ProAgri AFRICA

technology for the farmer

No 126

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p 7

AI is transforming smallholder finance

NEW SERIES: The benefits of using drones on farms

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Dear ProAgri Africa readers,

Agriculture across Africa is evolving at an incredible pace. Every season brings new challenges, but it also brings new opportunities for farmers who are willing to embrace innovation, adopt better management practices, and invest in sustainable growth.

This month's cover story, “Tips from Tiger Animal Feeds: Managing early chick mortality,” highlights the importance of getting poultry production right from the very beginning. Reducing chick losses through sound management practices not only improves profitability but also contributes to healthier, more productive flocks, an extremely important consideration for poultry producers across the continent as the demand for affordable protein continues to grow. Read more on page 3.

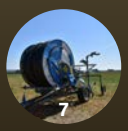
Innovation is another strong theme throughout this edition. We explore how artificial intelligence is transforming smallholder finance in Africa, opening new opportunities for farmers to access funding and financial services that were previously out of reach. As technology continues to reshape agriculture, digital solutions are becoming powerful tools for improving productivity and building more resilient farming businesses.

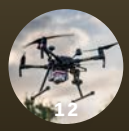
Water remains one of agriculture's most precious resources, making efficient irrigation more important than ever. In this issue, Irrigation Unlimited shares valuable insights into irrigation solutions that help farmers optimise every drop while improving crop performance.

We also begin an exciting new series on the use of drones on farms. Drone technology is rapidly becoming an essential management tool, providing growers with better crop monitoring, improved decision-making and more efficient orchard management.

African agriculture is filled with resilience, innovation and determination, and it is indeed a privilege for ProAgri Africa to share the stories, technologies and ideas that support this growth. Thank you for your continued support and for always allowing us to be part of your special farming journey.

ProAgri greetings!
Bianca Pretorius
bianca@proagri.co.za

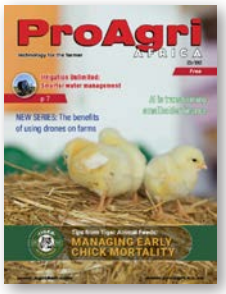




Content

On the cover

Healthy chicks are the foundation of profitable poultry production. Discover expert advice from Tiger Animal Feeds on managing early chick mortality. Read more on page 3.



ProAgri
technology for the farmer AFRICA

No. 10 Tito Road
Rhodespark, Lusaka
+26 (0)97-769-9786
www.proagri.co.za

ProAgri

Editor
Bianca Pretorius > 082-326-2572 bianca@proagri.co.za

Reporters
Natasha Pretorius > 083-468-2653 natasha@proagri.co.za

Benine Ackermann > 073-105-6938 benine@proagri.co.za

Loren Howard > 071 866 3590 loren@proagri.co.za

Language Editor
Martie Bester > martie@proagri.co.za

Senior Production Manager
Zainab Pandor > +26 (0)97-769-9786 zainab@proagri.co.za

Marketing
Tiny Smith > 082-698-3353 tiny@proagri.co.za

Kevin Greeff > 078-374-8597 kevin@proagri.co.za

Sales Manager
Quintus Grobler > 074-424-0055 quintus@proagri.co.za

Head of Design
Anja Oosthuizen > 079-959-6724 anja@proagri.co.za

Design
Stella van Eeden, Heinrich Jansen & Sean Spijkers

Enquiries
Engela Botha > 084-088-0123 engela@proagri.co.za

Accounts
Ronel Schluter > accounts@proagri.co.za

Distribution and subscription
Nita Volmer van Zyl > 079-515-8708 nita@proagri.co.za

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Early chick mortality part 2:

MANAGEMENT AND NATURAL CAUSES

by Barbara M. Simbaya, Technical Advisor at Tiger Animal Feeds

Poor management is a significant cause of early chick mortality. To keep your flock alive and healthy, your management practices should be extremely sound. Chicks reared in poorly managed brooding houses won't be able to reach their full genetic potential.

The following are some of the management blunders farmers often make:

High brooding temperature

When temperatures in the brooder are too high, the chicks may become dehydrated. This will result in them drinking more water at the expense of eating feed. A reduced feed intake will drastically affect growth and may even lead to death. High temperatures in the brooder will also lead to a pasted vent (i.e., a condition where a baby chick's droppings get stuck to the downy feathers around its vent (the opening where they poop and lay eggs later in life). If left untreated, this physical blockage can become fatal – usually within 24 to 48 hours if completely sealed.

Low brooding temperature

When temperatures in the brooder drop too low, the chicks get cold. This affects their immune systems, making them vulnerable to diseases. Low temperatures also cause chicks to huddle, and this may cause suffocation and death.

Poisoning

In early chicks, the mortality rate due to poisoning is high. The severity of poisoning, however, depends on the type, dose and duration of exposure. Poisoning mortality could be sudden and dreadful. There are various reasons for poisoning, such as contaminated feed and water as well as chemical poisoning due to the use of disinfectants.

Litter contamination

Another crucial cause of chick mortality is contaminated bedding materials. Some farmers use sawdust for brooding, which could be extremely harmful to chicks. Chicks can easily mistake sawdust for feed and, in the process, consume it in high quantities, which leads to gastrointestinal impaction and ultimately results in death.

Starvation

Starvation is another cause of chick mortality because young chicks do not have fat storage to fulfil their nutritional needs, resulting in death.

Injuries

It is important to handle chicks carefully during practices such as vaccination, grading and transportation from the hatchery to a rearing farm. Improper handling can result in injury and death.

Inadequate feeders and drinkers

Using the wrong feeding and drinking equipment can also cause chick mortality. Inadequate feeders and drinkers affect flocks' performance. Using unsuitable equipment leads to feed wastage and water spillage results in wet litter, which often causes disease outbreaks. Starvation due to insufficient feed and water leads to death.

High relative humidity

Damp litter in the brooding house is often caused by high relative humidity. This situation often results in the growth of microorganisms, which can cause disease outbreaks.

Predators

Poorly constructed brooding houses are also a cause of chick mortality. Predators such as rats, dogs and cats can easily enter the brooding house and attack the chicks.

Nutritional causes

Water

Water is one of the essential elements for maintaining the health and performance of chicks in the brooding house. It not only acts as a transport medium for nutrients and metabolic end products but also helps to maintain body temperature during hot weather. Additionally, water is absolutely crucial to balance minor mineral deficiencies, such as sodium (Na), calcium (Ca) and potassium (K). While unhygienic water results in high mortality rates among chicks.

Fat-soluble vitamin deficiency

Vitamins A, D, E and K are fat-soluble. These vitamins are required for normal growth, development and reproduction of chicks. A high deficiency of fat-soluble vitamins can cause death. In comparison, a minor deficiency of these vitamins results in, for example, cessation of growth, lacrimation, rickets, ruffled feathers, exudative diathesis and anaemia

Water-soluble vitamin deficiency

Vitamin C and B-complex vitamins are water-soluble. Water-soluble vitamins are an essential part of poultry diets. They are essential for the metabolism, reproduction, growth and development of chicks. A severe deficiency of these vitamins can cause death; however, a minor deficiency leads to, for example, poor feathering, low growth, weight loss, dermatitis, nervous signs and anaemia in chicks.

Tiger Animal Feeds produces broiler feeds for all stages of growth. The feed is a balanced, comprehensive ration packed with all the nutrients, vitamins and minerals a bird requires to thrive. Use the starter crumble for chicks that are between 1 and 14 days old. The grower and finisher, available in short pellets that are easily digestible, speeds up growth and ensures high productivity and excellent performance.

Untreated pasted vents can quickly lead to death among chicks.

Our expert technical department is always available, offering free technical support regarding all aspects of livestock production, including different species. Their goal is to ensure that you succeed in your business.

In next month's edition, we will look at diseases and various ways to reduce early chick mortality.

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Launch of FAW TRUCKS SOUTHERN AFRICA dealership in Eastern Cape

Article supplied

FAW Trucks Southern Africa has officially opened a flagship dealer ship in the heart of Gqeberha (Port Elizabeth), marking a major milestone in the brand's continued growth in the Eastern Cape. The modern facility at 21-23 Sidon Road, North End, officially opened on 21 May this year, reflecting strong demand for FAW vehicles and enhancing sales, service and parts support for customers in construction, mining and logistics.

As one of the first facilities in the country to roll out FAW Trucks Southern Africa's new corporate identity (CI), the dealership sets a new benchmark as a fully integrated 3S facility, offering Sales, Service and Parts under one roof. Strategically positioned, the dealership serves the entire Eastern Cape region and surrounding areas, forming a critical part of the broader FAW Trucks Southern Africa's dealer network and strengthening regional customer support.

The dealership is operated by the Scribante Group, a respected multi-generational family business with roots dating back to 1938 as a civil contracting company. Today, the group is active across concrete production, quarries, mining, asphalt, plant hire and related sectors. Scribante's association with FAW began in 2012 with the purchase of its first FAW mixer truck in Port Elizabeth, driven by superior fuel efficiency (cost per kilometre) and more affordable asset capitalisation.

Impressed by the performance and reliability of the FAW range, Scribante was appointed as an official FAW distributor in the Eastern Cape around 2019. The decision was a natural fit given the group's extensive logistics needs in the concrete business and their own fleet of FAW mixers and carriers.

Over recent years, models such as the JH6 28.500FT have driven significant sales growth due to excellent fuel consumption, reliability and versatility.

This success, combined with expanding demand, prompted the move to a larger, centrally located flagship facility to improve its service offering in the region.

'Higher levels of service'

Elma Van Zyl, Vice Dealer Principal at the Scribante FAW Dealership, said: "The opening of our new flagship dealership is a proud achievement for the entire team. From our first FAW mixer in 2012 to today, we have seen the brand grow in strength. The JH6 range has played a key role in building customer trust, and our new central premises will allow us to deliver even higher levels of service."

Mr Xin Huang, COO of FAW Trucks Southern Africa, added: "We want to congratulate the Scribante Group on this flagship Eastern Cape dealership. Their deep industry expertise and long-term commitment to FAW make them an outstanding partner. This new facility demonstrates our dedication to the region and will provide enhanced support to our valued customers."

Looking to the future, the FAW Trucks Eastern Cape team is excited about the impact of the new J7 28.550FT model as well as further improvements in after-sales service to maximise customer uptime.

The launch of the flagship dealership reinforces FAW Trucks Southern Africa's commitment to the Eastern Cape and its position as a trusted partner for businesses operating in the region's demanding conditions.

Join the conversation on FAW's Facebook Page and LinkedIn Profile. Subscribe here to receive all the latest news and information from FAW Trucks Southern Africa.

About FAW Trucks Southern Africa

FAW Vehicle Manufacturers SA (PTY) Ltd, established in 1994, is a leading global player in the commercial vehicle manufacturing segment, committed to delivering cutting-edge solutions. With over 72 years of experience globally and as one of the only OEM brands to offer such a diverse and extensive range from small to extra-heavy vehicles, FAW Trucks Southern Africa continues to be a trusted partner for businesses regionally and worldwide. Our comprehensive dealer network plays a vital role in ensuring that customers receive exceptional support and service throughout the African region. This network is strategically positioned to facilitate easy access to resources and assistance tailored to our clients' unique needs and routes of business. Local production is supported by a state-of-the-art manufacturing facility in the Eastern Cape, where most of the range is assembled locally to meet the diverse demands of the Southern African market. This facility not only fosters local job creation but also ensures the delivery of high-quality commercial vehicles specifically designed for regional challenges.

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THE LEADER IN IRRIGATION!

Irrigate effectively with Irrigation Unlimited's travelling irrigators

by Ashleigh Schubert

IRRIGATION UNLIMITED
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The water-powered travelling irrigator offers an affordable solution for farmers across Southern Africa.

The farmer always comes first; after all, he is the key player in the agricultural industry. This principle forms the foundation upon which Irrigation Unlimited is built.

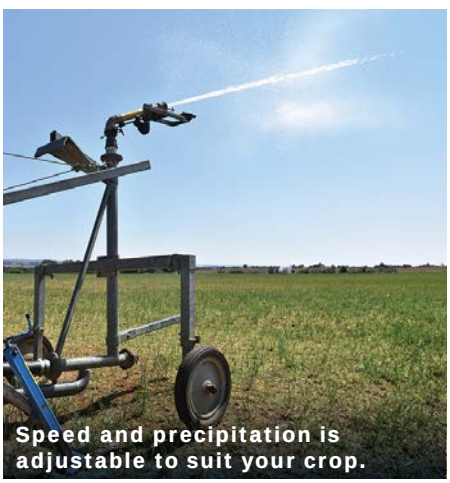
As a leading irrigation wholesaler in South Africa, Irrigation Unlimited has been supporting dealers and farmers with innovative irrigation solutions for over 23 years.

Irrigation Unlimited prioritises resource optimisation, including water and energy, to assist farmers effectively. Their practical irrigation solutions incorporate carefully selected components and technology.

This approach is crucial in a time where water and energy constraints are a reality. The company's commitment to quality and efficiency makes them a reliable partner for farmers in need of irrigation.

One of their successful systems is the Ocmis water-powered irrigator. This unit operates without electricity in the field, relying on water pressure and a gear system to move the spray cart across the land. In environments where power supply is uncertain or challenging, this blue workhorse is a winner!

Smart irrigation practices, such as watering in the evening, will also prevent rapid water evaporation due to sunlight, allowing crops to absorb more moisture.



Speed and precipitation is adjustable to suit your crop.

Effortless irrigation

The unit can be easily moved between fields using a tractor or even a pickup truck. The main water supply pipe can be placed underground in a safe location between the fields, avoiding interference with any soil preparation work.

The size of the unit determines how far the irrigation pipe can extend and how wide it can spray. Farmers can adjust the speed at which the spray cart moves based on crop water requirements.

These portable sprayers offer practical solutions with minimal risk.

Irrigation Unlimited's Ocmis travellers are well-suited for African conditions. Farmers can rely on these systems for efficient and cost-effective irrigation of their fields.

For more information on Ocmis systems, find your nearest Irrigation Unlimited distributor by visiting their website at **www.iunlimited.co.za** or contacting them at **(+27)12-736-2121.**

Irrigation Unlimited's Ocmis travelling irrigator makes farming easy.

The Ocmis irrigator in action.

Rewriting smallholder finance:

How AI is changing the game

Article supplied

Before sunrise, across small plots of land stretching from the temperate rural heartlands of Southern Africa to the tropical landscapes of East and West Africa, millions of smallholder farmers begin their day. Their work feeds families and underpins national food systems. Yet when it comes to access to finance – the credit, insurance and working capital needed to grow a sustainable business – many of these farmers remain invisible.

For decades, banks and insurers have viewed smallholder agriculture through a narrow lens of risk. Yields are weather-dependent. Income is seasonal. And records are informal or non-existent. The subsequent result is a persistent $65 billion financing gap.

The mismatch is stark. In many African countries, agriculture contributes up to 40% of GDP, yet receives only a fraction of formal lending. Smallholder farmers are frequently labelled as "unbankable." Not because their farms lack potential, but because the systems used to assess them lack insight.

The consequences are deeply felt. Without access to finance, farmers struggle to invest in better seeds, irrigation, storage or equipment. A single drought or flood can push households into crisis, forcing them to abandon farming altogether. Climate change has intensified these pressures, exposing the limits of finance models that were never designed for volatility.

The real challenge: Managing risk without visibility

At the heart of the problem lies a simple constraint: data. Large commercial farms generate years of production records, satellite monitoring and formal reporting. Smallholder farms rarely do. For lenders and insurers, this lack of visibility makes it difficult to answer fundamental questions: How exposed is a farmer to climate risk? And how likely is a farmer to recover after a shock?

Without credible answers, risk is either priced too high or avoided entirely. Many AgriTech solutions have attempted to bridge this gap, but many rely on smartphones and reliable connectivity – barriers for millions of farmers. What has been missing is infrastructure that works at scale, in low-connectivity environments, translating agricultural activity into financial insight that institutions can trust.

An African solution built for smallholder realities

This is the challenge eSusFarm sets out to address. The Agri-Fintech is building a financial infrastructure layer for smallholder farmers – designed around their lived realities, not the assumptions of traditional finance.

Rather than treating credit, insurance and climate risk as separate problems, eSusFarm integrates them into a single, Artificial Intelligence (AI)-powered platform. Farmers can register and participate using basic feature phones via Unstructured Supplementary Service Data (USSD), removing the need for smartphones or constant internet access. Behind the scenes, the platform combines satellite imagery, weather data and historical climate patterns to build a clearer picture of on-farm conditions.

AI models analyse this data to assess crop and yield risk, forming the foundation for parametric insurance products. When predefined weather thresholds – such as insufficient rainfall – are reached, payouts trigger automatically. There are no claims forms or lengthy delays. Funds are paid directly to farmers via mobile money when they are needed most.

"For too long, smallholder farmers have been invisible to financial systems, not because they lack creditworthiness, but because no one has built the infrastructure to prove otherwise," says Watson Vuyo Matsa, CEO and Co-Founder of eSUSFarm. "Our role is to turn the data that already exists in the field into a financial identity that opens doors to credit and insurance."

Turning insight into access

By translating environmental and farming data into financial intelligence, eSusFarm helps shift the economics of smallholder finance. Automated risk assessment can reduce operational costs for insurers, while insurance coverage lowers the likelihood of loan defaults. Clearer, more dynamic data gives financial institutions the confidence to extend credit into markets historically avoided.

"One of the greatest impressions the platform had on me was its ability to collect and collate farming data for smallholder farmers," comments Nontokozo Davidson, Development Finance Professional and Founder of Adopt-a-Farmer. "If harnessed and scaled, this will be a game-changer for the industry."

The social impact is tangible. Farmers with insurance recover more quickly after adverse weather, stabilising household income and reducing the need for distress coping strategies. Each participating farmer supports a household. At scale, these individual gains strengthen local economies, improve food security and build resilience across entire communities. Already, eSusFarm reports strong uptake and repeat usage across seasons. Farmers consistently describe registration as easy and straightforward, with many indicating they would recommend the service to others.

Unlocking inclusion at scale

Delivering this kind of solution requires technology that can operate securely, reliably and across borders. eSusFarm uses Microsoft Azure to run its data and AI workloads – processing satellite, climate and USSD data at scale, automating risk analytics and supporting secure deployment across multiple markets.

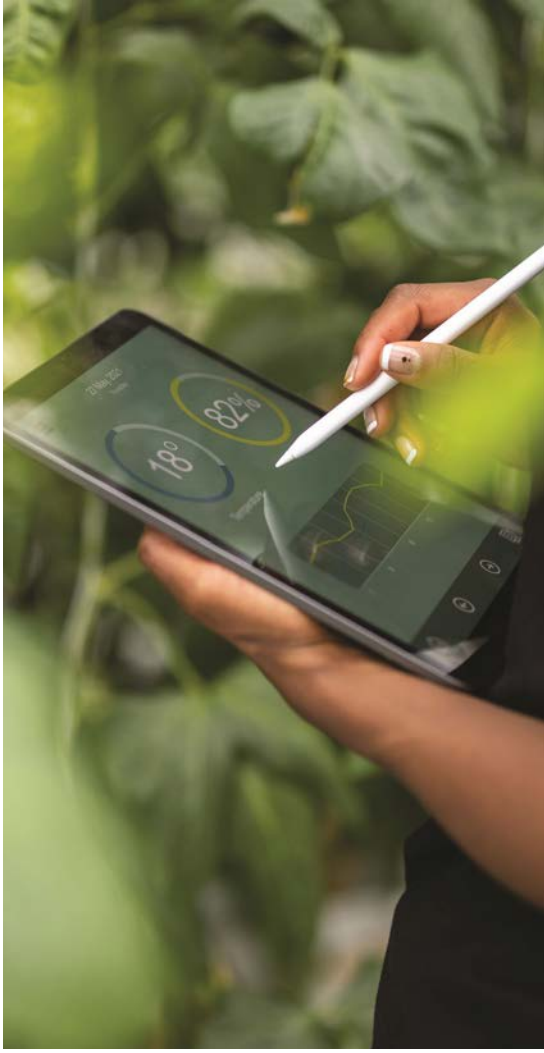
The Agri-Fintech has also participated in the Microsoft for Startups programme and the Microsoft and NVIDIA GenAI Accelerator, which has helped to refine AI models. This helped to strengthen its foundation for growth.

"Our focus is helping African founders build solutions that can scale securely and reliably," says Gerald Maithya, General Manager, Microsoft Africa Transformation Office. "eSusFarm shows how AI and cloud infrastructure can translate climate and crop data into faster payouts and more confidence for insurers and lenders – unlocking credit for smallholders at scale."

Today, eSusFarm is active in parts of Southern and East Africa, with expansion underway into West Africa. The platform has engaged over 380 000 smallholder farmers, and more than 20 000 insurance and advisory users. Working with partners across mobile, insurance and finance, its ambition is to support more than one million smallholder farming households.

Future developments include more advanced AI-driven risk scoring, continuously learning models that improve over time, and expanded satellite crop monitoring. The goal is not simply to digitise agriculture, but to reshape how risk and opportunity are distributed across Africa's food system.

"We're not building another app for farmers. We're building the financial rails that an entire continent of smallholders has never had access to, so that when the next drought comes, or the next opportunity, they're not left behind," Matsa concludes.

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Feeding communities, growing futures:

THE STORY OF KLIPPIES FONTEIN FARMING

Article supplied

In many of Southern Africa's rural communities, agriculture is more than just a livelihood … it is a pathway to food security, job creation and long-term sustainability. Emerging farmers are increasingly stepping up to meet these challenges, bringing fresh energy and innovation to the sector. One such farmer is Jonay Leda Kehaone, whose growing enterprise in the Northern Cape is not only producing food, but also creating opportunities and driving meaningful change where it matters most.

Rural development through agriculture

While Southern Africa continues to seek sustainable solutions to food security and economic growth, entrepreneur Jonay Leda Kehaone is demonstrating the transformative power of agriculture through his developing enterprise, Klippies Fontein Farming.

Founded with a vision to create sustainable opportunities within the agricultural sector, Klippies Fontein Farming has evolved into a diversified farming business offering livestock farming, animal feed supply, greenhouse and nursery solutions, irrigation systems and agricultural support services.

Through these operations, the company contributes to increased agricultural productivity while supporting local communities and emerging farmers.

Kehaone's entrepreneurial journey reflects resilience, innovation and a deep commitment to rural development. By investing in practical farming solutions and expanding access to agricultural resources, he is helping to strengthen food production systems and create economic opportunities in areas where they are needed most.

Increasing significance of emerging farmers

Agriculture remains one of the most important drivers of employment and economic activity in South Africa, particularly in rural communities. Through Klippies Fontein Farming, Kehaone is not only building a successful enterprise but also demonstrating how farming can serve as a catalyst for community development, food security and long-term economic empowerment.

His work highlights the growing role of emerging farmers in addressing national challenges while creating sustainable livelihoods. Through strategic planning, hard work and a commitment to continued excellence, Kehaone has positioned his business as a valuable contributor to the local agriculture.

"Successful agriculture is about more than farming; it is about creating opportunities, supporting communities and contributing to a more food-secure future," says Kehaone.

As the agricultural sector continues to evolve, stories like Kehaone's provide inspiration for aspiring entrepreneurs and showcase the positive impact that dedicated farmers can have on their communities and the broader economy.

THE IMPORTANCE AND BENEFITS OF USING DRONES IN MACADAMIA ORCHARDS

IMPROVED OBSERVATIONS LEAD TO BETTER DECISIONS

by Martie Bester

"Drones interest me because they give the farmer a new, advanced layer of visibility. A drone does not replace the farmer, the agronomist, the consultant or the person walking the orchard. But it does help them to see the farm differently," says Ken Treloar, a worldwide expert in the intersection of plant science, farm management and technology.

Ken holds an MBA in Business Administration and a BTech degree in Landscape Technology and Horticulture. This strong background eventually led him into the *AgTech space, and more specifically into drone-based orchard monitoring.

He is currently with HolmStone (part of the RusselStone Group), where his work has advanced into the broader space of renewable energy, infrastructure and long-term resilience for agricultural and industrial businesses. "Farmers need better data, better energy systems, better water use, better logistics and better decision-making. All of these things form part of building stronger farming businesses through agricultural technology innovation," Ken says.

DRONE TECHNOLOGY IN MACADAMIA ORCHARDS

"Macadamias are a very good fit for drone technology. Not because drones are trending. Not because the spraying, surveying or maps look impressive. And definitely not because every farmer needs yet another dashboard report.

"Drone mapping and macadamias make for a near-perfect and practical pairing. Trees are long-term, high-value assets that require expert management. In short: every tree matters."

A drone flying over macadamia orchards (Source: Monique Heydenrych)

A weak tree, a missing tree, poor drainage, a blocked irrigation line, uneven canopy development, recurring pest pressure or persistent chlorosis can all carry a cost for several subsequent seasons, Ken says. "Small differences in tree performance become large differences in nut-in-shell outcomes. All things being equal, sound kernel recovery and kernel quality are the big ones."

DRONE MAPPING

> "From the ground, we see individual trees, visible symptoms and the immediate environment. But with drone mapping (as we are leveraging a view from the air), we see orchards from a four-hundred-foot view."

Ken says that all the time and resources spent on reactive corrections will end up eroding margins. And this is where drones start to make practical sense.

They provide a new layer of visibility (mapping) and enhanced ways to spray, bait or seed cover crops.

"We see variation red flags and outliers. We see where orchards are uniform, where they are not and where there's sub-par performance."

'A PRETTY MAP IS NOT ENOUGH'

Let's not lose focus, though, says Ken. "The point is not the drone. It's the decisions that follow. A pretty map is not enough. One mistake farmers can make with drone data is stopping at the map."

According to him, a colourful normalized difference vegetation index (NDVI), normalized difference red edge index (NDRE) and a red, green and blue (RGB) or thermal layer map may look useful, but the real question is always: what now? He says the same goes for spray applications and asks why not utilise spot spraying or variable rate applications (VRAs) where it makes sense?

"Which block needs attention? Which trees are outliers? Which zone to scout first? Where should we go for leaf and soil samples? Which irrigation lines need checking? Where should we compare yield, cultivar performance, soil type, pest pressures or pruning?" says Ken.

Utilising objective source data comparatively leads to educated decisions and tailored next-steps, he says. This is an extremely valuable approach, and where drone data becomes a return on investment (ROI) engine for production teams.

WHAT DRONES CAN SHOW FARMERS IN MACADAMIA ORCHARDS

1. TREE INVENTORY

A drone survey can help identify how many trees are present, where trees are missing and where gaps exist, says Ken. "This is not just a neat counting exercise. Missing trees represent missing productive capacity. In young orchards, this helps with replanting plans, survival-rate checks and nursery orders. In bearing orchards, it helps quantify what the block can realistically carry."

2. CANOPY SIZE AND CANOPY VARIATION

"Canopy tells a story. Uneven canopy development can point to soil variation, drainage problems and *phytophthora* prevalence as well as irrigation pressure differences, nutritional imbalances, pest pressure hotspots, wind exposure and frost pockets. They can all display in some way through the canopy status metrics, especially when paired with other drone data metrics available. All

historic management issues or cultivar-specific growth patterns can also be tracked with drone scans over time."

According to Ken, a drone does not give the final diagnosis. But it does show where the diagnosis should start.

This is especially relevant in integrated orchard management. "A productive macadamia orchard is not only about yield in one season. It is about keeping the block in a productive stage for as long as possible. It is a sustainability game. "Once canopies become too dense, inter-row light declines and roots become exposed, spray penetration suffers and production can begin to decline. Drone-derived canopy metrics help farmers and managers see orchard statuses (or changes) early and objectively."

3. PLANT HEALTH AND VIGOUR MONITORING

Multispectral data, including indices like NDRE and NDVI, highlight differences in canopy condition. These indices should be interpreted carefully. A low value does not automatically mean a specific disease, deficiency or irrigation fault.

But it does highlight trees or zones that behave differently from the rest of the block, says Ken. "Outliers. Red flags. The areas of concern or focus. Outlier detection, in essence, allows us to move from broad observation to targeted inspection."

4. IRRIGATION AND WATER-STRESS INSIGHT

Thermal data can help show where transpiration patterns differ across an orchard. In practice, patterns often point to water stress, over-irrigation, blocked emitters or pressure variation.

Drainage issues, shallow soils or root-zone problems (among others) are also possibilities. Macadamias rely on a healthy, active root zone in a big way. Feeder roots, soil moisture, soil structure, pH, organic matter, drainage and ground cover. These factors influence whether a tree can take up water and nutrients effectively and efficiently.

Drone survey for data metrics. (Source: Monique Heydenrych)

"Drone data shows the above-ground pattern. Soil probes, irrigation records, soil maps and field inspections help explain the below-ground reasons. This is why drone data should not be viewed in isolation."

PHENOLOGY MATTERS

Timing is everything in macadamias.

Drone surveys during flowering, nut set, nut drop, shell hardening, oil accumulation or harvest time may all tell a different story, says Ken.

"The same block can look vastly different depending on cultivar, season, crop load, recent rainfall, heat stress, pruning, irrigation scheduling and stage of growth. That is why farmers and managers should not only ask, 'What does this map show?' They should ask, 'What does this map show at this point in the season?' Timing is important.

For example, a weak zone during flowering may affect nut set, he says. "A stress pattern during shell hardening or oil accumulation may raise different questions about water, nutrition and crop load. A canopy map before pruning may support contractor negotiations, or row access decisions, groundcover management, access routes and spray penetration discussions.

"The value improves when drone data is placed inside the macadamia calendar in a strategic way."

BETTER SCOUTING, SAMPLING AND PEST FOCUS

Macadamia orchards are rarely uniform. Some trees are stronger. Some are weaker. Some rows sit on slightly different soil. Some areas carry more water. Some dry out faster. Some zones are more exposed to wind. Some blocks have cultivar differences that affect flowering, nut set, nut drop and harvest timing, he says. If sampling ignores this variation, the results can be very misleading.

"Drone data can guide smart sampling by identifying representative areas, weak areas and strong areas. This is useful for leaf analysis, soil checks, pest scouting, nut counts, yield estimates and block comparisons. It also improves scouting. "Instead of walking randomly or only inspecting the areas that already look poor from the road, a farmer can inspect outliers. These are the trees or zones that differ most from the rest of the orchard."

This is useful where pests such as macadamia felted coccid, stink bugs, thrips or other orchard issues may be developing in pockets. Drones do not replace proper pest monitoring. They help focus attention, says Ken.

YIELD, QUALITY AND RECORDS

According to Ken, macadamia farmers think in terms of NIS, dry-in-shell (DIS), saleable kernel recovery (SKR), quality, crack-out and long-term block performance, and this is where he believes drone data is still underused.

"A block that looks good from the road is not always the block that performs best. A large canopy is not automatically a profitable canopy.

A strong-looking tree may carry poorly. A smaller tree may be efficient. The real value comes when drone data is compared with yield records, cultivar, tree age, soil type, irrigation design, pruning history and processor feedback."

Ken Treloar

He says one survey

gives a snapshot, but several surveys over time show direction. Ken emphasises the importance of asking questions. “Is the weak zone spreading? Are young trees catching up? Did the intervention work? Is the canopy closing too quickly? Is ground cover disappearing in shaded inter-rows? Is the same area underperforming every season?

“That is where the data becomes powerful.”

FROM MONITORING TO APPLICATION

Drone data also becomes useful when it feeds into application decisions, Ken says.

“In summary, a scan can identify weak zones, strong zones, stressed areas, canopy variation, missing trees or possible irrigation-related patterns. This information supports VRA either through ground-base equipment or through spray drones, where appropriate and legally compliant.

“In practice, spraying may include spot-spraying, targeted foliar appli cations, micro-element programmes, pest or disease interventions or specific orchard applications such as sunburn protection products.”

The right approach depends on the product label, crop need, canopy structure, timing, terrain, spray coverage requirement and operator capability, Ken says.“I would not position spray drones as a blanket replacement for conventional sprayers or mist blowers. But I do see a clear role for them in precision application work.

> “Understand the orchard needs first, then choose the right method.”

Especially true where access is difficult, soil conditions are challenging, terrain is uneven or the treatment area is specific.

“The same thinking can apply to seeding drones. In younger macadamia orchards with open inter-rows, drone seeding may have a role in establishing cover crops where access, timing or wet soil conditions make conventional equipment less practical.

Cover crops and living ground cover support soil structure, reduce erosion, improve orchard-floor conditions and contribute to the biological functioning of the system.

> “I do not believe every macadamia farmer needs to become a drone expert. But every farmer does need to become comfortable asking better questions of technology.”

TECHNOLOGY MUST SERVE THE FARMER

“Can it help me identify weaker trees? Can it help me find irrigation problems earlier? Can it improve sampling? Can it help my team prioritise scouting? Can it support pruning decisions? Can it reduce waste? Can it protect yield, quality or margin?” A farmer makes decisions today that may only show their full result years from now. That is especially true in tree crops such as macadamias, says Ken.

Drone survey for data metrics. (Source: Monique Heydenrych)

A poor decision around planting, irrigation, pruning, drainage, nutrition or pest control can echo for many seasons. A good decision can build value for decades. “That's why I have so much respect for agriculture. It is not just production. It is stewardship. It is business. It is risk management. It is science. And it is also deeply human.”

(Source: Monique Heydenrych)

DO NOT START WITH THE DRONE. START WITH THE PROBLEM.

'Where are my weak trees?' is better than 'I need a drone survey'. 'What is causing variation in this block?' is more useful than 'Can I get another map?'

"Good farming has always required observation. Drone technology, in essence, gives us another way to observe. A different perspective. And in macadamias, where every tree is a long-term investment, improved observations lead to better decisions."

> "Drones are not magic. They don't prune the tree, fix the irrigation, correct the soil, control the pests, improve SKR or make the management decisions. They show us where attention should go first," says Ken.

(Source: Monique Heydenrych)

(Source: iStock)

*AgTech, or agricultural technology, refers to the use of innovative tools, software and systems to successfully improve the efficiency, productivity and sustainability of agriculture.

Ken Treloar is a writer, consultant, speaker and strategist, focused on precision agriculture for perennial crops. He helps farmers and agribusiness teams to read drone data with clarity and act on insights with purpose. His work has appeared online, in various industry publications and at live presentations. He is also an AgTech consultant, focusing on drone data implementation, results, interpretation, sustainable practices and agribusiness management. Ken's first book, *Drone Data Metrics for Orchard Farming*, focuses on helping farmers and industry professionals practically understand drone-derived data. He is currently working on his second book, focused on drone use for macadamia orchard management specifically. It is designed to be as accessible and practical as his previous book. Anyone who would like to enquire about advanced copies of the new book, or more information, is welcome to contact Ken at agtech@kentreloar.com

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LSK- MALAMBO ROAD
LSK H.O- Plot sub v / farm
403a Lilayi road, Lilayi
P.O Box 31980 Lusaka

+ 260 967 640 126
+260 961 580 785
feedsales@nmc.co.zm