lambing Landholders generally believe that prickly acacia increases lamb marking percentages by about 10–20%. Typically, lamb marking has been raised from about 50% to about 60–70% due to the shade and shelter benefits of prickly acacia. This also has benefits for the genetic quality of the flock but this could not be valued. This is supported by Carter (1989) who documented up to a 16% increase in lambing percentage due to the presence of shade.

Better fleece weights Some landholders believe that they are cutting up to an extra 0.23 kg and 1 kg of wool per ewe and wether respectively per year due to the nutritional benefits of prickly acacia when utilized as a feed supplement to Mitchell grass. Other landholders did not detect a difference.

Drought insurance Some landholders believe that having prickly acacia has saved them from having to sell stock or agist during droughts. For example, they have saved between \$A0.75 and \$A1.00 per head per week for

Table 1. Benefits and costs of prickly acacia.

Priced benefits

- Increased lambing
- Better fleece weights
- Drought insurance
- Saved supplement expenditure
- Improved stock condition

Unpriced benefits

- Improved micron

Priced costs

- Control costs
- Capital expenditure
- Increased mustering costs
- Reduced grass production
- Reduced property value
- Increased tyre damage
- Impact on bore drain maintenance
- Medical attention
- Increased damage to fences

Unpriced costs

- Impact on management
- Environmental damage
- Increased erosion
- Harbour for feral and native pests

cattle in saved agistment costs. In other instances sheep may have died because no agistment was readily available and fodder and grain supplements were prohibitively expensive.

Some landholders link drought feeding in with control of prickly acacia so they obtain a benefit from control (which can partly offset the costs of control). This involves options such as pushing or chaining so that prickly acacia becomes available for browsing by stock.

Saved supplement expenditure Some landholders believe they do not have to purchase supplements due to prickly acacia. Estimates ranged from \$A400 to \$A11 000 per year in savings and were highly dependent on the extent and density of prickly acacia on the property.

Improved stock condition Landholders maintained that sheep and cattle on prickly acacia looked in better condition than those on pure Mitchell grass although most could not value this benefit. However, some landholders thought that the better condition did convert to dollars in the sale-yard. For example, one landholder thought that lambs were worth about an extra \$A2 per head in the sale-yard and another thought that steers were worth about another \$A20 per head due to the feed benefits of prickly acacia.

Improved micron There is varied opinion on the effect of prickly acacia on wool micron. Some believe it makes finer micron, others believe it broadens micron, while yet others believe there is no change. All perceived changes were deemed to be too small to quantify.

Control costs Control costs comprised both chemical and mechanical control options. Labour inputs were valued in each case and included. Control expenditure tended to fall into either of two categories. The first was containing the problem where control was limited to key management sites such as watering points, roads, fences and house paddocks.

The second form was aimed at controlling significant areas of prickly acacia (that is, overcoming the problem). Total expenditure on control ranged from about \$A2000 to \$A25 000 per year per property. Some landholders have spent well in excess of \$A100 000 since commencing prickly acacia control.

The Strategic Weed Eradication and Education Program (SWEEP) of the Queensland Department of Natural Resources has also been actively controlling prickly acacia in strategic areas of the Mitchell grass downs at no or minimal cost to landholders.

Capital expenditure Most landholders have had to purchase capital equipment such as spraying equipment and four wheel motorbikes for prickly acacia control. Other capital item such as bulldozers were either purchased specifically for prickly acacia or were already on the property but are now being used for prickly acacia control. The percentage of time a particular item of equipment was used for prickly acacia control varied from about 10–100% of total use.

Purchase of equipment (including interest and principal repayments), depreciation and repairs and maintenance all add to the cost of controlling prickly acacia.

Increased mustering costs The extent of extra mustering costs is heavily dependent on the density of prickly acacia. It was found that scattered to light infestations of prickly acacia did not increase the cost of mustering at all. However, medium densities increased mustering costs by about \$A0.03–0.17 per hectare and heavy densities increased mustering costs by \$A0.07–0.50 per hectare.

Medium to dense prickly acacia also tended to decrease mustering efficiency which has associated management implications (including animal hygiene considerations). Some landholders now require an aircraft or helicopter to facilitate mustering.

Reduced grass production The heavier infestations of prickly acacia are adversely impacting on grass production. Reduced grass production is then reflected in reduced animal production. There is considerable variation in the estimates for the amount of reduced animal production but estimates for cattle run in paddocks of dense prickly acacia range between a reduction of 25–33% of gross beef production.

This is supported by Carter (1994) who states that under normal grazing pressure a 25–30% canopy cover of prickly acacia reduces pasture production by 50% compared with prickly acacia free pasture. However, prickly acacia leaf and pod can compensate for some of the lost grass production in the short term.

Reduced property value There is general consensus that the full effects of prickly acacia have not flowed through to property values as yet. However, most landholders with significant amounts of prickly acacia concede that it has adversely affected property values. Anecdotal evidence suggests that property values may have been reduced by as much as 20% because of prickly acacia (especially on properties which are heavily infested). A number of landholders believed that it had reduced the market value of their properties by between about \$A12–25 per hectare. It was also suggested that it is much easier to sell a property without prickly acacia.

Increased tyre damage Most landholders believed that prickly acacia cost upwards of \$A1000 per year in tyre damage. These costs included the purchasing of tyre sealant, better quality tyres, sleeves and the labour involved in changing tyres and pumping up slow leaks. The ‘frustration factor’ involved with fixing tyres was not valued.

Impact on bore drain maintenance Having prickly acacia along bore drains increases the costs of delving (which involves the mechanical cleaning and reshaping of bore drains). In some cases it more than doubled the costs of delving resulting in landholders having to clear the trees from the bore drains (thereby adding to control costs). Other landholders have converted open bore drains to piping and troughs either partly or wholly due to prickly acacia. Converting to a piped system can cost more than \$A2000 per kilometre of piping (including bore rehabilitation and troughs). Piping also has other benefits such as being able to supplement stock through the water and better water management.

Medical attention Most landholders can quote experiences where they had to seek medical attention due to injuries from prickly acacia spines. Some have to visit doctors every year while others tend to see to their own injuries. The ‘pain and suffering’ factor was not quantified.

Similarly, some landholders have also used vets to tend injuries to working dogs, horses and stock although most would not resort to veterinary help.

Increased damage to fences Dense prickly acacia places added pressure on fences because it reduces the vision of domestic stock, feral and native animals. Therefore, animals tend to collide with fences more regularly and hence the fences deteriorate more rapidly. Also, some landholders without prickly acacia have reinforced boundary fences to stop neighbouring stock from breaking in and spreading seed from neighbouring properties. Fencing can cost up to \$A1600 per kilometre in materials and labour and some landholders have had to replace substantial lengths of fences.

Impact on management Most landholders have had to change management practices because of prickly acacia. This includes restricting stock movement between paddocks when prickly acacia is podding and moving stock (especially cattle) regularly as they can become very difficult to muster in prickly acacia. Also, time spent controlling prickly acacia is time that could be spent on other property management activities (that is, there is an opportunity cost involved). These costs could not be directly valued.

Some landholders have significantly changed management practices to minimize the negative impacts of prickly acacia. These changes include piping water (see impact on bore drain management), use of traps around water to aid mustering and fenced lane ways to reduce mustering costs (see increased mustering costs).

Environmental damage The Mitchell grass downs are one of the major grassland ecosystems of the world. If left uncontrolled, prickly acacia has the potential to convert the Mitchell grass downs ecosystem to a thorny shrubland. Presently, it has irreversibly changed the downs in some of the more heavily infested areas. Issues include the threat to the habitat of the Julia Creek Dunnart (*Sminthopsis douglasi*).

Increased erosion This cost is linked with lower grass production and resultant increased grazing pressure. The exposed soil has a tendency to erode particularly during high rainfall events. This will eventually lead to even further reductions in production and deterioration of the natural resource base. However, some landholders have also stated that prickly acacia growing in gullies has helped to minimize the effects of erosion.

Harbour for feral and native pests This issue is linked with the one for environmental damage. Prickly acacia provides a harbour for feral animals such as pigs, foxes and cats. It also has allowed western grey kangaroos to inhabit the Mitchell grass downs (where previously they had rarely ventured).

DISCUSSION

This survey only covered landholders who are actively involved in managing/controlling prickly acacia. There are still many landholders on the Mitchell grass downs who are inactive in prickly acacia management.

The results of this survey provide a flavour of the range of property level impacts of prickly acacia. A preliminary analysis shows that the costs of prickly acacia will far outweigh the benefits when infestations reach medium to heavy densities across a property (Miller, unpublished).

These results are relevant at a property level. Benefits and costs will be extrapolated to a regional level where possible to provide a regional perspective. Taxation considerations also need to be accounted for in this type of analysis. Control costs relating to prickly acacia are tax deductible while extra income derived from some of the benefits of prickly acacia is taxable. These need to be accounted for to determine the true impact of prickly acacia.

An analysis such as this highlights the difficulties of undertaking full assessments of the impacts of pest plants such as prickly acacia. It also shows how great the impact of prickly acacia varies and how diverse its management is.

However, these sorts of economic assessments are essential to provide better information to policy makers and indeed landholders so that more informed management decisions can be made both at the property and policy level.

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