Mallee Industry Tasks for Research and Development

FUTURE FARM INDUSTRIES CRC

PROFITABLE PERENNIALS™ FOR AUSTRALIAN LANDSCAPES

Department of Environment and Conservation

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Introduction

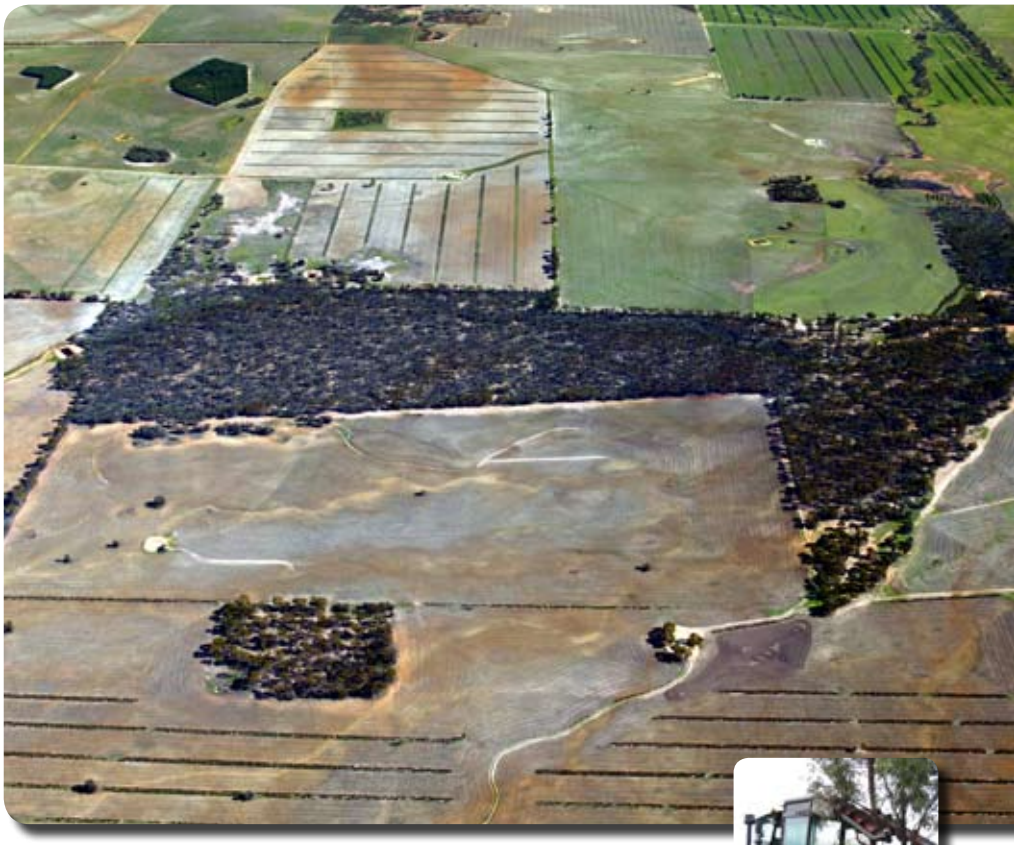
This joint statement by the WA Department of Environment and Conservation (DEC) and the Future Farm Industries Cooperative Research Centre (FFI CRC) explains their supply chain approach to research and development (R&D) for mallee industry development and the priorities for R&D activities along the supply chain. DEC and FFI CRC are collaborating with other R&D and industry partners to complete high priority tasks by June 2014.

This document focuses on industry development where a medium scale (or a 5 MW scale) bioelectricity plant is a key destination target. There are many potential products and industries that could be based on mallees. In this context, this document:

1. Outlines key tasks that must be completed to maximise the probability of achieving a successful mallee industry with bioenergy as a key product;
2. Ranks the industry development tasks for investment in the short to medium term (up to 30 June 2014);

in order to deliver on the FFI CRC joint venture outcomes in relation to biodiversity, productivity and land management.

Discussion stimulated by this document will also contribute to the review, over the next six months, of FFI CRC program priorities.



Background

Since 1993, DEC has maintained a woody crop development program focused on eucalypt mallees, the most prospective genus for biomass production in the <600mm annual rainfall zone. DEC's main driver for this work is one of its statutory functions, to promote and encourage the planting of trees and other plants for the purposes of the rehabilitation of land or the conservation of biodiversity throughout the State.

Biodiversity conservation has increasingly become the focus of the program. This view is based on the knowledge that commercially-driven, broadscale revegetation with mallees will greatly improve protection and recovery of natural biodiversity by:

- Providing a means of better managing water and reducing salinity impacts on wetlands (it has been estimated that the costs to government of managing natural diversity recovery catchments could be halved by commercially-driven, broadscale revegetation);
- Directly providing habitat for native animals;
- Buffering conservation lands against fertiliser and herbicide drift, and wind blown weed seeds; and
- Minimising the potential for new woody weeds to be introduced to south-western landscapes of Western Australia. (Mallees are either all native to the WA South West Land Division, or are a low weed risk, and are preferred for many land management purposes).

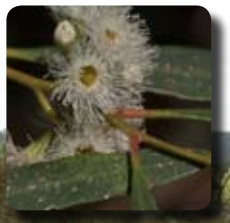
In addition, successful industry development will:

1. Help protect a range of public assets other than biodiversity, including water resources and rural infrastructure;
2. Improve profitability and resilience of agriculture;
3. Support work to combat projected climate change and variability; and
4. Contribute to energy security through the development of a bio-energy source to augment other renewable energy sources.

Given the above, there are compelling reasons for developing mallee crops, particularly for use in narrow belt arrangements that will integrate well with agriculture systems and improve farm productivity.

FFI CRC and its predecessor, the Cooperative Research Centre for Plant-based Management of Salinity, with DEC as a major participant in this joint venture, have maintained a mallee-centred R&D program. Other participants include Department of Agriculture and Food (WA), CSIRO and the University of Western Australia. Supporting participants include Verve Energy and the Oil Mallee Association. FFI CRC manages other important collaborative work including a key project with Curtin University.

Planning Assumptions



The following analysis is predicated on several assumptions. These are:

i. Bioenergy is, for this analysis, the primary product proposed. However, it is emphasised that there are several alternative approaches to industry development, and these may have quite different development pathways and priority tasks;

ii. Recurrent funds allocated to mallee industry development through agencies will be maintained at 2010-11 levels until 30 June 2014; FFI CRC involvement will continue until it terminates on the same date;

iii. A unit module for a successful mallee industry is expected to consist of:

- 10,000 ha of mallee within 100 km of a processing centre;
- Capacity to contract deliver >120,000 green tonnes per year to the processing centre on a sustainable basis;

iv. It is recognised that one industry module is not adequate to support a sustainable industry – at least two such modules are required;

v. In the context of (iii), it is considered that the industry development objective at this time should be to have one module completed, or at least well advanced, by June 2014; and a second module completed by 30 June 2020;

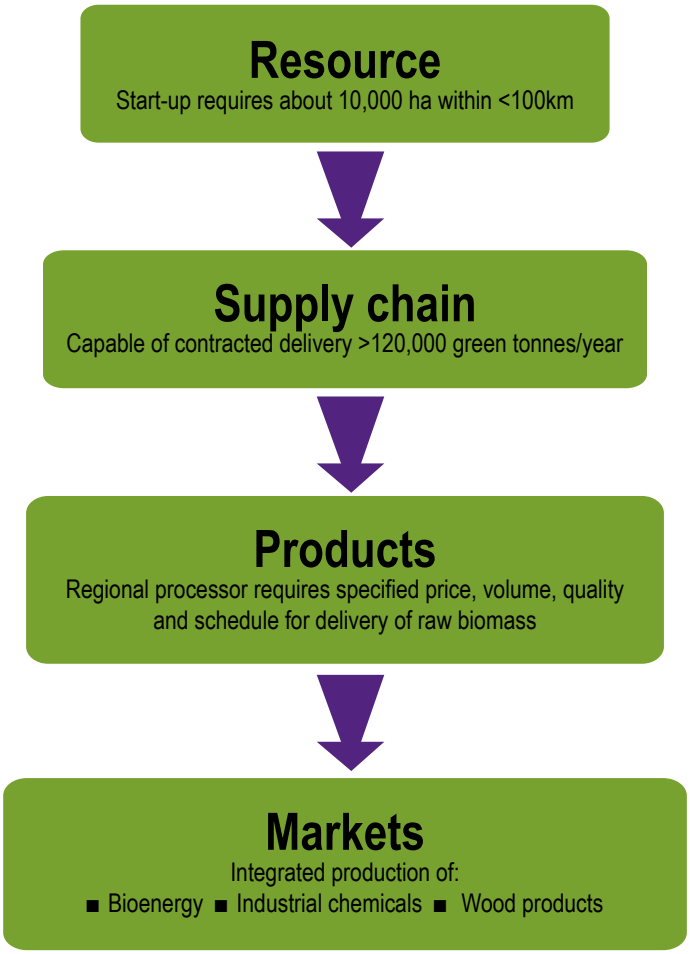
vi. In ascribing priorities, the higher priorities – particularly 1a and 1b (see definitions below) – will be the focus of new funding proposals. Consideration will be given to shifting current funds from lower to higher priorities, and when current tasks are completed funds will be shifted to tackle the next highest priority.

Industry Development Tasks and Priority Ranking

Supply chain development for successful woody crop industry development based on mallees requires work on four core components as shown in Figure 1: a mallee resource, supply chain, products and markets.

One challenge in developing the mallee industry is to ensure these four components are developed together – no industry will start unless all the components are achieved at the same time. Other important context for industry development includes the interactions among:

- Transport of biomass both as a raw product and in processed forms. This includes distance to processor and distance to market or, in the case of energy, appropriate entry points to the grid and/or proximity to population centres;
- Existing infrastructure; and
- Potential locations of processing facilities (ports, population centres, etc).



Four elements of a successful industry.

Within each of these components there are several key tasks that must be completed to a satisfactory level – these tasks are briefly described in the tables below. The priorities for each task, as at August 2010, are ranked using the following system:

- Priority 1a: Task is essential, one or more actions within the task must be completed to ensure industry development may proceed; this is the top priority for new R&D resources.
- Priority 1b: Task is essential, one or more actions within the task must be completed to ensure industry development may proceed. However, the task is dependent on a pre-requisite task.
- Priority 2: Task is essential, development will be adequate to support industry development provided current resource input to this area is maintained.
- Priority 3: Task has been adequately developed to support industry development, reduce or cease current expenditure and transfer funds/resources to a priority 1a task.

It must be emphasised that these priorities may change quite rapidly.

For example, a technological breakthrough in harvesting technology may convert a Priority 1a task to Priority 2. The reverse may also happen. For example, if current funding to a task ceases or declines, then that task may change from Priority 2 to Priority 1a.









Resource Base

Generally, new industries are developed around an existing resource base, for example, a native forest. In the case of woody crops for the WA wheatbelt, this resource must first be established, and this is a key component of developing a new industry. In the first instance, this resource needs to be of sufficient size to attract commercial processors. Note the resource base required is outlined in the assumptions above.

Component and tasks	Comment	Priority
Adequate knowledge and technical capacity to support establishment and management:		
Species selection and genetics	Satisfactory status except for inadequate knowledge concerning the inheritance of biomass productivity.	2
Seed production provides adequate seed volumes to support required plantings	Adequate orchard seed for *E polybractea* and minor spp, but less so for *E loxophleba lissophloia.* Interim measure is to source *E. loxophleba lissophloia* seed from wild populations.	2
Planting design to reduce costs and increase yields	Vital to get greater biomass per ha in paddock. Currently funded through existing project, but priority may change (become 1a) once project ceases.	2
Establishment and management technologies	Relevant technologies are well developed, no requirement for further research and development at this stage.	3
Adequate number of growers planting sufficient area, if economics is right. Elements include:		
Farm planning, design, layout, GIS services	Priority assigned because reliant on R&D from planting design.	1b
Farm scale economic analysis		1b/2
Appropriate policy, legislation and regulation are in place to support the biomass industry	Note that this is a high priority given the generally poor understanding amongst key institutions of the capacity for biomass industries to deliver across a wide range of community needs.	1a
Planting and supply contracts are on offer to private landholders for at least one industry project area	Critical, but reliant on success with items in the 1a category.	1b

Supply Chain

The supply chain includes all the linked processes from harvesting the resource to delivery at the processing unit. Based on current assessments, the supply chain must be capable of delivering >120,000 green tonnes per year of biomass.

Component and tasks	Comment	Priority
Contracting services and commercial network	Priority assigned because dependent on other tasks.	1b
Material handling: • Stockpile technology • On farm haulage • Container and loading/ unloading technology	Priority 1b for stockpile technology – also, need to explore whether the available technologies are available and adequate. Priority 1a for on-farm haulage and container and loading/ unloading technology.	1b 1a
Harvester development and component (eg chipper technology) R&D	Currently the highest priority given the level of technology development required, and the pivotal position the harvester has in industry development.	1a
Harvest planning, inventory and GIS		1a

Products

Specific processing industries will manage, plan and research (including feasibility) the linkage between price, biomass volume, quality of biomass and scheduling for delivering biomass to a processing plant. Key tasks across the industry will include:

- Project scale feasibility analysis (that is, first pass analysis of the general dimensions of biomass supply and its likely cost), Priority 1a; and
- Initiating small scale, but potentially scalable, processing to fully test the resource, supply chain and markets. Priority 1a.

Note that from the perspective of the FFI CRC and its participants, this component will inevitably be industry led. The CRC focus is on establishing the resource base and the supply chain. However, the CRC will, through partnerships facilitate development in this area. An example of such work is the current collaborative project with Curtin University where University researchers are undertaking important basic research and development. Applied research and development will need to be industry led.



Markets

In developing a new industry, there is significant work in the market exploration and development arena. However, this work is largely out of the domain of the CRC. Again, the CRC will, through partnerships facilitate development in this area.

Priority tasks in mallee industry development.

Farm planning, design, layout (1b)

Species selection, genetics and seed production (2)

Farm scale economic analysis (1b/2)

Planting design (2)

Appropriate policy, legislation (a)

Establishment/management (3)

Supply contracts on offer (1b)

Adequate knowledge for establishment and management

Adequate growers/area

Resource

Start-up requires about 10,000 ha within <100km

Contracting services, commercial network (1b)

Materials handling:
Stockpile technology (1b)
Road transport (1a)
On-farm haulage (1a)

Supply chain

Capable of contracted delivery >120,000 green tonnes/year

Harvester, R&D (1a)

Harvest planning, inventory and GIS (1a)

Processors taking existing resource (1a)

Products

Regional processor requires specified price, volume, quality and schedule for delivery of raw biomass

Project scale feasibility analysis (1a)

Markets

Integrated production of:

■ Bioenergy ■ Industrial chemicals ■ Wood products