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# SILVOPASTORAL POTENTIAL IN CENTRAL QUEENSLAND: A CASE OF LOOKING FOR THE WOOD IN THE TREES

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## INTRODUCTION

This paper describes the impact of national and state level natural resource management (NRM) policies on private native forest activities and agro-forestry opportunities in Central Queensland. These NRM policies have evolved from a period of minimal regulation to an environment of increased land use planning and vegetation management control. Changes in policy settings, timber resource availability and markets for forest products and ecosystem services have elevated the potential for agro-forestry to become a more important component of the farm enterprise. The links between these policy settings and an emerging range of local responses for private forestry are discussed, taking into account the biophysical attributes and early land use history of the region. The paper examines, with the aid of a case study, the impact of historical market trends and land tenure arrangements on forest management in the open woodland savannahs of Central Queensland.

## CENTRAL QUEENSLAND REGION

The Central Queensland region is defined as the Fitzroy Natural Resource Management Area which includes the Fitzroy River Basin. The region has a total area of 16.9 Mha with woody vegetation covering around 7.5 Mha (Queensland Department of Natural Resources and Water 2007). The climate is sub-tropical with an average annual rainfall of between 600 to 900 mm that is summer dominant. Beef production represents 80% of total land use by area with an estimated 1.9 million cattle in the region. Forest vegetation includes *Eucalyptus populnea* (Poplar box) and *E. melanophloia* (Silver leaved ironbark) woodlands, other mixed eucalypt woodlands and *Acacia harpophylla* (Brigalow) or *A. cambagei* (Gidgee) open forests and woodlands (Wilson *et al.* 2002). Woodlands with higher commercial potential include *Corymbia citriodora* (Lemon scented or Spotted gum), *E. tereticornis* (Forest red gum or Blue gum) and *E. crebra* (Narrow leaved ironbark) communities.

## LEGISLATIVE FRAMEWORK

Historically, the woodland resource has been viewed as an impediment to cropping and grazing development with extensive tree clearing, particularly on the leguminous *A. harpophylla* scrublands. From early colonial settlement until the mid 1980s, government policy with respect to private native forestry was largely laissez faire that coincided with the large scale conversion of woodland to agriculture. In 1999, there was only 40% of pre-settlement vegetation remaining in the Brigalow Belt (Wilson *et al.* 2002). However, most graziers have practiced silvopastoralism to some extent, with the retention of paddock trees for shade and shelter and larger wooded areas on less fertile or steep country for periodic grazing. Silvopastoralism is a specific type of agro-forestry, being the integration of trees, pasture and livestock in a production system to maximise net economic and/or other benefits.

Private forestry and grazing land management has been largely influenced by the history of land tenure in Queensland. From the 1860s onwards, the Queensland government instituted a series of pastoral settlement programs and crown leasing arrangements. Both the pastoral settlement and grazing lease regimes supported, and in many cases required, woodland clearing. Since the early 1960s, most grazing land has been converted from pastoral lease to freehold. The conversion to freehold included a number of development requirements, such as:

- clearing of forest;
- establishment of improved pastures; and
- provision of watering points and fencing of the grazed portion of the property.

These requirements, together with financial pressures for freehold conversion payments and infrastructure costs, resulted in widespread timber harvesting. This process was assisted over time through improved road networks and access to remote areas of the region. The fall in cattle prices and drought of the early 1970s further accelerated the harvesting of timber as a source of income.

A significant change in timber resource availability also occurred following the National Forest Policy Statement prepared in 1992 and consequent development of intergovernmental Regional Forest Agreements (RFAs). The RFAs, through the establishment of a comprehensive forest reserve system in 10 regions across four states, reduced the availability of hardwood timber from public native forests. In Queensland, a unilateral process was adopted through the South-East Queensland Forests Agreement and the Western Hardwood Agreement within Central Queensland. The net effect of these land use changes has been a reduction in public hardwood availability and industry restructuring through the government buy out of crown log allocations. Current projections suggest that hardwood sawlog demand in Queensland will exceed local production from existing sources by between 120 000 to 170 000 m<sup>3</sup> per year over the next 10-15 years (Timber Queensland 2007).

In parallel with these initiatives, concern over rates of land clearing in Queensland led to stronger state control of private land management through the *Vegetation Management Act 1999*. Remnant vegetation on private land, as defined under the Act and its regulations, is now protected from intervention unless exempted through an approved forest practice. These controls reflected concern over clearing as a threat to biodiversity and related issues (e.g. soil loss, greenhouse gas emissions). However, these controls do not limit the option of running cattle in these areas. As a consequence, silvopastoralism represents a multiple-use management option for many remnant woodlands. This is likely to become a significant incentive over time for forestry activity given the widespread occurrence of remnant ecosystems on private land with limited alternative commercial use. Strategic thinning and other silvicultural treatments may enhance both timber and beef production. In the short term however, the imposition of strict regulatory requirements has increased the level of complexity of planning requirements for many landowners regarding native forest management. An approved forest practice on freehold land must adhere to a code of native forest practice, with such requirements as riparian buffers, habitat tree retention, regeneration and minimum soil disturbance.

## **OPPORTUNITIES**

The United Nations Framework Convention on Climate Change and subsequent Kyoto Protocol in 1997 has led to rapid policy development and trade in forest carbon sequestration activities, with provision for international emissions permit trading and related mechanisms. In Australia, state and federal governments are working toward a national carbon trading scheme by 2010. Carbon offset trading in plantation forests has already occurred in some jurisdictions such as New South Wales (Murphy 2006). While there is still uncertainty regarding future trading and carbon accounting rules, private forestry has potential to take advantage of emerging markets for such ecosystem services.

The commercial opportunities for agro-forestry reflect the growing market for carbon sequestration as well as reduced public native wood availability. While carbon sequestration has the potential for direct offset payments to farmers from third parties (e.g. greenhouse gas emitters), agro-forestry activities may also help reduce on-farm GHG emissions. This on-farm component may be equally important should a broader range of agricultural activities, such as livestock emissions, be included in any future carbon trading scheme. A potential economic advantage of carbon farming is the receipt of regular payments based on the carbon increment of woody biomass (above and below ground), compared to the irregular income from selectively harvested woodlands for forest products.

Markets for wood production include import substitution and export markets in logs and sawn timber, mining timber, railway sleepers, poles and posts, as well as emerging pulpwood markets. The forestry company Integrated Tree Cropping, for example, has established over 5000 ha of hardwood pulpwood plantation in the higher rainfall southern portion of the region, either through direct land purchase or joint venture arrangements with landowners.

The second main opportunity relates to a range of NRM issues from previous land use history. The extensive removal of perennial native vegetation and related agricultural development has contributed to land degradation and soil erosion in the region. It is estimated that as much as 2.9Mt of sediment and 10 000 t of nutrients per year are exported from the Fitzroy Basin to the coast (Brodie *et al.* 2003). In addition, up to 40% of the Brigalow land type has been classified as slightly degraded and 23% as severely degraded (Tothill and Gillies 1991). In this respect, agro-forestry has been identified as a potential land use option that may help address ecosystem function and commercial goals in grazed landscapes but requires further research (MacLeod and McIvor 2006).

## **CHALLENGES**

Given that the majority of private landowners are engaged in grazing as their primary business, selective woodland harvesting has tended to be undertaken on an opportunistic basis. As a result, many woodland stands have been high graded (i.e. removal of best quality trees) and require treatment to improve forest health and yield (Reg Connolly, *pers. comm.*). Furthermore, growth rates from eucalypt woodlands of around 1m<sup>3</sup>/ha/year can be expected (Sean Ryan, *pers. comm.*), which are relatively low in comparison to the wetter native production forests of south-eastern Australia.

## **PARTNERSHIPS, RESEARCH AND TRAINING**

Given the multi-functionality of woodland systems to provide a range of goods and ecological services, current limitations in timber yield may be offset by other potential benefits to private landowners, such as shade and shelter for livestock, nutrient cycling, carbon sequestration, rehabilitation of degraded landscapes, aesthetic values and income diversification. A number of partnerships and extension initiatives are emerging amongst landowners, forest industry and pastoral groups and R&D organisations. The Central Queensland Forest Association (CQFA), established in 2001 as part of a network of Private Forestry Development Corporations, has acted as a catalyst for private forestry development with a focus on training and awareness, research and development. Extension activities include field days, training courses on native forest management and silviculture, information leaflets and website information covering such aspects as: forest product identification; plantation species selection and site preparation; forest management planning and forestry principles.

A local research project is also investigating the biophysical and economic potential for silvopastoral systems in grazed landscapes based on the establishment of wide rows of natural regrowth or planted trees in open pastures. Modelling techniques are being employed at a farm level to ascertain the sensitivity of these systems to current and projected cost, price and yield scenarios and help identify under what circumstances have the potential for profitable land use. The study is partially supported by the Joint Venture Agro-forestry Program, which is managed by the Rural Industries Research and Development Corporation. The project is a collaborative effort between the Commonwealth Scientific and Industrial Research Organisation, Queensland Department of Primary Industries and Fisheries, CQFA and Central Queensland University.

One of the key challenges has been to raise the level of awareness and skill amongst landowners in identifying the value and condition of standing timber resources and ability to comply with planning requirements and negotiate contract harvests. Recent demonstration harvests with local landowners have helped to document the forest management and contract harvest process for woodlands in varying condition. A demonstration harvest initiated by the CQFA with private landowners at 'Cardowan' is a recent example.

## **CASE STUDY**

The Hughes and Shannon families have been operating 'Tierawoomba' and 'Cardowan' as beef producers for over 100 years. The land tenure arrangements on both properties reflect regional trends with initial pastoral leases converted to freehold in 1964. The physical evidence at both properties indicate a regime of heavy timber cutting during the freehold lease period of the 1960s and again during the drought and cattle price crash of the early 1970s with 'Tierawoomba' continuing to support a full time timber cutter up until the mid-1980s.

The main objective of the CQFA demonstration salvage harvest at 'Cardowan' was to improve the quality of the stand for timber production, examine the implications of harvesting under a NRM regulatory framework and provide an indicative baseline for hardwood prices in the region.

The harvest focused on an area of mixed eucalypt spp. of uneven age that included *E. tessellaris* (Moreton bay ash), *E. tereticornis* (Blue gum), *E. creba* (Narrow leaved ironbark) and *C. intermedia* (Pink bloodwood). This area of 99 ha was in poor condition with densely stocked stands of post 1970s regrowth in flood prone country along the Connors River and Funnel Creek systems. The approved forestry practice addressed numerous overlapping legislative requirements.

The project tendered the sale of 500 m<sup>3</sup> of salvage timber, with 440 m<sup>3</sup> cut by the successful tender producing gross revenue of \$22000 for the landholder. Four tenders were initially submitted with prices ranging from \$7.50-\$49.95 m<sup>3</sup>. The price variation reflects prices historically paid by timber millers and current increases in value being partly attributed to reduced public wood availability and vegetation management controls. The salvage harvest has improved the future yield and product potential of the site. The demonstration harvest has also provided a template for other landholders dealing with NRM and vegetation management controls, contract harvesting and pricing issues.

## CONCLUSIONS

The open woodlands of Central Queensland have traditionally supported broad scale grazing enterprises with opportunistic timber harvesting. In recent years, a number of legislative changes have reduced public timber supply, restricted land clearing activities and encouraged plantation development. These policy settings have influenced the potential for private agro-forestry to become a higher value component of whole farm enterprises. In response to these opportunities, a number of partnerships have developed to improve local knowledge and facilitate increased investment and multi-functionality from private forestry. These activities have targeted the information needs of land owners to better understand the potential value of their woodland resource and the multiple benefits from an integrated approach to forestry and grazing land management. The involvement of landowners and experienced local foresters has been critical in the process of disseminating silvicultural and technical information to the wider rangeland community. The collaboration of research agencies has similarly been important in identifying R&D priorities that are regionally specific and include ongoing species trials and broader systems analysis such as the economic evaluation of silvopastoral systems.

## REFERENCES

- Brodie J, McKergow LA, Prosser IP, Furnas M, Hughes AO and Hunter H (2003). Sources of Sediment and Nutrient Exports to the Great Barrier Reef World Heritage Area. *ACTFR Report Number 03/11*, CSIRO Land and Water and Australian CRC for Tropical Freshwater Research.
- MacLeod ND and McIvor JG (2006). Reconciling economic and ecological conflicts for sustained management of grazing lands. *Ecological Economics* 56: 386-401.
- Murphy T (2006). Carbon Sequestration Fundamentals. Australian Forest Corporation. Available at: [www.australianforestcorporation.com.au](http://www.australianforestcorporation.com.au) [accessed 17/03/09].
- Queensland Department of Natural Resources and Water (2007). Land cover change in Queensland 2004-2005: a Statewide Landcover and Trees Study (SLATS) Report, Brisbane, February.
- Timber Queensland (2007). Timber Queensland Strategic Plan 2007-2010, Brisbane.
- Tothill JC and Gillies C (1992). The pasture lands of northern Australia: their condition, productivity and sustainability. Tropical Grassland Society of Australia Occasional Publication No. 5, Brisbane.
- Wilson BA, Neldner VJ and Accad A (2002). The extent and status of remnant vegetation in Queensland and its implications for statewide vegetation management and legislation. *The Rangeland Journal* 24: 6-35.