property rights australia

Property Rights Australia

Submission to:

Productivity Commission

Impacts of Native Vegetation and Biodiversity Regulation

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1. Executive Summary

Regulation of vegetation management in Queensland has for some time provided a high level of protection by outlawing the clearing of all 'endangered' and most 'of concern' remnants, and has included a rigorous *Performance Criteria* based assessment process addressing salinity and biodiversity concerns. More recently, all management of remnant vegetation has been effectively outlawed by the *Vegetation (Application for Clearing) Act 2003*. However economic and environmental necessity, market signals and past government policies have created considerable incentive for land development, including vegetation management. Unfortunately for land managers current and proposed regulation does not accommodate or acknowledge these drivers, and is poorly tailored to the unique nature of Queensland's woodlands. Nor does the policy framework make any genuine attempt to nullify, or compensate for, the adverse implications for individual primary producers and rural communities.

The historic pattern of development throughout Australia has resulted in the vast majority of the nation's remnant vegetation now being disproportionately located in Queensland. These woodlands are not static, but are constantly evolving both floristically and structurally in response to European habitation. A general thickening and encroachment of woody vegetation into rangeland or pasture areas is the normal, scientifically-proven observation.

This has substantial implications for the grazing industries which occupy most of Queensland's land mass and whose economic performance is heavily influenced by the *tree-grass relationship*.

The tree-grass relationship is one of 'exponential decrease', meaning that grass yields and corresponding pasture productivity decrease exponentially (ie. at an ever increasing rate) as tree cover increases, so that relatively small changes in tree cover generate large changes in production.

Resultant land development benefits both the producer and the consumer. The producer is provided with opportunities to increase economies of scale and reduce unit costs of production through increases in carrying capacity, while also enabling vertical integration in the market place through the achievement of superior animal nutrition and growth rates. Consumers benefit from the

satisfaction of their demand for inexpensive yet high quality food and fibre, the production of which depends on the superior animal nutrition, growth rates and cost efficiencies readily achieved through land development.

The producer's position as a price taker in a market environment approaching near-perfect competition means his/her profit requisite is heavily dependent on the productivity of their business relative to their costs of production. The profit relationship can be demonstrated by the following equation:

$$\textbf{Profit} = (\textbf{P x p} - \text{DC} - \textbf{OC}) \text{ x } \textbf{CC}$$

Where:	**P**	=	**Kg produced per animal**
	p	=	**Price received per Kg**
	DC	=	Direct costs per animal
	OC	=	**Overhead costs per animal**
	CC	=	**Carrying capacity**

The strategic importance of vegetation management in Queensland is evidenced by the fact that vegetation management practices are capable of directly influencing four out of the five variables in the above equation. (These four variables are those shown in **bold** type.)

In the pastoral zone where profits represent only a very small proportion of total production a relatively large change in profitability can be obtained from a relatively small change in any of these four variables.

The interaction of the tree-grass relationship with this micro-economic sensitivity of the grazing business mean that vegetation management regulation has severe and widespread implications for families dependent upon the pastoral industries.

Given their already economically and geographically disadvantaged status, it is unreasonable to expect farm families to shoulder this cost in isolation. If changing community expectations require the preservation of native vegetation on privately owned land, equity considerations require that the community meet the cost of preservation.

Our Submission

Property Rights Australia (PRA) is a non-profit organisation of primary producers and small business people from rural Queensland who are concerned about continuing encroachments on the rights of private property owners. The organisation was formed to seek recognition and protection of the rights of private property owners in the development, introduction and administration of policies and legislation relating to the management of land, water and other natural resources. Set up in South West Queensland in January 2003, PRA's membership now extends across the state and all major rural industries. PRA is not affiliated with any political party.

Our members are committed to balanced development of their businesses in both economic and environmental terms. While we support the need for sensible regulation, we are concerned that the nature of ongoing natural resource management reforms has created significant uncertainty which is stifling investment, economic development and job creation in rural Queensland.

Our submission focuses on the potential on farm economic impacts of the proposed regime. Whilst it is recognised that the scope of the inquiry is broader than assessing economic impacts, it is contended that the potential scale and effect of such impacts on individuals, industries, and communities warrants special attention. This single issue is also central to many other aspects of the inquiry.

Our submission is presented in five key sections:

1. A general background regarding the Queensland situation.
2. A summary of the unique nature of Queensland's woodlands.
3. A background to the potential on-farm economic impacts of vegetation management.
4. A review of existing literature regarding potential on-farm economic impacts.
5. A case study of a grazing enterprise and the potential implications.

We have used the Commission's Issues Paper to assist us in developing the submission, and in accordance with the instructions therein have not attempted to address all the issues under consideration, but have isolated our comment to those areas we feel properly qualified to address. Likewise, where considered appropriate, we have not limited our comment to the issues posed by the Issues Paper but have provided views and comment on other issues of relevance to the Commission's Terms of Reference.

2. Background

The regulation of native vegetation in Queensland is an issue currently stimulating a substantial amount of political and community debate. The contentiousness of the issue is related to changing community values regarding native vegetation management.

Historically, Queensland's woodlands have been viewed as an underdeveloped resource, and landholders have been actively encouraged by the government and community to further develop the productive capacity of these areas. As recently as 1995 the culture of the then Queensland Department of Lands was centered on encouraging land development in regional areas, as evidenced by policies of the day and lease conditions which encouraged and even required land development to be undertaken and maintained free of regrowth. Additionally, landholders have continually received market signals from the community encouraging further development of land, these being the requirement for inexpensive food and fibre, as well as the requirement for high quality (that is, younger) beef. These market signals have underpinned the economic incentives for individual landholders to clear vegetation. Such incentives, when backed by state funded schemes of assistance (capital improvement by land clearing was tax deductable until 1982) and departmental policy, have resulted in the creation amongst landholders of substantial investment backed expectations of their ongoing right to manage vegetation.

As community values began to shift away from land development toward preservation ideals, corresponding signals to landholders have not emerged. Additionally, the substantial investment backed expectations of landholders created internal markets for land amongst existing landholders based upon its *potential* productive capacity. In short, the world's appetite for cheap, quality beef has drowned out the weak signals to landholders regarding the community's preservation values.

In response to this situation the state government has, since 1995, continually amended existing regulations or imposed new ones. Such new regulations were initially well accepted by landholders as a reasonable attempt to address preservation concerns whilst also enabling in large part continued economic development of the state's woodlands. However more recent (1999 and 2003) regulation (which effectively prohibits any further development of woodlands) is now viewed by landholders as being politically driven, as the politically more powerful 'green' interest groups seek to exert their influence at the expense of the less politically powerful landholders and regional communities. This

raises serious concerns regarding the equity and efficiency aspects of the new regulations and represents a substantial shift away from the traditional, ordered policy making processes toward an 'impositional' style of policy making, such as that described by Halpin (2002) in respect to NSW native vegetation protection policy. Such increasing levels of uncertainty in policy making are considered by Richardson (2000) to lead to policy instability and unpredictable outcomes.

The Great Unknowns

Identifying the correct balance between development and preservation ideals remains the greatest challenge. The largest impediment to identifying the optimum solution is the lack of knowledge and information regarding the costs and benefits of competing alternatives.

<table>
<tr><th>Benefits of Land Clearing</th><th>Perceived Costs of Land Clearing</th></tr>
<tr><td rowspan="3">On Farm Benefits:
• Productivity Gains
• Value Adding opportunities (supply chain opportunities).
• Spreading of Grazing Pressure</td><td>Potential reduction in biodiversity</td></tr>
<tr><td>Contribution to CO2 Emissions</td></tr>
<tr><td>Potential salinity hazards</td></tr>
<tr><td>Positive environmental outcomes, eg. Reversal of land degradation, Provision of Carbon sinks.</td><td rowspan="4">Capital costs of clearing and maintenance costs of cleared land.</td></tr>
<tr><td>Economic and Employment Benefits to Regional Communities.</td></tr>
<tr><td>Maintained Competitiveness of Agricultural Industries.</td></tr>
<tr><td>National Income from Exports.</td></tr>
</table>

The actual value of the various benefits and costs outlined in the above table is unknown. However some are more defined than others. On Farm benefits can be approximately estimated from objective investigations as well as case studies, however some of the more intangible benefits are less easily identified. On the other hand, the actual extent of potential biodiversity loss, greenhouse gas emissions and salinity, as well as the value of these losses can not readily be reliably estimated.

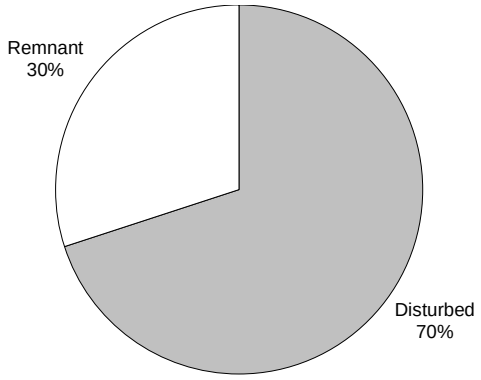
The absence of established scientific and economic bases to the debate further enables politically motivated interest groups to exploit the information gap through misrepresentation.

The Queensland Situation

Land development is confined to areas with suitable soils and rainfall for it to be economic to the landholder. Development has also been concentrated on the more closely settled areas first, before moving into the more remote regions. As a result of these dynamics, Queensland now finds itself with the vast majority of the remaining Australian woodlands suitable for economic development, and consequently high rates of clearing. At the exact same time community values are tending to shift toward preservation.

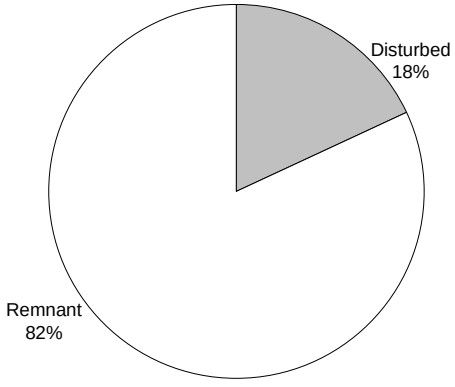
Figures 1 & 2 indicate the relative percentages of vegetation communities cleared or significantly modified both nationally, and in Queensland alone. Due to the earlier and in many cases less responsible land development in other areas, the vast majority of Australia's remnant vegetation is now disproportionately situated in Queensland, which has a relatively continuous cover of native vegetation which in 1999 covered 82 % of the land mass (Wilson et. al. 2002).

Figures 1 and 2. The relative percentages of native vegetation disturbed nationally, and in Queensland alone



Nationally (70% disturbed)

Source: Industry Commission 1998



Queensland (18% disturbed)

Source: Wilson et. al. (Queensland Herbarium) 2002

Queensland's Current Regime

Vegetation Management in Queensland is regulated under the *Land Act 1994* (leasehold land), the *Vegetation Management Act 1999* and the *Integrated Planning Act 1997* (freehold land), and most recently the *Vegetation (Application for Clearing) Act 2003* (all land). This section briefly summarises the development of these regulations over the past decade.

Leasehold Guidelines (1995)

In 1995 regulating guidelines were introduced to assist government and landholders to address preservation concerns. The guidelines only related to leasehold lands (there was no statutory controls over vegetation on freehold land at this time) and were developed through a largely transparent, regionally based consultative process involving all stakeholder groups. Because of this, and the regional flexibility they allowed, the guidelines were generally accepted by landholders as a fair compromise between development and preservation.

The Vegetation Management Act

The Vegetation Management Act introduced in 1999 corresponded with amendments to the Land Act and Integrated Planning Act. These developments regulated vegetation management on freehold land for the first time and set aside the previous leasehold guidelines in preference for an over-arching state policy. The regime allowed for the eventual development of regional guidelines similar to the previous leasehold guidelines, but as of July 2003 none have been consented to. This regime was not well received by landholders, primarily due to the absence of a consultative approach, and the regulatory taking of the previously purchased right to manage vegetation on freehold land without compensation. The over-arching state policies adopted under the regime were certainly more restrictive than previous policies and adopted a 'surrogate' framework through *Regional Ecosystems* for ensuring the maintenance of biodiversity (Sattler and Williams 1990). However they lacked regional flexibility. Policy implementation was also largely impeded by the inadequate resourcing of government agencies to manage the new regime (DNRM, 2003).

Vegetation (Application for Clearing) Act 2003 ("*The Moratorium"*)

The latest Act prohibits the making of an application to clear remnant vegetation under the Land Act or Vegetation Management Act. This effectively prohibits not only clearing but all management of remnant native vegetation in Queensland, and has been enacted for an indefinite period of time

whilst the state undertakes further consultation with the Commonwealth, with a stated view to refining arrangements to enable the permanent cessation of remnant clearing in Queensland. Given this state of flux in the Queensland regime, it is felt most appropriate for this submission to focus on the impact of the regime proposed to be implemented, and effectively implemented already by the *Vegetation (Application for Clearing) Act 2003*, ie. the cessation of remnant clearing.

3. The Nature of Queensland's Woodlands

Of Queensland's remnant vegetation a large percentage is woodlands. Originally comprised of 117 Million hectares, or 67.6% of the state's land mass, approximately 30.8% of Queensland's woodlands have been disturbed so that approximately 81 Million hectares (69.2% of original woodlands, and 46.8% of the state) was covered by woody vegetation in 1999 (Statewide Land and Tree Cover Study, 2003). This compares to the 90% removal of temperate woodlands and mallees of southern Australia (SEAC 1996, quoted by Industry Commission 1998).

The unique situation faced by Queensland in managing this disproportionately large percentage of the nations' remnant woodlands is further compounded by the nature of these woodlands themselves. The majority of Queensland's rangelands have been grazed in their natural state for some 100 to 200 years. Such grazing, made possible by consumer demand and government policy, has resulted in changing tree-grass dynamics, largely because of the removal of fire regimes which causes grazed rangelands to tend toward the further proliferation, or 'thickening' of woody species in both developed and undeveloped rangelands. Such proliferation of woody species under grazing is not a uniquely Queensland or Australian phenomenon, however the Queensland situation has been eloquently summarised by Burrows' (2002) forty year perspective on rangeland studies in Queensland, which is highly recommended reading for anyone with an interest in the regulation of native vegetation in Queensland and the special challenges that go with it. The concepts and findings outlined in this paper are considered so important to the current debate that it has been included here as Appendix 1 to this submission. The tropical and sub-tropical nature of Queensland's climate and vegetation also makes the woodland thickening issue more pronounced in Queensland than it appears to be in southern states.

The importance of this issue to regulation is that it is only well understood by frontline rangeland managers and scientists, and is not well understood by regulators, who tend to have a simplistic view of trees and grasses and the relationships between them. In essence what woodland thickening means is that if grazing is to continue in Queensland's rangelands, vegetation must be able to be managed, as any regulatory regime which removes the ability to maintain the tree-grass balance will ultimately result in the eventual loss of all grazing utility and a reduction in biodiversity through the excessive proliferation of woody species.

The woodland thickening phenomenon, along with the diversity of vegetation communities, the massive expanse of woodlands, the lack of reliable science, and the simplistic views of contemporary regulators have made the successful regulation of vegetation management in Queensland a cumbersome and difficult task.

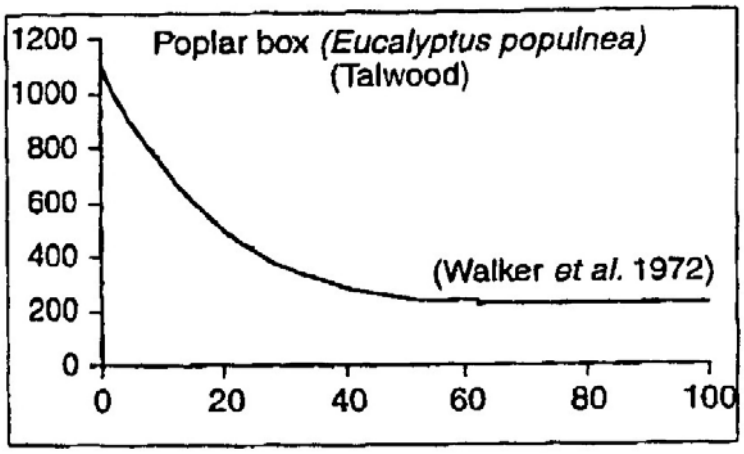
The Tree – Grass Relationship

Pasture Yield

The presence of trees has both stimulating and competitive effects on adjacent grasses. To understand the net effect of these relationships at a landscape level, tree populations can be graphed against pasture (grass) yields. The response of grass yields to tree removal is variable throughout the different climatic zones and for different vegetation communities, however ABARE (1995) Burrows (1990) reports that initial pasture production can be increased in Queensland woodlands from 2 – 7 times by removing tree competition. In other words the gross productive capacity of a woodland from a landholder's perspective is at least doubled, and up to seven times, simply by removing the competitive effects of the woody vegetation. In addition, removal of native vegetation provides for excellent conditions to introduce pasture species capable of generating superior yields than the endemic species, further adding to the economic incentive.

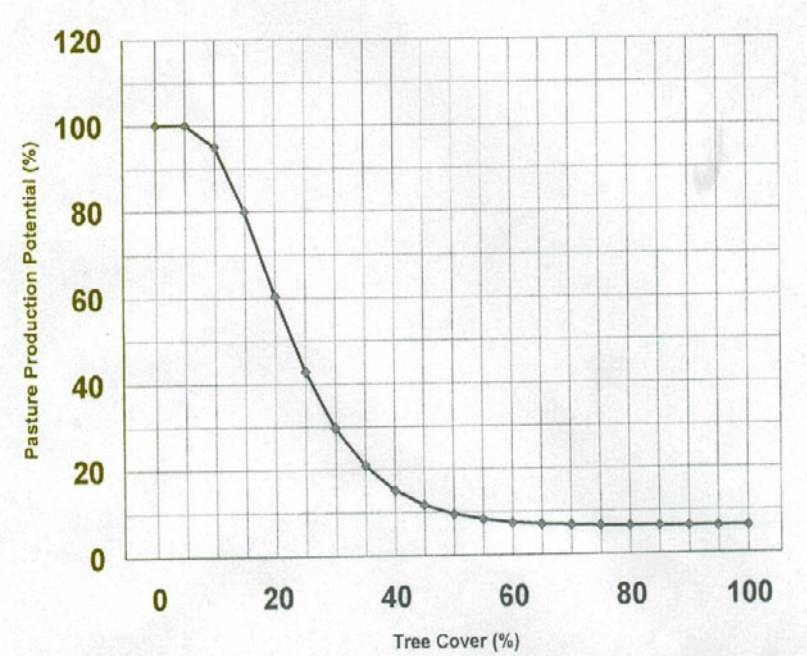
Of equal importance to the magnitude of the effect of tree-grass competition is the exact nature of the relationship, that is, the shape of the curve. The most commonly reported finding in studies of Queensland woodlands reveal what is termed an "Exponential Decrease" relationship of trees to grasses (Scanlan, 2002). This means that as tree density decreases, grass yields increase *at an increasing rate* (ie. exponentially) as shown on Figure 3.

Figure 3. Effect of Tree Retention % on Pasture Yield (Kg/Ha) in *Eucalyptus populnea* woodlands.



Beale (1999) further refined this relationship and demonstrated that grass yield tends to plateau between 0% and 10% canopy cover as shown in figure 3a.

Figure 3a. Effect of Tree Retention % on Pasture Yield potential in woodlands. (Beale, 1999)



This relationship is caused by the fact that in a woodland at any given point the understorey may be subjected to influences from a number of trees, with the aggregate competitive effect increasing as tree density increases. The significance of this relationship is that it explains, along with other practical reasons, why broadscale clearing is often preferred as a development option over other selective methods of reducing tree density. It also explains the importance to landholders of maintaining developed pastures, as a relatively slight increase in tree density will usually result in a relatively large decrease in pasture yields.

The economic impacts of restricting vegetation management on landholders are driven by this relationship and the '*exponential decrease'* shape of this curve.

4. On-Farm Economic Impacts

In conducting a thorough review of available literature, one surprising finding has been that there is very little published data regarding the on-farm economic implications of vegetation management, or the impacts of regulation of vegetation management on farm businesses. This finding is consistent with the wide discrepancies in government commissioned studies, and the recent public debate surrounding the true impacts on farm families of the cessation of remnant clearing.

Notwithstanding this shortage of reliable data, a summary of the available findings is presented here and some conclusions drawn regarding the implications of such on-farm impacts.

Nature of Economic Impacts

"Straight line" opportunity costs

To understand the impact on landholders of ceasing land development in Queensland regard needs to be had to the micro-economic landscape of the family farm business. Where land suitable for development exists, its development more often than not underpins the future plans for the business, and is the key to attaining and maintaining, financial viability. It would be easy to adopt a 'straight line' view of the economic incentives to develop land, or conversely, the economic impacts of not developing land. Such an approach would be based on the belief that new land brought into production would presumably generate similar returns to land already in production. Whilst this is perhaps a reasonable assumption when considering production and productivity at a state or industry level, in a true analysis of economic impacts on individual farm businesses it is overly simplistic to consider new development as a 'straight line" extension of existing development for the following reasons:

Economies of Scale

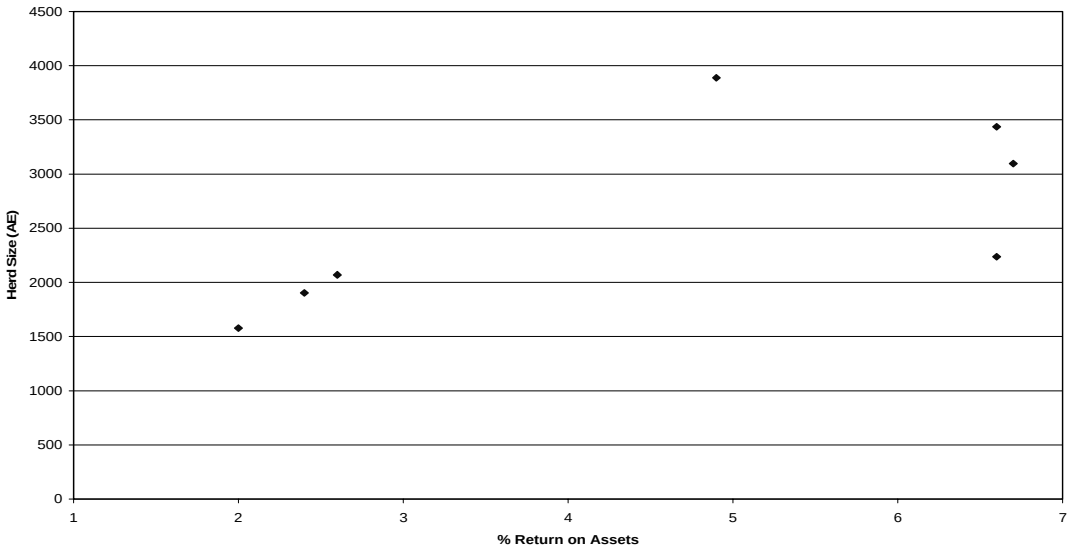
Scale is one of the most influential determinants of farm profitability. Most agricultural businesses in Australia are producers of commodities, the prices of which are in a large part determined by world market prices. As a result our rural industries operate in an environment approaching that of 'perfect competition', and individual businesses tend to be 'price takers'. Consequently businesses compete on costs of production, as does our export industry on the world market.

At the level of the individual business, further land development enables not only a 'straight line' type increase in the level of production, but also enables a ***reduction in the unit costs of production***.

This is particularly relevant in the pastoral industries where overhead costs tend to be the dominant form of cost. Because almost all land development in the pastoral areas represents an incremental increase in carrying capacity to an established business, such development enables the business to dilute its overhead costs over a larger production base. Consequently the additional production results in a lowering of the unit costs of production across the entire enterprise, most of which is translated into profit. This is best evidenced by a consideration of the effect of scale on the Overhead : Production ratio. Businesses with lower herd sizes need to devote more of their income to meeting overhead costs than do business with larger herds. With total overhead and direct costs being equal, the business with the larger herd size has lower overhead costs unit of production. Figure 4 demonstrates the relationship between scale (herd size) and profitability (return on assets) for seven grazing enterprises on similar country in the Augathella district. Those enterprises with a larger herd size had a substantially higher Return on Assets than those with a smaller herd size.

Figure 4. Relationship of Scale to Return on Assets, Augathella District.

(Source, Devine Agribusiness, 2001)



Further investigation of the data presented in figure 4 reveals that the overhead ratio (% of income required to meet overhead costs, and major determinant of cost per unit of production) for the three largest businesses was 44%, whilst the same ratio for the three smallest businesses was 61%. (Source: Devine Agribusiness, 2001).

Where suitable land exists, the most effective way to obtain additional scale from a given area without a corresponding increase in overheads is to increase the productivity of pastures through land development.

Because of this sensitivity of profit to scale in the pastoral zone, where profit tends to represent only a small portion of enterprise gross production, a relatively large increase in profitability can be obtained from a relatively small increase in scale. (ie the overheads remain 'fixed' and most of the gross margin attributable to additional development is translated into profit). Impacts of regulation when considered in terms of the percentage of land unable to be developed may appear at first minor, however the resultant impact on the income and standard of living of the business owner (the farm family) is most often substantially magnified because of the cost structure of the enterprise.

The effects of this were evidenced by Resource Consulting Services (1995) who undertook case studies under a Terms of Reference set down by the Strategic Policy Unit of the Queensland Department of Primary Industries. The initiative was in response to the leasehold tree clearing guidelines which were proposed to be implemented at that time, and concluded that in the case of one property studied, an increased carrying capacity of 19.2% available through further land development would be translated into a 96% increase in the Profit Before Interest and Tax (PBIT). The second case study undertaken on less productive land types concluded that a 26% increase in carrying capacity available through further development would translate into an 85% increase in that enterprises' PBIT.

Value Chain Integration

In the Queensland beef industry, which still operates predominately from a base of unimproved, native pastures, land development provides individual business with the opportunity to not only increase the quantity of production but also the quality of their output.

This is related to the fact that age is one of the greatest determinants of the eating quality of beef. Consequently younger animals produce a superior product, however the animal needs to be of a mature size to enable it be economically processed. The rate at which the animal grows therefore has a large bearing on its final value, as a younger animal of mature size is worth substantially more than an older animal of the same size. Growth rates are a function of animal nutrition, with a higher plane of nutrition translating into higher growth rates.

Land development impacts on animal nutrition and growth rates in the following ways:

- An increased abundance of available pasture reduces the animals 'maintenance' nutritional requirements, that is, the nutrients consumed (principally Energy and Protein) are able to be devoted towards growth, rather than the constant search for more food.
- Additionally, the treatment of vegetation and removal of competitive effects results in ideal conditions for the establishment of superior pasture species. That means that the actual pasture consumed is not only more abundant, but is usually of a higher nutritional value, enabling the animal to obtain more nutrients from a given level of intake than it would have obtained from the original pastures. Once again this means that the animal can devote more nutrients to growth, growth rates are enhanced and higher prices can be obtained for the product. In breeding enterprises these nutritional advantages are similarly reflected in reproductive performance.

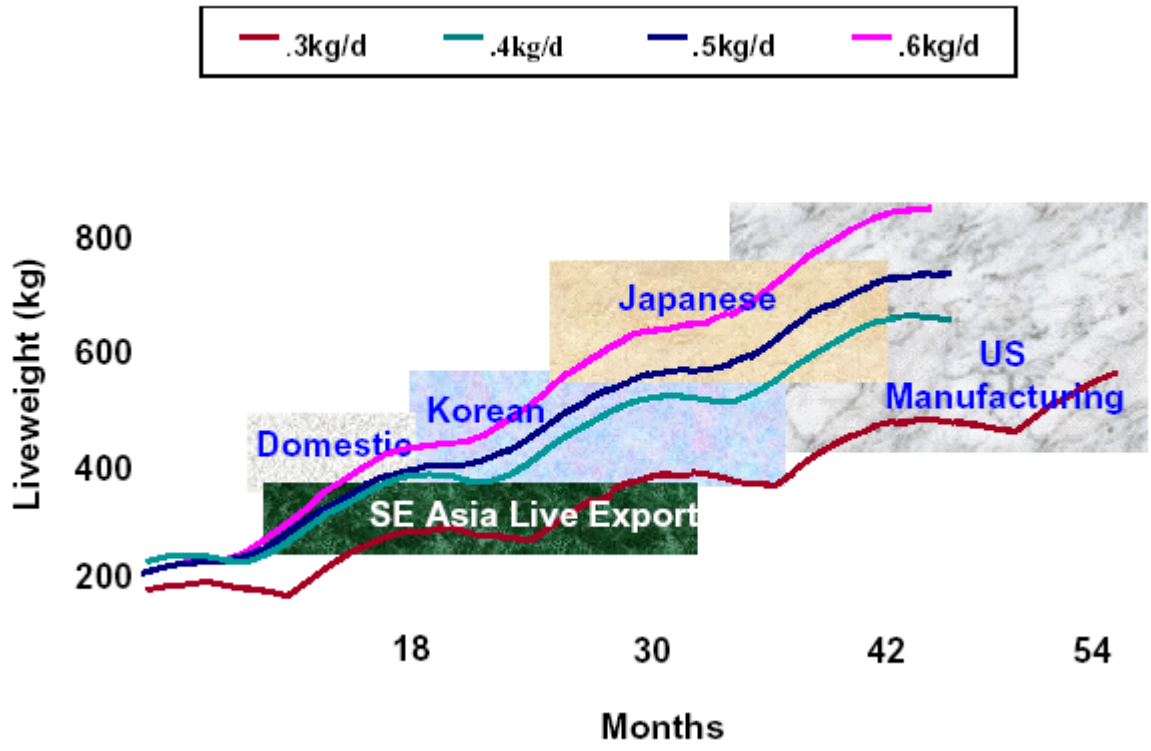
The importance of growth rate to market opportunity is evidenced by figure 5, which demonstrates that not only do higher growth rates result in additional production from a given period, but that the production achieved is actually *worth more* because of the market segmentation of the principal importers of our beef. This double benefit demonstrates why the development of land to improved pastures is strategically very important to so many beef producers.

In summary, the potential for vegetation management controls, if poorly devised, to impact farm profits is demonstrated by the following profit equation. ***The strategic importance of vegetation management in Queensland is evidenced by the fact that vegetation management practices are capable of directly influencing four out of the five variables in this equation.*** (These four variables are those shown in bold type.)

Profit = (**P x p** - DC - **OC**) x **CC**

Where:	**P**	=	**Kg produced per animal**
	p	=	**Price received per Kg**
	DC	=	Direct costs per animal
	OC	=	**Overhead costs per animal**
	CC	=	**Carrying capacity**

Figure 5: **Growth rates, Approximate age of turnoff and liveweight requirements for Australian domestic and various export markets. Source: Bindon (1999) as presented by Cox (2001)**



Approximate Prices (c/kg carcase wt) as at 7 August 2003
(Source: Queensland Country Life, August 7)

Japanese	298c
Korean	287c
Domestic	276c
US	217c

5. Summary of Existing Literature

One remarkable aspect regarding the debate surrounding the value of land clearing to primary industry is the obvious void of published data regarding the on farm economics of land development. Clearly, substantial economic benefits to landholders must exist. This is demonstrated by the willingness of those with suitable land to invest hundreds of thousands of dollars in its development. Government research agencies which have, until recently, contributed large amounts of research to the primary industries regarding technical and scientific matters do not appear to have contributed substantially to the collection and analysis of economic data surrounding land development, this is presumably because the economic advantage land develop has bestowed upon both landholders and society in general has not, until now, been questioned.

This lack of published material is a concern to landholders, since it would appear to follow that governments could not possibly know the true impact on landholders of proposed regimes prior to their implementation, because the necessary research to determine, or even estimate such impacts has not been done. There are however some commonly cited studies, and a summary of these is provided here:

A number of studies have been undertaken which examine the Net Present Value (NPV) of land development options to individual businesses. The NPV can then be used to demonstrate the opportunity cost to the landholder of NOT clearing areas of remnant vegetation. Burrows (1999) found that the NPV of clearing *Eucalyptus populnea* (Poplar Box) woodlands in central Queensland under a selection of timber treatments ranged from $40 to $64 per hectare, with the Internal Rates of Return for the various treatments ranging from 14% to 28%. This is consistent with the findings of another RCS (1999) report quoted by Rolfe et. al. (2000) which showed that NPV's for land clearing in the desert uplands region of central Queensland ranged from $57.61 per hectare in *Acacia cambagei* (Gidgee) country down to $12.34 per hectare in lesser productive Ironbark and Wattle country. An ABARE (2003) study demonstrates consistency with the order of magnitude shown by the earlier studies in that it recognizes $181 Million dollars as being the opportunity cost of forgoing 4.8 million hectares of land development, or $37.70 per hectare. The ABARE report also noted that of Queensland's remaining woodlands, 49 Million hectares is available for development under current guidleines, which at $37.70 per hectare, represents a total opportunity cost of $1.8 Billion forgone in favour of their preservation.

However pure economic studies such as these, whilst important, cannot adequately address the human cost to landholders. Quite simply the ability to continue to manage woody vegetation in much of Queensland's landscapes is the difference between viability and unviability. Since approximately 70% of Queensland's original woodlands remain in a relatively continuous remnant condition, it follows that many of our grazing holdings are relatively undeveloped by the European standards that the holdings were originally allocated upon. Accordingly, many holdings are economically marginal without additional and continued vegetation management. The regulatory taking of the right to manage vegetation requires that many landholders are now forced to accept that they will not be able to maintain economic viability through responsible development, and that they will have to accept forever a subsistence existence, with the real possibility of further erosion of their capital base and income through regulation and continued woodland thickening. There is an immeasurable social cost attached to this. Add to this the fact the landholder is then forced to sit and witness the vegetation that was supposedly to be 'protected', continually thicken and alter structurally and floristically into something that is neither remnant nor diverse, and eventually loses any productive potential it may have had.

Other studies have been undertaken which attempt to measure the effect of vegetation management regimes on farm income and profit levels. An unpublished Queensland Department of Primary Industries (1995) report investigated the impact of different rates of clearing on the Gross Margin of Mulga (*Acacia anuera*) woodlands. The study adopted an economic model which incorporated long standing and widely accepted models of safe carrying capacity, tree regrowth rates, and sheep and cattle herd dynamics. The study considered 5 clearing rates on six different combinations of country type (Hard and Soft Mulga) and Locality (Quilpie, Cunnamulla, and Morven). Consistent increases in property Gross Margins as clearing rates increased were shown under all six scenarios. The average property Gross Margins per hectare at 20% clearing rates of $1.02 increased to $3.75 at 80% clearing rates, with the relative increases in Gross Margin across the six combinations of land type and locality ranging from a 245% increase to a 2191% increase. Given that fixed costs do not increase in proportion to production levels, and that profit margins in the industry are low relative to the revenue base, a substantial percentage of these Gross Margin increases would conceivably be transferred to farm profit. Whilst this study did not evaluate net economic benefits to landholders of the additional clearing, it does demonstrate that substantial improvements in farm productivity and

profit are achievable through additional land development even in relatively unproductive landscapes.

Representatives of the then Queensland Industry Development Corporation (1995) in conjunction with the then Queensland Department of Lands undertook a case study on a property near Alpha in central Queensland. This study was also undertaken for the purposes of assessing the impacts of proposed leasehold guidelines. They modeled the property's income and expenditure under different rates of clearing and found that the property's annual 'steady state' cash surplus would increase from $16,000 at 15% cleared to $108,000 at 80% cleared.

Another project was undertaken by CSIRO, Meat and Livestock Australia, Land and Water Australia, and Environment Australia which used the GRASP pasture simulation model (McKeon 1997) to analyse the effect on profit of the area of woodland retained on four case study properties in South East Queensland. The study considered the economic performance of the four properties under their existing state of development, compared to what their performance would be if vegetation was retained in accordance with pre-determined preservation ideals. Effects on Carrying Capacity, Gross Margins and Net Profit was modeled by Macleod (2001).

Table 1: Effects of % Woodland Retained on Financial Indicators for 4 Properties in South East Queensland. (Source: Macleod 2001)

Treatment		Results		
Property	% increase in woodland retained	% decrease in carrying capacity	% decrease in Gross Margin	**% decrease in Net Profit**
A	20.2	22	21	**58**
B	20.2	23	22	**73**
C	6.0	12	9	**29**
D	6.4	8	11	**37**

Again, these data demonstrate that relatively small percentage changes in development potential translate into very large effects on Net Profit. This is why many landholders often state that they are being forced to "pay for conservation with their family's future".

All of these studies demonstrate a remarkable level of consistency, in that they all show that vegetation management policy has the potential to severely impact the future incomes of landholders, and consequently, the value of the holding. Studies undertaken in jurisdictions other than Queensland have obtained comparable results. Sinden (2002) considered the costs to landholders in the Moree Plains Shire of implementing the NSW Native Vegetation Conservation Act. He found that even in relatively well developed areas such as the subject shire, property Gross Margins would be reduced by 18%, and consequently property values would also be significantly reduced. He also compared the financial contribution by landholders (in the way of forgone income) with the financial contribution made by society in general toward biodiversity protection and conservation of soil and water and demonstrated that farm households in this shire were paying 3100% more than urban households, which serves to further aggravate equity concerns regarding natural resource management legislation.

6. Case Studies

The following examples further assist to explain the on-farm economics of land development. Representative South West Queensland properties with sound development potential have been used. Carrying Capacity estimates are based on the highly regarded Safe Carrying Capacity Model, and production and cost estimates have been sourced from data collected by Devine Agribusiness in the Augathella district over 6 years, and therefore considered reasonably robust. It is conservatively assumed that Gross Margins per head can be increased and the Overhead : Production ratio is able to be reduced, through scale, from 60% to 45%.

Assumptions:

Best Practice Development: Vegetation mechanically destroyed (chained) and oversown with buffel grass (*Cenchrus ciliaris*) 1kg / Ha. Spelled one or two growing seasons, burnt and resown, with only light stocking until pastures well established (total time taken approx. 2 – 3 years, depending on rainfall events).

Development Costs:

Chaining:	$25 / Ha
1st Sowing:	$ 5 / Ha
2nd Sowing	$ 5 / Ha

Time until full stocking: Approx. 2 – 3 years

Other:

- Development capital recovered in year 25 (eg sale of property)
- 6% discount rate on future cashflows.
- Opportunity costs of inventory included in Direct Costs
- Interest on capital cost of land development deducted.
- Provision for regrowth control deducted.
- 3 year time lag between development and additional income.
- In reality development would be spread over a number of years, however it has been analysed in a one-off project here as it will not effect the net returns

Case Study 1: "Dunheved"

"Dunheved' is a sheep and cattle property in the Mungallala district. It is representative of many properties in the Mulga lands, in that it is currently adjusting from the traditional grazing of sheep on native pastures which has become unviable in recent years, toward mixed cattle / sheep production from an improved pasture base. This process requires remnant vegetation to be adequately managed to enable the establishment of improved pastures.

In its current state of development the owners consider it be capable of 'breaking even' and consider that economies of scale, enhanced productivity, and superior market opportunities from further development will enable them to move to a profit situation.

This analysis considers the Net Present Value of a project to develop an additional three paddocks which are currently unproductive because of excessive canopy cover, a result of many years of woodland 'thickening' in response to sheep grazing and altered fire regimes. The widely recognised South West Queensland Safe Carrying Capacity model was used to calculate long term safe carrying capacities of the subject paddocks under existing and proposed canopy cover.

The analysis revealed the project was capable of returning and NPV of $38.61 per hectare and an internal rate of return of 13.6%. The slightly lower return from this project compared to others is expected because of the lower productive capacity of the eastern soft mulga land systems when compared to other brigalow and poplar box land systems. These findings are therefore considered consistent with those of other studies.

See table on following page for a summary of the analysis.

"Dunheved" Case Study

	Remnant Condition		Developed	
Herd Size (AE)	526	*	899	*
Gross Production / AE	150		200	
Direct Costs / AE (includes opp. costs of inventory)	45		45	
Gross Margin / AE	105		155	
Property Gross Margin	55230		139345	
% production required to meet overhead costs	60%		50%	
Total Overheads (net of interest)	47340		89900	
Overheads / AE	90		100	
PBIT	7890		49445	

Additional Gross Production resulting from Development			41555	
Additional Costs	Interest on Development Capital		13196	
	Provision made for Regrowth Control		10425	in years 10 and 20
Incremental PBIT as a result of development			**28359**	
Capital Costs	Ha	$/Ha		
Pasture Development	4170	35	145950	
Water			30000	
Project Lifetime			25 yrs	
Net Present Value			**$161,006**	
NPV / Ha			**$38.61**	
Internal Rate of Return			**13.61%**	

*Calculated using Safe Carrying Capacity Model

Case Study 2: "Valera Vale"

"Valera Vale is a 24,000 hectare grazing property in the Charleville / Augathella district. Unlike "Dunheved", "Valera Vale" has been extensively developed, and this analysis demonstrates the productive capacity able to be realized from relatively unproductive remnant land systems through land development.

"Valera Vale" is now a well established, profitable grazing enterprise. With profitability has come the ability to be innovative and adopt new technology, which has been a feature of this enterprise with the successful implementation of a large AFFA Farm Innovation project and the current development of a documented Environmental Management System to monitor and manage potential environmental risks. The "Valera Vale" enterprise provides evidence of the commonly held belief that "sustainability comes with viability".

When the development of "Valera Vale" was modeled under the conservative assumptions listed above, the project was capable of returning and NPV of $49.77 per hectare developed, and an internal rate of return of 14.8%.

See table on the following page for a summary of the analysis.

"Valera Vale" Case Study

	Remnant Condition		Developed	
Herd Size (AE)	600	*	3200	**
Gross Production / AE	150		200	
Direct Costs / AE (includes opp. costs of livestock inventory)	45		45	
Gross Margin / AE	105		155	
Property Gross Margin	63000		496000	
% production required to meet overhead costs	60%		45%	
Total Overheads (net of interest)	54000		288000	
Overheads / AE	90		90	
PBIT	9000		208000	

Additional Gross Production resulting from Development			199000	
Additional Costs	Interest on Development Capital		59625	
	Provision made for Regrowth Control		42500	in years 10 and 20
Incremental PBIT as a result of development			**139375**	
Capital Costs	Ha	$/Ha		
Pasture Development	17000	35	595000	
Water and Infrastructure			200000	
Project Lifetime			25 yrs	
Net Present Value			**$846,005**	
NPV / Ha			**$49.77**	
Internal Rate of Return			**14.77%**	

* Higher than Safe Carrying Capacity - only possible with significant fodder harvesting and costs.

** Actual year in - year out carrying capacity since development undertaken.

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