

Designing better trees, for a better future

The Tree Improvement research group of the CSIR affords local and international stakeholders the opportunity to use applied tree-breeding and genetics expertise to develop their own knowledge or to rapidly acquire better trees to effectively respond to changing markets, technologies, pests, diseases and environmental conditions. This research addresses the research needs of afforestation, reforestation/planning and planting material supply.

The root of tree improvement in South Africa

The tree improvement team of the CSIR has a long and proud tradition in the South African forestry sector. After the pine breeding programme was initiated in 1953, the formal genetic improvement of eucalypt forestry species, such as *E.grandis*, started in 1959. The South African Forestry Research Institute (SAFRI), which initiated these programmes, later became part of the CSIR. Initially research focused on eucalypt and pine species selection and introduction, followed by genetic improvement of advanced generations. The genetic products of this research formed the basis of South African plantation forestry. As plantation forestry expanded in South Africa, new species were introduced and new hybrids (such as drought and cold tolerant hybrids) were produced to pioneer new forestry areas and to secure higher productivity of quality products.



The benefits of tree improvement for the forestry industry

Today the Tree Improvement research group of the CSIR continues to develop quality genetic material of advanced generations of subtropical eucalypt and pine species. As part of a broader forestry competence area within the CSIR, the Tree Improvement group is involved in integrative projects across the whole forestry value chain. The group has also initiated research into the role genetics can play in the protection and conservation of biodiversity. The group's core skills are quantitative genetics, tree breeding and reproductive biology.

The benefits of this genetic research and development are shared in South Africa and abroad. This happens through partnering with the industry in breeding programmes; releasing the group's very best genetic seed and clones to the forestry industry for testing and commercial use; experience-sharing and the development of technical skills through research partnerships, and the provision of courses. The Tree Improvement research group also develops software to assist tree breeders in optimising gains and selecting the best genetic material from their populations using advanced selection methodologies.

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Flagship projects

Project pulp

The pulp and paper industry is an important industry and accounts for over 60% of the approximately 1.35 million ha of South Africa's forestry. South Africa's forestry contributes 7.3% to the gross value of agricultural output. The paper and pulp industry forms a large portion of the forestry industry in South Africa with 64 % of all roundwood sales from plantations being for pulpwood.

"Project Pulp" aims to develop new improved wood quality, high pulp-yielding Eucalyptus hybrids, thereby adding significant value to the resource. Development of the new product will focus primarily on quality while striving for the best tree volume and growth characteristics.

Seeds for a better future

The Seeds for a Better Future (SFBF) project was a four-year project funded by the Department of Science and Technology's Poverty Relief Programme. With the support of the CSIR, three commercial forestry tree seed orchards were established as SMMEs: Underberg Seed (Shongwe), Phumulani Tree Seed Company (Nelspruit) and Zoeknog Seed Project (Bushbuckridge) in poverty-stricken rural areas of the Mpumalanga and Limpopo provinces. This has created the opportunity for these communities to generate income through the sale of high-quality, high-value tree seed on national and international markets. In addition, vegetable gardens were established to supplement income until the trees have reached full production and to help bridge the time between harvesting seasons.

Siyatyala

One of the spin-off business opportunities identified during the development of the "Waste-to-Wood-to-Energy" (WtWtE) concept was a black empowerment

tree nursery, Siyatyala Nursery cc. This nursery is owned by women, primarily employs women and is located in the WtWtE project. This project is a poverty alleviation initiative to promote sustainable local economic development through the production of genetically improved plantation trees.

