

subtrop JOURNAL

your doorway to the subtropical industry

THIRD EDITION 2026

VOLUME 47



● Mango: Preparations for harvest



● Avocado: Dendrometers in irrigation management



● Litchi: Changing climatic conditions





WHO WE ARE

MBFi - Microbial Biological Fertilizers International is a family-owned multinational agricultural technology company founded in 2003. From its early beginnings, MBFi has evolved into a global leader in sustainable agricultural solutions, specializing in bio-stimulants, biological products, adjuvants, and green chemistry. Guided by science and innovation, the company partners with growers worldwide to improve productivity while protecting natural resources.

OUR VISION

Our vision is to shape the future of agriculture through green chemistry and biological innovation where productivity and environmental responsibility advance together. By continuously pushing scientific boundaries, we aim to enable resilient crops, healthier soils, and sustainable food systems that support farmers, communities, and future generations in an increasingly eco-conscious world globally today.

OUR MISSION

Our mission is to deliver safe, effective, and scientifically proven agricultural solutions that enhance plant growth responsibly. Through practical biological and chemical solutions, MBFi helps farmers achieve consistent performance with reduced environmental impact. We are committed to rigorous research, product quality, and trusted partnerships that drive sustainable success across diverse agricultural systems worldwide for farmers today and tomorrow across global markets.

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MBFi's impact in the agricultural market is defined by innovation, reliability, and sustainability. Our products improve soil health, crop resilience, and input efficiency, helping farmers achieve higher performance responsibly. As a trusted global partner, MBFi supports customers with technical expertise and responsive service, accelerating adoption of biological solutions and advancing a more sustainable, productive, and resilient agricultural industry worldwide.

THANK YOU TO OUR FARMERS.



CONTENTS

Third Edition

November 2026 - February 2027

Volume 47



GENERAL

- 2 Jaco Fivaz's involvement in the mango industry
- 4 Legal matters: Three issues employers should manage
- 6 SAMGA Chairman's Report



TRANSFORMATION

- 8 Avocado transformation in KwaZulu-Natal: a special focus on eMthonjaneni



SYMPOSIUM

- 10 SAMGA Research Symposium and Technical Day
- 11 SALGA Research Symposium



MARKET

- 12 Market access update



POPULAR RESEARCH

- 14 Monitoring and managing sucking bugs on avocados: new tools and emerging challenges
- 16 Calcium and boron applications on 'Hass'



TECHNICAL

- 18 Cleaning citrus and mango pack lines to reduce post-harvest fungicide residues
- 20 Preparing for the first mango harvest
- 21 SAAGA research
- 22 Balancing growth and production: Uniconazole in SA avocado orchards
- 24 The future of litchi in South Africa under changing climatic conditions
- 27 Using dendrometers in avocado orchards
- 30 South African avocado nursery tree sales and planting trends (2020/21 - 2024/25)



IMPORTANT DATES



- 5 November 2026** Subtrop Marketing Symposium
- 11 February 2027** SAAGA Research Symposium
- 6-9 September 2027** World Avocado Congress 2027, Cape Town



Based on predicted climatic changes, land suitability for litchi may reduce in the traditional production areas, particularly in the Limpopo Province and to some extent in the eastern parts of Mpumalanga. However, with the increase in climate forcing intensity, more areas in the east (Gauteng, North West, and western parts of Mpumalanga) as well as along the east coast (KwaZulu-Natal and Eastern Cape) and even pockets in the Western Cape are predicted to become more suitable for litchi production in future.

~ See page 24



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Jaco Fivaz's involvement in the mango industry

Jaco Fivaz is the General Manager of Mohlatsi Farm in Hoedspruit and has been involved in the mango industry for 32 years. He has served several terms as SAMGA chairman and has a deep knowledge of mango production and the mango industry.

Derek Donkin

SUBTROP

When it comes to mangoes, you are more than just a grower. You are passionate about mangoes. Where did it all begin?

My career started in 1994 after the completion of my MSc degree in Botany at the University of Pretoria. I started at the Agricultural Research Council as a post-harvest researcher on mangoes at the Institute for Tropical and Subtropical Crops, Nelspruit. Within a couple of weeks, I joined the horticulture department at the Institute, and under the mentorship of the late Dr Piet Stassen, I started assisting in pruning trials on mango trees. Three years later I joined Merensky Technological Services and two years after joined the Bavaria Estate team. I worked five fantastic years at Bavaria and then together with my wife became the managing couple for Mohlatsi Farm.

Mango production boomed in the 1990s then declined in the early 2000s. Why did this happen?

I have seen a lot of changes in the mango industry over the past 20 years. The sudden decline in the early 2000s was caused by the unexpected export changes of Peruvian and Brazilian mangoes. The Euro became stronger than the US dollar and more volumes were flowing from Peru and Brazil into Europe. South Africa exported over 4 million cartons per year into Europe by 2002, but volumes suddenly dropped below 200 000 cartons after competing with more than 16 million cartons from Brazil and Peru. I believe this caused the decline in the industry. Hoedspruit - the largest mango production region - also became a popular hub to produce lemons, and more than 2 000 hectares of mangoes were removed and replaced by lemons, grapefruit, and other citrus varieties.

Many mango orchards have been replaced with citrus, yet you continue to be mango focused. Why is this?

I remain focused on mangoes because this is the crop that I got to know while working at the ARC, Westfalia, and Bavaria. I also believe there is so much knowledge in the citrus industry and with me now farming citrus, it is easy to phone someone to assist with growing the crop. In the mango industry there is still so much more to learn, and I want to discover what is not known to us.



Jaco Fivaz

Are you optimistic about the future of mango production in South Africa?

I am extremely optimistic about mango production in South Africa. There are so many exciting new cultivars and selections on the horizon and I strongly believe we have so much more to learn to obtain higher yields. I hold the view that we are in the early days of an exciting industry. There are a lot of knowledgeable people out here in our industry, but we have so much more to learn about this crop.

You are an advocate of high-density planting. Why is this?

I have seen what high density offers to the deciduous fruit industries and cannot accept that it cannot play a significant role in our industry. We have been harvesting and keeping



record of single trees in a specific mango orchard at Mohlatsi Farm and found that more than 5% of trees in this orchard have the ability to produce in excess of 100 tons per hectare. And this is not even an extremely high-density orchard. To me, one of the best ways we can surpass 100 tons per hectare is through high-density orchards.

What does a mango grower need to do to be successful?

This is an extremely difficult question. I have seen that a farmer might do everything according to the book but still have bad yields and poor quality. Unfortunately, the problem remains that climate overrules everything. What I do strongly believe is that there is sufficient knowledge on post-harvest decay control, fertilization, and irrigation as well as information on pruning. I am very hesitant about fancy expensive fertilizer programmes and very reluctant to spray all sorts of new chemistry as foliar feeds. Just stick to the basics and follow the recommendations. I also have terrible seasons, but the two major things that a grower should never neglect are proper spraying for pest and disease control (do not cut costs) and proper pruning. Leaving dead panicles on a tree is detrimental to next season's quality and yield. Good quality mangoes will always sell. And, if I may add, growers should think out of the box when it comes to pruning and tree density.

You have been on the SAMGA Board for many years and have served a number of terms as chairman. Why is it important to have an industry body such as SAMGA?

I am sometimes dumbfounded that growers do not believe in SAMGA. I have been part of SAMGA for more than 20 years and have seen some minor failures in SAMGA but, more so, I have seen tremendous growth in our industry and major successes. If it was not for SAMGA sponsored research we would not have had:

- Answers for black spot control in the early 2000s until recently.
- Excellent post decay control programmes.
- Fantastic control measures for mango seed weevil.
- Alternatives to prochloraz.

- Yields starting to improve due to cultivar choices and pruning.
- New cultivars. Imagine if we still had to farm with Sabre, Peach, Dwarf Kidney, Zill, Irwin, and Haden.

I do understand that sometimes a research project does not produce the answers we wish to get but a negative result is a result. No private individual farmer has the capability or financial ability to coordinate research, capture information on MRLs and residues, develop new mango cultivars, liaise with government, access new markets, and get daily local market information and export marketing information for such a small contribution. I have been in this industry long enough to realise not all answers are obtained within one season nor does everything go according to plan every year.

Are there any other points you would like to mention?

I am seriously concerned that many younger generation farmers do not actively participate in SAMGA. There is often little interest in assisting with study groups, actively participating in research, and serving on SAMGA's board.

I have to acknowledge and admire the impact numerous growers, researchers, and consultants have had on my farming practices and, without a doubt, have significantly impacted our industry. I feel it fitting to mention them by name in no order of importance:

- The late Dr Piet Stassen
- The late Mr August Winter
- The late Dr Lindsey Milne
- Johann du Preez
- Gerhard Mostert
- Johan Botha
- Marius Boshoff
- James Lonsdale
- Estelle Louw
- Flip Roodt
- Tom van der Meulen
- Numerous consultants from Novartis, Syngenta, and Laeveld Agrochem. 🌱



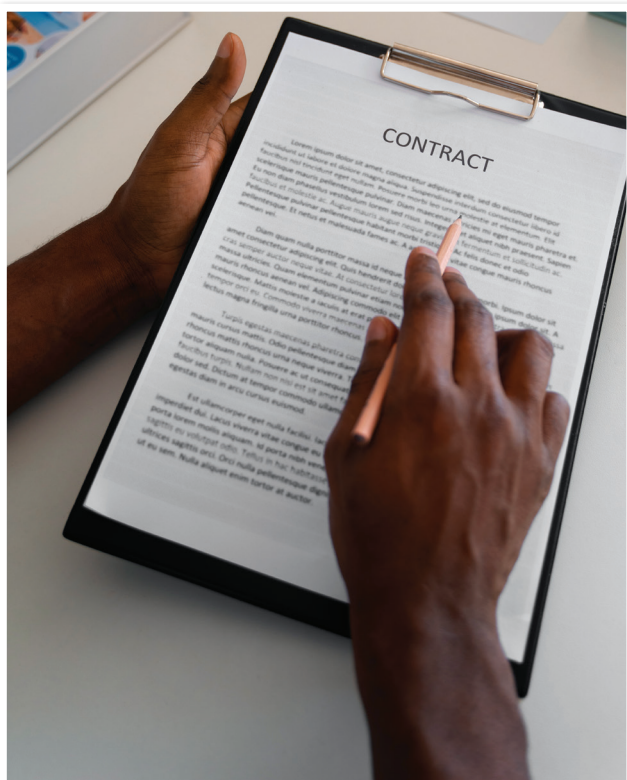
Three issues employers should manage

When an employment relationship begins, the parties often do not yet know each other. The relationship formally commences on the employee's first day of employment or, it may even be argued, it starts during the interview process, as the employee is expected to be honest about qualifications and abilities.

Hannes Latsky

LWO EMPLOYERS ORGANISATION

In the busy world of running a business, it is easy to overlook formal paperwork when you are excited about welcoming a new team member. You shake hands, agree on the basics, and get to work. But skipping a proper written employment contract can quietly create headaches that cost time, money, and relationships down the line. One of the biggest mistakes employers make is not to implement written employment contracts, or to settle for a generic employment contract that offers minimal protection when there is a dispute in the workplace.



South African Labour Law requires employers to provide written particulars of employment to confirm key details of the working relationship from the start of employment. Labour Law in the agriculture sector is no different in this regard in terms of the Basic Conditions of Employment Act, Act 75 of 1997 (BCEA) and Sectoral Determination number 13 (SD13). Without this clarity, both parties often face unnecessary uncertainty, especially around daily duties and expectations.

From the first day of employment, the employee owes a duty of good faith to act in the employer's best interests when performing their duties. An employment contract should clearly outline the obligations of both parties, and employees should be made aware of the consequences of failing to meet these obligations. Several common workplace issues can undermine the trust relationship between employer and employee and should be addressed proactively.

Misconduct

If an employee commits misconduct in the workplace, disciplinary action should follow.

Solution: Employers should ensure that a disciplinary code is in place and that all employees are aware of it. A disciplinary code sets out workplace rules and the consequences of breaking them. The type of warning or sanction depends on the severity of the misconduct. Employers should keep attendance registers and minutes of meetings when discussing the disciplinary code with employees.

Where dismissal is a possibility (usually for serious or repeated misconduct), a disciplinary hearing must be held before any decision is made. The employee must be given an opportunity to present their case during a fair process. Dismissal is generally reserved for serious or repeated misconduct where the trust relationship has broken down irreparably.

Conflict

Employees may sometimes struggle to get along, or personal issues may interfere with workplace harmony. Employers cannot simply ignore such conflict.



Solution: Employers should intervene as soon as they become aware of the situation to prevent it from spreading and affecting others. The matter should be investigated, consultations held with the parties involved, and a solution sought that is fair and workable for all thereby avoiding further disruption.

Poor work performance

If an employee's work does not meet performance standards or is of inadequate quality, the employer must follow a fair process, typically through a poor work performance consultation procedure.

Solution: During consultation, the employee should be informed of the specific areas where performance is lacking. This initial discussion is crucial as it allows the employee to respond and may reveal underlying causes such as insufficient training, adjustment to a new system, or misunderstanding of expectations. Employers should provide the necessary training and guidance, monitor progress over a reasonable period, and hold follow-up consultations to assess improvement. If performance does not improve despite genuine opportunities and support, a formal poor work performance hearing may be scheduled, which could lead to serious consequences, including dismissal in certain cases.

Conclusion

Across all three issues mentioned here, employers should maintain proper records, including attendance registers and minutes of consultations or disciplinary proceedings as these may prove invaluable if a dispute arises.

A healthy employment relationship is built on clear expectations, open communication, and fair workplace practices. From the outset, employers should establish clear boundaries and ensure that employees understand their rights, responsibilities, and the standards expected of them. Where issues arise, they should be addressed promptly and in accordance with fair policies and procedures.

Restrictive labour regulations are considered one of the most problematic factors when it comes to doing business in South Africa. Employers need to realise that by making a mind shift and proactively managing the business risk associated with Labour Law compliance, they are positioning themselves best for the employment relationship going forward.

Disclaimer: This information is not intended as legal advice and is given for information purposes only. The LWO, Subtrop, and Publisher accept no liability for any loss suffered from reliance on this information. Due to the complexity and sensitivity of these situations and depending on the facts of each case, different remedies and procedures may apply. It is therefore always advised that the reader seek expert labour law assistance and advice to ensure that the correct processes are followed and to limit the reader's risk. ♦

The LWO assist employers to comply to labour law. The organisation is registered with the Department of Employment and Labour and, as such, is authorised to represent its members (employers) at the CCMA, bargaining council, and Court of Labour. Contact the LWO Employers Organisation, available 24/7, for more information or assistance: Tel. 0861 101 828; e-mail info@lwo.co.za; visit the website <https://www.lwo.co.za>



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SAMGA

Chairman's Report



Emile van der Westhuizen
Chairman: SAMGA

A season of records

The 2025/26 mango season was characterised by several challenges. The most pertinent of these is a rainfall season that will be remembered for, perhaps, generations to come. After a cold winter resulting in early even blossoming, a temperate spring and summer, good fruit set was evident across all growing regions. The crop was estimated to be significantly better than 2024/25, but the actual figures likely surprised most, if not all, growers.

From January 2026 onwards, record rainfall was recorded in the Lowveld region, with some areas receiving up to three times the normal annual rainfall. This, together with the heavy crop, resulted in delayed harvests, pressure on outlets such as local markets, processing and juice factories, and export markets.

Furthermore, the situation in the Middle East exacerbated these challenges from Week 9 until the close of the season, with several growers severely impacted.

Every season has its challenges, some more than most. This, once again, emphasises the need for a coordinated effort by South African and African growers to align and optimise growing and marketing strategies and create a more resilient industry. With all the current challenges and uncertainty and El Niño looming, now is more important than ever.

The following sections will provide feedback on responses to these challenges to date, and the broad strategy going ahead as defined by the SAMGA Board and industry role players.

Strategic priorities and recommended actions for the year ahead

Over the past year, various Board meetings and stakeholder engagement actions highlighted the need for a coordinated industry action programme aimed at improving grower returns, improving fruit quality, reducing peak-season market pressure, and building a more resilient mango sector. I should emphasise that these priorities require cooperation between growers, marketers, exporters, processors, retailers, researchers, government, and industry partners. The following pertinent themes form the basis of the programme:

Improve quality and maturity control: Fast-track enforceable local market maturity standards, reduce early harvesting of immature fruit, improve eating quality and market presentation across all channels, and focus on sugar content as internal colour can create a loophole for ethylene-treated fruit to colour before being placed on the market. Progress

has been made during the past year, and a formal research project will be launched to inform proposed standards.

Strengthen market intelligence: Provide annual tree census updates, early crop estimates, weekly export forecasts, daily local-market information, PPECB inspection data, and shipment updates to support better planning and decision-making. The past season has seen the successful implementation of the SAMGA dashboard where members were kept up to date with market conditions. The dashboard will be further refined in the coming season.

Build regional coordination: Visit mango operations in Tanzania and Mozambique to improve sharing of information, understanding of phytosanitary treatments, and early-season market planning to prevent flooding of South African markets.

Coordinate local demand creation: Establish a local market development committee and work with retailers and food-service partners to increase mango sales during the peak season, including campaigns targeting the festive-season period where sales are traditionally slow.

Expand export and processing opportunities: Prioritise development of the Middle East export market, gather data on worldwide juice markets and trends, grow dried mango exports, strengthen cooperation amongst processors, and maintain long-term market access work for markets such as India, USA, China, and Vietnam.

Build production resilience: Support growers in responding to climate variability, water constraints, pest pressures, input costs, and operational risks through practical research and technical communication through coordinating efforts with academic institutions such as the University of Pretoria. Research priorities focussed on cultivar evaluation, MRL research, bacterial blackspot, blossom malformation, local market quality standards, post-harvest alternatives, and technical capacity building.



Prioritise research and cultivar diversification: Focus research on measurable on-farm and post-harvest value, continue evaluating cultivars from the ARC and others, and encourage earlier and later alternatives. Work with expert cultivar management companies with a worldwide footprint.

Support transformation and industry collaboration: Expand emerging-grower support through technical capacity, mentorship, and commercial linkages while deepening collaboration across the subtropical fruit sector with government, logistics partners, and research institutions.

Closing remarks

The Association's strength lies in the commitment of its growers and the willingness of the broader value chain to work

together in the interests of a competitive, sustainable, and inclusive mango industry. The year ahead will require discipline, innovation, and cooperation, but it also presents meaningful opportunities to improve quality, grow demand, support emerging producers, and build long-term value for members.

I thank every grower, committee member, partner, sponsor, researcher, and staff member who contributed to the work of the Association, and I encourage all members to remain actively involved in shaping the future of the South African mango industry. ✦

Emile van der Westhuizen

Chairman: SAMGA

7



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Avocado transformation in KwaZulu-Natal: a special focus on eMthonjaneni

eMthonjaneni, formerly known as Melmoth, has emerged as one of South Africa's most significant examples of successful agricultural transformation through commercial avocado production. Once characterised by uncertainty surrounding land restitution, the region has evolved into a thriving hub of community owned commercial agriculture, demonstrating that land reform, when supported by strategic partnerships and sound governance, can create sustainable economic opportunities.

Stephen Mantsho
SUBTROP

Today, community-owned avocado orchards in eMthonjaneni supply premium fruit to both domestic and international markets while creating employment, developing skills, and generating wealth for hundreds of beneficiary households.

A new chapter through land restitution

Following a lengthy land restitution process, thousands of hectares of commercial agricultural land were restored to communities between 2019 and 2020. The restored land included highly productive avocado orchards, sugarcane plantations, and timber operations, providing communities with

valuable agricultural assets rather than undeveloped land.

The major beneficiary communities include: Entembeni Community Trust, Entembeni Royal House Community, Isizwe Sakwa-Dludla Community Trust, and eMakhasaneni Community.

Collectively, these communities now own approximately 6 800 hectares of commercial farmland, including more than 320 hectares of commercial avocado orchards, making the area one of the largest community owned avocado production clusters in South Africa.

Building commercial avocado enterprises

Unlike many land reform projects that struggle to maintain productivity after transfer, the eMthonjaneni model prioritised business continuity.

Commercial avocado production continued through co-management arrangements that combined community ownership with professional farm management, technical expertise, governance support, and skills transfer. This approach ensured that export production continued while beneficiary communities progressively developed the capacity to manage



Farm management of the four farms with Franco Stander from Subtrop (centre) during the study group.





Zulpack activities during harvesting season.

sophisticated commercial farming enterprises.

The orchards produce predominantly 'Hass' avocados alongside complementary cultivars suited to export markets. Current avocado production includes approximately:

Community	Avocado area
Entembeni Community Trust	121 ha
Entembeni Royal House	80 ha
eMakhasaneni Community	68 ha
Isizwe Sakwa-Dludla Community Trust	54 ha

Partnerships driving transformation

The success of avocado transformation in eMthonjaneni demonstrates the importance of collaborative partnerships.

Government facilitated land restitution and post-settlement support, while strategic agricultural partners provided farm management expertise, governance support, graduate development programmes, mechanisation, working capital, and enterprise development. These partnerships have enabled communities to retain commercial production while simultaneously investing in long-term community capacity.

Besides avocado production, additional businesses have been established to diversify community income including livestock, sugarcane, and other agricultural initiatives.

Creating opportunities beyond farming

Transformation in eMthonjaneni extends beyond land ownership. Commercial avocado production has become a catalyst for:

- Permanent and seasonal employment.
- Skills development for local youth.
- Graduate internship programmes.
- Leadership development within community trusts.
- Increased participation of black growers in export agriculture.
- Local economic development through agricultural value chains.



A farm worker loading avocados during harvesting season.

By maintaining access to export markets while investing in people, the project demonstrates that transformation can simultaneously improve livelihoods and strengthen commercial competitiveness.

The role of Subtrop

Subtrop continues to support transformation within the avocado industry by strengthening technical capacity, facilitating knowledge exchange, and improving market readiness for black commercial growers.

Through technical training, study groups, farm visits, mentorship programmes, and industry partnerships, Subtrop contributes to developing sustainable black-owned commercial avocado enterprises capable of competing in global markets. The establishment of the Melmoth Study Group further reflects this commitment by providing a dedicated platform for commercial avocado growers in KwaZulu-Natal to share knowledge and adopt best production practices.

Looking ahead

The eMthonjaneni experience offers valuable lessons for agricultural transformation across South Africa. Its success demonstrates that land restitution alone is not sufficient. Sustainable transformation requires secure land rights, effective governance, commercial management, technical support, access to markets, and continuous skills development.

As global demand for avocados continues to grow, the community-owned orchards of eMthonjaneni are well positioned to expand their contribution to South Africa's export industry while delivering lasting socio-economic benefits to hundreds of rural households.

The story of eMthonjaneni is therefore more than a land reform success; it is a demonstration that transformation, when underpinned by partnership, professionalism, and shared purpose can build competitive commercial agriculture that benefits both communities and the national economy. ♦



SAMGA Research Symposium and Technical Day

Lowveld Country Club, Mbombela, July 2026



SALGA Research Symposium

Halls Training Centre, Mbombela, June 2026





Market access update



The most important thing of a Minister of Agriculture is that we must let our farmers farm the way they know how to farm. Our farmers are excellent farmers, they are the best in the world, and they know exactly what they are doing ... we must make it easy for the farmer to farm. This is the government's responsibility¹ – Willie Aucamp

James Mehl
SUBTROP

Recently I had the opportunity to accompany a delegation of officials from the South African Department of Agriculture (DoA) on a visit to a SAAGA member's farm and another member's packhouse. The visit serves to remind officials of the importance of the work they do: that **g**aining access to a market and **r**etaining and **o**ptimising that access (**GRO**wing access) contribute positively to profitability on farm, to the well-being of the industry, and ultimately, to the economy of the country. It also helped highlight to the officials that they serve the needs of an industry, albeit some distance away from the offices in Pretoria, that has several challenges and compliance issues that go into production of an avocado. If one considers how much money goes into production overheads (including fertilizers, irrigation, and energy costs²), labour, packhouse costs, audit costs, security to mitigate theft, and many others that are unintentionally omitted, then retail costs on a carton of avocados seem unfairly small at R150³ a carton.

Similar to hidden costs and what happens in the background, is the fact that the DoA handles other market access applications and the exchange of information related to other commodity organisations, and not just those relating to

avocados, mangoes, litchis, or kiwis. Indeed, until the news broke, we did not know that access for red meat products to China had been halted, highlighting the fact that market access issues can also be a problem for other associations. We must also bear in mind that a market/country that one of our members wants to access, must process applications from other applicants, and not just South Africa. Using China as an example and depending on whether countries are grouped or not, China trades with over 120 partners and potentially as many as 240 countries.

¹ Translated directly from Afrikaans: Die belangrike ding van 'n Minister van Landbou is dat ons moet ons boere toelaat om te boer soos wat hulle weet om te boer. Ons boere is uitstekende boere, hulle is die bestes in die wêreld, en hulle weet presies wat hulle doen ... ons moet dit vir die boer maklik maak om te kan boer. Dit is die regering se verantwoordelikheid.

² We are now seeing electrification of vehicles which will eventually translate into savings on production costs. Within the next 30 years, in my opinion if not earlier, battery powered electric vehicles charged by renewable energy sources such as solar power, will become the norm. And this also extends to shipping

³ One has to ask: on a carton of 20 avocados, R150 translates to R7.50 per avocado. Is this fair remuneration considering loss factors, culling of fruit, and grading for processing?





AVOCADOS

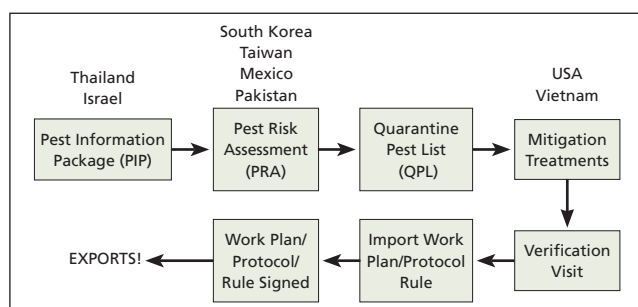
USA: A proposal for a Systems Approach has been submitted. The USDA-APHIS⁵ need to first finalise a revised PRA.

Other markets: Applications have also been submitted for access into Taiwan, South Korea, Vietnam, Thailand, Israel, Mexico, and Pakistan. Information on the progress of these applications is available to our members upon request and in the avocado app.

Changes to protocols

China: The Systems Approach proposal will be processed by the GACC⁶ once access for cherries has been finalised.

Japan: The MAFF⁷ consider the Systems Approach proposal a new application, and will only process this once citrus, table grapes, and blueberry applications have been processed.



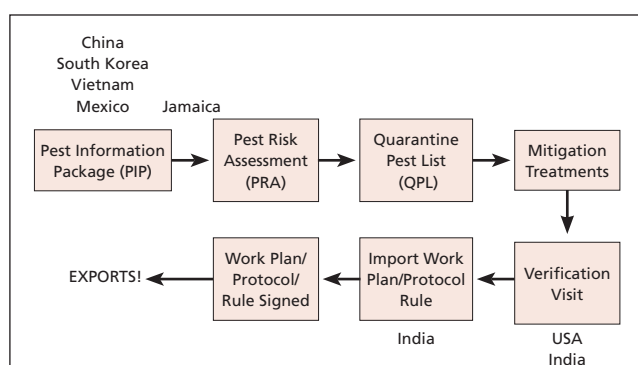
⁵ USDA-APHIS – United States Department of Agriculture Animal and Plant Health Inspection Service

⁶ GACC – General Administration of Customs of the People's Republic of China

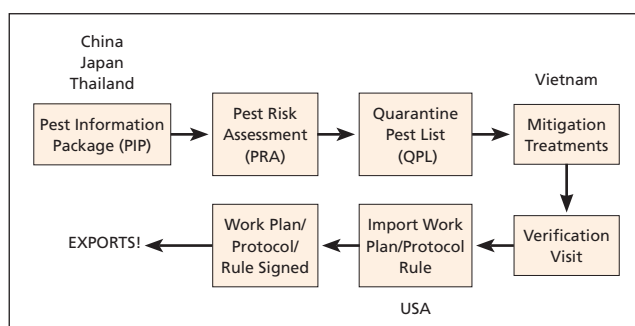
⁷ MAFF – Japanese Ministry of Agriculture, Forestry and Fisheries



LITCHIS



MANGOES



USA: Comments on a draft work plan were sent to the USDA-APHIS in July 2023.

China: Access for SA cherries and SA blueberries are to be granted before the application for SA mangoes can be processed. The updated PIP has been sent to the DoA.

Japan: Extended access for SA table grapes (the Crimson Seedless variety – current access into Japan only allows for imports of the Barlinka variety) and SA citrus need to be finalised before the PRA for SA mangoes can be processed. A Systems Approach proposal to mitigate against the risk of mango seed weevil being present in consignments, will be submitted once additional research has been done.

Other markets: Applications for access into Vietnam and Thailand have also been submitted.

India: An operational workplan or WTO notification is pending for this application.

China: The PIP for SA litchis was submitted in 2012 but will be revised in future.

Other markets: Applications for access into South Korea, Vietnam, and Jamaica have also been submitted.

Change to protocol

USA: Feedback on two cold treatments, as alternatives to irradiation, is pending from the USDA-APHIS. 💎





Monitoring and managing sucking bugs on avocados: new tools and emerging challenges

Stink bug damage on avocado orchards has shown a steady increase in recent seasons, often reaching its highest levels of symptomatic fruit in April. This timing is particularly challenging because registered broad-spectrum insecticides can no longer be applied safely due to the risk of exceeding Maximum Residue Levels (MRLs) close to harvest.

Dr Schalk Schoeman¹
Dr Shandukani Netshifhefhe² and Ms Amologeng Ngobeni²

¹SONBESIE CONSULTING

²TSHWANE UNIVERSITY OF TECHNOLOGY

To improve monitoring and support more environmentally friendly management, researchers evaluated pheromone-based traps for the sucking bug complex (mainly Pentatomidae, or shield bugs) affecting avocados in the Nelspruit region of Mpumalanga.

Materials and methods

The study used A3 black sticky traps (Fig. 1) baited with a kairomone lure containing methyl-(2E,4E,6Z)-decatrionoate (MDT) combined with the feeding attractant murgantiol. This lure was originally identified from the Asian stink bug *Plautia stali* and is widely used internationally to monitor the brown

marmorated stink bug (*Halyomorpha halys*). Traps were placed inside the tree canopy on horizontal branches on three commercial avocado farms.

Traps were checked every two weeks, and lures were replaced every six weeks according to manufacturer recommendations. On one farm, the influence of trap colour was tested by comparing red, blue, and yellow traps placed along an orchard edge bordering natural vegetation.

Results

The traps proved highly effective. Between April and June 2025, a total of 280 stink bugs representing 11 species were captured on two farms. The most abundant species were:

- *Parachinavia prunasis* (45.4% of total catches)
- *Antestia dollingi* (39.6%).

During the early season (October to February), catches remained similar in number but showed lower species diversity. Notably, an unidentified *Halyomorpha* species was much more common during the flowering period.

Trap colour had a strong effect. Blue traps captured more than double the number of bugs compared to yellow traps and showed slightly higher species diversity per trap (Table 1).

A particularly interesting finding was the repeated capture of a *Halyomorpha* sp. bug. Initial molecular analysis showed a close match (90.39%) to the highly invasive brown marmorat-



Figure 1. An example of a pheromone trap used during the initial part of the project.

Table 1. The effect of trap colour on trap catches as well as species diversity

Parameter	Colour		
	Red	Blue	Yellow
Total number of stink bug individuals/trap over 14 weeks (average)	46 (3.29)	66 (5.71)	28 (2.0)
Average number of species/trap over 14 weeks	1.93	2.5	1.57



Figure 2. Suspected *Halyomorpha* sp damage to an avocado inflorescence.

ed stink bug (*Halyomorpha halys*). Further identification work pointed toward *Halyomorpha picus* or possibly *Halyomorpha bimaculata*. This insect has since been found in macadamias in Mpumalanga and in avocado-growing areas of Malawi and Zambia, suggesting it is likely widespread in the region and not a new introduction.

Morphologically, the bug closely resembles the indigenous *Pseudatellus raptor*, which may explain why it could have been overlooked or misidentified in earlier surveys. Observations in the field suggest it feeds on avocado flowers, causing wilting (Fig. 2). Damage studies are planned to determine its actual economic impact.

Biological control potential

The relatively high diversity of Pentatomidae species caught raises the possibility of using biological control agents. A trial with the commercially available egg parasitoid *Trissolcus basal* was started in October 2025 and provisional results indicated that it holds significant promise. Additional trials with *Telenomus* sp. as well as with *Psix striaticeps* have already been initiated during February 2026.

If the presence of the true brown marmorated stink bug (*H. halys*) is confirmed, the well-known Samurai wasp (*Trissolcus japonicus*) could also be considered for future releases (subject to regulatory approval).

Conclusions and recommendations

This study demonstrates that pheromone-baited sticky traps, particularly blue ones, offer a practical and effective method

for monitoring the stink bug complex on avocados. The sucking bug community appears far more diverse than previously documented, highlighting the dynamic nature of pest pressures in subtropical orchards.

Key points for the industry

- Accurate monitoring is essential for timely and targeted pest management decisions.
- Several stink bug species are active during flowering and fruit development, making early-season monitoring especially important.
- The discovery of *Halyomorpha* sp. across South Africa, Malawi, and Zambia underlines the need for improved biosecurity, particularly regarding cross-border road transport in the SADC region.
- Further work is required to confirm the identity and impact of the *Halyomorpha* species, as well as to quantify damage caused by dominant species such as *Antestia dollingi* and *Parachinavia prunasis*.
- Biological control options using egg parasitoids show promise and should be explored further.

The Department of Agriculture has been notified of the *Halyomorpha* findings, and expanded surveys, damage studies, and mitigation strategies are recommended.

This research provides a foundation for shifting avocado pest management toward more integrated, sustainable practices in the face of increasing orchard plantings, pesticide restrictions, climate pressures, and biosecurity risks. ♦



Calcium and boron applications on 'Hass'

Both calcium (Ca) and boron (B) play critically important roles in avocado nutrition and phenology. A project by Danie Lemmer of ExperiCo sought to identify which products, supplying either or both nutrients to 'Hass' avocado trees, were effective and what were the optimal application timings that resulted in increased leaf and fruit contents.

James Mehl

SUBTROP

Boron (B) is essential for flower formation, pollination, pollen tube growth, and early fruit set. It drives carbohydrate metabolism (including sugars, starch, and cellulose), nucleic acid synthesis, calcium transport, and tissue development at the apical meristems of shoots, branching points, flowers, fruit, and roots. Acting in synergism with Ca, B reduces developmental disorders at these growing points. Furthermore, it maintains cell structural integrity by cross-linking pectic substances to strengthen cell walls and by bridging the cell wall and plasma membrane (Ryden *et al.*, 2003; Voxeur and Fry, 2014).

Calcium (Ca) acts as an essential building block of cell

walls and is vital for cell division, cell elongation, and maintaining normal cell membrane function and permeability. It binds directly with plant cell membrane lipids and proteins to stabilise them, helping to maintain subcellular compartmentation (Jacobson and Papahadjopoulos, 1975; Kirkby and Pilbeam, 1984; Legge *et al.*, 1982; de Freitas *et al.*, 2011). By forming cross-linkages with pectin gels in plant cell walls, calcium provides mechanical strength to fruit tissues and confers protection against cell-wall degrading enzymes (Wehr *et al.*, 2004; Hocking *et al.*, 2016).

Ultimately, these functions reduce internal fruit quality problems and work in synergism with boron to minimise the incidence of disorders at growing points. In this project, Ca applications were influenced by the fact that the need for Ca is greatest in the first 8 weeks following fruit set before stomata become non-functional lenticels and the waxy cuticle thickens, limiting transpiration and nutrient absorption.

A third element, silicon (Si), polymerises beneath the cuticle and in cell walls, forming a double-layer Si cuticle that provides structural rigidity and resistance against pathogens and heat stress through improved antioxidant defence. It strengthens fruit tissues (Dehghanipoodeh *et al.*, 2016; Marodin *et al.*, 2016) and activates plant defences against pests and pathogens (Islam *et al.*, 2020), while slow-release formulas show potential for tree health but require further research (Dann and Le, 2017).

Products tested are listed in Table 1. Soil treatments were applied as a drench, and foliar applications were timed while stomata were functional i.e., during specific growth stages e.g. cauliflower stage (2024 report), early flowering stages (2025 report), and with the cauliflower and early fruit set stages (2026 report). Products applied through foliar sprays were more effective when applied to new growth (summer leaf flush) rather than to hardened leaves.

Results are bulleted and organised under different areas of focus:

Ca

- Prior to the 2024 season, heavy rainfall had leached Ca present in the soil resulting in levels being lower than the norm.
- As expected, foliar applications of Ca products resulted in increases of leaf Ca contents.
- Both calcium nitrate and CaTs were best for increasing leaf

Table 1. Products tested in this project

Company	Product	Nutrient supplied	Method of application
Unknown	Calcium nitrate	Ca	Drench
Ground up Fertilizer	Microflex Super	B, Fe, Mn, Zn, Mo, Cu	Drench
Levity Crop Science	Indra ¹	B	Foliar, drench
	Albina	Ca	Foliar
	DAMU	B	Foliar
AECI Plant Health	Spraybor	B	Foliar, drench
	Flo-Bor	B	Foliar, drench
	Calcimax	Ca	Foliar
Cosmocel	Mainstay Calcium	Ca	Foliar
	Trazex Ca + B	Ca, B	Foliar
	INEX-A ²		Foliar, drench
Tessenderlo Kerley	Calcium thiosulphate (CaTs)	Ca, S	Drench
DuxAgri	InCa	Ca, B	Foliar
	Boro-Pro	B	Foliar, drench
	Purcal	Ca	Foliar, drench
	Eckosil	Si	Foliar, drench
Nutrico	Soluble Boron	B	Foliar, drench

¹Only tested in 2024

²INEX-A is an adjuvant/surfactant that functions as a wetter, spreader, and penetrator



Ca contents.

- Calcium nitrate and CaTs were effective at increasing Ca levels in the fruit pulp, however, CaTs was more effective at increasing Ca levels in the fruit skin.
- It is not clear whether calcium nitrate should be applied monthly, as recommended in the 2024 report, or as 3 total applications as recommended in the 2025 and 2026 reports, so as to increase leaf Ca.

B

- Spraybor and Soluble Boron were the most effective products with leaf B contents falling within the range of norms.

Si

- Including Si (Eckosil) increased leaf and fruit nutrient contents by stimulating root growth and transpiration rates.
- Soil applications resulted in significant increases in Ca leaf contents, Also, Ca was translocated into the fruit skin more effectively than in treatments without Si.
- Soil applications also resulted in increases in the nutrient contents of P, Mg, Zn, and Mo.
- To counteract the effects of heat stress, the 2025 report advised applying the product one month before the anticipated stress to allow for sufficient uptake and formation of the double Si layer.

Increasing yields

- Combined treatments significantly increased yields but lengthened days to ripen, likely due to improved cell wall integrity. Combined treatments included calcium nitrate + Soluble Boron and CaTs + Spraybor.
- Monthly applications of Indra from August to December significantly increased yields, possibly as the product helped maintain photosynthesis and water transport during periods of heat stress.

Other points to note

- INEX-A was extremely effective and helped increase fruit pulp Ca content by 49.8%. In the 2025 trial, its addition to all products resulted in yield increases. Eckosil improved the efficacy of Traxex Ca + B.

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Cleaning citrus and mango pack lines to reduce post-harvest fungicide residues

The use of shared pack lines for different fruit crops improves operational efficiency and reduces infrastructure costs. However, it may also increase the risk of transferring post-harvest chemical residues between crops.

Karlién Muller

AUXANO IPM CONSULTING

In South African citrus packhouses, Imazalil and Thiabendazole (TBZ) are commonly used after harvest to control *Penicillium* decay. Where citrus and mangoes are handled on the same packing equipment, residues may remain on fungicide tanks, belts, and brushes, and subsequently be transferred to mangoes. This presents a potential compliance risk, as neither Imazalil nor TBZ are registered for post-harvest use on mangoes in South Africa.

A study was conducted to evaluate cleaning methods for removing Imazalil, TBZ, and Fludioxonil residues from pack-line surfaces so as to provide practical guidance for packhouses.

Evaluating residue removal

Sodium bicarbonate (NaHCO_3), commonly known as baking soda, may assist in removing certain pesticide residues by improving their solubility. The study evaluated sodium bicarbonate for TBZ and Fludioxonil removal, while a chlorine-based treatment was used for Imazalil.

These treatments were followed by the application of Skimmer Plus and mechanical scrubbing. The following pack-line surfaces were evaluated:

- Stainless-steel fungicide tanks.



Heavily contaminated tanks may require several cleaning and scrubbing cycles. Change nozzles before the wash process commences.

- Packing belts.
- Brushes after the fungicide application point.

Residue samples were collected before cleaning, after the initial treatment, and following the Skimmer Plus treatment. The results were semi-quantitative and should therefore be regarded as an indication of cleaning efficacy.

Imazalil removal

Initial Imazalil residues in the fungicide tank and on the brushes exceeded the upper quantification limit of the analytical method. The tank had not been cleaned after the citrus season and represented a worst-case scenario (Table 1).

Residues in the tank remained above the analytical limit following the chlorine and Skimmer Plus treatments, indicating that heavily contaminated tanks may require several cleaning and scrubbing cycles.

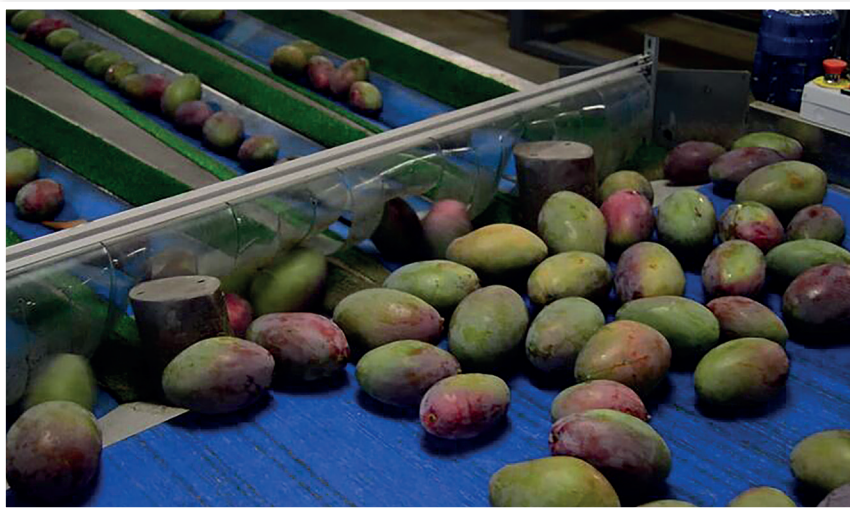
Better results were achieved on the packing belts. The combined cleaning treatments reduced Imazalil residues by approximately 74%. Brushes were more difficult to clean because residues may accumulate within the bristles and around their attachment points. However, the Skimmer Plus treatment resulted in an additional 52% reduction.

TBZ removal

Sodium bicarbonate was effective in reducing TBZ residues on stainless steel. Residues in the fungicide tank decreased by approximately 73% after the sodium bicarbonate treatment,



Feeding line brushes are more difficult to clean because residues may accumulate within the bristles and around their attachment points.



Residual rinse water can remain on parts of the feeding line. This highlights the importance of thorough rinsing and drying.

Table 1. Initial residue results on swabs testing Imazalil prior to washing as well as swabs after each wash

	Stainless steel fungicide tanks (µg/5 cm swab)	Packing belts (µg/5 cm swab)	Brushes (µg/5 cm swab)
Prior to washing	> 1	0.111	> 1
Chlorine wash only	> 1	0.068	> 1
Combined chlorine and Skimmer Plus wash	> 1	0.029	0.515

Table 2. Initial residue results on swabs testing TBZ prior to washing as well as swabs after each wash

	Stainless steel fungicide tanks (µg/5 cm swab)	Packing belts (µg/5 cm swab)	Brushes (µg/5 cm swab)
Prior to washing	0.641	0.366	> 1
Sodium bicarbonate wash only	0.175	0.323	> 1
Combined sodium bicarbonate and Skimmer Plus wash	0.071	0.338	0.555

Table 3. Initial residue results on swabs testing Fludioxonil prior to washing as well as swabs after the sodium bicarbonate wash. ND means residues were not detected

	Stainless steel fungicide tanks (µg/5 cm swab)
Prior to washing	0.026
Sodium bicarbonate wash only	ND
Combined sodium bicarbonate and Skimmer Plus wash	ND

while the addition of the Skimmer Plus treatment increased the overall reduction to approximately 89% (Table 2).

Results from the packing belts were less consistent because residual rinse water remained on parts of the belt during sampling. This may have resulted in the collection of residues suspended in the rinse water and highlights the importance of thorough rinsing and drying.

Brushes again proved difficult to clean: TBZ residues remained above the analytical limit after the sodium bicarbonate treatment but decreased by approximately 56% following the Skim-

mer Plus treatment.

Fludioxonil removal

A pilot evaluation was conducted on a stainless-steel fungicide tank to determine whether sodium bicarbonate could remove fludioxonil residues. The initial residue concentration was relatively low because the tank had been properly cleaned with normal soaps after the packing season (Table 3).

Following the sodium bicarbonate treatment, no fludioxonil residues were detected. These preliminary results indicate that sodium bicarbonate may be effective in removing low levels of

Fludioxonil from properly maintained stainless-steel surfaces. Further testing under different packhouse conditions is recommended.

Practical cleaning recommendations

The results indicate that cleaning effectiveness depends on the products used as well as the timing and how thorough the cleaning process is. Chemical residues that are allowed to dry and accumulate may become more difficult to remove.

Routine cleaning of all pack-line components should therefore form part of packhouse standard operating procedures. Pack lines should be cleaned as soon as possible after use, rather than allowing chemical residues to remain on equipment between seasons.

Cleaning should begin at the least contaminated section of the pack line and progress towards areas with the highest expected residue levels, such as the fungicide tank. This reduces the risk of transferring concentrated residues back onto cleaner sections.

Mechanical scrubbing is essential, particularly on brushes, belt joints, corners, and other difficult-to-reach areas. All surfaces should then be thoroughly rinsed with clean water, and cleaning products should not be allowed to dry on the equipment.

Cleaning cloths and brushes should also be replaced or cleaned frequently, as contaminated cleaning equipment may transfer residues between pack-line components.

Conclusion

The study demonstrated that targeted cleaning treatments, combined with mechanical scrubbing and thorough rinsing, can substantially reduce post-harvest fungicide residues on pack-line surfaces.

Sodium bicarbonate showed promising results for TBZ and Fludioxonil removal, while sequential cleaning treatments substantially reduced Imazalil residues on packing belts. However, heavily contaminated fungicide tanks and brushes may require repeated cleaning cycles.

Regular and timely cleaning remains essential to reduce cross-contamination risks, support compliance with market requirements, and protect continued access to export markets. ♦



Preparing for the first mango harvest

As spring progresses, South African mango growers shift their attention from flowering and fruit set toward fruit development and preparations for the first harvest. The start of the season is an important period, as orchard management and harvesting decisions can influence fruit quality, marketability, and the overall success of the crop.

André Botha

SUBTROP

The mango season generally begins during November or early December in the warmer production areas, with harvesting continuing through summer and into autumn as later cultivars become available. However, harvest timing differs between production regions, cultivars, and seasons, and is influenced by flowering time, temperature, and growing conditions.

During spring, mango orchards may be at different stages of flowering, fruit set, or early fruit development. Growers should inspect orchards regularly to assess fruit set, crop load, and fruit development.

Particular attention should be given to:

- Fruit set and natural fruit drop.
- Differences in crop load between trees and orchard blocks.
- Fruit growth and expected harvest timing.
- Pest and disease pressure.
- Irrigation performance and soil moisture levels.
- Tree nutrition and vegetative growth.
- Wind, hail, sunburn, or other physical damage.

Early crop estimates can assist with planning labour, harvesting equipment, packaging, transport, and marketing. These estimates should be updated, as fruit drop and weather conditions may still influence the final crop.

Flowering and young fruit are sensitive to pest and disease damage. Orchards should therefore be monitored regularly, and crop-protection decisions should be based on orchard observations, local conditions, and professional recommendations. Growers should ensure that spray equipment is correctly calibrated and provides adequate coverage.

All plant protection products must be used according to the registered label. Withholding periods, maximum residue limits, and buyer requirements should be considered when planning applications particularly as harvest approaches.

As temperatures increase, growers should monitor soil moisture and adjust irrigation according to weather conditions, soil type, tree size, and crop load. Irrigation systems should be checked for blocked emitters, damaged lines, pressure differences, and uneven water delivery.

Nutritional programmes should consider soil and leaf

analyses, expected crop load, tree condition, and previous seasons' orchard performance. Heavily bearing blocks may have different requirements from orchards carrying lighter crops. Excessive or poorly timed nitrogen applications should be avoided, as these may encourage excessive vegetative growth at the expense of fruit development and may reduce light penetration and spray coverage.

Preparing for harvest

The first harvest should be guided by fruit maturity and not by market pressure or external fruit colour alone. Mangoes must reach the appropriate physiological maturity to ripen correctly. Harvesting immature fruit may result in poor ripening and reduced eating quality, which can negatively affect consumer confidence in early-season South African mangoes. Please make sure to use the official SAMGA internal colour chart to determine maturity.

Before harvesting begins, growers should confirm:

- Maturity requirements for the intended market.
- Expected harvest dates for each cultivar and orchard block.
- Buyer, retailer, packhouse, or processor specifications.
- Withholding periods for all products applied.
- Labour, harvesting equipment, and transport requirements.

Harvest workers should be trained to handle fruit carefully and minimise sap burn, bruising, cuts, lenticel damage, and other defects. Harvested fruit should be kept shaded and delivered as soon as possible.

Markets

Fruit may be supplied to local fresh-produce markets, retailers, export programmes, or processors producing dried mango, juice, purée, and achar. Planning fruit destinations before harvest can reduce delays and help prevent quality losses.

Supporting local mangoes

Growers play an important role in maintaining consumer confidence in locally produced mangoes. Fruit that is harvested at the correct maturity and handled carefully is more likely to ripen properly and provide the flavour and eating quality expected by consumers.

A successful start to the season benefits individual producers and strengthens confidence in the South African mango industry. ♦



SAAGA research

James Mehl

SUBTROP

In 2025, a new strategic framework supporting and directing SAAGA research was developed and agreed to by the Board. The framework is organised into five areas of focus:

1. Finding solutions to production issues on farms and in nurseries

These include pests (entomology), diseases (pathology), on-farm practices and issues (horticulture - plant propagation, land preparation, irrigation, nutrition, tree manipulation, etc.).

2. Optimising post-harvest handling and storage to maintain fruit quality

These include harvesting practices, packhouse processes, post-harvest physiological disorders, post-harvest diseases, and cold storage regimes. There are always improvements that can be made to a process, including actions after avocados are harvested.

3. Overcoming phytosanitary barriers to market access

These include pest and disease mitigation treatments and systems approaches aimed at reducing fruit damage and making exports to markets with phytosanitary restrictions simpler and more cost-effective.

4. Building and retaining research capacity

These include nurturing centres of research built around individuals at various research institutions, and include a focus on entomology, plant pathology, horticulture, and post-harvest technology.

5. Developing new researchers and technical people for the industry

These include MSc students, PhD students, and Honours stu-

dents / 4th year students. These may be based at a research institution or part of a company with a research project. The process is also open to the involvement of technical people that may choose to pursue a career in the industry.

To ensure that all interests are represented, the SAAGA Research Committee is ideally constituted by representatives from all production regions and also includes a nursery representative.

The research cycle begins with a survey that participants complete in April and May. Results of this survey as well as potential priorities are reviewed by the committee prior to the call for research proposals being sent out to various research institutions as well as agrochemical and biocontrol companies. Proposals are then reviewed and shortlisted for funding. Contracts should be in place prior to any tranche of funding being released.

Every year aspects of the research cycle are reviewed, with the aim of refining and streamlining the process thereby adding value to the industry. From this year (2026), researchers wishing to check whether there is interest in funding a new project can prepare a concept note - a much shorter document than a full research proposal - to test whether their research idea could be considered for funding. Secondly, involvement of students in projects is being emphasised - even if a company undertakes a project, a student or technical person could still be involved and eventually settle on the industry as a career.

Finally, researchers will be encouraged to engage more with farmers - introducing the project at a study group with students also present, meeting the farmer and/or farm manager around the same period and gaining an awareness of on-farm activities that could influence the project but also increase on-the-ground awareness amongst students.

In summary, the strategic objectives and process around research within SAAGA should contribute twofold: to answering questions and addressing needs that growers have on farm or other stakeholders have in the value chain, and to attracting people into the growing avocado industry. ♦





Balancing growth and production: Uniconazole in SA avocado orchards

Certain avocado cultivars are naturally vigorous. In healthy, productive orchards, this vigour is useful for canopy renewal and fruit protection, but excessive shoot growth in spring can compete directly with flowering, fruit set, and fruit development. It also increases pruning, spraying, and harvesting costs, reduces light penetration, and accelerates orchard crowding. Uniconazole is one of the plant growth regulators used in South African avocado production to help manage this balance between vegetative growth and cropping within a well-balanced management programme (Penter and Snijder, 2001).

Ulrich Koster
SUBTROP

How uniconazole works

Uniconazole is a triazole growth retardant that inhibits gibberellin biosynthesis. Gibberellins promote cell elongation, and lowering their activity reduces the extension of actively growing shoots. The aim is not to stop growth completely but to moderate excessive vigour at stages when vegetative growth competes strongly with reproductive development (Penter and Snijder, 2001; Lahack *et al.*, 2025).

Avocado flowering is particularly sensitive to this competition. Many inflorescences are indeterminate: after flowering, a vegetative shoot continues growing from the tip of the flower panicle. This new shoot can become a strong sink for carbohydrates, water, and nutrients at the same time that flowers and newly set fruit require resources. By limiting shoot extension, uniconazole may help shift the balance towards fruit retention, fruit growth, and a more manageable canopy (Lovatt and Salazar-García, 2006; Lahack *et al.*, 2025).

What South African research has shown

Early South African work evaluated uniconazole applied via foliar sprays on 'Hass', 'Fuerte' and 'Pinkerton' in several production regions. The response differed between cultivars and depended strongly on application timing. On 'Hass', treatment at full bloom generally increased fruit size and improved the proportion of fruit in commercially preferred counts. In one Burgershall trial, treated trees produced 2 540 marketable cartons per hectare compared with 1 786 cartons per hectare in the untreated control. Approximately 78% of fruit

from treated trees fell within counts 10-16, compared with 37% in the control (Erasmus and Brooks, 1998).

The main benefit in 'Hass' was often improved exportable yield rather than a large increase in total fruit number. This occurred because later flowering applications were made after much of the initial flower and fruit drop had already taken place. The treatment could therefore influence fruit growth and size distribution but had less opportunity to improve early fruit retention (Erasmus and Brooks, 1998).

'Fuerte' and 'Pinkerton' were treated earlier in flowering. These cultivars showed stronger increases in total and export yields, although the response in fruit sizing response was smaller than that of 'Hass'. Across all three cultivars, uniconazole applications resulted in shorter, rounder shaped fruit compared to long, 'necky' fruit in the control. Fruit shape is commercially important in cultivars that may otherwise produce an excessive neck ('Pinkerton'), but the desired response must still be balanced against cultivar characteristics and market requirements (Erasmus and Brooks, 1998).

Further South African trials placed growth inhibitors within a broader orchard manipulation programme. Pruning alone improved 'Hass' fruit size while growth inhibitors used either with pruning or on unpruned trees provided additional benefits. In a high-crop season, untreated trees averaged approximately count 22 with 40% of the fruit classified as undersized. The best performing treatment resulting in trees bearing on average approximately count 16, with only 15% undersized fruit. Yield responses were less consistent and varied between on- and off-crop years, illustrating that reduced shoot growth does not automatically guarantee a yield increase (Penter and Snijder, 2001).



Timing and orchard condition matter

Plant growth regulators are powerful tools but also highly sensitive to timing. The correct application window depends on the intended outcome. An application during flowering is aimed mainly at improving fruit shape, fruit sizes, fruit retention, and yield. An application following mid-summer pruning is intended to suppress vigorous regrowth and help maintain the desired tree dimensions (Lovatt and Salazar-García, 2006; RT Chemicals, n.d.).

According to the South African product label supplied for this article, uniconazole is registered for use on 'Fuerte', 'Hass', and 'Pinkerton'. The pruning application is made when new vegetative regrowth is 10-15 cm long. Applications must only be made to healthy, actively growing trees that are not under stress. The label also specifies a withholding period of 70 days between the final application and harvest (RT Chemicals, n.d.).

Avocado can also respond differently from other fruit crops. Uptake through the leaf surface can be inconsistent, and trees within the same block may carry shoots, flowers, and fruit at different developmental stages. In addition, mature fruit may remain on the tree while the next flowering and fruit set cycle begins. Alternate bearing further changes the demand for carbohydrates from one season to the next. These overlapping processes make precise timing more important than simply increasing the application rate, and reinforce the need to assess each orchard before treatment (Lovatt and Salazar-García, 2006).

Water quality and spray preparation can influence performance. The label indicates optimum efficacy at a spray water pH of 4.5-5.5, while very hard or alkaline water may reduce efficacy. Coverage, tree size, vigour, flush uniformity, temperature, water status, and season can all alter the response. This helps explain why results may differ between orchards, blocks and years, even when the same product is used (RT Chemicals, n.d.).

A supporting tool, not a substitute for management

Uniconazole should not be viewed as a replacement for pruning, training, irrigation management, balanced nutrition, or good canopy design. A crowded orchard with excessive nitrogen, poor light distribution, or irregular pruning cannot be corrected sustainably by repeated growth retardant applications alone. Uniconazole's greatest value is as part of an integrated programme in which the grower has a clear objective: improving fruit-sizing, moderating competition among flowering shoots, or controlling regrowth after pruning (Penter and Snijder, 2001).

Crop load must also be considered. Larger crops naturally reduce average fruit size, while very strong growth suppression may limit the renewal shoots required for future bearing wood. The most suitable programme is therefore not necessarily the one that produces the shortest (water-) shoots. It is the programme that achieves adequate growth control without sacrificing canopy renewal, yield stability, or tree health (Penter and Snijder, 2001; Lahack *et al.*, 2025).

Recent international findings reinforce this need for balance. A two-year Israeli study using soil-applied uniconazole found effective vegetative suppression and increased floral

bud density. Higher treatments produced larger fruit in the first season but also reduced yield, while the lowest treatment provided the best balance between growth control, physiological performance, and production. Although the product was applied to the soil, and not foliarly as prescribed in South Africa, the results demonstrate the importance of accurate dose selection and long-term evaluation (Lahack *et al.*, 2025).

Sustainability also requires attention. Recent Chilean research found that foliar and irrigation applications of uniconazole caused some temporary, rate-dependent changes in the avocado rhizosphere bacteriome. However, the dominant bacterial community remained largely stable and, by 12 months, treated communities closely resembled the untreated control. The findings are reassuring but repeated annual use and differences between soils require further study (Afkairin *et al.*, 2025).

Conclusion

Uniconazole remains a useful tool for managing vigorous avocado trees and improving commercially important fruit characteristics such as size, shape and uniformity, etc. South African research has demonstrated benefits for fruit size, shape, and exportable yield, particularly when treatment timing matches the cultivar and production objective. However, responses are influenced by crop load, phenology, tree vigour, orchard condition, and season (Erasmus and Brooks, 1998; Penter and Snijder, 2001).

The practical message is simple: use uniconazole for a defined purpose, integrate it with sound orchard management and follow the latest registered label exactly. The objective is not maximum growth suppression, but a productive balance between vegetative renewal, fruit set, fruit development, and manageable tree size.

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The future of litchi in South Africa under changing climatic conditions

Litchi tree growth and, in particular, flowering processes necessitate strict environmental conditions. However, over the past two decades changes in seasonal weather patterns have affected litchi production in South Africa. Warmer and, in certain years, wetter autumns are causing continuous flushing which interferes with flower formation, warmer winters (and late frosts in certain areas) are affecting flower development, and extreme weather conditions during summer are reducing fruit quality and shelf-life.

Regina Cronje¹, Harold Weepener² and Innocent Ratlapane¹

¹ARC-TROPICAL AND SUBTROPICAL CROPS, MBOMBELA

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With the higher frequency of abnormal weather conditions, both seasonal weather forecasts and projections for future climate scenarios are important for growers to make informed decisions on how to adapt to changes in seasonal weather patterns with appropriate orchard management and cultivar choices.

Land suitability study for litchi in South Africa under changing climates

While other litchi producing countries such as India, China, and Taiwan have conducted climate studies and modelled land suitability for litchi under changing climates (Kumar *et al.*, 2023; Chang *et al.*, 2025; Ma and Jiang, 2025), no comprehensive information on land suitability is available for litchi in South Africa. Hence, a study was initiated in collaboration with the ARC-Soil Climate and Water (ARC-SCW) to determine projected changes in land suitability for litchi in South Africa due to expected climate change.

In this study, critical environmental variables for 'Mauritius' litchi production i.e. specific temperature and rainfall ranges required for successful flowering and fruit quality, were applied to historical climate data (Agro Climatology database of ARC-SCW) and 15 different Coupled Global Climate Model (CGCM) projections for two greenhouse gas emission scenarios: SSP2-4.5 (a medium greenhouse gas emission scenario), and SSP5-8.5 (a high greenhouse gas emission scenario). The data were analysed for the subperiods 1991-2020, 2021-2050, and 2051-2080.

Under the high greenhouse gas emission scenario (SSP5-8.5), the climate projections for the traditional litchi production areas indicate higher minimum and maximum temperatures in autumn and winter (April to July; Fig. 1) and a higher likelihood for temperatures above 30 °C in August during peak flowering compared with the historic period (1991-2020). Higher minimum and maximum temperatures are also predicted for the fruit maturation period (November, December; Fig. 2), particularly for the 2051-2080 period.

No major changes are predicted for rainfall, except for slightly lower rainfall between August and October in certain regions of the Limpopo Province. However, rainfall projections should be interpreted with caution because rainfall in South

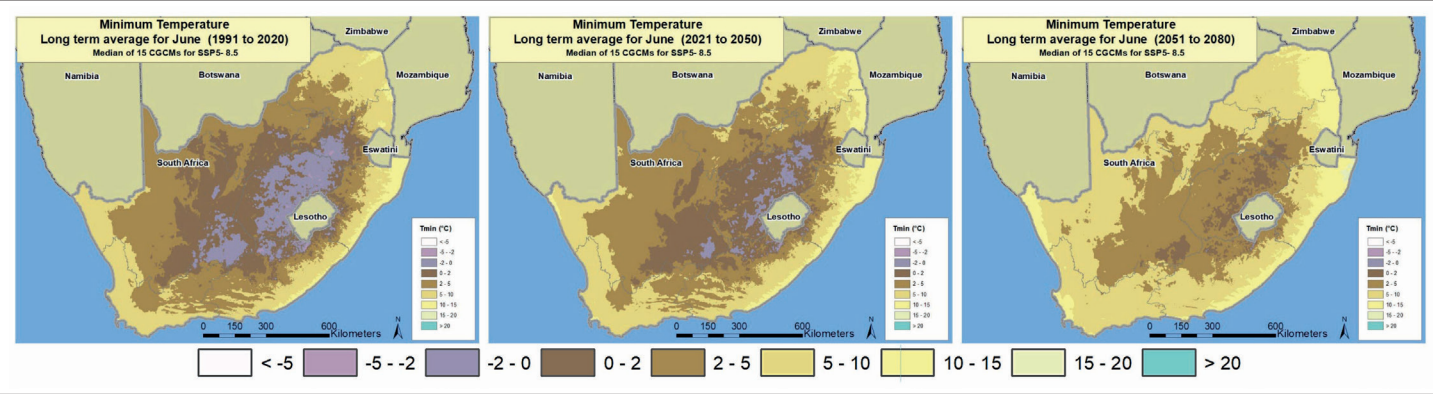


Figure 1. Projected average monthly minimum temperatures for June under the high greenhouse gas emission scenario (SSP5-8.5) for the 1991 to 2020 (left), 2021 to 2050 (middle) and 2051 to 2080 (right) sub-periods. Source: Weepener *et al.* (2024).

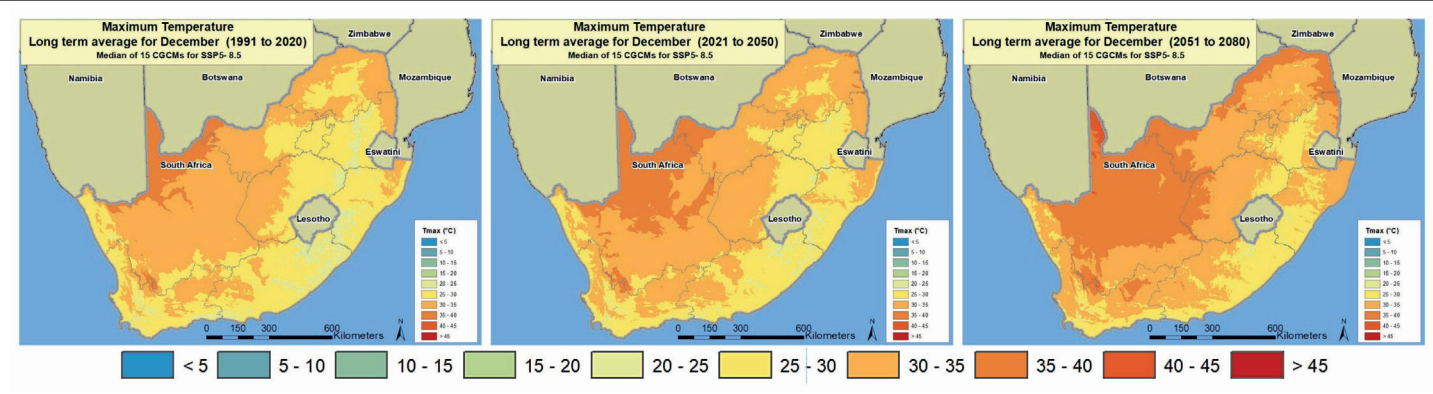


Figure 2. Projected average monthly maximum temperatures for December under the high greenhouse gas emission scenario (SSP5-8.5) for the 1991 to 2020 (left), 2021 to 2050 (middle) and 2051 to 2080 (right) sub-periods. Source: Weepener *et al.* (2024).

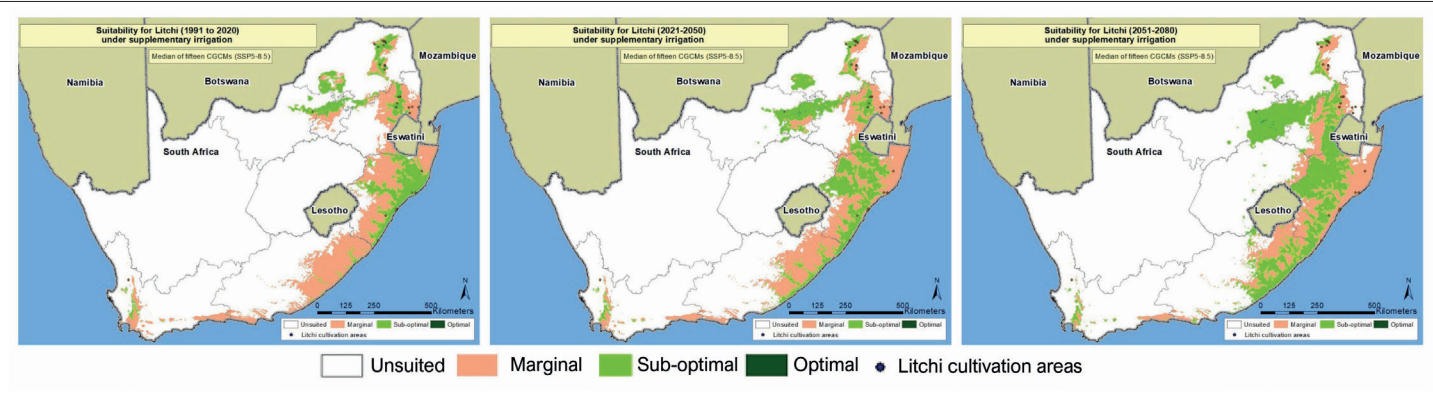


Figure 3. Land suitability for litchi under the high greenhouse gas emission scenario (SSP5-8.5) for the 1991 to 2020 (left), 2021 to 2050 (middle) and 2051 to 2080 (right) sub-periods.

Africa is strongly influenced by the El Niño-Southern Oscillation (ENSO). Although climate models simulate ENSO, they cannot predict the exact timing, frequency, or intensity of future El Niño and La Niña events nor the associated connections that influence regional rainfall patterns.

Based on these predicted climatic changes, land suitability for litchi may reduce in the traditional production areas, particularly in the Limpopo Province and to some extent in the eastern parts of Mpumalanga. However, with the increase in climate forcing intensity, more areas in the east (Gauteng, North West, and western parts of Mpumalanga) as well as along the east coast (KwaZulu-Natal and Eastern Cape) and even pockets in the Western Cape are predicted to become more suitable for litchi production in future (Fig. 3).

For current litchi production areas, the predicted higher minimum and maximum temperatures for April to June may cause more challenges to flush control and flower induction than currently experienced. Likewise, higher projected maximum temperatures during the fruit maturation period (November, December) will put fruit quality at a higher risk, particularly ‘Mauritius’ which is prone to sunburn and cracking. Therefore, short- and long-term strategies are required to sustain and expand successful litchi production in South Africa in the future.

Short-term and long-term strategies

Short-term strategies should include the optimisation of current practices (e.g. irrigation, biostimulant and plant growth

»» TO PAGE 26



The future of litchi in South Africa under changing climatic conditions

» FROM PAGE 25

regulator applications, and pruning), as well as the development of new technologies to promote successful flower development and good fruit quality under warmer conditions, with the focus on efficient and cost-effective protection technologies. Adopting regenerative farming principles can improve soil health, water infiltration, and retention and increase biodiversity which in turn can promote climate resilience in the orchard. Furthermore, collaboration with international researchers on critical R&D projects is important to find quicker answers, particularly regarding more effective flush control and promotion of floral induction.

As shown in Figure 3, regions westwards and southwards (including higher elevations) of the current litchi production areas are likely to become more suitable for litchi production. Therefore, one of the long-term strategies should be to explore these areas as potential production areas for future opportunities to expand the litchi marketing window in general, and for high quality cultivars in specific. Considering this, establishing cultivar test sites will be important to determine cultivar adaptability in the new regions identified by the land suitability study.

Breeding litchi cultivars with low to medium chilling requirements will also be a key long-term strategy. Cultivars with low chilling requirements currently available in South Africa are 'Third Month Red', 'Fay Zee Siu', 'Baitangying', 'Baila', and 'Souey Tung'. Although not confirmed yet, 'Hung Long' may also have low chilling requirements (D. Banai, personal communication). Among the cultivars with high chilling requirements are 'Wai Chee', 'McLean's Red', 'Nuomici', 'Goose Egg', and 'Maguili'. As South Africa has a vast variety of macro- and micro-climates that do not suit all cultivars, the availability of a range of cultivars to suit different climates is of utmost importance for the existence of the South African litchi industry. Therefore, the search for promising early, low to medium chill adapted litchi cultivars for the industry should continue through goal-driven breeding. In addition, the chill-

ing requirements of other litchi cultivars that hold promise in terms of production potential and fruit quality (e.g. low susceptibility to sunburn and cracking, big fruit size, small seeds, and good colour) should be determined.

In conclusion, the land suitability study for litchi in South Africa has shown that it is not all doom-and-gloom for the future of litchis in South Africa. Although certain areas may become less suitable, many areas will become more suitable. If the litchi industry is proactive, current production areas can remain productive with suitable horticultural practices and cultivar choices while production in newly identified production areas can assist with expanding the litchi marketing window. In this way, South Africa can become a more relevant player on the international litchi market.

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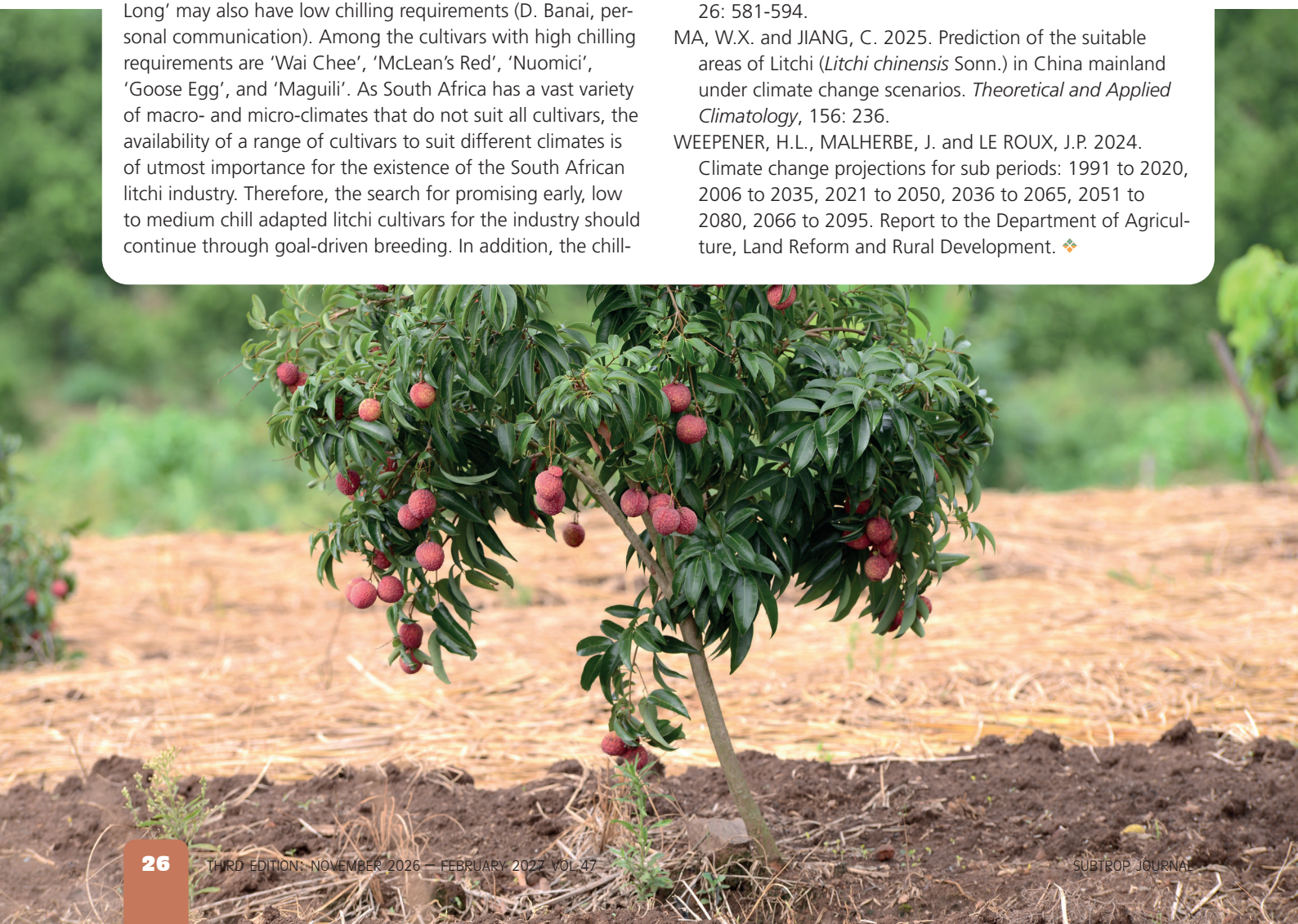




Figure 1. Photograph of a Phytech dendrometer installed on the trunk of a mature tree.

Source: Phytech

Using dendrometers in avocado orchards

How often is an irrigation decision made because the schedule says it is time, the soil probe reading has dropped to a certain level, or the block simply looks as if it needs water? These are all useful guides, but none of them answers the most important question directly: how is the tree responding?

Franco Stander
SUBTROP

Irrigation management is particularly demanding in avocado orchards. Too little water can restrict growth, fruit development, and yield, while too much water reduces soil aeration, increases nutrient losses and can create favourable conditions for *Phytophthora* root rot. The difficulty is that wet soil does not always mean that the roots are taking up water effectively, and a drying soil does not automatically mean that the tree is under stress.

Weather stations, evapotranspiration calculations, and soil-moisture probes therefore remain essential, but they describe the conditions around the tree. Dendrometers add another layer by measuring the tree itself. They do not replace the other tools; they help the grower see whether the irrigation strategy, soil conditions, and weather are producing the intended response.

What does a dendrometer measure?

A dendrometer is a sensitive sensor attached to a trunk or

branch. It measures extremely small changes in diameter, usually in microns. These changes cannot be seen with the naked eye, but they occur continuously as water moves into and out of the tree.

Before sunrise, after the tree has had the night to rehydrate, the trunk is generally close to its maximum diameter. As the day warms and the leaves begin transpiring, water is lost from the canopy faster than the roots can replace it. The tree temporarily draws on water stored in elastic tissues in the trunk, causing the trunk to contract slightly.

Later in the afternoon, transpiration begins to slow. During the evening and night, root uptake replenishes the water used during the day and the trunk expands again. When conditions are favourable, the tree recovers the loss in diameter experienced during the day and may reach a new maximum as permanent growth is added.

A well-watered tree does not necessarily show no shrinkage. Daily contraction is a normal part of tree function. The useful information lies in the size of the contraction, the speed and completeness of recovery, the longer-term growth trend,

» TO PAGE 28



Using dendrometers in avocado orchards

>> FROM PAGE 27

and how these measurements compare with the weather, soil-water status, and the tree's stage of development.

Reading the daily pattern

A typical dendrometer graph has a recognisable daily rhythm: a high point in the morning, contraction through the warmer part of the day, a low point in the afternoon, and recovery overnight. Once a grower becomes familiar with the pattern of a particular block, departures from that pattern can be very informative.

One commonly used measurement is maximum daily shrinkage (MDS), the difference between the maximum and minimum trunk diameter recorded during a day. A larger MDS can indicate greater atmospheric demand or developing water stress, but it cannot be interpreted as a fixed stress number in isolation. Temperature, solar radiation, and especially vapour pressure deficit (VPD) can all increase the daily contraction of the trunk.

Avocado research has shown that the relationship between MDS and VPD also changes during the season. The same VPD can produce a different MDS during flowering and fruit set than during fruit growth and maturation. This means that a threshold that works in one month may not be suitable later in the season. Crop load, tree age, root condition, and recent stress history can also influence the signal.

Overnight recovery is often easier to understand in practice. A tree that repeatedly fails to return to its previous maximum diameter is not fully replacing the water used during the day. One incomplete recovery may simply reflect a very hot day, but a repeated pattern can point to accumulating stress or a limitation in water uptake.

The longer-term growth line is equally important. Depending on the terminology used by the platform, this may be described as daily growth increment, trunk growth rate, or stem growth rate. Positive growth indicates that the trunk is reaching new maximum diameters over time. A flat or declining trend does not automatically prove that irrigation is inadequate; growth can slow naturally during certain phenological stages or when fruit demand is high. It should, however, prompt the grower to look more closely at the tree and the surrounding data.

From a sensor to a management system

The dendrometer is the part of the system that "listens" to the tree, but it can also form part of a broader monitoring and irrigation-management system. Phytech has the capability to combine plant monitoring with soil, climate, hydraulic, and irrigation-system information in a single platform.

This distinction is important. A dendrometer can show that a monitored tree is experiencing an unusual response. It cannot, by itself, determine whether the cause is a blocked dripper, a pressure problem, poor root health, saline water, a damaged irrigation line, or unusually high atmospheric demand. The wider system helps the grower investigate the cause.

A broader system can include in-field pressure sensors, valve and flow monitoring, filter and fertigation monitoring,

tank-level monitoring, soil-moisture measurements, weather data, and irrigation planning or control. Hydraulic alerts can show whether an irrigation event took place as planned and whether pressure or flow deviated from the expected range. The plant sensor then helps answer the next question: did the tree respond?

For example, a soil probe may show that the profile contains water, while the dendrometer indicates that the tree is not recovering adequately. This could occur where root activity is restricted by poor aeration, root disease, salinity, low water quality, or a wetting pattern that does not match the active root zone. In the opposite situation, a soil-moisture reading may be declining while the tree continues to recover and grow normally. The grower may then be able to delay irrigation, provided the trend is watched carefully and the decision fits the phenological stage and weather forecast.

The aim is not to follow a coloured screen without thinking. It is to combine the tree's response with an understanding of the orchard. The greatest value comes when the system is used to test decisions: Was the irrigation long enough? Did a shorter cycle improve recovery? Did splitting the application reduce midday stress? Did the tree respond after a heatwave? Was the pressure at the end of the block adequate?

Selecting representative trees and blocks

Reliable information starts with correct sensor placement. A dendrometer measures one tree, and that tree must represent the management unit as closely as possible. A sensor on an unusually weak, vigorous, shaded, or damaged tree may provide an accurate measurement of the wrong tree.

The selected tree should be healthy, of average vigour and crop load, and located within a uniform irrigation block. Avoid obvious edge effects, roads, windbreaks, drainage lines, low spots, irrigation boundaries, and areas with known soil anomalies unless the purpose is specifically to monitor those conditions. The irrigation emitter serving the tree should be checked, and the wetted area should be typical of the block.

Variation within avocado orchards can be substantial. Changes in soil depth, clay content, slope, aspect, rootstock, cultivar, tree age, canopy size, irrigation design, and historical *Phytophthora* pressure may all affect the tree's response. A large block that is managed as one unit may therefore require more than one monitored position, particularly where there are clear soil or topographical zones.

The number of sensors required cannot be decided by hectares alone. It depends on how uniform the block is and what decisions will be made from the data. One sensor may be adequate for a small, uniform management unit, while several may be justified where the block contains different soil types or pressure zones. Local guidance from the system provider is therefore important during installation.

The sensor must remain firmly positioned while allowing the tree to grow. Bark condition, installation height, and the position relative to scaffold branches can influence measurement quality. Routine field checks are still necessary to make sure the



unit has not shifted, been damaged by machinery, or become obstructed by bark growth, ants or debris. Data quality should be questioned whenever the graph changes abruptly without a corresponding weather, irrigation or orchard event.

Using the information in avocado production

The most obvious use of dendrometer information is irrigation scheduling, but its practical value is wider. It provides a continuous record of how the tree behaves before, during and after an irrigation event. This can help a grower refine both timing and duration rather than simply adding more water when stress is detected.

During hot weather, the system may show whether trees recover from high daytime demand or whether stress is carrying over into the following day. This is especially useful in avocado because the crop can be sensitive to rapid changes in atmospheric demand. The correct response is not always to apply a large additional irrigation. The grower should first confirm that the system is delivering water uniformly and that the root zone is not already excessively wet.

During flowering and fruit set, avoiding severe or prolonged stress is important, but the dendrometer signal must be interpreted against the seasonal baseline. Research in 'Hass' has shown that MDS values are influenced by phenology, and fruit load can strongly affect trunk growth patterns. The tree is allocating water and carbohydrates among roots, shoots, flowers, and fruit; the trunk signal reflects this competition.

During fruit development, maintaining adequate water status supports cell expansion and fruit growth. A dendrometer does not measure avocado fruit size directly, but it can show whether the tree is maintaining recovery and whether stress is interrupting growth. Where fruit sensors are available and validated for avocado, combining trunk and fruit measurements could provide a more direct view of whether irrigation changes are supporting the desired fruit-growth trajectory.

The data may also help assess responses to orchard problems. A tree affected by root damage may show poor overnight recovery despite adequate soil moisture. A pressure failure or missed irrigation may produce an abrupt change in the plant response. A newly planted block may be monitored to learn how young trees react to short irrigation cycles and a limited root volume. After corrective action, the graph can show whether recovery actually occurred.

Year-to-year records may become more useful than a single season. They allow the grower to compare similar weather events, flowering periods, crop loads, and irrigation strategies. Over time, the orchard develops its own reference pattern. This local history is often more meaningful than a universal threshold taken from another region or production system.

What the system can and cannot tell the grower

Continuous monitoring creates a large amount of data, but more data does not automatically mean better decisions. The first season should be treated as a learning period. Growers and irrigation managers need time to understand how the monitored trees respond to normal weather changes, irrigation cycles, and phenological events.

Dendrometer readings should be checked against field observations. Dig in the root zone. Confirm emitter output. Look at new root activity, leaf condition, crop load, and canopy vigour. Compare the signal with soil moisture at more than one depth and with the irrigation records. A graph that does not agree with the orchard should trigger investigation, not blind acceptance of either the graph or the field impression.

It is also important not to overreact to a single stressful day. Irrigation changes should be based on trends and context. An unusually high MDS on a hot, dry, and windy day may be expected. Repeated poor recovery under moderate conditions is more concerning. Similarly, low trunk growth during a heavy fruiting period may reflect carbohydrate allocation rather than a water shortage.

The technology is most useful as a decision-support tool. It does not remove the need for a well-designed irrigation system, correct pressure, good distribution uniformity, appropriate scheduling, healthy roots, and regular orchard inspection. It makes the effects of those practices easier to see.

A practical shift in irrigation management

The major change introduced by dendrometers is not the sensor itself; it is the shift from asking only, "How much water is in the soil?" to also asking, "What did the tree do with it?"

For avocado growers, this is a useful change in perspective. The crop's water use is affected by weather, crop load, canopy size, root health, soil conditions, and phenology. No single measurement captures all of these factors. The tree, however, integrates their combined effect, and the dendrometer records part of that response continuously.

Used on representative trees and interpreted with soil, climate, hydraulic, and field information, a dendrometer-based system can help growers identify stress earlier, verify whether irrigation events achieved the intended result, and refine irrigation timing and duration. The system should not replace grower experience. It should make that experience more measurable, easier to test, and faster to act upon.

In a production environment where water, electricity, and labour are under pressure, that additional clarity can be valuable. The goal is not simply to irrigate less or more. It is to apply the right amount, at the right time, in a way that the avocado tree can actually use. ♦



South African avocado nursery tree sales and planting trends (2020/21 - 2024/25)

The Avocado Nurserymen's Association (ANA) plays a vital role in supporting the South African avocado industry by ensuring the production of healthy, high-quality nursery trees through its accreditation and certification programme.

Mukondeleli Munzhedzi
SUBTROP

Anual nursery tree sales data collected from ANA-accredited nurseries provide valuable insight into industry investment, cultivar and rootstock preferences, regional planting trends, and the demand for South African avocado planting material. Over the past five seasons, the industry has demonstrated resilience despite challenging economic conditions.

Annual nursery tree sales remained above 690 000 trees between 2020/21 and 2023/24, peaking at 771 021 trees in the 2023/24 season (Fig. 1). During 2024/25, total sales

declined to 632 644 trees, an 18% decrease compared with the previous season. This reduction likely reflects increased establishment costs, inflationary pressures, and more cautious investment by growers rather than a decline in long-term confidence.

Forecasts indicate that production will recover over the next two seasons, with total nursery sales expected to exceed one million trees during 2026/27, highlighting continued optimism within the industry.

'Hass' remains the dominant avocado cultivar propagated in South African nurseries, accounting for the largest proportion of annual tree production throughout the review period. Although 'Hass' propagation declined in 2024/25 (Fig. 2) in

line with lower overall nursery sales, it continues to dominate new orchard establishments because of its strong export demand and proven commercial performance.

‘Lamb Hass’ has shown the most significant increase among alternative cultivars, reflecting growing interest in extending the harvesting season and improving marketing opportunities. ‘Maluma Hass’ remains an important locally developed cultivar, while ‘Fuerte’ and ‘Pinkerton’ continue to be propagated, although at lower volumes as growers increasingly favour Hass-type cultivars.

Rootstock preferences have also remained consistent over the review period. ‘Dusa’ continues to dominate nursery production and remains the industry’s preferred clonal rootstock due to its excellent field performance. ‘Bounty’ has strengthened its position as the second most propagated rootstock (Fig. 3), reflecting increasing grower confidence in its performance under a range of production conditions.

In contrast, the use of older rootstocks such as ‘Duke 7’ and ‘Edranol’ has declined, while the introduction of newer selections including ‘Leola’, demonstrates continued investment in genetic improvement and orchard performance.

Regional destinations and exports

Regional nursery tree sales continue to reflect the expansion and diversification of avocado production across South Africa. The Letaba region remained the largest destination for nursery trees throughout the five-year period, reinforcing its position as the country’s leading avocado-producing region (Fig. 4). Levubu maintained steady demand through orchard replacement and expansion, while KwaZulu-Natal and the Western Cape continued to increase their share of nursery tree sales.

The steady growth in these regions reflects increasing investment in commercial avocado production and the industry’s expansion into diverse climatic areas to improve production resilience and extend harvesting windows.

Export markets have become an increasingly important component of

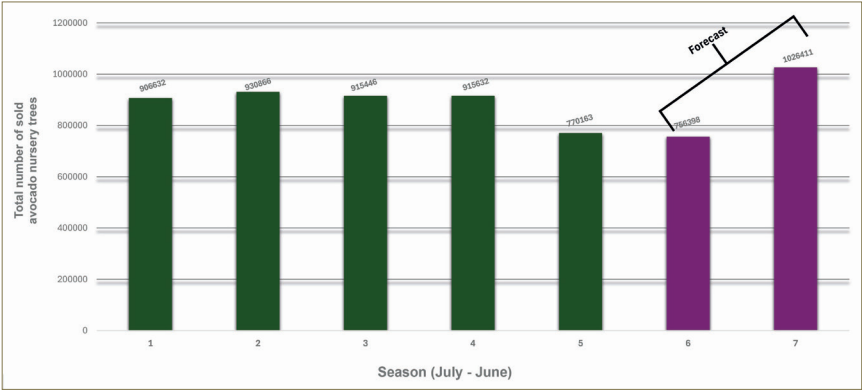


Figure 1. South African avocado tree sales and forecast.

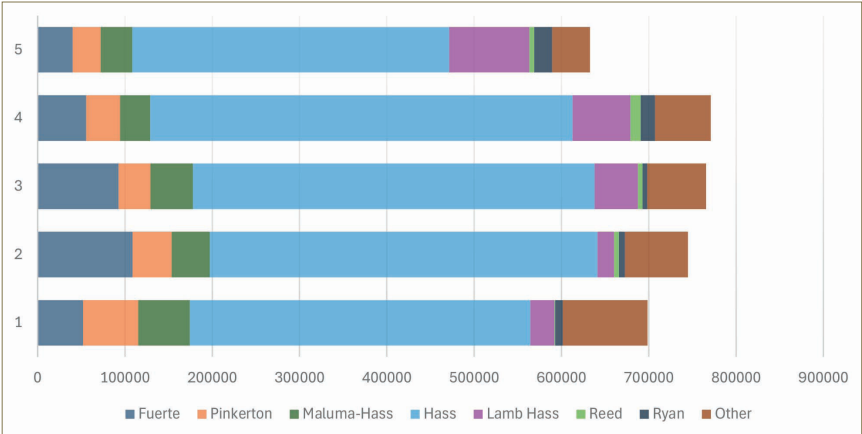


Figure 2. Tree sales by cultivar 2020-2025.

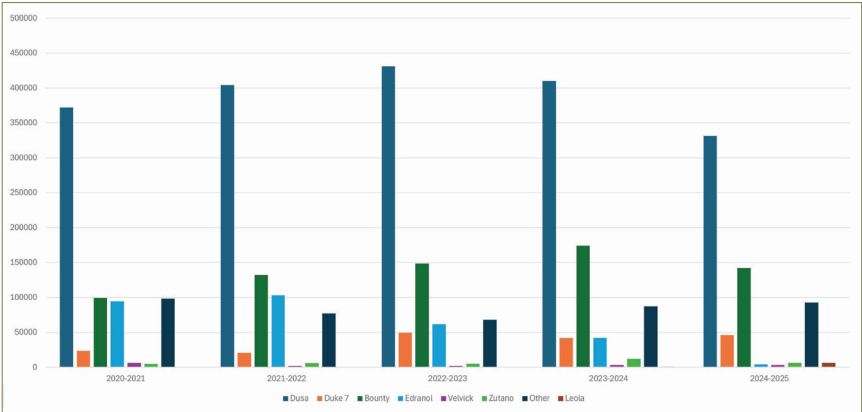


Figure 3. Tree sales by rootstock 2020-2025.

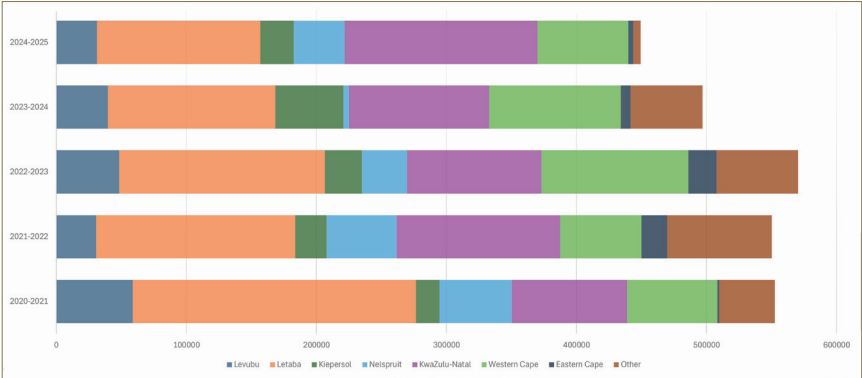


Figure 4. Tree sales area distribution South Africa 2020-2025.



South African avocado nursery tree sales and planting trends (2020/21 - 2024/25)

» FROM PAGE 31

nursery production. Although South Africa remains the largest market for ANA-accredited nursery trees, exports to neighbouring SADC countries have grown substantially as commercial avocado industries expand across the region.

Demand from markets outside the SADC region has also increased, reinforcing South Africa's reputation as a supplier of high-quality, certified planting material. During the 2024/25 season, approximately 73% of nursery trees were sold locally, while 27% were exported, demonstrating the growing contribution of international markets to the nursery industry (Figure 5).

Overall, the past five years have highlighted the resilience and adaptability of the South African avocado industry. Continued investment in improved cultivars, advanced clonal rootstocks and new production regions, together with expanding export opportunities,

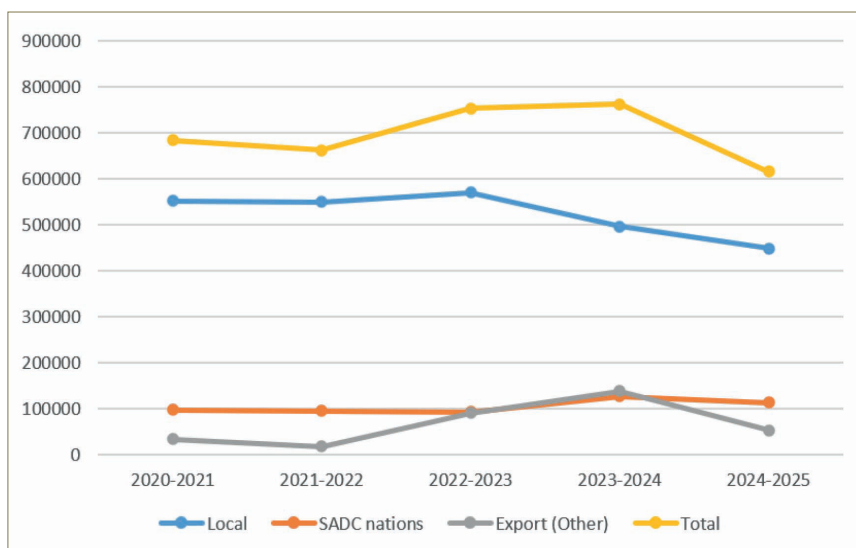


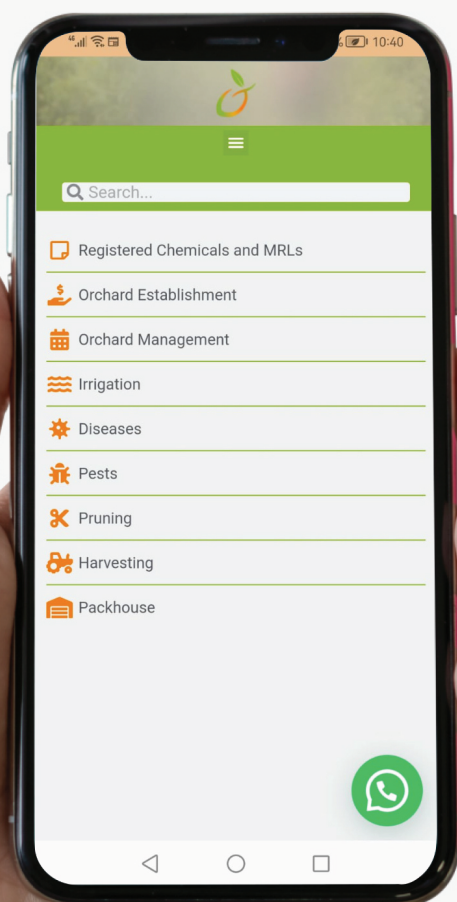
Figure 5. Tree sales local vs export 2020-2025.

provides a strong foundation for future growth. The annual nursery tree sales statistics compiled by ANA remain an important indicator of industry confi-

dence and suggest that South Africa is well positioned to support the continued expansion of avocado production both locally and internationally. ❖

32

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You can click the "ADD" option on the top right side of the screen, or click on DONE on the bottom of the Screen.

The App will then be stored on the home screen of your device.

Go to your device home screen / app screen and look for the SAMGA / Mango Logo Icon. This will open the APP.



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CAPE FRUIT COOLERS



Cape Fruit Coolers was established in 2004 by Grower-Exporters who recognised the need for a state-of-the-art and independent cold storage and handling facility that truly understood the requirements of the South Africa's fresh produce export industry.

That foundation remains part of who we are today.

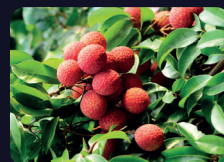
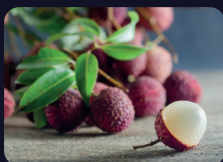
At Cape Fruit Coolers, we treasure the farmer and the enormous commitment behind every piece of fruit entrusted to us. We understand that what arrives at our doors represents years of investment, dedication, hard work and risk — and ultimately, the livelihood and reputation of the people who produced it.

We understand what goes into growing that fruit long before it reaches us. The journey starts on the farm, with the grower, and we are proud to play our part in protecting the value they have worked so hard to create as that fruit continues its journey to markets around the world.

Over the years, our business has grown, our facilities have expanded and technology has changed — but what we believe in hasn't.

Our role in that journey is clear: to take care of our clients' product, protect the cold chain, provide a reliable service, and have an experienced team that understands exactly what is at stake.

We're extremely proud of what we've built — and especially proud of the people behind it: our team, our clients and the growers whose hard work makes our industry possible.



www.capefruitcoolers.co.za