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Harvest SA

Securing South Africa's Food Resources

Raising the bar

Goscor sets new
lift truck
warranty standards



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On the cover

Goscor Lift Truck Company's extended warranty is a true indicator of the extent of trust in the Korean product, as well as a sign of commitment to servicing customers for the long haul.

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Forest products matter – every day in every way

EDS NOTE



GREG PENFOLD
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Environmental, societal and economic challenges are interconnected, and they can only be overcome through innovation predicated on what stakeholders really need. This was the core message of an important recent statement by Syngenta.

The Swiss agricultural behemoth conducted 150 listening sessions worldwide, engaging a broad cross section of views and achieving clarity on the expectations of society and farmers and different groups' understanding of sustainable agriculture. Consequently, the company has adopted a new approach intended to enhance the way crops are grown and protected and develop sustainable solutions for interconnected challenges.

Work will focus on product innovation guided by society and nature in consideration of externally verified sustainability principles, striving for the lowest residues in crops and the environment and investing in researching and developing sustainable solutions in collaboration with farmers, academia and environmental groups.

According to Syngenta's Chief Sustainability Officer, Alexandra Brand, "There is an undeniable demand for a shift in our industry. This has been the clear message throughout the listening sessions.

"We will put our innovation more strongly in service of helping farms become resilient to changing climates and better able to adapt to consumer requirements including reducing carbon emissions and reversing soil erosion and biodiversity decline."

There is a growing consensus that agriculture has to shift to a more sustainable footing if a growing world population under climate stress is to be fed, and when a leading corporation like Syngenta decides to lead the charge, the future begins to look less uncertain and more hopeful.

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SETTING NEW LIFT TRUCK WARRANTY STANDARDS

With its newly-introduced five-year warranty on its Doosan 7 Series range, Goscor Lift Truck Company is setting new standards in the South African materials handling industry. The extended warranty is a true indicator of the extent of trust in the Korean product, as well as a sign of commitment to servicing customers for the long haul.

In a ground-breaking development, Goscor Lift Truck Company has rolled out an industry first, standard five-year warranty on its Doosan 7 Series range of lift trucks. The new offering is the longest ever warranty to be offered in the South African forklift industry.

Patrick Barber, Sales Director at GLTC, says warranty is a valuable component of any capital equipment purchase, especially mission critical and big-ticket purchases such as lift trucks. "It assures equipment users that their funds are being spent on a trustworthy product and the supplier is committed to the health of the equipment for the long haul," he says.

"The pertinent reasoning behind the extended warranty is the fact that the initial capital investment on these machines is very high. Therefore, to retain the value on the product, the warranty is a

significant component of the product life-cycle," says Barber.

While different lift trucks from different manufacturers may have different price tags, the length of warranties has largely remained the same for years, pegged at 12 months, which is an industry norm. GLTC's new warranty is thus a game changer in the industry, driven by the company's understanding that the longer and more comprehensive the warranty is, the lower the overall potential cost of ownership for owners.

"We have been supporting the Doosan product since 1994 and have come to trust the build quality of this Korean product.



Darryl Shafto, Managing Director

We have worked closely with our principal, Doosan, to develop a product that meets our local operating conditions and support it with a fitting warranty that gives customers the peace of mind they need, especially in these difficult operating conditions," says Barber.

Barber also reasons that the extended warranty is a sign of service commitment from GLTC as the exclusive distributor of Doosan's range of lift trucks in the southern African market. "The initiative is in the best interests of the end user. A longer product warranty gives customers extra coverage for their mission-critical assets, along with a little more peace of mind. From a supplier point of view, it means that we want to be there for our customers, and be involved in their businesses with a vested interest," explains Barber.



Best combination

Barber says GLTC has in recent years worked closely with the OEM to bring the best combination lift truck in terms of engines and the drivetrain, among other crucial components. The result is a product that speaks directly to the local market's needs.

Therefore, the Doosan 7-Series forklift range is a product that ticks all the right boxes, from maximum productivity to cost-effective and safe operation across an array of applications – attributes that are high up on every warehouse or distribution centre manager's checklist when evaluating and selecting materials handling equipment.

For example, the new Doosan 7 Series, launched locally last year, is powered by a Yanmar 3.3-litre diesel engine that works in harmony with the transmission to offer the best fuel efficiency. The in-line, 4-cylinder, water-cooled, overhead valve engine provides high torque (191 Nm) at low engine speeds (1 600 rpm) in applications requiring ramp loading and unloading, fast lift speeds and heavy hydraulic flow. The high torque at low engine speeds translates into reduced fuel consumption.

The range also speaks directly to durability and reliability. For example, the Powershift Transmission precisely modulates clutch oil pressure for smooth forward and reverse directional changes, thereby preventing damage to the transmission and make the forklift more durable.

"These features, coupled with a long warranty, mean that if services are done according to OEM specifications and standards, the machines will definitely give owners

a longer lifespan, while retaining the value of the investment," says Barber.

Transformation matters

Apart from the warranty, another key development is that GLTC has just become the only importer of capital goods in South Africa to attain a Level 3 B-BBEE status, effective March 2019. Barber says this is a proud moment for the company, which speaks to its transformational attitude.

To get a Level 3 status, a business has to score between 90 and 95 on the BEE scorecard. This is measured on all five elements on the BEE scorecard, including ownership, management control, skills development, enterprise and supplier development and socio-economic development.

"For such a big organisation, attaining a Level 3 B-BBEE status means that we have covered a lot of ground with regards to our transformational goals. We have done a lot when it comes to employ equity, enterprise development initiatives and corporate social investment, among other initiatives," says Barber.

GLTC has also invested heavily in skills development. "Skills shortage has become

one of the most common enemies to economic development, not only in South Africa, but across the globe.

It is a problem that hinders both business and economic growth. Therefore, forward-thinking businesses should play an active role in skills development, and GLTC has done a lot in that regard," says Darryl Shafto, MD of GLTC.

Following the establishment of its merSETA accredited Training Centre last, the company is now armed with a facility that allows it to build a pool of technical skills that it needs to better support its customers.

"The Training Centre offers an NQF Level 3 qualification. It operates nationally, accommodating both new trainees and existing GLTC employees from around the country on an annual basis," says Shafto.

"Our B-BBEE rating can offer huge benefits to other companies that do business with us. Benefits of being compliant include the ability to actively participate within the preferential procurement policy of government, qualifying to tender for contracts with governmental bodies and a competitive edge over other competitors in the industry," concludes Barber. ■



Patrick Barber, Sales Director





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Beating off invaders

The Agricultural Research Council releases the Tradescantia tip beetle as a biological control agent

The Agricultural Research Council-Plant Health released *Tradescantia* tip beetle in Iphiti Nature Reserve, Gillitts, Etkekhwini, KwaZulu Natal as a biological control agent on 13 March 2019. The release of the *Tradescantia* tip beetle is to respond to the *Tradescantia fluminensis* commonly known as the spiderwort, an invasive plant originally from southern Brazil. The agricultural sector today is facing many challenges that can affect high yields and food security.

The invasion of non-indigenous species is one of the challenges that the agricultural sector is facing. The control of weeds has a huge economic impact of the agricultural

sector as huge amounts of money is spent on controlling the invasive species. The invasive species can have a negative impact on the farming sector and the health of the community. However the Agricultural Research Council-Plant health campus has been working on a number of control measures that are environmentally safe.

In 2013 the ARC initiated a biological control programme to assist with the invasion of the *Tradescantia fluminensis* commonly known as the spiderwort. The spiderwort is native to southern Brazil, but has become invasive in several parts of the world including Europe, Australia and New Zealand. The plant forms thick mats on the ground, particularly in wooded areas, preventing other herbaceous species from growing and impeding the recruitment of forest trees.

The *Tradescantia* tip beetle, *Neolema abbreviata*, was imported into the ARC-Plant Health and Protection quarantine facility at Cedara in 2014.

A breeding population was established in quarantine, and the safety of the beetle was tested for, using standard international procedures. Indigenous plants closely related to spiderwort were exposed to the beetle, and its ability to survive on them was recorded. As had been demonstrated in New Zealand, the beetle was only able to survive and form a population on the target weed, and is therefore safe for release in South Africa.

An application for release of the beetle as a biological control agent against spiderwort, in the form of a report, was therefore submitted in 2017 to the Department of Agriculture, Forestry and Fisheries. The report was reviewed by international and local experts, and a permit for release was issued in March 2018. Unfortunately at the time the size of the beetle culture in quarantine was small, and it has taken a year for the culture to be increased to a point at which a release can be made.

The ARC will therefore release the beetle at a number of sites with plenty of healthy spiderwort, in different habitats, and monitor it to determine whether it establishes a permanent population that is self-sustaining. If it does so, at some release sites at least, we will assess the effectiveness of the beetle in suppressing growth, density and spread of spiderwort, and the return of native biodiversity.





Costas Zachariades in the greenhouse tunnel at ARC-PHP Cedara, with some *Chromolaena odorata* plants.

“The ARC realises the importance of the insects in the ecosystem and how they can contribute to food security and high yields. This is an integral part of the organisation’s mandate or supporting the agricultural sector through technology transfer,” said ARC CEO Dr Shadrack Moephuli.

About the Agricultural Research Council

The Agricultural Research Council is a premier science institution with a national footprint that conducts research with partners, develops human capital and fosters innovation in support of the agricultural sector. The ARC provides diagnostic, laboratory, analytical, agricultural engineering services, post-harvest technology

development, agrochemical evaluation, consultation and advisory services, food processing technology services as well as various surveys and training interventions. ■

For more information, visit the ARC website at www.arc.agric.za or call (012) 427 9770 or download the ARC Hub App at archub.agric.za, also available on Android and IOS.

Dr Costas Zachariades

Dr Zachariades is a senior researcher at the Cedara, KwaZulu-Natal laboratory of ARC-Plant Health and Protection. He obtained his PhD in Entomology from Rhodes University in 1994, and since 1996 has worked on biological control of invasive alien plants. His main research focus has been on the biological control of *Chromolaena odorata*, a shrub from the Americas that is invasive in eastern South Africa and elsewhere. He has also been involved in several committees of the International Organisation of Biological Control.



Future legend

Delivering food security through technology
Samuel Mathekga (left) and Clive Mathe (right)

With the head and wings of an eagle and the body of a lion, the legendary gryphon has the mobility to soar through the air and the muscle to take on the strongest opponents. As such, it is the perfect symbol for the Gryphon Corporation, an engineering and technology start-up founded in 2018 by two young aeronautical entrepreneurs, Samuel Mathekga and Clive Mathe.

Focused on designing and developing innovative solutions for solving economic and societal problems in Africa, the company has been incubated at the Innovation Hub in Pretoria since 2018.

Mathekga and Mathe are advocates for data-driven farming practices. They are currently working on creatively engaging large and small-scale agricultural through

crop-spraying drones and agricultural data consultancy, advocating for data-driven farming practice.

"A crop-spraying drone platform that is cheaper, more efficient and more reliable than any traditional crop-spraying platform. Traditional crop-spraying platforms include manned-aircraft crop-spraying, manual spraying and tractors," says Mathekga.

Mathe weighs in on the importance of data-driven farming: "Data-driven farming practice speaks to a farming cycle that is more informed about its processes, how these processes interact with each other, and what the output is, depending on the inputs.

This comes naturally as each farmer knows with time what and what not to use, how crops respond to different inputs such as chemical treatments (pesticides, fungicides etc), and how much each field yields, amongst many other things.

"Traditionally all this knowledge is attained by the farmer through experience and deliberate measurement. It is safe to say therefore that the attainment, assimilation, synthesis, analysis and evaluation of this information (data) is done at a human scale and sometimes (many times!) the amount of data that a human can take in is limited. A good example where the latter assertion is true is when a farmer walks through his field to access the health of his crops by looking at the leaves. This is very feasible for a small farm, but if you scale up into hundreds of hectares, you need a machine, such as a drone, to quickly and efficiently scan the farm and analyze crop health with limited human interaction.

"The aforementioned addresses data acquisition and usefulness to address go/no-go decisions at that instant. The data can also be collected for a prolonged length of time, and what we hope for, is to start seeing correlations of inputs and outputs, and using



“Data-driven farming practice speaks to a farming cycle that is more informed about its processes, how these processes interact with each other, and what the output is, depending on the inputs”

The Gryphon Corporation's innovation also comes with a data-acquisition package that collects data for specialised trend analysis to help make better farming decisions in the future. “The objective for this is to adopt robust, adaptive farming methods that are in sync with the uncertain weather patterns, natural farm inputs (such as pest attacks) and the required need for increased crop-yields across Africa.”

According to Mathe, the crop-spraying drone addresses the critical need to increase food security in the region.

“To do this, under uncertain climate conditions (among other drivers of farming failure or success), it is necessary that not only more efficient processes be adopted, but that robust and adaptive methods become part of the farming system.”

The autonomous crop-spraying drone, and the data-acquisition platforms address these requirements, and are one step of many in the direction of enhancing food security in the region.

“A first-principles analysis of most of our farms in Africa clearly shows a lack of infrastructure in general, and this has resulted in inefficient execution of many of the farming processes. This is not in sync with the heightened development in technology, engineering design, and the decreased cost of acquiring and deploying these. Through the right amount of synergy between technology and design, we can help leapfrog that lack of infrastructure with enhanced platforms such we are developing,” adds Mothekga.

The duo believe their innovation will be a significant player in the agricultural sector in Africa: “Besides the skills training that will come along with its application, it will see

farmers spending significantly less money in the crop spraying process while at the same benefiting from the efficiency it adds.”

Mathe and Mothekga are no strangers to the world of agriculture. “Both Sam and I have farming backgrounds, and as we grew up we spent a significant amount of time at the farms doing menial work.

“As we grew in the knowledge and experience of engineering, we realized that there is a better and more efficient way of doing these menial tasks, and many of the other farming processes that we did growing up. Farming is something that is very close to our hearts, and we will endeavour to add as much value as we can through our company,” says Mathe.

“The drone was designed with small-scale farmers in mind, as they are the ones mainly affected by the lack of infrastructure, but scalability of the platform allows it to be deployed for medium- and large-scale farmers. We are still currently prototyping, and we hope that at the end of the pilot we will be having a platform that will be used across the board,” he adds.

The innovation will play a role in improving food security in the region, and make African agricultural sector more attractive to investors.

“With about 10% of the people in Africa under-nourished, and 30% - 40% of children's death attributed to malnutrition, the social need is critical, both in South Africa and in Africa as a whole,” says Mathe.

The Gryphon Corporation was a finalist in the 2018 SAB Foundation Social Innovation Awards and received a seed grant of R200 000. ■

(Sources: SAB and personal communication).

our in-house developed AI algorithms we can help make better decisions based on past system performance. The ability to make decisions and acquire data is much enhanced using technologies such as AI and machine learning than the linear classical approach that a human being adopts.”

The same approach can also significantly enhance the resilience of a farming operation.

“The farmer doesn't necessarily become resilient, but rather more informed and better equipped to tackle all the uncertainty,” says Mathe. “By definition, if our response time to an uncertainty decreases to close to zero days, and our response tactics are more informed, the density of the uncertainty is significantly decreased, and that is what we hope data-driven farming methods will do, on top of the improved yields per unit time per unit hectare per unit cost-of-production that we hope to achieve.”

Spray compatibly

The importance of foliar sprays of micronutrients in citrus

Living plants consist generally of 70% water, 27% organic matter and 3% minerals. The mineral fraction can be subdivided into macronutrients and micronutrients. The difference lies in the quantities a plant needs of a specific element, with micronutrients being in the order of parts per million (milligram of nutrient per kg of dry plant material).

Both macronutrients and micronutrients are equally important for citrus trees, and although micronutrients signify minute quantities, they are essential for the production of organic matter. Micronutrients are what we call essential nutrient elements: without them, citrus trees cannot complete their life cycle, and the cell functions and metabolic reactions of the citrus tree are compromised. There are eight known micronutrients, viz. zinc, copper, iron, boron, manganese, molybdenum, chlorine and nickel, and the function or working of each of these elements within the plant cannot be replaced by another element. A better approach will therefore be to correct the deficiency of the specific element in question, rather than apply a mixture of micronutrients, with the hope that one of them will work.

Soil conditions and characteristics, such as pH, clay mineralogy, organic material, soil texture, etc., play an important role in determining micronutrient availability for uptake. For example, micronutrients that are part of the metal group of elements strongly bind to organic and other soil particles, rendering them unavailable for plants. Thus, although soil analysis can show abundant

micronutrient quantities in the soil, it is no guarantee that they will end up in the plant. That is why it is always a good idea to take leaf samples to check if the concentration of the individual elements is at optimum levels in the tree. Corrections for micronutrient deficiencies are commonly done via foliar

Always take leaf samples to check if the concentration of the individual elements is at optimum levels in the tree

application of the specific deficient element, since higher plants are able to absorb nutrients through their leaf surfaces.

Three key properties for the choice of micronutrient product, for foliar application, are important: i) type of micronutrient compound, ii) compatibility, and iii) improved uptake through superior product formulation.

Micronutrient absorption in leaves is influenced by the type of charge, ion size and the ion's ability to bind to the leaf surface. Research conducted by Citrus Research International showed that micronutrients in

the sulphate form performed quite well, in a controlled environment, in terms of uptake and cost of product.

In a commercial environment, at field level, product formulation with advanced adjuvant systems to improve compatibility and uptake of a micronutrient plays as important a role as the type of compound.

Growers will save a substantial amount of spraying costs when a commercial product is chosen that is compatible with the tank mix, whether it is a fungicide or insecticide or mixture of both. When a micronutrient product is compatible with the tank mix, no precipitates in the tank or stratification of the tank mix should occur.

Another important component of compatibility refers to the intended purpose of each product in the tank mix.

If a micronutrient formulation is truly compatible, no antagonism in the working of the individual products, which will result in poor performances, will occur.

Micronutrient products with superior formulation will increase the humectancy and retention of the micronutrient on the leaf, reduce the surface tension of the spray droplets, and improve the movement of the element across the cell wall and membrane into the cell, where it can fulfil its intended function.

To summarise, a high quality micronutrient product is characterised by the right elemental compound and the right product formulation to increase uptake and compatibility with the tank mix. ■

*JT Vahrmeijer, Nutrient Specialist,
Villa Crop Protection*



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High or low volume spraying?

Recover the maximum active ingredient on the target

The focus into improving biological efficacy of agrochemicals by improving application techniques and apparatus has never been more intense.

Risking over-simplification, there seem to be primarily two schools of thought that need to be considered:

- Improving biological efficacy by increasing application volumes.
- Improving biological efficacy by reducing application volumes and increasing chemical concentrates.

It is imperative to understand that neither of the above is intrinsically “right” or “wrong”. What is important is to understand which strategy would be beneficial to the biological outcome in which circumstance.

Circumstances favouring increased application volumes

Applications where the “active ingredient” has no or very little chemical activity

Winter and summer oil applications (with no second active with a chemical activity for controlling the first instar larvae) for Red Scale.

In this approach the functionality of the oil is physically to suffocate the dormant Red Scale.

The principle is simple—although it is possible to drown in a cup, it is much more probable to drown in the sea!

In this case— more free water/oil gushed into the target area will have a better chance of control, naturally at great expense and huge negative impact on the environment.

Winter oil sprays to break the rest cycle have the actual objective to “wake up the tree by strangling it momentarily” and also require the bark to be drenched.

Applications where chemical activity is the driver

Insect vectors hiding behind bark and/or protected by their own natural structures can pose a virtual impossible situation to get active ingredient into their environment to affect them. Again, this category requires drenching the environment in a quest to achieve contact.

The above applications are not technically spraying operations, but rather drenching, and have very little built-in science, achieving high levels of coverage by the mixture, but very little chemical recovery. This constitutes a huge amount of waste and environmental contamination, at tremendous cost to the producer. It should be restricted to the minimum.

Low volume, high concentrate

The science of effective application of agrochemicals has the sole purpose of optimizing the recovery of active ingredient on the target area. The proper distribution uniformity on the target and throughout the total target area is of equal importance.

This has been shown in numerous recent (2009-2015) trials to be far better achieved by a reduced volume and a pro-rata increased concentrate to keep the active per hectare constant. This has been demonstrated in Vineyard, Apples and Citrus through independent research*.

The reason is simple: A certain surface area will only be able to “carry” a certain amount of atomized solution before run-off will commence. At that point we have exited spraying and entered drenching.

What about product registrations for low-volume spraying?

Very few chemical registrations refer to a specific water volume per hectare – generally the amount of active is specified per hectare

or per 100 litres of water. Thereafter it is left open for interpretation. Phrases like “full cover spray” are used, and this supposedly indicates that the active ingredient should be recovered and retained over the entire surface to have the desired effect.

In a case of a product that has a chemical function, e.g. a preventative spray against Black Spot, with copper as active ingredient, this means that control depends on the presence of copper.

The worst recovery and retention will be achieved with the highest volumes, resulting in the worst outcome—poor control, early re-infection, increased risk of resistance and gross environmental contamination.

On the other hand, if the “full cover spray” is used in context with an oil application against dormant Red Scale, where physical suffocation is the objective, the drench application will necessarily require large volumes per hectare for the desired result.

Tank mixes

It is clear from the distinction between spraying and drenching for different purposes that it is important not to use two contrasting chemical in one tank mix! If the oil spray requires high volumes for drenching and copper compound low volumes at higher concentrates for maximum recovery, they cannot be mixed.

In conclusion: merely reading product labels without understanding the difference between recovery (spraying) and coverage (drenching) applications might mislead one into choosing a non-optimal route.

Marius Ras (M.Eng),
Marketing Director, Rovic Leers

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Potassium nitrate's role in Systemic Acquired Resistance in citrus

In our last article, *Harvest SA* January-February 2019, we described the many benefits of using potassium nitrate for fertigation as well as for foliar applications. In this issue we elaborate on potassium nitrate's potential to increase a plant's Systemic Acquired Resistance (SAR) to pests and diseases.

The Huanglongbing (HLB) bacterial disease has been found in most citrus growing areas of the world. The disease is severe, resulting in bitter, inedible, misshapen fruit. The trees show severe deficiency symptoms often leading to tree death in severe cases. The vector is the Asian citrus psyllid. The bacteria, introduced by the psyllid, cause blockages in the phloem transport system affecting nutrient and carbohydrate distribution within the plant. Aggressive psyllid control and balanced nutrition are ways to control the disease.

Work done by the University of Florida has shown that there were significant reductions in leaf mottling, whole leaf chlorosis, rosette formation, Zn island greening, veinal chlorosis and vein corking as well as larger leaf sizes with balanced fertilizer applications vs. no fertilizer applications.

Additionally, in a five-year study (2008-2012) by the University of Florida, a heavily HLB infected citrus orchard was treated (foliar) with various nutrient cocktails containing potassium nitrate (Maury Boyd cocktails) and other compounds known to promote SAR in plants, such as phosphorous acid, salicylic acid and/or the *Bacillus subtilis* antibiotic. All the treatments containing potassium nitrate doubled the citrus yield, and the most cost-effective in terms of return on investment was the stand-alone potassium nitrate treatment. The yield improvements were not ascribed to any bactericide properties of potassium nitrate but to the ability of potassium nitrate to enable a plant to regenerate new phloem vessels to compensate for those blocked (infected) by the HLB bacteria.

SAR in citrus has also been reported against the Florida wax scale with potassium nitrate foliar applications. With soil applications, SAR against phytophthora spp. has been reported by applying nitrogen in the nitrate

form. Nitrate-N can be optimized by using potassium nitrate along with other nitrate containing fertilizers.

Potassium increases the resistance of plants towards diseases by several means: On a metabolic level, optimal potassium nutrition reduces the accumulation of short chain carbohydrates and non-protein nitrogen which may serve as food for invading bacteria and fungi. Potassium also increases auxins, phytoalexins and phenols which are identified disease inhibitory compounds found in the cells around infected sites. Low plant potassium levels cause a rapid breakdown of phenols and an increase in inorganic nitrogen levels. On a physical level, potassium firms cell walls which can offer increased physical resistance to invasion, and on the contrary, a lack of potassium leads to thinner cell walls and slower growth making it easier for parasites to penetrate the epidermis. Optimal potassium nutrition will also increase the plants' ability to recover from pest and disease attack (such as phloem regeneration) after recognized treatment measures.

According to the International Potassium Institute, Perrenoud (1990) extensively reviewed the effect of potassium applications on disease severity. With bacterial infections, potassium application decreased severity in 99 out of 144 cases with 14 unchanged. For fungal infections, potassium application decreased disease severity in 1080 of 1549 cases with 112 cases unchanged.

Immunity booster with potassium nitrate* (Ultrasol K Plus and Ultrasol K Plus Acid***)**

Using potassium nitrate as the N (nitrate-N) and K source, both required by plants in the largest quantities, has been shown in all crops to be the most efficient of all N and K fertilizer combinations to enhance not only their mutual uptake but also to enhance the uptake of the Ca, Mg, Fe, Cu and Zn cations and to promote SAR in citrus trees.

Potassium is not a pest-control product but certainly plays a role in Systemic Acquired Resistance of plants and has been reported to increase the efficacy of both insecticides and fungicides in effecting proper pest and disease control. ■

* All claims in this article can be substantiated with references which can be made available on request.

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Citrus sizzles

Record exports, tremendous prospects

Southern African citrus growers are in a buoyant mood, with the announcement that a record crop of an estimated 131.7 million 15-kilogram-cartons of citrus will be packed and passed for export by producers in South Africa, Zimbabwe and Swaziland to more than 100 countries this year. This is compared to 123 million last year.

The good news was first proclaimed at the Citrus Marketing Forum, held under the auspices of the Citrus Summit, organised by the Citrus Growers Association (CGA) in Port Elizabeth from 12-14 March. Some 600 delegates, including citrus growers, economists and business people, attended this year's event.

"The citrus industry has enjoyed two record crops for the export market in succession. Last year's crop yielded a revenue of nearly R19 billion," Justin Chadwick, CEO of the CGA, said in a statement.

The soft citrus and lemon categories are the main growth drivers, although their combined net growth has been dampened by a 3% decline in Valencia oranges, which make



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Compatible with a wide
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Increased yield and
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Spray Ultrasol® K Plus after fruit set to boost tree potassium at the critical time to increase size and quality.

Sprays are known to:

- Increase **rind thickness** and **reduce skin creasing** and cracking ✓
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Spraying Ultrasol® K Plus on your citrus trees is a wise investment!

Consult your local agronomist for advice concerning rate and frequency of application.



up the biggest portion of the citrus export market at 39%, followed by navel oranges (20%), lemons (16%), soft citrus (13%) and grapefruit (12%).

According to Chadwick, the growth can be ascribed to the increased resilience of the citrus industry and its ability to adapt to technological changes and overcome challenges. Elaborating on this to Harvest SA, Chadwick said, "Farmers in South Africa are faced with many challenges not shared by other southern hemisphere competitors—in particular the need to embrace land reform and transformation, and the fact that South Africa is a semi-arid country.

Citrus growers have embraced the need to enact land reform and transform their businesses. They have done this in a manner that enhances their business models, and grows the sector.

Instead of trying to slice the pie into smaller pieces – they have grown the pie and allowed new entrants to get their slice. They have also adopted a raft of water saving technologies which have allowed expansion in area under citrus without the need for additional water resources."

In terms of technological adaptation: "Netting is a good example – many of the new plantings of citrus are under nets which significantly reduces water requirements, while dealing with issues such as hail, sunburn and wind.

Citrus growers in southern Africa invest over R60 million a year in research and technological development—mostly aimed at dealing with pest and disease issues. Through this research they have developed risk management systems for both CBS and FCM, which means retention of important export markets," explained Chadwick.

Although the Valencia output declined in 2016, it has since regained levels of 50 to 54 million cartons. "This is a massive volume and is adequately meeting the market demand. Most Valencia are grown in the north of the country—drier weather during the summer of 2018 could impact on the 2019 crop," said Chadwick.

The citrus windfall is also good news for the economy as a whole, as it is expected to lead into more job opportunities and foreign exchange revenue.

"Our local citrus industry is one of the country's most important fruit groups by value and volume. It yields a revenue of over R20 billion per year of which 92% comes from exports, and provides jobs to more than 100 000 people," Chadwick stated.

Beyond that, the citrus sector is committed to the progressive transformation of the industry. As Chadwick explains, "The CGA Grower Development Company is focussed on providing support to black growers. This company is working closer with national and provincial government to ensure that the 145 black growing entities on 8 000 hectares are successful, profitable and sustainable. In the Eastern Cape, the CGA GDC have a joint project on enterprise development, assisting growers to replace older orchards and developing new land. In Limpopo a joint arrangement on extension ensures technology transfer to black growers. The CGA GDC would like to partner with government throughout the country."

Looking forward, Chadwick says, "There is a good chance that new market access for Philippines and wider access to the USA could be concluded in 2019." ■

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Jeanette du Plessis, International Sales & Marketing Manager, Gossamer





A passion for innovation

With 4IR, the client's at the core

Founded in 2001, Go Global has been operating for almost 19 years. Its core purpose is perishable and dry cargo logistics with a strong focus on how to make use of IT and business information for a stronger presence in the market and to offer a unique approach to managed logistics. It handles every aspect of the supply chain, from an exporter IT system (iRoot), perishable logistics (GoReefers), transport (GoRoad), quality inspections (GoCheck), coldstores (GoChill), seafreight (GoMarine). We spoke to Derick Robertson, Executive: Sales and Marketing, to find out more.

"GoGlobal works with a lot of producers and exporters," says Derick. "We pick up the

product and ship it wherever it needs to go. We ship all the way around the world. We ship to USA, Canada, UK, Europe, Middle East, Asia. We also have an office in the UK.

Go Global is an IT focused company. "Because of the volume that we handle, everything is focused around technology and IT. We've got a passion for innovating within the industry, seeing how we can do things better, smarter and faster," says Derick.

"Our whole philosophy is to have a full integrated seamless and effortless system built around us, our clients and their products. We need to have and give focus to moving the product. The new 4th industrial revolution (4IR) is happening as we speak and if any person does not embrace this new way of doing things, they will be left behind

very soon as IT will be the big player in the logistics industry."

GoIntell, which is the information and support division of GoGlobal, has just developed a software called 'Root2Go'. Root2Go embraces all the aspects of the value chain that GoGlobal can offer.

"It allows you to go sit on the beach and consult your dashboard with all the things that you need to see, like your stock levels, how many containers are stuck somewhere in the supply chain, status on your door-to-door cargo. You can follow from stock level at the pack house all the way through to the destination," says Derick.

"All these services have been developed with reference to our clients' needs," says Derick. "The client is at the core of everything we do." ■

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Rooted in limestone

Exciting prospects open for SA lime-processing company



P&B Lime Works is a lime-processing company that mines high-grade calcitic limestone in its own open grove mine. The company then produces quicklime or unslaked lime using customised rotary kilns, and also possesses a hydration facility where high quality hydrated limes are produced. P&B Lime Works has been in the business of lime mining, calcining and hydrating for 97 years, and thus has gained a vast amount of experience within the lime industry. P&B Lime Works is also mid-way through an expansion project where it is set to more than double its production volumes.

"With an estimated mine lifespan of more than 300 years, we are extremely excited to

see what the future will hold for our brand in the industry," says Managing Director, Johan Alberts.

Deep roots

The history of P&B is intertwined with the local farming community.

"Our roots run deep in lime and limestone. We've been marketing lime since 1925 – initially as Piquetberg & Bredasdorp Lime Works. Generations of customers have benefitted from our high quality calcitic lime," says Alberts.

At first, the company focused on calcining limestone into lime for the building industry. In 1935 it started producing its renowned P&B Agricultural Lime. Production of Animal Feed Lime followed in 1995. Since 1998 the Company has been using modern,

environmentally friendly technology to calcine the limestone, which is mined on the premises.

"It is an open-cast mine. There are sufficient deposits of calcium carbonate to ensure supplies for the next 300 years," says Alberts.

In 2001 new rotating horizontal kilns were constructed for the calcining of limestone with a hydration plant which entered production during June 2008.

Expansion plans

"To continue serving our customers who demand high quality limestone CaCO_3 , quicklime(CaO), and hydrated lime Ca(OH)_2 products, further expansions are planned," Alberts explains.

An additional 6 rotating horizontal kilns will be constructed and commissioned in phases,

along with upgrades on the current hydration and crushing plants. Completion of all phases is scheduled for 2021.

P&B Decarb Lime

P&B Decarb Lime is a product that is specifically designed for application in controlled atmosphere rooms used in fruit and vegetable preservation. A highly reactive form of white hydrated lime, the function of this product is to absorb excess carbon dioxide found in controlled atmosphere rooms.

"It can either be used in the place of an air scrubber, or in conjunction with an air scrubber for the added effect, especially when filling the controlled atmosphere rooms with fruit.

"P&B Decarb Lime comes in 12.5kg bags which have been specially designed to maximise the contact between the lime and the atmosphere by merely puncturing the bag with small holes.

"Don't worry about the mess, this product has no risk to any fruit or human health," Alberts explains.

"This product has been used for years in apple packhouses across South Africa where

The uses of lime in agriculture sector

- pH regulation in soil
- Source of Calcium in soil
- Source of Calcium in feed
- Water filtration, flocculation, pH regulation, softening
- Kills bacteria and removes odour in animal pens
- White wash paint for animal pens
- Removes carbon dioxide from atmosphere in controlled atmosphere rooms.

it has proven its worth, over and over. This product is a highly cost-effective solution to regulating the carbon dioxide levels in your controlled atmosphere rooms as it does not require any expensive air circulating equipment.

"P&B Decarb Lime can be placed on a shelf or floor in the controlled atmosphere room and left there to perform its magic. It is estimated that one bag of lime can be used for 3-4 crates of apples. This relates to roughly 10kg of lime per ton of apples. This calculation depends on the specific fruit varietal," says Alberts. The product is available across South Africa and can be ordered directly

from the factory in cost effective quantities. Alternatively, P&B Lime Works has preferred agents in both Gauteng and Kwa-Zulu Natal who can deliver smaller quantities if that is the need of the client," concludes Alberts.

No job too big or small

"Whatever the job, if it needs lime, P&B is ready to help you. We supply agricultural lime products, building and construction lime or other products, including water-related lime products and road building lime.

"Our efficient transport network delivers in bulk to your site. We are a Level 4 BEE contributor," Alberts concludes.



Lime - the farmer's versatile friend

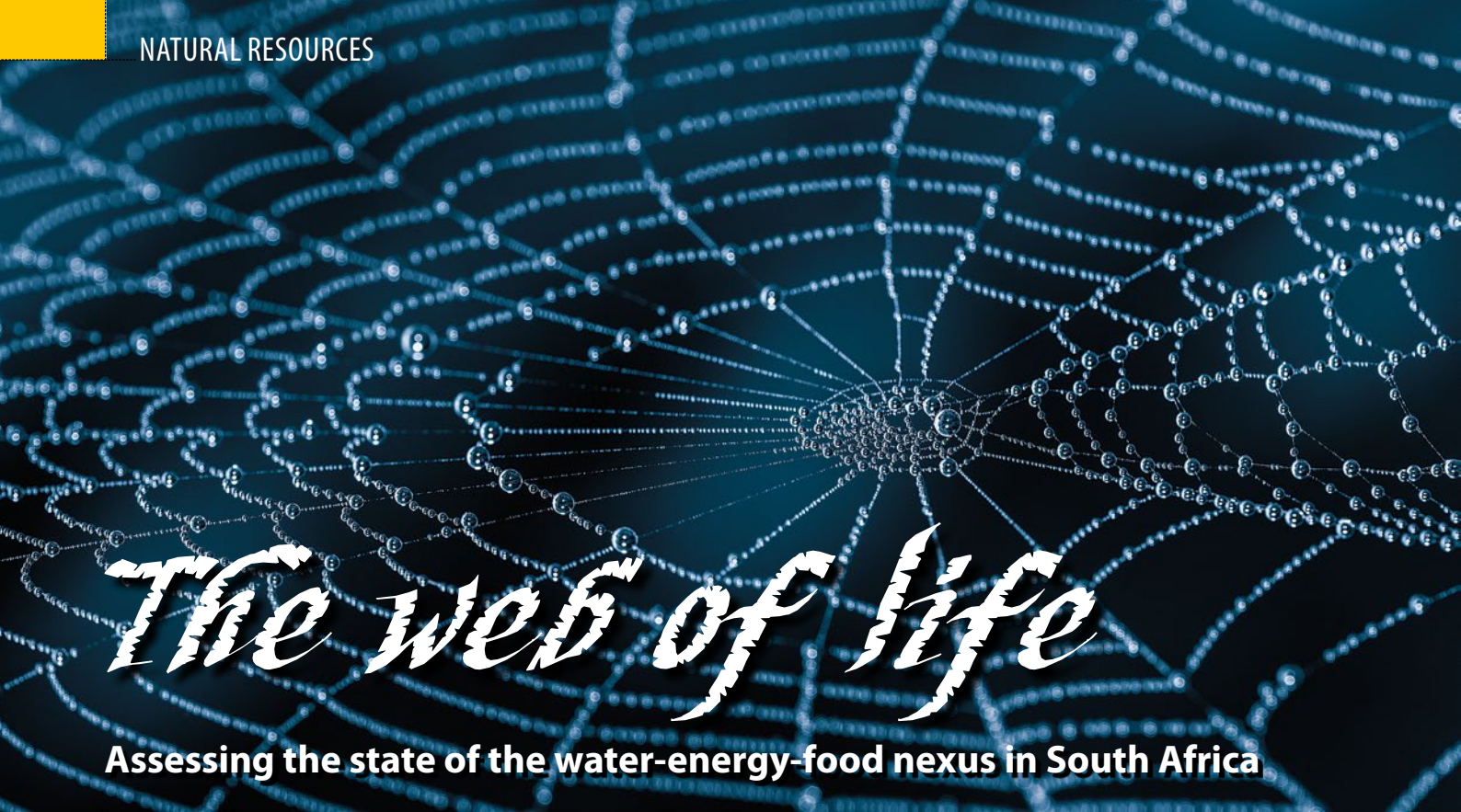
Calim:

- Pig farms, poultry farms, any feed lots, milking stations, stables
- Disinfects the area
- Kills bacteria
- Helps with odours
- Can be used as white wash

Decarb Lime:

- Strong absorbant of carbon dioxide
- Used to remove carbon dioxide from atmosphere in controlled atmosphere storage rooms
- Apple industry
- Potato industry
- Any industry that uses controlled atmosphere





The web of life

Assessing the state of the water-energy-food nexus in South Africa

The Water Research Commission (WRC) has identified the water-energy-food (WEF) nexus as one of its focus areas of research. Unlike integrated water resource management, which is water-centric in nature, the goal of the WEF nexus is to approach resource management more holistically by utilising a multi-centric philosophy. Each resource sector within this sector has an equal weighting. In its latest study on the subject, the available information and knowledge about the WEF nexus in South Africa was reviewed.

Background

The water-energy-food nexus is broadly defined as an approach that considers the interactions, synergies and trade-offs of water, energy and food when undertaking the management of these resources. Water, energy and food securities are inextricably linked, with usage within one sector influencing the use and availability in the adjacent sectors.

The WEF nexus is gaining recognition internationally as an intersectoral approach to resource management and sustainable development. The WEF nexus is a focus

research area for the WRC. The WEF nexus presents an opportunity for policymakers, researchers and development agencies to integrate the sectors to optimise the use of the resource base, maximise synergies and minimise trade-offs and conflicts.

In this latest project, the WRC led a review of available information and knowledge about the WEF nexus in South Africa. More specifically, the study reviewed past, present and ongoing work on the WEF nexus, focusing on the current status, potential, challenges and opportunities for intersectoral WEF nexus planning.

Why water-energy -food nexus is important for the country

Increased frequency and intensity in drought attributable in significant part to climate change is already causing acute water shortages in some parts of South Africa. In view of the water scarcity problem, there is a need for an increased ability to make use of alternative water sources. Even though water is a renewable (recoverable) resource, and there is sufficient water globally to satisfy an expanding and wealthier population, demand for water exceeds supply in many regions of the world. Water availability will affect the future of the WEF nexus. While

there is significant uncertainty regarding the magnitude of effects, water availability and predictability will be altered by changing temperatures, shifting precipitation patterns, increasing variability, and more extreme weather. Several factors require the water-energy nexus be addressed in an integrated and proactive way, and urgently so.

First, climate change has in the last two decades become significantly pronounced both in terms of increased temperatures but more worryingly increased variation in precipitation both intra and inter rain season across Southern Africa.

Furthermore, population growth urbanisation and regional migration trends indicate that the population is further impacting the management of both energy and water systems.

Last but not least, introduction of new technologies in changing energy and water domains could shift water and energy demands.

Main results

Much of the WEF nexus information that has been produced has a regional SADC focus. South Africa, however, has many opportunities to implement WEF nexus thinking in resource management.

Solar power generation, water reuse and recycling, and precision agriculture are examples of opportunities that could contribute to intersectoral optimisation.

For South Africa, it is imperative that the WEF nexus approach be closely aligned with the United Nations Sustainable Development Goals (SDGs), particularly to SDG 2 (zero hunger), SDG 6 (clean water and sanitation) and SDG 7 (affordable and clean energy).

A diverse set of challenges hinder the effective implementation of the WEF nexus in South Africa.

As a developing country, South Africa's primary focus is on alleviating poverty, inequality and corruption while attempting to increase economic growth.

Secondly, resource management and policy development are generally sector-specific, with little acknowledgement of adjacent sectors. Thirdly, data related to the three sectors, and especially their

interactions, are frequently unavailable, inaccessible or unusable due to scale, unit or temporal differences. Further more, WEF nexus implementation will be subject to its inclusion in national policies and standards, implying the integration of the water, energy and agricultural departments.

Conclusion and recommendations

A systematic analysis of existing WEF nexus framework in academic and grey literature resulted in the development of a South African framework that considers the three sectors as well as technological innovations, human-wellbeing, SDGs and different drivers of the WEF nexus.

It is proposed that this framework be utilised as a point of departure for future research related to the WEF nexus in South Africa. To this end a research agenda for the WEF nexus in South Africa is proposed in the final report of the study.

It is recommended that future research on the WEF nexus focus on the following:

- Developing an integrated model, metrics and indices to assess the WEF nexus in South Africa and creating a WEF nexus database.

- Translation of existing knowledge to inform policies for integrated sustainable resource management among the WEF sectors

- Participatory research aimed at demonstrating the applicability of the WEF nexus at the local level, especially among the poor, and generating cases that demonstrate how the WEF nexus could assist in achieving the SDGs.

South Africa is well positioned to achieve these goals as there are large datasets already in existence.

The development of a WEF nexus model, metrics and indices would help to unlock the value of such existing data and also guide the generation of new datasets. ■

Dr. Sylvester Mpandeli, WRC



OCCUPATIONAL HAZARDS

Are occupational allergies an overlooked health problem among South African crop farm workers?

Crop farming consists of many elements that can potentially cause respiratory allergies and skin allergies or allergic contact dermatitis (ACD). The South African agricultural crop sector employs thousands of workers, yet the prevalence of occupational respiratory allergies and ACD among these workers has not been established.

Crop farming is one of the biggest contributors to the South African economy, employing thousands of workers. However, occupational diseases within this sector are not well researched, and occupational allergies even less so. An allergy is an over-reactive immune response to a harmless foreign substance (allergen). It is estimated that allergies affect 30-40% of the general population worldwide; and according to the Allergy foundation of South Africa, a third of the South African population will suffer from at least one allergy during their lifetime. Respiratory allergies and skin allergies (allergic contact dermatitis, ACD) within the work environment are among the commonly reported occupational diseases worldwide.

The global incidence of occupational respiratory allergies such as asthma and rhinitis is estimated at 15%, and it is also estimated that ACD accounts for 20% of all reported occupational skin diseases. In South Africa, the prevalence of occupational asthma is estimated at 1.8/100 000 population; however, the prevalence of occupational ACD in South Africa is still unknown.

Crop farms are a unique environment, consisting of many elements that can potentially cause both respiratory allergies and ACD. A respiratory allergy is an immune response to airborne substances, which enter the body through inhalation. Common causes of respiratory allergies within crop farms include plants, rubber and organic dust (Table 1). Mould is a common component of organic dust and several studies have reported that farm workers seem to have a much higher prevalence of mould allergies compared to the general public. ACD, is an immune response on a localized region of the skin, due to contact with a substance (allergen) that an individual is sensitized to. Common causes of ACD within crop farms include plants, chemicals (pesticides and disinfectants), rubber compounds and airborne

biological hazards (Table 1). Plants and pesticides are identified as major causes of skin diseases including ACD in this environment.

Allergy symptoms experienced can vary depending on the individual and period of exposure to allergens, and often multiple symptoms may occur at once. Common respiratory allergy symptoms include asthma, allergic alveolitis, wheezing, rhinitis, conjunctivitis, and coughing.

The common ACD symptoms include inflamed skin, rash, blisters, skin peeling, scaly and itchy skin. Once a worker develops an occupational allergy, early diagnosis and early removal from exposure to the allergen is crucial for improved health outcomes.

However, emphasis should remain on prevention of disease which involves implementing control measures such as organisational measures (policies), engineering controls, training and awareness of workers, and lastly the use of personal protective equipment (PPE).

Studies have shown that occupational incidences are reduced significantly when workers are effectively trained on the dangers of their jobs. Furthermore, employers need to have guidelines and procedures

Table 1: Common causes of respiratory and skin allergy (allergic contact dermatitis) associated with crop farming

Common aetiologies	Allergen examples	Exposure	Allergenic components	Allergic condition
Plants, trees and weeds	Crop plants: Corn, rye, wheat, potatoes, tomatoes Trees: London plane tree Weeds: <i>Amaranthus</i> species (Common pigweed), <i>Chenopodium album</i> (Goose foot), <i>Cynodon dactylon</i> (Bermuda grass)	These plants can be within the farm vicinity and farming activities may lead to exposure.	Commonly the plant pollen, but other parts of the plants can also be allergic components.	Respiratory and skin allergy
Organic dust particles	Organic substances of plant and animal origin	During soil preparation for planting, during harvesting and produce storing.	Plant and animal proteins.	Respiratory and skin allergy
Airborne microbiological hazards	Bacteria: <i>Thermoactinomyces vulgaris</i> and <i>Saccharopolyspora rectivirgula</i> Fungi: <i>Alternaria</i> , <i>Cladosporium</i> and <i>Aspergillus</i> species	During soil preparation for planting, during harvesting and produce storing.	Bacteria and mould spores. Other mould cell-wall proteins can also be allergic components.	Respiratory and skin allergy
Chemicals	Pesticides: Glyphosates, captofol, carbamates Disinfectants: Glutaraldehyde, formaldehyde, lysol	Pesticides: During pesticide preparation, application, planting and harvesting. Disinfectants: During cleaning and decontamination processes.	Hapten molecules of pesticides and disinfectants bind to proteins on the skin surface.	Skin allergy
Rubber and rubber compounds	Rubber: Natural rubber Rubber compounds: Rubber compounds include N-isopropyl-N'-phenyl-p-phenylenediamine (IPPD), 2-mercaptobenzothiazole (MBT), N-1,3-dimethylbutyl-N-phenyl p-phenylenediamine (DMBPPD)	Rubber: Products containing natural rubber such as gloves, boots and working tools. Rubber compounds: Rubber products such as working gloves, boots and working tools.	Rubber: Proteins in natural rubber latex. Rubber compounds: The rubber compounds are hapten molecules that bind to proteins on skin surface.	Respiratory and skin allergy

in place to ensure health and safety compliance by workers. In crop farms, this may include restricted access to crop fields during pesticide application; with access only being given to trained pesticide applicators wearing the appropriate PPE. Furthermore, advocating the use of correct PPE amongst workers' is very important; as it could lead to great reduction (65%) in exposure to pesticides as reported by previous studies.

Although this article has only looked at occupational allergies, it is important to note that certain substances (including those that cause allergies) can act as irritants. These irritants can cause both respiratory and skin (i.e. irritant contact dermatitis) diseases. The prevalence of occupational disease caused by irritants is high, with irritant-induced occupational asthma accounting for an estimated 11-22% of all work-related asthma and irritant contact dermatitis accounting for an estimated 80% of all occupational skin disorders. Importantly, the symptoms of irritant

disease are often indistinguishable from those caused by allergies. Thus, the diagnosis of an allergy using diagnostic tests is essential in order to distinguish an irritant disease from an allergic disease.

From the few studies that have been conducted in South Africa, it is evident that very little is known about occupational allergies within crop farm workers.

The Immunology and Microbiology Section at the National Institute for Occupational Health (NIOH) is aware of the lack in data regarding occupational allergies amongst crop farm workers' in South Africa, and have made studying the prevalence of occupational allergies within this occupational sector a necessity.

Further information can be obtained by contacting the NIOH +27 (0) 11 712 6400 or info@nioh.ac.za. ■

M. Muvhali, E Ratshikhopho, A. Fourie and T. Singh

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RAVING ABOUT ROOIBOS

SA tea breaks into Japan



Rooibos is becoming a big deal in Japan is one of the largest tea-drinking nations in the world, so it's big news when a South African product like Rooibos catches on over there.

Recently, the SA Rooibos Council (SARC) announced that exports of South Africa's indigenous tea hit record highs in 2018, with more than 2 000 tons were shipped to the shores of Japan—the largest consignment since the tea was first introduced to the country in the 1980s.

According to SARC chairperson Martin Bergh, breaking into the Japanese market was no picnic, but Rooibos is starting to make serious inroads.

"The Japanese are spoilt for choice. They have more than 26 different types of tea to choose from, which range from their traditional green tea varieties to jasmine and barley tea or 'mugicha' as it is known among the locals, so Rooibos has been up against stiff competition.

"Over the years, Rooibos has carved a niche for itself as a refreshing health tea, which has resonated with the ultra-health-conscious

Japanese market. Today, it counts among the leading teas in Japan's 'Healthy Tea' segment. While the Western world has known about the risks associated with drinking too much caffeine for years, the Japanese have only recently taken notice of it. This has helped to increase Rooibos' appeal since it is low in tannins and completely caffeine-free. The general trend toward natural health and wellness products continue to exert a growing influence on purchasing patterns in the region and as more of Rooibos' health benefits become known in the East, we anticipate the demand for the product to grow," says Bergh.

Exports to Japan more than tripled in the last five years as more mainstream supermarkets started stocking the product, many going so far as to launch their own private-label products.

Popular restaurant chains like Ippudo have also done their bit to promote Rooibos, using Rooibos tea instead of water with their traditional pork bone broth as they felt the clean taste of Rooibos complemented the dish better. Being purists, the Japanese prefer to drink Rooibos tea unflavoured, without milk or sugar. "Rooibos is mostly prepared as

a hot or cold water infusion in large pots or servers rather than single servings. Hence the larger teabag sizes of 3.0g or more.

"In the past, Rooibos was consumed more in summer for hydration, but has now become an all-year-round tea product which all generations of consumers, from children to the elderly enjoy.

"Among the youth, our homegrown brew is also gaining traction as a ready-to-drink or frozen beverage, middle-aged women consume it specifically for its beauty and age-defying benefits, while the elderly drink it as a sleep elixir. The majority by far still favours the red, fermented Rooibos, but there is a growing interest in unfermented, green Rooibos too. Rooibos is also a popular product in cosmetics, food and puddings, as well as liquor," says Bergh.

Even though Rooibos only makes up a tiny slice of the 200 000 tons of tea consumed in Japan per year, it is faring well above the annual 2.3% growth rate for the tea industry, clocking up a 7% increase in sales last year. And with a market as big as Japan's 126 million-strong tea-loving population, always eager to experiment with new products, Rooibos offers endless possibilities. ■

BIG IN JAPAN

We were curious to find out more about the art of marketing Rooibos in Japan. Clinton Gass, MD of Rooibos Marketing Limited in Japan, answered our questions.

Tell us more about breaking into the Japanese market.

It has been a journey through at least three phases. The original export model started sales into Japan in 1983 and put Rooibos into the hands of a limited number of small Japanese companies, very savvy marketers who commissioned research on Rooibos and built the market to a first peak of 800t in 1993. The value of the market was huge with retail prices at over ¥20/g.

However the strong emphasis on health properties in fact limited the appeal of Rooibos to the greater consumer market, while the unorthodox business practices of these pioneering companies undermined the credibility of the product and the business. By setting up a business in Japan to distribute and market Rooibos, we were able to change the positioning of Rooibos—the perception shifted to become less medicinal, lower priced and more appealing to the mass market as a specialty tea. The retail

price dropped to ¥12/g or less in this second phase.

The third phase saw a massive price drop as Rooibos as internet retailing and wholesale supermarkets sold the tea simply on price.

Did you deal directly with Japanese trading partners or through an intermediary?

As Rooibos Marketing Japan we operated in the market as a Japanese distributor. By operating in the Japan business space we had better control over marketing while capturing more of the value chain.

How is the tea packaged and presented?

Resealable pouches are the most common form of packaging. Large teabags of 3g or more are also standard because brewing for larger volumes—500ml-1.5L is more common than 1 cup brewing.

How does the Japanese tea value chain differ from the local if at all?

Rooibos is sold through multiple channels in Japan with the value chain varying significantly across those channels. At the low-cost

end in shorter sales channels, such as online and wholesale retailers, consumers can buy Rooibos for less than ¥3/g. At the upper end in specialist or premium retail stores consumers will pay as much as ¥20/g.

What's the future for Rooibos in Japan?

If the price continues to fall and the position of Rooibos moves closer to the very cheap barley tea, volumes could increase significantly although the total value of the market could decrease.

What other markets are looking good for Rooibos right now?

If China follows suit—as it often does with successful products in Japan – this could be the next big growth market.

What should Rooibos growers bear in mind in terms of quality assurance and any other factors that might limit entry into the Japanese market?

Processors—rather than producers—need to adapt to the requirement for tighter specifications for cold-water infusion and objectives measures of quality like polyphenol content.



SUPPORTING THE YOUTH

Raising the next generation in a 4IR world

Globalisation—opening borders between countries—and better communication between people and companies have in the past decade led to an unprecedented and worldwide explosion of knowledge.

In the process, a segment of the population whose technological skills did not grow became unemployed or had to revert to lower income jobs. They became poor(er) without them doing something wrong.

Between 1980 and 2015 an explosion of technological expertise forever changed the world's way of communication.

The development of PCs, TVs, cell phones and the internet suddenly made the world one big city—the global village. Knowledge and products started flowing freely across borders and among people. A new era where people can immediately share in other's experiences and knowledge is the new norm.

Eager students from all corners of the world could now listen to the lectures of experts 10 000 kilometres away from them and increase their own knowledge. Academics believed the explosion of knowledge brought about by globalisation had the potential to lift up the mass of semi-literate and illiterate people to new levels as well as offering “normal” people the chance to make it big. Just think how Google, Facebook, Skype, WhatsApp, Twitter and YouTube have influenced and simplified our lives.

The next knowledge explosion – the so-called Fourth Industrial Revolution (4IR) —came about from around 2016 when technology like cell phones, robots, artificial intelligence, nano-technology, 3D printing,

self-driving cars, drones and cloud storage dramatically increased.

This revolution requires even more technological savvy from consumers and even more people are left behind.

According to the World Bank, extreme poverty shrunk from 64% to 10% between

**Eager students
from all corners
of the world could
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and increase their
own knowledge**

1960 and 2016. Illiteracy dropped from 58% to 15%.

The dilemma is that people who embraced these technologies moved forward at great speed, while those who did not use the momentum to become part of the development were left even further behind.

The gap between those who have and those who don't is indeed becoming even wider. This creates a new set of challenges with those who stayed behind demanding to share in the prosperity.

There are two billion* more people on earth than three to four decades ago. Around 80% of people live in urban areas or can reach it within an hour. This creates a concentration of skilled people whose concerted efforts leads to an unparalleled progress in the field of technology.

Where half a billion people had access to the internet in the 1980's, now more than five billion enjoy its perks today. More intellectual contact leads to an explosion of extraordinary talented people.

On top of that, people are living longer and their skills base is available longer. A decade ago we had 250 million less university students. China had 250 000 doctoral students in 2018.

One of the problems is that new technology and inventions more often benefit individuals rather than a system or community. It is difficult to benefit from new technology if you do not have access to a PC, cell phone or even financial credit.

But the faster technology develops, the more difficult it is to keep up. Those with the tools, technology and knowledge available only stay on top as long as they enhance their skills.

The income of the top 1% of the richest people on earth grew an average of 12% during 2018. However, the income of the bottom 50% decreased with an average of 11%. The rich is getting richer and the poor even poorer.

There are, in some instances, examples of people who lifted themselves out of poverty into prosperity—you cannot keep a good man down.

It is against this background that everyone needs to position themselves. The challenge for youth is immense. Parents should keep

the following dimensions in mind as part of their education:

Anchor your child

Give him or her a framework set in beliefs and ethics so they can distinguish between right and wrong. Explain where their power is rooted. Have house meetings and set house rules. Tell them about the history of their country and where their ancestors fit in. Who are their grandparents and what did they believe in. What are the criteria for success in your family? They should know who they are, who their family is, what their values are and how they fit in.

Lead your child

Accompany and lead your child in the process of learning skills. They don't automatically know which skills they have to master for success in the world. Help and explain the importance of subject choices. Make sure your children have the skills in demand in the world. The saying goes: "Don't major in a minor thing". Teach them dexterity – why not become computer skilled as well as learning a trade and practicing an additional

language? Be involved to the maximum. Be there, be positive and cheer them on.

Choose extracurricular activities with care

What will give your child the edge later on in life? Horse-riding lessons or computer classes? If your child is the best in the drama class, they would want to ensue a career in that field. Explain the difference between a hobby and something that could be a career. Careers such as modelling, sportspersons, actors, musicians and pilots have the downside of an unstable family life – they should be aware of this.

Empower your child

Not everyone will naturally be an academic achiever. But extra tutoring in difficult subjects can help them understand difficult subjects. Help them be academically successful. Success in other fields are great for building their self-esteem and making them believe they can. Empower your child to one day be independent. It is best not to rely on a job in government service where their race or religious beliefs may count against them.

Rather spend your money on your children's (and your own) education and development instead of clothes and cars.

Enlighten your child

Expose your children to the world. Travel, read and talk about interesting places and events. Make newspapers, magazines and books available. Speak about what happened in the world today during dinner and put it into context for them. Teach your child not to be naïve or to fall for scams. We live in a world rife with fake news. Knowledge will help them see the truth and protect them against unnecessary fears. Be positive, energetic and do things with them. Visit museums, landmarks and natural wonders like the ocean, mountains, forests and rivers.

Give your child an emotional shield

Teach your child to not have a victim mentality. You are responsible for your own happiness and prosperity. Prepare your children for the world. Teach them to handle change from their base of values instead of shielding them from it. ■

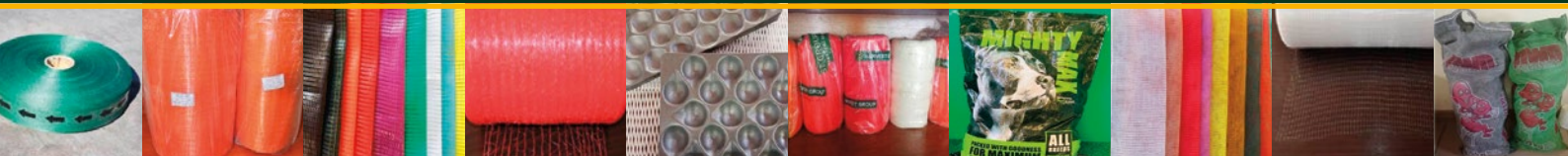
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In the pink

The South African pig industry is modern and dynamic

The South African pig industry is a modern, dynamic industry that compares well with the best in the world in terms of production figures. It is not unusual for experts from other countries to visit South African pig farmers to learn more of the tricks of the trade.

The South African Pork Producers' Organisation (SAPPO) is the mouthpiece of pork producers in South Africa. It serves a small but dynamic industry consisting of:

- Approximately 110 400 sows owned by approximately 140 pig farmers

- A total of 148 registered pig abattoirs, applying modern technology to ensure a

streamlined slaughtering process responsible for the slaughtering of just more than the 3 million pigs annually.

A total of nine stud breeders.

SAPPO serves the South African pork producer by co-operating within the organised agricultural fraternity and by liaising with various sectorial organisations, role-players within the supply chain of the meat industry, the government and international interest groups.

Pork 360

SAPPO's quality assurance system, Pork 360, ensures that producers meet the increasing demand for food safety by retailers and

consumers. A further result is that producers save in feed and medicine usage as the intensive monitoring of their production systems ensures that wastage is avoided and those opportunities for improvement in their production systems are continuously being identified.

Animal health

Preservation of the South African pig herd's excellent health status, compared to most other countries in the world, is one of SAPPO's priorities. The health status of the South African pig industry is of vital importance to the survival of the industry and its role players at large. For this reason SAPPO regards strict biosecurity on farms



as a fundamental departure point towards a respectable health status of the industry.

Research

SAPPO regards research to be one of the pillars on which the pork industry stands. Research in the pork industry is in the interest of the entire red meat chain including the consumer, and SAPPO believes that pork research should enjoy government support. SAPPO has a Research Portfolio Committee to manage research and development within the pork industry.

Business development

The role of SAPPO is to enable pig producers in South Africa to be economically viable and

Pork for fun and profit

Former security guard Noncedo Khawuleza-Ndzawuse started farming three years ago with only three pigs. Today she has 30.

Khawuleza-Ndzawuse says she quit her security guard job in order to earn more money and spend more time with her family.

She was working an 11-hour shift. "It was not healthy for me. I would come back [home] and head straight to bed. I missed important family events, and I could not make time for my kids."

Khawuleza-Ndzawuse, bought three pigs to start Ithemba Farm in Faure, where she has a shack and a big piece of land. Today, the 41-year-old mother of three has 30 pigs. She sells the pork mostly to vendors of braai meat.

"The business is doing well. I saw an opportunity selling pigs. They grow easily and are not complicated to farm." Her clients are business people who sell tshisanyama, mainly in Mfuleni and Khayelitsha.

"It is better to be your own boss than work for someone else," she says. She learned about farming from her late grandfather in the Eastern Cape, who used to take her with him to attend to his livestock.

Ndzawuse says she feeds the pigs twice a day. Her challenge, she says, is access to water. There is no water on her plot and she has to fetch water by car from taps several kilometres away. She and her two employees slaughter the animals themselves and take the carcasses to a nearby butchery for slicing.

She makes about R7 000 per pig.

"In order to make money you need to get dirty, and love what you are doing," says Khawuleza-Ndzawuse.

www.groundup.org.za

The health status of the South African pig industry is of vital importance to the survival of the industry

to maximise their long-term profitability through transferring industry knowledge, liaison with stakeholders, training/skills development and mentorship.

Small, developing pig farmers face numerous challenges hindering them to become successful. SAPPO strives to assist aspiring and existing pig farmers to become

sustainable profitable pig farmers. This takes place, among others, through mentorship programmes, study groups and training at SAPPO's Baynesfield Training Academy (BTA)

Consumer education

South African pork producers have been involved in the promotion of their product for many years.

SAPPO's promotion and marketing team continuously inform consumers of the virtues of pork by means of various media and promotion projects. SAPPO also conducts consumer and product research on a regular basis.

Communication

SAPPO communicates with its members and industry stakeholders via its infohub, bimonthly magazine, Porcus, and its monthly e-newsletter, SAPPO News and a weekly update to producers, SAPPO's Weekly Update. ■

www.sapork.co.za

BEEF BITES BACK

Middle East regains its
appetite for SA red meat



Excellent progress made by government and other industry players at the recently held Gulfood Trade Show 2019 to re-open the beef trade between South Africa and the Middle East has allowed the Beefmaster Group of Companies to export quality beef products to the region once again, at a volume of some 300 tonnes.

According to Roelie van Reenen, supply chain executive at Beefmaster, while the outbreak of Foot and Mouth Disease (FMD) experienced earlier this year threatened South Africa's FMD-free status, causing several countries to close their borders to SA-meat products, the swift response by government and industry players has succeeded in reinstating veterinary certificates for beef with select Middle Eastern and North African countries, including Qatar, Jordan, Kuwait, Bahrain, Dubai, and Egypt.

If you're wondering what all the beef is with the Middle East, van Reenen points out that "South Africa is one of the five largest producers of Halaal-certified meat worldwide, making it attractive to Middle Eastern nations. Overall beef exports increased from 8 292 tons in 2001 to 31 888 tons in 2017 with the UAE, Kuwait, Jordan and Qatar being the top Middle Eastern destinations for beef exports. Additionally, the Middle East has a rapidly growing population which opens opportunities for South African beef exports."

The re-established beef trade will maintain local beef prices, but a high maize price, a debilitating drought and a stagnant economy have combined to hit red meat hard, driving weaner purchase prices and beef prices down, further pressuring cattle farmers and the beef industry as a whole.

"The current economic climate in SA has consumers under pressure, which means the market is unable to absorb the excess beef in production. However, the progress made at the Gulfood Trade Show will go a long way in mitigating these pressures, as it will allow for the excess volumes of red meat, currently in

SA, to be absorbed by foreign markets," says van Reenen. However, more needs to be done to ensure that the trade volumes from beef exports increase to the volumes seen before the FMD outbreak: "We need to ensure that the meat industry remains profitable, a stable source of revenue and employment, and stimulates the growth of commercial and emerging farmers, as it greatly contributes to the economy. However, it is only by working together, with government, that we will be able to take advantage of export markets," says van Reenen.

"In addition, the agricultural community has been hard hit by a high maize price, a debilitating drought and a stagnant economy. This has resulted in low weaner purchase prices, as well as downward beef prices, exerting added pressure on cattle farmers and the beef industry as a whole. Operating in the agriculture sector can be tough, as there are factors outside of one's control that impact the business.

"The only way to overcome these challenges is to be prepared, yet adaptable and flexible. For Beefmaster Group of Companies, this means diversifying to hedge against tough times.

"For example, we believe that all cattle breeds have the potential to deliver exceptional beef products. This allows us to work with both established and emerging cattle farmers, regardless of the breed of cattle with which they farm," he concludes.

Van Reenen says that driving the interest from the Middle East in South Africa's red meat products is quality assurance of its Halaal-certification.

"Our cattle are slaughtered at a relatively young age of approximately 12-15 months. This makes the meat more tender, softer and leaner in fat content, which is favoured by Middle East nations," says van Reenen.

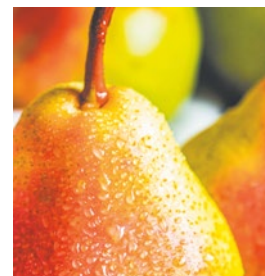
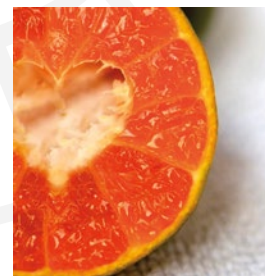
South Africa competes with Brazil and Australia for the export of red meat.

The Gulfood Trade Show places emphasis on Halaal-certified food products in the Middle East, attracting approximately 90 000 visitors per annum. ■



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Resilience at a glance

Agroclimatological Risk Tool developed to assist smallholder farmers in Limpopo Province

Weather and climate variability affect water resources and crop production in all environments. Droughts and floods are common and occur interchangeably at all time scales in semi-arid South Africa.

These weather hazards often put agriculture and the overall livelihoods of communities at risk of poor production and food insecurity. However, proper planning and utilization of weather and climate information can reduce the impact of the hazards and build resilient systems. Planning and management of sustainable agricultural production systems requires detailed agroclimatological information that is presented in a clear manner. Although institutions like the South African Weather Service (SAWS) produce regular weather forecasts and seasonal outlooks, tailor-made products for mostly illiterate and resource-poor rural farmers are not available to assist in smallholder farming. Thus, research is necessary to package useful agroclimatological information in a usable format to help smallholder farmers and decision-makers to make informed decisions. With funding from the Water Research Commission (WRC), the Agricultural Research Council (ARC) conducted a study to investigate rainfall characteristics in the Luvuvhu River catchment in Limpopo Province. Historical climate data were used to determine occurrences of droughts and floods in the catchment with



reference to crop production. The ultimate aim of the project was to assist farmers and other stakeholders with properly packaged information that would help them to make appropriate farming decisions to maximize crop production.

In the Luvuvhu River catchment, as in many regions around the world, historical climate data has gaps and erroneous readings. The causes of this can include malfunctioning instruments, absenteeism of weather observers or vandalism of weather stations. As a result, the available data cannot be used to produce meaningful information

and products unless it is corrected. However, there are very few readily available tools to perform quality checks and to patch climate data.

To address this shortfall in data quality, the ARC developed a stand-alone data patching application to assist farmers, agricultural officers and researchers who have incomplete climate data. The tool patches missing values of daily minimum and maximum temperatures, rainfall, solar radiation, water vapour pressure and wind speed using various scientifically recognized techniques that employ data from other nearby stations. The

tool was used to fill the data gaps during various analyses in the project. Although it is easy to use, it requires similar temporal data from neighbouring weather stations and their geographical coordinates.

Agroclimatological indices provide information regarding characteristics of the agricultural season for a specific location. They provide farmers and other professionals with climatological averages which, when used with other information (i.e. near-future weather forecasts and seasonal climate outlook), can assist with farm decisions. But since it may not be that easy for many climate data users to compile these climatological averages, a web-based decision support tool called the Luvuvhu Agroclimatological Risk Tool (LART) was developed to assist with the already compiled indices for that catchment. With just a click, LART can assist users with location specific climatological onset dates (10-day periods) of the summer season, dates for the end of the season and length of the season, average rainfall, temperature and many other indices. The tool contains a functionality that will enable the user to obtain

agroclimatological risks for different crop varieties. With this information, the farmer can know the best time to plant and which periods in the season are risky. In its current form, LART is only applicable in the Luvuvhu River catchment, therefore more climate data and derived indices will need to be incorporated for it to be applicable in other regions of South Africa.

Detailed climate descriptions assist farmers and planners with information regarding which crops can achieve optimum productivity in a particular location. Indices that were developed in the project indicate that the Luvuvhu River catchment consists of different agroclimatological zones ranging from arid conditions in the low-lying northern region to the humid high-lying southwest. Seasonal rainfall ranges from 315 mm in the northern and eastern plains to more than 1500 mm in the elevated southwestern parts of the catchment.

The study showed that planting in October and December would pose a high risk of frequent severe to extreme droughts at low rainfall regions and high-moderate rainfall

regions, respectively. On the other hand, flood frequencies are increasing with greater probability of exceedance for all return periods. This information emphasizes the importance of choosing a drought-tolerant cultivar for planting in the plains.

Moreover, with increasing flood frequency, crop production in the northern regions is at more risk than other parts of the catchment. The overall conclusion is that detailed analysis of climate data at smaller spatial scales is useful since it can provide for location specific cropping systems. Blanket management systems may not always be recommended, particularly in heterogeneous terrains.

*Mphethe Tongwane, Mokhele Moeletsi, Zakhele Shabalala and Teboho Masupha
Agricultural Research Council - Soil, Climate and Water*

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Common roots

Forest products matter – every day in every way

According to Frederick Herzberg’s motivation-hygiene theory, some things are consumed passively or sub-consciously with little thought given to how they are made or what life would be without them. Applying this to forest, wood and paper products, one does not think about the roof trusses above our heads nor wooden furniture in our home. We however would notice if they were damaged or non-existent. At societal level, we notice when learners are not equipped with desks and chairs or books to read from. In short, our sector’s products do not please by their presence, but they will certainly aggravate by their absence.

As South Africa commemorated Human Rights Day on March 21, the United Nations also marked the International Day of Forests, under the theme ‘Forests and Education’. According to the UN’s Food and Agriculture Organisation (FAO), forests will be more important than ever as the world population climbs to 8.5 billion by 2030.

A pivotal role

South Africa’s “tree farms” and the forest product value chain play a pivotal role – at an economic and societal level, in the environment and conservation space and at a practical level in everyday life.

When we recognise this value, we can truly appreciate the thousands of hectares of farmed trees that are doing more than just growing taller and taller each year.

Forest—both indigenous and commercially planted—help to keep air, soil, water and people healthy. They help mitigate some of the biggest challenges we face today, such as addressing climate change, eliminating hunger and keeping urban and rural communities sustainable.



Responsible forestry, renewable products

Commercial forestry is much like any other farming practice. The produce—used for making sawn timber, pulp, paper, poles, mining timber, matches, charcoal and nano-cellulose products—is planted, harvested and replanted in rotation, ensuring that there is always stock which is newly planted, growing and nearing maturity.

The consumption of sustainably farmed wood actually help combat deforestation. Timber plantations in South Africa were originally established to provide an alternative timber supply and, in so doing, have protected our country’s few natural forests.

Looking after nature and our neighbours

Healthy forests will help us to achieve many of the Sustainable Development Goals, for example by supporting the livelihoods of some of the world’s poorest communities and conserving biodiversity.

The South African forestry and forest product sector employs 158 000 people, with 690 000 people dependent on it for their

livelihoods. With much of forestry-owned land and paper mills situated in rural or peri-urban areas, the sector contributes to basic infrastructure such as roads, clinics and schools as well as investing in education, community development and eco-tourism.

Well-managed plantations reduce soil erosion, maintain the water balance in the surrounding areas and provide refuge for an array of species, preserving biodiversity.

Today around 25% of the country’s remaining natural forests are conserved on forestry-owned land. Protected by law, the natural forests in the forestry sector’s care are carefully managed to ensure that alien invasive plant species are controlled and forest margins are protected from the impacts of fire, pests and disease.

So think about the place that forest and paper products play in your life—especially the next time you run out of toilet paper. ■

*Jane Molony,
Executive Director, Paper Manufacturers
Association of South Africa (PAMSA), and
president, International Council of Forest and
Paper Associations (ICFPA)*

The background of the advertisement is a photograph of a red tractor with large, treaded tires operating in a field of harvested corn. The ground is covered in dry, yellow corn stalks and husks. In the upper right, another tractor is visible in the distance. The overall scene is bright and sunny.

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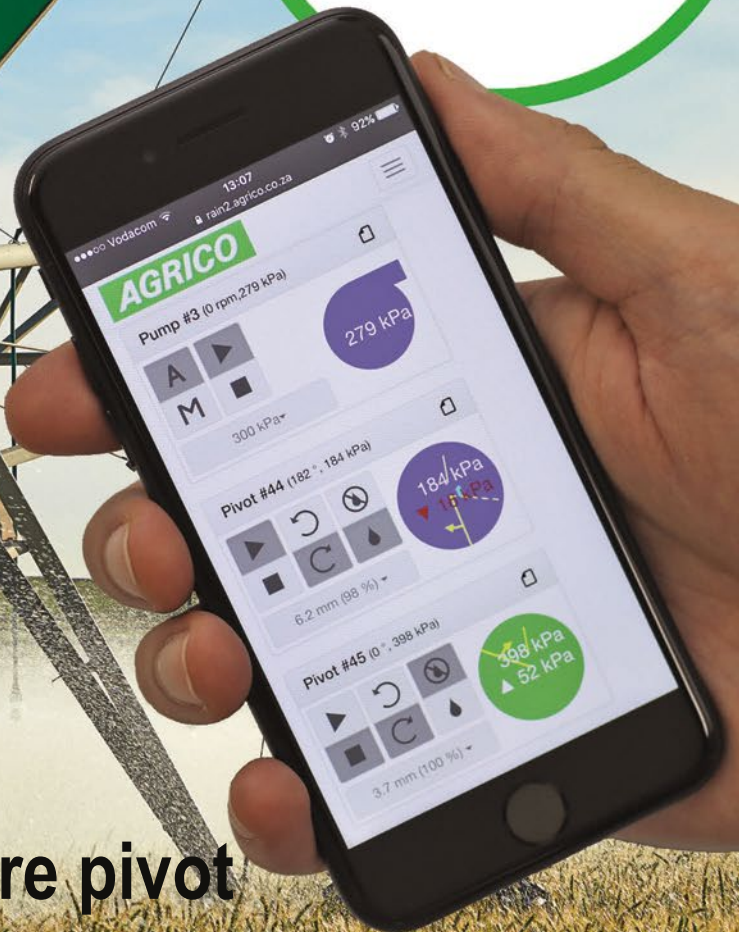
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