

Northern Forestry & Forest Products Industry Situation Analysis

Project Number - A.1.1718122

**Stage 1 – Overview of the forestry and forest products industry and
preliminary evaluation of forestry opportunities**

Overview Report

*This Overview Report is informed by and should be read in conjunction with the Literature
Review and the Workshop Report included in the appendices.*

Draft 1.1

Cooperative Research Centre for Developing Northern Australia

The Cooperative Research Centre for Developing Northern Australia (CRCNA) is focused on delivering industry-led research collaborations across northern Australia in the areas of agriculture and food, health service delivery and Traditional Owner-led business enterprises.

CRCNA acknowledges the support of its project partners:



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1.0 Purpose of the Overview Report

This draft Overview Report forms a key part of the “situational analysis of northern forestry and forest products industry”.

The draft Overview Report identifies and describes key challenges faced by the northern Australian forestry and forest products industry, and subsequently explores potential solutions and opportunities for further discussion, research or investment.

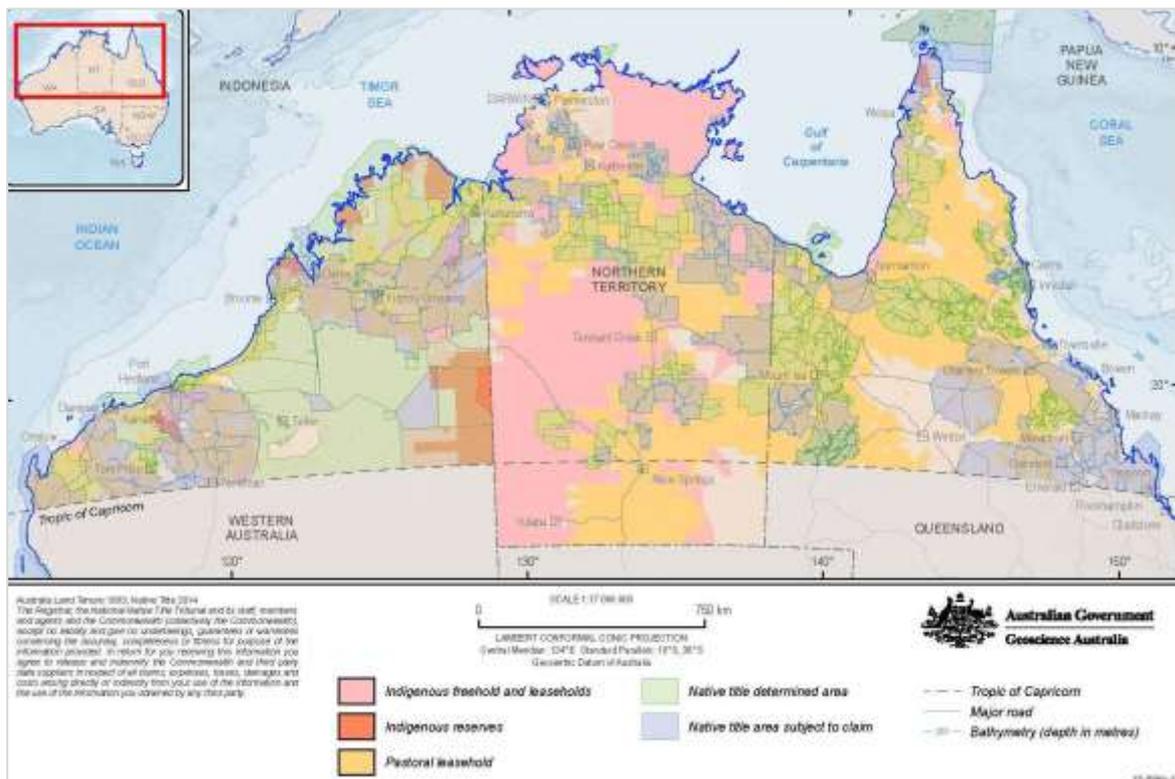
It will be distributed to stakeholders for feedback and after a final workshop (Western Australia, September 2019), will be updated to a final, action-oriented Overview Report, in the form of a multi-faceted roadmap.

The draft Overview Report is informed by and should be read in conjunction with the literature review and workshop report included as appendices.

2.0 Introduction

Despite the potential of an extensive landmass, and vast forest areas, remoteness and extremes of climate have limited the potential of the region, including the forestry and wood products industry. The northern Australian forestry and forest products industry, at least in terms of wood product processing and value chain activity currently is small scale, geographically fragmented and sectorally diverse.

Northern Australia, as defined by the tropic of Capricorn in Queensland and Western Australia, and including all of the Northern Territory, encompasses 52.7% of Australia’s land mass and contributes 11.7% of Australia’s GDP, despite only accounting for 5.5% (1.3 million) of the Australian population, including approximately one quarter of the national Indigenous population.



Source: Geoscience Australia, 2015a

3.0 Current context of northern Australian forestry

In aggregate, northern Australia is currently growing more than 12 million hectares of native eucalypt forest with low to high wood commerciality (ABARES 2019, data provided for this project). This represents a significant potential existing resource for future development.

In addition, there is around 30,000 hectares of softwood (*mainly Pinus caribaea*) plantation in far north Queensland (e.g. around Mareeba), approximately 6,000 hectares of teak plantation (Qld), approximately 14,000 hectares of African mahogany (*Khaya senegalensis*) plantations (NT) and 4,000 hectares of Red mahogany (*Eucalyptus pellita*) plantations (Qld) intended primarily for higher-value, solid wood products. There is also approximately 30,000 hectares of Acacia (*Acacia mangium*) plantations for pulpwood production (NT), more than 4,300 hectares (NT) of Indian sandalwood plantations and approximately 8,500 hectares of Indian sandalwood in northern Western Australia.

Given the extensive forest resources of northern Australia, and the potential to target climatically and otherwise suitable expansion of the plantation forestry assets, the opportunities are equally extensive.

This is especially the case when plantation expansion occurs in proximity to major processing opportunities and existing port facilities. Either or both can assist in addressing major challenges that include the geographic remoteness of some parts of northern Australia and transport distances to wood processing facilities, ports and population centres. The situation is little different for native forest opportunities.

As stakeholder feedback identified, key opportunities are consistently constrained by logistical challenges, that will be best overcome by an integrated and regional approach.

Regardless of whether they are in plantations or native forests, trees sequester carbon and store it, long into the future. Policy measures that include ensuring there is an adequate price on carbon will provide assistance to expansion of the forestry and wood products industries in northern Australia.

Providing security of access and supply is necessary to ensure that commercial viability can be commuted into success at the community, regional and national level.

In addition to addressing any policy and regulatory impediments to the expansion and establishment of plantation forestry opportunities, there are areas for further consideration by Government, especially as they relate to access to native forests.

The available data demonstrates that in northern Australia, the total area of native forest amounts to over 60 million hectares.

Significantly, this includes more than 20 million hectares of private forest (including indigenous forest), where specific measures to support forestry activities may assist in addressing some of the barriers to development of this resource. It is noted that the data on the productive capabilities and commercial viability of this resource has not been extensively assessed, although up to 12 million hectares has been crudely identified in northern Australia as having low to high wood commerciality.

4.0 Consistent themes, despite the diversity

Despite the regional diversity, there are consistent themes for forestry across northern Australia:

- Vast areas of land are available for **expansion of plantations** in northern Australia;
- **Significant areas of native forest** exist, but there is need for **improved forest inventory**;
- More **certain native forest resource security arrangements** (whether for private native forests or for those growing on crown land) will support future investment in processing, downstream value adding and employment;
- Expansion of forestry and wood products industries requires **meaningful engagement models between industry, investors and resource owners** (particularly traditional owners);
- **Silvicultural awareness** needs to be improved and supported with expertise and training for private native forestry (particularly among traditional owners and to support expansion of Indigenous forestry opportunities¹) to raise and maintain future productivity and sustainable flows of wood;

¹ *Indigenous forestry opportunities and challenges are subject to a parallel review by the University of Sunshine Coast, the outputs of which will be joined with this review.*

- **Silvopastoral systems** (particularly beef cattle and timber) are likely to be important to the viability of both plantation and native forestry on the one-hand and the expansion of beef cattle operations, on the other hand;
- **Carbon incentive schemes** could play a role in supporting expansion of forestry operations, both in plantations and related to native forests (including private native forests);
- **Infrastructure needs** are significant across northern Australia, linking resource with processing and export (port) opportunities.

These themes are important because they assist in defining opportunities and what is required to realize them. However, they are most important because consistencies across regions point to likely action priorities for governments, industry and other stakeholders.

5.0 Established opportunities

Arising from the themes in available literature, the opportunities for forestry and wood products in northern Australia include:

- **More certain long-term wood supply arrangements for effective utilization of crown leasehold lands** on which eucalypts are growing and which is potentially available for hardwood processing (north Queensland).
- Extension of **Indigenous forestry management and wood products manufacturing** and supply (East Arnhem Land, NT and Cape York, Queensland).
- Further development of the **sandalwood industry** for ceremonial, pharmaceutical and personal care purposes (WA, NT and Qld).
- Expansion of **hardwood pulp fibre plantations** (*Acacia mangium*) with expected continuation of export market strength (Tiwi Islands, NT).
- Establishment of further **climatically suitable plantation species** (e.g. African mahogany; *Khaya senegalensis* and *Eucalyptus pellita*), and scope for combined co-beneficial agribusiness such as silvopastoralism (Douglas-Daly to Katherine region, NT, and Townsville – Burdekin region, Qld).
- Maintenance and expansion of the well-established **softwood plantation estate** and further processing developments (wet tropics regions of north Queensland, and Byfield in central Qld).
- **Red mahogany** (*Eucalyptus pellita*) was the most widely planted eucalypt in humid, coastal areas of northern Australia

6.0 Case studies provide some examples of both opportunities and needs

"Imagine if we can demonstrate that we can collect sawlogs for our sawmills, process some for veneer, utilize some logs for power poles and then utilize the rest as woodchips to generate electricity for Aurukun through Indigenous owned business and replace diesel power generators. And all of this from forest resources that have been traditionally cleared and burnt for over 50 years,"

Gina Castelain, MD of Wik Timber.

WIK TIMBER



- Wik Timber Holdings is an Indigenous business and the timber harvesting, wood chipping and seed collection operations will provide jobs for local Aboriginal people resident in and around Aurukun and Napranum. The Wik Timber project recently purchased two Tigercat machines for its logging operations south of the Embley River, on the Western Cape York Peninsula. They were put to work clearing land for Rio Tinto Aluminium, to allow the mining giant access to the abundant supply of Bauxite.
- With harvesting, transport and port access planning complete, the logging operations are now in their initial stages. When at full scale, the business will produce up to 125 000 tonnes (138,000 tons) of timber and other forest products annually for international and domestic markets. Annual turnover is expected to be around \$6 million. The operations will employ 70 local Aboriginal people.
- Demand for the various products is expected to come from Chinese, Vietnamese and domestic sawmillers and manufacturers of timber-based products. In addition, power transmission poles will be marketed to electricity distributors, Rio Tinto Aluminium will require railway sleepers, and Rio Tinto Aluminium and others will demand chips for mine rehabilitation.

Perhaps this is just the tip of the iceberg for mining operational land clearing practices in Australia going forward.

Australian Forests & Timber News December 2017

Established in 2013, **Cape York Timber** is a lighthouse Indigenous-owned business that produces high-quality sustainable Australian hardwood while providing Indigenous employment and training.



CAPE YORK TIMBER

- Cape York is home to a vast quantity of Australia's durable, aesthetic and merchantable hardwood timbers. Responding to the growing demand for this resource locally and internationally, Cape York Timber supplies a range of premium hardwood for wholesale, retail, and specialty markets.
- The Cooktown sawmill was commissioned in January 2015, has year-round road access and is supported by on-grid power and other mainstream infrastructure.
- Timber harvesting and processing represents a significant economic opportunity for Indigenous people of Cape York. The business provides long-term, valuable employment and training opportunities for Indigenous people; currently employing 10 full-time staff and maintaining 70% Indigenous employment.
- Cape York Timber is leading sustainable management of Indigenous forests in northern Australia. Timber is harvested on Indigenous properties, and an integrated conservation regime enables an overall improvement in the forest resource over the coming decades.

With industry development and government investment a long term, sustainable forest and timber industry can develop.

Indigenous Economic Development – the Cape York Timber Story
<https://capeyorkpartnership.org.au/our-partnership/cape-york-timber/>

7.0 Integrating opportunities and needs

These opportunities were confirmed, refined, extended upon and amended in the workshops. The following table, developed from the workshops, incorporates all of the identified opportunities, but to inform the development of clear action priorities, also identifies broad activity streams:

- Regulatory
- Research
- Development
- Market

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Priority opportunities/needs	Region/s	Stream
<p>OPPORTUNITY: Expansion of downstream processing and value adding ~ given the large potential native forest resource, there is an opportunity for expanded processing, but this is dependent upon security of access to supply of resource, given capital and investment financing requirements.</p> <p>NEED: Security of access to supply of resource ~ particularly for native forests, for land under all tenures, to facilitate decision-making and investment. In Far North Queensland, there are also good prospects for pine plantation resource expansion, requiring assessments of land availability and investment models with landowners.</p> <p>NEED: Effective engagement models ~ between industry, private forest owners and investors, particularly for indigenous owned and managed forests.</p>	<p>Far North Queensland Cape York East Arnhem Land</p>	<p>Regulatory (Crown land) and Development (PNF, Plantations)</p>
<p>OPPORTUNITY: Mine site revegetation ~ add value to existing extensive mining land-use activities through revegetation with productive forestry (e.g. timber, bioenergy).</p> <p>NEED: requires forest inventory and silvicultural information for native forests and for suitable plantation species, and market information to inform decisions as to scale and specific opportunities.</p>	<p>Cape York East Arnhem Land</p>	<p>Research and Development</p>
<p>OPPORTUNITY: Expansion of silvopastoral systems ~ can maximise returns through joint production of timber and livestock via improved revenue streams and business cash flows.</p> <p>NEED: research and extension of silvopastoral systems that are regionally specific to site conditions, climate and species.</p>	<p>Far North Queensland Cape York Douglas Daly</p>	<p>Research and Development</p>

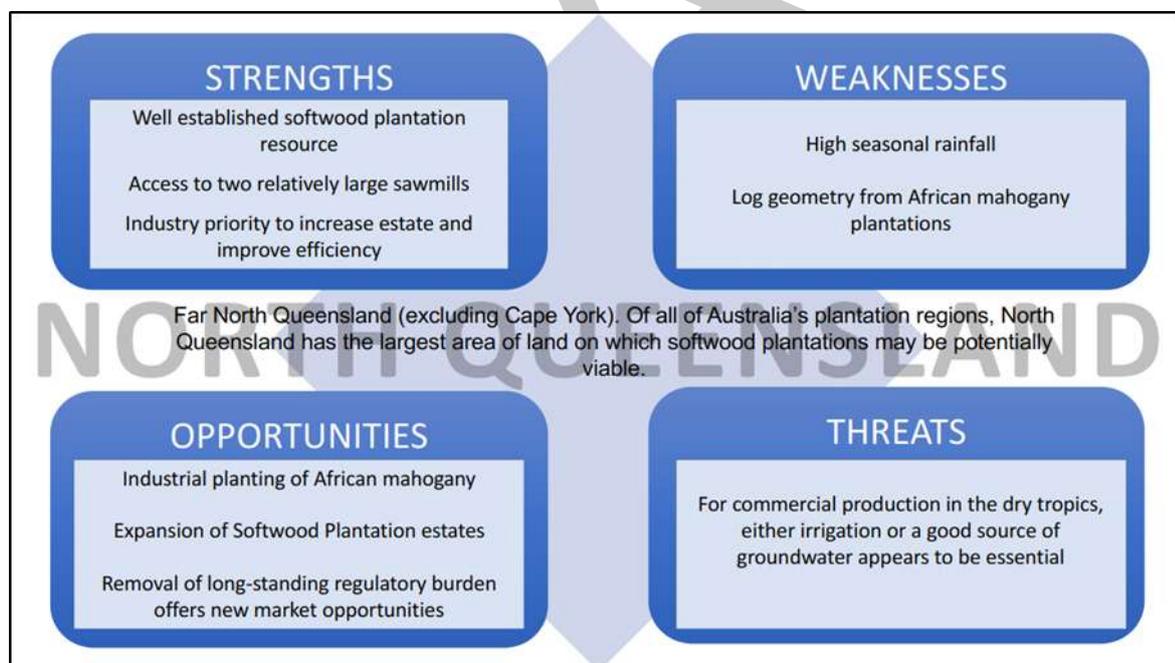
<p>OPPORTUNITY: Sustainable local employment, including for indigenous people ~ provide long-term, skilled and self-sufficient employment opportunities, across northern Australia, including in remote indigenous communities.</p> <p>NEED: extend and establish business models aiming to extract maximum value from forestry resources (trees) in the regions and communities where the resource is found.</p> <p>NEED: requires training and skills development opportunities and integration with national training and skills recognition arrangements, for business development and management, through the entire forestry supply-chain to operator level.</p>	All regions	Development (including training)
<p>OPPORTUNITY: Supply to meet demand for solid wood products ~ given remoteness of the region and proximity to end use markets, local suppliers may have a comparative advantage servicing local demand (northern Australia) as well as some specific export markets (e.g. Asia) which are projected to grow over time.</p> <p>NEED: requires improved market information, and may require related forestry inventory and silvicultural information research on product mixes.</p>	All regions	Market and Research
<p>NEED: Carbon markets ~ carbon accounting research, especially for native forests, linked to the forestry inventory and silvicultural information research; and removal of the federal 600mm “water rule” for new plantations.</p>	All regions	Research and Regulatory
<p>NEED: Forest inventory and silvicultural information ~ specifically required for native forests across northern Australia, to inform decision making and forestry extension in the field.</p>	All regions	Research and Development

<p>NEED: Market information ~ especially for native species and for assessment of opportunities (particularly solid wood) at the local (northern Australia), national and export market levels.</p>	<p>All regions</p>	<p>Market and Research</p>
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8.0 SWOTs for Key Regions

A summary analysis of the Strengths, Weaknesses, Opportunities and Threats for each of the regions follows. Details can be found in the Literature Review.





9.0 Developing action and research and development priorities

This draft Overview Report is the mid-point of a three-phase process, the summation of which will be a final Overview Report including prioritized opportunities and actions for northern Australia, for the regions and for the major identified priorities.

In addition to a Western Australian workshop (September, 2019), this draft will be distributed for specific feedback, especially as to the priority opportunities, including addressing development and associated research needs.

Subsequently, the 'Overview Report' will be finalized and will ultimately be presented as an action-oriented roadmap for the future of the forestry and forest products industry in northern Australia.

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APPENDIX ONE

10.0 Appendices

APPENDIX ONE - Literature Review (June 2019)

APPENDIX TWO - Workshop Report (June 2019)

Northern Forestry & Forest Products Industry Situation Analysis

Project Number - A.1.1718122

**Stage 1 – Overview of the forestry and forest products industry and preliminary
evaluation of forestry opportunities**

Literature Review

Draft 2.2

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Executive Summary

Purpose

This “situational analysis of northern forestry and forest products industry” literature review identifies and describes key challenges faced by the northern Australian forestry and forest products industry, and subsequently explores potential solutions and opportunities for further discussion, research or investment.

This literature review is the first element of a staged process to a complete analysis of forestry and forest products industry opportunities in northern Australia. The component elements of which are:

- Literature review, to inform and guide;
- Stakeholder consultations and regional forums, that feed into
- A comprehensive ‘Overview Report’.

Stakeholder feedback and input from direct consultations has been incorporated to form v1.2 of this literature review document. Any stakeholder contribution that adds value, provides further information or even contradicts literature findings, is prefaced with “*Stakeholder feedback*” and formatted in italics.

Background and themes

Northern Australia, as defined by the tropic of Capricorn in Queensland and Western Australia, and including all of the Northern Territory, encompasses 52.7% of Australia’s land mass and contributes 11.7% of Australia’s GDP, despite only accounting for 5.5% (1.3 million) of the Australian population, including approximately one quarter of the national Indigenous population.

This initial review of published and otherwise available literature highlights the regional diversity of the industry and its opportunities, across quite distinct geographical regions and sectors in northern Australia.

Available literature contains some consistent themes:

- Vast areas of land are available for **expansion of plantations** in northern Australia;
- **Significant areas of native forest** exist, but there is need for **improved forest inventory**;
- More **certain long-term native forest resource security arrangements** (whether for private native forests or for those growing on crown land) will support future investment in processing, downstream value adding and employment;
- Expansion of forestry and wood products industries requires **meaningful engagement models between industry, investors and resource owners** (particularly traditional owners*);
- **Silvicultural awareness** needs to be improved and supported with expertise and training for private native forestry (particularly among traditional owners and to support expansion of Indigenous forestry opportunities*) to raise and maintain future productivity and sustainable flows of wood;
- **Silvopastoral systems** (particularly beef cattle and timber) are likely to be important to the viability of both plantation and native forestry on the one-hand and the expansion of beef cattle operations, on the other hand;

- **Carbon incentive schemes** could play a role in supporting expansion of forestry operations, both in plantations and related to native forests (including private native forests);
- **Infrastructure needs** are significant across northern Australia, linking resource with processing and export (port) opportunities.

* *Indigenous forestry opportunities and challenges are subject to a parallel review by the University of Sunshine Coast, the outputs of which will be joined with this review.*

Findings and opportunities

Arising from these themes, the opportunities for forestry and wood products in northern Australia include:

- **More certain long-term wood supply arrangements for effective utilization of crown leasehold lands** on which eucalypts are growing and which is potentially available for hardwood processing (north Queensland).

There is currently a network of small hardwood saw mills with uncertainty over future wood security from crown land (i.e. present contracts are about to expire). The Queensland Government is presently determining its policy on the 'future of timber production on state-owned land'. Without the necessary certainty of future wood supply, there is a lost opportunity to grow and build on the existing industry investment that has been established around the crown forest resource and for any new potential entrants.

- Further development of the **sandalwood industry** for ceremonial, pharmaceutical and personal care purposes (WA, NT and Qld).

Indian sandalwood (*Santalum album*) is grown for oil and pharmaceuticals in the Douglas-Daly and Katherine regions of the Northern Territory, in the Ord River Irrigation District in northern WA, and in the Burdekin and Lakeland Downs regions of north Queensland. Sandalwood is the only plantation forestry in Australia that is routinely grown in a mixed species system, and with irrigation.

WA's sandalwood plantations are currently being harvested and re-planted. Still at the early rotation phase, the NT sandalwood plantations will not be harvested for more than a decade, where they then expect to go into the oils and pharmaceutical markets.

- Expansion of **hardwood pulp fibre plantations** (*Acacia mangium*) with expected continuation of export market strength (Tiwi Islands, NT).

Continued growth in global demand for hardwood fibre is expected over the next decade as global populations expand and their living standards increase. Already being harvested, the existing plantations can be re-planted and extended on the Tiwi Islands, the closest Australian location to the main Chinese and Japanese markets and the emerging Indonesian market. These plantations provide an example of targeted suitability plantation forestry, and of opportunities to expand Indigenous-owned forest enterprises.

- Establishment of further **climatically suitable plantation species** (e.g. African mahogany; *Khaya senegalensis* and *Eucalyptus pellita*), and scope for combined co-beneficial agribusiness such as silvopastoralism (Douglas-Daly to Katherine region, NT, and Townsville – Burdekin region, Qld).

The current African mahogany plantations have an expected rotation of between 18 - 25 years. The NT plantations are mid-rotation and have just been independently valued at AUD100M standing value i.e. the current value of trees within the plantation, which will yield saleable timber when harvested at maturity. They provide an example of targeted suitability plantation forestry and of the financial returns that may be available from silvopastoral activities.

- Extension of **Indigenous forestry management and wood products manufacturing** and supply (East Arnhem Land, NT and Cape York, Queensland).

Whether Cape York Timber in eastern Cape York, Wik Timber Holdings in eastern Cape York, or Gumatj Corporation Limited's in Arnhem Land in Nhulunbuy (NT), the integration of Indigenous business and employment opportunities, with access to native forests and specific (local and international) demand and markets, provides a roadmap for future developments.

- Maintenance and expansion of the well-established **softwood plantation estate** and further processing developments (wet tropics regions of north Queensland, and Byfield in central Qld).

Based on well-established growth in demand for sawn wood products in Australia, planting an additional (approximate) 44,000 hectares of softwood plantations in north Queensland, coupled with some log reallocation from other softwood growing regions, could support a world-scale softwood sawmill in the region, which is currently home to two relatively large sawmills.

Of all of Australia's fifteen plantation regions, north Queensland has the largest area of land on which softwood plantations may be potentially viable.

- **Red mahogany** (*Eucalyptus pellita*) was the most widely planted eucalypt in humid, coastal areas of northern Australia and about 4,500 hectares were established in coastal, north Queensland until much of the resource was destroyed by Cyclone Yasi in 2011. About 500 hectares of existing small plantings still target timber production.

Plantation-grown red mahogany generally targets integrated pulp and sawn wood production. Potentially, plantation-grown timber is suitable for solid wood products, veneers and other, appearance grade products, and it can be grown for carbon sequestration, in a range of locations in northern Australia (Harwood et al 1997).

Despite the potential of an extensive land mass, and vast forest areas, remoteness and extremes of climate have limited the potential of the region, including the forestry and wood products industry. The northern Australian forestry and forest products industry, at least in terms of wood product processing and value chain activity currently is small scale and fragmented.

In aggregate, northern Australia is currently growing more than 12 million hectares of native eucalypt forest with low to high wood commerciality (ABARES 2019, data provided for this project). This represents a significant potential existing resource for future development.

Regarding plantations, there is around 30,000 hectares of softwood plantation in far north Queensland (e.g. around Mareeba), approximately 6,000 hectares of teak (Qld), approximately 14,000 hectares of African mahogany plantations (NT) and 4,000 hectares of red mahogany (Qld) intended for high-value products, approximately 30,000 hectares of *Acacia mangium* plantations for pulpwood production (NT), more than 4,300 hectares (NT) of sandalwood plantations and approximately 8,500 hectares of sandalwood in north Western Australia.

Given the extensive forest resources of northern Australia, and the potential to target climatically and otherwise suitable expansion of the plantation forestry assets, the opportunities are equally extensive.

This is especially the case when plantation expansion occurs in proximity to major processing opportunities and existing port facilities, which can assist in addressing major challenges that include the geographic remoteness of some parts of northern Australia and transport distances to wood processing facilities, ports and population centres. This has typically occurred under the private ownership model, but has, as the case studies on Cape York Timber and Wik Timber demonstrate, at least some similarities to opportunities arising from native forests of different tenures.

Stakeholder feedback has also highlighted that key opportunities are consistently constrained by logistical challenges and suggested analysis around the integration of solutions. For example, there might be a single infrastructure investment/solution servicing multiple industry sectors, or port facilities continuously utilised from various sectors.

Regardless of whether they are in plantations or native forests, trees sequester carbon and store it, long into the future. Policy measures that include ensuring there is an adequate price on carbon will provide assistance to expansion of the forestry and wood products industries in northern Australia.

In addition to addressing any policy and regulatory impediments to the expansion and establishment of plantation forestry opportunities, there are areas for further consideration by Government, especially as they relate to access to native forests.

The literature and available data demonstrate that in northern Australia, the area of native forest that is not legally restricted from being harvested is very substantial, amounting to something in excess of 60 million hectares.

Significantly, this includes more than 30 million hectares of private forest, where specific measures to support forestry activities may assist in addressing some of the barriers to development of this resource. It is noted that the data on the productive capabilities and commercial viability of this resource has not been extensively assessed, but at a national level, the proportion of total forests that is commercially viable was 29% in 2016 and only 8% was of high or very high value.

Providing security of access and supply is necessary to ensure that commercial viability can be commuted into success at the community, regional and national level.

Stakeholder feedback reiterates the need for both private sector leadership, and for government to take a long term view of how to support the opportunities.

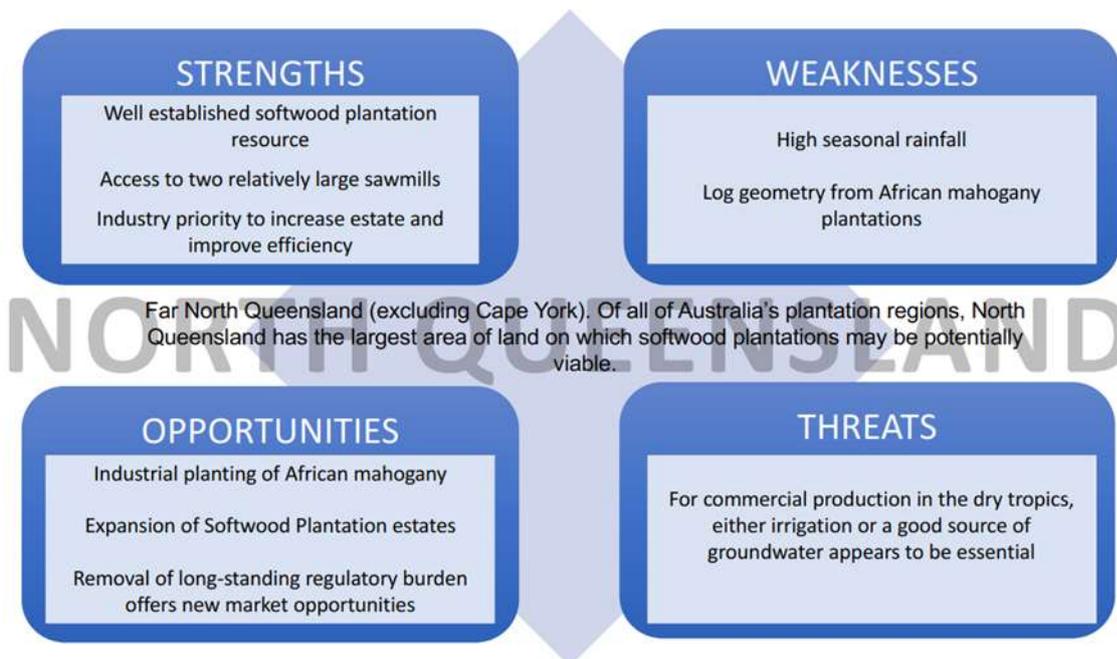
SWOT Summary

A summary analysis of the Strengths, Weaknesses, Opportunities and Threats for each of the regions follows.

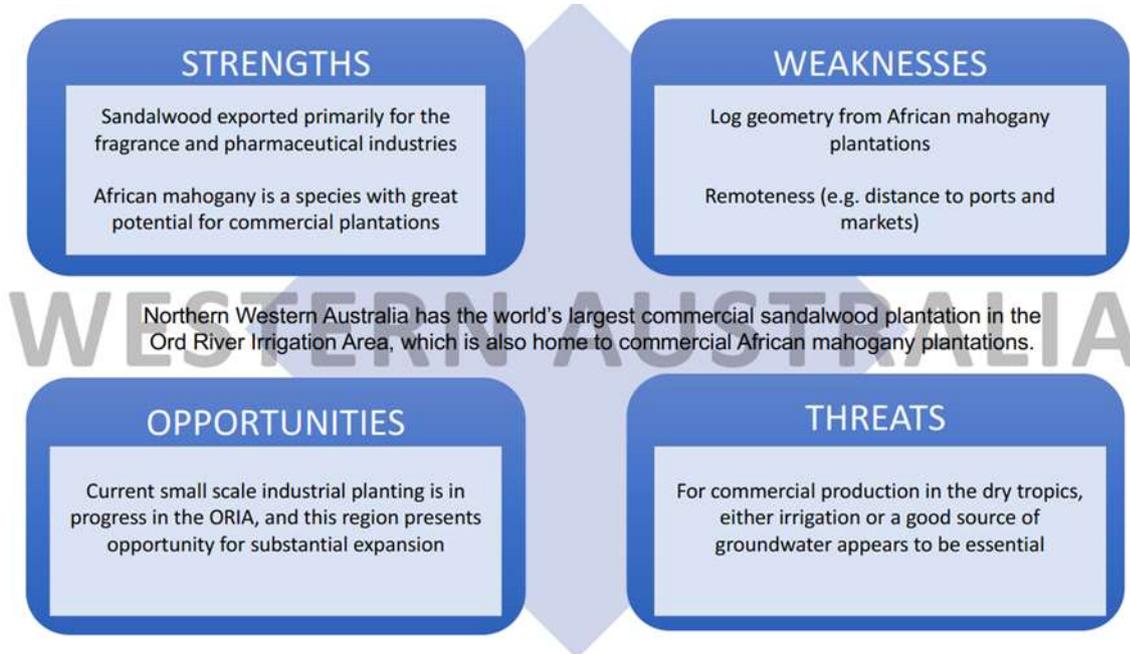
Cape York



North Queensland (Other than Cape York)



Western Australia



Northern Territory



1.0 Introduction

1.1 Objective of the review

This ‘situational analysis of northern forestry and forest products industry’ literature review will:

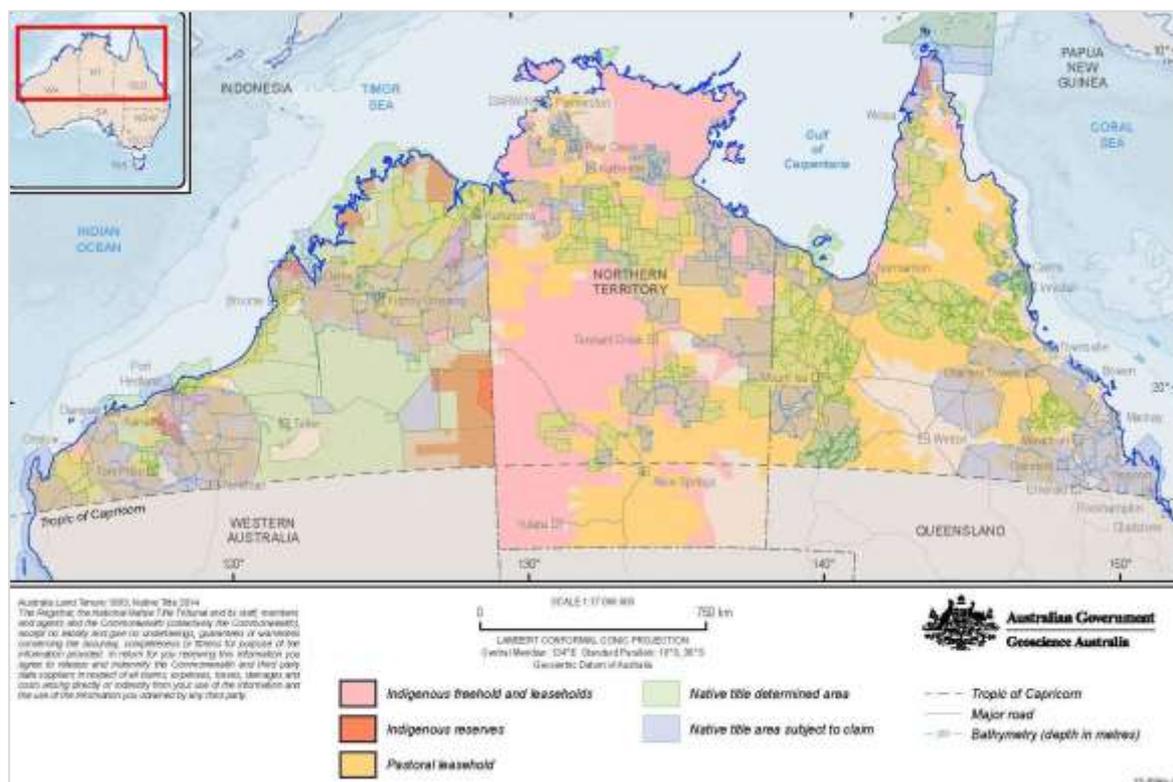
1. identify and describe key challenges and opportunities faced by the north Australian forestry and forest products industry;
2. explore potential policy, investment and other solutions to challenges, and
3. assess sector wide research priorities as well as identify the most strategic research projects for further investment.

This will include and not be limited to: infrastructure, policy, investment, environmental, production, knowledge, training and human capital gaps, and the research or alternative solutions to address them.

This document forms part of ‘Stage 1 – Overview of the forestry and forest products industry and preliminary evaluation of forestry opportunities’, and will be achieved via literature review, collection of forest inventory and spatial data from government agencies and other stakeholders, working field trips, and key informant interviews.

1.2 Study area

The Australian Government, Department of Industry, Innovation and Science (2017) published an economic overview of northern Australia, as defined by the tropic of Capricorn in Queensland and Western Australia, and including all of the Northern Territory.



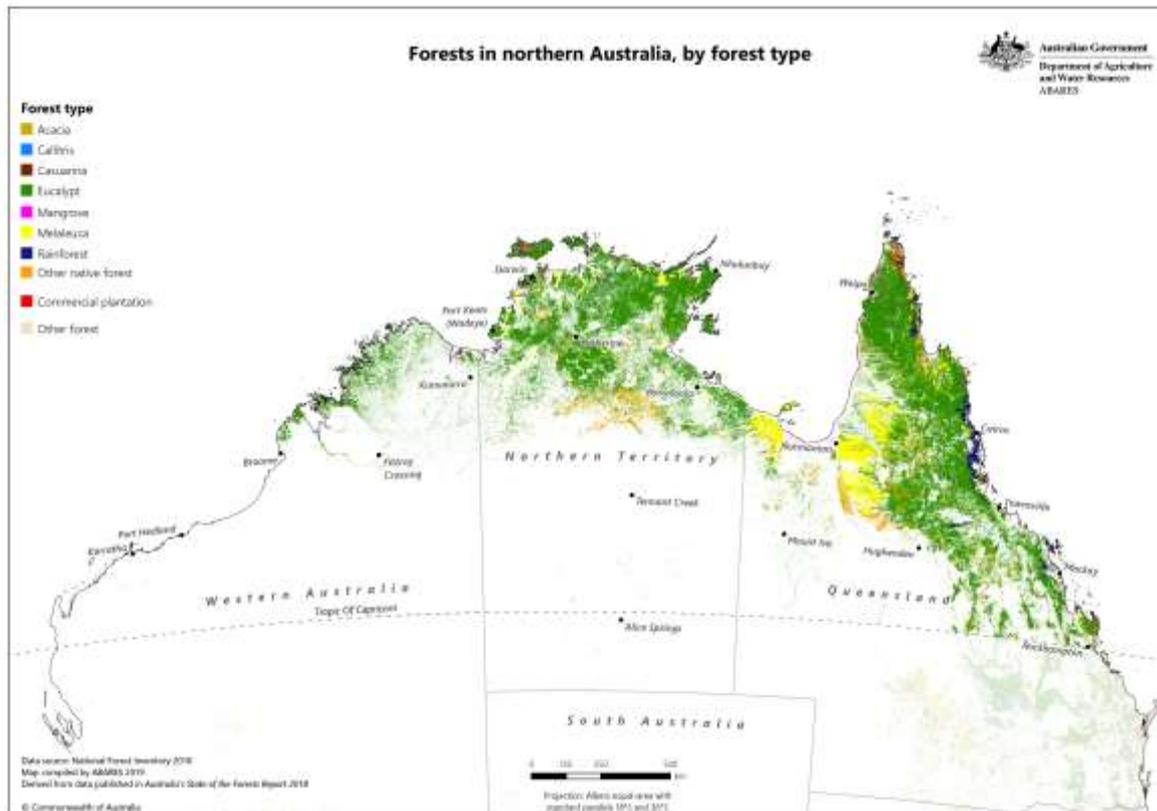
Source: Geoscience Australia, 2015a

The Australian Government, Department of Industry, Innovation and Science (2017) asserted that northern Australia encompasses 52.7% of Australia's land mass and contributes 11.7% of Australia's GDP, despite only accounting for 5.5% (1.3 million) of the Australian population. At the 2016 census, about 15% (169,400) of northern Australia's population identified as Indigenous, which represents 26% of the national Indigenous population.

2.0 Northern Australian forestry and forest products industry

2.1 Overview

Australia has 134 million hectares of forest, covering 17% of Australia's land area. Australia has approximately 3% of the world's forests, and globally is the country with the seventh largest forest area.



Queensland has the largest area of forest (39% of Australia's forest), with the Northern Territory (18%) second and then Western Australia (16%). (SOFR, 2018)

2.1 Industry development and growth patterns

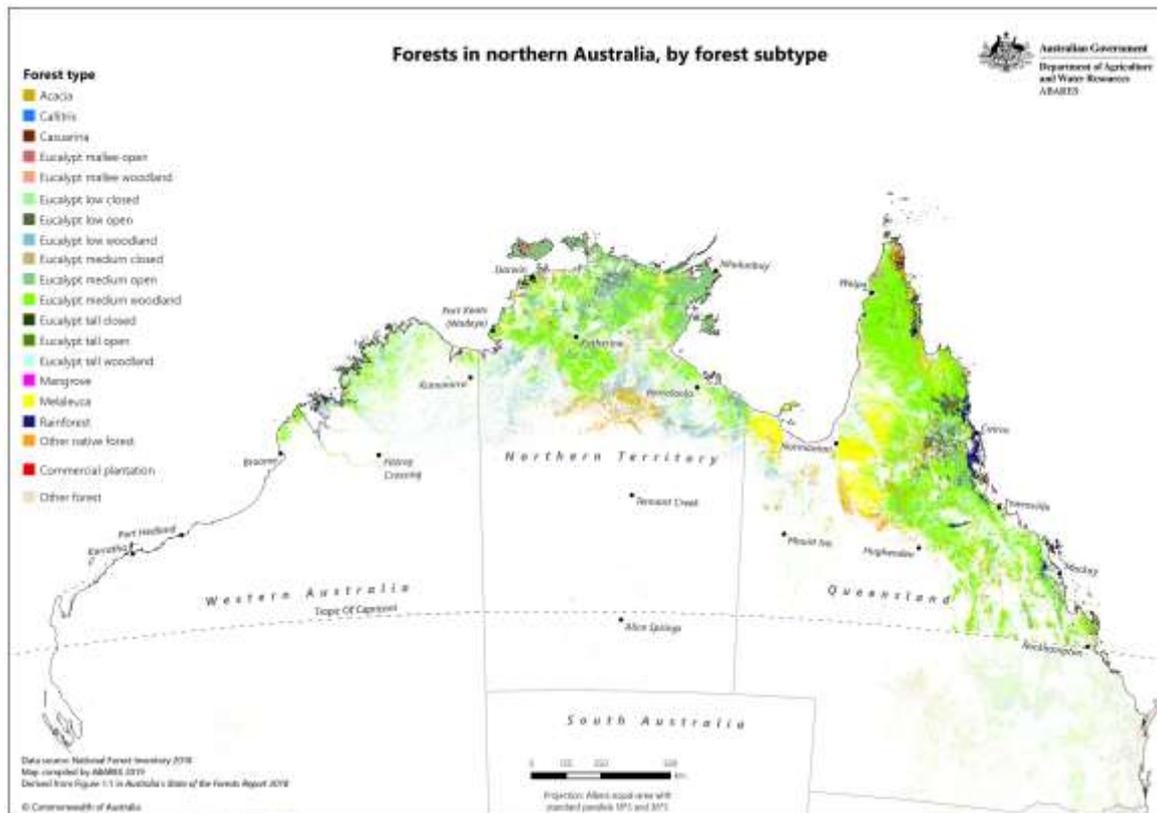
Forestry in northern Australia is small scale and fragmented.

The size and remoteness of northern Australia presents significant challenges for primary industries, including forestry. Distance to wood processing facilities, ports and population centres creates price and competitiveness pressures.

Northern Australia is a vast region, constituting over half of the continent. To date its remoteness, land variability and highly changeable climate have presented barriers to development.

2.2 Current industry characteristics

2.2.1 Forest types



<http://www.agriculture.gov.au/abares/research-topics/forests>

Resource information on native forests in northern Australia is limited in terms of species, volumes and access, as well as with respect to productive capacity. Forest inventory is an area requiring further examination, to inform future decision-making.

Nationally, the area of native forests available for harvesting was 36.6 million hectares in 2011–12 (Whittle et al. 2019). In broad terms, the medium and tall eucalypt forests, (those which have potential for commercial utilisation) for the Northern Territory and Queensland extend over about 10.5 million hectares. Some of this area in Queensland is inaccessible or designated as existing or prospective nature conservation reserve (Halkett et al 2012).

Whittle et al. (2019) reported that nationally, the aggregate plantation estate totalled 1.97 M ha in 2015-16, with approximately 930,000 ha of hardwoods and the remainder being softwoods. The hardwood plantation estate has declined from a peak of about 990,000 ha in 2008-09, and is expected to decline further as commercially marginal plantations are converted to other uses. The softwood plantation estate appears to have reached a steady state.

Tree plantations include those established for sawn timber production, high value and specialty timbers, pulp, bio-energy, sandalwood, carbon and chemicals. Northern Australia plantation forestry has been undertaken since the 1960's in both Queensland and the Northern Territory mainly for sawn products and pulp. Early plantation programs were government sponsored and while some were developed to a stage where commercial activity could be undertaken the limited scale of planting was a major limitation (Halkett et al 2012).

African mahogany is being grown in the Douglas-Daly region of the Northern Territory, to produce high-value sawn timber used for flooring, fine furniture or veneers. The 14,000 ha dryland plantation is the largest African mahogany plantation in the world, with a predicted rotation of 17 - 22 years (Halkett et al 2012). There is also a small area of several hundred hectares of African mahogany plantations by private landowners in the Townsville region.

Black wattle or *Acacia mangium*, is being grown on the Tiwi islands in the Northern Territory, for woodchips to produce pulp, used to manufacture paper. The approximately 30,000 ha of forest is expected to produce between 200,000 and 400,000 green metric tonnes of wood chips, for export each year.

Indian sandalwood is grown in the Ord River Irrigation Area (ORIA) in Western Australia, in the Douglas-Daly to Katherine regions of the Northern Territory, and at Lakeland Downs, between Mareeba and Cooktown, Queensland. It is a valuable product that has the potential to deliver a high return to growers (Halkett et al 2012).

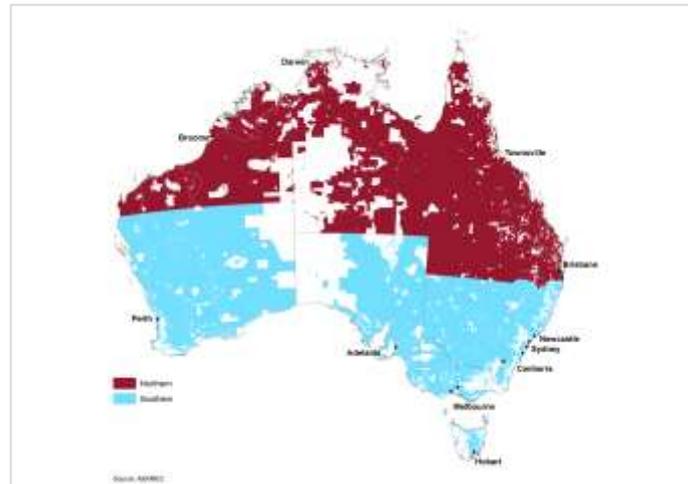
Sandalwood is grown in irrigated, mixed-species plantations to produce sandalwood oil for pharmaceutical and ceremonial markets worldwide. The more than 4,000 ha of plantations in the NT, centred around Katherine, are part of the largest area of sandalwood plantations in the world (NT Government 2019).

Future development of tree plantations depends on access to suitable land. In addition to being suitable for the growth of selected species, such land has to be within an acceptable distance of processing or port facilities and preferably be part of an aggregate area to develop a critical mass. General analyses can be undertaken using soils, topography, location, climate and tenure information (Halkett et al 2012). However, the general analysis can only ever be pre-commercial, with private sector investment requiring significantly more detailed and 'granular' analysis. Investment support mechanisms are required across Australia, to incentivize plantation establishment (deFegely et al 2011).

A future development opportunity may be the expansion of agroforestry activities, in particular combined silvopastoral activities, that should be well suited to northern Australia. In particular, grazing of beef cattle may be integrated with tree growing, in land that could be marginal for both activities, without the other.

This opportunity may be substantial. In 2017-18, the northern beef cattle industry constituted an average 73% of total farm income in northern Australia, as compared with an average 45% for the southern beef cattle farming industry. (ABARES, Australian Agricultural & Grazing Systems Survey, 2018)

Fig. Beef regions defined by Meat & Livestock Australia (excluding areas of Plantation Forestry)



Source: ABARES

2.2.2 Contribution to the socio-economics of northern Australia

Nationally, the value added by the Australian forestry and wood products was \$8.6 billion in 2015–16 and contributed 0.52% of Australia’s gross domestic product (GDP). (SOFR 2018)

Queensland's forest and timber industry makes an important contribution to the economy and to many rural and regional communities. At a state-wide level, the industry had an estimated annual turnover of around \$3.8 billion in 2015–16 with diverse activity and investment across the value chain - from forest growing through the manufacture and sale of new and innovative timber products. (<https://www.daf.qld.gov.au/business-priorities/forestry/industry-profile>)

Within northern Queensland, the industry is estimated to produce around \$50 million per annum in gross regional product (Schirmer et al 2018). The gross regional product estimate used here captures data from the Northern region of Queensland and assumes half of the value from the Central region, given a large proportion of the central region is below the Tropic of Capricorn.

In Queensland, forestry and the timber industry directly employed more than 10,000 people in 2016, and is a highly-valued employer in many rural and regional areas.

Within northern Queensland, the industry directly employs over 1,052 people which includes growing and harvesting, primary and secondary processing and wholesaling based on the 2016 Census. Assuming a multiplier of 1.5, total direct and indirect employment from the industry in northern Queensland is estimated at around 1,500 jobs.

For the **Northern Territory**, plantation forestry is the second largest production land use, after beef grazing, with more than 47,000 ha of the NT currently growing forest plantations. There are three plantation operations in the NT where companies grow African mahogany (*Khaya senegalensis*), black wattle (*Acacia mangium*) or sandalwood (*Santalum album*). Relevantly, each provides distinct regional employment and income generation opportunities.

In 2017-18, the agriculture, forestry and fishing industry contributed \$735 million in real terms to the Northern Territory's economy, and accounted for 1.4% or 1,924 persons of the total resident workforce. (Department of Treasury & Finance, NT 2019)

The **Western Australian** forestry and forest products industry delivers a significant contribution to communities, employing more than 6,000 people and generating \$1.4 billion for the economy. (Forest Products Commission of Western Australia 2019)

2.3 Preliminary evaluation of forestry opportunities

The CSIRO and ABARES (Ash and Gleeson 2014) provided policy makers with a clear indication of the location and scale of medium and longer term opportunities for agricultural production across northern Australia, and critical supply chain and infrastructure investment issues that may help to foster those opportunities. The key messages arising from that research are pertinent for discussions about forestry expansion in northern Australia:

1. Irrigated agriculture in northern Australia has the potential to add considerable value to regional economies;
2. Securing water for irrigated agriculture does not guarantee positive financial returns;
3. Supply chains are a significant constraint in some locations;
4. New markets are critical, especially for high value horticultural production;
5. Processing facilities and supporting infrastructure are needed in most regions;
6. There are opportunities to integrate crop production with the beef industry to create a value-add in both sectors;
7. Infrastructure investment needs differ significantly between regions;
8. Investment plans need to be designed to accommodate unexpected shocks;
9. Labour supply and agribusiness services are important to achieving successful new agricultural initiatives;
10. Successful agricultural development will depend on understanding the entire system, including climate, soils, water resources, pests, agronomy, management, processing, supply chains and markets; and
11. Regional economies are projected to expand (with expansion of irrigated agriculture), but changes to national economic welfare are negligible.

It is encouraging to note that sandalwood is included in the irrigation regional scenarios for the Ord River region, with this crop generating much higher gross margins than any other crop (Ash and Gleeson 2014). However, the report recognizes that sandalwood may not yet be commercially viable.

There has been some assessment of specific opportunities.

2.3.1 Native forests

Whittle et al. (2019) asserted that hardwood sawnwood from native forests is predominantly used for high-value appearance applications, including flooring, decking, veneer and furniture. They also reported that domestic hardwood consumption is highly dependent on future native forest log

availability and changing consumer perceptions of the native hardwood industry over time. Given uncertain changes in future consumer preferences for Australian hardwoods, Whittle et al. (2019) assumed demand for hardwood sawlogs, posts and poles would remain constant at 2015–16 levels until 2050.

2.3.2 Hardwood plantations

Nickles et al (2012) states that **African mahogany forestry** is potentially an important new industry with capacity to expand in northern Australia producing high-value products and benefitting the whole value chain.

Annual plantings of African mahogany currently constitute approximately 20% of the national yearly increase of Australian hardwood plantations, with the most extensive area in the Douglas-Daly, Northern Territory where over 11,000 ha of plantations have been established since 2006 with annual increments currently around 1,500 ha (Dickinson et al, 2011).

Virtually all these plantings are derived from Africa- sourced wild seed, the rest being from Australian-landrace or locally-improved seed. Many trees have poor stem straightness, short merchantable boles and low diameter. However, the better trees can yield high- value products such as veneers, high-grade boards and furniture.

Red mahogany (*Eucalyptus pellita*) plantations have also demonstrated resilience and both solid wood and pulp wood outputs in volumes and qualities that are equivalent to or better than other eucalyptus species (Harwood et al, 1997 and Herbohn et al, 1999)

Hardwood plantations on the Tiwi Islands (NT) are **Acacia mangium**. They were planted to produce hardwood woodchips to be used primarily in the production of printing and communication papers (and increasingly in products like dissolving pulp, used to make synthetic cloths like rayon).

According to IndustryEdge, (2018 a.) all of the resource on the Tiwi Islands will be exported to pulp producers in Asia. Exports commenced from Melville Island in 2016 and are expected to continue into a second rotation when then first rotation is completed in 2021.

Demand for hardwood chips in China and Japan continues to grow, with mature Japanese markets, maturing Chinese markets and emerging markets in India and Indonesia all adding to aggregate demand. Northern Australia is well situated for supply into Asia.

2.3.3 Softwood plantations

Total demand for plantation softwood sawnwood in Australia is forecast to grow by 30 per cent to 6.6 million cubic metres by 2049–50, with detached house commencements and real GDP growth expected to be the primary drivers of increased demand. Meeting this increased demand with domestic supplies would require expansion of the softwood estate by 200,000 ha to 490,000 ha (Whittle et al. 2019). Using the FORUM model, Whittle and Downham (2019) estimated 495,000 ha of cleared agricultural land is potentially financially viable (NPV > \$0/ha at a 7% discount rate) under softwood plantations given continuation of the existing economic environment.

However, softwood plantations may only provide higher returns than the existing land use on about 24,000 ha nation-wide, and this was the estimated area of plantation expansion to 2050 (Whittle et al. 2019). At this low rate of additional planting, Australia's imports of softwood sawntimber have been predicted to rise from 560,000 m³/y in 2020 to 1,150,000 m³/y by 2050 (Whittle et al. 2019).

Factors that may drive future plantation investment include carbon market incentives such as the Emissions Reduction Fund and any new carbon reduction policies by Government. Forestry can play an important role in emission reduction strategies due to the sequestration of carbon dioxide from the atmosphere in growing forests and storage in timber and forest products. The Australian Government has recently announced a new National Forest Industries Plan with a goal to plant an additional 1 billion timber production trees to boost timber supply for further processing (Prime Minister of Australia 2019).

Although addressed separately at 2.3.6 below, notably Rhodes and Stephens (2014) identify access to carbon markets as important to establishment of additional plantations.

In addition, there are emerging technologies that can convert the volume of smaller diameter or lower quality logs to high performance Engineered Wood Products (EWPs) such as plywood and glue laminated timber products

Due to relatively low land values, there is potential to establish additional plantations in north Queensland for export or domestic sawn timber production (Whittle et al. 2019). Whittle and Downham (2019) investigated opportunities for establishment of internationally competitive, world-scale softwood mills throughout Australia. This is essential to maintain an internationally competitive manufacturing base (Ferguson 2014a). Whittle and Downham (2019) projected that planting an additional 44,000 hectares in north Queensland, coupled with some log reallocation from other softwood growing regions, could support a world-scale softwood sawmill in north Queensland.

Prospects for softwood plantation estate expansion in north Queensland appear strong, and have the potential to buffer the region's economy against other shocks, including the risk of Panama disease spread in banana growing regions. If investor discount rates could be lowered, for example, through provision of low interest rate loans similar to those provided from the federal government to the states during the softwood forestry agreements of the 1960s, 1970s and 1980s (Carron 1985).

Whittle et al. (2019) found large opportunities for softwood plantation expansion in north Queensland. At a 6% discount rate, about 200,000 ha of existing cleared agricultural land would have its highest value under softwood plantations. At a 5% discount rate, over 500,000 ha in north Queensland would have its highest value under softwood plantations. A 200,000ha estate in north Queensland has the potential to support 10,000 full-time equivalent jobs.

There is presently around 30,000 hectares of high-quality softwood pine plantation in the Mareeba area of North Queensland. These plantations already provide a feedstock for two softwood mills located in Mareeba and Ravenshoe. These mills in turn produce sawn timber for downstream truss and frame manufacturing and other sawn products for the local Cairns market as well as further east-coast markets. Given the importance of building scale and competitiveness in softwood manufacturing, an industry priority is to increase the area of softwood plantation to enable greater economies of scale and production output.

Stakeholder feedback concurs with the need for the expansion of softwood plantations in north Queensland (specifically *Pinus caribaea*), and see a role for Government in encouraging such expansion activities.

ABARES did not consider the Northern Territory as providing realistic softwood plantation expansion prospects, because the territory lacks a sufficient softwood estate, existing processing capacity and suitable agricultural land to support an internationally competitive world-scale sawmill. (Whittle and

Downham 2019, Whittle et al. 2019). The north of Western Australia was not considered in these ABARES assessments.

2.3.4 Silvopastoral systems

Donaghy et al. (2010) found there are financial benefits to landholders of adopting silvopastoral systems in northern Australia. Whish (2016) did not account for potential future timber value, but found that a net carbon income (i.e. income after grazing management expenses are removed) of \$2/tCO₂e to \$4/tCO₂e was required to offset the financial losses of arising from reduced herd productivity due to retaining regrowth on a moderately productive (8 ha/AE) property in central Queensland. Baker et al. (2018) asserted silvopastoral systems have the potential to increase livestock and timber production in Australia, although the many research gaps identified by the authors make it challenging in practice to convince landholders that the benefits of trees outweigh the costs.

AACM (1996) provided a strategic development framework for agro-forestry that emphasized the need for pre-assessment of co-benefits, while Polglase et al (2008) described widespread opportunities in Australia from agro-forestry activities.

Much of the literature about grazing system management in northern Australia focusses on perceived negative trade-offs between trees and pasture (Scanlan 2002), and how to manage trees (often referred to as woody weeds or regrowth) to maximise pasture production (Hunt et al. 2014).

It is generally accepted there is a linear to curvilinear negative relationship between tree density and pasture production in the study area. Competition for site resources means there is a trade-off between trees, and pasture and cattle production. However, numerous studies in Queensland have reported benefits of trees on grazing properties (Cameron et al. 1989; Wilson et al. 1990; Bird et al. 1993; Gutteridge and Shelton 1994; Lamb and Borschmann 1998; Jackson and Ash 2001; Radford et al. 2007; McKeon et al. 2008; Stephens and Stunzner 2008; Stephens 2009; Donaghy et al. 2010; Maraseni and Cockfield 2011; Schulke 2017).

These benefits include:

- increased nutrient cycling;
- improved soil condition and structure;
- reduced runoff, erosion and transport of nutrients and agricultural chemicals;
- lowering water tables where salinity is a problem;
- reducing temperature and wind speed;
- higher pasture quality;
- biodiversity conservation; and
- carbon sequestration.

ABARES' Australian Agricultural and Grazing Industries Survey indicates that in the grazing of beef cattle in Northern Australia, there has been a reduction of 0.2% per annum in the cost of inputs from 1977-78 to 2017-18, and output growth of 0.9% per annum over the same period. Input cost growth is lower than for the Southern beef cattle region (+0.4% per annum), as is Output growth (1.1% per annum). (ABARES, Australian Agricultural & Grazing Industries Survey, 2018)

The addition of plantation forestry, as set out above, may involve increased costs, increased output productivity and diversified wood products income.

Trees provide microclimate benefits for grazing properties, particularly in relation to reduced temperatures created by shade from the trees. Gutteridge and Shelton (1994) reported that the effect of heat stress on growth and reproductive performance of cows has been well documented, with recordings in Australia of a reduction of 0.9% in calving rate for every 0.1 degrees Celsius increase above 39°C in the rectal temperature of cows. The average depression in calving rate due to heat stress was reported to be 15% to 25% for British breeds and 10% in Brahman-cross herds. Stressed cows also gave birth to lighter calves. In a study by Davison et al. (1988, cited in (Gutteridge and Shelton 1994), animals without shade had a mean rectal temperature of 40°C while those with shade had a mean rectal temperature of 39.4°C. Given that the 'best estimate' of climate change across the rangelands of Australia is for a decline in rainfall and an increase in temperature (McKeon et al. 2009), the microclimate benefits of trees on grazing properties are likely to increase in the future. This was also considered by Ash and McIvor (1998).

Detailed analysis of *Pinus caribaea* plantations integrated with pasture on the Atherton Tablelands in north Queensland demonstrated positive outcomes similar to those set out earlier in this section, but with specific reference to that region (Applegate 1991 and Applegate and Nicolson 1998). The economics of a range of agro-forestry activities was considered to be generally net positive by Hardman et al (1985).

See also: Bureau of Rural Sciences (2005), Gordon et al (2013), Schirmer et al (2000), Sun et al (1998), Turvey and Lawson (2001).

2.3.5 Processing other wood products

Total demand for wood-based panels (plywood, particleboard and medium-density fibreboard) and hardboard is forecast to grow by 10% to 2050 (Whittle et al. 2019). Total demand for paper and paperboard is forecast to grow by around 28 per cent to 4,643 kilotonnes by 2049–50. The estimated availability of pulplogs from existing plantations and the small base case projected increase reported by Whittle et al. (2019) is expected to be sufficient to meet domestic demand to 2050, even when taking into account potential exports of roundwood and woodchips. Whittle et al. (2019) did not examine emerging markets for engineered wood products, bioenergy products and other downstream wood products.

The counter to that view as IndustryEdge (2018, b.) has reported, is that demand for softwood pulp is growing at a faster rate than previously anticipated, in Australia and globally. Softwood pulp is used to strengthen cement-board products used in housing and as a replacement for asbestos fibres, and is deployed most extensively in the manufacture of corrugated boxes and other packaging, demand for which has increased rapidly.

2.3.6 Carbon sequestration

As a co-benefit of harvested wood products, the sequestration of carbon in planted forests has been widely recognized, as Rhodes and Stephens (2013) identify. Notably, they also identify that the value of sequestered carbon in planted forests may provide the required economic incentive to establish new plantations.

Estimates of the potential value of carbon in planted forests vary, over time, based on the prevailing carbon pricing schemes at the time the research was undertaken. Mitchell et al (2012) summarise a range of scenarios where the prevailing price of carbon is approximately AUD20/t CO₂e. They identify that the amount of land that would become viable for plantations ranges widely and into the many millions of potential hectares. Lawson et al (2008) take a similar approach.

Neither Rhodes and Stephens (2013) or Mitchell et al (2012) adopt a specified model or advise that plantation establishment for carbon sequestration alone represents a specific forestry value. In that context, Enters and Durst (2004) describe incentives, including those associated with carbon sequestration, as providing support for the establishment of plantation forestry activities.

Several studies place carbon sequestration in the context of a broader set of 'eco-system services', rather than identifying carbon sequestration as the primary emphasis. See ABARES (2011), Bahaus et al (2010), Burns et al (2011), Harrison et al (2003), Kanninen (2010), Kanowski (2010)

Building on the broader benefits of carbon sequestration in a forestry context, both Polglase et al (2011) and Paul et al (2013) outline that the operation of carbon markets may provide more employment, in a wider range of activities, than plantation forestry operating without access to a carbon market. However, Schirmer and Bull (2011) reported divergent views among landowners as to the suitability of plantations for carbon sequestration purposes, with considerable concerns where there was no other wood outcome.

3.0 Regulatory framework for the forestry and wood products industry in northern Australia

The Federal Government supports tree plantation development and expansion, through the national strategy *Plantations for Australia: The 2020 Vision*. At a state level, there is an absence of a clear forest policy. This has created uncertainty for investment in tree plantation development (Halkett et al 2012).

Stakeholder feedback stated that expansion opportunities rely on more certain access arrangements to crown forest lands, and related native vegetation rules and applicable codes of practice regarding the sustainable management of private forests. The Forest Stewardship Council (FSC) was also highlighted as a major challenge to Indigenous decision-making regarding land access for plantation development.

3.1 Queensland

3.1.1 Plantation legislation and regulations

New plantation developments require planning approval in Queensland.

These activities are considered a material change of land use which are subject to the *Planning Act 2009* and the relevant local government development assessment requirements.

Plantations that include *Corymbia* and *Eucalyptus* tree species are regulated by the koala conservation plan and management program in some areas of Queensland (koala districts A and B). This regulation complies with the *Nature Conservation Act 1992*. Additional advice on regulatory obligations associated with plantations is provided in the Timber plantation operations code of practice for Queensland. (Business Queensland, 2019, a)

3.1.2 Private native forestry legislation and regulations

The *Vegetation Management Act 1999* regulates native forestry on private land through an accepted development vegetation clearing code.

The *Vegetation Management Act 1999*, defines native forest in Queensland as being 'remnant regional ecosystems' (Category B vegetation), 'regrowth regional ecosystems' (Category C or R vegetation) or 'non remnant' (Category X vegetation) (Department of Environment and Resource Management 2010). Landholders can request a free property map of assessable vegetation (PMAV) to determine the status of vegetation on their property.

Remnant regional ecosystems in Queensland refer to vegetation that has never been cleared or, if it has been cleared in the past, has regrown to meet particular criteria². Regrowth regional ecosystems have been cleared in the past and are less mature than remnant vegetation, but often contain many of the biodiversity and habitat values of remnant vegetation. Regrowth regional ecosystems in Category C are high value regrowth vegetation and in Category R are within 50 m of a watercourse in the Burdekin, Mackay, Whitsunday and Wet Tropics Great Barrier Reef catchments. Category X areas had been cleared of native vegetation in the past, and when a PMAV applying to the area was made, did not contain remnant or regrowth vegetation (Department of Environment and Resource Management 2010). In the years since being categorised as Category X, native vegetation may or may not have re-established on the area.

Due to the importance of private native forests on freehold and Indigenous land for hardwood timber supply, the *Planning Act 2016* (formerly the *Sustainable Planning Act 2009*) provides exemptions, known as exempt clearing work, under Schedule 21 of the *Planning Regulation 2017*, for removing or harvesting vegetation in Category B, C and R areas, provided the activities comply with the requirements of the *Vegetation Management Act 1999*, and the conduct of activities is in accordance with the native forest practice code (Department of Natural Resources and Mines 2014). Under the *Planning Act 2016*, these codes are known as 'Accepted Development Vegetation Clearing Codes'. There are codes applicable to Category B (Department of Natural Resources and Mines 2014), Category C (Department of Natural Resources and Mines 2013a) and Category R vegetation (Department of Natural Resources and Mines 2013b). Forestry activities on Category X land is exempt from requiring management in accordance with a code.

The Department of Natural Resources, Mines and Energy (DNRME) is currently responsible for the regulation of private native forest management for timber production in Queensland. The majority of private native forest within the study area is in remnant regional ecosystems (Category B vegetation), and a brief description of key elements of the relevant *accepted development vegetation clearing code, Managing a Native Forest Practice: A Self-Assessable Vegetation Clearing Guide* (Department of Natural Resources and Mines 2014), hereafter referred to as the 'native forest practice code', is provided online (Queensland Government 2019).

The native forest practice code defines a native forest practice as the 'sustainable management of a forest area for timber harvesting within a framework that conserves the natural values of the forest' (p. 6). The native forest practice code defines required outcomes, specifies mandatory practices and provides key definitions with regards to managing native forests for timber production. The private native forest owner must notify the DNRME before commencement of harvesting. The forest practice must produce value-added products (other than woodchips for export) as part of an ongoing forestry business, and landholders must maintain documentary evidence of the sale of products.

Vegetation mapped as 'remnant' has a canopy cover that is at least 50% of the undisturbed predominant canopy cover; averages more than 70% of the vegetation's undisturbed height; and contains species characteristic of the undisturbed predominant canopy (Accad et al. 2015).

The native forest practice code lists the regional ecosystems (REs) in which a native forest practice is permitted. These include three coastal wet sclerophyll native hardwood forest REs, 241 other native hardwood forest REs, four cypress forest REs, and 37 rainforest REs. Three permissible silvicultural regimes are described: a rainforest selective harvesting regime; a coastal wet sclerophyll forest group selection regime; and a selective harvesting regime for all other hardwood and cypress pine forests. Clearfelling is not permitted.

The native forest practice code specifies several other restrictions to a native forest practice, including:

- forestry is not permitted where the majority slope (90% of the area) is greater than 25 degrees;
- minimum number of retained trees per hectare;
- minimum number of habitat and recruitment habitat trees per hectare;
- which silvicultural treatment methods, including thinning, planting, fire and weed control, are permissible;

- restrictions on harvesting within buffer zones and filter zones around wetlands and watercourses; and
- the placement and management of snig tracks and landings; and protection measures to minimise soil degradation

Other regulations concerned with managing protected native plants and animals are also relevant to private native forestry. In some cases, a protected plant flora survey and clearing permit may be required for certain activities (e.g. new road) in high risk areas where endangered, vulnerable or near threatened plants are known to exist or are likely to exist. (Business Queensland, 2019, b)

3.2 Northern Territory

The Northern Territory has no specific forestry legislation.

The Territory presently lacks any instruments developed specifically for managing forests for wood production, as the Forestry Act 1980 was repealed in 1992. Many existing laws and policies regulate environmental management, none of which specifically refer to plantation forestry operations. All are much more explicit than the Code (Northern Territory Codes of Practice for Forestry Plantations, Appendix F) about operating methods for protection of land, water and biodiversity values. The Code currently has no status under relevant environmental or planning laws.

Land tenure in the Territory is mostly either pastoral lease, Aboriginal freehold land under the Aboriginal Land Rights Act (Northern Territory) 1976, or vacant Crown land. There are smaller areas of leasehold land (for a variety of development purposes) and non-Aboriginal freehold (largely the residential and surrounding areas of Darwin). There are significant differences in the legislation that regulates the development and management activities across these tenures. Subject to the resolution of native title issues, there is ongoing conversion between different forms of leasehold, and from Crown land to freehold.

The predominant land use in the Territory is grazing, with little clearing of native forests and woodland. The proportion of land cleared has been estimated to be < 1% of the total Territory land area. Because of limited forestry activity, limited pressure for related land clearing, and the desire to treat plantation forestry as an agricultural activity, the Territory Government has not developed regulations specifically for plantation forestry.

Plantation forestry in the Territory has not yet led to a proven supply of commercially viable wood products, but some possibilities exist. The industry is currently confined to plantation developments on Aboriginal-freehold land of Melville Island (Tiwi Islands), and in the freehold farming areas of the Douglas-Daly region south of Darwin. (Raison et al, 2012)

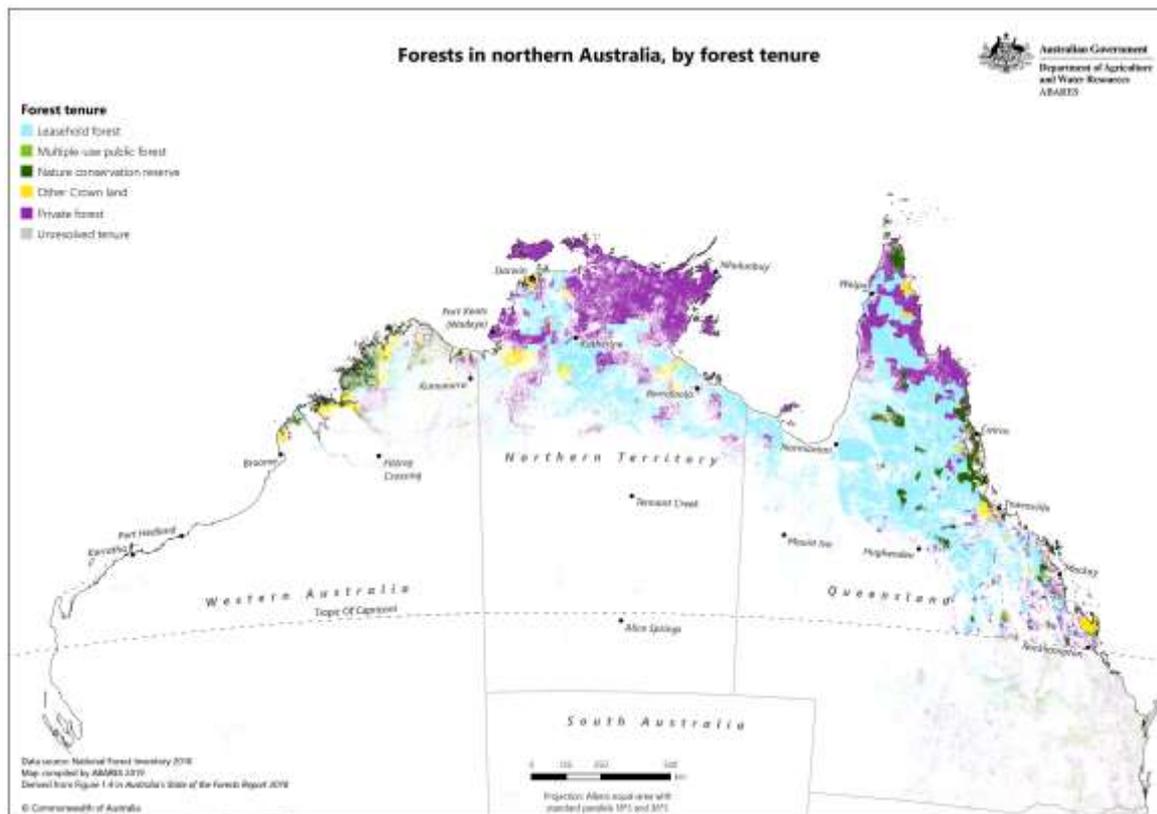
3.3 Western Australia

Sustainable timber harvesting in Western Australia's South West native forests is governed by a comprehensive legislative framework and management procedures. (FPCWA, 2019)

However, there is no regulatory framework that covers northern Western Australia. The Forest Management Regulations 1993 only cover specific requirements relating to sawmills and forest produce licenses. (WA Government, 2019)

4.0 Land Tenure by Forest Type

4.1 Forest by Tenure



Area of forest, by tenure and jurisdiction					
Tenure class	Area ('000 hectares)				Proportion of total forest area (%)
	NT	Qld	WA	Australia	
Leasehold forest	9,318	28,135	4,095	47,268	35
Multiple-use public forest	0	3,074	1,405	10,673	8.0
Nature conservation reserve	15	4,379	5,056	21,752	16
Other Crown land	889	1,308	7,419	11,102	8.3
Private forest	13,476	14,269	3,006	42,436	32
Unresolved tenure	38	666	0	806	0.6
Total forest	23,735	51,830	20,981	134,037	100

Note: Totals may not tally due to rounding.
Source: ABARES, National Forest Inventory, PSMA Australia Ltd.

About one-third of Australia's forests (69.5 million hectares, 52 per cent of Australia's forest area) is identified as part of the Indigenous forest estate as one of four broad Indigenous land tenure and management categories: Indigenous owned and managed; Indigenous managed; Indigenous co-managed; and Other special rights. About 69 per cent of this forest area is in Queensland and the Northern Territory (SOFR 2018).

4.2 Native forest

Of the 132 million hectares of native forest in Australia, 47.2 million hectares (36 per cent) are native forest on leasehold land, and 41.0 million hectares (31 per cent) are native forest on land held under private freehold title.

Tenure class	Area ('000 hectares)				Proportion of total native forest area (%)
	NT	Qld	WA	Australia	
Leasehold forest	9,318	28,135	4,089	47,246	36
Multiple-use public forest	0	2,881	1,344	9,772	7.4
Nature conservation reserve	15	4,378	5,035	21,719	17
Other Crown land ^a	881	1,308	7,382	11,042	8.4
Private forest	13,435	14,213	2,600	41,031	31
Unresolved tenure	38	666	0	805	0.6
Total native forest	23,686	51,580	20,450	131,615	100

^a A total of 1.3 million hectares of native forest on Other Crown land tenure is managed by the Australian Government Department of Defence. A breakdown of this area by jurisdiction is given in Table 1.27, Indicator 1.1c.

Note: Totals may not tally due to rounding.

Source: ABARES, National Forest Inventory, PSMA Australia Ltd.

The majority of Australia's public native forests that is not legally restricted from wood harvesting, are held under Leasehold, accounting for 51% (42.323 million hectares) of a total 83.567 million hectares. (SOFR 2018, Table 2.1)

The proportions of the total of Australia's native forest that is not legally restricted from wood harvesting is set out, by tenure type, in the table below.

National forest tenure	Total native forest	Legally restricted from wood harvesting	Not legally restricted from wood harvesting				Proportion not legally restricted from wood harvesting (%)
			NT	Qld	WA	AU Total	
Leasehold forest	47,246	4,922	8,276	26,180	3,894	42,323	90
Multiple-use public forest	9,772	1,639	0	2,826	1,342	8,133	83
Nature conservation reserve	21,719	21,719	0	0	0	0	0
Other Crown land	11,042	10,656	0	386	0	386	3
Private forest	41,031	9,079	8,841	11,812	2,435	31,952	78
Unresolved tenure	805	32	37	659	0	773	96
Total	131,615	48,047	17,153	41,863	7,671	83,567	63

Notes:

Legal restrictions on wood harvesting apply in all native forests in the ACT and SA; on nature conservation reserves; on informal reserves on all other tenures; on private and leasehold land that is under conservation covenant, or regulated or reserved by other mechanisms (see Indicator 1.1c); and are presumed to apply to areas of 'other Crown land' that is not available to commercial wood harvesting.

Wood harvesting on Tasmania's Future Potential Production Forest Land is currently restricted through regulation and is classed here as 'Other Crown land' and legally restricted from harvesting.

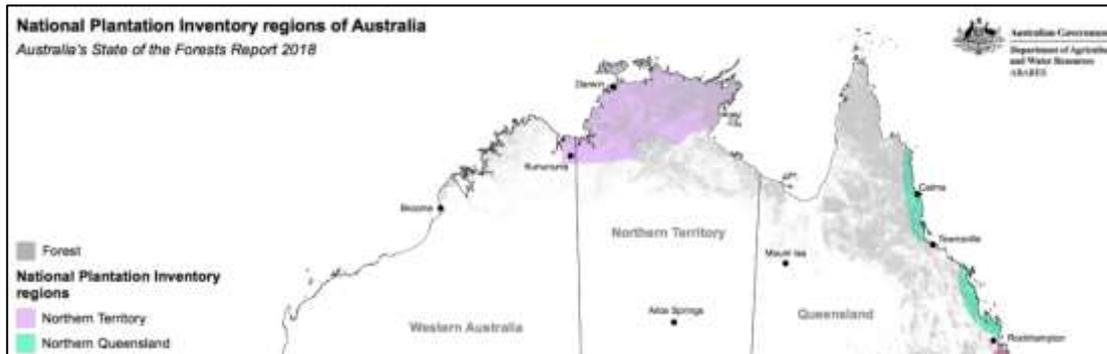
Tenures are national tenure categories (see Introduction and Indicator 1.1a) and may not coincide with state or territory tenure categories.

Totals may not tally due to rounding.

Source: ABARES.

4.3 Plantations

4.3.1 National Plantation Inventory Regions – Northern Australia



Area of commercial plantation estate, and proportions by jurisdiction, 2014–15			
	Commercial softwood plantations	Commercial hardwood plantations	Total plantation estate
Total area ('000 hectares)	1,035	928	1,973
Proportion by jurisdiction (%)			
Northern Territory	0.2	5	2
Queensland	19	4	12
Western Australia	10	30	19
Notes: Includes plantations where type is unknown. Totals may not tally due to rounding.			
Source: ABARES (2016b)			

4.3.2 Northern Territory

The total plantation area in the Northern Territory was 47 600 hectares in 2014–15. The total area of softwood plantations was 1 900 hectares and the total area of hardwood plantations was 45 700 hectares.

Around 68 per cent of the hardwood plantations are managed for pulplogs; the remaining 32 per cent are managed for sawlogs. The softwood plantations are managed for sawlog.

The majority of the hardwood plantations are *Acacia* (*Acacia mangium*) (31 200 hectares) on the Tiwi Islands, which are grown for paper pulp, and African mahogany (14 500 hectares) planted in the Douglas-Daly and Katherine regions for high-value timber. Indian Sandalwood is also grown in the Douglas-Daly and Katherine regions, and used for oil and pharmaceuticals. Sandalwood is the only plantation forestry in Australia that is routinely grown in a mixed species system and with irrigation (ABARES 2016).

4.3.3 North Queensland

The total plantation area in North Queensland covered 36 620 hectares in 2014–15. The total hardwood plantation area was 4 860 hectares with the softwood plantation area being 31 760 hectares.

The hardwood plantations are privately owned or managed to produce pulplogs. The softwood plantations are privately managed or owned to produce sawlogs.

5.0 Productive Condition of Forest Resource

At a headline level, over the twenty years from 1995-96 to 2015-16, the net harvestable area of Australia's public native forests² declined from 22% (10.061 million hectares) to 12% (4.989 million hectares). (SOFR, 2018, Table 2.3)

In Queensland, the proportional decline was from 40% (3.186 million hectares) to 22% (1.921 million hectares), noting that this refers to the net harvestable area on multiple-use public native forest only, but not other Crown land (or unresolved tenure). (SOFR, 2018, Table 2.3)

In Western Australia, the proportion was stable at 6%, however the total area of public native forest declined from 1.157 million hectares to 0.849 million hectares, as a result of tenure changes. (SOFR, 2018, Table 2.3)

No similar data was found for the Northern Territory.

Queensland's forest resources in the north are characterised by highly productive softwood plantations and extensive areas of relatively slow-growing native forest hardwoods.

Commercial viability: Over the last decade (to 2015-16), the proportion of Australia's native forest area that is commercial, has declined an aggregate 4% to 29% of the total. Of that, the proportion of total forest that is of moderate, high or very high commerciality has declined from 9% to 8%. (SOFR, 2018, Table 2.2)

The national commercial productivity by tenure is set out in the following table for 2015-16.

Reporting year	Tenure ^a	Area ('000 hectares)								
		Total forest ^b	Non-commercial forest and forest legally restricted from harvesting ^c	Commercial forest (forest available and suitable for harvesting)						Total ^d
				Wood commerciality rating						
				Very low	Low	Moderate	High	Very high		
2016 (SOFR 2018)	Leasehold forest	47,246	39,094	0	7,596	390	164	2	8,151	
	Multiple-use public forest	9,772	3,476	0	2,465	2,063	1,284	484	6,296	
	Private forest	41,031	27,421	0	10,346	2,049	840	374	13,611	
	Total	98,049	69,991	0	20,407	4,502	2,289	861	28,058	

Source: SOFR 2018 Table 2.2

6.0 Evaluation of Forestry Opportunities by Geography (SWOT)

Each of these SWOT analyses is summarized graphically in the Executive Summary.

6.1 Cape York

Cape York is an area with a high proportion of Indigenous owned and managed forest land with substantial high-quality timber resources. Areas like Cape York have extant native title, particularly the Indigenous owned lands. These communities have a direct interest in economic activity to create business and jobs from regionally based industries such as forestry, including in the context of mine site preparation and rehabilitation (Bell, 2001). For the Cape York forests to be appropriately managed and utilised it is essential that skills development, training and qualifications are available.

Strengths

- Strong desire by traditional owners to manage their land and resources for economic development outcomes, creating economic, social and environmental benefits.
- Proximity to Asian markets.

Weaknesses

- Currently the timber resource occurs on both public and private land holdings. There is very little data on the extent or status of this resource. Investment is needed to better understand this resource and develop appropriate management regimes to ensure its long-term viability and productivity.
- It is acknowledged that greater forestry skills or experience amongst the Indigenous land owners and managers is needed to produce long-term reliable supply from the region.
- The experience from Cape York suggests that a significant barrier to greater levels of investment is the lack of long-term resource security for the industry. While there are large volumes of timber resource on Cape York, some of which is located on privately owned Indigenous land, there is still a poor understanding of this resource and its timber quality and potential end uses.
- Cape York is a very remote location. Lack of adequate infrastructure has been one of the reasons for minimal forest product development from the area. In recent times the road infrastructure has been improved to some level and this work continues. The remote context continues to limit development in telecommunications facilities. For broader economic activity to emerge in this region there will need to be investment in infrastructure. For the forest products industry, the key areas are road improvement, strategic port facilities and telecommunications services.
- A number of conservation tenures have been applied to large areas of land on Cape York.

Opportunities

- The Cape York region has a large resource of durable hardwood species. While there are some supplies of equivalent timber from international sources, these supplies are dwindling and there are significant questions about sustainability of harvesting and management regimes. These circumstances have created an opportunity for hardwood timber harvesting from Cape York.
- Given the remote locations of forest resources on Cape York it is imperative that opportunities are developed to maximise utilisation and returns from the timber resource. This will involve additional utilisation beyond sawn timber outputs. Possible additional utilisation may involve production of electricity from sawmill by-product, thermal energy pellets, biochar production or other charcoal product, and there are a number of emerging new developments such as gas extraction and rare chemical production.
- New plantation potential as part of the mining land rehabilitation partnership with Rio Tinto Aluminium. (Refer Wik Timber Case Study below.)

Threats

- Lack of collaboration between Government, Traditional Owners, Pastoralists and Miners.
- A perception that Cape York forests are there for the taking - without Traditional Owner involvement.

Case Studies

"Imagine if we can demonstrate that we can collect sawlogs for our sawmills, process some for veneer, utilize some logs for power poles and then utilize the rest as woodchips to generate electricity for Aurukun through Indigenous owned business and replace diesel power generators. And all of this from forest resources that have been traditionally cleared and burnt for over 50 years,"

Gina Castelain, MD of Wik Timber.

WIK TIMBER



- Wik Timber Holdings is an Indigenous business and the timber harvesting, wood chipping and seed collection operations will provide jobs for local Aboriginal people resident in and around Aurukun and Napranum. The Wik Timber project recently purchased two Tigercat machines for its logging operations south of the Embley River, on the Western Cape York Peninsula. They were put to work clearing land for Rio Tinto Aluminium, to allow the mining giant access to the abundant supply of Bauxite.
- With harvesting, transport and port access planning complete, the logging operations are now in their initial stages. When at full scale, the business will produce up to 125 000 tonnes (138,000 tons) of timber and other forest products annually for international and domestic markets. Annual turnover is expected to be around \$6 million. The operations will employ 70 local Aboriginal people.
- Demand for the various products is expected to come from Chinese, Vietnamese and domestic sawmillers and manufacturers of timber-based products. In addition, power transmission poles will be marketed to electricity distributors, Rio Tinto Aluminium will require railway sleepers, and Rio Tinto Aluminium and others will demand chips for mine rehabilitation.

Perhaps this is just the tip of the iceberg for mining operational land clearing practices in Australia going forward.

Australian Forests & Timber News December 2017

Established in 2013, **Cape York Timber** is a lighthouse Indigenous-owned business that produces high-quality sustainable Australian hardwood while providing Indigenous employment and training.



CAPE YORK TIMBER

- Cape York is home to a vast quantity of Australia's durable, aesthetic and merchantable hardwood timbers. Responding to the growing demand for this resource locally and internationally, Cape York Timber supplies a range of premium hardwood for wholesale, retail, and specialty markets.
- The Cooktown sawmill was commissioned in January 2015, has year-round road access and is supported by on-grid power and other mainstream infrastructure.
- Timber harvesting and processing represents a significant economic opportunity for Indigenous people of Cape York. The business provides long-term, valuable employment and training opportunities for Indigenous people; currently employing 10 full-time staff and maintaining 70% Indigenous employment.
- Cape York Timber is leading sustainable management of Indigenous forests in northern Australia. Timber is harvested on Indigenous properties, and an integrated conservation regime enables an overall improvement in the forest resource over the coming decades.

With industry development and government investment a long term, sustainable forest and timber industry can develop.

Indigenous Economic Development – the Cape York Timber Story
<https://capeyorkpartnership.org.au/our-partnership/cape-york-timber/>

6.2 Far North Queensland (Other than Cape York)

6.2.1 African Mahogany Plantations

Commercial plantations of African mahogany (*Khaya senegalensis*) have been or are being established in five regions in northern Australia. In northern Queensland, these were in Weipa (163 ha), north of Cooktown (355 ha) and Ingham to Bowen (150 ha across many small growers).

Successful establishment generally involves the use of well-conditioned, container-grown stock, intensive site preparation, effective weed control and application of starter fertilizer. In seasonally dry regions where the summer rainfall is erratic, irrigation may widen the planting window.

Strengths

- African mahogany is a species with great potential for commercial plantation development in the northern dry tropics of Australia. Early experience indicates that African mahogany grows on a range of sites, is relatively drought-hardy, and is capable of producing high-grade timber from plantation-grown trees. (Underwood 2006).

Weaknesses

- Log geometry from African mahogany plantations.

Opportunities

- Potential for substantial expansion is in the Ingham to Bowen region (including the lower catchment of the dammed Burdekin River, which flows northward to enter the sea some 80 km NW of Bowen) — mainly ongoing, significant plantings by 'small growers', but industrial planting could arise.

Threats

- For commercial production in the dry tropics, either irrigation or a good source of groundwater appears to be essential (Underwood 2006).

See also: Bell (2001), Nikles et al (2014) & Nikles et al (2012).

6.2.2 Crown native hardwood forests (leasehold)

*This SWOT analysis for Crown leasehold forest is based on **Stakeholder feedback**.*

Strengths

- Extensive native forest resource on leasehold land (tree ownership retained by the Crown)
- Network of small-scale sawmillers and new potential entrants
- Industry interest in further processing, job and product value creation

Weaknesses

- Lack of resource supply certainty with the State presently developing its policy on the ‘future of timber production on state-owned land’
- Current short term (5 year) wood supply contracts about to expire

Opportunities

- More certain long-term wood supply arrangements from crown leasehold land would generate further investment in processing, hardwood industry development and local job creation

Threats

- Inaction by the State Government will likely result in mill shutdowns, job losses and reduced regional timber output

6.2.3 Softwood Plantations

The Queensland plantation estate comprises around 216 000 hectares—the majority owned and managed by private company, HQ Plantations. Their estate is dominated by softwood species, which are managed on long-term rotations (between 25 and 50 years) to produce a range of structural and high-value timber products. Their Northern Queensland plantations comprise of Southern Pine on the Hinchinbrook Coast (near Ingham and Cardwell) and Atherton, and Araucaria also near Atherton.

There is around 31,000 hectares of good quality, well-established softwood plantations owned and managed by HQ Plantations in Far North Queensland that are located close to sawn timber processing facilities and local markets such as Cairns.

Strengths

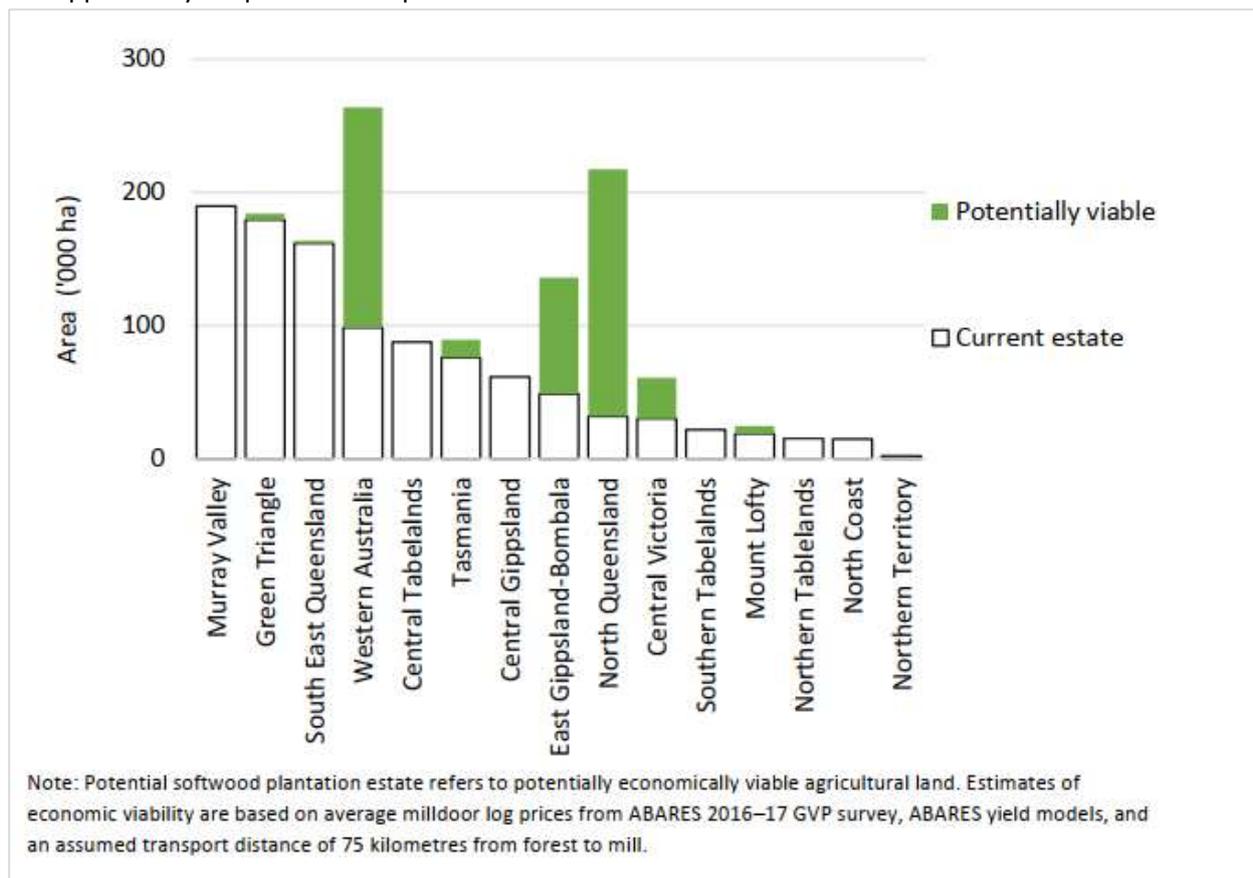
- Existing pine resource
- Access to two relatively large sawmills
- Industry priority to increase estate and to improve efficiency of growing and processing value chain

Weaknesses

- Highly seasonal rainfall

Opportunities

- Expected reductions in the productivity of timber plantations in southern Australia due to climate change (Bush et al. 2018) suggests a need to expand the plantation estate, and the greatest opportunity for plantation expansion is in north Queensland:



Source: Whittle and Downham 2019.

Stakeholder feedback reiterates that there is great scope for expansion of the Southern Pine plantation estates. Potential areas are above the tablelands, including the Lakeland Irrigation Area Project inland from Cape Tribulation. The feedback continues that even though the area has amazing soils, the real estate (land) can be expensive and the required reliable rainfall can be inconsistent.

- A number of actions have been implemented under the Queensland forest and timber industry plan, providing positive outcomes for plantation investments in Queensland. As a result of these actions, a licence is no longer required to export Queensland unprocessed plantation-sourced timber products, removing a long-standing regulatory burden and offering new market opportunities. (Queensland Forest & Timber Industry – An overview, 2016)

Stakeholder feedback for far north Queensland raised silvopastoral as a real option, especially with African Mahogany. HQ Plantations stated they would consider trials on newly stocked land with pine plantations. Teak was also presented as a potential opportunity requiring further research.

6.3 Northern Western Australia

6.3.1 African Mahogany Plantations

The commercial plantations of African Mahogany (*Khaya senegalensis*) in northern Western Australia are in the ORIA (377 ha).

Refer 6.2.1 African Mahogany Plantations for plantation establishment information and *Strengths*, *Weaknesses* and *Threats* specific to African mahogany plantations.

Opportunities

- Current small-scale industrial planting is in progress in the ORIA, and this region presents opportunity for substantial expansion.

Stakeholder feedback concurs regarding the opportunity for increasing mahogany plantations, especially in the drier regions, but also noting that water allocation is an important issue and needs to be used more efficiently.

6.3.2 Sandalwood

Although the Indian Sandalwood (*Santalum album*) resource is extensive in Western Australia, the resource in the northern part of the state is the world's largest commercial sandalwood plantation, in particular in the Ord River Irrigation Area (ORIA) and nearby Kingston's Rest.

Quintis has sandalwood plantations totalling more than 12,500 hectares in Western Australia, Northern Territory and Queensland, with products, particularly oils, exported primarily for the fragrance and pharmaceutical industries.

Approximately 6,000 hectares of Sandalwood plantations are located in northern Western Australia, where commercial harvesting commenced in 2014. For 2018, the interim yield results indicate record levels of heartwood from Quintis managed plantations. The average heartwood per tree is 13.4kg – this is 38% above the previous high of 9.7kg achieved from the 2016 harvest and double the average heartwood achieved in last year's (2017) harvest. (Quintis, 2018)

In addition to Quintis, *Santanol* has been growing pure sandalwood in the Kimberley region of Western Australia since the plantation industry's inception in the late 1990s, transforming a desert area into a forest, and *The Sandalwood Sanctuary*, originally a dairy farm, began its first small harvest in 2014.

Strengths

- *Stakeholder feedback* advises that oil is a key market, along with heartwood sales for carvings and medicines.

Opportunities

- *Stakeholder feedback* advises Quintis has a collaborative project with Cape York Sandalwood, and in conjunction with the University of the Sunshine Coast, are trialling a different species of Sandalwood suited to both dry and wetland regions.

- *Stakeholder feedback also highlights opportunities to further promote the natural and pharmaceutical characteristics of sandalwood, but that significant research is required.*

Threats

- *Stakeholder feedback raises the risks of fire, disease, fungus and termites (specifically the giant northern termite).*

6.3.3 Teak

Teak (*Tectona grandis*) is a large deciduous tree with a heartwood that has a fine grain, is golden in colour and is resistant to damage by weathering termites and fungus. These qualities make it well suited to the manufacturing of high-value timber products, such as furniture, flooring and boats (Pandey and Brown 2000).

Teak tolerates a variety of conditions but prefers deep well-drained soils in warm moist tropical climates with a marked dry season (Pandey and Brown 2000). The soils in the Kununurra region are believed to be well suited to teak growth. (Brennan and Radmiljac, 1998)

6.4 Northern Territory

6.4.1 African Mahogany Plantations

The plantations of African Mahogany (*Khaya senegalensis*) in the Northern Territory are in the Douglas–Daly region to the south of Katherine.

A current research project initiated by the mahogany industry aims to understand the optimal resource inputs and management systems (silviculture) on productivity and wood quality. (“Economic diversification through innovative forestry”; Northern Territory Government, Department of Primary Industry and Resources; April, 2018)

The project will examine best practice in silviculture. This includes looking at different fertilising, pruning and thinning techniques as well as researching the optimum practices to grow the NT’s African mahogany for the market specifications, whilst ensuring the profitability of Territory forestry growers. The industry estimates that African mahogany plantations in the NT will have a projected value of \$150 million by 2019. (“Funding for forestry research”; Northern Territory Government, Department of Primary Industry and Resources; April, 2017)

Refer 6.2.1 African Mahogany Plantations for plantation establishment information and Strengths, Weaknesses and Threats specific to African mahogany plantations.

Opportunities

- Current industrial plantings in the Douglas–Daly to south of Katherine (NT) began in 2006, and present further opportunity for substantial expansion.
- In the Northern Territory, laws now allow a portion of pastoral leases to be developed for other commercial purposes such as agriculture, horticulture, forestry, aquaculture or tourism ventures, so long as these activities are consistent with the *Native Title Act* where native title has been determined (Australian Government 2015).

6.4.2 Tiwi Islands

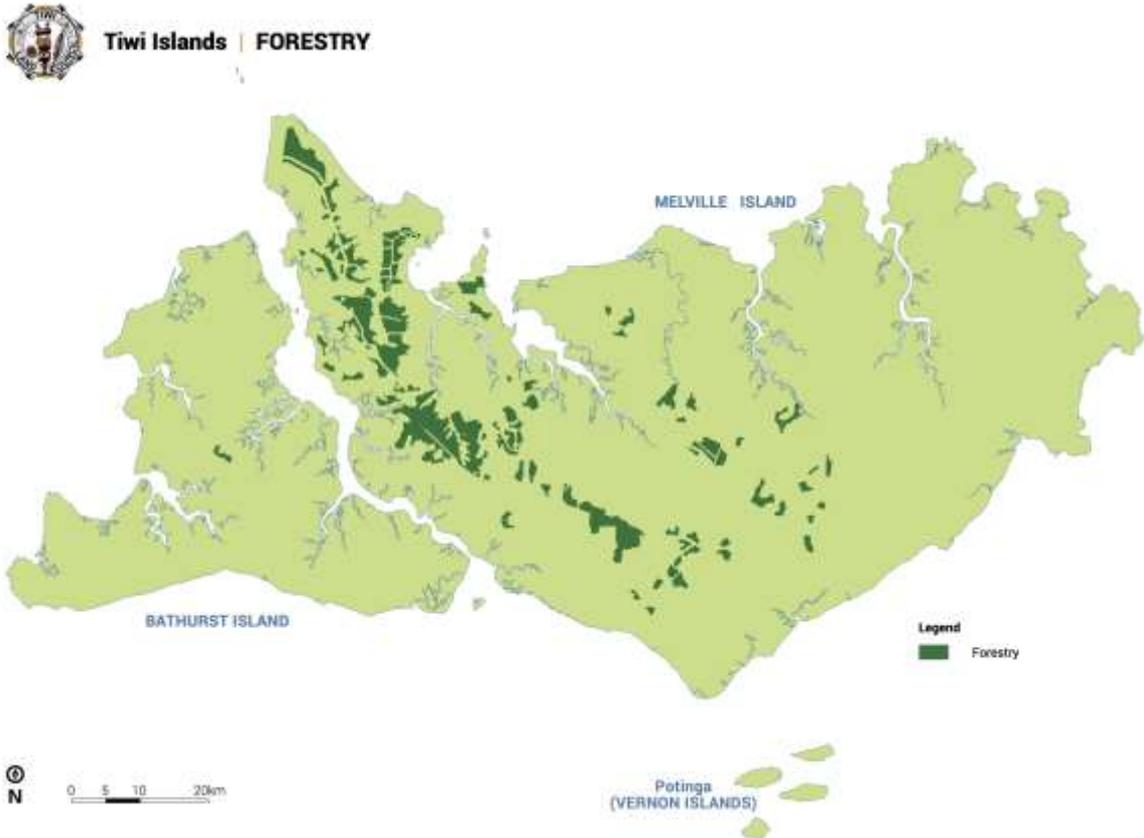
The Commonwealth Government initiated plantation forestry on Melville Island in 1960, and about 3,900 hectares of *Pinus caribaea* were planted during the subsequent 20 years. These activities were

terminated in the mid-1980s and the ownership of the existing plantations reverted to the Tiwi community, controlled by the Tiwi Land Council. About 900 hectares of these plantations are currently being harvested, with the remainder deemed to have no commercial value and likely to be cleared for re-establishment.

Stakeholder feedback also highlighted the current harvesting of *Pinus caribaea*, but contrary to the above, stated this was a good outcome and could be expanded.

In the mid-1990s, a new forestry project was established as a joint venture between the Tiwi community and *Sylvatech Pty. Ltd.*, in which Aboriginal land was leased to *Sylvatech*. The Commonwealth and Northern Territory governments approved the project, which was to establish up to 30,000 hectares of *Acacia mangium*. The venture was declared non-viable in 2009 and abandoned, with the plantations and management responsibility subsequently passing to the Tiwi community, who are currently managing the plantations with assistance from plantation management consultants.

Midway Limited has now partnered with Tiwi Plantation Corporation to manage about 30,000 hectares of *Acacia mangium* trees on Melville Island, and is shipping to customers in Asia for making paper.



Source: http://www.tiwilandcouncil.com/documents/Uploads/Maps/06_Tiwi-Islands-Forestry-Map.pdf

Strengths

- Midway investment in new equipment such as in-field chippers and also new infrastructure at the Melville Port.

- Midway investment will see an increase in loading of woodchip vessels from five to six a year to eight or nine. (ABC Rural: Timber company Midway commits \$17 million to boost woodchip exports from Tiwi Islands.)

Opportunities

- Eucalypts have been trialled on the Tiwi Islands since the 1980s, but the latest trial of eucalyptus trees are showing significant growing advantages to the acacias that currently dot the landscape of Melville Island. (Ref: ABC Rural - Eucalyptus trees being trialled on Tiwi Islands.)
- There is still an opportunity to conduct a study of future commercial use options for established *Acacia magnum* plantations, including reestablishment options and economic prospects. (Halkett et al, 2012.)
- Regional demand for pulpwood is projected to grow as a result of increasing Chinese demand.

Threats

- Due to its proximity to the equator, tropical cyclones are a common occurrence along the Northern Territory coastline. (The Senate 2009)

6.4.3 East Arnhem Land

In East Arnhem Land, the Indigenous owned *Gumatj Corporation Limited's* sawmill (near Nhulunbuy) has been operating since 2014, harvesting and milling timber from land managed by Rio Tinto, prior to mine-site developments. The timber is primarily for local use in the construction sector. This includes supplying the timber required for housing projects in nearby Indigenous communities and for specific projects elsewhere in the Northern Territory. (ABC Online 2018)

Some timber, primarily Darwin stringybark, is supplied to local furniture businesses, including Manapan Furniture, whose products are supplied nationwide.

Underscoring the logistical challenges in northern Australia, timber has to be barged from Nhulunbuy to Darwin. In May 2017 sixteen Indigenous people were employed at the mill, with expectations that by the end of 2017 the number would rise to 120 locals being employed in various kinds of full-time work. ("Remote Aboriginal community in the NT finding new ways to create local jobs" ABC Online 2017)

Stakeholder feedback reiterated that Nhulunbuy has good access to resources, but that infrastructure was less of a challenge with regards to rehabilitating mining areas with plantations than literature might suggest.

Strengths

- Indigenous community leadership and engagement
- Ability to supply local markets that are distant from other sources of building materials

Weaknesses

- Remoteness (e.g. distance to ports and markets)
- Lack of infrastructure (e.g. roads, telecommunications, etc.)
- Thin local markets
- Limited access to maintenance and other technical support

Opportunities

- Unique timbers and properties
- Branded products for international markets
- Extension of government contracts

7.0 Developing action and research and development priorities

This literature review is the commencement of a three-phase process to produce a comprehensive overview report on the northern Australian forestry and forest products industry, and its opportunities.

Providing information and guidance, the literature review will form the basis of two consultation steps:

- one-on-one interviews and discussions with key stakeholders and
- regional industry and stakeholder forums

These consultation processes will focus on identifying key priorities for action by industry, government, stakeholders and other actors, including addressing development and associated research needs.

Subsequently, the review will be updated to be an 'Overview Report', able to be presented as a roadmap for the future of the forestry and forest products industry in northern Australia.

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Northern Forestry & Forest Products Industry

Situation Analysis

Project Number - A.1.1718122

Stage 1 – Overview of the forestry and forest products industry and preliminary evaluation of forestry opportunities

The Cooperative Research Centre for Developing Northern Australia (CRCNA) is focused on delivering industry-led research collaborations across northern Australia in the areas of agriculture and food, health service delivery and Traditional Owner-led business enterprises.

CRCNA acknowledges the support of its project partners:



APPENDIX TWO

Workshop Summaries

June 2019

The following is a summary of workshops and field visits conducted in June 2019, involving stakeholder, industry and other interested parties. The workshops were conducted to explore forestry opportunities in northern Australia.

While the workshops largely confirmed the input of stakeholders in one-on-one interviews, they added depth to both the opportunities and the actions that need to be taken, for those opportunities to be realised.

Key themes from the workshops

- Security of access to supply is a major constraint on investment in wood processing, including resource availability from crown-owned land (e.g. leasehold in Queensland) and private resources
- Forest inventory and silvicultural information needs to be improved for end-use and investment decisions to be taken in northern Australia
- Re-vegetation opportunities on mine sites are significant, including for regrowth native forests and plantation forestry, but engagement with the mining industry needs to be enhanced to be effective in the future
- Opportunities for meeting local supply are significant, as well as potential national and specific exports markets for some regions
- Market information needs improvement, especially for longer term decision making
- Carbon markets can play a role but more carbon accounting work is needed, particularly for native forestry activities, and removal of the federal 'water rule' for new plantations
- Forest industry has potential to deliver long-term economic and social benefits to many remote communities

In the text, items referenced in square brackets (e.g. [X]) refer to the likely activity stream of workshop outcomes or major topics arising. In summary these streams are: Research; Regulatory; Development and Market.

A further workshop will be held in northern Western Australia in September 2019.

The themes and outcomes from the workshops are being incorporated into the Project's Overview Report.

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Cairns – Tuesday 11th June

Key point ~ regardless of species or source of supply, scale needs to be achieved for a sustainable industry to exist. Fundamental to that, is security of supply across a reasonable forest industries investment timeframe.

Opportunities

- Supply of sawn hardwood to local and specialty markets
- Expansion of supply of sawn softwood to Queensland framing and other softwood product markets
- Hardwood plantation expansion with emphasis on sawlogs
 - Species [Research]

Specific Needs

- Resource security for native forest dependent hardwood mills [Regulatory]
 - Longer-term supply arrangements from Crown leasehold lands (e.g. current contracts in FNQ are due to expire in 12 months for most permit holders)
 - Longer term supply arrangements in partnership with private native forest owners including indigenous owned lands
- Securing resource available from Private Native Forest (PNF) [Development]
 - Note: this is the industry component of the resource security action
- Expansion of softwood plantations [Development]
 - Land assessments
 - Consideration of access to Federal plantation establishment support mechanisms
- Improved access to mineral resource sites [Development]
 - Salvage prior to mining
 - Rehabilitation for suitable re-vegetation
- Improved coordination across the supply-chain [Development]
 - Regional Hubs a key emphasis

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Nhulunbuy – Wednesday 12th June

Key point – sustainable local forest industries can supply local and NT sawn wood markets, with native forests capable of supporting small-scale forestry operations, and plantation establishment options requiring further research and development activities.

Opportunities

- Expand salvage (pre-mining) harvest on mines [Regulatory]
- Economic and social benefits from sustainable (selective) harvesting of traditionally owned native forests
- Alternatives to traditional mine revegetation [Research]
 - Specific plantations

Specific Needs

- Forest inventory [Research] for native forests
- Resource and market information requirements to assist the Northern Land Council assess the most appropriate use
- Plantation species suitable for land [Research]
 - Trial sites of African Mahogany (*Khaya senegalensis*), *Eucalyptus pellita* and other hardwood species for pulp or sawn/peeled wood

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Darwin (for NT in general) – Thursday 13th June

Key point – across NT, plantation forestry expansion for sawn wood, peeled wood and for sandalwood outcomes are dependent upon rainfall levels (or irrigation options for sandalwood), unknown value of native trees on crown lease lands with a need for analysis of end-use markets and forestry resource use options.

Opportunities

- Expansion into high-value pharmaceutical and related markets for sandalwood [Market]
- Silvo-pastoral expansion on a variety of land, building on lessons from plantation African Mahogany estate (Douglas Daly) [Development]
- Sale of thinnings for cash flow purposes – African Mahogany [Research]
- Processing options in NT [Research]
 - Sandalwood
 - African Mahogany and other hardwoods
- Hardwood pulpwood plantations
 - 600 mm water rule and access to carbon markets is relevant

Specific Needs

- Infrastructure
 - Electricity
 - Roads
 - Airfields
 - Water (sandalwood)
 - Telecommunications in the broadest context ~ see RRDC research ‘Data to Decision’ (available from Forest & Wood Products Australia [FWPA])
- Employment, training and retention strategies – note the link to telecommunications for retention
- End-use market analysis
 - African Mahogany
 - Other sawn hardwoods [Market]
- Research into species and market options for standing forests on Crown land, currently utilized primarily as pasture, as well as for plantation species:
 - Local and international end-use markets and values [Market]
 - Forest inventory (native forests) [Research]
 - Pathways to required land-use approvals (Crown land under lease) [Regulatory]
 - Chip, Biomass. Sawlog, Peeler log [Research]

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Tiwi Islands – Friday 14th June

Key point – as it moves to second rotation of its hardwood plantations, traditional owners and their entities and partners on the Tiwi Islands need information on which to base species selection decisions, along with consideration of small-scale native forestry opportunities for self-sufficiency and local markets.

Opportunities

- Second rotation species change [Research]
 - Research to date suggests 60% uplift in productivity from switch from *Acacia mangium* to *Eucalyptus pellita*
 - Note challenge of EPBC Act approval required for change of species [Regulatory]
- Plantations for solid wood outcomes [Research]
 - Sawn wood
 - Peeler
- Plantation income diversification [Research]
 - Horticulture
 - Provision of fuel stations – co-beneficial
- Small-scale native forest harvesting
 - Selective harvesting likely
 - Supply local building materials
 - Sawmill operations previously existed on Melville Island

Specific Needs

- Research support for alternative plantation species
- Market research and development support for sawn wood and peeler wood
- Native forest inventory (may already exist from 1970s)

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General Opportunities

- Commonwealth concessional loan fund and similar financial support
 - AUD \$500 million concession loan fund
 - Further information is required
- PNF in all its forms is an under-utilised resource and little understood
 - Tenure differences
 - Traditional Owner freehold
 - Non-indigenous freehold
 - Adequacy of inventory and therefore opportunity [Research]
 - An extensive resource that can generate economic and social benefits (jobs, skills) and less welfare dependency in remote areas [Development]

General Needs

- Resource security for native hardwood processing and investment [Regulatory for State-Owned land and Development for private native forests]
- Improved/complete forestry inventory [Research]
 - Reference in forest inventory to non-timber values, on an indicative basis (see appendix)
- Silvicultural knowledge [Research]
- Silvo-pastoral options
 - Silvo-pastoral trials and co-benefits analysis [Research]
 - Silvo-pastoral information for potential partners [Development]
 - Understanding access requirements for Crown lease lands in each jurisdiction [Regulatory]
 - Understanding rules for access to land under other tenures [Regulatory]
- Cross-sector and cross-tenure engagement, especially with Traditional Owners (TOs)
- Commercial demonstration and trial sites for tree growing [Research]
 - Commercial demonstration for silvo-pastoral systems (i.e. livestock and trees)
 - Trials for plantation species under different regimes
- Business model options for non-indigenous investors to co-invest with Traditional Owners and leverage benefits available to TOs [Development]
 - Specific business models
 - Access to Commlnsure or other insurance concessions or support
- Sandalwood
 - Water management rules for land under irrigation (the use it or lose it rule) – NT [Regulatory]
 - Pest and disease management (the ongoing need for termiticides and their efficacy) [Research]
- Training and capacity building support [Development]



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- Existing operations
 - Workforce development planning
 - Training and assessment capacity building
 - Emphasis on national objectives including 'Closing the Gap'
- Prospective operations
 - Workforce needs planning
- Market development planning and support
 - End-use market analysis
 - Market information services

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OPPORTUNITIES & NEEDS MATRIX ARISING FROM WORKSHOPS (examples)

Priority opportunities/needs	Region/s	Stream
<p>OPPORTUNITY: Expansion of downstream processing and value adding ~ given the large potential native forest resource, there is an opportunity for expanded processing, but this is dependent upon security of access to supply of resource, given capital and investment financing requirements.</p> <p>NEED: Security of access to supply of resource ~ particularly for native forests, for land under all tenures, to facilitate decision making and investment. In Far North Queensland, there are also good prospects for pine plantation resource expansion, requiring assessments of land availability and investment models with landowners.</p> <p>NEED: Effective engagement models ~ between industry, private forest owners and investors, particularly for indigenous owned and managed forests</p>	<p>Far North Queensland Cape York East Arnhem Land</p>	<p>Regulatory (Crown land) and Development (PNF, Plantations)</p>
<p>OPPORTUNITY: Mine site revegetation ~ add value to existing extensive mining land-use activities through revegetation with productive forestry (e.g. timber, bioenergy).</p> <p>NEED: requires forest inventory and silvicultural information for native forests and for suitable plantation species, and market information to inform decisions as to scale and specific opportunities.</p>	<p>Cape York East Arnhem Land</p>	<p>Research and Development</p>

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<p>OPPORTUNITY: Expansion of silvopastoral systems ~ can maximise returns through joint production of timber and livestock via improved revenue streams and business cash flows.</p> <p>NEED: research and extension of silvopastoral systems that are regionally specific to site conditions, climate and species.</p>	<p>Far North Queensland Cape York Douglas Daly</p>	<p>Research and Development</p>
<p>OPPORTUNITY: Sustainable local employment, including for indigenous people ~ provide long-term, skilled and self-sufficient employment opportunities, across northern Australia, including in remote indigenous communities.</p> <p>NEED: extend and establish business models aiming to extract maximum value from forestry resources (trees) in the regions and communities where the resource is found.</p> <p>NEED: requires training and skills development opportunities and integration with national training and skills recognition arrangements, for business development and management, through the entire forestry supply-chain to operator level.</p>	<p>All regions</p>	<p>Development (inc. training)</p>
<p>OPPORTUNITY: Supply to meet demand for solid wood products ~ given remoteness of the region and proximity to end use markets, local suppliers may have a comparative advantage servicing local demand (northern Australia) as well as some specific export markets (e.g. Asia) which are projected to grow over time.</p> <p>NEED: requires improved market information, and may require related forestry inventory and silvicultural information research on product mixes.</p>	<p>All regions</p>	<p>Market and Research</p>



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NEED: Carbon markets ~ carbon accounting research, especially for native forests, linked to the forestry inventory and silvicultural information research; and removal of the federal 600mm “water rule” for new plantations.	All regions	Research and Regulatory
NEED: Forest inventory and silvicultural information ~ specifically required for native forests across northern Australia, to inform decision making and forestry extension in the field.	All regions	Research and Development
NEED: Market information ~ especially for native species and for assessment of opportunities (particularly solid wood) at the local (northern Australia), national and export market levels.	All regions	Market and Research

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Appendix

Example of possible representation of non-timber values (forestry perspective) for Indigenous managed forests within an expanded forest inventory for northern Australia.

Stakeholder feedback is being sought as to the most suitable means of representing this information.

Species	Region *	MAI~	Non-timber benefits (etc.)			
			Art	Food	Medic.	Pharm. (etc.)
Species A	East Arnhem Land	6				
	Douglas Daly	7.2				
	Tiwi Islands	9.5				

* Possibly also describe by tenure type, for each region.

~ Mean Annual Increment (MAI) = cubic metres of wood growth, per hectare per year (hypothetical MAIs are presented).