

Focus on CSIR research in Forestry

CSIR Natural Resources
and the
Environment
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Main Focus

The CSIR conducts strategic research and develops competencies required to meet the research and development (R&D) needs of the South African plantation forestry industry and the forest products industry. Research in this area focuses on tree improvement, forest assessment, wood science and fibre processing. Scientists in these specialised fields undertake world-class research. Strategic relationships with stakeholders and collaboration with partners ensure that research is relevant and that it creates an appropriate impact.

Focused Research Groups

Tree Improvement

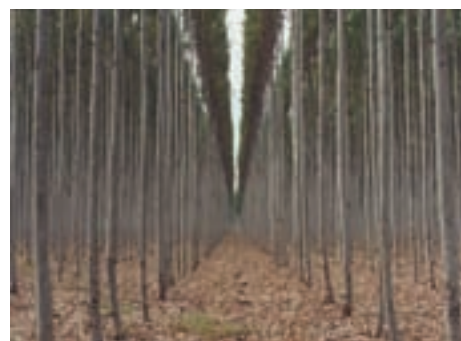
Local and international stakeholders are given the opportunity to use applied tree-breeding and genetics expertise to develop their own knowledge or to acquire better trees at a faster rate. This research typically addresses the research needs of afforestation, reforestation/planning and planting material supply. Key competencies include quantitative genetics, breeding strategy development, forest genetics, gene conservation, reproductive biology of plantation species and propagation technologies.

Forest Assessment, Wood Science and Fibre Processing

The Forestry and Forest Products (FFP) Research Centre - an initiative of the University of KwaZulu-Natal and the CSIR - focuses on the afforestation and planning component of the value chain, aimed at creating an impact on the processing component. Research is directed at understanding the fibre characteristics of timber, the properties of the raw material, how this knowledge can add value in processing operations, and how processing can be improved.

This research builds on existing world-class capability, and is rendered in support of the global competitiveness of South African forest products companies. The primary focus lies in the optimisation of plantation forest resources grown for the pulp and paper industry, aimed at maximising fibre quality, value and uniformity of wood fibre entering pulp and paper mills. The key value addition lies in supporting companies to better understand the quality of the fibre resources that they own, or buy, and to support them in extracting maximum value from that resource. Key competencies are in wood chemical and physical properties, wood anatomy, pulp and paper manufacture, remote sensing, geographic information services (GIS), and tree physiology.

Access to state-of-the-art equipment at the Centre ensures that relevant quality research is conducted.



Current Research Projects

Cooperative Research Programmes

The Eucalypt Cooperative Research Programme and the Fibre Processing Cooperative Research Programme are joint initiatives that have been in place for several years, the current members being CSIR-FFP, Mondi Business Papers, Sappi and Nampak. The CSIR manages these programmes through steering committees constituted by the stakeholders. The cooperatives have an impressive track record, and their industry partners have expressed satisfaction at the value the association adds to their businesses.

Remote-sensing in Forestry

A collaborative research initiative between the CSIR and Mondi Business Papers focuses on the application of remote sensing in plantations, forests and woodlands. The project is aimed at tracking the latest remote sensing technologies, quantifying and validating the levels of precision achievable with different remote-sensing technologies and determining the potential to address practical problems that can increase efficiency in current plantation, forest and woodland management practices. It is also aimed at understanding the strategic role of remote-sensing as part of a cost-effective suite of technologies to address the operational

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needs of the South African forest industry, and build local capacity and expertise to support the future need for highly skilled remote-sensing specialists.

High-performance *Eucalyptus* and Interspecific Hybrids for Marginal Lands

This collaborative project involves South Africa (the CSIR and the University of Stellenbosch) and Australia (ACIAR, Australian National University, ENSIS and State Forests of New South Wales). The goal of this project is to improve rural livelihoods and environmental conditions on marginal lands for agriculture and commercial wood production in the medium rainfall zones of both South Africa and Australia, by addressing the challenges and opportunities of commercially-viable farm and landscape reforestation in marginal lands. The research will result in improved genetic resources and breeds for marginal farmlands, which will meet the needs of farmers for commercially-viable plantation and farm forestry species, and of the forest industries that draw on this resource. Other outcomes include more cost-effective and less risky breeding strategies for the generation of eucalypt hybrids as well as new and improved technologies for the generation and propagation of eucalypt hybrids for commercial production on marginal farmlands.

Research Successes

Prediction and Management of *Eucalyptus grandis* Solid Wood Quality

This large integrative project on the prediction and management of *Eucalyptus grandis* solid wood quality comprised:

- Pre-felling assessment of wood value at individual tree or stand level, to achieve optimal management of the resource, and to enable prediction of future mature wood value from young trees for planning, management and planting purposes;
- The development of an understanding of the relative impact of genetics and the environment on wood quality for future improvement and planting programmes;
- Distribution of seeds and clones from trees of known growth and sawlog/veneer value in trial studies for evaluation at other locations by organisations participating in the R&D study.

Rapid Screening Tools

Rapid screening tools have been developed to support the strategic research objective of understanding the plantation resource of major stakeholders. These tools have been developed and validated, and have facilitated the process of evaluating and modelling commercial timber resources more rapidly than was previously possible. These screening tools have in turn contributed to the development of an effective fibre management and optimisation system by allowing rapid analysis and quantification of the factors influencing wood properties.

Some of the screening techniques are image analyses for the evaluation of wood anatomical characteristics, near infrared spectroscopy to predict wood chemical composition and gamma ray densitometry to assess wood density.