Developing a Business Case for Expansion of Plantation Forestry in Tropical North Queensland, Australia

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ABSTRACT

Developing or expanding the plantation estate is often advocated on the grounds of producing a timber resource, creating employment and providing ecosystems services. Australia is a net importer of timber, despite having much land well suited for forestry, and there is a national policy to promote plantation forestry. This paper describes an initiative funded under the Sustainable Regions Programme of the Australian Government to investigate options for expansion of the long-term supply of timber in north Queensland. The objective of this project is to develop a business case, implementation plan and supporting data analysis and regional models in relation to the Hoop Pine processing industries on the southern Atherton Tablelands. Potential opportunities include expansion of the plantation area and expansion of existing value-adding activities along with the development of new value-adding opportunities focused on both domestic and export markets. Major elements of the multi-faceted project include: market research; supply chain and value chain analysis; estimation of available area of forestry land; analysis of the regulatory environment; identification of forestry options, silvicultural systems and sources of funds; financial modeling; inter-industry input-output analysis; environmental impacts and biodiversity analysis; social impacts analysis; development of the business plan and implementation plan; and gaining local acceptance and ownership for the business case. This paper explains the logic for the method of developing the business case, and the experiences and insights gained in carrying out the various stages of developing the case.

INTRODUCTION

Forestry based on logging of native rainforest and sclerophyll forest was a major industry in north Queensland, with many timber mills operating, from about the 1930s. Thirty six tree species were being utilized for timber by 1940 and 103 species were regarded as merchantable in the ‘compulsory list’ of the 1950s. A log quota system for timber mills was introduced in the late 1940s. The aggregate quota was 207,000 m³ in 1979, but was progressively reduced to 60,000 m³ (the estimated sustainable yield) in 1986. Gazettal of the Wet Tropics of Queensland World Heritage Area (WTWHA) in 1988 led to a sharp contraction of the timber industry. Currently there are about 17,000 ha of timber plantations in north Queensland, mostly of Caribbean pine (Pinus caribaea var. hondurensis). Various programmes have been introduced to re-establish the timber industry, including the Community Rainforest Reforestation Program supported by the three levels of government, and the Plantation Joint Venture Scheme of the Queensland government, both of which have been targeted at landholders. The aggregate area established on private land since World Heritage listing has only been about 3000 ha. Currently, the focus of the Queensland government is to develop hardwood plantations in the south-east of the state.

Australia is a timber deficit country, with annual imports of about $2 billion in forest products. The Federal Government strategy Plantations for Australia: The 2020 Vision produced in 1997 provides a framework and vision for plantation forestry development in Australia, the target being to treble the effective area of Australia’s plantations.
between 1996 and 2020 (Commonwealth of Australia 2004). As noted by ATSRAC (2005), one of the aims of ‘FNQ 2010’, which was formulated in 1988, is to increase the production of timber and value-added products through the sustainable development and management of State and privately-owned timber resources.1 Locally, the Atherton Tablelands Strategic Framework and Prospectus for Regional Development acknowledges that ‘The significant timber resources of the Tablelands and the development of a plantation system as both a future resource and restoration initiative represent significant opportunities’ (ATSRAC 2005, p. 17).

This paper discusses a project designed to develop a business case for the expansion of timber plantations in north Queensland, supported by the federal government and being carried out in collaboration with local governments on the Atherton Tablelands.

**THE AUSTRALIAN SUSTAINABLE REGIONS PROGRAMME**

There has recently been an interest in ‘sustainable regions’ in Australia. The view is taken that regional and metropolitan Australia’s economic futures are inextricably linked. By working together, the economic prosperity of the nation as whole can be increased. Impediments to regional growth have been identified in four key areas: attracting investment and accessing finance; dealing with government policies and programmes; recruiting and retaining skilled people; and establishing and maintaining adequate infrastructure. In 2003, the Regional Business Development Analysis Panel proposed actions that address the difficulties faced by regional businesses in attracting finance and investment, and in accessing adequate infrastructure. The Panel noted that other actions, in many cases, come down to more effectively focussed government support and structures that will help regional businesses to help themselves to identify their competitive advantage and pursue opportunities for growth.

The federal government, through the Department of Transport and Regional Services (DOTARS) developed a $100.5 M Sustainable Regions Programme, as the centrepiece of the Stronger Regions: A Stronger Australia package released in 2001. A key feature of Sustainable Regions Programme is local government involvement. According to DOTARS, ‘Stronger Regions is about building on a community’s existing efforts to create strong and sustainable futures, with the government partnering their development by supporting local ideas and actions and helping to provide the tools to make it happen.

![Regions targeted under the Sustainable Regions Programme](image)
Funding is provided for minor local infrastructure, promoting skills building, encouraging small businesses, as well as addressing social development, environmental and cultural issues’. The 10 regions targeted in this programme are indicated in Figure 1.

The Sustainable Regions Programme has been a mechanism through with the federal government could provide direct financial support to local governments for specific projects, rather than through the state governments (which are generally of a different political persuasion to the federal government).

The Atherton Tablelands Sustainable Regions Advisory Committee (ATSRAC) comprising representatives of the four local governments was established to nominate and administer projects supported by the Sustainable Regions Programme. Up to $18 million was allocated to the Atherton Tablelands region (the local government areas of Atherton, Eacham, Herberton and Mareeba) under the programme. The aim has been to identify and support specific activities to promote sustainable development including, strengthening the economy, improving social conditions and sustaining the environment.

**THE HOOP PINE PRODUCTION PROJECT**

At a meeting of ATSRAC in late 2002, the members of the programme group in the Rainforest Cooperative Research Centre on Social and Economic Aspects of Reforestation were invited to submit a proposal for the development of a business case for expansion of the forestry plantation estate on the Atherton Tablelands. This proposal underwent considerable debate and refinement, including the decision to limit attention to expanding the plantation area of hoop pine (*Araucaria cunninghamii*). Hoop pine is the only native softwood grown in the Queensland government plantation estate, comprising over 20% of the total softwood area, or about 40,000 ha. About 1000 ha is grown around Atherton and Kuranda.

A wide-ranging and multidisciplinary project was designed to examine and report on the case for ‘hoop pine expansion’. DOTARS approved funding of $250,000 for the Hoop Pine Production Program (HPPP) in late 2005. The deed of agreement between DOTARS and the Herberton Shire Council describes the following ‘activity’ of the project:

The Activity is for the development of a business case, implementation plan and supporting data analysis and regional models in relation to the Hoop Pine processing industries on the Atherton Tablelands.

The Activity aims to:

- identify employment, economic development and environmental impacts;
- consider options as to source, types and levels of financial returns from investment in Hoop Pine plantations, including the development of a financially viable model attractive to investors and land owners;
- develop a practical model as to industry structure, ownership, infrastructure and demand chain, orientated to meeting customer needs and market trends; and
- identify policy settings required to foster a positive industry development

**THE REGIONAL SETTING FOR THE HPPP**

From the hot tropical coastal farming area along the coast (growing sugarcane, bananas and other crops), highways proceed west up the steep escarpment from Cairns, Gordonvale and Innisfail up to the Atherton Tablelands (Figure 2). The tablelands have an elevation of about 800-1000 masl, with average annual rainfall of about 1200-1500 mm, and soils mostly of basaltic origin.

Tourism is the largest industry in north Queensland, with Cairns surrounded by two World Heritage areas – the wet tropics rainforests (over 900,000 ha) and the Great Barrier Reef (about 2000 km long). Any tree planting has to be compatible with the high natural values of the area, basically dictating use of native tree species. Under Australia’s National Forest Policy Statement (Commonwealth of Australia 1992), clearing of native forest for plantations is vetoed, so planting needs to be on degraded farm land.
Historically, rainforest tree species with outstanding timber properties have been used to produce high quality solid-wood furniture in north Queensland, and there is strong interest amongst landholders in the growing of mixtures of rainforest tree species, though the small volumes now produced make marketing difficult.

Agricultural industries have in general suffered adverse market conditions in north Queensland, with dairy deregulation and reduced milk prices forcing farmers out of dairying on the Atherton Tablelands, volatile prices creating problems for the sugar industry, and closure of the tobacco industry. Category 5 tropical cyclone ‘Larry’ caused great destruction in February 2006, particularly to coastal towns of Innisfail and Babinda and surrounding sugarcane and banana crops, as well as native forests and plantations.

The areas with the greatest prospect for forestry expansion are around Milla Milla and Ravenshoe on the southern tablelands. The sole softwood mill on the tablelands is Ravenshoe Timbers Pty Ltd – processing about 35,000 m³/year of approximately equal quantities of Caribbean and hoop pine from Crown plantations – which is located near Ravenshoe (Figure 2). The Melbourne-based Pentarch Forest Products has recently purchased Caribbean pine from coastal Crown plantations, providing a second buyer for Forestry Plantations Queensland. Three hardwood mills process small quantities of rainforest and eucalypt species, mainly sourced from private land.

The relatively small local market means that Ravenshoe Timbers must sell most of its product in south Queensland and as exports. Mill technology includes several drying kilns, bandsaw milling, and two finger-jointing lines.

RESEARCH ACTIVITIES AND METHODS

The HPPP has been designed in terms of a number of activity areas, referred to in project documentation as:
- Gap Analysis
- Current Situation Analysis
- Impact Assessment
- Options and Strategy Development
- Business Case Development
- Implementation Plan

Each of these has in turn been divided into a number of project (or research) tasks, the overall project structure being as illustrated in Figure 3.

The nature of the business case is not specifically defined in the project documentation. This presumably will be like a business plan as commonly adopted in the accounting discipline. According to Cunningham et al. (2004, p. 61), a business plan consists of: a description of the company; a marketing plan; a description of the operations of the company; and a financial plan. The financial plan in a business plan includes estimates of capital requirements (including start-up costs in the case of a new firm) and sources of capital, and projections of financial performance. In the case of hoop pine expansion, the business case would presumably also argue the public good benefits, as required within the framework of the Sustainable Regions Programme.
FINDINGS FROM THE VARIOUS RESEARCH TASKS

The activity areas of Knowledge Consolidation, Situation Analysis and Gap Analysis were reported in the first Milestone Report as documented in ATSRAC (2006), and drew heavily on findings of research projects which had been carried out under the Rainforest CRC. The Industry Impact Assessment and the identification of Options and Strategies are the subject of the Second Milestone Report, the preparation of which was made difficult by cyclone ‘Larry’ and the undesirability of making visits to north Queensland while the local community were in a recover phase. Key observations from some of the project tasks are presented below.

The Social and Economic Environment of the Atherton Tablelands

Local area data from AusStats and other sources were used to draw up a profile of the Atherton,
Eacham and Ravenshoe local government areas (LGAs), in terms of demography, industry, employment, incomes and social criteria. The population of the FNQ statistical division is about 215,000 persons, including about 125,000 in Cairns. The annual population growth rate in FNQ 1.5% is somewhat lower that that of the state overall, of 2.1%. Atherton Shire has a population of about 11,000, while Herberton and Eacham Shires have about half this number. The latter two shires are predicted to have a population growth of less than 1% over the next 20 years. Respective unemployment rates for the three shires are 8.1%, 9.9% and 16.6%, as of 2001.

Job containment (i.e. proportion of jobs held by people in the LGA in which they reside) was only about 25% for Herberton Shire. Job containment (the proportion of an LGA's workforce having a workplace in the same LGA) was only 47.5% in Eacham Shire and 50% for Herberton Shire, as compared with about 60% for Atherton Shire and 70% for Cairns City. About 75% of the total value of agricultural production in the Atherton Shire was from crops, compared with less than 30% in the other two shires where land is more sloping and dairying and beef production are more prevalent.

Land-Use Policy and the Institutional and Regulatory Environment

The regulatory environment FNQ is in general favourable for forestry, although some local government opposition is apparent, because of the fear of loss of agricultural land and the potential of plantations to harbour crop pests.

Industry Infrastructure and Supply and Value Chain Analysis

The only large timber mill is located at Ravenshoe on the southern end of the tablelands, which was the main centre for rainforest logging before World Heritage listing. The present Caribbean and hoop pine plantations are on the northern and central tablelands, with a 1.5-2 hours trucking time to Ravenshoe. The steep and winding highways from the coast to the tablelands tend to make these separate log markets.

Domestic and Export Market Prospects for Expanded Hoop Pine Production

The preferred timber for Ravenshoe Timbers is hoop pine. This species has a light-coloured timber with excellent physical properties – including high strength to weight ratio, clear grain, easy workability, suitability for staining and sanding, and non-tainting when used for food handling.

Hoop pine can fill the same market as radiata and Caribbean pine, but because of superior properties can also be used for niche market products – particularly high quality plywood and joinery products (windows, doors, awnings, bannisters), furniture, flooring and icecream sticks. There is a limited domestic market which takes advantage of these special features, e.g. joinery products for restoration of colonial homes, and in some new home designs. Substantial market research and product development was conducted through the Araucaria Australia Group which comprised DPI Forestry and the hoop pine processors in Queensland.

Relative to radiata pine (Pinus radiata) and Caribbean pine, hoop pine has more demanding soil requirements and a longer rotation, so profitability depends on selling in markets which recognize the superior timber quality. Hoop pine timber has limited recognition internationally, although some recent success has been achieved with exports, for example of cots components (fixed lengths dressed timber) to China. Japan, Korea and India are other promising overseas markets for hoop pine components, joinery and plywood products.

Estimation of Area of Land Available for Hoop Pine Planting on the Atherton Tablelands

A GIS study was conducted to estimate land available for hoop pine production, identifying an area of up to 86,300 ha on the southern Atherton Tablelands. When only land with high and medium suitability soils, and suitable climate, on the more remote southern Atherton Tablelands, is considered, and excluding Crown land, land with current high-value uses and protected regional ecosystems, the available area falls to 33,500 ha.
This is somewhat less than in previous studies. If the target area is restricted to the high suitability land class, and to the Eacham and Herberton Shires, then the total area approximately halves, to 17,800 ha. This GIS research was accompanied by research into property sales and land values, indicating that land could be acquired for approximately $1100 or more per hectare.

Financial and Risk Analysis of Hoop Pine Plantations

A mean annual increment of 15-20 m³ (for site index 25 to 30) can be obtained in hoop pine plantations harvested at about 45 years, with final stocking of 300 sph. The NPV is estimated as $732/ha, and the LEV as $823/ha, at a discount rate of 5%. There is some prospect for a shorter rotation under a lower final stocking rate. Also, in that hoop pine seedlings are in general not damaged by cattle there is a potential for grazing benefits in wider spaced stands, with reduced weed-control costs.

No risk analysis has yet been conducted, although the cyclone ‘Larry’ experience has raised awareness of the destructive forces of extreme tropical weather events. Rainforests, eucalypts and Caribbean pine on the coast and tablelands were severely affected, but with hoop pine showing considerable resistance to wind damage. Falling trees and wind-blown branches contributed greatly to damage to buildings, and power and phone lines, and blocked roads. Destruction of young plantations sounded an alarm about riskiness of forestry as an investment. The damage was most severe along the patch of the cyclone, in exposed sites and for some species and forest configurations.

Non-timber Income and Non-wood Values from Hoop Pine Production, Including Possibilities of Payments for Ecosystem Services

Hoop pine does not provide edible seeds or other useful non-wood products. There is no market for commercial thinnings or harvest residue on the Atherton Tablelands. Some possibility of carbon credits arose, through the Greenhouse Gas Abatement Project funded by the Australian Greenhouse Office, but this has not as yet proceeded.

Forestry Industry Support Measures

No government-funded forestry extension service exists in north Queensland. During the 1990s two financial support programmes for tree planting – the Community Rainforest Reforestation Program and the Plantation Joint Venture Program – gave impetus to growing of native tree species on farms, but no assistance programmes currently exist. Private Forestry North Queensland Association (PFNQ) as an ‘industry cluster’ provides support for farm forestry, but is not resourced to be an extension agency. The North Queensland Timber Co-op (NQTC) formed in 1996 has yet to achieve an impact in timber selling.

The Proposed Hoop Pine Expansion Plan

In planning the project tasks, the formulation of plantation options and strategies was timed to come after industry impact assessment. However, it soon became apparent that a specific hoop pine expansion plan was needed, to provide a context for the impact analysis. Further, it was necessary to specify a considerable amount of detail of the plan at this stage. An estimate of total expenditure on plantation establishment and early maintenance was needed for social and economic analysis. An estimate of the plantation design including the extent and species for permanent plantings was needed for environmental impact assessment. While the hoop pine expansion plan would no doubt be refined when developing the business case and implementation plan, important judgments were needed at this point, which involved discussions among project team members and consultation with stakeholders.

The proposed plan includes an initial five-year stage of the government planting an additional 1000 ha of hoop pine, with a similar area of farm plantings. The recommended area for planting is on the southern Atherton Tablelands, particularly
around Milla Milla. Here the land is relatively steep, with little cropping, and some farmers have ceased dairying to run beef cattle. Commuting times to main population centres of more than one hour have limited subdivision. The land around Milla Milla has been classified as having a high priority for biodiversity restoration (Figure 4). Consistent with the emphasis on ‘sustainable regions’, it is envisaged that the planted areas will be interspersed with permanent mixed-native-species (mainly broadleaf) plantings – particular on land over 25% in slope and along watercourses – and open grazing land. There is a possibility of using volunteers and trainees to assist in tree planting, particularly of the permanently planted areas.

Two clear observations can be made about necessary conditions for successful farm forestry. First, landholders cannot be expected to establish plantations for timber production unless they have a high degree of confidence that they will be able to sell their timber, and a reasonable price. At present, sales by Forestry Plantations Queensland to the single softwood tend to lock farm-grown timber out of the market. Second, timber processors cannot be expected to purchase farm-grown timber unless it is of high quality, resulting from sound silvicultural practice (supported by forestry extension activities).

Economic Impact Analysis: Inter-industry Input-output Analysis

Inter-industry input-output analysis is being used to estimate output, income and employment flow-on effects of forestry investment. Some problems are being experienced in applying this to a small regional area with a single dominant timber processor.

Social and Environmental Impact Analysis of Hoop Pine Expansion

Forestry expansion has the potential to redress rural depopulation, particularly following the World Heritage listing of the Wet Tropics rainforests when property prices in the country towns have fallen, and there has been loss of some services including schools, and banks and hotels.7

One of the challenges to project implementation will be gaining support for additional hoop pine plantings by the local community. While this is a native tree species, and used widely for farm windbreaks and as a town ornamental tree, there is strong interest by environmental groups in planting mixed rainforest tree species. A survey of attitudes to landscape by locals and tourists indicated that hoop pine is reasonably well thought of in the landscape, well ahead of exotics, but not as popular as mixtures of rainforest species.

The interspersing hoop pine and other native species, including corridor plantings, will favour wildlife habitat. Also, the long rotation of hoop pine allows considerable understorey development, and a large number of volunteer native species have been recorded in research studies.

Community consultation about the hoop pine expansion plan has proceeded through meetings.
with individual stakeholder groups, though not at this stage through open community meetings.

**DISCUSSION**

The Hoop Pine Plantation Project has provided an opportunity to apply much of the knowledge and insights from activities in the Rainforest CRC to a practical business setting. At the same time, the wide-ranging nature of the project, and need to produce a business case that will stand up to scrutiny by a variety of stakeholders, has presented a major challenge. Tropical cyclone ‘Larry’ has caused some interruption to project fieldwork, which is restricted to a short funding timespan due to the winding up of the DOTARS sustainable regions programme. The cyclone also raised questions about the security of forestry, although probably increasing the reputation of hoop pine as a low-risk plantation species.

There would appear to be adequate land available for new plantations, and hoop pine is a well-researched and reliable tree species, although the long rotation limits profitability and requires that value adding and niche marketing be practiced. Hoop pine expansion is potentially well suited to integration with a biodiversity restoration programme in an area of degraded farm land. Some government support would appear to be warranted because of the environmental benefits which can be generated by hoop pine expansion, and this could enhance to attractiveness of forestry to private growers.

This type of analysis would appear to be a useful step in forestry planning, in that a comprehensive evaluation of the issues and the plantation options is provided, within the ‘sustainable regions’ framework. It is likely that the main obstacles to implementation of the recommended hoop pine expansion plan will be institutional and political ones.

**REFERENCES**

ATSRAC (Atherton Tablelands Sustainable Regions Advisory Committee), (2005), Atherton Tablelands Sustainable Regions Programme Application Form, Herberton Shire Council, Herberton.


Commonwealth of Australia (1992), National Forest Policy Statement: A New Focus on Australia’s Forests, Department of Primary Industries and Energy, Canberra.


FNQ RPAC (Far North Queensland Regional Planning Advisory Committee) (2000), Far North Queensland Regional Plan, Queensland Department of Communication and Information, Local government, Planning and Sport, Brisbane.

**Notes**

1 Far North Queensland (FNQ) is a statistical division within the state of Queensland, including the Cassowary Coast (on which Cairns is the largest city), and Atherton Tablelands area (including the Atherton, Evelyn, Julatten and Windsor Tablelands). FNQ 2010 is a vision statement for development within the statistical division.

2 Forestry Plantations Queensland was previously known as DPI Forestry, which was a business unit of the Queensland Department of Primary Industries and Fisheries responsible for commercial forestry production. At the beginning of May 2006, it was separated from DPI&F, as a stand-alone government-owned corporation.
Land availability and the cool climate and natural environment attracts people to live on the Atherton Tablelands. Some commuting takes place to Atherton as the main commercial centre on the tablelands and to Cairns.

Hoop pine has long internodal distances, and milling can be designed to maximize production of clearwood components of up to about 1.5 m in length.

The site index for case of hoop pine is the expected tree height in metres at age 25.

The trees would be shorter, but the stumpage price penalty may not be great because the price of pruned butt logs is about three times that of top logs and there is no pulpwood market for small-diameter timber.

Ravenshoe Timbers is the largest single employer in the Herberton Shire.