

# SA Forestry

**ANNUAL 2021**

**Resilient forestry  
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## 2021 ... a challenging year!

Dear SA Forestry Readers

2021 is almost done and dusted! What a year it has been! The third wave of the COVID-19 pandemic kept us pinned down for months and took down some of the icons in our sector; KwaZulu-Natal and Gauteng erupted in civil unrest, anarchy and widespread looting in July; the municipal elections in early November revealed the cracks in our democracy and voter backlash against deteriorating governance across SA.

In the midst of all this mayhem, the forestry sector has shown its resilience and has kept on planting, harvesting and investing, putting trees in the ground that will keep on supplying the raw materials for countless downstream processors and manufacturers. Moreover the strategic importance of the sector is on the rise as the world turns increasingly to green energy resources to reduce our reliance on fossil fuels, sequester carbon and replace plastic, concrete and steel with wood.

### Green shoots

Another green shoot is the increasingly influential role played by forestry in conservation. Both Sappi and Mondi have partnered with WWF in water stewardship programmes that extend beyond their own boundaries, reaching out to other land users and stakeholders. At the same time ordinary tree farmers are becoming more conscious and more active conservationists as there is increasing evidence of the important role that forestry estates can play in protecting patches of biodiversity while still operating productive plantations.

The role of forestry as catalyst for rural economic development is another strong reason for optimism within our sector. Time and again forestry provides a starting point for mobilising rural communities to become more actively involved in utilising their land more productively and building sustainable businesses. However a lot more support and investment is required on this front to build resilient communities.

On the negative side, the fact that South Africa's forestry resource is not growing is disappointing. In fact it's shrinking as conversion of forestry land to crops such as macadamias and avocados continues. Even more disappointing is the poor utilisation and management of some state owned and municipal plantations, and the lack of urgency in returning 22 000 ha of land in the Western and Southern Cape to forestry. Thirteen years have passed since Cabinet made a decision to return that land to forestry and we are still waiting. Meanwhile the shortage of sawlogs in the region is reaching crisis proportions, threatening jobs and livelihoods. It just doesn't make sense.

Perhaps the biggest blow for me personally, and I know for many other people in the industry, was the passing of Jaap Steenkamp in mid-year. Jaap was a stalwart of the sector who made a massive contribution in so many areas. He battled for contractors, for academia and for his students, for training service providers, for manufacturers and entrepreneurs, and for the entire industry. I never attended a forestry event where Jaap didn't make a telling contribution, whether as a presenter or from the floor. At every forestry fair I attended over the past 15 years he showcased some new piece of equipment that he had a hand in designing and developing.

I got to know Jaap for the first time back in the day when he invited me to his factory in George to see the new pitting and planting machines he was developing. I was new in the industry, a nobody, yet Jaap took me under his wing and went out of his way to 'show me around'. He arranged for a visit to an MTO harvesting operation, took me to see PG Bison extracting pine thinnings with mules, and drove me into the mountains around George to view the countryside. He even took me to his favourite padstaa! and bought me what he reckoned were the best koeksisters ever made. Damn they were good! I ate them while he drove and talked enthusiastically about forestry, about the southern Cape, about life. All of this was in his own time and at his own expense.

### Forestry brotherhood

In many ways Jaap epitomised to me the ethos that exists within the forestry sector. There is a brotherhood among forestry people that is the glue that holds the sector together. We talk the same language, share similar interests and face similar challenges. Somebody likened Jaap's passing to a big tree that has fallen in the forest. He sure left a big gap in the canopy, but at least it provides an opportunity for some new forest giants to emerge.

I would like to dedicate this first edition of the SA Forestry Annual publication to 'Oom' Jaap. May he rest in peace! 🌱

**CHRIS CHAPMAN**  
Editor



'Oom' Jaap Steenkamp.

# OUR ROOTS ARE IN TIMBER

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## Leopard on the prowl

South Africa's plantation estates are providing rangelands for a wide array of wildlife, including highly threatened species like this magnificent leopard. It was caught on a forestry camera trap in the KwaZulu-Natal midlands.



# New SAFCA CEO appointed

Dwayne Marx has been appointed Chief Executive Officer of the South African Forestry Contractors Association (SAFCA). Dwayne fills the giant boots vacated by SAFCA founder and forestry industry stalwart Jaap Steenkamp who passed away earlier this year.

### Contracting experience

Dwayne brings a wealth of forestry and contracting experience to his new role of providing strategic leadership to the Association. He has over 30 years' experience in the forestry industry. He has worked as a forester for Mondi, then joined a silviculture contracting business in 2000, eventually taking over management of the business and establishing Idube Forestry in 2004.

Under Dwayne's management Idube looked after 28 000 ha of Mondi forestry land across the KZN midlands. Idube Forestry was at the cutting edge of introducing new modernised silviculture equipment to Mondi's operations, and was also involved in BEE and community forestry initiatives.

In 2019 Dwayne relocated to Hermanus in the Cape where he has established a commercial



Dwayne Marx checking the quality of a pitting operation during his contracting days with Idube Forestry.

drone business, Forestry Drones. He says this exciting new technology can provide a wide range of services to industry and agriculture, and there are many opportunities in forestry.

He is excited about his new leadership role at SAFCA and has a deep understanding of the kind of support that forestry contractors require in order to be successful. 🌱

# International collaboration in eucalypt genome sequencing project

Professor Zander Myburg of the University of Pretoria and Director of the Forest Molecular Genetics Programme at FABI, will lead an international team of researchers in a United States Department of Energy-funded genome sequencing project, known as 'Eucalypt genomic resources for woody biomass production and carbon drawdown', to decipher woody biomass production and environmental interactions of eucalypts.

The genome sequencing and analysis will be done at the US Dept. Energy's Joint Genome Institute and other associated institutes. The project leads, Prof. Zander Myburg from the University of Pretoria, Prof Justin Borevitz at Australian National University and Prof Jill Wegzryn from the University of Connecticut and their teams bring together expertise in forest molecular genetics, tree genomics and computational biology. Prof Myburg holds the Chair in Forest Genomics and Biotechnology in the Faculty of Natural & Agricultural Sciences and is affiliated with Innovation Africa@UP at the University of Pretoria.

### Carbon sequestration

Fast-growing woody plant species from the sister genera Eucalyptus, Corymbia and Angophora, jointly known as the "eucalypts", include some of the most carbon-dense vegetation on earth and hold great promise for carbon drawdown



Professor Zander Myburg

through restoration and plantation forestry. Eucalypt species and hybrids also constitute the most widely planted hardwood crop globally (>20 mha) serving as renewable biomass feedstocks for timber, pulp, paper, textiles, food additives, pharmaceuticals and a wide range of other lignocellulosic products. They also have some of the most diverse secondary metabolism of all plants and therefore offer a rich collection of genes and pathways for novel bioproduct development.

The project will see more than 3,700 eucalypt tree genomes sequenced of which 2,200 are in common garden field trials in South Africa and 800 in similar landscape genomics

trials in Australia. These trials will be hosted and maintained long-term as a resource for the international community.


### Eucalyptus, Corymbia and Angophora


To unravel the vast genome and chemical diversity of the eucalypts, the project collaborators will also perform genome sequencing for most of the more than 900 eucalypt species in Australia, including members of Eucalyptus, Corymbia and Angophora. The project aims to generate resources for genome-assisted improvement of woody biomass crops and for understanding how trees interact with changing environments in view of having to adapt to rapid climate change. The project follows on from a previous DOE-JGI funded project that generated the genome of the iconic *Eucalyptus grandis*.

Participation of Prof. Myburg's research team at UP is supported by South African forestry industry partners and by strategic funding from the Department of Science and Innovation and the Technology Innovation Agency of South Africa, including a new TIA-funded high-throughput robotics DNA isolation facility and Tree DNA Biobank at the University of Pretoria. 🌱

Source: Fabi News


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Beautiful grassland and forest, Weza KZN.

# How the forestry sector fared in tough 2021

The forestry sector has shown remarkable resilience through a pandemic, a wave of civil unrest and in a fast changing world ...

Globally and nationally, the economic, environmental and human health impacts of the COVID-19 pandemic and climate change mean we are living in truly unprecedented times, which has been compounded in South Africa by the failed insurrection and resulting civil unrest which took place in July. These factors have forced us to re-evaluate how we work, live and consume and left us relying on world leaders and decision makers to make tough decisions today to ensure there is a better tomorrow.

## COVID-19 impacts

As an Industry, we have been and will continue to be affected by both the pandemic and the uncertainty of how and where climate change will affect us most. In South Africa, as in the rest of the world, changing and more unpredictable weather patterns are being observed and attributed to climate change. As an industry

we are preparing for these changes, investing millions of Rands into research and development projects which will better position our industry to adapt to the prospect of more frequent and intense fires, water scarcity and an increased prevalence in pest and disease outbreaks, although we were pleased to note that for the first time in many years, no new pest outbreaks were recorded in 2020. It is not just climate change itself that will impact our industry, it is also the measures being put in place to address it. The complexity of which, has led to the establishment of the FSA Climate Resilience Working Group chaired by Dr Ronald Heath that will help ensure the Sector's collective voice is heard regarding the implementation of national climate change mitigation policies such as the National Green House Gas Reporting, Carbon Tax Act and the National Business Initiative's 'Just Transition'. All of these important initiatives which have serious potential impacts and

potentially some benefits too for our sector and associated value chains, must be carefully and mindfully implemented by the authorities.

COVID-19 has claimed the lives of too many valued colleagues, family members and friends. Even with the essential sector status FSA was able to secure through its links with the Presidency through our participation in the Public Private Growth Initiative, COVID-19 and the associated lockdowns have pushed business and forestry operations to the brink. We can however, take some comfort in the knowledge that forestry was one of the least-affected sectors in the country, with year-on-year timber volumes falling by 14.6%, whereas we would have seen a 25%, or R15 billion loss, had FSA not taken the swift and decisive action needed to get forestry declared as an essential sector and ensure most of the forest and forest product value chains remained open. COVID-19 has still had a crippling effect across the sector,

especially on small and medium-scale growers and other businesses.

## Sustainability

Yet, even in the direst of situations there is always a glimmer of hope and in this case it comes in the form of a global mindset shift towards conscious consumption and the preference for sustainable products. Sustainability has gone from a buzzword to a mindset, as both consumers and governments demand natural resources are protected and products resulting from them are derived in a sustainable fashion. Fortunately for forestry, sustainability is at the heart of what we have been doing for the past two decades, illustrated by the high levels of Forest Stewardship Council® (FSC®) certification in South Africa. The recent launch of the Sustainable African Forestry Assurance Scheme (SAFAS) that places sustainable forestry in an African context will only add to this, improving the overall sustainability of the Industry by making certification more accessible and practical for all scales of forestry operations.

The sustainable nature of forestry, its superior and most cost-effective ability to sequester carbon and store it both as a tree and as forestry products, its versatility and potential to provide low carbon alternatives to many traditionally used fossil fuel products, as well as the forestry sector's contribution to the economy and its ability to provide green jobs in the rural communities with the highest levels of unemployment, makes forestry an obvious component of any green-economic model. The global 'awakening' to the potential environmental, social and economic benefits of forestry and the increased demand for forestry products is exciting, but in a South African context it leaves us in the predicament of how to meet this increased demand with the current constraints that have been placed upon the sector.

## Forestry Masterplan

This is where the Forestry Masterplan and Private Public Growth Initiative (PPGI) has made a constructive impact, linking industry investment in the sector with government action that will deliver the structural, legislative and administrative reforms needed to ensure the economic, environmental and social growth the sector is predicted to yield, is realised.

To date, R31 billion has been pledged by the sector of which R11.7 billion has already



FSA Executive Director Mike Peter (centre) engages with President Ramaphosa and Dr Roelf Meyer as part of the PPGI.

“Structural, legislative and administrative reforms are what is needed to unlock investment opportunities in the forestry sector.”

been invested in projects in the pulp and paper, sawmilling and board subsectors. In turn, Presidential intervention has led to a meeting between the FSA Department of Water and Sanitation that saw the resolution of a 6-year-old water licencing dispute that has seen long awaited changes to the prohibitive water-use license conditions delivered to FSA. However, there is still a lot of action needed for the investment potential to be realised and thus the sector finds itself at a crossroads, unable to move forward on all commitments without the promised support of the State. While R&D and innovation can help boost productivity, structural, legislative and administrative reforms are what is needed to unlock the investment opportunities. The fastest route to securing additional timber would be to reduce annual losses resulting from fire, pests and diseases; and the recapitalisation of state-owned, burnt or exited forests. Regrettably, we are still in the same position with the Department of Forestry, Fisheries and the Environment (DFFE) that we were in at the end of 2020 with a lack of delivery on the long-overdue commitment to establish a PPP-type partnership to recapitalise State plantations which is key to securing the additional timber support the PPGI industry investment relies upon. It is important to note,

however, that the Masterplan implementation has seen more action from DFFE in 2021 than we have seen in the last 10 years.

Equally concerning is the failure to finalise the Memorandum of Understanding (MoU) between DFFE and FSA to ensure the protection of South Africa's existing plantations against pests and diseases. Failure by DFFE to finalise the MoU for almost four years has led to the suspension of the world-leading National Sirex Control Programme, a flagship programme displaying the success of public-private research partnerships. It has also resulted in the loss of research capacity, with the country's top forestry research institutes losing key forestry scientists due to funding constraints. Once again, on a positive note, we have as recently as September this year received confirmation from the Minister of DFFE that the MoU will be finalised and signed before November this year. We hope that this indeed materialises as Minister Creecy committed to FSA in February of 2020, to finalise it "immediately" so hopefully this time it will be concluded. This will truly alleviate the pressure of the reduction in Government funding over the past five years for R&D across the industry. On a more positive note, lack of State funding has seen FSA create other funding opportunities including a collective initiative with other agri-



sector commodities that has enabled FSA to secure both human capacity and increasingly institutional capacity. FSA's collaboration with Grains SA has secured R 1 million from the Department of Science and Innovation (DSI) toward a Biosecurity Platform.

### Timber & equipment theft

Timber and equipment theft remains a major concern, with FSA continuing to lobby Government to agree to a national, specialised Timber Theft Unit. It is crucial that FSA members report any case of theft and criminality independent of the lack of responsiveness by the law enforcement agencies. We also urge them to drive timber theft issues at a local and regional level through the Anti-Timber Theft Forums (ATTF) and FSA Regional Committees. The growth of "mafia-esque" special interest groups that prevent timber growers and operators accessing their land without payment is a big concern. The President's decision to elevate economic crimes as priority crimes in response to the information presented to the PPGI by FSA, illustrates the seriousness of the situation. In addition to this, FSA's Operations Director, Francois Oberholzer, has been included on a National Priority Committee for Extortion and Violence at Business Sites which was recently established, to deal with this crime trend. This committee was established following FSA and the construction sector's lobbying within the PPGI for Presidential intervention to stop the proliferation of these "special interest" groups. Dr Roelf Meyer in particular must be acknowledged for his leading role in bringing this committee into existence. Provincial Priority Committees have also been established to deal with issues on a local level.

### Disparity in disaster relief support

Going back to the PPGI and Masterplan, the support of black forestry entrants is another area where more State impetus is needed. The COVID-19 pandemic illustrated the disparity between COVID-19 disaster support available for agriculture and forestry smallholders and communal farmers, with only a single, mixed operation forestry grower receiving any disaster funding from the State, despite the best efforts of the Business Unit. With the loss of CASP funding and the uncertainty surrounding the future of the Land Bank, the land reform initiatives could not be realised. Despite the Herculean efforts of FSA's Business Development



Community forestry business bringing jobs and opportunities to rural areas of South Africa.

Director Norman Dlamini and the Grower Development Committee, both applications to the Presidential Employment Stimulus Fund for hundreds of millions of Rands in forestry development funding, were unsuccessful. The first application was scuppered when Minister Creecy appealed to the fund to only consider external applications (like that of FSA) once the DFFE applications had been granted. The second application, which we were encouraged to make jointly with DFFE, failed as the fund said that DFFE had failed to spend the vast majority of the funds it was granted during the first application process!

However, close PPGI ties with the Presidency has ensured small-scale grower funding is firmly on the Presidency and DFFE Minister's radar and FSA is pursuing this aggressively at every opportunity. Through the continued efforts of FSA's Business Development Director, Norman Dlamini and with pressure from the PPGI and Masterplan, forestry is now eligible for blended (loans and grants) development financing through the DALRRD.

### Green economic recovery

With so much depending on government action, it can often feel like although we stand at a crossroads we have no actual control over the direction forestry will take. After all, we have experienced two decades of nationally approved forestry plans that have never been executed, so it is understandable that some in the industry are still a little sceptical. Yet when everything is considered the future of forestry looks bright, for it is indeed a renewable, carbon

neutral, sustainably managed, natural resource that has the power to contribute significantly to a South African green economic recovery. Also, as already mentioned, the Masterplan is galvanising action from DFFE and other State actors, to a greater extent than we have seen in over a decade. How many sectors can boast that they can create sustainable employment opportunities in rural communities where the need is greatest, provide renewable alternatives for fossil-based energy, packaging and construction and help combat climate change by sequestering carbon at the same time? All of this while also investing R 11.7 billion during an international pandemic and the subsequent depressed trading conditions. Yes, Industry's future investment is heavily dependent on the State realising their part of the deal, but never have we had the level of Presidential support and access that we have now. The Forestry Masterplan is not an isolated initiative, it emanates from the Presidentially-led PPGI and so has Presidential buy in, illustrated by the repeated referrals to the Forestry Sector by the President and Finance Minister to both the Masterplan and PPGI in their various addresses. It is clear there is strong political will to ensure that this plan is executed for the benefit of our sector and the country more broadly. We just need to have a little faith, keeping the pressure on the State and be ready to make the next step when the time comes. 🌱

**Michael Peter**

Executive Director, Forestry South Africa



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**Responsible forestry requires attention to sustainable, efficient and effective practices that have the lowest environmental impact and yield the greatest social and economic benefit, while producing an array of renewable and versatile end-products.**

To this end, Forestry South Africa (FSA) represents 13 corporate forestry companies, approximately 1 100 commercial timber farmers and some 20 000 small-scale growers. Collectively, these growers own or control no less than 93% of the country's total plantation area of 1.2 million hectares. FSA is a voluntary association registered as a Not for Profit Organisation consisting of four operational units within the FSA structure namely: Business Development, Forest Protection and Research and Development, Operations, and the Environment. The overall objective of FSA is to represent the collective common interests of its members and thus, the Industry at large. FSA's key roles include:

- ▲ Collective Research and Protection Platform
- ▲ Leveraging Funding from External Sources
- ▲ Deferring/Preventing Potential Costs
- ▲ Lobbying Platform



### Business Development

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The Business Development Unit convenes the Industry's think tank for the growth of the Sector through new afforestation, which is one of the keys to the industry's tangible transformation. Through partnerships, the committee engages on issues of development finance, land reform, capacity building, skills transfer, business support to ensure the success of new entrants and smallholder tree farmers.

#### Committees and Working Groups (WG)

- ▲ Business Development
- ▲ Land
- ▲ Training & Skills Development



### Operations

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The Operations Business Unit deals with all matters related to the day to day Forest Operations, looking for opportunities to introduce new innovations and to make operations safer and more efficient. We provide members, government and other stakeholders with guidance on operations based procedures, produce handbooks and Sector statistics.

#### Committees and Working Groups (WG)

- ▲ Commercial Crimes
- ▲ Forest Operations
- ▲ Forest Valuation WG
- ▲ FSA Statistics
- ▲ Health & Safety
- ▲ Human Resources
- ▲ Training
- ▲ Transport



### Research & Development (R&D), Forest Protection & Communication

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R&D and Forest Protection is critical to increase yield, reduce loss, remain competitive locally and internationally, while addressing current and future challenges and uncertainty. FSA drives the collective effort to identify, fund and commission the R&D and protection interventions the Sector needs, steering a coordinated approach between research partners, their associated networks and where possible, government. The unit also coordinates FSA's communication efforts to accurately promote the Sector

#### Committees and Working Groups (WG)

- ▲ Climate Resilience WG
- ▲ Fire
- ▲ TIPWG
- ▲ Baboon Damage WG
- ▲ National Pest & Disease
- ▲ Communication Advisory
- ▲ Research Advisory



### Environment

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The drive towards sustainable land use and conscious consumption, has seen the remit of the Environmental Business Unit expand. This is not only to ensure environmental sustainability across the Sector, but also to evaluate and mitigate the impact environmental legislation may have on the Sector. This is achieved through a coordinated approach between the Industry and Government to remove impediments to the Sector and to ensure future growth of the Industry. By reviewing and commenting on new/revised laws and regulations, we can assist the relevant competent authorities in drafting laws that are meaningful, unambiguous, implementable and within their mandate.

#### Committees and Working Groups (WG)

- ▲ Environmental Management (EMC)
- ▲ Soil Conservation WG





# Forest Sector transformation impacted by COVID-19 pandemic

The Forest Sector Charter Council has released its Annual Report for the 2020/2021 period, showing slow but steady progress in achieving transformation goals.

The Forest Sector has achieved an overall level 4 B-BBEE status during the COVID-19 impacted 2020/2021 period under review, with Qualifying Small Enterprises (QSEs) achieving Level 2 and Exempted Micro-Enterprises (EMEs) achieving Level 1. The fibre and pole producers sub-sectors were the best performers in most of the scorecard elements achieving an overall Level 1 B-BBEE status.

The average black ownership profile across all sizes of business in the Forest Sector also improved and surpassed the 30% target for black people and 10% for black-women ownership.

However, it is disappointing to note that the number of businesses of all sizes reporting their BBBEE performance to the Forest Sector Charter Council, which is charged with driving transformation in the sector, has declined significantly. In the current reporting year, a total of 37 valid B-BBEE certificates were received, down from the 68 certificates received in 2019/2020 and 70 in 2018/2019.

The COVID-19 pandemic and subsequent lockdowns undoubtedly had a negative impact on reporting in the sector, as well as on the performance in some scorecard elements such as Skills Development and Enterprise and Supplier Development. But this does not tell the whole story as the trend of declining report submissions stretches back to at least 2018.

Medium and Large Enterprises (MLEs) maintained their Level 4 rating achieved in the previous year, while QSEs improved from Level 2 in the previous year to Level 1, and EMEs improved from Level 3 to Level 1 mostly due to that the submitting QSEs and EMEs were enhanced.

It is also noteworthy that fewer underlying reports (14) were submitted by MLEs with their certificates. These reports are extremely important as they provide a more in-depth picture of transformation performance.

## Medium & Large Enterprises (turnover above R50m)

Medium and large Enterprises (MLEs) submitted 18 certificates, with 14 also providing underlying reports which provide more detail about their transformation performance as shown in Figure 1.

MLEs recorded a slight improvement in their overall B-BBEE weighting points for the year under review from 85 to 88, despite the negative influence of the COVID-19 pandemic. The average rating achieved for MLEs was maintained at Level 4. Most of the MLEs have reported in the last two years, confirming their commitment to transformation.

Figure 2 provides an indication of average B-BBEE levels achieved by MLEs

operating in different sub-sectors. No submissions were received from the Charcoal or Contractor sub-sectors which indicates that there are no MLEs operating in these two sub-sectors. A total of seven MLEs achieved a Level 1 B-BBEE rating, most of them from the Fibre and Sawmilling sub-sectors. None of the reporting MLEs received a non-compliant B-BBEE rating.

A three-year comparison of the percentage compliance target achieved in each of the B-BBEE scorecard element is displayed in Figure 3. The current year's performance reveals improvements in all the four scorecard elements, namely Ownership (O), Enterprise and Supplier Development (ESD), Socio-Economic Development (SED) and skills development (SD). A slight drop in performance was observed in Management Control (MC) when

compared to the previous year.

## Qualifying Small Enterprises (turnover R10 – R50m)

QSEs achieved an average Level 2 B-BBEE rating, largely because of the Level 1 and Level 2 ratings, with black ownership increasing from 63%

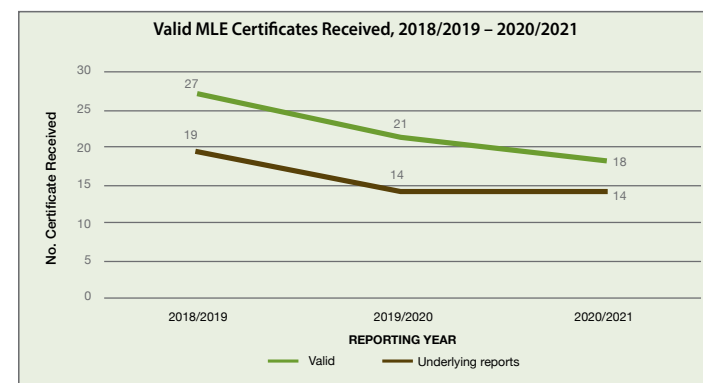


Figure 1: Valid MLE Certificate and Underlying Report Submissions, 2018/2019 – 2020/2021

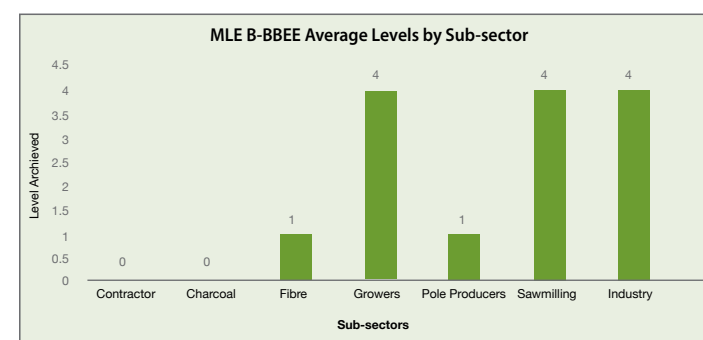


Figure 2: MLE Overall Performance by Sub-sector and B-BBEE Level

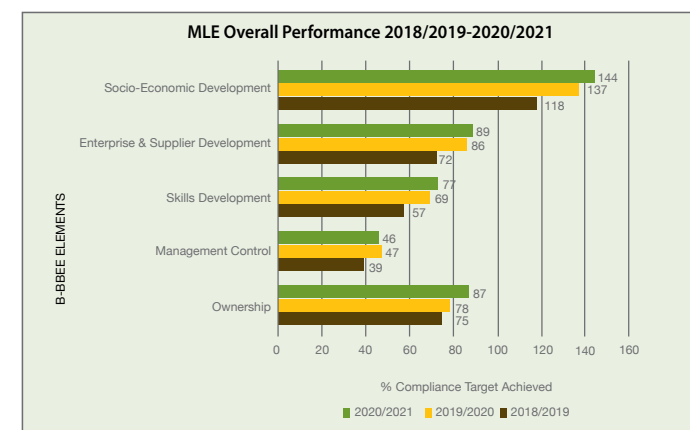


Figure 3: MLE Overall Performance per Element as a Percentage of the Compliance Target

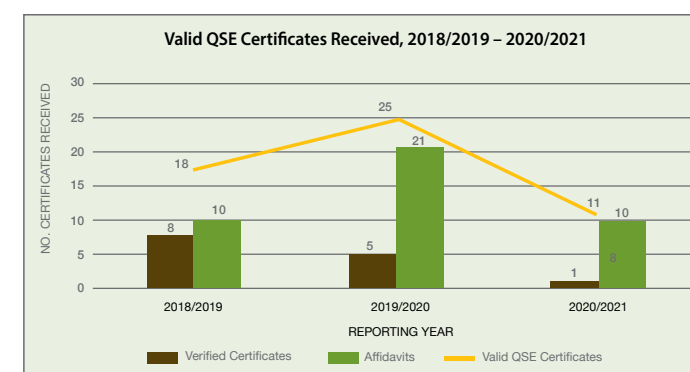


Figure 4: Valid QSE Certificate Submissions, 2018/2019 – 2020/2021

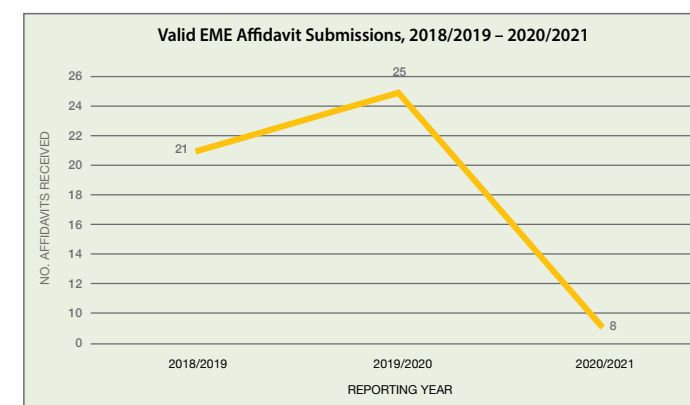


Figure 5: Valid EME Affidavit Submission, 2018/2019 – 2020/2021

in 2019/2020 to 73% in the current year under review. Analysis of the submissions from the QSEs indicates that the majority are involved in contracting such as harvesting, silviculture and transport. Only two are in pole production, with one operating in the Fibre sub-sector.

The number of affidavits and certificates received from QSEs has reduced drastically. Only 11 submissions were received for the year, with one certificate and 10 affidavits as illustrated in Figure 4.

## Emerging Enterprises (turnover below R10m)

EMEs are automatically awarded a Level 4 B-BBEE rating but may be enhanced to Level 1 if they are 100% black owned or Level 2 if they are 51% black owned. Unenhanced EMEs (i.e., enterprises with black

“

Industry's effort is creditable, and should focus more on impactful outcomes, inclusivity and broad-based economic participation.”

ownership below 51%) may be rated on the QSE's scorecard should they want to improve their B-BBEE rating level.

The number of submitting EMEs has decreased from 21 to eight affidavits as shown in Figure 5 from the previous reporting year. Similar to QSEs and previous years, all EMEs that submitted in the year under review are involved in contracting.

The average black ownership profile increased significantly from 24% to 87.7% while the average black women ownership decreased from 14% to 12.5%. The overall average B-BBEE rating for EMEs improved from a Level 3 to a Level 1, largely due to the fact that only Level 1 and 2 EMEs made submissions.

## Conclusion

The Industry maintained a Level 4 rating despite COVID-19, which had a negative impact on economic outlook and performance. Improvements were observed in all the scorecard elements, with the exception of Management Control (only the Fibre sub-sector achieved more than 50% towards the target on Management Control). The Fibre and Pole sub-sectors performed exceptionally well in all the scorecard elements achieving an average B-BBEE Level 1. Industry's performance on the SED element is also encouraging considering that it was during the time of the pandemic.

Responses received on the COVID-19 questionnaire proved beyond doubt that the industry was heavily affected by the pandemic. The most affected were the non-essential entities, resulting in halted operations during the lockdown. Some could not even implement or comply with B-BBEE requirements due to a shift in focus to business survival.

Differing opinions were shared on the impact of each scorecard element. Management Control together with Ownership were the least challenging elements under the pandemic with skills development and enterprise development highly ranked and expectedly so, as these two have a financial commitment.

“Industry's effort is creditable, and should focus more on impactful outcomes, inclusivity and broad-based economic participation,” commented Makhosazana Mavimbela, Executive Director of the Forest Sector Charter Council. “It is evident from the performance this year that Council should continue to prioritise advocating for B-BBEE implementation and compliance and for the support of black-owned businesses for their growth and contribution to job creation, in particular to the youth,” she said. 🌱

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# Forestry and conservation

By Chris Chapman

Eleven years ago I visited a young timber harvesting contractor and budding entrepreneur Brendon Raw on his smallholding in the Karkloof in the KwaZulu-Natal midlands. Ringed on one side by mountains cloaked in magnificent mistbelt forest, Karkloof is one of the most beautiful and fertile farming areas in South Africa.



NCT's commercial tree farmers of the year Brendon and Ninette Raw with their prize, a brand new STIHL chainsaw.

## NCT Tree Farmers of the Year 2021

The NCT Tree Farmer of the Year is awarded annually to tree farming operations that display excellence in sustainable plantation management. Candidates are assessed against broad sustainability principles.

The 2021 winners in the Commercial Tree Farmer category are Brendon Raw and his wife Ninette, who manage their forestry business, Jettison Timber Products, from a smallholding in the Karkloof in the KwaZulu-Natal midlands.

The 2021 winner in the Communal Land category is Nomthandazo Hlombe, who farms in Matimatolo outside of Greytown in the KZN midlands. 🌱



“

*Proper conservation can be practiced in tandem with productive plantations thus creating sustainable jobs while supplying raw materials into value adding downstream industries.* ”

systems. Mount Gilboa is on Mondi owned land and has already been declared a Nature Reserve. Brendon plans to establish a Nature Reserve on his adjoining piece of land which will add further to the integrity of the landscape.

The importance of these conservation efforts cannot be over-stated. South Africa is a water-scarce country, and the water that arises in these mountains feeds into the Umgeni River which services and supports agriculture, industry and rural and urban settlements all the way down to the coast.

Brendon has removed plantation patches beyond the parameters of his planting permit and the requirements of FSC to ensure that the trees that support his business do not impact on the environment, and especially on its water production capacity. We drove past piles of slash where the plantations have been pulled back. These will be burnt on a cool day after light rain and rehabilitated to pristine grassland and wetland.

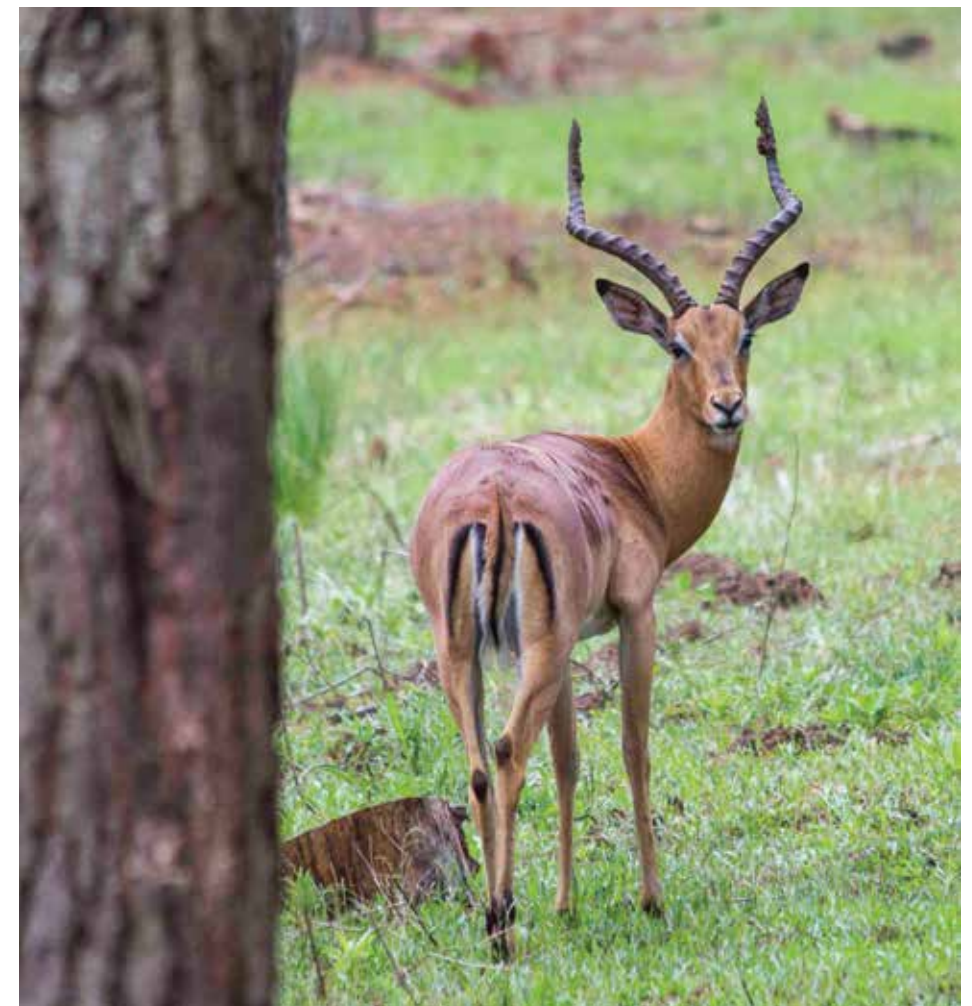
We saw eland, oribi, reedbuck, impala, wildebeest, blue cranes and spoonbills in our drive through the farm, just to mention a few resident species.

This just goes to show that proper conservation can be practiced in tandem with productive plantations, thus creating sustainable jobs while supplying raw materials into value adding downstream industries.

By the way, when we popped in to the Jettison Timber Products sawmill on the Karkloof smallholding from where Brendon runs his business, I spotted the Sampo Rosenlew parked near the woodyard. It has racked up over 16 000 hours and is still going strong, according to Brendon. 🌱



This stream rises on a small patch of grassland that adjoins Brendon Raw's timber plantation high in the Karkloof mountains. It feeds the Gilboa wetland and eventually ends up in the Umgeni River.



The Raw's timber plantation in the Karkloof is teeming with wildlife, including this beautiful impala ram.

Continued on opposite page ►

# NCT

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# Building a sustainable, diversified timber business

Commentary from Craig Norris, NCT's Forest Technology Manager

Brendon comes from farming stock in the Kokstad area, however his father sold the family farm and relocated to a smallholding in the Karkloof. Brendon met Ninette during her schooling years and in their early 20s they decided to settle on the family smallholding.



Harvesting operations are motor/manual using labour to fell and cross-cut and debarking mechanically.



This is the only Sampo Rosenlew purpose-built harvester operating in SA. Brendon bought it more than a decade ago and it is still going strong, debarking felled timber in the Karkloof.

Durban Wood Chips, Sappi Saiccor and their own sawmill. The sawmill operation is extremely well run with no waste being generated and a clean and safe environment. The entire operation is under cover with concrete floors - a necessity in the Karkloof. The mill produces 60 cubic meters

of lumber a day, including structural timber and industrial timber. The lumber is kiln dried and structural timber is CCA treated. Low grade lumber is used for 'throw away' pallets, saw dust is used to produce bricketts and any other waste is used to fire up kilns to dry lumber. They have

established other businesses such as a garden accessory outlet and a sawn timber retail outlet to create new markets for their lumber. These businesses have been established and 'handed over' to relatives and are now very successful stand-alone enterprises.

Silviculture on the farms is of a high standard with species being planted according to site and market requirements. Most of the farms experience occasional snowfall and regular frost events. In addition, diversification of markets is part of their farming strategy. This means that numerous species need to be carefully matched to site conditions. The main species include *P. patula*, *P. gregii*, some pine hybrids, *E. smithii*, *E. nitens*, GxN hybrids, *E. benthamii* and *E. badgensis*.

Harvesting operations are motor/manual using labour to fell and crosscut, de-barking is done mechanically. Heavy brush is stacked in piles to be burnt after heavy rain under cool conditions, lighter residues are left to form a mulch. This system is very effective in reducing fuel loads while also protecting soils.

An exceptional aspect of their farm management is their passion for protecting the environment and biodiversity. About half of their landholdings are managed as open areas and include grasslands, wetlands, bush and forest patches. Wetland and riparian areas have been delineated, wattle jungle/weed patches have been removed and rehabilitated and some plantations have been removed to create biodiversity corridors between open areas. The open areas on the Karkloof management unit are in the process of being declared a nature reserve. This management unit has healthy populations of black wildebeest, red hartebeest, eland, zebra, blesbuck, impala, reedbuck and bushbuck. In addition, rare species such as oribi, aardvark, serval, blue, crowned and wattled crane use the farm as a habitat.

Brendon and Ninette have built up a successful forestry business through hard work and an acumen for identifying opportunities and acting on them. Diversification and own operations have been important strategies in achieving this success. In addition, they have done this with a commendable social and environmental conscience, truly worthy recipients of the 2021 award. 🌱



The Jettison Timber Products sawmill produces structural and industrial lumber, utilising timber grown on their own farms.



Jettison Timber Products Sawmill Manager Kim Harty.

# NCT

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# Wonderful wattle in Matimatolo

NCT's Small-Scale Tree Farmer of the Year for 2021 demonstrates how to establish and build a sustainable tree farming operation in faraway Matimatolo, near Kranskop in the KZN midlands ...

By Samora Chapman

Matimatolo is a small tribal area in the KwaZulu-Natal midlands, which lies on an escarpment 850 metres above sea level. It's a remote rural area, where job opportunities are scarce and infrastructure is limited. However the rainfall is good and the land is fertile and abundant. In this area, and many others like it, small-scale forestry and farming can sustain families and communities - if it is done right.

Introducing husband and wife team Nomthandazo Hlombe and Fisokuhle Ngcobo, who together run an efficient 6ha wattle farm that supports the family, provides jobs and inspires others to make better use of their land.

Nomthandazo is the recipient of the NCT Small Grower of the Year Award for 2021, a proud achievement for her and her husband, who have worked side-by-side to improve and grow their business from humble beginnings to the sustainable enterprise that it is today.

Mr Ngcobo has been growing trees for 27 years, learning the practice from his neighbour, who was the first person in the area to establish a sustainable timber farm. In 2000 he married Nomthandazo Hlombe and introduced her to the business of growing trees. She learned fast and took over many responsibilities – land preparation, accounts, marketing and planning, allowing Mr Ngcobo to focus on planting, labour, maintenance and harvesting.

Together they grew their operation from 1ha to 6ha, which is spread out in the form of small plots within a kilometre of their homestead. The wattle stands are fenced, meticulously maintained and planted in neat



Husband and wife team Nomthandazo Hlombe and Fisokuhle Ngcobo, NCT's Tree Farmers of the Year 2021 (Communal farm category) with their awards and prize.

rows - in stark contrast to the neighbouring wattle and bramble jungle!

"Unemployment is the biggest challenge here, but the youth do not see value in farming," says Mrs Hlombe as she sits under a shady avo tree with her husband. She is nursing a beautiful baby girl, while chickens walk about the yard chasing anything that moves. It's a typical scene of rural life in KwaZulu-Natal. A few wattle poles are stacked alongside the homestead, readily available for neighbours to pop in and buy on an informal basis.

"We lead by example, showing our community that you can make a good living growing trees," she goes on. "We encourage youth to get an education first, but it's good for them to know that if you work hard you can run a successful tree farm. The land is full of opportunity."

Vusi Dladla, NCT's Development Services Manager commented on Mrs Hlombe's journey to becoming one of the top small-scale tree farmers in the area: "Her claim to fame was the

use of naturally regenerated wattle seedlings to plant up new areas," he explained. "This was a learning curve since she was planting non genetically improved material. But with limited financial resources, she managed to expand her timber area from a small field to the six hectares under timber production today. When NCT and NTE introduced a wattle replanting programme she grabbed the opportunity and made a success of it."

## Wonderful Wattle

Mr Ngcobo discusses the many wonders of the wattle tree. "Wattle is a very profitable crop – it has many benefits," he says in his quiet way. "We sell the timber to NCT and the bark to NTE. Thinnings can be used for fencing and firewood. We also grow cabbage, potatoes, spinach, madumbis and chilli, which we sell at the local market and use to feed our family."

Winning the NCT Small Grower of the Year came with a brand new STIHL chainsaw. "I'm so proud and happy that we won this award,"

says Mr Ngcobo, beaming. "Although I have been using a chainsaw for over 20 years, this is the first time having our very own machine. We usually hire machines, they are expensive and in bad condition!"

Mr Ngcobo says that the support and guidance of Eza Mapipa (NTE's Forestry Development Officer) and Cliff Walton (NCT's Greytown District Manager) has helped their business immensely. "The partnership helps steer us in the right direction," he explains. "We communicate all the time, so we can see where we are going. We have direct access to the market, which means we get paid the correct rate for our timber and bark."

## Project Regen

Mr Ngcobo and Mrs Hlombe are part of a small-grower development initiative called Project Regen, which was first established in Zululand in 2012, and launched in the Matimatolo area in 2018. NCT supplies member small-growers with seedlings and NTE supplies chemicals for land prep, as well as offering technical advice on how to improve production, manage diseases and burn firebreaks.

Seedlings are sourced from CPS and delivered directly to small growers to minimize stress on the plants. "The eMatimatolo area is particularly well suited to black wattle," says Cliff. "We choose cool days for planting, which happens in spring when there is plenty of rain in this area. We don't plant with any gels, only water and we leave fertilizing up to our small growers, although we advise where needed. We require that all growers fence their plots to ensure protection from goats, cattle (and even rabbits) which roam the area."

It made perfect sense for NCT and NTE to collaborate on supporting small growers in the area, to help secure a consistent and quality supply of timber and bark in the region.

"Project Regen is all about getting these small growers to be more sustainable," explains Cliff. "What's amazing about Mrs Hlombe and Mr Ncobo is that they always take initiative, they ask questions when they have problems and they take pride in their work. Mrs Hlombe makes sure their GST is signed annually and their requests are placed at our office. She is



Fence made with home-grown wattle posts keep the cattle out, and a well-maintained firebreak keeps the trees safe from fire.



NCT's Greytown District Manager Cliff Walton (left), NTE Forestry Development Officer Eza Mapipa (centre) and Nomthandazo Hlombe discuss business in one of Nomthandazo's young wattle compartments. She sells the timber to NCT and the bark to NTE.

“We encourage youth to get an education first, but it's good for them to know that if you work hard you can run a successful tree farm. – Nomthandazo Hlombe”

certainly very organised!

"They concentrate all their energy into building their own areas, whether it is wattle or other forms of agriculture and are certainly pure farmers from that point of view," continues Cliff. "Many other small-scale farmers in the area are non-sustainable and harvest their small patch of wattle or gum and then have to buy and sell from other people around them whilst they wait for their plantation to come back into

maturity. Mrs Hlombe and Mr Ncobo have slowly increased their average yield per ha and we expect their yields to increase in the future. Their wattle plantations reflect all their hard work. As a unique team they manage to achieve superior results and are a shining example of what can be achieved. Whenever we visit, they are busy adding value to their forestry/farm operations and always appear happy and humble."

Continued on page 65 ►

# NCT

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# Forestry and the carbon economy

By Gaynor Lawson

Illustrations courtesy of [www.forestrysouthafrica.co.za](http://www.forestrysouthafrica.co.za)

Dealing with carbon dioxide is big business, but if your business is forestry, nature does it for you. How can forestry benefit from this process and stay ahead of the curve?

Carbon forestry and carbon taxation are topics that have the potential to start a bar fight, depending on who is in the bar at the time. It's a discussion that is becoming increasingly significant as we see the impact of global climate change on the planet and as governments across the world implement measures to try and change the way we live so that we can reduce the impact of our global footprint. There's something in the local news almost every week about this contentious matter...

On 9 September this year, E Biz Blitz carried a Reuters-based story headed, 'Turning atmospheric carbon into Icelandic stone'. Apparently, the world's largest plant, which removes carbon dioxide directly from the atmosphere and deposits it underground, is due to start operation within a few days. "Swiss start-up Climeworks, which specialises in capturing carbon dioxide directly from the air, has partnered with Icelandic carbon storage firm Carbfix to develop a plant that sucks out up to 4 000 tons a year of carbon dioxide. That's the equivalent of the annual emissions from about 790 cars ... Direct air capture is one of the few technologies extracting carbon dioxide from the atmosphere and is viewed by scientists as vital to limit global warming, blamed for causing more heatwaves, wildfires, floods and rising sea levels. There are currently 15 direct air capture plants operating worldwide, capturing more than 9 000 t/y of CO<sub>2</sub>, according to the IEA."

Dealing with carbon dioxide is big business. In mid-August, Engineering News reported on our country's first internationally-recognised carbon offset programme that was launched by the Climate Neutral Group (CNG), an environmental consultancy focusing on the agricultural sector. Farmers are being encouraged to apply to the AgriCarbon Programme before September 30 2021, "to maximise their carbon credit income for



accumulating carbon in their soil over the past five years and receive their first payment as soon as 2022". This is a global milestone in carbon trading - the project is the first to be approved for Verra Pipeline Listing using the new Verra carbon methodology, 'VM0042: Improved Agricultural Land Management'. The programme apparently streamlines processes, assisting farmers by determining the amount of carbon credits generated on a property via soil data received, enabling them to focus on their core business while offering them an invaluable new source of income.

On 24 August, Moneyweb featured another Reuters' story, headed 'SA aims to bring pilot carbon capture project online in 2023'. It revealed that work has started on geological mapping at the country's first carbon capture and storage (CCS) site, situated near the town of Leandra in Mpumalanga, close to several coal-fired power stations as well as Sasol's Secunda coal-to-liquids fuel plant, all major emitters of carbon dioxide (CO<sub>2</sub>). David Khoza from the Council for Geoscience (CGS), who is the executive manager for the project, explained in the article that the concept is to "link a pipeline transporting compressed CO<sub>2</sub> from major emitting sources such as Secunda, directly to the identified injection site that is overlain with an 'impermeable rock cap'...We will test

the feasibility of injecting between 10 000 to 50 000 metric tons of CO<sub>2</sub> (a year) to a depth of at least 1 km, with the first injection seen late in 2023." This just happens to be the deadline for a \$23 million World Bank grant to fund the CCS project - originally set for December this year, but now extended to June 2023.

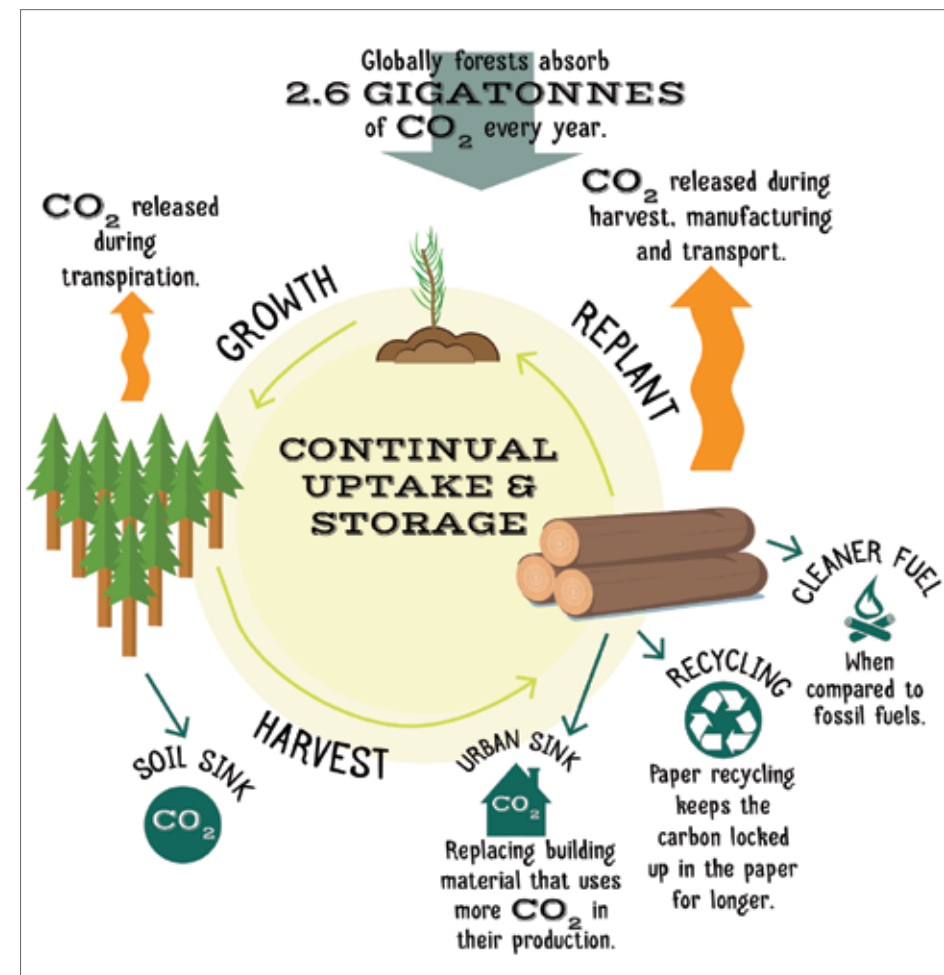
CCS is a controversial process. Backers from the international coal industry say that it is a way to attain the goal of a net carbon zero world economy by 2050. Naysayers include environmentalists, who believe that CCS is nothing more than an excuse to keep on mining and using fossil fuels, and could be a distraction from, as the article says, "nature's own carbon capture system, forests, which also sustain biodiversity and rainfall".

So how do forestry and carbon trading work, and do they really work successfully together to address the problem of global climate change?

## Carbon forestry & carbon trading

Carbon forestry is based on the fact that during photosynthesis, a growing tree absorbs and converts carbon dioxide from the atmosphere into carbon in the tree's biomass. It may be stored within the tree structure - including its wood, leaves, and roots - above and below the ground, in organic matters such as dead wood and plant litter, and in the soil. The storage capacity is variable and is affected by environmental factors such as climate, topography, soil type, moisture, temperature and land use. Soil is the largest carbon reservoir, constituting 50% to 80% of total carbon stored.

So-called carbon trading sees carbon tax credits being earned by companies/tree-growers that can be sold to those who produce higher levels of emissions of greenhouse gases or GHG through various (usually industrial) processes. The Carbon Tax Act identifies six main greenhouse gases that are emitted from industrial activities: Carbon Dioxide (CO<sub>2</sub>) Methane (CH<sub>4</sub>), Nitrous Oxide (N<sub>2</sub>O),



“The amount of CO<sub>2</sub> stored each year in a tree can be calculated and then sold on the international market in units equivalent to tonnes of CO<sub>2</sub>, which is known as a carbon credit.”

Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs) and Sulphur Hexafluoride (SF<sub>6</sub>). These greenhouse gases are problematic as they act like a thick blanket, trapping warmth from the sun within the earth's atmosphere and causing a rise in global temperatures.

Each greenhouse gas causes a varying degree of harm to the atmosphere when compared to CO<sub>2</sub>. This degree of harm is referred to as the Global Warming Potential (GWP) of a greenhouse gas, and every greenhouse gas has its own GWP factor that was developed by the Intergovernmental Panel on Climate Change (IPCC). For example, 1 kg of methane causes 23 times more global warming than 1kg of CO<sub>2</sub>, while 1kg of Sulphur Hexafluoride causes 22 200 times more global warming than 1kg of

CO<sub>2</sub>. To calculate a factory's total greenhouse gas emissions, the quantity of each greenhouse gas (kg/year) is multiplied by its GWP factor and these six numbers are totalled. This figure is the "Carbon Dioxide Equivalent" or CO<sub>2</sub>e. [Source: Yellow Tree consultancy]

Dry wood is almost exactly 50% carbon by weight. It takes 3.67 tonnes of CO<sub>2</sub> to make one tonne of carbon, so each tonne of dry wood has sequestered approximately 1.8 tonnes of CO<sub>2</sub> in its formation. The amount of CO<sub>2</sub> stored each year in a tree can be calculated and then sold on the international market in units equivalent to tonnes of CO<sub>2</sub>, which is known as a carbon credit. [Source: Roger Dickie New Zealand Limited]

## Is carbon trading happening already?

Carbon markets are active throughout the world. According to the Roger Dickie New Zealand Limited website, "In 2007 carbon trading sales of US\$64 billion were transacted around the world. In 2011, that figure had grown to US\$176 billion. An 'ideal' carbon sequestration (commercial) forest is one where the owner is able to sell carbon credits each year until the forest sequestration rate plateaus, at which time the forest could be harvested and the harvest revenue used to repay the carbon liability. The forest could then be replanted and start sequestering CO<sub>2</sub> for another rotation of carbon sales."

## Why is this so important?

Global warming is a fact, despite what some people believe, or say they believe, and it's humans and our behaviour that are causing it. Carbon dioxide is the most significant of the greenhouse gases, and its concentration in the atmosphere has increased by 31% since the beginning of the industrial era, with around 30 billion tonnes being released annually. The World Bank estimates that carbon dioxide emissions are now 60% higher than they were in 1990 and are growing at a rate of about 2.5% a year. Unless this changes, the Intergovernmental Panel on Climate Change warns, global mean surface temperatures will probably increase by 4.8°C in 2100, compared with preindustrial levels.

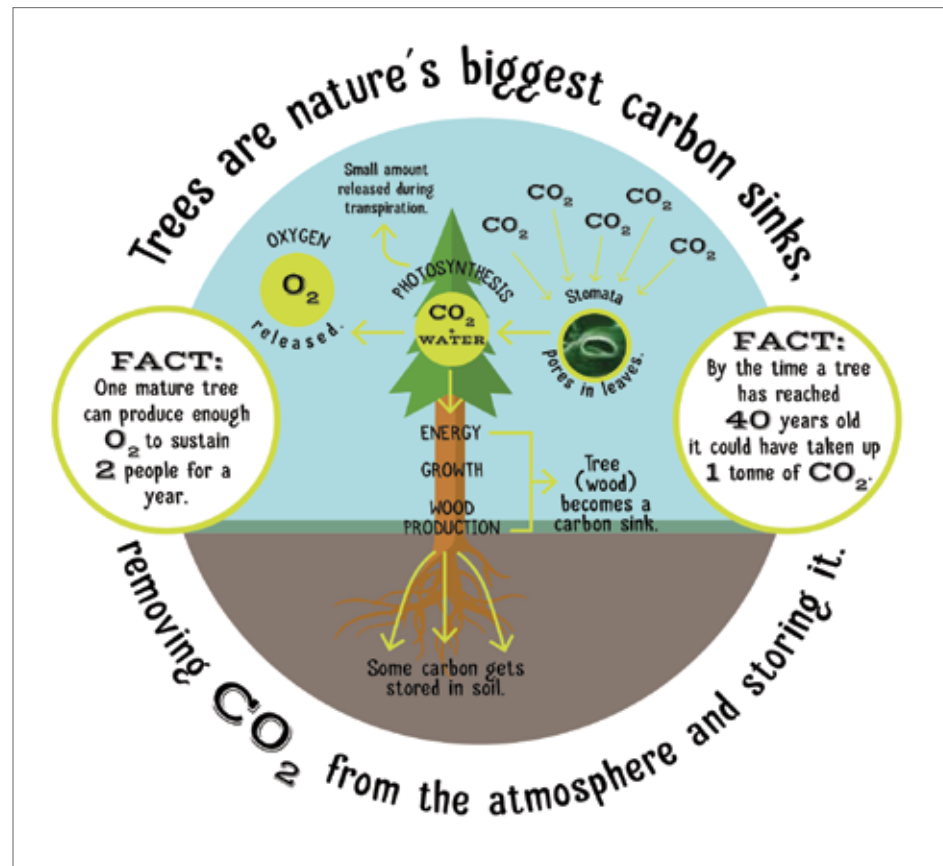
The result is higher annual temperatures, with more frequent and extreme weather events such as storms and floods, cyclones, droughts and heatwaves. According to Oxfam, the number of climate-related disasters has tripled in the past three decades, with over 20 million people being forced to flee their homes every year because of the impact of climate change.

In terms of local agriculture, climate change will increasingly affect rainfall patterns and increase evaporation rates; cause higher temperatures and more pests, diseases and changes in diseases and pest distribution ranges; reduce crop yields and cause a shift in prime growing regions. Agricultural Business Chamber chief economist Wandile Sihlobo recently explained that the effects of climate change are already evident in South Africa and the wider sub-Saharan Africa region, manifesting in more droughts and more intense, but less frequent,



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*The best strategy to maximise carbon storage is to maintain forests/plantations in an active growing phase.* ”



rainfall. These weather changes impact on agricultural output and the timing of harvest seasons, wreaking havoc on food security and logistical planning. Madagascar is currently requesting international aid to help feed its people, after devastation caused by drought (the worst in 40 years), sandstorms and locusts, which destroyed 60% of its crops.

Higher temperatures are already having a negative impact on both natural and commercial forests, which are lauded as the 'green lungs' of the planet, trapping and storing carbon dioxide and thereby helping to mitigate the negative effects of climate change. However, studies indicate that it can take up to 100 years for  $CO_2$  released from current bioenergy generation to be fully compensated by forest regrowth. [Source: Nature Communications - article from 22 June 2021, 'Commercial afforestation can deliver effective climate change mitigation under multiple decarbonisation pathways']

### The local situation

The Carbon Tax Act No. 13 (Gazette No. 42483) came into effect on 23 May 2019 as a way for the South African National Treasury to tax activities that release significant amounts of greenhouse gases (notably, energy and chemicals giant Sasol is the country's second-largest emitter). The Act also aims to promote change by rewarding entities that use energy efficiently through the incorporation of tax-free incentives and encouraging investment in energy-efficient, low-carbon technologies.

The Act was structured to be phased in over several years. We are currently in Phase 1 (1 June 2019 to 31 December 2022), with Phase 2 running from 2023 to 2030. The first phase focuses on activities that directly emit greenhouse gas emissions, with various allowances/exemptions. The commercial timber sector is exempt until 2024, although the associated value chain is not exempt. Some forestry companies, however,

have disclosed forestry emissions/removals to the Department of Forestry, Fisheries and the Environment (DFFE) and National Treasury since the inception of the Carbon Tax. Currently, the regulatory environment does not make provision for carbon trading in South Africa, although the Act includes an allowance of 5 - 10% for carbon offsets for companies to reduce their tax liability by investing in mitigation projects in sectors that are not directly covered by the tax that includes the forestry sector.

However, carbon storage is finite, according to Dr Ronald Heath, Chairperson of Forestry South Africa's Climate Resilience Working Group, and once that limit is reached, carbon stocks will be maintained until the trees start dying from old-age, stress or disturbance. It is suggested that the best strategy to maximise carbon storage is to maintain forests/plantations in an active growing phase (the maximised rate of carbon uptake), and to store carbon in long-lived harvested wood products, rather than storing the carbon in the forest at much greater risk of release back to the atmosphere due to disturbances such as fires. A similar principle exists with adding carbon to forest soils, which can increase soil C storage (mostly in degraded soils) until a limit or equilibrium state is reached. With this in mind, the forestry industry is in discussions with government to gain credit for carbon stored in harvested wood products.

### Commercial forestry and the carbon factor?

Commercial forest plantations in South Africa cover approximately 1.24 million hectares, representing approximately 0.98% of the country's landmass, and include exotic fast-growing Pine (49%), Eucalyptus (44%) and Wattle (7%), with the species of pine and eucalyptus varying according to factors such as region and climate. Planted areas account for around 70% of the forestry landscape, with natural, unplanted areas often included in sustainable and socially-responsible management programmes in line with the standards of Sustainable Forest Management (SFM) and Forest Stewardship Council (FSC) certified plantations.

Sustainable harvesting is important as it reduces the potential damage caused by pests and diseases and limits the build-up over time of the fuel load.

Dr Heath emphasises that, "In South Africa, trading in carbon is currently not practiced, so

### The CARBON STORED in trees OFFSETS the amount released during:

Harvesting



Processing



Manufacturing



Transporting



the forestry sector is aimed purely at timber production ... this means that the threats of pests, diseases and fires are actively managed."

But the looming implementation of a local carbon tax is starting to stir a change in behaviour. Heath explains, "To reduce emissions and the risk of soil degradation, companies are investigating alternatives which are often more costly, for example alternatives to burning of harvest residue. A carbon tax will also be an incentive to utilise harvest residue for bioenergy or biofuel generation."

### Diversity versus abundance

Apparently, it does not matter what species of trees are considered for carbon storage. According to a report from the University of Geneva from November last year, "Inventory data from natural forests on five continents shows that species diversity is optimal for equatorial and tropical rainforests, and that, conversely, in forests located in cold or dry regions, it is the abundance of trees and not their diversity that favors the recapture of  $CO_2$ ."

Originally it was thought that a wider diversity of plant species "allows for denser stacking and niche compartmentalisation that promotes the abundance of trees within a forest and that this abundance increases the forest's carbon storage capacity. But another hypothesis suggests that it is not diversity that allows tree abundance but the availability of energy substrate. Areas with higher energy content allow more trees to thrive per unit area and thus increase carbon recapture" according to the University report.

"Having more species may not always be what is needed to achieve greater carbon storage in forests," states Dr. Madrigal-Gonzalez. This only seems relevant in the most productive forest regions of the planet - mainly equatorial

and tropical rain forests, and some temperate forests in regions where deforestation and human-induced forest fires have recently ravaged pristine environments. "On the contrary, in the forests located in the coldest or driest regions on Earth, it is seemingly the abundance (of trees), promoted by productivity that determines the diversity. Here, any increase in the number of species will not necessarily result in more trees and will not therefore have a big contribution to carbon storage."

The report advises that "These findings ... will aid decision-makers identifying nature-based climate-change mitigation strategies to successfully use forests and their sequestration of carbon to reach the climate goals defined in the Paris Agreement."

In a nutshell, the findings indicate that single-species plantations can be equally or more effective in achieving carbon storage compared to natural forests.

### Government plans

In May this year, Mineral Resources and Energy Minister Gwede Mantashe, while announcing plans to request proposals to secure over 9 000 MW of additional energy capacity, noted that South Africa has 'vast reserves' of coal and petroleum sources that continue to be tapped to ensure the security of the country's energy supply. "In an alternative universe, one would immediately eliminate fossil-fuel-generated energy such as coal and petroleum. However, this is not our reality; our reality is that we have vast reserves of coal and petroleum resources which we continue to exploit," said Mantashe. However, he confirmed that government has begun investing in clean technologies to support the country's move to a low-carbon economy.

Barbara Creecy, SA's Minister of Forestry

“

*Single-species plantations can be equally or more effective in achieving carbon storage compared to natural forests.* ”

and Fisheries and Environmental Affairs, writes in her article, 'Mitigation, adaption and means of implementation the keys to success of COP26' [News24, 10 August], that "climate-related events in recent years have shown that no country will be immune to both extreme and slow-onset weather events. In this regard, South Africa is committed to joining many other countries in doing our part to reduce carbon gas emissions. We are in the process of revising our Nationally Determined Contribution to reducing emissions and will submit this ahead of COP 26 in Glasgow in November of this year..." There is apparently an aspiration by our government to achieve net carbon zero emissions by 2050, in line with the vision of the EU. But we cannot do it on our own.

She continues, "...the main focus should be ensuring robust accounting rules, and ensuring the share of proceeds from internationally transferred mitigation outcomes to finance adaptation efforts of developing countries. Emerging markets require an estimated \$3-4 trillion annually in low-carbon investments over the next 15 years to operationalise and implement the current round of updated Nationally Determined Contributions (NDCs) and to prepare a second updated NDC in 2025. Developed countries need to ensure access to long-term, predictable, and affordable finance for developing countries. With regard to the \$100 billion commitment from 2020 through to 2025, it is imperative from the perspective of restoring and maintaining trust and transparency that the Conference of Parties assess whether the goal of mobilising jointly \$100 billion per annum has been achieved. As a reflection of ambition and progression, we must initiate deliberations on setting a new collective quantified mobilisation goal before 2025 from a floor of \$100 billion per year from both public and private sources,



taking into account the needs and priorities of developing countries. In this regard, we require that Parties at COP26 agree on a clear road map outlining milestones towards setting this goal."

### What is happening abroad?

Decision-makers in Europe have already drafted plans to build up the EU's forests, grasslands and other natural "carbon sinks" that absorb carbon dioxide from the atmosphere to help curb climate change, aiming to achieve "net zero" emissions by 2050, which means emitting no more greenhouse gases than can be balanced by removing gases from the atmosphere. According to an article in The Daily Maverick on 6 July this year, "EU forests, grasslands, croplands and wetlands altogether removed a net 263 million tonnes of CO<sub>2</sub> equivalent (CO<sub>2</sub>e) from the atmosphere in 2018, according to the European Commission. That tally also accounts for the amount of CO<sub>2</sub> released when trees were cut down or wildlands burned." The Commission, the executive arm of the EU, intends giving each member state a legally binding goal, requiring enhanced formal protection for forests and wildlands, "which have shrunk due to logging, demand for biomass energy and threats worsened by climate change such as wildfires and pests".

The new draft policies replace current commitments to ensure that CO<sub>2</sub> sinks do not shrink this decade, and will be hammered out by member states and the European Parliament in a to-and-fro negotiation that could take up to two years. It is part of a far-reaching plan to make Europe a "climate-neutral continent", the first in the world, by 2050, with a revised 2030 emissions-reduction goal raised from 40% to at least 55% from 1990 levels.

The EU also plans to establish a "system of carbon removal certificates, which farmers and foresters could sell to polluters needing to balance their emissions – creating a financial incentive to store carbon. From 2031, the EU would also begin accounting for agricultural emissions of gases including methane – another potent greenhouse gas – in its net carbon sink tally. EU agriculture emissions have not decreased since 2010. The proposal is ... part of a broader package of climate policies whose main thrust will be cutting CO<sub>2</sub> emissions from sources such as vehicles, factories and power plants." [Source: The Daily Maverick, 6 July] There are also plans to phase maritime transport into the EU Emissions Trading System



from 2023.

It's not all airy-fairy idealism...there is real money at stake. According to an article in the Business Maverick of 28 June this year, the price of carbon in the EU Emissions Trading System (ETS) has "doubled over the past two years as Europe stepped up its climate ambition, luring in financial investors. The benchmark emission permits surged to a record 56.9 Euros per metric ton last month and some hedge funds predicted it could reach 100 Euros before year-end."

Under the draft law, the Commission intends improving the Market Stability Reserve, or MSR, that helps control excess emissions permits. "The reserve's parameters would be modified to introduce a 'buffer MSR intake' when the number of carbon permits in circulation is between 833 million and 1.096 billion. In that case, the amount of permits to be absorbed would be the difference between the number of permits in circulation and the 833 million threshold. As long as there are more than 1.096 billion allowances in circulation, including permits for aviation, the intake rate would remain at 24% until 2030. To offer investors more predictability about permits held in the reserve as of 2023, their number would be limited to 400 million. Allowances above that level would be invalidated."

There is a 'greener' vision as well. "To alleviate concerns about the costs of the green transition, the Commission wants to change the way the governments use revenues from auctions of carbon permits and bolster ETS-based mechanisms to fund low-carbon technologies. EU nations would have to use all the revenues for climate-related purposes, including support for low-income households' sustainable renovation. The EU would also strengthen

a special ETS-based fund for modernisation in low-income member states. It would get revenues from auctioning an additional 2% of the cap to fund the energy transition."

### Will commercial forestry be able to alter climate change?

A recently released study, as reported in Nature Communications in 'Commercial afforestation can deliver effective climate change mitigation under multiple decarbonisation pathways', says that it reveals "new evidence on the comparative long-term (100-year) GHG mitigation efficacy resulting from the establishment of commercial forests and conservation forests on grassland in the UK". The study demonstrated "the comparatively high long-term GHG mitigation efficacy of commercial forests compared with unharvested conservation forests", and determined that "forest growth rate is the most important determinant", irrespective of whether trees are harvested. Ultimately, the study found, "Even after heavy discounting of future product substitution credits based on industrial decarbonisation projections, GHG mitigation from harvested stands typically surpasses unharvested stands. Commercial afforestation can deliver effective GHG mitigation..."

So in conclusion: trees are seen as a vital element of the battle against greenhouse gases (GHG) and the potential impact of climate change on the world and its people. Any trees, anywhere, are good for carbon capture. But as concluded above, it appears as if harvested stands are even more effective. The forestry industry in South Africa is an inescapable part of the country's efforts to reach that goal of achieving net carbon zero emissions by 2050... 🌱

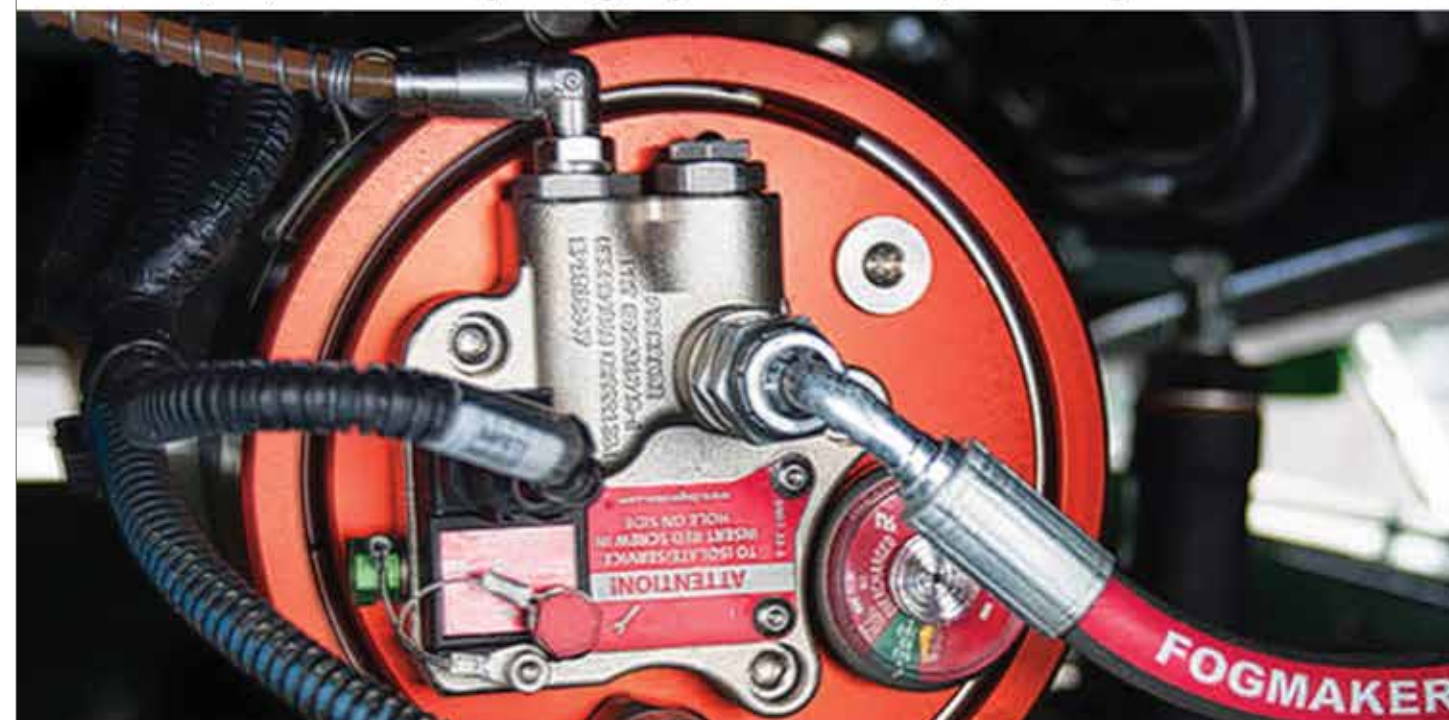
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Renewing the WWF-Mondi Partnership in 2008, and still going strong in 2021 (left to right) David Lindley, manager of the WWF-Mondi Water Stewardship Partnership, Viv McMenamin, CEO of Mondi SA and Morne du Plessis, CEO WWF.

# Mondi and WWF's water stewardship journey

Mondi has adopted a partnership approach to align their growth plans with sustainable development goals ...

The last of the UN Sustainable Development Goals is SDG17 – Partnership for the Goals and it is an acknowledgement that the Global Goals can only be met if we all work together. But this is easier said than done – who should one collaborate with, for how long and what does it involve? How does one measure success and ensure that both sides of the arrangement get what they need out of the collaboration?

The partnership between the global packaging and paper group Mondi and WWF is one such partnership that has demonstrated the value of collaboration by working beyond their fenceline to strengthen freshwater stewardship in South Africa at a landscape level.

The collaboration has lasted two decades

and emerged from an industry-wide initiative to conserve wetlands in South Africa, explains David Lindley, manager of the WWF-Mondi Water Stewardship Partnership at WWF South Africa.

"We are a very dry country and water is our biggest limiting factor. Wetlands are very important in managing water resources, but they were being affected by plantation forests, agriculture and other sectors," he says.

"Plantation forests are the only crop in South Africa that are regulated by the government, because of the water risk they present. We're a grassland country, not a forest country, and pulp mills use significant amounts of water," Lindley points out.

Wetlands shrink during the dry season and expand in the wet season, he says, so their

## Water stewardship

Mondi recognises the critical importance of water stewardship and distinguishes between consumption and use.

### Fact check

- Of Mondi's total water intake, 93% is returned to the environment;
- In 2020, Mondi was recognised by CDP (Carbon Disclosure Project) with a 'Triple A' score on their environmental performance on climate, forests and water security;
- Mondi is a member of the Alliance for Water Stewardship to tackle climate change impacts on water security.

boundaries move. These buffer zones were being affected by agricultural and plantation activity and so WWF started working at an industry level to ensure that the wetland buffer zones were undisturbed.

"In 2001, Mondi was the first company to stand up and say 'we will help you and work to bring others along,'" says Lindley.

"As a significant landowner and an influential player in the South African forestry sector, Mondi has a lot of influence with other companies in the industry that we would not otherwise have access to," Lindley points out. "It is impossible for us to do what we are trying to achieve without partners."

Over time, the partnership expanded beyond the fence line to focus on broader landscape management and to work with other stakeholders in other sectors. This approach strengthened Mondi's water stewardship and management practices. Then it evolved further to tackle shared sustainability challenges around the world - for example in Russia and Bulgaria.

"We work with other forestry companies as well, helping them to manage their water and land resources more effectively. We also help them to understand that water is a critical business risk and that they need to work with their neighbours because water needs to be managed at a catchment level," Lindley says.

"It's quite an undertaking because a lot of companies only work within their own boundaries and it can be very difficult to get them to see beyond that. That's what is so good about working with Mondi – they don't just focus on the two catchment areas in South Africa where they have mills. They look beyond their own operations and take a more holistic view. They are helping WWF to strengthen freshwater stewardship for the greater good of the country. Not many corporate partners work in this way."

The relationship has not all been plain sailing, he stresses. "We have had our differences over the years. The industry was going through tough times about a decade ago, and it coincided with changes in Mondi's environmental team. But like any healthy partnership, we communicated and talked through the issues and resolved them."

There have also been times when WWF has had to ask some difficult questions.

"When you have a corporate partnership with a company, you have to balance it all the time in order to maintain your independence. Sometimes, you step over that line but it can be



Working together to protect water resources (left to right): Candice Webb from Mondi SA, David Lindley from WWF, Denis Popov from Mondi AG and Michelle Hiestermann from Water Research Commission.



Mt Gilboa is an important wetland on a Mondi forestry estate in Karkloof in KZN. It has been declared a Nature Reserve, which means it is protected for conservation purposes. It is situated at the head of three major river systems that supply fresh water to agriculture, industry and rural and urban settlements all the way to the coast.

“This partnership has changed how Mondi thinks about water stewardship and it has changed how WWF thinks about working with corporates to manage water resources – David Lindley”

hard to see because it happens very gradually. Both partners need to see the benefits and respect the value each side brings."

Overall Lindley believes it has been a transformational partnership.

"It has changed how Mondi thinks about water stewardship and it has changed how WWF thinks about working with corporates to manage water resources."

This partnership has shown that by working collaboratively and openly, we can find the right answers.

## Putting a partnership into action

As a member of the Alliance for Water

Stewardship (AWS), Mondi aims to encourage and recognise good water management.

Working alongside the WWF, Mondi has integrated the AWS International Water Stewardship Standard (AWS Standard) into its 12 pulp and paper mills by introducing a pathway to establish water stewardship practices and standardise the way they are implemented across its mills.

This Group-wide water stewardship standard provides Mondi with a graduated and standardised approach for implementing water stewardship across its mills, based on regular water risk assessments. 🌱



# Research solutions to support forest management

The Institute for Commercial Forestry Research (ICFR) is a non-profit organisation, providing project-based research solutions and related services in support of forest management in southern Africa.

From its establishment in 1947 as the Wattle Research Institute, the ICFR has provided important research support to the South African forestry sector. Its role was featured in the prestigious journal *Nature* (*Nature* n. 4205, 1950). In response to changes in a very dynamic sector, the ICFR has transformed significantly over the years. Today the ICFR provides research capability and applied research solutions to various funding consortia addressing sustainable production and tree improvement objectives. To achieve desired research project goals the ICFR works closely with other research institutes, universities, and other research partners.

In March 2021, the ICFR underwent a reshaping and consolidated once again its profile of expertise, skills, and facilities in key research areas based on the needs of current funders. The reshaping coincided with the retirement of CEO Dr Andrew Morris, who was replaced on a temporary basis by Karin Nagel, the institute's business manager.

Currently, the key areas of expertise and research are:-

- tree breeding for wattle and eucalyptus
- integrated pest management
- spatial technologies
- analytical lab analysis

Research leadership is under Dr Julian Moreno Chan for Tree Improvement and Dr Ilaria Germishuizen for the other areas. Researchers are supported by a highly skilled technical team led by Greg Fuller, an on-site research nursery, a well-equipped analytical laboratory, and a library with the most comprehensive collection of forestry related publications in the country including ICFR publications and document archive. This resource is invaluable to researchers, practicing foresters, academic partners, and students.

## Current funding model

Multi-year research projects and platform funding form the basis of the research focus, from which various short-term value-adding projects and pilot studies evolve. The mandate and expertise of the ICFR also extends to other tree crops (i.e. macadamia nut orchards), particularly where they are a choice for commercial farmers.

## Current multi-year research projects are:-

- wattle tree improvement
- eucalypt tree improvement
- eucalypt forest protection
- baboon damage impact
- wattle tannin properties.

## Short-term projects include:-

- appraisal of harvesting residue potentially available for bioenergy production
- testing the utility of near infrared spectroscopy
- testing seed germination and vigour in a variety of crops
- screening of tannin quality.

## Collaboration and training

A new element that has been steadily growing at the ICFR is its collaborative work with academic institutions and research partners, resulting in an ever growing mentoring and supervisory role for post-graduate students. The ICFR has also been strongly involved in internships and it is now a recognised host institution for the placement of interns by the Department of Science and Innovation (DSI). The mentoring of students and interns adds to the institute's value proposition to the forestry sector, by playing a crucial role in developing highly skilled capacity in key aspects of forestry and forestry research that will be available to the sector.

In addition to the in-house compliment

of scientists, the ICFR has established formal collaborations with key experts in relevant areas of forestry research through the appointment of Prof Brett Hurley (FABI), Prof Keith Little (NMU), and Dr Andrew Morris as research associates.

## Current research projects and platforms Wattle breeding

The Wattle Breeding Programme is focused on developing genetic material with better growth than current planting stock, and resistance to existing and new pest and diseases, frost and other environmental risks. The wattle rust disease emerged in 2013/2014 and is a major threat to the South African black wattle industry. Identification and deployment of genetically rust resistant sources is currently the only alternative to manage this pathogen in black wattle plantations. Alongside the identification of rust-resistant clones, the ICFR has recently established new seed orchards which will produce seed highly-resistant to rust and of superior growth than current planting stock. The ICFR is the sole supplier of improved wattle seed for South African wattle growers.

The development of wattle hybrids between black wattle (*Acacia mearnsii*) and green wattle (*Acacia decurrens*) is a recent focus area in the breeding programme. Unlike *A. mearnsii*, *A. decurrens* is not affected by rust, however, its tannin is of inferior quality and is not favoured by the bark processing factories. Thus, the plan is to develop wattle hybrid varieties with increased rust resistance and acceptable tannin quality.

There is ongoing work to develop genetic stock tolerant to frost and resistant to rust which is a major challenge as such material is very limited in the current breeding population. Genetic improvement for other traits of economic importance include growth, stem form, gummosis resistance and tannin quality.



ICFR Analytical Lab technician Letho Nzimande and Preesha Bridglall from NTE collaborating on a wattle bark research project.

## Eucalypt breeding

Eucalypt genetic improvement at the ICFR commenced in the 1980s. Provenance introductions for a range of eucalypt temperate species that took place in the 1980-1990s have served as base populations for advanced generation breeding at the ICFR and in-house breeding programmes of large companies in the 2000-2010s. In 2018, the ICFR was granted autonomy to utilise all the existing ICFR breeding trials and germplasm stored in seed archives for the benefit of the broad forestry sector. This includes CSIR breeding archives with subtropical eucalypt species recently transferred to the ICFR.

Eucalypt breeding at the ICFR is currently funded by two companies and thus our current activities are aligned to the funders' needs. A group of commercially important species has been identified for further breeding work as well as other less common species that have potential as hybrid partners. The goal is the development of hybrid clones suitable to the different commercial climatic areas and markets/products. Testing existing and new hybrid combinations for a changing climate, new diseases and other environmental challenges are important considerations in the breeding programme.



UKZN plant pathology honours student Melusi Mthetwa testing the use of near-infrared spectroscopy to evaluate *Corymbia henryi* seed quality.

“The Wattle Breeding Programme is focused on developing genetic material with better growth – and pest and disease resistance – than current planting stock.”

The ICFR produces improved seed for a range of important commercial temperate eucalyptus for the local and overseas markets. Improvement level ranges from first to fourth generation depending on the species.

## Forest Protection

The forest protection team provides research-based recommendations based on integrated pest management principles that can be applied to maintain plantations in a healthy and productive condition. Two key aspects of research efforts are (a) the evaluation of the relationship between levels of damage and the resulting losses in productivity, and (b) optimisation of measures of intervention in terms of type, timing, and method. The current focus of this project is on eucalypts.

The Eucalypt Protection project currently comprises of two insect exclusion trials located at the Mountain Home and Hodgsons plantations. Early results have shown that tree growth is negatively impacted by the presence of pests and

diseases. However, the true impact of pests on growth and yield at rotation-end is still unclear.

Therefore, the ICFR is initiating a new, field-based eucalypt canopy pests study seeking to develop a protocol for targeted and effective control of damage founded on the economic thresholds of damage and pest-specific indicators to optimise timing of chemical spraying. The project will focus on the Eucalyptus snout beetle (*Goniapterus* sp.n.2), currently the most prominent eucalypt canopy pest. However, the outcome will be principle-based and can be applied to other defoliators.

The new trials will make use of exclusion plots (treated vs non-treated) to evaluate the impact of the snout beetle on growth and productivity. Specifically, the project aims to:

- Quantify the impact of varying levels of canopy damage on growth of eucalypts
- Develop an “early warning sign system” for proactive intervention based on simple metrics related to the life stages of the pest



The long-term nature of these trials has sparked several collaborative projects. The trials will be used as a study site for *Gonipterus* research projects based at the Forestry and Agricultural Biotechnology Institute (FABI):

1. Remote sensing for early detection of beetle damage, a study run as a collaboration between FABI (Dr Michelle Schroeder and PhD candidate Phumlani Nzuza) and the University of Ghent, Belgium (Dr Renè Heim and Prof Wouter Maes).
2. The identification of constitutive plant metabolites associated with the feeding preference of *Gonipterus* sp.n.2, with Prof Almuth Hammerbacher and Mr Christoff Joubert (PhD candidate)
3. The impact of insecticide on the population of biological control agent *Anaphes nitens*, with Prof Brett Hurley, Dr Michelle Schroeder and Harris Keetse (MSc student)



A current ICFR research project is underway to quantify the impact of baboon damage on productivity, and the resulting economic losses, focusing on Mpumalanga pine plantations.

Information gained from these trials will provide quantitative estimates of yield loss and a simple early detection protocol that will facilitate effective integrated pest management of the *Eucalyptus* snout beetle.

### Baboon damage

For several decades, damage caused by baboons has been a major concern particularly in pine plantations in Mpumalanga. A concerted effort to quantify the damage and resulting economic losses and to understand the triggers of the behaviour leading to the damage was initiated in 2012 through a collaboration between the forestry industry, the ICFR and the University of Cape Town. The project aims to develop the knowledge required for an effective and sustainable baboon damage management strategy and is made of three components:

- Remote sensing for monitoring baboon damage at varying spatial and temporal scales
- Quantify economic losses based on levels and type of damage
- Understand the triggers of this behaviour

The current focus of the ICFR is on the damage impact on productivity and resulting economic losses. To this end, 31 plots have been established during 2015-2017 in pine compartments at varying crop stages and silvicultural regimes. The plots are measured and assessed annually and are producing

“*Baboons tend to damage the bigger trees in a stand, and that damaged trees grow at a slower rate, leading to major repercussions on final yields.*”

invaluable information on the impact on growth and silviculture operations such as thinning selection in sawtimber stands. Results show clearly that baboons tend to damage the bigger trees in a stand, and that damaged trees grow at a slower rate, leading to major repercussions on final yields. In 2021, the project has attracted funding from the National Research Foundation (NRF), which will support a new post graduate study on the impact of baboon damage on timber quality in collaboration with Stellenbosch University. To date, the project has produced four peer reviewed papers, one ICFR technical note, two confidential reports, and 1 graduate at master level.

### Platforms Spatial Technologies

The FSA funded Spatial Technology platform

ensures capacity in GIS and remote sensing-based research in support of ICFR projects, FSA members, industry initiatives, and academic partners. Over the years, the ICFR has developed a strong, trusted relationship with its industry partners, and the spatial technology platform has become pivotal in collaborative projects requiring the sharing of sensitive company information. Among the key industry initiatives where this platform has been playing an important role is the South African Sirex Control programme, the annual *Leptocybe* survey, and the FABI pest and disease database. The platform is strongly involved in research applying remote sensing to monitoring forest health. Extensive work has been done on baboon damage and the wattle rust, and a new project investigating the potential of using remote sensing technologies to monitor ecophysiological aspects of forest health such as evapotranspiration rate monitoring is being initiated as a post graduate study with Nelson Mandela University. In addition, the platform works particularly closely with FABI on several projects requiring geospatial analyses, mapping and georeferencing of insect pests, pathogens, and their biological control agents.

Skills and expertise in spatial technologies are available to FSA members for company specific projects such as the Mondi Site Classification; recently, the ICFR has expanded its realm beyond forestry and, through a collaboration with Macadamias South Africa spatial technologies expertise has been applied to develop a site classification for macadamia orchards.

The spatial technologies platform also plays a very important role in mentoring and capacity development through the supervision of post-graduate students working on a variety of research topics, from process-based productivity models to big data mining and remote sensing of forest health, through close collaborations with UKZN, Stellenbosch University, Nelson Mandela University and Pretoria University.

This platform is responsible for the management of the weather data on behalf of the forestry industry; through a collaboration with FABI and the Pretoria University master's in information technology programme, this invaluable dataset of daily rainfall and temperature data from 1950 to current will soon be available to members via a web-based application.

### Analytical Laboratory Services

There has been no stopping research in the FSA funded Analytical Laboratory platform under the leadership of Dr Richard Burgdorf. While routine analytical services have continued during the lockdowns, providing timeous high-quality data to the research projects and growers that depend on analytical service, R&D in the lab has also resulted in some exciting new developments. The FSA/Sector Innovation Fund Wattle Bark Research project working within the FSA ALS platform has resulted in several new laboratory methods and techniques that are now available to the wattle industry for bark quality assessment. The UKZN MSc student, Presha Bridglall from NTE continues to receive support from the ICFR in the lab and field and the project looks to expand into a PhD project continuing in 2022. The platform also supports UFS Chemistry PhD student Andrea Davis, and the UFS team visited harvesting operations in KZN earlier this year. UKZN MSc student, Nkosi Trywell Mkhize, funded with a bursary from NCT and working in the platform is making strides in developing the use of near-infrared spectroscopy (NIRS) for forestry seedling production. Working with him, UKZN Plant Pathology Honours student Melusi Mthethwa is testing the use of NIRS to evaluate *Corymbia henryi* seed quality. With the close support of the ALS platform, Stellenbosch University PhD student Glen Cooper is nearing the completion of his PhD on the contribution of regolith to plantation production. The ALS platform is also providing UKZN MSc student Kuhlekonke Mathenjwa with support for his project on community forestry of indigenous trees on the WoodRIGHTS Project with Professor Tafadzwanashe Mabhaudhi from the UKZN Centre for Transformative Agricultural and Food Systems. The ALS platform, established at the ICFR with

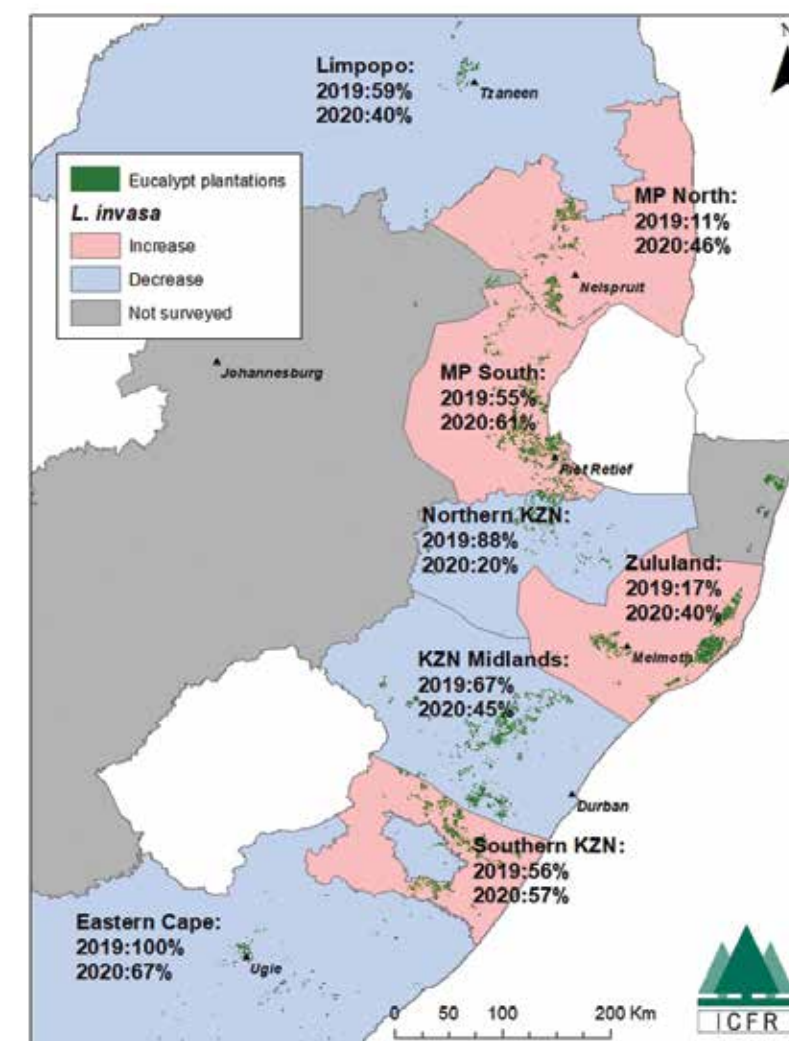


Manager of ICFR's technical services team, Greg Fuller, in the field.

FSA funding continues to grow in services and research areas providing real returns for the forestry industry in South Africa.

### Site resilience

The ICFR continues to play a pivotal role in



the technical aspects of the multi-rotation site resilience project. The pillars of this project are five nutrient depletion trials, which were established to understand the risk of nutrient depletion associated with harvesting and residue management across key lithologies, as well as the ability of these sites to recover, once depleted. As part of the industry effort to monitor the long-term sustainability of its operations, a network of long-term soil monitoring plots is being established across the forestry landscape to benchmark the impact of multiple forestry rotations on soil nutrients.

Thirty plots have been established to date, with about 10 new plots being added each year. This project has a strong analytical laboratory component and relies on the ICFR analytical lab for both routine analyses and the development of novel technique to improve nutrient pool size estimates. The project is part of the PhD of Nkosinathi Kaptein which is a study on the long-term sustainability of commercial afforestation and impact on water and nutrient resources.

### Information Support Centre

Over many years the ICFR has maintained a technical library with collections important to plantation forestry research and management and widely used by FSA members, students and academics at South African tertiary institutes, and various other stakeholders in the industry. The centre offers a valuable source of forestry information for the industry, providing support, storage and access to relevant reports, journals, books, and related literature. 📄

ICFR's special technologies team has produced a series of maps tracking key pests and diseases, this one showing the occurrence of *L. invasa* across SA.





Sappi has developed cutting edge tree breeding technology and nursery capacity to supply improved planting material for their own plantations, and those of their fibre-supply partners.

# Sappi driving sustainability through forestry, manufacturing & beyond

In a year that has been disrupted by the ongoing impacts of the COVID-19 pandemic and lockdowns, as well as a wave of civil unrest in KwaZulu-Natal and Gauteng, global forest products company Sappi has managed to look after the health and wellbeing of staff and contractors, improve efficiencies, build trust through collaborations and outreach and play a pivotal role in developing rural economies.

In an exclusive interview with SA Forestry Editor Chris Chapman, Sappi Forests Vice-President Duane Roothman heaped praise on his team for the way they have adapted to the disruptions that have impacted on business operations this past year. Through “good work and collaboration” between staff, private health care providers and the Department of Health, Sappi has managed to inoculate 4 000 people (at the time of writing) with the COVID-19 vaccine, including in-house staff and contractors.

Another highlight of the year has been the building of trust between the private and



Sappi Forests Vice-President Duane Roothman.

public sectors that has taken place thanks to the “great work” that FSA has been engaged with on the PPGI and the Forest Sector Masterplan. “Progress has been slow but there has been a lot of advancement in building trust and driving participation through public private partnerships, and it is gaining traction,” he said.

Sappi’s collaborations and the leadership role the company plays within the forestry sector and the rural South African landscape is a theme he returned to again and again. Under Duane’s watch it is clear that Sappi won’t shirk its responsibilities both in terms of

growing its own business and in leveraging its position as an anchor tenant in the rural areas by using its expertise and infrastructure to drive sustainability, uplift people and contribute where it can make a difference.

The challenges of 2021 have come from all sides, some foreseeable others not. Apart from the disruptions caused by the third wave of the COVID-19 pandemic, the upsurge of civil unrest that swept across KZN and parts of Gauteng in July resulted in the temporary closure of three mills (Saiccor, Stanger and Tugela) and put pressure on inbound and outbound logistics.

Once again Sappi staff stepped up to the plate joining forces with neighbours to protect people and facilities, assisting the SAPS and providing the SA National Defence Force with vehicles to help them do their job of restoring peace and order.

“People looked after each other. It is a reflection of the goodwill that exists in the forestry industry,” he said.

The Saiccor mill expansion programme was temporarily delayed as a result of these disruptions, but now work is back at full throttle and is expected to be completed in the next few months. This will require Saiccor to ramp up its fibre intake from 8 000 tons a day to just under 10 000 tons a day, which will put greater demands on every facet of the mill operation, including the logistics of timber supply into the mill and getting the product to market through the port of Durban.

## Logistics efficiencies

Inbound and outbound logistics at the Saiccor mill is one of the key focus areas of an on-going drive at Sappi to improve efficiencies, in order to create capacity to handle the ramping up of production at the mill. A big effort went into software development which allows Sappi to integrate the annual plans of operation and break it down into detailed daily, weekly and monthly plans.

“We focused on the Saiccor basin in KZN because of its complexity both on the supply and market sides, so we can run algorithms to optimise our supply and delivery plans into the mills in KZN,” said Duane.

This system will now be rolled out to Mpumalanga to standardise transport planning and execution.

The drive to improve efficiencies across all facets of the business saw a focus on reducing or eliminating short haul operations. This



Healthy wetland on a Sappi Mpumalanga forestry estate ... Sappi has joined forces with WWF to establish a water stewardship programme in the Umkomaas catchment in KwaZulu-Natal.

“Sappi is properly situated to drive biodiversity, socio-economic development and the circular economy in the rural landscape.”  
– Duane Roothman

involves investment in roads infrastructure to allow long haul timber trucks to access in-field compartments thus eliminating the need for that extra short haul transport leg to depots that involves double-handling of timber.

Silviculture operations has been another area of focus for Sappi. This has seen the introduction of mulching across the Zululand plantations, the Highveld and into the midlands, to reduce slash burning operations, protect soil integrity and facilitate early and rapid re-establishment resulting in reduced temporary unplanted areas. Duane said that the rainy season has been arriving later in the year, in November or even December, creating a shorter planting window, and mulching has provided one solution to this problem. It also brings significant sustainability benefits.

The Sappi team has been trialling different slash management options, including the use of chopper rollers which are proving to be effective in pine compartments, as well as accumulation of post harvest slash for supply into biomass energy markets.

Sappi has committed to reducing burning of slash on its plantations by 10% a year, and is already well ahead of this curve.

## Certification and sustainability

In terms of certification, Sappi is the first South African company to achieve certification through the South African Forest Assurance Scheme (SAFAS), which is designed specifically for local conditions and is endorsed by PEFC. Duane explains that they are working hard to enable small-scale growers who supply timber through the Sappi Khulisa programme to engage with certification through the SAFAS platform.

“Certification is really about practical forestry. It’s a big challenge to get our outgrowers certified, which equates to sustainable forestry.”

The Sappi team has also put a lot of effort into small-scale grower development, recognising their importance as fibre suppliers to Sappi mills, but also the impact these small businesses have on stimulating economic activity and development in the rural areas where unemployment is high and formal job opportunities scarce. This effort has included the provision of training and development for contractors who service the small-scale growers.

## Nursery services

Sappi has also developed cutting edge tree



breeding technology and nursery capacity to supply improved material for planting on their own landholdings as well as those of their fibre supply partners. This includes free seedlings for Sappi Khulisa growers. Supplying outgrowers with improved planting material is a win-win as when that timber is harvested it will end up coming back into Sappi's mills.

"We are making our internal seed sources available to drive good quality genetic material into South Africa and Africa."

Duane says that Sappi's nursery expertise and capacity has also made it possible to provide growing out services to the macadamia industry, which is providing an additional source of revenue while building in-house expertise. He says this may be expanded to the avocado industry in future.

He revealed that Sappi has planted around 30 ha of avocados, in partnership with established avo growers, and has plans to expand to around 100 ha in the foreseeable future. They haven't started planting macadamias on Sappi owned land yet, but this will probably happen sooner rather than later.

This does not signal a change in strategy for Sappi, says Duane, it's simply a question of maximising the returns on the land that Sappi owns and manages without compromising their core focus.

### Water stewardship

Sappi has recently joined forces with WWF and engaged in a collaboration with landowners and other stakeholders to establish an exciting water stewardship programme in the Umkomazi River catchment. The health of this catchment is crucial as it encompasses extensive Sappi and outgrower plantations that supply the Saiccor mill, as well as the mill itself. It is also where many own and contractor employees live.

South Africa is a water scarce country and the Sappi team recognises the importance of protecting water resources which are crucial for sustainability, not only for Sappi's own operations but also the livelihoods and health of the people and businesses living and working in the catchment.

Duane explains that the Sappi team has embraced the responsibility of performing an active leadership role not only in the forestry space, but also in the context of facilitating and promoting socio-economic development in the rural areas of South Africa.

He said Sappi has extensive land holding



Harvesting gum, Mpumalanga.



Dissolving pulp, manufactured at Ngodwana and Saiccor mills, is exported from the ports of Durban and Richards Bay.

in the rural areas, and has technical expertise which can be leveraged to drive local economic development and responsible management of the landscape.

### Biodiversity

"Sappi is properly situated to drive biodiversity, socio-economic development and the circular economy in the rural landscape – not just in South Africa but also into Africa and even give insight in Europe," said Duane.

"Sustainable forestry practices in SA is key to drive sustainable development and the circular

economy. We must not miss this opportunity. We are sticking our necks out, and we are expanding our influence into Africa and Europe. We are reaching out to show that forestry works not just for the planet but also for its people. We are developing new biotechnologies and biomaterials derived from wood that don't just make economic sense – it also makes common sense."

Sappi has indeed come a long, long way since its establishment in 1936 with a small mill in Springs that started out making paper from straw. 🌱

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sappi.com





Footage captured by spotter planes can provide key evidence of the origin of wildfires. (Photo courtesy of Zululand FPA).

## A CASE STUDY



# Fire Investigation: Cause and Origin ...

By Dave Dobson, uMziki Forestry Consulting

### Introduction

A wildfire investigation requires that a systematic problem solving process is followed in order to determine the ignition area, cause and sequence leading to a wildfire. Factual data is collected and analysed, resulting in the development of hypotheses that must be tested before the selection of a final hypothesis containing informed conclusions.

### Background

While scientific methods are required when undertaking a wildfire investigation, linear thinking is not encouraged. A linear or event-orientated action is often viewed as being pragmatic, action-orientated and simple. In reality it is often myopic. For example, refuse pits or sawdust piles are a fire hazard. The

solution is to burn around the hazard. The action is simple and decisive; move on to the next problem. But what is the consequence of a fire getting into the sawdust! A feedback approach that encompasses a causal loop diagramme of factors contributing to the wildfire helps to depict the interdependencies, in this case, between the origin and the subsequent wildfire.

The normal procedure that can be expected in investigating a wildfire is that once appointed to the task, the investigator collects data, analyses the data and finally develops and tests a hypothesis regarding the origin and spread of the fire. Reliable empirical data is required and tests need to be applied in an attempt to reject the hypothesis. This is done to ensure that bias does not creep into the work. Only once these steps have been followed can an opinion be

presented regarding the cause and origin of the wildfire.

A further important aspect of a wildfire investigation concerns the qualification of the investigator. If the case goes to court an assessment will be made by the Judge on the admissibility of the evidence or expert testimony. The investigator must be suitably qualified to do the work and must provide evidence that can be tested and that is generally accepted within the discipline.

Finally, while the theory is well and good, not all cases will follow the typical investigative pattern and adjustments will be required to address the circumstances.

### The Problem

I was appointed by a legal practitioner to

investigate, on behalf of the Plaintiffs, the cause, origin and spread of a wildfire that had destroyed crops and grazing on their farms. The fire in question occurred on Saturday 2 July 2011. I was engaged to undertake the investigation on 23 February 2016. Clearly an investigation of the specific origin area and the ignition area was not going to yield much information. To complicate matters further we were denied access to the general origin area of the fire during the in loco visit to the site on 3 March 2016.

An expert report had been prepared for the Defendant which was submitted before I was appointed. This report identified three fires that could have burnt the Plaintiff's properties. Four options were presented for the cause and origin of the initial fire on the Defendant's property. The second fire was identified as having originated from a burnt out vehicle on the boundary of the Defendant's property and the third fire was said to have originated near some informal housing on the second Plaintiff's property.

A further complication was that the photographs accompanying the report were of such poor quality as to render them useless.

### Data Collection

Data pertaining to the fire in the form of witness statements, an accident report, and weather conditions on the day of the fire, together with photographs was obtained.

A FDI 59 (Yellow) was recorded by the local Fire Protection Association for the Saturday morning at 10:00 hours on 2 July 2011 with an average wind speed of 17.3 km/hr. This later deteriorated to a FDI 65 (Orange) by 14:00 hours with an average wind speed of 19.4 km/hr. The wind direction during this time was recorded as being between 2600N and 2700N.

### Cause and Origin of the Fire on the Defendant's Property

Four possible causes and origins for the fire were proposed by the Defendant's investigator. Clearly assumptions were being made and there was a failure to actively seek data pertinent to the investigation. Each of the hypotheses proposed is dealt with individually.

### First Hypothesis: Arson or a Misplaced Cigarette

As this was the first day following payday the suggestion was made that someone traversing

the property might have dropped a cigarette in the unburnt grass resulting in the fire. The Defendant's investigator reported that it was possible (i.e. less than 50% chance) that this was the cause of the fire. For a cigarette to set fuel alight a number of factors need to be present. Firstly the Relative Humidity (RH) at the time needs to be in the range of 0% (likely) to 18% (unlikely). The RH between 10:00 hours and 12:00 hours was of the order of 14% so that under these conditions it was possible for a cigarette to cause a fire. However, other factors need to be taken into account. These are that 30% of the glowing tip needs to be in contact with the fuel (dead grass), the tip should be orientated into the wind with the tip angled downward below the non-burning end. A careful investigation of the Ignition Area should have been made to provide evidence of a cigarette. This was not done. The possibility of a cigarette causing the fire could thus be regarded as minimal.

### Second Hypothesis: Base of Eskom Poles

The Defendant contended that there was a strong probability (i.e. greater than a 50%



chance) that the fire started at the base of Eskom poles on the property. The motivation for this hypothesis was that the path of the fire formed a typical V-shape starting at the base of the Eskom poles.

A number of potential causes were investigated. Firstly, a careful examination of the Google image of the property showed two roads intersecting close behind the Eskom poles which formed the V-shape alluded to. In addition, the wind on the day was blowing from the west and for the fire to have burnt the V-shape required a southerly to south easterly wind. Furthermore, clashing conductors was ruled out since no evidence was presented of molten metal on the ground that could have started the fire. In addition, the fire was purported to have started at the base of the Eskom poles and clashing conductors can only occur some distance away from the poles (mid-span). Faulty top pole insulation and earthing failure was also ruled out as there was no reported sign of degradation, or tracking down either of the poles. In short no evidence was presented to substantiate the view (other than the V-shaped burn pattern) that this was the probable cause of the fire. A later report from Eskom engineers confirmed that no fault was recorded at the Eskom installation in question.

In short this probable cause did not stand up to scrutiny and the hypothesis was rejected.

### Third and Fourth Hypotheses: Refuse Pit and Re-ignition of the Previous Day's Burn

The third and fourth hypotheses were taken together as they appeared to be closely related. In the case of the refuse pit, the Defendant's investigator ruled this out as the possible origin of the fire since a wide area of veld around the pit had been burnt. The prospect of a re-ignition of the previous day's firebreak burning was also ruled out as the Defendant's manager had reportedly inspected the burnt areas and found no signs of smouldering.

Evidence that the fire originated from the area on the farm where a small patch of pine trees surrounded the refuse pit was obtained from two witnesses. The first witness saw the refuse pit/pine tree area burst into flame at about 12:00. The witness attempted to raise the Defendant's manager but, being unsuccessful, alerted other farmers in the area who reacted. A second witness was able to corroborate this evidence reporting that at 10:00 when driving



The burn scar on this Eucalyptus tree indicates clearly the direction the fire was travelling.

“A wildfire investigation requires that a systematic problem solving process is followed to determine the ignition area.”

to town with a load of vegetables he saw smoke coming from the vicinity of the pine trees where burning had taken place the previous day. On returning two hours later (at 12:00) he observed thick smoke coming from the Defendant's farm and a fire advancing at a rapid pace. He continued home to collect his bakkie sakkie and returned to fight the fire.

From the evidence submitted by these two witnesses I was able to draw the conclusion that the hypothesis that the fire originated from

smouldering fuel (stumps, logs or refuse) that had caught alight as a result of the previous day's burning was indeed probable.

### Fire Contained to the Defendant's Property

The Defendant's investigator reported that he was informed that as a result of the fire fighting activity on the Defendant's property he was of the opinion that the fire was contained on the subject property. This opinion was in conflict

with the statement made by a third witness who observed flames and burning material being blown across the road onto the second Plaintiff's farm.

### A System Dynamics Model

At this stage, having developed a hypothesis for the probable cause of the fire I prepared a System Dynamics causal loop diagramme of the problem situation in order to understand the interdependencies between the origin and the subsequent wildfire that devastated the Plaintiff's farms.

The causal loop diagramme while looking complicated provides a useful picture of events and the investigation. The hypothesis relating to the Eskom poles has been rejected and plays no further role in the cause and origin investigation. The arson or misplaced cigarette I found could possibly have contributed to the origin of the fire. This would have been a delayed action since the person traversing the property would have moved on before the fire started. The probable cause though, supported by witness statements, was that an ember emanating from the logs/stump/refuse pit resulting from the previous day's burning set fuel (dry grass) on the Defendant's property alight causing the fire. Again this is a delayed action since it would have resulted from the previous day's burning and the question arises as to whether due care had in fact been taken to ensure that there was no smouldering resulting from this burn.

The fire – embers - fuel loop in figure 1 is a reinforcing loop that grows progressively as weather conditions deteriorate and drives the flames across the Defendant's property.

### Second Fire: Burnt out Vehicle

The Defendant's investigator reported the presence of a burnt out vehicle near the common boundary between his property and that of the second Plaintiff. He stated that in his opinion the driver of the vehicle in attempting to drive through the smoke covering the road lost control causing it to crash down into the road reserve where it caught alight. The intense heat originating from the burning fuel and tall thatching grass in the road reserve would have been capable of starting the second fire. No further evidence is presented to support this claim.

A number of important sources of evidence were used to refute this hypothesis. The first was an accident report form at the local police station completed by the driver of a second vehicle that was driven through the smoke and collided with the first stationary vehicle in the road. The first vehicle had not crashed down into the road reserve but appeared to have ended up there after the accident.

A third witness who stopped some distance from the smoke and walked to the end of the feedlots from whence the thick smoke emanated, reported seeing flames and burning material being blown across the road opposite the last feedlot and before the crashed vehicle. This evidence was corroborated by aerial photographs taken by the spotter plane flying over the fire which showed clearly where the fire crossed the road i.e. opposite the last feedlot.

Once again the Defendant's hypothesis could be disregarded and the probable cause of the fire that devastated the Plaintiff's properties was the fire that escaped the Defendant's property. It was a single fire.

### Third Fire: Informal Housing on Plaintiff's Property

The origin of the third fire was correctly reported. However, a fourth witness who attended the fire reported that having seen the smoke when the fire started he proceeded to fight the fire pushing it towards the fire that had already entered the Plaintiff's property. He was successful in controlling the fire, forcing the head into the break formed by the already burnt out area. This action resulted in minimal damage to the Plaintiff's properties from this third fire.

### Causal Loop Diagramme

The causal loop diagramme can now be completed. Having ascertained that a single fire caused the damage a number of causal loops become apparent. The first is the dung in the feedlot catching fire and generating smoke and embers. The embers ignite fuel (grass) on the second Plaintiff's property. Two reinforcing loops now appear. The first is the fire – embers – fuel loop and the second is the fire – Plaintiff – fuel loop. These are both reinforcing loops which result in the wildfire that destroyed grazing and crops on these properties.

### Result

It was agreed by the two party's legal teams that the hypothesis that the cause and origin of the fire was in fact the burning embers originating from the logs/stump/refuse pit on the Defendant's property was accepted. This fuel had caught alight during the previous day's firebreak burning and had smouldered through the night before igniting the dry veld the following day. As a result the case moved onto the calculation of quantum.

### Conclusion

While there are standard procedures to follow in investigating a wildfire, the inclusion of a causal loop diagramme helps to provide a holistic view of the problem situation and a model of the particular wildfire incident. Providing a systemic view of the problem is also a good way to avoid the linear thinking alluded to in the opening paragraphs of this case study. 🌱

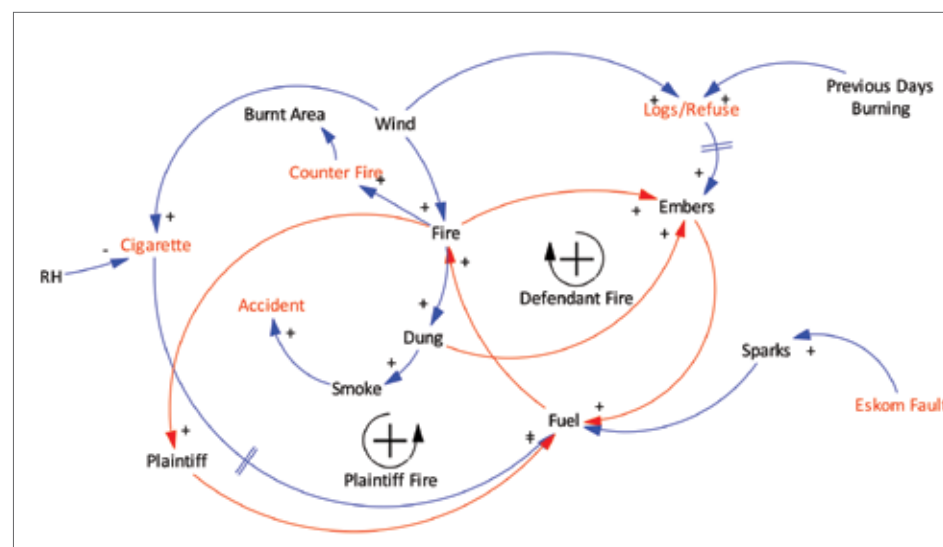


Figure 1: A Causal Loop Diagramme depicting the variables at play in the wildfire investigation.



# Ellepot propagation system gaining ground in SA

The Ellepot propagation system is designed to grow seedlings or clones in paper pots and to get them from nursery to field and into the ground with minimum hassle in between. This innovative system brings numerous benefits to the table, and is revolutionising the way nurseries grow and deliver seedlings to customers around the world.

Designed and developed in Denmark, the Ellepot system was introduced to South African forestry in 2017 by Shaun Biggs of Ellepot South Africa, and has already been adopted by a number of leading growers and nurseries in the commercial forestry sector.

The key difference between the Ellepot system vs conventional methods of growing forestry plants is that Ellepots are grown in a paper 'roll' (it looks like a fat cigar) that holds the growing medium and root plug together on its journey from the nursery to the field and into the ground, where the paper decomposes naturally and the root system grows out into the soil. There is no transplant shock and the tree is literally growing from day one.

The uniformity, density and resilience of Ellepot seedling plugs makes them well suited to the variable planting conditions found in South Africa, as well as for mechanised planting systems in which the plants are fed into the pit through a planting tube or head.



Shaun Biggs of Ellepot SA .... changing the way seedlings are grown for commercial forestry in South Africa.



Ellepots promote good root architecture and strong root growth.

## Benefits of the Ellepot system include:-

- Air pruning ... this is the drying off of root tips exposed to air. It promotes secondary root formation and produces a root system that closely resembles a direct sown seed in soil. Thus improved root architecture promotes the growth of active young roots that start growing out as soon as the Ellepot seedling is placed in the soil. The young plant gets off to a good, healthy start, with improved survival, growth and uniformity.
- Root plug density – Ellepots have a higher density/weight than standard loose-filled plugs, thus they are easier to handle and are more resilient, and well suited to mechanised planting systems that rely on gravity to feed the seedling through a tube or into a planting head.
- Water holding capacity – the higher

density of the Ellepot improves the water holding capacity of the growing medium, resulting in less transplant shock.

- Improved logistics – Ellepots are easier to handle for the roadside unpacking team as no insert extraction required – and no need to return inserts to the holding nursery.
- Nursery automation – the Ellepot system is fast and efficient allowing quicker turnaround and delivery of seedlings and clonal planting material.
- Survival and growth - Growth differences observed range from no difference when planting conditions are ideal, to 30% biomass gain on harsh sites, according to Shaun. Survival gain ranges from 5-8%, depending on site and planting conditions.

Ellepot South Africa is the partner in South Africa that supplies and supports the system from Ellepot machines to the specialised papers for the pots, trays, service and back-up. Sappi was the first South African forestry company to test



Ellepots are well suited to different planting systems, manual or mechanised.

the system in South Africa after extensive trials, and currently has two large Ellepot machines operating at their nurseries.

Since then, a number of South Africa's leading forestry nurseries have invested in Ellepot technology and are able to supply their clients forestry plants grown in Ellepots. According to Shaun, most foresters ask for their

plants to be exclusively supplied in Ellepots once they have trialled the system in field.

The system also provides an opportunity to relook at the Plant Quality Index and the specs required by foresters, as there is more scope for flexibility and innovation with the stabilised Ellepot media. There are also opportunities to move towards mechanised silviculture and to relook at the logistics of getting plants to the field.

The Ellepot system was founded in Denmark in 1993, and is now operating in 120 countries around the world, producing around five billion Ellepots a year. The system is being used in commercial forestry as well as fruit and nut trees and vegetable crops.

Shaun says that there is a strong focus on R&D within the Ellepot group. "There is an impressive pipeline of new machines, papers and trays, and Ellepot South Africa has been working closely with Ellepot Denmark on testing new products," said Shaun. "This will undoubtedly lead to further gains in transplant performance and growth infield."



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Mondi Zimele (MZ) is the enterprise development arm of Mondi (Pty) Ltd in South Africa. MZ has four key objectives:-

- To drive inclusive growth and transformation within the Mondi SA value chain.
- To encourage economic development and job creation around Mondi SA's operations and communities.
- To promote sustainable, empowered local contractors in Mondi SA's forestry value chains.
- To develop and support emerging forestry land owners, timber farmers and small growers, whilst facilitating sustainable market access for competitive fibre.

MZ seeks to achieve these objectives by making

available business development support, coaching and mentorship and loan funding support to job-creating small businesses within Mondi's value chain and surrounding communities. A hands-on approach to business development and skills transfer in conjunction with the availability of discounted business funding is fundamental to the initial growth and success of these businesses.

Inputs include advice on business management, corporate governance, legal compliance, technical assistance, administration and strategy. MZ provides ongoing business support and assistance from the initial establishment phase until its underlying philosophy of independence through enterprise is achieved.

MZ business development and support

services are targeted at three stakeholder groups:-

- Contractors and suppliers - eligible and potential supply partners that are critical to Mondi's value chain.
- Small and medium enterprises, as well as community-based small businesses around Mondi's operations, thus creating job opportunities in rural areas within the Mondi catchment.
- Land claimants, emerging timber farmers and small-scale timber growers - development and support, including market access and supply of seedlings, in order to increase the availability of sustainable, competitive fibre for Mondi mills (over 3 300 small-scale growers currently supply timber to Mondi's mills).



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## LYNWOOD COMMUNITY TRUST

# Cattle, timber and the tea tree 'wonder crop'



(L-R) Muzi Ngubani, Mbongeleni Mchunu and Bonga Mlotshwa of the Lynwood Community Trust take a walk through their newly established tea tree plot at Hazelmere Farm in Dargle, KZN midlands.

The Lynwood Community Trust has been closely involved with Mondi and Mondi Zimele for over two decades. This is a partnership that benefits both Mondi AND the land claimant community, creating jobs and nurturing new agriculture ventures that have great future potential.

The Lynwood Community Trust includes 81 families and over 400 beneficiaries located in the Howick area in KwaZulu-Natal. In 2012, the community acquired a 1 400 ha Mondi farm after a successful land restitution claim. This farm is being leased back to Mondi for two rotations, generating consistent income for the community.

To include the land claims beneficiaries in the running of forestry operations on their land, the communities became shareholders and non-executive directors of the SIBSA Group, a silviculture business that was awarded a five-year contract with Mondi in 2018.

In addition, Mondi helped facilitate Lynwood's purchase of a Mondi farm in Dargle, which is in the process of being transformed into a tea tree and timber farm with the help of Mondi Zimele's enterprise development team.

### Working together

"It feels like we are one with Mondi and Mondi Zimele, like we are colleagues," says Muzi Ngubani, Chairperson of the Trust. "We work together in everything we do... they have given us many opportunities and guided us every step of the way!"

Muzi is one of 10 trustees that manage the various Lynwood projects, the most exciting of which is the new tea tree farming operation in Dargle, which is currently taking root.

"Since Mondi leases the Lynwood Farm, we needed our own farm where we could make decisions about how to use the land," explains Muzi, "and it was Mondi that offered us the chance to buy Hazelmere Farm."

Mondi assisted the Lynwood Community Trust to purchase the 74ha farm, with assistance from government, in 2015. The farm had 36 ha of timber and 14ha of unplanted land, which provided an opportunity to plant a different crop.

"It was Velapi Dlamini from Mondi who introduced us to the idea of tea tree," remembers Mbongeleni Mchunu, one of the trustees managing the new farm. "Mondi invited us to visit tea tree farms in Zululand and Paddock, to see the great potential of the crop."

According to Laird Mitchell of Mondi Zimele, tea tree is a very resilient and profitable crop with excellent potential for growth in South Africa. It is frost resistant, it doesn't get attacked by insects or browsed by livestock and it doesn't burn! Furthermore, when harvested sustainably, it only needs to be re-planted every 40 years.



Laird Mitchell of Mondi Zimele (centre) discusses the tea tree planting operation with Lynwood trustees.



In 2015 Mondi assisted the Lynwood Community Trust to purchase 40 head of cattle. The Community took over management of the herd, which has more than doubled in five years.

A Mondi CSI grant and community funds were used to purchase 100 000 tea tree seedlings, and Mondi Zimele stepped in to guide the land preparation and planting of the first 4ha at Hazelmere farm.

"Our first phase was technical support," explains Laird. "We helped with training on how to pit and plant. We organized contractors to do the ripping with a grader and land preparation spray by drone."

With all the preparation done, planting commenced in December 2020.

The tea tree is organically grown and offers quick and continuous yield. The first harvest can be done within 18-24 months and harvesting can be done annually thereafter. The farm should yield 250-300kgs of oil per hectare, approximately 1 000kgs per year.

The project has created 20 permanent jobs – with staff responsible for land prep, planting, maintenance and firebreaks. Other operations

on the farm include planting and tending of eucalypts on the forestry land, as well as a cattle project.

### Business support

"We will now move out of the technical support phase into the business support phase," continues Laird. "We will take a look at the Trust, their financial model, planning, investing, the succession plan for the management of the trust, developing the farm manager and financial manager. We've called on specialists for tea tree and forestry where needed. We operate as coaches – offering introductions and overseeing the progress, but the Trustees do the work!"

"We would not be where we are without Laird's assistance," says Mbongeleni. "This project will determine our future. If we succeed, the community will always be behind us." 🌱



# SIBSA GROUP

## Building a new business model



Ansen Sibanyoni (centre) and members of his team during a planting operation at Mondi Mountain Home plantation in Hilton.

Ansen Sibanyoni has a big grin as he walks through a cool Eucalyptus plantation in Hilton, reminiscing about his exciting career in forestry. Ansen is accompanied by Laird Mitchell from Mondi Zimele, which has provided vital support to enable Ansen to build a dynamic silviculture contracting business.

Ansen began his career as a supervisor in the forests of Mondi at Iswepe in 1996. Today he's the CEO of the SIBSA Group, one of the biggest silviculture contractors in the KZN midlands. He's also the guiding force behind a dynamic partnership with three land claimant communities – uMkhuzane Community Trust; iNkanyezi Yamahhobe Community Trust and Lynwood Community Trust – who are shareholders in the business he founded.

Mondi Zimele has played a crucial role in the formation, growth and development of the SIBSA Group – financing assets to strengthen the business and providing business support and guidance to Ansen as he leads the business into uncharted territory.

### The journey

Ansen began his forestry career working for Mondi at Iswepe, and then decided to study

forestry at Saasveld (now NMU George). Once qualified with a BTech Forestry, he landed a job at Mondi Shanduka in the KZN midlands, gaining experience in silviculture, harvesting and occupational health and safety. This provided the foundation to start his own business, Sibs Weed Management, which secured a silviculture contract with Mondi in 2007.

"I began with 120 workers and one bakkie," remembers Ansen. "Then I bought a second-hand truck, which was always breaking down – that truck gave me sleepless nights! Within the first year I bought a new truck and everything started running more smoothly from there."

Over the next 20 years, Ansen built his business slowly and steadily, with a number of silviculture and harvesting contracts that took him to Zululand, Ixopo and Highflats. In 2018 he was awarded a major five-year contract

with Mondi for the Eland Working Plan Unit, which meant that he would be responsible for silviculture at farms spread across the midlands from Howick to Boston and Richmond. The contract required that Ansen incorporate three land claim communities into his business, signaling the beginning of a whole new chapter.

### A unique partnership

To include the land claims beneficiaries (uMkhuzane Community Trust, iNkanyezi Yamahhobe Community Trust and Lynwood Community Trust) in the running of forestry operations on their land in the uMkhomazi area, the communities became shareholders and non-executive directors of the SIBSA Group.

According to Laird, Mondi Zimele has been involved in putting the model together over several years; nurturing the directors and board members and helping them register their

business, Limkhobe Holding.

"Capacitating land claimant communities to manage their own forestry operations through Mondi Zimele's development and support programme will help ensure the supply of fibre to Mondi's mills well into the future," says Laird.

"We work well together, our relationship is good," adds Ansen. "We take everything to the boardroom, find solutions and then implement them in the business."

"As trustees, we have learned a lot about forestry and how to run a business," says Lindokuhle Nxele from the iNkanyezi Yamahhobe Community. "We are gaining knowledge that helps us run our own farm in Richmond, where we are growing wattle and gum."

Mbongeleni Mchunu from the Lynwood Community is new to forestry, but he has embraced the experience: "When the land is being productive, it brings joy to the community," he says with a smile. "Being land owners and being part of the company working the land is a dream come true."

The major contract with Mondi required investments in new equipment as part of the modernisation drive.

"We approached Mondi Zimele for a loan because they understand the forestry business, the custom-built equipment we need and the value of the contract," explains Ansen. "Mondi Zimele helped us buy tractors, four labour carriers and three vehicles. Mondi assisted us with the Novelquip MPAT multi-pit machine, which is a fast and efficient modernised pitting system."

In-field, the Volvo excavator/MPAT head is racing through its duties, while in the distance a team of approximately 25 forest workers are steadily planting Eucalyptus seedlings grown at the Mountain Home nursery. The team members are using 'Faka Plenty' backpack planters developed by Midlands Spraychem. The compartment was prepped with a tractor-drawn FAE mulcher. SIBSA also use KISS tractor-drawn planters.

SIBSA employs 285 people on the Mondi contract and over 500 throughout the business.

Pathizwe Sithole from the uMkhuzane Community explains that the land claimant communities are benefiting directly from job creation on the Mondi contract. "We are building the business steadily and providing many jobs for our community," he says with pride.



Above and below: Modernised pitting and planting systems required investment in new equipment and training.



### Business support

Mondi Zimele has played a vital role in entrepreneur mentorship and business development for SIBSA.

"I never dictate how Ansen should run his business," says Laird. "It's an open dialogue. I try and understand his needs, then we use various tools to assist the business as well as to develop Ansen as a business owner."

Laird established various areas of focus for SIBSA Group. MZ is running tax and finance interventions, streamlining HR processes and providing Ansen with a specialist in business coaching.

"As Mondi Zimele we help identify the strengths and weaknesses in the business,"

explains Laird. "We then look at training courses to fill the gaps. We arranged corporate governance training for the new shareholders and we are planning additional business training for them in the future."

"The professional business coach is assisting Ansen with medium to long-term strategizing. As a coach I seek out the skills needed to assist Ansen and SIBSA. This is all part of the MZ service."

What I love about forestry is being outdoors, and seeing the results of all your hard work. It's a blessing to be able to make a difference in people's lives, create jobs and form relationships," concludes Ansen philosophically. 🌱



# Agroforestry the sustainable way at Chevy Chase



The Chevy Chase leadership group, with James Ballantyne of Umsonti in the front row extreme right.

An agroforestry approach is providing a rural Eastern Cape community with a chance to develop and farm their land more productively, creating jobs, skills and opportunities along the way ...

Chevy Chase is the unlikely name for a rural Eastern Cape community located between Mount Fletcher and Maclear (now Nqanqa Rhu). Like many rural communities in South Africa the people of Chevy Chase have access to ancestral land but very few job opportunities as they are far from markets and have little or no infrastructure. As a result the local economy is based on subsistence agriculture. However over-grazing has reduced the potential of the land to support livestock, while rampant alien plant invasion is further eroding agricultural potential and using up precious water resources.

In 2010 the Chevy Chase community got involved in a European Union funded rural development project known as 'Thina Sinako', which is when they started working with a dedicated group of rural development practitioners who went on to establish Umsonti Community Forestry NPC.

Through the help of Umsonti, the Chevy Chase community, under the Leadership of Chief Montoeli Lehana of the Batlokoa Traditional Council, approached the Department of Rural Development and Agrarian Reform (DRDAR) for funding from their LandCare Program for a forestry project.

The area identified for the forestry project was fenced to control livestock, and work commenced to clear the wattle jungle and plant grasses for grazing pending the completion of an EIA and the granting of a Water Use License for the establishment of the correct commercial tree species for the site.

The nitrogen left in the soil from the wattle and the successful exclusion of livestock meant the grass sown by the Landcare staff under the supervision of the DRDAR grew well and thanks to the summer rains, by winter the community was able to provide good grazing for their livestock.



Developing rural communities through forestry and associated businesses

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In 2019, on the back of this initiative, the DRDAR approached Umsonti with an ambitious plan to start a conservation agriculture project with the community on adjacent agricultural lands which had been standing idle for over 10 years. A community Trust was formed with the six villages that make up Chevy Chase in 2020.

With agricultural equipment purchased by Government (initially a no till planter and a spray rig) and borrowed from local farmers, 100 ha of land was fenced off and 27 ha was successfully established to yellow maize by early December 2020. This yielded around 20 tons of maize (which was sold to the community, given to members in lieu of work, and 9.6 tons sold to BKB) and stubble for community cattle to graze at the end of winter / early spring when insufficient grass is available before the first rains. A cattle auction was also organized with the help of Umsonti and Meat Naturally in May 2020 which resulted in the sale of 282 head of cattle, bringing in R 2.27 million to the community. This also assisted with reducing the pressure on the veld from overstocking, meaning survival rates of the remaining animals increased.

## Clearing wattle jungle

In the initial phase of removing the wattle jungle the cleared wattle is separated into usable poles, firewood and pulp logs for sale. The money generated from these activities is ploughed back into the project allowing clearing work to continue.

In 2012, with funds from Thina Sinako, a soil survey was conducted on the land earmarked by the community for the forestry project. Due to the amount of seed in the soil, the wattle has kept on coming back on the 'cleared' areas. Considering the high cost of spraying the small trees or cutting them out, the work teams adopted a different approach and it was decided to line out the wattle jungle already growing there using the 'boere metode' to give the trees space to grow and produce more poles, firewood and pulp in the years to come. This serves to generate some cash and get the wattle jungle under control, pending the granting of a Planting Permit for the establishment of a proper plantation. Wattle coming back in riparian and other sensitive areas are permanently removed and grass seed sown in these areas to allow for establishment of additional grazing areas of good grass for livestock, and the roots to bind the soil to reduce erosion.



The clearing of jungle wattle at Chevy Chase is self-funding through the sale of pulp, poles and fire wood.



“ If it wasn't for the wattle clearing and the income from this, there would have been no maize production. ”

Lined out wattle with inter-row sprayed with Triclon .. putting a wattle jungle to use at Chevy Chase, while awaiting a planting permit to establish a proper plantation.



Pulp wood extracted from a cleared wattle jungle is loaded by hand and sold to NCT Durban Woodchips.



“The sale of firewood and pulpwood is absolutely necessary, as the income from these activities has helped with diesel (Government doesn't supply diesel) and equipment maintenance,” said James Ballantyne, one of the directors of Umsonti, who has been working closely with the community for a number of years. “If it wasn't for the wattle clearing and the income from this, there would have been no maize production, as a lot of money is spent on diesel for ripping, lime spreading, ploughing, spraying and planting.”

The community is budgeted to be clearing roughly one hectare of wattle per week, translating into around 48 ha per year. There are three teams doing the initial wattle clearing. Each team comprises a chainsaw operator and three people stripping bark and stacking branches and bark in brushlines while utilizable timber (poles, pulp and firewood) is left in the middle of the ‘indimas’.

The pulp timber is kept separate from the large logs of firewood timber which get sold to the local community. Depending on distance from the project, the 1.5 ton loads of firewood are sold for between R500 and R1 200. The income (around R 10 000 per month) is used to purchase diesel for the tractors to transport staff from the community to the forestry project.

“The philosophy of paying for a product is being entrenched in the community,” said James. “The ‘everything for free’ (EFF) model does not work.”

Wattle pulpwood logs are sold to either NCT Durban Woodchips (when tickets are available) or PG Bison. The Chevy Chase LandCare project has the potential to generate between one to two truckloads (30 tons) of pulpwood per month.

The funds generated from pulpwood sales have been used to assist with purchasing diesel for the ripping, liming, ploughing, planting, fertilizing and spraying of maize, as Government pays for all the inputs (equipment, fencing, seed, lime, fertilizer and chemicals), but not for diesel or equipment maintenance. The people working on the maize are paid as part of the LandCare project.

### Environmental considerations

Roads have been planned using natural or existing routes such as cattle tracks and wattle extraction routes that have been used for decades by the community. Bridges across streams have been made from rocks or wooden



Livestock auction at Chevy Chase.



Trustees outside FNB Mount Fletcher where they opened a bank account for their farming business.

“*The formalisation of structures and investment by government provides an opportunity for sustainable development.*

- James Ballantyne, Umsonti”

poles so tractors and bakkies can cross safely and without causing any disturbance to the rivers.

“Ultimately, concrete pipes and culverts will be constructed, but with the shortage of funds, we have had to make a plan to minimise the impact on the environment,” said James.

The key to sustainable rural development at Chevy Chase is the agroforestry approach i.e. integrating agricultural activities with forestry, maintains James. This has allowed cash generated from pulpwood and firewood sales to be ploughed into clearing of alien

invasive plants and crop production which has provided winter food for livestock – all of which has provided an opportunity to improve management of the land. In addition these activities have created a vehicle – in the form of a community trust - to mobilise community resources and efforts which has the potential to create further opportunities going forward.

“The formalisation of structures and the investment by Government provides an opportunity for sustainable development, which creates jobs and benefits for the community both formally and informally,” says James. 🌱

# The magic of trees



Cool, shady tree, Mkhuze Game Reserve, northern Zululand, KZN.

*Never mind the science, trees are magic beings that inhabit a beautiful world and fill our lives with wonder ...*

By Gaynor Lawson

Trees have been a vital, integral part of mankind's existence since before history began. They are the largest living things on earth, and live longer than any animal (some species such as the Californian giant sequoia may live for over 3,000 years), forming a set of new cells each year. Trees provided earliest man with shelter from the elements, food in the form of fruit and nuts, fuel to burn, and protection from dangerous beasts - as long as he could climb!

### Divine beings

We have always been fascinated by the majesty of tall trees. Before there were temples, churches and other man-made places to celebrate our beliefs, people worshipped in forests and under trees. Genesis tells us that eating of the tree of knowledge set us apart from all other living creatures, and trees are significant in most religions, as well as in ancient and pagan beliefs.

Although they were some of the first people to worship a single God, early members of the Jewish faith also appear to have viewed trees, especially oak trees, as divine. Two words frequently appearing in the Bible, alon (oak) and ela (terebinth - a kind of pistachio tree), are apparently derived etymologically from "el", the Hebrew word for "god". The ancient

Hebrews considered the oak to be sacred because it was under an oak that God and his angels appeared to Israel's founding father, Abraham, disguised as travellers (Genesis 18); this is one of 60 references to oak trees in the Bible. An almost 5,000-year-old tree is allegedly located in the exact place where God and his angels appeared.

Other 'holy' trees mentioned in the Bible include the ela under which King Saul and his sons were buried, and an angel is said to have delivered the word of god under the "oak which was in Ophrah" (Judges 6:11). The sycamore and almond tree also feature extensively in the Bible.

In Greek mythology, dryads and oreads were nymphs, minor goddesses of forests, groves, and woodlands who were spirits of trees such as oaks and pines, poplar and ash, apple and laurel. Hamadryads were tree



nymphs whose lives were so connected to a particular tree that if it died, so did they. Consequently, dryads and the gods would punish any mortals who harmed or felled trees.

Norse religion features the Tree of Life or Yggdrasil, a massive tree (perhaps a yew or ash tree) that exists at the centre of the world, which it supports and nurtures.

Few peoples held trees in such high regard as the Celts and their druids, who were religious leaders as well as healers, legal authorities and judges, lorekeepers, and political advisors. The druids' veneration of trees is considered not merely a pagan, primitive form of worship but was based on a deep understanding of the vital significance of trees for mankind's existence. The Celts believed that we are descended from the 'Great Oak', growing like fruit from its branches.

The oak was also revered by the early Gauls as a symbol of their supreme god. Penalties for damaging trees are reflected in the rulings of the Brehons or Gaelic judges, close in power to a chieftain, who would impose severe penalties for those who felled trees or even wantonly hacked off branches without their chief's permission - one of the earliest examples of ecological legislation. Trees were divided into distinct categories, with fines determined by which tree was damaged. Oak, hazel, holly, yew, ash, pine and apple were classed as *airig fedo*, or "nobles of the wood" because the oak has acorns and nobility, hazel has nuts, apple has fruit and bark, yew because it is good for building, holly for making chariot-axes, and ash for spear shafts. Other categories were trees such as willow and birch, considered as *aithig fedo*, or "commoners of the wood"; aspen, elder, and juniper were some of the trees called *fodla fedo*, or "lesser divisions of the wood", while the lowest ranked group, the *losa fedo* or "bushes of the wood" included bracken, bramble, and heather.

Today's sustainable forestry is not a modern concept but is based on principles of Celtic woodland management that aimed to ensure that their precious natural resource was preserved, including pollarding, coppicing, planting, drainage, hedging, and foraging (by people and animals). Folklore advised that those wanting to cut down a tree should ask the tree's permission, and to leave a gift or offering in thanks, such as wine or a coin buried in the roots.

Trees were so important to some ancient tribes that they named themselves after them, such as the Eburones (the Yew People), and the Lemovices (the Elm People) of Gaul.

### Tree worship today

In the Middle East and North Africa, sacred trees are still regarded as the abode of souls of local saints known as *Wellis*, which protect their tree from humans with their divine power. Any damage to this tree is regarded as a personal insult against the saint, who will retaliate.

In Japan today, there are more than 15 tree species are related to the Shinto and Buddhist religions.

In Madagascar, the Baobab tree is said to be where ancient spirits reside, and where the spirits of dead family members linger. Gifts of wine, honey and old money are placed at the foot of the tree in their honour.

### Our arboreal heritage

Locally, there are many plants and trees that form an essential part of our indigenous heritage. In Zulu culture, trees are often referred to as 'growing people', in acknowledgement of their status as a sacred being, the home of the spirits. 'Inyanga' means 'man of the trees' in Zulu and refers



Iconic palms frame a church in Matatiele, southern KZN.

“Norse religion features the Tree of Life or Yggdrasil, a massive tree that exists at the centre of the world.”



Buddhist face carved from tree and roots. Photo courtesy of Ben Yi.

to herbalists who make medicine or 'muti' (from the Zulu/Xhosa word *umuthi* meaning 'tree') from bark, herbs, and roots. Crushed rocks, bones and animal horns may also be used.

The reverence for trees is also significant amongst 'sangomas', who use divination rather than herbs for healing. Sangomas have their own specially chosen sacred tree that is believed to be metaphorically linked to their physical body. During ritual ceremonies commemorating the Nguni ancestors, these trees are 'dressed' with brightly coloured cloth or fabric wrapped around the trunk.

Traditionally, buffalo thorn branches are placed on the graves of Zulu chiefs and carried by a family elder leading the pallbearers, while the *Umsinsi* or "lucky bean tree" is another auspicious tree associated with Zulu royalty, with these trees planted on the graves of Zulu chiefs. It is also used as an effective, living fence to contain and protect kraals, and is used in traditional 'muti' because of its antibacterial, anti-inflammatory and analgesic properties.

In the same way that the Gauls valued ash for making strong spear shafts, the *Umsimbithi*/ *Umsimbithwa* (*umzimbeet*) is prized for its strength, making it a trusted wood for assegais, knobkerries and walking sticks. Its seeds were worn as a necklace by Zulu impis to indicate a heroic warrior, much like a military medal, while the leaves of the *umyezane* or willow were worn around their waist to indicate that they had been victorious in battle.

### The ancient giants of Knysna

The Knysna forests are the country's largest forest complex, covering around 568 square kilometres, and include fifty different species of indigenous trees, such as giant yellowwoods, wild fig, Cape chestnut, candlewood, white milkwood and stinkwood. This ancient place was once home to indigenous people from the early Stone Age onwards who lived in harmony with their green canopy, but that changed when the settlers arrived with their commercial need for wood, which became the commodity that underpinned the local economy. The forests were harvested mercilessly to the detriment of the local wildlife, including the legendary Knysna elephants, until 1939 when all logging in the forests was stopped by the government and the demand for timber replaced with sustainably produced exotics such as pine and gum.

Today the forests (and the Knysna Lagoon) are protected, and since 2009 have formed part



Tree growing over a ruin. Photo courtesy of James Wheeler.



800-year old yellowwood, Hogsback, Eastern Cape.



of the Garden Route National Park, which covers more than 160 000 hectares. There are four official Big Trees in this park: the Dalene Matthee Big Tree (named after the author of “Circles in a Forest”); the Tsitsikamma Forest’s Big Tree, a yellowwood estimated to be between 600 and 800 years old and is 36.6 metres high with a trunk circumference of 9m; the 800-year-old Woodville Big Tree, an Outeniqua yellowwood that stands over 30 metres tall; and the King Edward VII tree or the Diepwalle Big Tree, a famous Outeniqua yellowwood near Diepwalle Forest Station that is close to 40 metres high and is more than 800 years old.

It is interesting to note that the names of the forest derive from the Khoekhoen people, who lived in the area in pre-Colonial days. Outeniqua means “honey-gatherers”, Hessequa means “men of the trees”, Tsitsikamma means “bright waters”, and Knysna means “ferns”, according to Professor Mike de Jongh, author of, “A forgotten First People - The Southern Cape Hessequa”.

### Intertwined

The existence of man and trees is so interwoven that without trees, man often ceases to exist. Jared Diamond’s 2005 book, “Collapse - how societies choose to succeed or fail”, describes five factors that could bring about the collapse of life as we know it: climate change, hostile neighbours, trade partners, environmental problems, and a society’s response to its particular environmental problems. Deforestation is highlighted as a key element of man’s survival, and Diamond looks at case studies of communities who died out because they did not value trees. These include the residents of Easter Island and Norse Greenland.

Vikings had lived in Greenland since the year 985 AD, when the Icelandic explorer Erik the Red arrived with a fleet of 14 longships, a journey made easier by the warming of the seas during what is known as the Medieval Warm Period (from around 900 to 1300) that saw a dramatic reduction in sea-ice. The settlers thrived, developing farms where they grazed cattle, goats and sheep; built manor houses; and even traded imported stained glass for live polar bears, furs and walrus-tusk ivory. But a volcanic eruption in Indonesia in 1257 caused sulfur to be rocketed into the stratosphere. It reflected solar energy back into space, cooling Earth’s climate and causing global famine. Greenland’s Vikings, numbering at most 5,000 people, refused to adapt, stubbornly trying to raise crops and livestock on the now over-grazed and eroded landscape. They had depleted the island’s few trees, mostly scrubby birch and willow that grew near the fjords, and so could not build boats to escape. They refused to learn from the Inuit, who arrived in northern Greenland a century or two after the Vikings landed in the south and lived off the natural resources, hunting seals, whales and walrus. When the livestock died and the crops failed, the Vikings died out too. The adaptable Inuit, survived.

The fate of the human inhabitants of the remote Easter Island, called Rapa Nui by its indigenous people, was another example used



Wooden totem god. Photo courtesy Mohammad Jumaa.

by Diamond to show catastrophic societal collapse through mismanagement and abuse of an environment. By around 1600, the island’s population had descended into warfare, cannibalism, and population decline. Diamond’s theory of deforestation causing the islanders’ downfall is now being debated by archeologists, some of whom believe the islanders did not self-destruct but rather practiced environmental stewardship and continued to thrive, as proven by stone platforms on which the iconic statues stand, built after the 1600s. Possibly, it is conjectured, European settlers brought disease, slave-trading, and conflict that wiped out the island’s residents.

### Industry of the past, present and future

Trees and the various ways that we use them formed the basis for one of mankind’s earliest industries. From primitive sledges and wooden

shelters to wheels and carts, ploughs and tools, construction of bridges to cross waterways to boat-building and railway sleepers that allowed for exploration and expansion, trees and forests helped the advancement of mankind. Let’s not forget that most coal, petroleum and natural gas consist of submerged forests and plants from a long ago time. Wood has evolved into a modern engineering and industrial material, and with the increasing focus on more sustainable living and reduced dependence on oil-based materials such as plastic, wood is coming to the fore again.

In 2016, the U.N. Food and Agriculture Organization (FAO) released a report that confirmed that (sustainably-sourced) wooden furniture, floors, doors and similar building materials require less energy to produce than aluminium, concrete or plastic, and in addition, the timber so used continues to store carbon for years, offsetting almost all of the greenhouse gas emissions related to the production process.

There are also physical and mental health advantages of using wood in our environment that is a key part of a trend called biophilic design (biophilic means love of nature). This movement encourages the use of organic materials, natural light, real vegetation, nature views and other aspects of the natural world in our built environment. Being near wood mirrors the sense of well-being that we feel after time spent outdoors in nature, with reduced stress, fatigue and anxiety; lowered blood pressure and heart rates; mental invigoration; enhanced moods and improved productivity; reduced employee absenteeism and faster healing times. Wood products also improve indoor air quality by moderating humidity. Incorporating wood into our homes and places of work, healing, and education makes so much sense.

The use of trees outside is a further way to enhance our living spaces, buffering the sounds of a city, lowering street-level temperatures, creating a haven for birdlife and wildlife, and generally breaking the monotone concrete and steel grey hues of city centres.

### Buildings of the past and the future

Cross laminated timber or CLT is a popular way to build, especially in

Europe. Invented in Austria in the mid-1990s, this type of engineered timber consists of three to eleven layers of wood, glued together to form solid panels between 60 to 320 millimetres thick. It offers sustainability, flexibility of application and faster construction processes, but is not accepted everywhere, with fire regulations in places such as the UK prohibiting or limiting its use in tall buildings. Currently used for low rise residential, commercial, and mixed-use buildings, architects and developers are starting to propose that it could be used for buildings of six or more storeys.

Timber is tough and resilient. Aged structures made of wood are still standing, the oldest being an ancient Japanese temple built in 607 AD that is the world’s oldest surviving wooden structure. The Horyuji Buddhist temple with its five-storey pagoda

was constructed from Japanese cypress trees that were around 2,000 years old when felled. It’s been 1,300 years since the cypress trees were cut down, and the wood still stands firm. Railway sleepers take the punishment of heavy trains for decades without breaking. Submerged forests still stand underwater. Mine props are made from timber (usually spruce) because it is cheap and readily available, and most importantly, because of its ability to yield under immense roof pressure while metal and concrete props are inflexible and collapse.

Wood can also be reused / recycled repeatedly without degradation or damage to the environment, while materials such as concrete, plastic or aluminium require extensive energy from fossil fuels to produce, and even using recycled plastic is not as environmentally friendly as some people may think, as the recycling process also requires a lot of energy. We need to spurn plastic wrapping, cutlery and Styrofoam fast-food containers, and revert to using paper packaging for our shopping and insist on paper straws.

### Do trees do math?

In nature, the intervals at which branches emerge from the trunk of a tree reduce towards the top of the tree, in the same way that the intervals between leaves decrease towards the tip of the branch. These intervals are related to one another by a mathematical law called a Fibonacci series, which was discovered by an Italian mathematician around 1200.

### Do they talk?

While the likes of authors such as Tolkien and CS Lewis said that trees definitely communicate, it’s taken a while for botanists to agree. Studies indicate that trees do communicate, in the sense of mutual interaction, mostly through the release of pheromones (chemicals produced by living creatures that cause a social response or change in behaviour in creatures of the same species) to share information. In 1979, a chemist called Rhoades used willow trees to show that when one tree was under attack from insects, it could send out a warning to other willow trees, which would then produce chemicals to defend against the bugs.

While researching her doctoral thesis two decades ago, American



Tree sculpture, Hogsback, Eastern Cape.

ecologist Suzanne Simard used radioactive isotopes of carbon to determine that paper birch and Douglas fir trees were sharing an underground network of soil fungi. These underground fungal systems or mycorrhizal networks consist of delicate, hairlike root tips of trees that join with microscopic fungal filaments in a symbiotic relationship. The fungi consume about 30% of the sugar that trees photosynthesize from sunlight to fuel their search for nitrogen, phosphorus and other mineral nutrients in the soil that are in turn absorbed by the trees. This network also enables trees to share water and nutrients, and send distress signals about threats such as insect pests, drought and disease - significantly, the nearby trees alter their behaviour accordingly. They may increase their levels of toxins and repellents in their tissue to deter pests, or may produce airborne

compounds that attract the natural enemies of a particular pest.

Simard and her study group grew seedlings of Douglas fir alongside ponderosa pine, and then damaged the one that would have been acting as the ‘mother tree’ (one of the largest, oldest trees that favour and nurture their own ‘kin’ - the seedlings that are growing around them - by sharing nutrients with them along the network). She says, “When we ‘injured’ these Douglas fir trees, we found that a couple of things happened. One is that the Douglas fir dumped its carbon into the network and it was taken up by the ponderosa pine. Secondly, the defense enzymes of the Douglas fir and the ponderosa pine were ‘up-regulated’ in response to this injury. We interpreted that to be defence signaling going on through the networks of trees. Those two responses — the carbon transfer and the defense signal only happened where there was a mycorrhizal network intact.”

This theory of trees communicating or interacting has found support beyond the realms of scientific and university research. A book by a German forester, Peter Wohlleben, entitled “The Hidden Life of Trees: What They Feel, How They Communicate - Discoveries from A Secret World”, became a bestseller in 2018. He describes what he calls the “wood-wide web”, saying that trees in every forest that is “not too damaged”, are connected to each other (through the underground fungal system discovered by Simard).

Do short rotation plantation trees – such as Eucalypts grown in South Africa - also communicate with each other through their interconnected root systems? Maybe, maybe not – the jury is still out on this. But they are supplying us humans with the fibre and wood we need, thus saving their much older, natural brothers and sisters in the natural forests from the axe and the chainsaw. So in a way, they are still working together to maintain a balance.

Whether you believe these stories or not is up to you. But it cannot be denied that trees elevated mankind from cave-dwellers in our primordial past. They helped to feed us, clothe us, protect and shelter us. They gave us the means to explore, expand and evolve. They may be the way for us to help save our planet in the not-too-distant future. And if you stand quietly in a grove of tall trees, you might just hear them whisper to you... 🌿



# The Cape sawlog PINCH!

The scramble for scarce roundlog resources in the Southern Cape has stakeholders on edge while government takes tentative steps to begin the process of bringing 22 000 ha back into timber production ...

The timber industry in the Southern Cape has a long history that goes back to the 19th Century. We've all seen those grainy black and white photos of woodcutters felling and sawing huge indigenous hardwood trees in the natural forests around Knysna, George and the Tsitsikamma. The giant logs were hauled to the mills by teams of oxen where they were sawed up for use as building material, furniture, tools and implements, wagons and railway sleepers.

When the authorities eventually realised that the natural forests could not sustain the scale of the logging, they mercifully introduced management controls and then stopped it completely, placing the remaining natural forests in the region under conservation management.

To fill the void the government of the day as well as private entrepreneurs started planting pine to provide the raw sawlogs needed by the sawmills and countless downstream manufacturers and processors engaged in the timber industry, which by this stage



Charles Whitcher, head of AC Whitcher forestry, with some impressive pines on one of their plantations in the Tsitsikamma. These precious timber resources are protected behind very wide fire breaks which are essential to maintain in this fire-prone environment.



An old steam-powered sawmill in the Knysna indigenous forest, dating back to the late 19th century.



Break-down saw, 19th century-style, Southern Cape.

underpinned the entire regional economy. The area under pine expanded from the Boland to Plettenberg Bay, and was concentrated around George, Knysna and the Tsitsikamma.

After 1992 government had a re-think about forestry and established Safcol to manage the state plantations on a commercial basis. A decision was made to lease out the 85 000 ha of Cape plantations via a tender process. MTO won the tender and took over management of the plantations in 2001 under a 75 year lease. Prior to this Cabinet made a decision to convert some 45 000 ha of the Cape plantations out of forestry into conservation and other land uses as these plantations were considered marginal and not commercially viable. In terms of the lease MTO was to hand back the exit areas as they were clearfelled at full rotation.

When a fire in the Tsitsikamma in 2005 destroyed some 16 000 ha of plantations, the volume of timber available for sawmillers and other processors in the region began to shrink as the gap between supply and demand became evident. This was the first of many blows that would erode the timber resources over the next 15 years or so. The roundlog shortage was exacerbated by the closure of plantations in terms of government's exit strategy.

This prompted MTO and other stakeholders to start lobbying government to reassess its exit strategy, which they maintained had not taken into account the full socio-economic impacts that the exit would have on the regional economy.

## Exit reversal

As a result Government appointed the Vecon Consortium in 2006 to re-assess the viability of the exit areas, which recommended that half of the exit areas – 22 000 ha – be restored to commercial forestry. Cabinet approved the exit reversal of the 22 000 ha in 2008.

Meanwhile the roundlog shortage began to impact on local timber processors with the smaller, informal mills going out of business first. Between 2005 and 2006 11 sawmills closed in the Cape. At the same time there were fears that the land being handed back to SANParks and other authorities was becoming a fire risk.

As the years rolled by, MTO as the incumbent managers of the state plantations tried various approaches to persuade government to allow it to re-establish and/or manage the re-growth of the exit reversal areas after clearfelling. At the same time community leaders and other



21st century breakdown saw, AC Whitcher sawmill, Cold Stream.

stakeholders started applying pressure to stake their claims to the land. Bold decision-making and dynamic action was needed, but was not forthcoming.

In 2014 (six years after the Cabinet decision) a feasibility study for the re-commissioning of the VECON forestry areas was presented to the IDC. In May 2017 a land rights enquiry for the Western Cape re-commissioning areas for DAFF was presented to the Western Cape Forestry Forum.

In November 2019 DAFF and the Department of Agriculture, Land Reform and Rural Development put out a tender for a transaction advisor to assist with the development of a sustainable forestry business model in the Western Cape recommissioning areas.

In the meanwhile the 2017 and 2018 wildfires delivered a hammer blow to the region and put a huge hole in the sawlog resource, and skewed the age class distribution.

The urgent need to re-commission the 22 000 ha was identified as a priority deliverable in the Forestry Sector Masterplan, a part of the Public Private Growth Initiative backed by the president himself.

By this stage the shortage of sawlogs – especially the large B,C & D class logs required by the sawmills producing structural lumber – is reaching critical levels, raising tensions among stakeholders even further.

Some of these mills, like AC Whitcher and Boskor, are partially or wholly dependent upon MTO for suitable roundlogs to keep their mills operating at capacity. MTO has its own mills in George and Longmore to keep supplied with

logs as well, so there is a conflict of interests at play.

Both Whitcher and Boskor (owned by Swartland Investments) are old, established family-owned Cape businesses. Their supply contracts with MTO have long since been curtailed and they are reduced to haggling over roadside auctions. Job losses are on the cards. Many smaller mills and pole manufacturers in the region are in the same boat.

## Survival mode

"We are surviving for now ... we are simply outbidding all the competition because we still can, but this is not sustainable," commented Hans Hanekom, CEO of Swartland which owns and operates the Boskor sawmill in the Tsitsikamma. Swartland manufactures doors and windows in their factory in Cape Town.

"For now we are taking everything into the mill that we can - even rejects. We need mainly B, C & D class logs but can use the upper end of A class logs as well. Half of our pine business is for export. The commodity boom due to COVID helped us as prices climbed, but it is getting over now ... we are hanging on for dear life. Sooner or later we will lose the export business because our raw log prices are too high – we are competing in this market with Brazil, Chile and Poland.

"There were 300 000 cubes of roundwood a year available in the Tsitsikamma ... now its 200 000 cubes, and 100 000 cubes is being taken to George by MTO. We are buying the lion's share of timber sold at roadside here in Tsitsikamma," said Hans.



AC Whitcher is slightly better off as they have 1 200 ha of their own plantations in the Titsikamma, which supplies some 10-15% of the mill's roundlog requirements. Another 25% of their timber intake is supplied in terms of a long term contract with MTO. For the rest they must compete with the open market for roadside sales.

According to Gene Ritchie who manages the AC Whitcher sawmill, they are over-harvesting their own plantations to keep their mill busy.

AC Whitcher sawmill employs 300 people and Boskor around 150 people.

PG Bison, which operates the large Thesens sawmill in George, is better off as they have their own plantations, although they also suffered losses during the recent fires.

Kareedow Kreosoot Werke (KKW) in E Cape is also feeling the pinch. They employ 76 people and produce 12 000 cubes to 16 000 cubes of SABS approved poles a year for domestic and international markets. According to branch manager Lelani van der Walt they are running short of poles for processing – especially the species that they need i.e. *P. radiata*. She said they were getting the bulk of their poles from MTO but no longer ... the supply dried up around December last year. They also source poles from private growers. *E. grandis* is also scarce, she says, and they are trucking in raw



The timber grown in the Titsikamma provides the raw materials for downstream processors where it is turned into lumber used in the construction industry and many other products, creating and sustaining downstream jobs.  
Inset: Gene Ritchie, Manager of AC Whitcher sawmill, 5th generation sawmiller.

poles from KZN.

"We knew there was a shortage looming, but the crunch has actually arrived – not just for us but for everybody including the small sawmillers. We have hope that we will continue to be able to source the right raw poles we need, if they plant up unplanted and burnt

areas etc ... I pray that something will come up, otherwise it is inevitable that jobs will be lost."

### Avocados

The news that MTO is planning to convert 4300ha of forestry land to avocados has not gone down well with the sawmill lobby. Neither has the

fact that, as at January 2020, 8.7% of MTO's sustainable plantation area was temporarily unplanted – presumably mainly areas burnt in the 2017/18 fires. According to the MTO Management Plan TUP will increase to 14% by 2024, whereafter it will reduce to 1.5% by 2029.

"It's a dire state of affairs, and there are no easy answers," commented Roy Southey, Executive Director of the Sawmilling Association of SA. "The small independent millers are really battling. Everybody has known the timber shortage has been coming for a long time, but now it's critical."

The pressure on the Department to get a move on and put the 22 000 ha out to tender is ratcheting up, and all of the stakeholders are positioning themselves to pitch hard for these plantations, which are expected to be offered in three or four packages.

Albi Modise, Chief Director of Communications for DFFE told SA Forestry that the process would begin during the 2021/2022 financial year.

He said that the preferred model will be

for investors to partner with neighbouring communities, and that the leases would be for a maximum of two rotations.

### MTO response

MTO CEO Greg Woodbridge welcomed the news that DFFE plans to move on returning the Vecon areas into timber production.

"We believe revitalizing the forestry cultivation on the Vecon areas is long overdue and will go a long way in enhancing the round log supply to the market. MTO attempted over an extended period of time to have the decision around exit plantations reversed, however we were not successful. Through ongoing engagements with DFFE we are in support of their plans of returning the 22 000 ha back to forestry. It is our opinion that this could have been done several years ago and the impending volume cliff could have been avoided. MTO stands ready to assist in whichever manner this initiative takes to restore the forestry industry in the area to previous levels that will benefit the local community and the industry," said Greg.

"MTO's operations in the Southern Cape have been significantly affected by fires over an extended period of time, however we continue to invest in our forestry assets to ensure we get the plantations into full rotation. The average growth cycle for our trees is between 18-22 years which gives us the clear runway for getting our plantations into full rotation and the timing to realize the maximum volume possible."

The exit reversal areas are currently being managed for fire protection and alien clearing by the Forestry Support Programme and Working on Fire. According to Braam du Preez of the Forestry Support Programme, there are pockets of trees in some of these exit reversal areas that have regenerated naturally and are growing well. This will give the new lessees a bit of a running start when they take over management of these areas, some of which have been lying fallow and unproductive for years.

In any event there is going to be a lot of investment required and a lot of work for local people when these areas eventually come back on stream! 🌱

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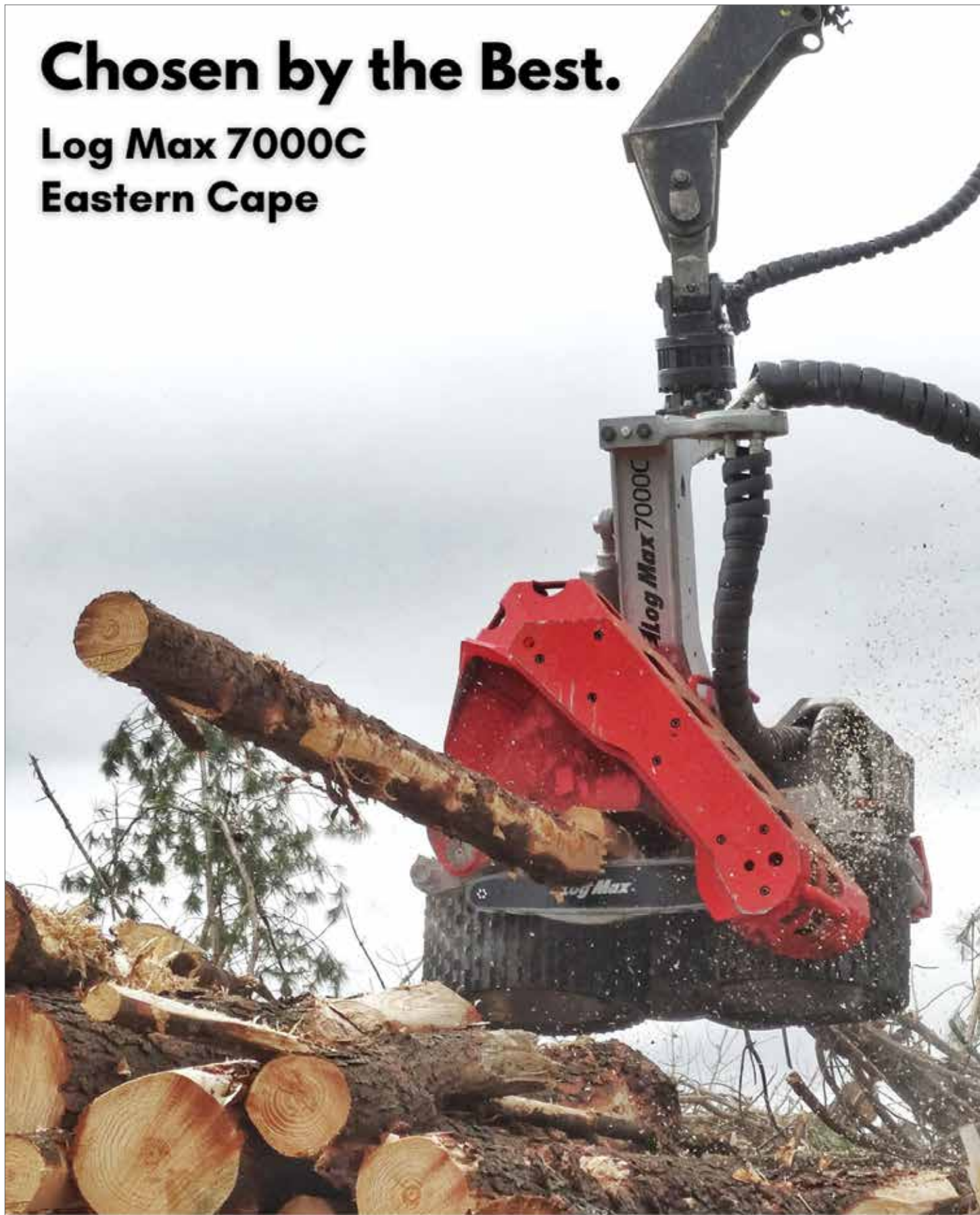

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# 16 years of AfrEquip supporting mechanised harvesting in SA

AfrEquip has been one of the pioneers of mechanised harvesting in Southern Africa, supplying and supporting some of the biggest brands in the industry including Tigercat, Log Max and Morbark for over 16 years. The company was established in 2005 with their headquarters in Empangeni, just as mechanised harvesting operations were really beginning to take off in this region.

Following their initial success, AfrEquip expanded quickly in key forestry areas to ensure they were able to provide the necessary technical, mechanical and logistical support to keep their customers' machines operating productively. Consequently, they moved their head office from Empangeni to Pietermaritzburg to accommodate an undercover workshop and spare parts inventory. By 2015 additional branches had been opened in Nelspruit, Ugie, Piet Retief and Richards Bay. This means that AfrEquip teams are located closer to customers around the country for effective and efficient service.

In order to accommodate their expanding customer base, AfrEquip built bigger head office premises in Mkondeni, Pietermaritzburg earlier this year. The expansion provided increased workshop capacity and more space for their large spare parts inventory.

Underpinning AfrEquip's success in the field has been the quality of the premium equipment brands that they supply and support, including Tigercat, Log Max, Morbark and numerous supporting brands. The choice of PG Bison to go with Tigercat and Log Max for their timber harvesting operations in Ugie, Eastern Cape speaks volumes for the durability of these harvesting heads which operate in the harshest



*Tigercat M726G mulchers reducing slash on extraction routes in Zululand.*



*Tigercat forwarder collects harvested timber in-field and hauls it to the roadside depot.*

environments. AfrEquip opened a branch in the small Eastern Cape town specifically to support harvesting operations in this area.

Similarly, AfrEquip's Richards Bay facility is focused on supporting and operating Morbark electrical horizontal grinders which are used to grind mill waste. The ground material is used to generate heat and power at the mill thus reducing their reliance on Eskom power.

Environmental considerations and the subsequent increased opportunities in alternative energy has resulted in a growing focus on appropriate equipment required for handling biomass. Hence the increasing use of mulching post harvest residues as an alternative to the traditional method of burning in South African forestry. Several forestry companies have adopted mulching in a big way and



Tigercat mulchers have proved their worth with all contractors.

The benefits of mulching post harvest slash are numerous, including:-

- The mulch layer protects the soil from sun and erosion, retains moisture and suppresses weed growth
- The mulch allows organic material to break down quickly and provide the soil with nutrients
- Provides a protective 'blanket' to reduce soil compaction by mechanised equipment
- Eliminates old stumps for improved compartment access and paves the way for mechanised silviculture operations to follow
- Speeds up the turnaround from clearfell to re-establishment
- Improves seedling survival and subsequent growth of the tree
- Reduces fire risk.

The utilisation of post-harvest slash for further processing as mulch in agricultural crops or feedstock for heat and power plants has forward-thinking entrepreneurs considering efficient ways to accumulate and reduce the biomass to match downstream requirements. This is where Morbark grinders, which are designed to reduce all kinds of tree and wood waste, are expected to play an increasingly crucial role in this expanding value chain.

At the same time a shift in government thinking has created exciting opportunities for independent power producers.

All services and repairs on equipment supplied by AfrEquip are carried out by Tigercat/Morbark/Log Max accredited field service technicians. AfrEquip technical staff are trained annually by the equipment manufacturers. In addition AfrEquip provides relevant training for operators and technical staff to ensure that productivity of the forestry equipment they supply meets customers' high expectations.

The major brands supplied by AfrEquip in South Africa, along with a host of smaller brands to support these main brands, include:

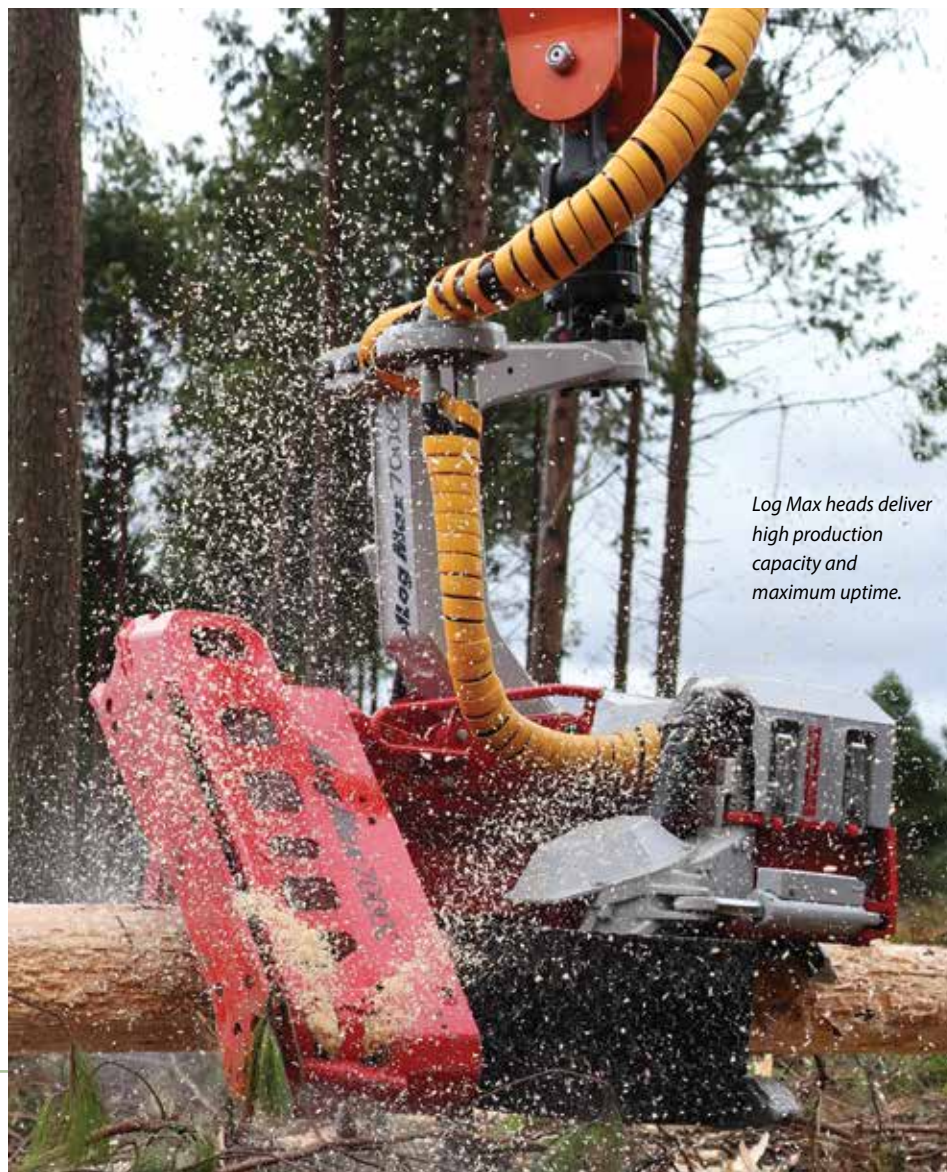
- Tigercat
- Log Max
- Morbark

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# Trees Can Fly

## ... if you've got an Alpine Shovel Yarder

Don't know about the piggy story, but Alpine Shovel Yarders have literally been making trees fly around the four corners of the globe.

Last year, just as lockdown kicked in, Alpine's agent in Canada got the first Alpine fully interlocked running skyline working in the Pacific North West. The ASY-RS450MI is currently the fastest, most powerful hydraulic interlock yarder in the market, and is setting new standards for excavator based running skylines.

Alpine's agent in New Zealand recently went down to check on an Alpine interlock and found the contractor consistently hauling in well over 8 ton payloads. Although it was designed for average loads of approximately 4 tons, it just shows you what it is actually capable of.

Competition in the excavator-based yarder market is growing fast, and Peter Allpass of Alpine Logging says he believes it is all because Alpine has helped to pioneer guy-less grapple yarding systems around the world, with bigger and bigger machines and cable sizes. This has led to excavator based guy-less yarders becoming a popular, really safe, productive, and cost effective steep terrain harvesting solution.

Peter says that the only way to thrive in this competitive environment is to stay ahead of

the pack with new and innovative products that are low maintenance and extremely reliable. All Alpine's export products are based around high production grapple yarding systems. Currently Alpine has got the most comprehensive range of Shovel Yarder packages and grapple carriages in the market.

A variety of grapple yarding options are essential, as each region of the world has developed a large part of their road network and yarder landing locations based on old choker type yarding systems that suited their terrain. Now with a world-wide switch to grapple yarding systems, the grapple system has to fit in with the existing infrastructure. For example, Chile in South America has predominately long-distance convex slopes, with the infrastructure designed around uphill yarding with a two drum skyline yarder. Excavator-based two drum fully interlocked running skyline systems are a really productive and cost-effective system in shorter distance downhill and uphill single span concave settings, where move time for big swing yarders is a limiting factor. These Shovel Yarder systems are particularly suited to Canada and

New Zealand, in their niche areas.

Hence Alpine has developed a winch-set for virtually every need, from simple choker yarding winches, to high-speed grapple logging winch-sets. The simplest being a single drum winch, which combined with a timber grapple, turns your excavator into a versatile extraction unit for log fishing, shovel logging and log loading.

Next step up, Alpine has a base model Hydraulic Running Skyline Double Drum Winch-Set for traditional choker systems. Starting off the grapple logging range of yarders, Alpine has a 400m and a 600m Double Drum Live Skyline Winch-Set for uphill skyline grapple yarding. These live skyline winch-sets come in several versions for different applications. They can be specked with or without skyline brakes and have either a power in and power out mainline drum, or an optional free-wheel mainline drum, for high-speed gravity return systems.

Then there is Alpine's top of the range fully interlocked hydraulic winch-set for high speed, high power, running skyline grapple yarding systems. This winch-set can be combined with a powerful live skyline drum to make it a truly

Alpine ASY-RS450MI high-speed grapple yarder.

versatile three drum machine, for any logging situation.

And lockdown has not stopped Alpine's development there. Recently, a large company asked for a number of rear mount winch-sets. Up until then Alpine's winch sets had all been top mount. Alpine immediately obliged, and designed the new winch-set from scratch, and within four months Alpine had their first rear mount double drum live skyline winch-set set on the floor.

Up until recently, grapple yarding has been limited to single span, concave terrain, where deflection is sufficient to allow a grapple yarding system. However, there has been continued pressure in most parts of the world to grapple every single tree wherever possible, thus totally eliminating all choker type yarding.

### Long distance grapple yarding

The last few years has seen a big push to develop grapple yarding systems that allow the steepest, long-distance, convex terrain to be grapple yarded. Previously, this terrain has been limited to multi-span skyline systems using manual choker type skyline carriages.

In pursuit of developing a multi-span grapple system, Alpine Logging had just developed an innovative, motorized grapple carriage in early 2019, that was designed to ride over intermediate supports which was fitted with special rollers, when an even better idea came out of Austria in mid-2019. Since these



An Intermediate support being rigged up for an Alpine Drop Carriage



Alpine Single Drum log fisher / shovel logger/loader.



guys did not patent their product, Alpine was quick to recognize the brilliance of their invention and quickly developed its own 'Alpine Drop Carriage' - all during lockdown.

These Drop Carriages work on the principle that the grapple carriage is suspended from a top truck which rides on the skyline cable, instead of lowering the skyline to the ground to grab or release the logs, as with all live skyline grapple yarding systems. The grapple carriage lowers itself from the top truck to the ground, and raises itself back to the top truck, by means of two cables fitted to a winch, which is housed in the carriage. Hence the name, 'Drop Carriage'.

With this system, the skyline remains tight overhead, generally in multi-span settings, using intermediate supports. The mainline cable is attached directly to the drop carriage and is only used to pull the carriage up and down the skyline cable.

The top truck carrying the drop carriage travels along the skyline cable, over the intermediate supports, as the yarder hauls in the mainline, or feeds out the mainline to return the carriage to the forest. Hence long distance severe convex slopes can now be cost effectively grapple yarded.

All these modern and innovative grapple logging systems are highly productive and are fully mechanized systems, with only the yarder operator in sight. The grapple carriages all have video cameras and transmitters on board, for the operator to see the logs he is grabbing,



Alpine Drop Carriage suspended from the Top Truck.



This massive 600m double drum live skyline winch-set will be mounted at the rear of the excavator, replacing the counterweight.

often up to 600m away from the yarder. They are also typically fitted with several work lights to allow night-time logging.

The operator's cab on the latest grapple yarders resembles a purpose built play-station room, with the operator holding onto two joysticks, tapping foot-pedals and constantly monitoring an array of machine monitors, and a large, split-screen video monitor, for a good visual of the logs to be grabbed infield. Operating one of these machines is perfect for the younger generation of play station experts, and this really is 'logging made easy'.

Where on earth have all the 'wild men' gone. 🌱

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## Wonderful wattle in Matimatolo

Continued from page 17



"From the outset it's been a wonderful partnership," adds Eza Mapipa of NTE, who has a close working relationship with Cliff and the husband and wife team. "NTE offers extension services – which includes everything from advice on fire protection, planting and harvesting. We aim to use the resources we have to empower local farmers with knowledge and skills to improve their businesses and make them self-sustainable."

Mr Ngcobo and Mrs Hlombe deliver their bark to the NTE Hermannsburg factory where it is processed for use primarily in the tanning industry. It's crucial that the bark is stripped and delivered as soon as possible after harvesting to make the best quality product out of fresh bark. Ideally it should be delivered on the same day that it is harvested, or at least within 48 hours.

### NCT Ahrens depot

Their timber is delivered to the NCT Ahrens depot. From there it is transported to the NCT chipping mill in Richards Bay and exported, primarily to markets in the East.

Transport is a major challenge for small growers in Matimatolo. Local transporters are unreliable and charge a hefty price for services – R500 for a bakkie load of bark and R1 000 for a small truckload of timber, which must be paid in cash.

"One day we hope to buy our own bakkie so that we can be totally self-sufficient," comments Mrs Hlombe. "We would also like to work towards certification, so that we can get better prices for our timber."

Eza explains that efforts are continuing to get sustainable small-scale growers like the Ngcobos certified under SAFAS, which has developed a certification system that is relevant to the African context and has been endorsed by PEFC. Although there are a number of challenges with certifying the small growers, SAFAS takes into consideration the low environmental impact of small-scale farming across the landscape and the numerous benefits of forestry to the local economy and people.

In terms of fire protection – firebreaks are hoed and all excess brush is burned to keep fuel loads down. Mr Ngcobo says that the community are quick to support one another in the case of a wildfire.

The champion tree farmers hope to buy more land in the future, with the goal of expanding their planted area to 20ha. With more small-scale growers emerging and improving their tree farms in Matimatolo, the mix of forestry and agriculture has the potential to improve the standard of living and benefit many generations to come. 🌱

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Q and A with **Simon Ackerman**, Forest Operations Research, Department of Forest and Wood Science, Stellenbosch University.

#### What is the buzz around drones?

**SA:** To some, drones are seen as a bit of a gimmick, or an annoyance with potential for contravening just about every clause in the POPI act. However, both research and industry are proving that drones truly represent an amazing new technology with the potential to produce radically new data driven solutions in land-use applications such as agriculture, forestry and conservation.

#### How can awareness of the apparent opportunities for using drones be improved?

**SA:** The Department of Science and Technology, through the Forest Sector Innovation Fund, awarded a project for the promotion and development of Precision Forestry Tools to improve the efficiency of forest operations in South Africa. Part of this funding was in support of a series of workshops in the forest sector. The Department of Forest and Wood Science at Stellenbosch University sees a need for the forest sector to take a more proactive role in ensuring a sustainable adoption and roll-out of

drone-based sampling methods and services. This includes capacity building amongst our students, drone operators, and industry players alike. Awareness of this can be generated through articles, social media, and the road trip we embarked on. An increased use of drones is obviously going to benefit both research and practice.

#### What were some of the main goals of this 'campaign'?

**SA:** The main goals of the project, and there with the series of workshops, were really to:

- Upskill the forestry industry in the application and use of tools to measure and manage our resources through the use of UAV's, including the advanced processing of these data. This is being done partly through postgraduate student projects and industry workshops
- Complement existing and develop new forms of data and data sets for use in our industry
- Create the links through academia and

industry to skills both locally and through our cooperation partners abroad who have adopted drone based data in forest research to a far greater degree than we have.

#### How was this implemented practically?

**SA:** The Forest Operations group (FOR) arranged a series of workshops on 'Drones in Forestry' during July. These were targeted at both established drone operators who needed to know more about the specifics of working in the forest sector, as well as forestry management and research staff who were interested in knowing more about potential applications, potential outputs, or just in exchanging experiences. The workshops were held at some of the major forestry hubs in the country, starting in Pietermaritzburg, followed by Mbombela (Piet Retief) on the highveld and finally, Sabie on the eastern escarpment. Unfortunately, with the 3rd Covid wave hitting just before our arriving and adjusted lockdown, the final workshop had to be held online. All in all, approximately 40 forest industry staff participated.

#### Why push for an increased use of drones in forestry?

**SA:** Drones are incredibly convenient tools for the collection of data in forestry. Plantation forests are typically between 3 000-10 000 ha, and have individual management units of 10-30 ha which need to be sampled for survival, health, growth and stocking densities more or less throughout their 6 to 25 year rotation. This is normally done on foot or through remote sensing, typically with LiDAR which has its benefits, but has a lower temporal and spatial resolution. Methods for analysing drone based data are rapidly evolving within and between research environments around the globe, and these developments provide a rich basis for research, and not least, research publications. We see lots of opportunities here, both for our industries and for ourselves, especially given that some of the species that we use have quite different attributes to those grown in Europe or North America where a lot of the research is currently being done.

#### What are the main drone payloads or sensor technologies of relevance?

**SA:** For a large part, drones carrying RGB sensors (i.e. normal cameras) are more than sufficient for the purpose of forest measurement. Through specialised software that creates stereopsis through a process known as structure-from-motion (SfM), a series of RGB images with sufficient overlap can be processed into a 3D point cloud. The point cloud is used in creating a 3D surface or digital surface model (DSM). Even consumer grade drones such as the DJI Mavic 2 with integrated camera easily meets or exceeds the needs for small area surveys in very high resolution.

A second commonly used payload is a multispectral or hyperspectral camera. A lot of people would know that these have been used for many years in agricultural settings, as the wavelengths captured in multispectral imagery can be used both in distinguishing between plant species (e.g. crop and weed), indicate the health of the crop (water stress, nutrient deficiency) or between live and dead or dying biomass, e.g. in evaluating effectiveness of a herbicide treatment.

Physical direct measurement through laser scanning (LiDAR, laser distance and ranging), using drone borne scanners, which was once prohibitively expensive for forestry applications, is becoming economically feasible



Wade Harrison of Thuthuka Forestry keeps an eye on a drone doing a pre-plant spray outside Mkhondo, Mpumalanga. He flies the drone from a platform on top of his bakkie, which provides good visibility. The drone carries 10 litres of pre-mixed Roundup, and sprays 2 to 2.5 ha per hour from an elevation of around two to three metres above the ground.



Drones can fulfil a multitude of tasks in forestry, from silviculture functions like aerial spraying to day-to-day plantation management and research.

“Drones are incredibly convenient tools for the collection of data in forestry. – Simon Ackerman”

and the applications are expanding accordingly. The benefit of LiDAR over photogrammetry based 3D models is that the LiDAR pulses are able to penetrate any gaps in the tree canopy and provide information from lower down on the stem or from the ground, which is seldom discernible in RGB data. Also, at the level of detail we can work with using drone data, it is quite essential to have a high resolution terrain model as well, and that can really only be measured with LiDAR.

Drones are also widely used in providing services, such as aerial herbicide or pesticide applications, something that is more well known in agriculture / viticulture. A couple of

these have been well covered in the SA Forestry Magazine. Interestingly, they show a strong competitive advantage over tractor borne or manually applied chemicals when it comes to being able to apply the dosage precisely and in a timely way, obviously also providing access when trees get beyond a certain practically reachable height.

#### How do drones fit in with other platforms used for remote and proximal sensing?

**SA:** Very well actually. Drone based data is mostly sampled in nadir, i.e. vertically, and is therefore 100% complementary to fixed-wing aircraft platforms (LiDAR and imagery) and



satellite based data (imagery and radar). Each have an important role to play and will continue to do so. High resolution drone imagery can be used in calibrating the interpretation of imagery from the other platforms. Aircraft can cover large areas far more economically than drones can, but are not ideal for smaller areas or specific sites, while satellites offer data with a high temporal frequency (daily) but at a lower resolution. So, ideally, one will always be working with a portfolio of data from different platforms.

#### Can anyone fly a drone?

**SA:** Actually flying the drone is the least of the challenges. Usually a survey flight is pre-programmed on a tablet in the planning office, and flown without human intervention. One does however need to have the skills to step in if something unexpected happens, and that does happen more often than not. In South Africa, the use of drones in a commercial setting is strongly regulated by the civil aviation authorities (CAA). A commercial operator is defined as anyone that receives any sort of remuneration for the work, whether in the form of a bottle of wine or even co-authorship of a research paper. We were fortunate to have Robert Britz of DroneX join our series of workshops and give a very thorough run-through of the regulations, requirements and obligations, tailor-made for our industry.

#### What do you think about these regulations that are obviously aimed at the public and the protection of private property when out in the middle of a plantation?

**SA:** It's a bit of a paradox that here in our country, one can get a truck licence for R 3 000 and drive a 45 ton truck down a crowded main road at the end of an almost unlimited shift, while it costs ten times that (R 30 000) to get a licence to fly a 950 gram drone in a remote forest area, and one must also pass a medical exam. There's some room for lobby work here. At FOR, we are planning to engage the industry in jointly applying to CAA for a couple of exceptions to the current regulations. We can also do more in regulating our own operators. Of course uncontrolled altitude is a threat to aviation, but this can be restricted in the software, and in cases where the fire bombers are working within the 100 m envelope, we as an industry should really take responsibility in developing our own protocols and regulations. If we are



Correct planning of a drone survey mission is essential in generating data of a useable quality and this is an area that needs further cooperation between forest planners and drone operators

going to exploit this new highly valuable data source, we really need every forester to have a drone in their bakkie. They have to be able to fly a compartment at short notice to document e.g. fire damage, windfall, insect or pathogen attack, harvesting or thinning progress, amount of timber on the landing, or the condition of a road or stream crossing. There is no question that the benefits will far outweigh the costs. Until then, we need to train licensed operators on the peculiarities of forests and forestry, and pay them to occasionally come by and fly a survey flight.

#### Is it possible to bring the analysis of drone data into the forestry curriculum?

**SA:** Our students will definitely need to know more about sequencing and planning data capturing campaigns, analysing the data and interpreting the results rather than actually flying a drone. They should of course not be deprived of the fun part of flying drones, but certainly it is the interpretation that is the crux. The forestry education at Stellenbosch does already include a good component of the analysis of

remotely sensed data, and other departments offer courses on digital photogrammetry, image analysis, geomatics etc., so it is really more a question of deciding to enhance these elements in the curriculum.

#### What role will the Department of Forest and Wood Science be playing with regard to 'Drones in Forestry' in the next 5 or so years?

**SA:** There is obviously an important role to play in ensuring that our graduates are equipped to embrace the data coming from drone acquisitions, just as they are for other data sources today. This process can be short circuited somewhat through promoting postgraduate projects using drone data in all aspects of forestry already today, and we are doing that. The role of the department will hopefully be one of provisioning industry research by supplying young 'experts' into the value chain. We hope that in five years time, our graduates will be just as at home with using drones and drone data, as they are with a dbh calliper today! 🌲



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# Forest Operations Research

Stellenbosch Forest Operations Research SU-FOR was established in 2019 with the aim of developing capacity in this field of forestry in South Africa.

SU-FOR is funded and supported by York Timbers, Sappi and Mondi as well as the Agrisciences Faculty at Stellenbosch University. SU-FOR has also been successful in attracting funding from the industry supporting MSc projects and broad-based Industry related projects.

SU-FOR participates in three EU projects.

- The Care4C project which is coming to the end of its life saw a limited exchange and field activity in 2021 due to Covid.
- The new Skill-For.Action project, which is in cooperation with forest operations environments in Italy, Germany, Switzerland and Spain, will include two 3-year PhD projects that will be jointly hosted by SU, York Timbers and Hans Merensky Holdings.
- The FOREST21 project is managed nationally by FSA and includes all higher education institutes in forestry in the country, with overall coordination from Finland and Norway.

The momentum generated by the unit over the last three years has been bolstered by the addition of Assoc. Prof Bruce Talbot as the Forest Operations academic anchor for this project. He brought European experience and a broad international network to our group and the Forestry Industry.

## Projects on the go in 2021 include the following: DST-FSIF projects (developing small scale growers' tools):

SU-FOR was successful in securing funding to develop a productivity and costing tool for small scale growers. The aim of this project is to develop tools to enable growers to measure and manage their operations effectively as well as enable access to training in Time and Productivity studies.

## DST-FSIF projects (developing Forest Operations Tools):

SU-FOR was also successfully awarded a project to develop FOR tools for the Forestry Industry. This project focussed on the application of new tools and technologies that can enable monitoring and measuring of forestry resources. The project has supported technology transfer (by means of workshops) enabling improved decision making when deploying UAV's. The project has supported the development of one PhD, two MSc's as well as additional data for the [forestproductivity.co.za/new-woo](http://forestproductivity.co.za/new-woo). The details of the projects are as follows:

### MSc 1 - Evaluation of a mechanized CTL harvesting system in thinning operations - Munyaradzi Makoto

Thinning in commercial pine plantations is an important intervention aimed at stimulating growth, reallocating growing area and improving stand health. This study was aimed at testing if a simple change in thinning geometry could have an impact on productivity, cost, biomass conversion efficiency, residual stand damage and spacing uniformity by comparing conventional 7th row thinning with diagonal thinning.

### MSc 2 - Post-thinning control of harvester operator consistency and adaptability using UAV derived imagery. – Hugo Zandberg



Munyaradzi, the MSc student (left) and Junior, the harvester operator (right)

Remote sensing and the use of drones is a fast-developing practise that is being utilised in many professions these days ranging from applications in Engineering to Precision Agriculture. This study was done to evaluate the effectiveness of using drones and photogrammetry to aid in the decision-making and evaluation of the efficacy of forest operations performed in modern-day forestry leading to Precision Forestry.

### PhD Study: Understanding the Effect of Compartment Uniformity on Forest Operations - Simon Ackerman

This PhD study is comprised of four parts, two of which are complete and the results are currently undergoing a peer review process, while reports for the other two are currently being compiled for submission later in the year. The components of this study aim to provide tools that can be applied to remotely sensed data (LiDAR or UAV) for effective pre-harvesting productivity management.

### PhD Study: Using appropriate and improved technology-based approach to ensure sustainability of small and medium-sized private farmers - Ms Zimbili Sibiya.

This project will therefore investigate, identify and develop appropriate and improved technology-based approaches in contributing toward the medium term economic and social sustainability of small and medium-sized farmers. The approach considers both strategic, tactical and operational decision making as well as technical productivity in the field. The project is funded by NCT Forestry.

### General SU-FOR projects:

The partner companies have supported additional projects. These are:

### "Understanding the system and supply chain effects of residue management by mulching, as compared to conventional residue management operations in pine and eucalyptus" - Leeshan Mahadeo

The aim of this study was to assess the application of two different residue management methods, namely mechanical-mulching as against burning, and the effect of this mulched and burnt material on subsequent operations, i.e., pitting and planting. Two field studies were carried out; one at a coastal Zululand site looking at eucalyptus and the other at Bulwer, southern KwaZulu-Natal, on pine. Mulch quality was assessed

separately at a third field site located in the Warburton area of the Mpumalanga highveld.

### 'A Framework for Simulating the South African Forestry Supply Chain' – Jennimi Laubscher

Historically, the South African forestry supply chain was divided up into discrete sections, namely nurseries, silviculture (growing and cultivation of trees), harvesting, transport and processing. However, when viewed from a partial supply chain perspective, optimisation within certain sections often result in poorer efficiency for other sections. This recognition has urged the South African forestry industry to look at their supply chain in a more holistic manner.

To fully understand the current forestry supply chain, information was gathered from key industry players. Process owners of different operational sections within each of the primary pulp-processing companies in South Africa were asked to present information regarding their own supply chain. The results of the exercise yielded a conceptual map of the South African pulpwood supply chain; an understanding of its parts and their interactions with one another; details of necessary interventions, opportunities and identification of potential new investigations that could spring from their research.

### 'The technical and economic potential for using winch-assist technologies in South African forestry' - Ndamulelo Raboho

In steep terrain, motor manual felling followed by cable yarding is the prevalent timber harvesting system. However, this system is associated with high risks, arduous work, low productivity and a resulting high cost. Recent developments have seen the use of specialized winches that can be attached to forest machines and allow them to operate on steeper slopes. This development has revolutionized steep terrain timber harvesting operations in a number of countries with comparable forestry, both in terms of safety, productivity, cost, and reduced environmental impact. Additional important contributions are that they allow for a greater utilisation of existing ground-based machines as well as provide access to difficult corners that cannot justify the rigging up of a cable yarder. As yet, these systems have not been adopted in South Africa.

The study will provide insight into the applicability of the new technologies in a South African context, and shed light on the likely utilization rates, distances, productivities and unit costs. In addition, guidelines for winch-assisted harvesting systems will be established to help expand knowledge and understanding of how winch systems can be utilized.

SU-FOR hosts a monthly online First Thursday presentation series. These presentations cover topical Forest Operations themes, presented by students, researchers and forestry practitioners. 🌲



An example of a winch-assisted machine, in this case a John Deere 1470 attached to a T-winch from Ecoforst (cable line is schematic).

### Enquiries

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# Global/local solution to improve sustainable forest management

SAFAS has the goal to improve the sustainability of small-scale timber growers and to ensure that they don't get excluded from markets requiring certification.

The Sustainable African Forest Assurance Scheme (SAFAS), the governing body for PEFC in South Africa, is on a mission to make forest certification accessible to all scales of forestry and to boost its value to sustainable forest management. With Sappi and NCT already certified and seven other companies in the process, it is likely that most South African plantation area will be PEFC certified by the end of 2022.

A number of factors in South Africa and globally makes the timing of this development most opportune:

- There is increasing demand by the market for certification. Certification is now essential for an organisation that is exporting and it is growing in importance for the local market as well.
- Certification is no longer enough. Markets, shareholders and investors are no longer satisfied with the fact that the forest is certified, but are asking focused questions about certain aspects of value chain sustainability. For example: labour practices or biodiversity. The practice of ESG (Environmental, Social and Governance) reporting is growing in importance.
- Smaller operations continue to struggle with certification. In South Africa, as in the rest of the developing world, there are still no credible systems that have been rolled out at scale for small timber farmers and community forestry.
- Economic pressures and accelerating technology is spawning new markets. With the explosion of new technology has come a plethora of new uses for wood based products. For example: The use of wood-based cellulose fibres for textiles is growing rapidly in fashion and nanocellulose which is continually expanding its range of applications. Currently nanocellulose fibres can be found in a bewildering diversity of products including pharmaceuticals, cosmetics, electronics, food products and rubber products to name only a few.
- Most of these new markets accept a range of globally recognised certification systems. Burgeoning economic powerhouses in the tech

world, such as China and India are asking for PEFC or FSC certification and PEFC is growing in acceptance in Japan and many European countries. Many companies are opting for dual certification in order to respond to market demands.

- PEFC is now firmly in South Africa. Sappi and NCT are certified, while eight other companies making up about 70% of the South industry are on target to get certified by the end of 2022.
- Timber theft and corruption is on the increase. There is a need to tighten up on supply chain tracking and verification to ensure that there is no longer room for criminals to operate.
- Social unrest is growing in frequency and severity. The recent riots in South Africa have highlighted the importance of industry being part of the solution to the problems of inequality, poverty, unemployment and poor educational standards.
- Increasing production costs places pressure for certification to deliver more in terms of sustainable forest management. It is critical that certification begins to drive the right behaviour by addressing the real challenges to sustainability in the national context. The industry can no longer afford for certification to be an add-on or box ticking exercise.

## New solutions for small-scale timber grower certification

After years of struggling with the issue of certifying small-scale timber growers, in 2015, a group of South African forestry organisations got

together to develop a local certification system that would be appropriate for all scales of forestry and specifically meet the needs of the smaller forestry operations and those on communal land.

It was decided that the PEFC would be the ideal partner for the development of their new approach to forest certification and applied to PEFC to endorse a South African National Certification Standard for the following reasons:

- PEFC has a track record with smallholders by certifying large numbers of small and family forests in Europe and is gaining traction in North America.
- PEFC has policies, standards and a culture which celebrates diversity, exemplified in their federalized approach.
- Countries run their own national certification systems allowing them to be sensitive to the needs of local growers
- Countries are encouraged to be innovative and flexible and are encouraged to adopt risk sensitive approaches.
- The PEFC is the largest certification system in the world with over 330 million hectares certified in 55 countries.
- The PEFC system is highly credible. According to the Central Point of Expertise on Timber (CPET) their certification systems are rated with 96% compliance.
- While PEFC lags behind FSC in terms of chain of custody certificates, according to a global consumer survey the PEFC and FSC have a similar brand recognition.

In 2017 SAFAS formed a not-for-profit company and established a Standards Development Group. The standard was developed with the following principles in mind:

- There must be a shift from a rules based to a risk based approach.
- The standard must focus on outcomes on the ground.
- Standards and policies must be written in plain language.
- There must be provision for innovation and demonstrating compliance in line with current technology.

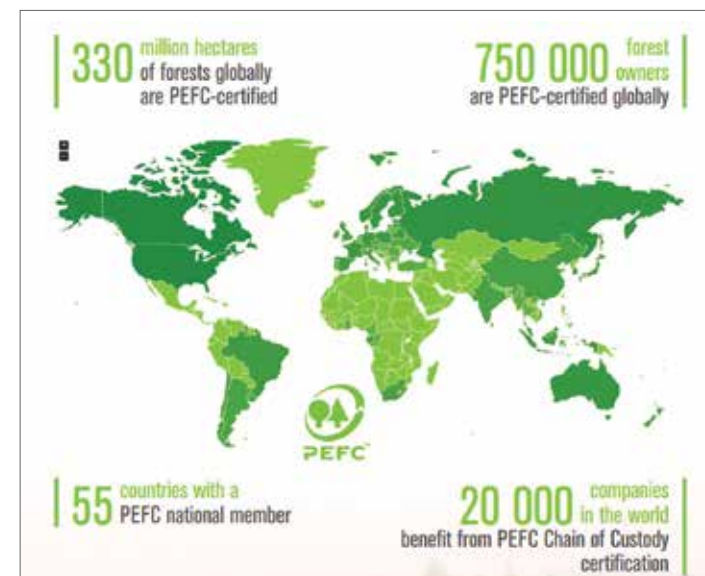
After field testing and independent review, the SAFAS standard and supporting policies were officially endorsed by the Programme for Endorsement of Forest Certification (PEFC) in November 2018. The new standard has been very well received by managers and auditors alike.

## The Value Based Platform – A paradigm shift for certification

The VBP is an online forest management support system that analyses how sustainability values are effected by forestry activities. By inputting basic data about the forestry operation, a risk profile and a host of other supporting information is provided to assist the forest manager to plan and strategize.

The VBP was designed to streamline the certification process by eliminating irrelevant or low risk criteria or indicators through conducting a risk assessment at plantation or farm level. The process effectively tailors the certification standard to the precise context in which it is to be applied. The result is that a large complex forestry business owned by a multinational corporation would have a large number of criteria and indicators to address, whereas a farmer with a few hectares of trees would have a much shorter list of requirements.

It works as follows. At the heart of the VBP is a set of Sustainable Forest



PEFC has a global footprint of 330 million hectares in 55 countries.



Manual harvesting operations have low impacts on soils and therefore compliance with indicators related to soil erosion are determined by the VBP during the risk assessment.



Heavy machines have a potential impact on soils and the level of risk depends on the erosivity of the soils and steepness of the terrain.





The VBP helps timber growers understand their risks and provides good practice guidelines to manage these risks.



Plantation landscapes vary considerably and this should be reflected the risk profile. Areas rich in biodiversity and natural beauty would have emphasis placed on criteria and indicators related to biodiversity or protection of ecosystems.



In some plantations the VBP would identify and prioritise risks related to safety and social aspects.



The VBP assists plantation managers to understand the risks and values on their plantations and to allocate resources

Management Values derived from global sustainability principles and categorised into biodiversity, ecosystem services, community, work place and economic values. As the graphic below illustrates, these correspond to the United Nations Sustainable Development Goals.

The concept is that the impacts (negative and positive) that forestry activities have on the values will vary depending on where the forest is situated and the scale of the activity. For example; 'soil retention' is a value that is essential to a plantation's sustainability. Harvesting can cause soil erosion depending on the harvesting system used and where the plantations are situated. If the plantations are on steep terrain with highly erodible soils, the impacts will be greater than if on flat land on highly resilient soils. If heavy machinery is used, the impacts will be greater than if harvesting is done manually. By entering figures for soil erosivity, terrain (steepness) and harvesting methods, the platform uses a simple model to evaluate the risk of soil loss on that plantation due to harvesting.

The process starts by completing an online Risk Survey which covers all aspects of the forestry business including information about the site, the type of forestry operations, labour and natural habitat and so on. Other information from GIS and remote sources can be used as well. These data are used to identify and rank the risks in terms of severity.

### Potential information sources for the Value Based Platform – a system to integrate data to facilitate decision making

Effectively this allows a forestry business to rank its sustainability risks and focus its management on the higher risks. For certification purposes, the SAFAS forestry management standard's indicators associated with those risks are referenced.

Using the VBP, certification at all scales becomes much more effective as a tool to improve management and the effect of this on certification of small-scale operations will be transformative.

The VBP has additional features which streamlines the certification process and provides a platform to run a group certification scheme. It provides risk data across a group of growers so that the group manager can target certain risks for group interventions. For example, training courses on health and safety.

The platform provides comparative data so that risks can be analysed across a group of plantations operated by different timber growers

The platform provides supporting information such as legislation, good practice guidelines and templates to assist in planning. In general it greatly reduces the administrative burden for the growers. A central goal is that the timber grower must have more time to engage with forestry and not be burdened with unnecessary paper work.

### The VBP has good practice guidelines to assist growers to improve their management

The VBP facilitates a dynamic view of sustainable forest management. In other words, the requirements for sustainability can vary considerably both in time and geographic area. For example, the socioeconomic conditions operating during and after the COVID-19 lockdown or riots and looting in July 2021 are vastly different to those that were prevailing 18 months before. Other changes such as climate are dynamic but over a much longer timeframe. As conditions change the risk profile of the forestry business will change and the VBP will allow the manager to understand and respond to those changes.

The context specific and up to date information on the sustainability of a forestry business provided by the VBP will assist management to respond to stakeholders who want to know more about specific aspects regarding an operation's sustainability, when preparing sustainability reports or for ESG reporting.

### A label for community timber

Small-scale timber growers on tribal authority land still face a number of challenges because they are usually operating in remote areas with poor infrastructure, lack of resources and lack of institutional support, making it difficult to comply with all legal requirements. SAFAS believes that support for these growers is a priority and is taking the following steps:

- Developing a dedicated label for community based timber to ensure that they have continued access to markets. The label will indicate that the timber comes from a community that has identified and is addressing their sustainability challenges.
- Criteria will be drafted to ensure that SAFAS certified operations are required to demonstrate their support for small-scale timber growers by providing a market for them and work with them to address their key sustainability issues.
- The Value Based Platform will be used to identify and rank the risks faced by the community as whole. 🌱

### Enquiries

For more information on SAFAS and the VBP visit:  
[www.safas.org.za](http://www.safas.org.za)



Small-scale timber growers in Matimatolo, KZN Midlands. SAFAS is developing a dedicated label for community based timber.



SAFAS works with organisations that support small-scale timber growers in tribal authority areas. Here in Matimatolo in KZN, Eza Mapipa, forestry development officer from NTE works infield with Mthandeni Ntanzi to identify some of the challenges faced by growers in the area.

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# Ponsse solutions for thinnings

Growing a productive forest requires hard work and commitment. Correctly timed thinning operations improves a compartment's growth conditions and makes trees grow bigger and faster thus maximising productivity. It also helps trees to become more resistant to pests and pathogens as they are not growing under unnecessary stress.

“Thinning can also be called improvement felling, as it ensures the productivity of the forest, and the high quality and health of trees,” says Tuomo Moilanen, forest specialist at Ponsse. “The better a forest grows, the better it sequesters carbon. Thinning ensures that trees can be processed into high-quality products that sequester carbon for dozens or even hundreds of years.”

In cut-to-length (CTL) harvesting, trees are processed and cross-cut to the intended length required in-field. It is important that the harvester operator plans trails so that they can also be used by the forwarder that will collect them and haul them to the roadside depot. This means that trees can be both felled and transported without needing to move around unnecessarily in the compartment.

“At thinning sites, the distance between trails is roughly 20 metres, and trees remaining by the side of the trail will grow in Finnish conditions 20–25% more quickly, because they will have room to grow, both above and below ground,” says Moilanen.

## Ponsse machines designed for thinning sites

The six-wheeled PONSSE Beaver and the eight-wheeled PONSSE Fox, Ponsse's harvesters in the smaller size category, are ideal solutions for first thinning. PONSSE Fox is an excellent choice, especially when operating in soft terrain. High-flotation tracks should be selected as optional equipment for softer terrain to prevent surface damage.

At heavier thinning sites, the PONSSE Cobra and Scorpion harvesters, combined with the H5 or H6 harvester head, are the best choices in terms of productivity. In PONSSE Scorpion, the unobstructed visibility in all directions, together with cabin and crane levelling, makes working smooth even at dense thinning sites. Both models are eight-wheelers and

“A lot of responsibility rests on the forest machine operator as he must decide which trees are removed and which trees are left standing.”

so also work well in soft terrain.

While Elk and Wisent are the most popular PONSSE forwarders for thinning sites, Buffalo is also an excellent choice, especially when distances are longer, and the aim is to improve productivity. The forwarder can easily pick up trees from thinning sites when trails are properly protected (with branches) and as straight as possible; the fewer sharp bends there are, the less surface damage is caused.

At thinning sites, the harvester head should be selected according to the dominant tree species. However, it should be considered that damaged trees and other trees in poor condition must also be removed from thinning sites, calling for sawing and feed force from the harvester head. The harvester head must be reliable at thinning sites because a large number of trees are produced quickly during each shift.

At thinning sites, a lot of responsibility rests on the forest machine operator as he must decide which trees are removed and which trees are left standing. This will have an impact on the productivity of the compartment at the end of the day. 🌱

## For more information

Contact Chris Odendaal at MTS Parts in Piet Retief on email: [chris@mtsparts.co.za](mailto:chris@mtsparts.co.za) or Visit: [www.afrequip.co.za](http://www.afrequip.co.za)

# Change of Management at Kwamahlati

Ashley Diack, founder of Kwamahlati Training, has retired and the management of the company has been taken over by well known forestry practitioner, James Ballantyne.

Kwamahlati has been delivering training services to the forestry industry in Southern Africa, Uganda, Ghana, Mozambique and Vietnam over the past 15 years.

“I have no doubt that James will steer Kwamahlati along an exciting new path of growth and development, whilst continuing to provide a professional and reliable training resource to the forestry as well as the agricultural sectors,” commented Ashley.

James is a seasoned forester, trainer, consultant and rural community development practitioner with extensive experience.

“We will be focusing on continuing to be the training provider of choice, and I will be looking to modernize our training materials (bringing in an element of technology) and focusing the training to continue to deliver on principles of Quality, Cost, Delivery, Environment, Safety and People,” said James.

Kwamahlati was established in 2006 with four Members: Ashley and Gail Diack, Nceba Ntloko (who has retired), and Daniel Mlindazwe. 🌱



The Kwamahlati team: Seated front (L to R) Daniel Mlindazwe, Ashley Diack, Gail Diack. Seated behind (L to R) Innocent Molaba, Bongzi Molaba, Louise van Lingen, Patrick Gqwaru.

Standing (L to R) James Ballantyne, Nceba Nikelo, Siyabonga Mthlane, Michael Khumalo, Alson Zondi, Zingisani Mlindazwe, Ben Mhlongo.

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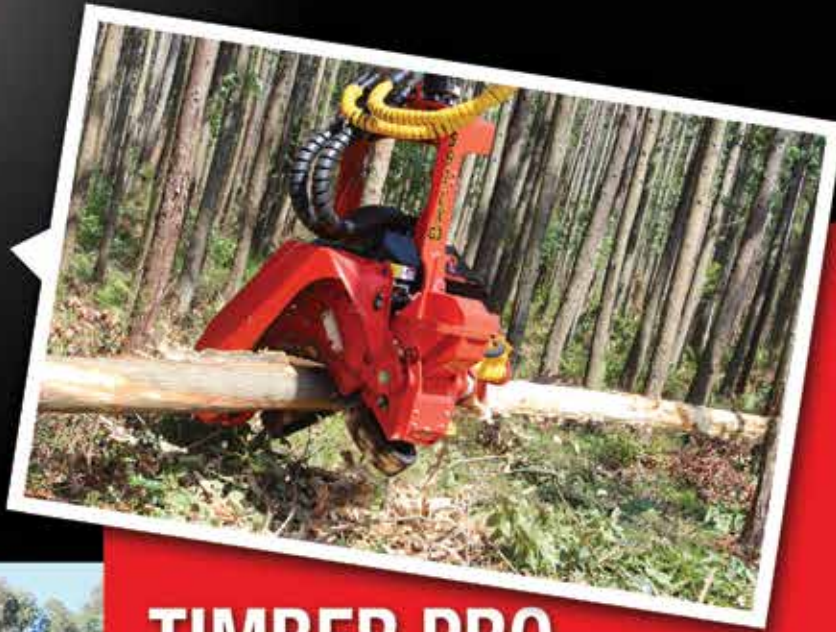
## SP 591 LX

SP harvester heads cover all felling applications, from first thinning to final felling in pine or Eucalyptus. The SP 591LX is the tried and tested head used extensively in South Africa over the past 10 years.



## SP 661E NEW IN SOUTH AFRICA

New head from SP Maskiner, the SP 661E is a super-durable, productive harvesting head designed specifically for one pass debarking of plantation-grown Eucalyptus.



## TIMBER PRO

Timber Pro purpose built forest machines, including feller bunchers, forwarders, clambunk skidders and harvesters (tracked and wheeled) are big, tough and versatile, i.e. perfectly suited to South African conditions. The combination harvester/forwarder offers unparalleled versatility and productivity, and can be changed from one application to another in 15 minutes.



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## SP's sharp new heads

SP was founded in 1978 and developed the world's first ever single-grip harvester head in 1980. Since then they've stayed ahead of the game in terms of sheer experience and productivity. During the past year the SP design and development team has focused on finalising all options and market adaptations to the SP 661 LF and SP 661 E harvester heads. These heads were released for sale in early 2018 and have quickly become SP's best-selling models globally with more than 200 units sold so far.

### SP 661 LF

The SP 661 LF is the latest design from SP. It is a compact and strong high performance harvester head designed according to SP's Low Friction concept for maximum productivity. It is designed to be versatile and offers high productivity in both small and large diameter trees.

The well protected and robust design - in combination with state of the art hose routing - ensures high reliability and uptime

regardless of tree size and harvesting conditions. The 661 LF can be customized to meet customers' individual needs. Its versatility means it is equally at home on a wheeled harvester in Europe, a tracked harvester in Canada or an excavator in the Southern Hemisphere.



SP 661 LF with HD tilt frame.





### SP 661 E – the one-pass head

The SP 661 E is designed for one task only – one pass debarking of plantation grown Eucalyptus. Highest debarking quality and productivity is achieved through a unique combination of specially designed debarking knives, replaceable bark deflectors and high-speed feeding capabilities. Thanks to the proportional pressure function on knives and feed rollers the debarking process can be adjusted for different conditions, resulting in the best possible debarking quality and a minimum of fiber damage. The SP 661 E shares the same state of the art hose routing and protected design as the SP 661 LF, and offers unrivalled reliability and uptime. It was released at the end of 2018 and is currently working in Eucalyptus plantations all over the world. The latest development on the 661 E is the addition of the HD tilt frame for a better fit to suit tracked carriers for demanding operations.

### Five innovations for maximum efficiency

- SP harvester heads in the LF and E series are designed according to SP's '**Low Friction**' concept, which comprises five separate innovations and solutions designed to maximize production, optimize fuel and energy consumption, and drastically reduce maintenance costs. Together, these five solutions provide an unbeatable combination that allows SP to offer highly productive heads for thinnings, heavy final felling or harvesting hard wood.
- The **delimbing knives** boast long, specially designed cutting edges, ensuring delimbing by cutting rather than snapping. This minimizes friction during delimbing,

thereby increasing speed and productivity. The delimbing knives are cast in high-strength steel for maximum durability and service life.

- **Proportional pressure** ensures that the head automatically always applies the optimal delimbing knife and feed roller clamping pressure on the stem, regardless of diameter. This minimizes friction between stem and head, ensuring the fastest and smoothest feed possible. Individual settings for different tree species further maximises production.
- **LogHold** enables the delimbing knife clamping pressure to be lowered even further without any risk of dropping the stem. Should the stem start to slip, LogHold reacts instantaneously, raising the clamping pressure sufficiently to hold the stem in position.
- Proportionally **angled feed rollers** ensure that the angle and carrying capacity of the feed rollers change in proportion to the stem diameter. When the feed rollers are fully open for processing large diameter stems, the feed rollers are set at their widest angle for maximum carrying capacity. This means that the clamping pressure to the delimbing knives can be minimised, which in turn reduces friction and enables the head to feed the stem quickly and easily. When the feed rollers are closed, this unique solution provides an incredibly narrow and agile head with compact dimensions.
- **Optimal hydraulics** means that pressure drops are minimized by means of the size



SP 661 E

and design of each hydraulic component, such as the motors, valve blocks, couplings and hoses. This generates high energy efficiency and the lowest possible fuel consumption per cubic meter timber harvested, with power, force, and productivity maximized during feeding, delimbing, and cutting. Due to the fact that the heads in SP's low friction concept only have two feed roller motors, the number of hoses, couplings, and bends can be significantly reduced, which also results in minimal hydraulic losses. The low pressure drops also reduce heat generation in the hydraulic system, which increases the service life of many machine components. 🌱

## RIP Doc Mahango

**D**r Diphoko Emmanuel Mahango - affectionately known as 'Doc' - passed away earlier this year. He was chairperson of the Forest Sector Charter Council since 2015. He brought a wealth of experience and wisdom to his role due to his commitment and passion for transformation and from the extensive experience he gained from previous institutions where he also served as chairman.

The Forest Sector Charter Council staff is still in shock and saddened about the tragic and unexpected passing of Dr Mahango. He was a genuine workaholic and passionate about his work, transformation in general and ensuring that transformation benefits a wider group of beneficiaries. He undertook the CEO initiative with pride as he would engage with CEOs of the forest companies and communities. He was well known in the sector as he developed special relationships with stakeholders and would often share his thoughts with them without any fear or prejudice, and more so his many jokes.

He led the Council sincerely, diligently and made it one of the best.

"Our Forest Sector has really lost a true leader. No comfort is quite enough to replace the loss and our thoughts and prayers are with his wife, children and family. Nonetheless, we are grateful for the time we spent with him and for his wisdom and we will forever cherish such



moments. Dr Mahango had a flair for words and will be remembered mostly for his unique way of giving his opinions as he seldom just agreed without putting context into the reasoning", said FSCC Executive Director, Khosi Mavimbela.

Dr Mahango had a string of degrees including Doctorates in Philosophy and in Business Administration from the University of California. He worked as a teacher, headmaster and lecturer, and was a long-serving member of the Forest Sector Charter Council where he served as chair. He served on many committees across civil society, was an accredited moderator and assessor for a number of SETAs, and even did a stint as General Manager of the Department of Roads and Transport.

Rest in Peace Doc Mahango! 🌱

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