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**Going big with
Groothoek Farms...
Zimmatic ensures
sustainable irrigation**

Fantastic food gardens

Irrigation scheduling

SABI Technical Forum 2023

**IRRIGATION
BESPROEING**



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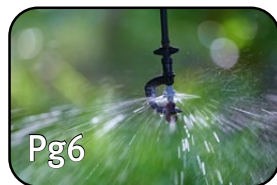
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Carol Posthumus

Editor's message

Focus on food gardens

"The glory of gardening: hands in the dirt, head in the sun, heart with nature. To nurture a garden is to feed not just the body, but the soul." – Alfred Austin

Growing with the Seasons: A Sharing of Insights Into the Creative Aspects of Organic Gardening

Given the rising cost of food coupled with inflationary pressures, food garden protagonists say there has never been a better time to plant fruits and vegetables. With this, there are 20 million people who are dangerously food-vulnerable in South Africa. Growing nutritious organic food is life-enhancing and nourishing in every way.

SABI magazine features food gardens at least once a year, as these are such a vital part of food security, a major goal of the irrigation sector, optimum irrigation technologies and water conservation methodologies.

We were astounded anew by the depth of knowledge and the amazing role food gardens play in different communities. Food gardens provide sustenance but also provide people with hope, enterprise and creative inspiration.

"If you've never experienced the joy of accomplishing more than you can imagine, plant a garden."

Rainwater harvesting

Many of the food gardens are making every effort to conserve water. Water is still the main limiting factor for food growers. Water sources vary in the vegetable gardens, but rainwater harvesting, and different forms of drip irrigation were widely seen and must be strongly encouraged. Mulching and composting is widely used too. Most of the food farms besides

feeding people also have a commercial and/or a social element.

At the time of going to print we were deeply saddened by the outbreak of cholera in Hammanskraal and the loss of people's lives due to a water health emergency which pundits had predicted happening for two decades! The Human Rights Commission intervened in this area years ago and demanded urgent action to remedy the waste water plant. Residents in the area say the water is undrinkable and dirty coming out of the taps. It is the most vulnerable people who suffer the most from this horrible and uncaring neglect and misuse of resources. All care must be taken at all times with life, and the systems and environments people live in should be safe and healthy. We pray for the families of all those who lost loved ones.

Happy reading!



Become a

SABI member

South Africa's most established water, water-saving and optimum irrigation focussed technical organisation SABI invites all role players in the irrigation, farming and water use communities to become members. SABI members are designers, engineers, farmers, soil scientist, crop experts, economists, marketers, business owners and irrigation technicians, nationwide and abroad, in the agriculture and landscape sectors in business, academic and government.

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- Access to irrigation design norms, standards and guidelines information.
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New era for SABI

As we invite farmers to join us

SABI Forum debuts

With inflation driving up food prices, there is a rise in people growing their own vegetables and also an increase in community gardens investment

In this edition of SABI magazine we look at the growing trend of vegetable gardens. This move is excellent to see and we as the irrigation industry, with our love of growth of veggies, fruits and fibres, would love to see this trend get bigger. It takes us back to our roots growing our own vegetables and is good for the heart and soul of neighbourhoods and communities. People are also learning in their own backyards about the importance of water conservation in the growth of vegetables.

We have cause to be excited, as SABI is entering an exciting

new era in 2023, with many new chapters opening.

We recently extended a special invitation to all farmers to join the Institute and enjoy the benefits of membership. Indeed, SABI has embarked on an exciting drive to include farmers as SABI members and partners. We believe we can learn from their special knowledge and experience, while farmers can benefit from SABI membership and the range of technical knowledge, practical advice and technologies of our members. SABI members are serious about saving water, and we know many farmers are too.

Use SABI Designers

At SABI we also know it is important for farmers to make use of accredited SABI Approved Designers, as this is one of the most powerful and practical ways to save water.

Further good news from SABI is that we will be holding our first ever SABI Forum, a Save The Date (15-17 August at the Lord Charles Hotel, Somerset West in the Western Cape) has been sent out. (see page 4 for all the details). This will be an exciting technical Forum, with excellent thought-provoking sessions and speakers. We will also have a high-tech exhibition of irrigation technologies and systems. I urge you to book your seat at the Forum, join us for the day or the entire event.

Michael Esmeraldo
President

Do read the articles on the great achievements of Marius Adendorff (pg 9) and Altus Momsen (pg 14) in this edition, congratulations gentlemen!

Loadshedding appears to be a constant through winter. On an upbeat note, we can say South Africans have become expert very quickly in mitigating loadshedding. Innovation has been prompted. There are some brilliant products that have been developed in agriculture to help farmers during loadshedding, do take time to look into these as solutions!

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Introducing the SABI Technical Forum and Exhibition

Don't miss this vital event!

We live in times of change, times of challenges and of opportunity. Worldwide in the irrigation industry there are exciting changes in terms of technology coupled with an enormous need to ensure irrigation fulfils its role in creating food security and sustainability.

In South Africa, we need to excel to meet the immediate challenges and opportunities inherent in factors such as loadshedding and water quality plus playing our broader role in agriculture and landscape settings. Fortunately, as a technical Institute SABI has the tools to explore, provide and look at solutions.

The SABI Technical Forum is a new SABI initiative, suited for this time in our history, taking place from 15-17 August 2023 at the Lord Charles Hotel in easily accessible Somerset West, Western Cape.

Attend the whole Forum or book for a day.

It is time to grapple with the issues and find solutions.

Let us apply our collective minds and skills to the issues of the day.

Don't miss this event – it is going to be productive and memorable.

At the Forum which will be fully interactive, we will -

Explore issues – with an amazing line up of experts and with you. Debate and the sessions will be workshop style – really make your voice heard. Sessions 1 to 4 cut to the heart of the issues and opportunities out there.

Who should attend the Forum –

- ▶ Designers
- ▶ Managers
- ▶ Marketeers
- ▶ Consultants
- ▶ Entrepreneurs
- ▶ All from the Agricultural and Landscape Sectors

The Takeaways from the Forum –

- ▶ Deep understanding of the issues and the solutions available.
- ▶ New ideas for products and services.
- ▶ Better grasp of opportunities now and in the future.
- ▶ Networking with colleagues and companies.

Session 1: How is the current Economic Situation affecting the irrigation industry?

Let's look at the facts and debate - Eskom, the market, logistics, raw materials, commodities, competitiveness, food prices, AGOA and more.

Session 2: How can we mitigate the effects of Loadshedding?

The vital nature of scheduling, designing in an era of loadshedding, alternative power, the design and financial solutions.

Session 3: How can we expect Irrigation Design to change in the Future?

Weather patterns, water quality, water availability, agronomy, soil preservation, regenerative farming, AI, automation, remote management..

Session 4: The relevance of Existing Design Norms, are we on the right track?

Pumps, filters, emitters, pipes and all systems.

Please note that event will be registered with the Engineering Council of South Africa (ECSA) for qualifying delegates to receive Continuous Professional Development (CPD) points.

SABI Technical Forum contains the rich knowledge and networking of a Congress but in a Condensed form - don't miss it.

Please email riana@sabi.co.za to book for you and your company today. Please find the registration forms also at www.sabi.co.za.



Farming in the mountains

Farmer relies on Zimmatic to ensure sustainable irrigation

by Emile Opperman



About 30 kilometers east from Verkykerskop in the magnificent mountain range of the Eastern Free State, one finds Groothoek farms. This is where farmer Sakkie Bibbey spends the majority of his time, tending to his crops and lands with exceptional attention to detail.

Bibbey has been farming for the past 30 years and according to him, this is all he has known his whole life.

"Groothoek is not a family farm. We started farming in Mpumalanga where our strategy was to develop farms and sell them. This way of doing business meant we moved around a lot, but five years ago, we ended up here on Groothoek. The moment we set foot on the farm, we knew this is where we wanted to settle down after nearly a decade of farming all over the country," Bibbey commented.

Ideal

According to Bibbey, the area in which Groothoek is located is ideally suited for farming. This makes the process all the more enjoyable and rewarding.

"There's nothing better than farming for me. On our farm, we

mainly focus on cattle and we only grow crops for cattle feed," he said.

Approximately 1700ha of Groothoek's land is used for the growing of crops, of which 100ha is used for irrigation purposes.

Under the irrigated section of the farm, Bibbey mainly grows corn. Corn requires precise and accurate irrigation to ensure successful harvests. That's exactly why Bibbey bought a Zimmatic pivot in 2022.

"From the first day we used the Zimmatic pivot we were very satisfied with the results. What stands out to me about Zimmatic in particular is their belief in sustainable agriculture. In today's world, farmers must consider how their practices impact the environment, and I feel that Zimmatic understands this most important task," Bibbey said.

Precision

Zimmatic pivots are known for their precise and accurate water application, which reduces any potential water wastage during irrigation cycles.

Good customer service and aftersales support is another advantage that convinced Bibbey that his investment in Zimmatic was a wise one.

"Irrigation has its challenges. That's why good support is crucial. Luckily, Zimmatic's support and help has been unparalleled. In fact, I am willing to go on the record and say that in all my years, Zimmatic's service has been the best I have received from irrigation product manufacturers" he commented.

Groothoek is unique because it is located in the mountains. This makes the natural water supplies cooler than what one would traditionally expect to use for irrigation. But Bibbey says they have not had any major issues when using the cooler water sources.

Automated

"Right now, we have about five Zimmatic pivots on the farm. We are also using Zimmatic Control Panels to make our jobs a bit easier. The ultimate goal is to fully automate our irrigation operation - something that Zimmatic's products make a very achievable goal," Bibbey explained.

Bibbey went on to say that they plan on adding an additional four Zimmatic pivots to their arsenal of irrigation equipment.

"Our dealer in the area is Pinetree Irrigation. They've been fantastic at assessing our needs and making bespoke recommendations as to which Zimmatic pivots to implement on the farm for the best results imaginable," Bibbey said.

"Without a shadow of a doubt, Zimmatic is one of the best pivot brands on the market. I can recommend them to any farmer looking for new irrigation systems," he said confidently.

For more information about Zimmatic pivots, Visit:- www.lindsay.com





Continuous improvement for efficient micro-sprinkler irrigation

By Marike Brits, Netafim South Africa

Most commonly, a micro-sprinkler is used in an upright position. In vineyards and trellised orchards, for example, micro-sprinklers may be used in an upside-down position.

In a previous article by Netafim South Africa, in the December 2022/January 2023 edition of the SABI Magazine, we wrote about the massive importance of continuous improvement and the necessity of adapting to change.

"Agronomy changes and engineering follows," explained Jerry Austen, product manager at Netafim South Africa in the article. "Products and tools must be continuously improved, adapted and reinvented to ensure that they

can do the job that is required on the farm." This was said with the announcement of important improvements made to the GyroSA micro-sprinkler range, discussed in the context of changing agronomic practice in apple production.

Choose More

Product improvement is driven not only by industry requirements, but also by the ongoing pursuit of higher efficiency. An innovator and solutions supplier, such as Netafim, must never stop innovating and adapting to change in its bid to supply industry with solutions to overcome challenges in the field. "We prioritise the needs

of our end-users and it is therefore important for us to adapt to market trends in order to supply the industry with what it needs in the field," said Michael Esmeraldo, Managing Director of Netafim South Africa, when recently quoted about the start of local thin wall dripline manufacturing in Cape Town. The same applies to Netafim South Africa's recent launch of the GyroForce micro-sprinkler range.

GyroForce upright in action in an apple orchard.



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But let's go back a few years first. In 2015, Netafim South Africa purchased the company, Gyro Sprinklers, to answer a specific need in the local orchard and vineyard market. "The market wanted a lower-cost efficient micro-sprinkler that operates at lower pressures and has a female nozzle," explains Austen. The GyroSA micro-sprinkler range was born and has been a stalwart in the Southern African market for several years.

Low Pressure

Why is the ability to function at low pressure so important? Austen explains that the jet of water produced by a micro-sprinkler's nozzle must physically drive the swivel, throw the jet of water horizontally away from the sprinkler and break up the jet of water into optimally sized droplets. These functions require energy, and energy from pressure.

The lower the nozzle's flow rate and pressure, the more difficult it is for the micro-sprinkler to efficiently achieve these functions. If the swivel is however optimally designed, the required energy is less, and it can function efficiently at lower pressure. In the case of the GyroForce micro-sprinkler range, the well-designed swivel means that it can function optimally at low pressure and flow rates. It is even forgiving if the pressure drops below 1 bar in unpredictable field conditions and at flow rates as low as 15 ℓ/h .

No need to struggle

Important updates were made to the design of the GyroSA micro-sprinkler: mainly aimed at increasing the ease of use in the orchard or vineyard. The GyroForce range upholds the highly efficient operation of the GyroSA micro-sprinkler, while bringing several important ease-of-use features to daily use.

The most significant improvement brought by GyroForce is the improved design of the upper bearing. The design means that it is easier to loosen and therefore easier to remove in the field, no tools or superhuman strength required. The fact that there is no longer a need to struggle with a stubborn bearing, supports the micro-sprinkler's modularity and ease of maintenance, opening up many possibilities in practice.

One example is the easy unblocking of a blocked micro-sprinkler. We all know that blocked micro-sprinklers aren't unusual in the tough conditions out there. As the bearing is easy to remove, the micro-sprinkler can quickly be disassembled, the nozzle flipped over - and debris removed by allowing water to flow through the blocked part - and re-assembled to continue giving the plant the precise water it needs.

Adapt and Grow

One of the benefits emphasised for the GyroForce micro-sprinkler range, is its modularity. We know that trees need more water as they grow and that a different wetting

pattern would be required for efficient irrigation for young and adult trees. The concave spreader facilitates a smaller wetted diameter for young trees with a smaller root system. As the bearing is easy to remove, the spreader can easily be replaced in the field with a swivel to enlarge the wetted diameter to ensure continued efficient irrigation as the tree gets older.

Upright and Upside Down

Most commonly, a micro-sprinkler is used in an upright position. In vineyards and trellised orchards, however, micro-sprinklers may be used in an upside-down position. When the sprinkler is turned upside down, the pin of the swivel now points downwards into the cup of the bearing. This is the perfect spot for dust to collect, mix with water and form a grinding paste, leading to accelerated wear on the pin and cup.

A bearing and swivel designed for upside-down use, has it the other way around and removes this risk. The bearing now has the pin, and the swivel now has the cup. The bearing and its pin point upwards plus there is no cup where dust can collect.

Lower application rates

Generally speaking, says Austen, application rates are getting progressively lower as time passes. This is, of course, in response to changing agronomic demands and evolving knowledge. As our understanding of the water requirements of plants, and the movement of

water in soil, as well as our ability to measure aspects such as soil and plant moisture have improved, irrigation technology and practice have evolved. "This applies to both drip irrigation and micro-sprinkler irrigation. It was not long ago that a 4 ℓ/h dripper was the norm. Nowadays that is regarded as high and 2 ℓ/h flow rates and below are demanded. Similarly, not long ago a 40 ℓ/h micro-sprinkler was regarded as the norm. Nowadays 20 ℓ/h and 30 ℓ/h are preferred. As conditions and practices continue to change, even lower flow rates are becoming necessary. According to Austen it has been historically difficult to achieve flow rates lower than 20 ℓ/h in micro-sprinklers. The flow adaptor developed by Netafim South Africa, means that GyroForce micro-sprinklers are available in a 15 ℓ/h option, as was GyroSA before it.

Do it right for efficiency

An important part of successful precision irrigation, as we all know, is selecting the most suitable solution for the task at hand. Micro-sprinkler irrigation is often perceived as a wasteful or non-precise irrigation method, especially when compared to drip irrigation. Austen reminds that, if the system is designed in a smart and efficient way and, quality products are used, and all the necessary aspects are considered, high water-use efficiency can be achieved with micro-sprinkler irrigation.

The lower the nozzle's flow rate and pressure, the more difficult it is for the micro-sprinkler to efficiently achieve efficient operation

Marius's career as an extension specialist Is crowned with local and international acclaim For irrigation scheduling research and promotion

by Carol Posthumus



A series of local awards culminating in an international award in February 2023 at the International Society of Sugarcane Technologists (ISSCT) Congress held in Hyderabad, India was indeed a happy culmination of SASRI Extension Specialist and SABI member Marius Adendorff's 21 years of service at the South African Sugarcane Research Institute (SASRI). What an amazing affirmation of a career in service to agriculture!

In an interview on these wonderful accolades and his research, Marius comments to SABI magazine: "It was wonderful to receive these three awards, especially with me concurrently reaching my retirement age, thus these accolades were a climax of 21 years of service to the South African Sugarcane Research Institute (SASRI).

"What was so special and satisfying was that it was one of the few papers in history, at the ISSCT congress, where the emphasis of the paper was not on pure scientific research but on extension (transfer of research results/technology)."

Marius is grateful to all who helped in his research and work, but especially thanks co-authors Dr Ashiel Juman and Aresti Paraskevopoulos for their valuable inputs as well as his fellow research personnel at SASRI for their continued support. "Ashiel especially had a big input in the success of this paper," says Marius.

Marius elaborates that the 2022 ISSCT congress was postponed to February 2023 due to COVID-19. This congress is held every three years in one of the major sugarcane growing countries of the world with the one in 2023 held in Hyderabad, India. The congress was attended by 523 registered delegates from 38 countries.

"The paper that I presented at the ISSCT congress contained the

results as presented at the SASTA paper combined with additional results from my research trial. At the end of this event, I was given the award for the best paper presented in the agriculture section of the congress."

Dedication

Notably, winning a research award on the international stage invariably involves not just a "one hit wonder" but an amazing amount of tireless work and dedication.

For instance, Marius's recognition on the international stage in effect started with a paper presented in 2021 at the 3 day South African Sugarcane Technologist (SASTA) annual symposium held

in Durban. Elaborates Marius: "The paper gave the results of a research project, on promoting irrigation scheduling, that I ran from 2013 to 2019."

At the SATA Congress the paper won the Kynoch award as well as the prestigious Jubilee award. The criteria for the awards are as follows:"

The criteria for the Kynoch and Jubilee awards are as follows:

- **Kynoch Award criteria:** The best paper in the Agricultural Section of Congress. The award is based on content of the paper, as well as the quality of the presentation at the Congress.
- **Jubilee Award (Agriculture) criteria:** An exceptional paper/s presented in the Agricultural Section of Congress at the three Congresses preceding the closing date for submissions to the next International Society of Sugarcane Technologists (ISSCT) Congress. The award is based on content of the paper/s, as well as the quality of the presentation/s at the Congresses. The award includes a paid trip to the following year's ISSCT Congress



Marius with SASRI colleagues Dr Abraham Singels (to his left) and Dr Riekert van Heerden (right) and a gentleman who is a representative from the Indian sugar industry at the (ISSCT) Congress in India.



for the principal author.

Sugarcane industry

Marius has had a passion and dedication the sugarcane industry throughout his career. Prior to joining SARSI, Marius was a lecturer at a College of Agriculture in Nelspruit.

He explains his role as an Extension Specialist: "I give agro-economic advice and support in all aspects of sugarcane agriculture and assist our research division in deciding on relevant research projects. I therefore have to be well informed about all aspects of sugarcane agriculture from planting to harvest

Special interests for Marius include pest and disease control plus variety selection and management of cane quality (yield combined with high sucrose content).

As an Extension fundi his knowledge includes many vital arenas ranging from soils to irrigation.

"I however do have a good knowledge of soils, crop nutrition (sugarcane), crop propagation and ratoon management. For the majority of the twenty one years of service I worked in the irrigated areas of the sugarcane industry, Pongola and Mpumalanga and therefore had to develop good knowledge of irrigation," elaborates Marius.

Marius says in building his knowledge on irrigation he completed a number of SABI courses, including the SABI flagship course on Introduction to Irrigation Design. He says: "My special interest in irrigation would be to give advice on the choice of irrigation systems, based

on soil, climate and management style, as well as effective irrigation, of which irrigation scheduling is a critical component."

As SABI magazine we hope to spread the message on the importance of scheduling, and we asked Marius to expand on his Paper for us.

While scheduling is very important and accepted, the application of it still needs to be encouraged it appears?

Says Marius: "Although the benefits and methods of irrigation scheduling has for been known for many years with continuous improvement the adoption thereof, at farm

level, is in most cases very poor. The result of this is wasted water and energy (electricity), as well as poor crop yields.

"The aim of my research project was to compare three known methods of irrigation scheduling to fixed cycle irrigation. This was done to demonstrate the benefit of irrigation scheduling at local level to promote scheduling. The aim was not to compare the methods of scheduling to each other, but the differences did show in the results. The aim of the paper in short was to use the results of different methods of irrigation compared to fixed cycle

irrigation to promote adoption of irrigation scheduling. (see tinted block for definition of scheduling)

Encouragement

Marius says there is more of an awareness of scheduling, but this doesn't always translate into effective implementation on the farm. Demonstration trials and similar are needed to nurture the widespread adoption of scheduling.

He elaborates that "perceptions about the difficulty, technical challenges, cost, time required, fear of change, etc associated with irrigation scheduling stop farmers from fully adopting irrigation scheduling. This is where methods such as demonstration trials are useful to promote adoption of scheduling."

Any further comments or advice as to his journey to the international stage of acclaim?

Marius says he wishes he had started presenting papers many years ago.

"When one is involved in technology exchange (extension) and not in fulltime research one tends not to write scientific papers on your work. Following the two papers I presented late in my career at the ISSCT congresses (2016 and 2023) and the two presented at the SASTA symposium (2017 and 2021), I realised that I should have started looking at writing papers about my extension work from a much earlier stage. The focus on your work and the external exposure is extremely valuable."

All at SABI Congratulate Marius, and extend a hearty Well done to him for his Awards!

What is irrigation scheduling?

Irrigation scheduling is often misunderstood in that people think that scheduling equates to irrigating on a fixed frequency.

Marius Adendorff clarifies that the definition of irrigation scheduling is the process of deciding on when and how much to irrigate, based on the crop's water requirement (evaporative demand).

Evapotranspiration for a crop will depend on the climate (temperature, solar radiation, relative humidity and wind) as well as the crop age/size (evaporative surface).

The demand for irrigation will therefore be different for different seasons (summer, autumn, winter and spring), climate and crop growth stage. Irrigation systems are designed to meet peak evaporative demand (warm climate and active growing near mature crop) and irrigation scheduling is the process of deciding how much of the design capacity is used to meet the prevailing crop demand.

Scheduling therefore is in contrast to fixed cycle irrigation where the amount of water irrigated exceeds the crop requirement for most of the crop cycle. This excessive level of irrigation will result in wasted water, energy (electricity) and will result in reduced crop yield due to waterlogged conditions (excessive irrigation).

Irrigation scheduling promotion in the sugar cane industry

Summary by Marius Adendorff for SABl magazine readers



In the South African sugarcane industry, as is the case in many countries, poor adoption of irrigation scheduling is common, leading to ineffective use of irrigation water and loss in yield and income. The reasons for the lack of adoption include economic constraints, perceived difficulty with implementation and especially human perceptions such as fear of under-irrigation, perceived time constraints and unfamiliarity/dislike of using computers.

To demonstrate the benefits of effective irrigation scheduling under local conditions, this demonstration trial was conducted over 5 years at Pongola using drip irrigation. The aim of the trial was not to compare or test different irrigation scheduling techniques. In the trial a fixed irrigation schedule (control), which is common with farmers on all irrigation systems, was compared with three scheduling treatments. The scheduling treatments consisted of: (1) using the MyCanesim® computer irrigation scheduling model, developed by SASRI, which uses data from an automatic weather station; (2) soil-water data from a capacitance probe; and (3) a combination treatment, where MyCanesim® recommendations was integrated with data from a capacitance probe.

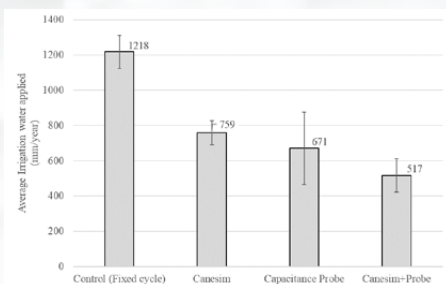


Figure 1. Average annual irrigation water applied for each scheduling method.

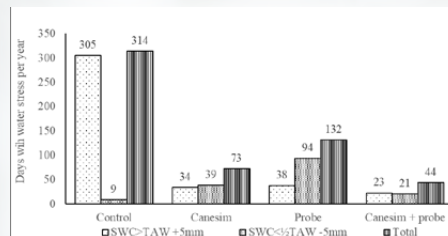


Figure 2. Average number days with water stress per year showing soil-water content (SWC)

For each of the treatments the following was measured or calculated:

- The volume of irrigation water applied.
- The number of stress days from either under or over irrigation.
- Cane yield, along with the RV (recoverable value/sucrose) yield.
- The irrigation water productivity (IWP) was calculated as ton yield/ha/100mm irrigation water.
- The financial benefits were used to assess each treatment.
- The adoption of irrigation scheduling was also evaluated through farmer surveys before and after the trial.

When compared to the fixed-cycle control, the use of irrigation-scheduling techniques resulted in:

- a reduction of irrigation water applied of up to 58%,

- an increase RV (sucrose) yield with up to 13%, improved IWP of up to 23.9 tonne cane/100 mm of irrigation
- financial benefits from cost saving and yield increase up to R10 487 /ha/year,
- the combination treatment incurred the least number of water-stress days, 79% lower than the control,
- farmer surveys showed an increase of 45% in adoption of irrigation scheduling, from 11% (n=111) in 2014 to 56% (n=100) in 2020.

When comparing the capital and the annual cost of irrigation scheduling equipment (capacitance probe and scheduling software) to the additional financial benefit achieved in this research, it is clear that the financial benefits far outweigh the cost. As an illustration: if a capacitance probe is used on every 10 ha of land the combined financial benefits (as achieved in this research) associated with 2 ha in the first year would cover the first year's costs and thereafter the financial benefits of 0.19 ha would cover the annual probe fee. Although they are site-specific, the trial results show that substantial benefits can be realised by scheduling irrigation. The trial results compare well to other similar studies showing that the results can be used in other areas to promote adoption of irrigation scheduling

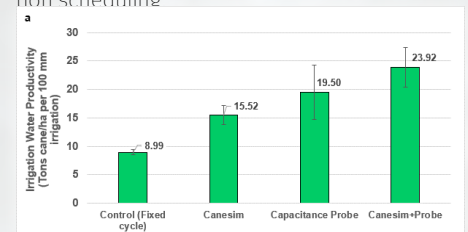


Figure 3. Irrigation water productivity in terms of (a) Cane Yield and (b) RV yield



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Consortium to establish and run a green digital innovation hub (gDIH) in Kenya

GIZ Digital Transformation Centre (DTC) Kenya, in collaboration with the GFA Group, said recently it is pleased to announce “a call for proposals to establish and operate a Green Digital Innovation Hub (gDIH) in Kenya. The gDIH aims to support the country's digital transformation while promoting sustainable development, circular economy, environmental protection, and climate change mitigation.

With a focus on “Human-Centred Digitalisation”, the Digital Transformation Centre's technical assistance offer supports a digital transition that serves people's needs and protects their rights.

Technology

Under the Strengthening intermediaries of the Kenyan digital innovation ecosystem (SKIIVE) Project, the consortium seeks to enhance the structural capacities of technology and innovation hubs, entrepreneurship and SME support organizations, universities,

research and technology organizations, start-up and SME associations. The goal is to strengthen digital and entrepreneurial skills of SMEs and startups, enabling them to leverage the digital transformation for growth and success.

The gDIH will offer a comprehensive range of services to MSMEs, including access to finance, innovation and ecosystem development, testing facilities, and skills development and training. It will provide tools, skills, and networks necessary for MSMEs to thrive in the digital economy while promoting

environmentally sustainable business practices. The hub will be in Nairobi but will be accessible to MSMEs across Kenya through digital technologies.

Applicant, it said, must meet specific eligibility criteria, including being registered entities under the laws of Kenya, demonstrating the ability to address the four key pillars of the gDIH (Skills & Training, Innovation & Ecosystem Building, Test Before Invest, and Access to Finance), and showcasing experience and expertise in the focus sectors of Agriculture, ICT, and Energy, as well as the technological sectors of Automation (AI, IoT/Sensor Networks), Cyber/IT Security, and Cloud Computing.

For more information and to access the detailed call for proposals, visit the GFA Consulting Group website at https://www.gfa-group.de/news/call_for_proposals_gDIH_Kenya_4027665.html



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Altus Momsen

Low-flow and micro research in Citrus

And a passion for agriculture

Part of winning formula for Altus



SABI magazine recently caught up with Altus Momsen of Mouton Citrus. Altus recently graduated with his Masters in Irrigation Management from the University of the Free State (UFS).

SABI mag (SABI): Firstly, Congratulations on graduating with your Masters. Please tell us about your research and thesis: on Micros in Citrus and in Irrigation Management. It seems a brilliant field.

Altus Momsen (AM): Thank you very much. It was a tremendous privilege and honour to receive my Master's degree. My research focused on the topic of Micro-Irrigation, specifically drip and micro sprinkler irrigation. The title of my research was "Assessing water use of various micro-irrigation systems applied in citrus production." I have always been intrigued by low flow drip irrigation and desired to delve deeper into its intricacies.

In the year 2020/2021, I conducted six case studies on Mouton Citrus farms situated in the Citrusdal-valley. The objective was to compare the performance of two low flow drip systems with an emitter discharge rate of 0.7 L/hour, two drip systems with an emitter discharge rate of 1.6 L/hour, and two micro sprinkler systems used for irrigating Robyn Navels oranges. The case studies involved quantifying yield, water consumption, as well as electricity usage and associated costs for each irrigation system.

SABI:

Is the art and science of Irrigation Management vital? We have a shortage of business and agricultural managers in South Africa, does Irrigation Management also need more trained and qualified people do you feel?

AM:

Irrigation management is of utmost importance. I believe that irrigation management plays a fundamental role in any agricultural enterprise related to irrigation. In an irrigation business, the management/scheduling of irrigation is responsible for more than 60% of the overall production success. Even if you have the best fertilization and pest control strategies, without proper irrigation management, achieving good production is unlikely

SABI:

How important are the people skills and "soft skills" in irrigation, a highly technical field. Some say the soft skills are vital with the advent of the Artificial Intelligence (AI) age etc.

AM:

I agree that technical skills are indeed crucial in irrigation management. It is essential to have a deep understanding of the crop to implement the appropriate irrigation system that can cater to its specific requirements. The design of the

system and pump house should be able to address challenges related to water quality and soil conditions. Moreover, precise scheduling tailored to the specific needs of each area or system is essential.

Artificial intelligence (AI) can significantly simplify irrigation management. It can assist in various aspects such as water resource management, weather forecasting, irrigation scheduling, and even provide insights into how plants respond to irrigation. By leveraging AI, farmers and agricultural professionals can streamline their irrigation practices and enhance overall efficiency.

SABI:

Advice, please for your colleagues in irrigation thinking of doing their Masters' degree and working concurrently?

AM:

I highly recommend pursuing further studies if you have the opportunity. Balancing work and study were not an easy task; however, effective planning and prioritization greatly assisted me. The process of conducting research, collecting data, and analysing it taught me valuable lessons. Undoubtedly, writing proved to be the most significant challenge. Through the research project, I gained a more comprehensive understanding of irrigation management, which broadened my perspective..

SABI:

It's early days but are you going to proceed with your studies

and what areas do you feel need more research work in Citrus and Irrigation.

AM:

I believe I am done for now. However, I still have a few remaining small courses that I am in the process of completing. Additionally, I need to write my final SABI national exam to become an accredited Approved SABI designer. Considering the demanding nature of my current work, my primary focus now is on fulfilling my professional responsibilities.

SABI:

You are deeply rooted in Citrus farming. Altus where did you grow up and how was your childhood on a citrus farm? Did you envisage working in agriculture?

AM:

I was born in Ceres, where my father has been actively involved in the agricultural industry. Growing up, I developed a deep passion for agriculture, inspired by my father's influence. From an early age, I knew that I wanted to pursue a career in farming. When I started working at Mouton Citrus, I was determined to broaden my understanding of irrigation, specifically in relation to citrus production and the intriguing concept of low flow drip irrigation.

SABI:

It seems you are blessed in being able to navigate academia and practical work plus you are creative. Would you advise young irrigation fans to do some



practical work abroad, as a lot of students are doing, in countries like Australia and the USA.

AM:

The balance between academic and practical work is important. I think practical experience in general is essential and gaining experience abroad can help you think from a different perspective which is helpful. I believe there is always a solution, and one must be creative. In irrigation, there is no one system solution for everything. With my time in the irrigation industry, I have learned that the "horses for courses" saying is true.

SABI:

What does your workday involve and what are the most rewarding aspects of your day?

AM:

I joined Mouton Citrus as a Horticulturist three years ago and have recently transitioned into a new role as the Production Business Unit Manager. In this position, my primary responsibilities entail strategic and operational management of assigned farms. It brings me great satisfaction to witness the success of our irrigation strategy and the flourishing state of our trees, as they thrive under optimal production conditions.

SABI:

We like to include comments and tips on Scheduling. Has it developed well in South Africa in recent years, when we started SABI 14 years ago the farmers were not that attuned to Scheduling but that has changed!

AM:

Technological advancements have provided valuable tools for precise



scheduling. Soil moisture probes, NDVI (Normalized Difference Vegetation Index), Stem Water Potential Sensors, dendrometers, and accurate weather forecasts enable accurate scheduling. While not all these technologies are necessary, they can greatly assist in achieving accurate irrigation scheduling, particularly on a large scale.

However, despite the benefits of technology, it is essential to physically inspect the orchard and conduct profile holes to ensure optimal scheduling. There is a saying that resonates with us "Nothing replaces feet in the orchard." This highlights the importance of hands-on involvement and direct observation in achieving the best irrigation scheduling practices.

SABI:

How do you see water conservation and optimum irrigation strategies?

AM:

I believe that water conservation and implementing optimal irrigation strategies become increasingly critical as water scarcity becomes more pronounced. It is essential to have a thorough understanding of the water requirements of your crops to avoid over-irrigation beyond the root zone. In the future, the use of fertilizers will likely face stricter regulations and monitoring. This will compel farmers to



adopt more efficient and optimized approaches to irrigation and fertilization practices.

SABI:

What technologies or management strategies in irrigation do you believe are exciting right now?

AM:

There are currently exciting AI automation controllers available in the market. However, I believe that there is still a considerable amount of work and research to be conducted in this area. These AI automation controllers have the potential to assist farmers in achieving more effective and cost-efficient irrigation practices.

SABI:

What are the opportunities and challenges before us in Irrigation

in South Africa – in the present and the future. Please comment on your vision for Irrigation here and internationally.

AM:

Considering the present uncertainty surrounding future electricity costs and the increasing demand for energy, I believe that the current challenges we face with electricity, such as load shedding, can present exciting opportunities for the irrigation industry. These challenges are unlikely to dissipate quickly, requiring irrigators to adapt accordingly.

Creative and innovative thinking is crucial in addressing this issue. Systems must be designed to adapt to these challenges, and affordable solar power systems can pave the way forward. Relying on generators is neither sustainable nor cost-effective in the long run. By embracing affordable solar power solutions, the irrigation industry can navigate the challenges posed by electricity limitations and move towards a more sustainable future.

Thank you Altus and a hearty Congratulations from all at SABI!



Altus Momsen



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Divinely inspired Abundant Seeds of Hope Garden For the precious children of Heartlands



Located in the Western Cape's Somerset West on the verges of Paardevlei, a lifestyle and nature reserve, Heartlands Baby Sanctuary is a temporary residential care facility for 25 children.

The children who are temporarily placed - in what must feel to the children and their families a heaven sent Sanctuary – need a safe and loving home for a while as they may be abandoned, abused, neglected orphaned, disabled or sick. The children and their families require Heartlands assistance following a Children's Court order. Every effort is made to reconcile the children with their parents and families to whom they return and if this is not possible then fostering or adoption is looked into.

On visiting the Garden, we popped into the different areas of the Sanctuary with Heartlands Nikki Bower who co-ordinates marketing, sustainability and events. Heartlands had just held their Children's Literature Festival, a significant event attended by many authors, literature fans and schools.

The entire Sanctuary is absolutely spotless, thoughtfully designed and brimming with love, professionalism and good cheer. Run by a small team and also volunteers, the children look so happy and well cared for.

There are so many facets that the public can support including

a coffee shop, vintage shop and an absolutely brilliant book shop. Heartlands welcome volunteers too.

It is fact that a charity like Heartlands relies heavily on supporters and fund generation. They have to be self-supporting as they are not wholly supported by the State.

Business has stepped up to assist Heartlands and it is a truly worthy charity. The beautiful Seeds of Hope Garden is one example of business and the community assisting to get a venture going well – the amazing

Seeds of Hope Garden is like a mini organic farm. With its duck ponds, greenhouses, hens, composting, bountiful crops and drip irrigation systems it feels like a small farm.

Divine Appointment

It's a project that Bruno Hermann of Agrimotion, a SABl Company member, has catalysed and spent a lot of time and energy nurturing. It was only recently that the Garden welcomed fulltime farmer Silvester Mahloane prior to that the Garden ran on volunteer's time and energy.

Agrimotion Soil Scientist and Agronomist Bruno, who is based in Stellenbosch at the Agrohut, has from inception spent hours planning, starting and managing this Garden.

It was by Divine Appointment that this Garden was planted, and thanks to the power of prayer, says Bruno.

"In October 2019 we attended a Farming Gods Way (FGW) in-field mentor training in Durban. This inspired us to pray for a piece of land where we could put into practice what we had learned and to train others the principles of FGW here in Somerset West. Through divine appointment I was led to Heartlands and shortly after, the SOH garden started in November."

Bruno says the initial idea was to produce nutrient-dense vegetables in a sustainable manner. "For us this meant not using chemical pesticides and making use of what was available, without expensive equipment or infrastructure."

The Garden started as a small area of 64m² with an additional 24m² in the greenhouse. However, in 2020 the Garden expanded by a further 100m², dedicated mainly to diversifying with chickens and ducks". Expansion continued. "Earthworks for an additional 3000m² occurred in November 2021, with levelling of approximately 2000m² for aquaponic tunnels and 1000 m² for a citrus orchard and vegetable production."

A good variety of vegetables are grown and used for the children's meals and also sold. For instance, a

Farming God's Way

The Seeds of Hope Garden's production method of vegetables is according to a principle called "Farming God's Way."

Bruno says that this Way is based on three conservation agriculture pillars, namely:

**Firstly, minimal soil disturbance with no inversion of the soil*

**Secondly, 100% soil cover with mulch and*

**Thirdly, ensuring biodiversity through rotations, relay, and cover cropping.*

"We also follow management keys such as doing things On Time, to a High Standard, with Minimal Wastage and with the Fruit of the Holy Spirit," explains Bruno



The early days

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GRUNDFOS 

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chilli jam maker has bought practically a whole crop of chillis. The goal, explains Bruno, is to sell $\frac{2}{3}$ of the produce and generate an additional income for Heartlands, while $\frac{1}{3}$ of produce goes straight to the kitchen. Most of the eggs are used to feed the children or in the coffee shop. The surplus free range eggs are also sold in the coffee shop.

Crop rotation

"Crop rotation helps to reduce pest and disease pressure, while also improving nutrient cycling and adding to the sustainability of the garden," explains Bruno.

Roots crops include sweet potato, potato, leeks, carrots, and spring onions while leafy vegetables started off as spinach and lettuce and then also a crop of "beautiful brassicas (cabbage, broccoli, and cauliflower)".

Bruno elaborates further: "In the past we have mostly grown tomatoes, peppers, cucurbits (gem squash, butternut, patty pans and baby marrows), and then also chillies for drying. Green beans did very well last season and we also try to grow broad beans during winter.

"We had great success with our sweetcorn this year and plan to expand this during spring/summer. Due to the seasonality of the vegetables, we decided that by establishing a citrus orchard we will be able to extend our harvest window with lemons, oranges and soft citrus during winter."

The Ducks (who apparently also go to sleep when the children have nap time!) are Indian Runner ducks who help to keep the snails and slugs under control.

The Garden has challenging soils, which cover cropping has helped to restore and the addition of organic matter helps activate and sustain the soils. The team make compost on-site and also have had donations of compost to boost the soils.

Bruno says: "Our soils are very challenging, not only physically with an abundance of rocks, but also



chemically. Prior to establishing the orchard, we had some profile pits dug. All the soil seems to have been brought in and top filled. The soil is therefore highly variable in terms of clay content and coarse fraction. From a soil scientists' point of view, I have never seen such high P, K, and S levels. Fortunately, the total soil carbon levels are also way above average (between 1.17 – 3.86 %)."

A philosophy of minimal wastage happily also means water saving and making use of dripper irrigation.

"Water saving comes due to reduced evaporation, weed pressure, but most importantly water is saved with drip. We have very strong south-easter winds in summer. We have been very blessed by Charles Cherry for donating all of the dripper lines and pipes for the expansion of the garden."

Bruno says they also utilise rainwater harvesting tanks and currently have capacity for harvesting 60m³ of rainwater. "This rainwater stored is unfortunately not enough, especially in the hot summer months when we must supplement with municipal water. We would like to preserve

this precious resource as much as possible and would therefore like to increase rainwater storage capacity or investigate drilling a wellpoint or borehole. To achieve this, we however need support from companies or individuals who can sponsor their services, knowledge, or equipment."

Tunnels

The hydroponic-aquaponic tunnels under construction will make use of a closed loop system, which aims to produce vegetables with minimal inputs and with less water.

Lots of patience, time management (outside of working hours) and Faith have grown this Garden, and donations always seem to come just at the right time.

Growing organic vegetables is vital for the Seeds of Hope, situated as it is in a Sanctuary with the health and wellbeing of babies and children being of utmost importance.

"We didn't want to store or spray harmful pesticides or chemicals that could harm the children or our poultry. Having children playing next to the garden and ducks roaming

freely amongst the plants really gets you thinking!

"We also live in such a wasteful society, and we wanted to change that by really trying to have minimal wastage and making use of what we have. Kitchen scraps are composted (bokashi and vermicompost), while garden refuse gets turned into compost. All the chicken and duck manure from the coop gets used as mulch in the garden, adding nutrients to the soil."

Worldwide, food prices are increasing with more pressure on consumers. Bruno comments that producing food with less inputs and harmful chemicals seems like a simple solution to the problem and should be explored for food security.

Consumers should also "buy local".

"Furthermore, communities should support their local farmers and reduce the environmental footprint," adds Bruno.

Future plans for the Seeds of Hope Garden include:

- Farming every square meter as intensively but sustainably as possible.
- Organic certification through the Participatory Guarantee System (PGS).
- Increasing our customer base.
- Expanding our apiary with more hives and having honey as an additional source of income.

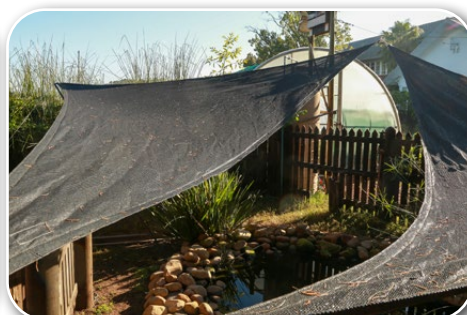
"We would also like to start presenting Farming God's Way training sessions and sharing our testimony," relates Bruno. Given the success of the Seeds of Hope Garden it seems a given that this training will prove extremely popular!

We wish the Seeds of Hope Garden at Heartlands every Blessing.

If you would like to be involved in the project by donating R150 per month via debit order to Adopt-a-Tree, this will help feed the children with 10 meals per month. To find out more please visit: [//www.heartlandsbaby.org/sustainability/](http://www.heartlandsbaby.org/sustainability/)



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SocioTech's broad-based livelihoods programme (BBL)

Mobilising food security and economic activation

by Carol Posthumus



BBL growers with their greenhouse, which they constructed themselves.

I breathe the spirit of passion

The love I have for what I do fills me up with hope for the future

The love I have for my hands fills me with commitment to achieve more

The love I have for my brain, fills me up with creative thinking

The love I have for my environment cheers me up when I see green

The love I have for my garden gives me a cradle for relaxation when I feel tired and disempowered

I love my garden I love my rain-water harvesting strategies

I love my designs

I love the food I harvest from my own sweat I love to share my joy and pleasures, from what I think, from what I do I love to spread the Gospel to all who struggle to survive I love the poor because they can, if all is well, be motivated to stand for themselves

Stanzas of a poem by MaTshepo Khumbane, you can read freely the book online: <https://www.wrc.org.za/wp-content/uploads/mdocs/Mma%20tshepo%20book%20complete.pdf>

We recently caught up with engineer and water activist Marna de Lange who with the legendary social activist the late MaTshepo Khumbane spearheaded the revolutionary Water for Food Movement. MaTshepo was Marna's mentor, and what a formidable team these wise water ladies formed.

It is always an honour and an inspiration to converse with Marna whose company SocioTech, based in Pretoria operating nationwide, does amazing development work bringing solutions to break the bonds of household poverty and unleash economic participation all around South Africa.

Marna, an accomplished civil engineer who for many years was one in the comparatively small group of pioneering women engineers in water and irrigation South Africa shattering glass ceilings – or rather, in Marna's case building, nurturing, designing, catalysing and looking for the paths for more people to do well.

Starting out as a young engineer, Marna was on the team sent into townships and rural areas to examine and suggest solutions to water issues during the terrible drought of 1992, and from then seeing the scope of the issues and the system, universal water access and the role of water in food security became a passion.

"The BBL programme is fundamentally about self-determination, encouraging and enabling people to believe in their God-given ability and talents to implement their own dreams through own effort."

"The BBL programme catalyses individuals into economic activity and participation."

Mind mobilisation

Marna is genius in that she can provide a brilliant engineering analysis of a problem – while at the same time challenging and inspiring people to think and work technically, innovatively and creatively to make circumstances better and indeed, prosper.

The recipient of many Awards internationally and locally including an accolade for her work in water from the Department of Water, Marna is grounded and approachable.

Not surprisingly, Marna's company development specialist SocioTech is involved in catalysing exciting food farms and ventures working with communities in rural areas at the bottom of socio-economic pyramid.

Their BBL programme is active in 8 South African provinces. The BBL programme has a number of branches including BBL MyFood, BBL MyBusiness and BBL MyFuture.

"BBL is about reaching as many people as possible. We don't pre-select participants, we open it up to everyone. Our goal is not to have a target number of food growers, our goal is to help entire communities lift themselves out of poverty, by creating multiple pathways for themselves to access the economy since formal sector jobs are on the decline," say the group.

The BBL programme is active in hundreds of communities where over ten of thousands of families have been trained in growing food, basic business skills and goal realization.

A numbers' game



Consider if the poorest 12 million people in South Africa added just R10 to their expendable income (e.g. by selling one bunch of spinach a day). This would boost GDP by R33 Billion.

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Strydkraal growers with multi-award winning sommelier Moses Magwaza, who made history by pairing Nederburg wines to traditional dishes cooked with Strydkraal heritage and indigenous ingredients. Requests are streaming in from across the country for similar events and SocioTech communities will benefit from this growing exclusive market for traditional ingredients.



One of the chef's exquisite dishes with indigenous ingredients from SocioTech's Strydkraal community



Famous food author Anna Trapido thanking Harvesting Heritage's Caroline McCann for this impact-making partnership with SocioTech communities.

Roots

The design of the BBL programme, says Marna, has its roots, grown and well fertilised since the 1990s through the efforts of dedicated people ranging from farmers, mines, municipalities to the Water for Food movement, WRC, Departments of Water and Agriculture, International Water Management Institute, World Summit on Sustainable Development, Social and Labour Plans, Corporate Social Responsibility and Broad-based Black Economic Empowerment.

South Africans, buckling under tides of negativity and lack of confidence arguably now more than ever need SocioTech's mind

mobilisation and economic activation calls-to-action.

"Nobody has nothing" is an ethos of the BBL facilitators – we all have something no matter how small to start with. A skill, an idea, a talent... and you don't need billions in capital to start. It really is true that a journey starts with one small step. And "mind mobilisation" is of the utmost importance especially in our country with a never ending stream of negativity about society's ills.

It is in the numbers

Consider, says Marna, if the poorest 12 million people in South Africa added just R10 to their expendable income (for e.g., by selling one bunch

of spinach a day). This would boost GDP by R33 Billion.

And, incidentally, selling spinach tends to take off like a rocket. Many food farms we visited, the growers cannot keep up with the demand for fresh organic spinach!

Marna observes that rising food insecurity due to food prices and also the pandemic years certainly brought the matter of food security and the need for nourishing food for all as well as the necessity for most people to grow their own salaries or activate an enterprise. front of mind, and the awareness has accelerated the BBL programme.

"We have to unlock potential, and it often starts with growing food, vegetables, grains and fruits," says Marna. "The Almighty Lord gave us the potential and power to survive and indeed grow and prosper in our endeavours," says Marna.

Interestingly, Marna says all programmes need to be able to be multipliable if they are to be called successful.

Any programme to address alleviation and growth out of poverty needs, if successful, to have a multiplier effect. Thus, if you have a successful food garden going, ensure that the model is replicable, or each-one-teach-one-or-more in your community. BBL is also replicable, and aim to replicate their successful programmes nationally with more funding. It is testament to BBL that its partners and funders have been involved with BBL for more than 7 years.

BBL has captured imaginations all over South Africa and internationally. "It's a journey of the mind, unlocking intrinsic motivation to build income streams around personal business and individual talents," says Marna.

The BBL programme is a proprietary process which while catalysing a personal journey of discovery also imparts practical hands-on training in various aspects. The programme begins with a one year intervention course with theory

and get-your-hands in the soil and water sessions. BBL imparts technical and practical knowledge about important aspects such as rainwater harvesting methodologies, trenching, greenhouses and low-cost drip irrigation. Water still remains the biggest obstacle to the establishment of food growing in many areas.

The aim of the BBL programme is to see South Africans flourish – building an endless diversity of businesses, value-adding, selling more, activating side hustles, managing money and making more profit.

Harvesting Heritage

In urging creative thinking and enterprises, SocioTech thinks out of the box and in May partnered in a Harvesting Heritage Culinary Competition in Pretoria with Harvesting Heritage Nederburg Wines and the South African Chefs Association. Marna tells us the BBL participants from the Strydkraal community showcased their indigenous foods at this event. SocioTech has been partnering with the Strydkraal community for over 30 years.

Strydkraal participants are delighted to help promote and preserve South Africa's indigenous crops. The growers who essentially form family businesses who take part in BBL are encouraged to grow, cook and sell indigenous crops, such as morogo, okra, marula fruit and more.

Marna says this culinary event was an amazing success in celebration of South African produce and cuisine. The BBL Horticulture program has played a vital role in empowering the individuals to grow and cultivate the traditional ingredients showcased by the 10 creative chefs from the Johannesburg and Pretoria area.

If you would like to read more about SocioTech's work please visit them on: www.sociotech.co.za. There are a number of ways individuals, corporates and communities can partner and/or invest in SocioTech's BBL programmes.

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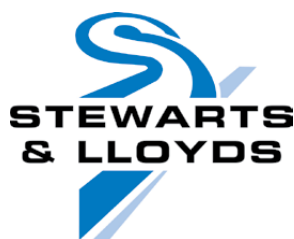
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Water Solutions





From food Insecurity to self-reliance INMED and Woolworths helping transform youth's prospects With climate-smart project in the Free State

The levels of hunger and food insecurity in South Africa are unacceptable with some 14,3 million people facing hunger and, with this, tragically, one third of food wasted and ending up in landfills.

With loadshedding adding to the serious problems of high levels of unemployment, rising inflation and a cost-of-living crises (a problem in other countries too), the time is ripe to start growing food sustainably.

Gardens can range from small scale for family food needs and nutrition to the basis of a small enterprise – a message we have heard from a number of wonderful food garden protagonists in this special edition.

SABI magazine has reported on INMED South Africa's aquaponic farming training and projects for a

number of years, and INMED rates as a powerhouse food farming charity with various initiatives around the country.

In recent months INMED has partnered with Woolworths SA to boost its project in the Free State, wherein 30 unemployed young people in Kroonstad and Bultfontein have become involved in aquaponic food farming to grow food, receive technical and business training and in order to create opportunities.

AgriSETA accreditation

The young participants, primarily unemployed school-leavers, have learnt the basics of seedling production, nursery management, climate-smart food and aquaponics plus food preservation. The training was aligned to INMED's AgriSETA accreditation for primary agriculture. Each participant received seeds, basic tools and shade netting, as well as sustained training and hands-on support to improve their household food security and sustainability long term.

"INMED's youth programme utilizing climate-smart aquaponics aligns with our food security strategy to empower communities to grow more food to help reach #zerohunger2030. The programme

also offers critical youth development and employment in rural Free State communities," says Zinzi Mgolodela, Woolworths director of corporate affairs.

For over 30 years Woolworths has been working to create a positive sustainable impact to alleviate hunger in South Africa. "Food security and access to food is a fundamental human right, the absence of which truly highlights inequalities in a society. Our alignment with the UN Sustainable Development Goal 2 of a #Zerohunger Future by 2030 is a further expression of our commitment to Inclusive Justice through lasting impacts," say Woolworths.

Woolworths partners with 8 important food security charities. These are engaged in various



Janet Ogilvie with gardeners



Kroonstad youth get tools



Young gardeners in training

activities, including: distributing edible surplus food to people in need, growing food to support communities or Early Childhood Development Centres, providing training opportunities for youth wanting to enter into the agricultural sector, supporting local community food systems and supporting small holder farmers to increase their harvest, markets and income.

Sustainable livelihoods

INMED last year launched the country's first INMED Aquaponics® Social Enterprise (INMED ASE) in Vanderbijlpark, and this year will be leveraging the INMED ASE model to tackle youth unemployment.

Building food security and sustainable livelihoods with climate-resilient aquaponics are key to INMED's mission of helping vulnerable communities adapt to climate change and reduce poverty.

"It is vital to our country's food security that we develop the farmers of the future," says Unathi Sihlahla, director of INMED South Africa. "Many young South Africans are excluded from creating careers in agriculture due to the lack of access to resources, land and agricultural education. Aquaponics is an exciting, climate-adaptive technology that will have high appeal to the youth and empower them to play a significant role in developing social enterprises that alleviate poverty, enhance food security and provide dignified livelihoods."

INMED already runs a number of highly successful programmes with a variety of farming cooperatives. INMED has been assisting these farmers, many with disabilities, to increase their capacity and achieve sustainable livelihoods for more than 10 years.

"Through participation in the programme, courtesy of Woolworths, these young South Africans will take a personal journey towards greater self-reliance," says Sihlahla. "They will learn the life skills of food production and gain understanding and insights into how we can be resilient in the face of climate events as we work together to lift ourselves, families and communities out of poverty."

INMED's communication director Nancy Baker elaborates that the Free State project in partnership with Woolworths encompassed two phases.

Phase 1 focused on helping the students with practical skills on how to create a home garden that produces enough vegetables to feed their families. They were also given the implements needed to start their own home gardens (spade, fork,



Moiketsi Tsiane & Luckyboy Mlumbi - Bultfontein

rake, hoe, hosepipe and watering can, compost and seeds).

Phase 2 is adding to these skills with both theoretical and practical training on various aspects of home farming, such as permaculture, correct planting and harvesting procedures, pest identification and eradication, fertilizing soil and attending to plant nutrition, as well as financial management and marketing for those who wish to start their own agro businesses.

In-depth skills

Great news is that eight of the participants have chosen to do the additional work required to receive AgriSETA qualifications in 11 subjects. The qualifications will help them develop more in-depth skills related to farming and enable them to get jobs on farms at a higher level than just a labourer, opening up another world of opportunity to these youngsters.

Furthermore, each student has been given a small greenhouse structure (3m x 6m) to help their gardens withstand adverse elements (hail, pests, cold, birds, etc.). A few of the students in Kroonstad do not have the space at their homes for these structures, so the Moakeng Disabled Centre has allowed them to erect their structures on the property where the INMED Aquaponics® system is located.

At present the farmers are busy with winter crops.

"The young farmers are now busy planting winter vegetables with the aim of feeding their families and communities," reports Mantombi Maine, INMED South Africa programme facilitator in the Free State. "All of the youth are making sure that they eat healthily all the time, and they are going to sell some to the communities to earn some income for their households."

The homestead gardens are boosting nutrition and outlooks.

"Home gardening has had a positive impact in my life," says Nteseng



Nteseng Maripa

Maripa of Bultfontein. Nteseng says prior to finding her fulltime job she was unemployed for a while after matriculating, and the gardening helped her tremendously. It has empowered her with the knowledge of growing nutritional food, and also she is now aware that that growing vegetables is a good way of making some extra money in a community.

Water and irrigation

Water availability is a big challenge for most food gardens. Water sources and accessibility to water present obstacles more often than not.

In the Free State, water scarcity is a huge problem, observes INMED, making it extremely challenging for families in under-served communities to garden. However, INMED South Africa teaches a number of climate-smart agriculture techniques to home gardeners to help them conserve water, such as: using homemade organic compost to help the soil hold moisture and nourish plants, using water-wise crops and creating a drip irrigation system with cold-drink bottles.

Moreover, composting also is widely used, helping soils and is an environmentally friendly way to dispose of food and yard waste. Using shade netting protects plants from the harsh sun and slows the evaporation rate.

INMED's operations manager Janet Ogilvie shares an inspiring story about the young farmers irrigating resourcefully.

"One group of young farmers in this programme have been very resourceful in getting water to their plot of land. With no water on their property, they had to make several daily trips with a wheelbarrow and buckets to collect water from a public windmill to irrigate their crops. The windmill is 1 km from their farm, and they were only able to irrigate a very small fraction of their land.

"They worked out a plan to connect to the water source by installing underground piping, but

the pipe would have to traverse land owned by another farmer. The young men approached the farmer with their idea, committed to performing the work themselves and the farmer agreed. Now, they are able to plant the full hectare of land and are generating income. This is a real success story of determination and collaboration."

Water saving aquaponics

Aquaponics is an effective way of addressing water scarcity, emphasise INMED. Indeed, INMED's aquaponics system has a recirculating design that requires 90% less water than conventional farming. It is an all-natural process that pipes nutrient-rich water from the fish tanks through the grow beds, where the crops absorb the nutrients and oxygenate the water. The gravel in the grow beds acts as a filter, returning clean water to the fish tanks. INMED also uses rain-water harvesting to provide water for its systems.

Interestingly, INMED's financial and marketing training is highly rated by the young growers.

Janet recently delivered financing and marketing training courses to the young farmers. "They told me that the financial training was the best thing we could have ever given them," says Janet. Now they can price their products correctly and know when they're making a profit. This training allows them to become successful farmers with the information and knowledge they need to grow exponentially."

"INMED's partnership with Woolworths provides the technical training young farmers need to successfully produce all-natural, nutritious food despite their geographic and economic obstacles. Our training also teaches business skills for emerging farmers to run thriving agro enterprises," adds Nancy.

These skills are life changing in Bultfontein with an unemployment rate of more than 70% and few opportunities for permanent employment.

"The young farmers in this programme are determined to create their own businesses so they will not have to rely on anyone else. Together, we are providing the knowledge, tools and opportunities for them to become thriving entrepreneurs."

Overall, INMED's Free State project seems to be thriving, and it is hoped it continues to harvest new opportunities and security for the young farmers.



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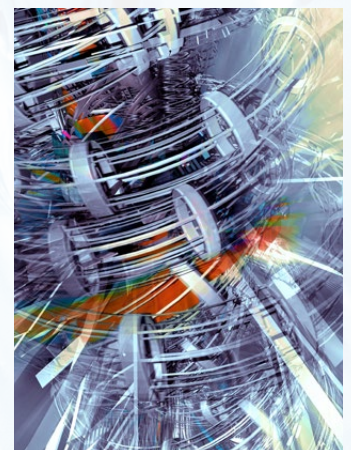
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CSIR researcher presents groundbreaking research On the changing Southern Ocean



Recently the Council for Scientific and Industrial Research (CSIR) took to the stage at the TEDx Johannesburg event on climate change to share the outcomes of a groundbreaking study that reveals the declining productivity levels of the Southern Ocean.

CSIR senior researcher, Dr Tommy Ryan-Keogh, unpacked the implications of high iron stress levels on phytoplankton (microscopic marine plants) in the Southern Ocean and how this will impact the overall health of the global ocean and the future of our planet.

"The Southern Ocean has managed to protect all of us from some of the most extreme impacts of climate change by absorbing carbon dioxide emissions and the heat generated by these emissions through the greenhouse effect. But this protection comes at a cost to the

natural ecosystems of Antarctica and the Southern Ocean," says Ryan-Keogh.

Iron stress

During his talk titled "A changing Southern Ocean: The impact of climate change", Ryan-Keogh explained that 26 years of data revealed that the phytoplankton in the Southern Ocean was becoming more iron-stressed with time.

"Our latest research findings indicate that an escalation in iron stress is having a detrimental effect on the phytoplankton of the Southern Ocean. This implies a decrease in the availability of iron in the sunlit waters, directly impacting the capacity of Southern Ocean phytoplankton to absorb carbon dioxide. This, in turn, affects the ocean's productivity levels and its ability to maintain ecosystem services."

Ryan-Keogh consulted additional data products to complement his research results which, to his surprise, also confirmed that the productivity levels of the Southern Ocean were being compromised, most likely due to climate change.

"The research findings were like a double-edged sword. Although I was excited that we had made headway, the results were concerning. Our research findings, coupled with the alternative data sources we had collected and analyzed, were showing that the Southern Ocean is becoming less productive and yet, earth system models, which are currently being used for climate projection, are saying the Southern

Ocean with time will become more productive," shares Ryan-Keogh.

Ground-breaking

This ground-breaking discovery by CSIR scientists is among the first to demonstrate that the natural carbon cycle in the Southern Ocean is being negatively impacted.

"We need to act now to significantly reduce our emissions and transition to greener and cleaner societies that can sustain everyone. We cannot just rely on ideas that we will invent technology in the future to capture carbon dioxide. If South Africa transitions to a renewable energy society, we will not only see enhance energy security but also improve our natural environment through reductions in air pollution," adds Ryan-Keogh.

Ryan-Keogh intends to raise awareness to audiences about the unique habitat of the southern-most waters, including solutions on what people can do to make a difference in reversing the cycle of decline in ocean health and find sustainable solutions.

How climate change is affecting the Southern Ocean

- The greenhouse effect is warming the planet. This is the emission of carbon dioxide (CO₂) from the burning of fossil fuels and the heat it generates.
- Ninety per cent of this excess heat has been absorbed into the oceans, while 10% has been absorbed by land and the atmosphere.
- The majority of the ocean heat has gone to the Southern Ocean, as it has absorbed almost half of the CO₂ that goes into the ocean.
- The CO₂ causes the ocean's acidity pH to lower – known as ocean acidification. This impacts the natural carbon cycle, which is the natural flow of carbon across the globe.

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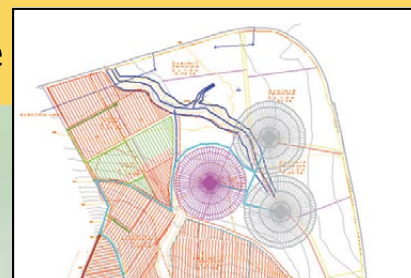
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Dam Levels

The levels of selected dams in South Africa, presented as a percentage of full supply capacity on 22 May 2023 as well as the corresponding date in 2022.

% of Full Supply Capacity	22 May		% of Full Supply Capacity	22 May		% of Full Supply Capacity	22 May	
	2023	2022		2023	2022		2023	2022
OLIFANTS RIVER			Boskop (NW)	102.7	102.9	GREAT FISH RIVER		
Witbank (M)	98.5	99.9	Klipdrift (NW)	#102.9	102.9	Grassridge (EC)	71.1	93.6
Middelburg (M)	97.5	98.1	Erfenis (FS)	101.4	100.8	Kommandodrift (EC)	99.1	51.6
Bronkhorstspuit (G)	96.7	101.6	Kalkfontein (FS)	102.7	102.5	De Mist Kraal (EC)	84.8	105.2
Rust de Winter (LP)	102.8	102.0	Rustfontein (FS)	100.3	100.2	Katriver (EC)	100.3	101.7
Loskop (M)	101.1	101.2	Krugerdrift (FS)	102.1	101.8	GROOT KEI RIVER		
Buffelskloof (M)	100.3	100.3	Groothoek (FS)	98.1	99.5	Xonxa (EC)	100.5	100.4
Ohrigstad (M)	100.1	51.2	Sterkfontein (FS)	101.5	101.7	Lubisi (EC)	91.4	107.0
Blyderivierspoort (M)	100.6	101.1	Saulspoort (FS)	98.0	100.0	Doornrivier (EC)	104.8	111.1
Klaserie (LP)	100.8	100.6	Vaalharts Storage Weir (NC)	102.5	57.9	Waterdown (EC)	100.4	101.9
Ebenezer (LP)	100.3	100.5	Bloemhof (FS)	100.3	105.0	UMGENI RIVER		
Magoebaskloof (LP)	100.5	100.5	Douglas Weir (NC)	133.8	119.5	Midmar (KZN)	97.1	101.4
Tzaneen (LP)	99.2	101.2	OLIFANTS RIVER (WC)			Nagle (KZN)	98.9	102.8
Middle Letaba (LP)	5.8	2.8	Clanwilliam (WC)	59.9	48.1	Albert-Falls (KZN)	100.3	101.6
LIMPOPO RIVER			BERG RIVER			Inanda (KZN)	101.5	103.4
Hartbeespoort (NW)	9.8	99.9	Voëlvlei (WC)	39.5	57.0	Hazelmere (KZN)	58.9	61.7
Olifantsnek (NW)	100.8	76.8	Wemmershoek (WC)	71.7	30.6	THUKELA		
Buffelspoort (NW)	100.7	100.7	Berg River (WC)	87.1	64.9	Spioenkop (KZN)	99.8	104.6
Bospoort (NW)	101.9	102.0	Eikenhof (WC)	86.5	56.1	Driel Barrage (KZN)	96.7	75.6
Lindleyspoort (NW)	100.0	65.4	Steenbras (WC)	98.9	82.9	Woodstock (KZN)	98.1	
Roodeplaat (G)	100.8	100.8	Upper Steenbras (WC)	98.9	78.4			
Kosterrivier (NW)	100.2	40.1	BREEDER RIVER			MFOLOSI RIVER		
Klipvoor (NW)	104.3	101.2	Brandvlei (WC)	41.9	36.4	Goedertrouw (KZN)	100.2	100.3
Vaalkop (NW)	94.8	96.0	Roode Elsberg (WC)	29.7	18.4	Klipfontein (KZN)	100.5	101.8
Roodekopjes (NW)	100.8	101.7	Pietersfontein (WC)	84.3	19.9	Hluhluwe (KZN)	100.6	81.6
Marico Bosveld (NW)	100.2	100.7	Theewaterskloof (WC)	58.6	66.1	Pongolapoort (KZN)	85.5	86.5
Klein Maricospoort (NW)	#95.8	49.5	Kwaggaskloof (WC)	41.8	37.0	Jericho (M)	91.6	101.5
Albasini (LP)	99.8	98.5	Duiwenhoks (WC)	101.5	87.6	Westoe (M)	86.8	94.3
Vondo (LP)	100.3	101.8	TSITSIKAMMA RIVER			Morgenstond (M)	109.1	99.4
ORANGE RIVER			Hartebeeskuil (WC)	4.9	6.3	Heyshope (M)	101.0	101.0
Katse (L)	98.8	98.4	Wolwedans (WC)	100.6	86.5	CROCODILE/KOMATI RIVER		
Egmont (FS)	96.9	101.5	Kromrivier (EC)	29.6	11.5	Nooitgedacht (M)	100.6	100.8
Gariep (FS)	109.7	99.2	GAMTOOS RIVER			Driekoppies (M)	100.5	101.0
Vanderkloof (FS)	109.6	99.9	Kouga (EC)	19.2	12.8	Witklip (M)	100.3	100.6
Boegoeberg (NC)	#110.6	121.6	Loerie (EC)	101.2	41.3	Da Gama (M)	100.3	100.8
VAAI RIVER			SUNDAYS RIVER			Inyaka (M)	100.2	87.0
Vaal (FS)	97.2	107.0	Nqweba (Van Rynevelds Pass) (EC)	34.5	5.4	Kwena (M)	100.6	100.7
Grootdraai (M)	96.9	100.8	Darlington (EC)	51.6	47.0			

Latest available data—* Water available to RSA from Lesotho

Source: Republic of South Africa - Department of Water & Sanitation

Source: <http://www.dwaf.gov.za>

Seasonal Climate Watch

May to September 2023

Website: www.weathersa.co.za–

Weatherlines:

012 367 6000 and USSD-*120*7297#

Information supplied by



ISO 9001 Certified Organisation

Overview

The El Niño-Southern Oscillation (ENSO) is currently in a Neutral state, and forecasts indicate that it will likely remain in a neutral state during winter, with predictions indicating a higher probability to switch to an El Niño state during late-spring (Jul-Aug-Sep). However, ENSO's impact is limited for the coming seasons until the next summer season which may be impacted by an El Niño state if early predictions are correct. Caution is advised however as changes in the

ENSO prediction may change during winter and only monitoring is advised at this stage.

The multi-model rainfall forecast indicates above-normal rainfall for most of the country during early winter. Of importance for the next two seasons, mid-winter (Jun-Jul-Aug) and late-winter (Jul-Aug-Sep), there is below-normal rainfall expected for the south-west and above-normal rainfall for the southern coastal areas. As most of the rainfall during winter is expected in the far south-west, the below-normal rainfall

conditions in those areas are expected to have a significant impact.

Minimum and maximum temperatures are expected to be mostly above-normal countrywide for the forecast period.

The South African Weather Service (SAWS) will continue to monitor the weather and climate conditions and provide updates on any future assessments that may provide more clarity on the current expectations for the coming season.

Climatological Seasonal Totals and Averages

The following maps indicate the rainfall and temperature (minimum and maximum temperature) climatology..

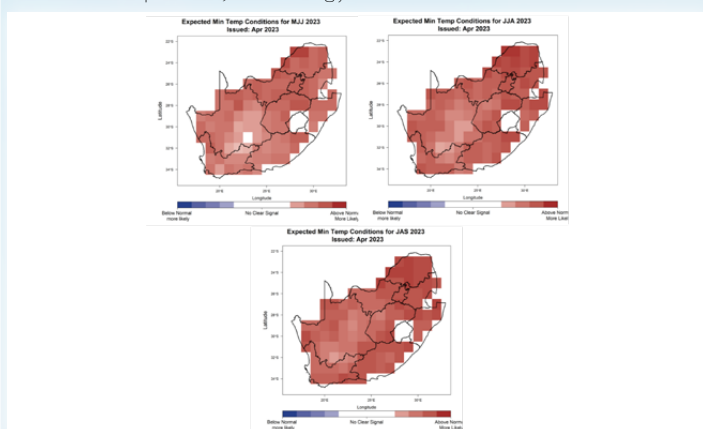


Figure 4: May-June-July 2023 (MJJ; left), June-July-August 2023 (JJA; right), July-August-September 2023 (JAS; bottom) seasonal minimum temperature prediction. Maps indicate the highest probability from three probabilistic categories, namely above-normal, near-normal and below-normal.

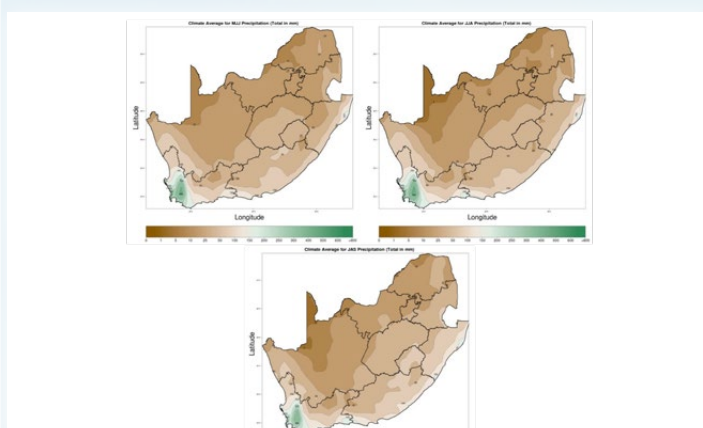


Figure 6: Climatological seasonal totals for precipitation during May-June-July (MJJ; left), June-July-August (JJA; right) and July-August-September (JAS; bottom).

Summary implications to various economic sector decision makers

Water and Energy

The expected above-normal rainfall for the southern coastal areas across the seasons provide a good opportunity for improvement of dam levels and other water reservoirs. This also pose risk of flash flood in flood-prone areas. Furthermore, the expected below-normal rainfall conditions coupled with above-normal minimum and maximum temperatures may lead to water scarcity due to exacerbated evapotranspiration and on-going drought, among other factors, in the south-west parts of the country. Minimum and maximum temperatures are expected to be mostly above-normal countrywide for the forecast period and demand for space heating will likely increase during the forecast period. Relevant decision-makers are encouraged to take note of these possible outcomes and communicate to affected businesses and communities.

Health

The projected minimum and maximum temperatures during the forecast period may result in warmer conditions with varying implications depending on the sensitivity and general health of impacted individuals. The danger of UV-related health impacts is significant throughout this reporting period. The public is encouraged to take appropriate sun protection measures such as seeking shade, wearing clothing that covers

the body, and applying sunscreen, particularly at midday. The public is encouraged to take precautions and follow the guidelines and recommendations of local authorities. The predicted below-normal rainfall during mid-winter (Jun-Jul-Aug) and late-winter (Jul-Aug-Sep) for the southwestern part of the country may result in dry conditions that have direct and indirect impacts on human health. The public is advised to take precautions and adhere to the recommendations and guidance of local authorities.

Agriculture

Above-normal rainfall is expected for most parts of the country during early winter and throughout the forecast period for the southern coastal areas. However, the south-western part, which normally receives significant rainfall during mid and late-winter seasons, is expected to receive mostly below-normal rainfall during this period. Below-normal rainfall conditions in these areas are expected to have a significant impact on crop and livestock production. Therefore, the relevant decision-makers are encouraged to advise farmers in these regions to practice soil and water conservation, proper water harvesting and storage, and other appropriate farming practices.

This forecast is updated monthly, and users are advised to monitor the updated forecasts as there is a possibility for the longer lead-time forecasts to change. Additionally, farmers are advised to keep monitoring the weekly and monthly forecasts issued by the South African Weather Service. Farmers are also advised to keep on monitoring advisories from the Department of Agriculture and make changes as required.

Contributing Institutions and Useful links

All the forecasts presented here are a result of the probabilistic prediction based on the ensemble members from the coupled climate model from the South African Weather Service. Other useful links for seasonal forecasts are: <http://www.weathersa.co.za/home/seasonal>

(Latest predictions from SAWS for the whole of SADC)

<https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/> - (ENSO predictions from various centres)

<https://iri.columbia.edu/our-expertise/climate/forecasts/seasonal-climate-forecasts/> (Copernicus Global forecasts)

Technical teams activated At Hammanskraal Following cholera outbreak

Water experts have warned for years that technical solutions had to be activated urgently in many areas of South Africa to ensure water is potable and fit for human consumption. Too many South Africans still do not have the basic human right of access to potable water and modern sanitation.

Sadly, the community of Hammanskraal has been crying out for years for attention to their water quality which has high levels of nitrates and phosphates, the water in the area was declared not fit for human consumption years ago.

Due to cholera 24 lives have been lost, including two children, with several other people hospitalised, at the time of going to print.

Water and Sanitation Minister, Senzo Mchunu, also at the time of writing, had activated technical teams to work with the City of Tshwane and Health Department in response to the cholera outbreak in Hammanskraal, north of Pretoria.

The technical teams said "They are working with the national and provincial Health Departments and the City of Tshwane to assist with various matters, including an investigation into the water quality and identifying the causes for the outbreak.

The department has been continuously carrying out water quality tests at the Temba Water Treatment Works and water distribution points in Hammanskraal.

Water quality

"The latest tests indicate the water quality from the Temba Water Treatment Works does not meet minimum standards. However, water supplied by Magalies and Rand Water meet the drinking water quality standards. Therefore, the water quality challenges are in central Hammanskraal, which is supplied by the city."

The Minister has further deployed his Deputy Ministers, David Mahlobo and Judith Tshabalala, to work with Gauteng Health MEC, Nomantu Nkomo-Ralehoko, to visit Hammanskraal and the affected areas.

The Minister is expected to meet with Tshwane Mayor, Cilliers Brink, noted the department, with an aim of discussing and agreeing on a plan with timeframes for Tshwane to rehabilitate and upgrade the Rooiwal Wastewater Treatment Works.

In a statement issued on Monday, Mchunu expressed his concern at the outbreak, noting that despite the upgrade of Temba Water Treatment Plant to a capacity of 120 megalitres a day (ML/d), the community of Hammanskraal, which is under the City of Tshwane Municipality, has been experiencing unreliable and

poor-quality potable water supply for an extended period.

Poor water quality

According to the Minister, the poor water quality is caused by the failure of Rooiwal Wastewater Treatment Works to meet the desirable final effluent quality for discharge to the Apies River, which in turn flows into the Leeukraal Dam.

"The Wastewater Treatment Works is situated upstream of Hammanskraal and has affected the Leeukraal Dam, where the Temba Water Treatment Works abstracts water for treatment and distribution. This has over the years led to the department instituting a series of enforcement actions (directives) against the city, and for the city to address the pollution from the Rooiwal Wastewater Treatment Works into the Apies River and Leeukraal Dam," Mchunu said.

After the city failed to respond to the department's directives, the department instituted a legal process, with the aim of obtaining a court order to force the city to address the failure of the Rooiwal Wastewater Treatment Works.

The Minister said the legal process is currently underway and to date the city has opposed the legal action.

The department has also directed the city to stop supplying water from Temba Water Treatment plant to Hammanskraal residents for human consumption, and the city is currently providing potable water

to affected communities, who were initially supplied by the Temba Water Treatment Plant, through the deployment of water tankers.

Sewage pollution

In 2021 the South African Human Rights Commission (SAHRC) released a report "Gauteng Provincial Inquiry into the Sewage Pollution of the City of Tshwane's Rivers and the Roodeplaat Dam", which recommended, among other things, that the national government should take over the water and sanitation function of the city, in terms of section 139(7) of the Constitution, section 63 of the Water Services Act (Act 108 of 1998), and section 19 of the National Water Act (Act 36 of 1998).

However, according to the Minister, the city rejected the SAHRC recommendations.

Mchunu said the department contacted the National Treasury for funding for the intervention recommended by the SAHRC, however, Treasury indicated that the city had already been provided with funding for the rehabilitation and upgrading of the Rooiwal Wastewater Treatment Works, through its Urban Settlements Development Grant (USDG) allocations.

"Consequently, the department is pursuing legal action against the city for a court order to force the city to use its USDG allocations to rehabilitate and upgrade the Rooiwal Wastewater Treatment Works," Mchunu explained.

Cactus-power for your generator?

The spineless cactus

A promising source of sustainable energy

You thought tequila is a strong “fuel” – but did you ever imagine running your generator, bakkie or tractor on cactus-power?

This may sound novel - but biofuels/ biogas from cactus is already being produced in Mexico and Brazil. Locally a farm near Bloemfontein has planted masses of cactus and is gearing up to produce biogas from cactus. Incredible research into this exciting field is also being conducted at the University of the Free State.

The spineless cactus is a unique perennial plant that is able to yield close to 40 tons of dry matter per hectare per year with a rainfall of 500 mm per annum. “This equates eight tons of biomethane or 11 000 litres of diesel-equivalent energy per hectare,” says Axel Tarrisse, a PhD student in the Department of Sustainable Food Systems and Development at the University of the Free State (UFS), who is working on the biogas and fodder potential of spineless cactus in Africa.

Tarrisse believes biogas, produced from the spineless cactus, has the potential to complement the supply of South Africa’s existing industrial energy companies to produce sustainable jet fuel and diesel and a variety of other products with the gas-to-liquid process they use.

Developing biogas

He says with rainfall, key nutrients, carbon dioxide, and solar energy it is possible to produce biomass from cactus.

“First, we harvest the cactus and macerate it prior to going into an anaerobic digester where it is heated to 38°C, the same as a cow’s body temperature. Inside the digester, naturally occurring bacteria, similar to those found in their stomachs, break down the cactus, resulting in the production of biogas. This biogas is composed of both methane and carbon dioxide,” he explains.

According to him, biogas generated through this process can be used in a number of ways. This

includes running generators to produce electricity or burning it to generate heat. It will also serve as a feedstock to replace coal and natural gas used by companies such as PetroSA and Sasol in their production of synthetic renewable fuels.

“The methane can also be separated from the carbon dioxide and compressed into bottles, creating compressed biomethane. This can be used as a replacement for liquid petroleum gas (LPG), as well as petrol and diesel in vehicles, such as bakkies, tractors, buses, and delivery trucks.”

The carbon dioxide produced in the process can, for example, be used to replace the fossil-based carbon dioxide typically used in the production of carbonated beverages. Additionally, it can be applied to extend the shelf life of packaged foods, serve as a water softener, and even be applied to a variety of industrial applications.

Commercialisation

Biogas/biomethane is already produced in Mexico on a commercial scale. In Northeast Brazil, farmers have planted 600 000 hectares of spineless cactus, also known as Palma Forrageira, but the machinery needed to harvest it only became commercially available this year.

Back home in South Africa, just 30 km outside of Bloemfontein, Barren Energy farm is at Stage 1 with 140 hectares of high-density cactus planted to provide the initial

feedstock for anaerobic digestion. With 600 hectares, they will be able to produce five million litres of diesel-equivalent methane.

Tarrisse says, “With the right methodology and management system, producing biogas from the spineless cactus will be adopted relatively quickly on a commercial scale.”

He believes that the lack of investment in cultivating the spineless cactus as a crop for fodder in South Africa may be due to a few factors. “It is easier to stick to what is known, such as irrigating lucerne and maize and managing these crops with existing planters, pest management solutions, and harvesting machinery than to develop local machinery and management solutions for a perfectly adapted crop,” he says.

Compelling reasons

According to Tarrisse, there are several compelling reasons to consider the spineless cactus as a source of biogas in South Africa.

Firstly, he explains, “Only the cactus pads, harvested from high-density plantations (20 000 plants per hectares), are used for biogas production.”

“Secondly, the spineless cactus can yield large volumes of biomass from marginal semi-arid land where conditions are unsuitable for conventional crop cultivation. This makes it an ideal option for the 65% of South African land that receives less than 500 mm of rainfall annually.”

Thirdly, he says, “The plant contains 30 to 50% of easily

digestible sugars, which degrades easily in an anaerobic digester. This simple, low-tech process can provide a substantial amount of baseload energy with relatively limited capital expenditure, which is particularly important in developing countries such as South Africa where capital is difficult to raise.”

“On top of that, anaerobic digestion only extracts carbon, oxygen, and hydrogen molecules from the cactus, while most of the macro- and micronutrients, water, and some fibres remain in the digestate. This nutrient-rich cactus digestate can then be spread on the cactus fields, reducing the need for fertiliser once the plantation has been fertilised in the first two years of implementation.”

Societal impact

Besides the benefits of producing biogas from the cactus plant, there is also the opportunity of job creation. “This farming can create one million direct job opportunities from only 3% of South Africa’s land area, approximately 4 million hectares,” says Tarrisse.

He is of the opinion that if production was at scale, as opposed to the current small orchard-style farming of cactus, there would be substantial biomass available to sustain not only biomethane, but also to support various bio-industries, such as protein production through cactus fermentation, biomaterials as a substitute for wood-based cellulose, organic acids, and bioplastics. “Consequently, cactus provides a climate-resilient, drought-resistant, and perennial feedstock for food, feed, fibre, and fuel in semi-arid Southern Africa,” he says.

Tarrisse states that this initiative also has the potential to significantly reduce migration from rural to urban areas, therefore addressing issues related to the growth of urbanisation, such as the provision of infrastructure and crime.



Axel Tarrisse (left), a PhD student in the Department of Sustainable Food Systems, working on the biogas and fodder potential of spineless cactus in Africa. Pictured with him are Prof Maryna de Wit, his supervisor and Associate Professor in the UFS Department of Sustainable Food Systems and Development, and Dr Herman Fouché from the Agricultural Research Council.

Somerset West's restorative veggie garden

It takes a village garden To make a difference

by Carol Posthumus

A beautiful verdant green and productive block in the heart of Somerset West, the neatly kept Village Garden is almost like a mini-food farm in the CBD of the town, and is complete with sheds, a weekly market and even a graffiti wall.

It did not always look like this, in fact the ground it occupies was once an eyesore, derelict and not somewhere you would want to stroll through day or night.

The Somerset West Village Garden in the Western Cape had its start in 2015 thanks to the vision and efforts of local residents and avid vegetable gardeners. Somerset

West is known for being a highly active and caring community. For instance, when there are fires on the mountains during the dry season in this picturesque town, you can count on it that within hours practically mountains of donations of eye drops, bottled water and snacks are delivered to firefighters. So, it is really not

surprising that the good gardeners of Somerset West unleashed something of a green revolution to help the vulnerable people in the town.

Indeed, the group fervently wanted to help local people living without homes or employment in a constructive fashion – “a hand up” rather than “hand out” – and felt a community vegetable garden and the selling of vegetables would catalyse many good productive things – like access to employment, nutrition, ablutions and an avenue to opportunities.

And, by all accounts, the garden certainly is a force for good in many people's lives.

Challenges

However, starting a garden – big or small – often comes with challenges and surprises, both positive and negative. It hasn't all been plain sailing to create the garden. The Village Garden has had its challenges, not least the Cape drought of 2017-2018 – and if it survived that, it can probably survive anything.

The people and founding committee who helped catalyse the Garden included Jenny Findlay, Jenny Douglas, Wendy Carter, Penny Neethling and Penny Osborne.

Jenny Findlay, the chairperson of the Somerset West Village Garden, a registered NPO, tells us that she has long been inspired by other Gardens created to boost a social cause (such as War Gardens or Gardens helping against sanctions) and also by the famed Oranjezicht City Farm Market (OCFM) (SABI magazine has covered the OCFM extensively). The OCFM is now a privately owned enterprise with the awesome market in Granger Bay near the Waterfront in Cape Town on the weekends. It was formerly an NPO, but it was sold a few years ago.

Jenny says once they had the idea, they met with the legendary founder of the Oranjezicht market Sheryl Ozinsky to find out “how they did it” and she was generous in giving the Somerset West Village Market some start-up advice. The Oranjezicht City Farm was started on an old disused bowling green.

There was a lot of administration and paperwork to navigate, Jenny recalls. One cannot just simply choose to create a veggie garden on a piece of public land because it seems a good idea. However, the City of Cape Town and the Department of Agriculture were, happily, highly supportive of the initiative.

The City of Cape Town, after their proposals, agreed the Garden could lease the land and use the water. The Garden then needed to be fenced off and ablutions and a shower installed. ECHO Erinvale helped with the fencing and the Department of Agriculture helped them install the “portaloo” and shower.

Passion for gardening

There are a number of organisations and a team of enthusiastic volunteers, as well as the official government bodies, who help make this Garden a success, reflects Jenny, who



Jenny Findlay, chairperson of the Somerset West Village Garden.

“A garden requires patient labour and attention. Plants do not grow merely to satisfy ambitions or to fulfill good intentions. They thrive because someone expended effort on them.”

Liberty Hyde Bailey

is a tireless champion of the garden. Her own passion for gardening started as a child in Worcester. “My love for gardening started in our garden at home in Worcester. My Dad, an attorney, was also a very keen gardener and he instilled a love for gardening in me too.”

The 20 volunteer gardeners who are hard at work the day we visited are made up of mostly gentleman gardeners and one lady. The Garden is in a partnership with the Thomas House of Hope and the Somerset West Night Shelter. The gardeners are volunteers from the Thomas House of Hope who work in the garden to earn tokens – they exchange the tokens for hot meals, get a new ID book, clothing and showers. For many people replacing an ID book is an important step to getting and reintegrating into society.

Jenny says working outdoors in the garden helps to lift heart, health and soul of their gardeners. “The garden is rejuvenating, and we can see how work in our garden

helps restore health and wellbeing in so many ways, while giving people a sense of accomplishment” says Jenny. Finding a job or supporting a family on an empty stomach and with a malnourished body is just about impossible. It is clear many people need help.

Jenny says that they have also helped design and start a garden for the Somerset West Night Shelter.

A further partnership the Village Garden is proud of is with Circular Homes, who helps the Garden with a Bokashi project.

While we were visiting residents in the area regularly arrive with their Bokashi donations. Thanks to an innovative partnership with Circular Homes, locals in the area save their household waste in a Bokashi bin, and then donate the contents to the Gardens and compost is made. They also earn bags of compost by doing this. Some people however do not want bags of compost as they live in flats and just want to recycle household waste and contribute.

Irrigation

Jenny says that Helderberg Irrigation have assisted the Garden with drip irrigation – it is a basic version with piping with holes along the length, which work well, and they hope will assist in saving water. Rainwater tanks are also utilised. The main water source is municipal water, and it is a gravity fed system and uses no electricity. They are planning to extend the drip irrigation this year.

When we visited the Gardeners were busy planting and nurturing winter crops, there is constant crop rotation in their garden. But the bounty that comes from the garden with its raised beds is vast – lots of veggies for soups, herbs and more. They are growing carrots, cauliflower, leeks, turnips, parsnips, aubergine, peppers and more.

Jenny says there is an emphasis on nutrition in the garden, as they would like their gardeners and the community to also benefit from nutritious food. “There should definitely be a major move to growing vegetables for families, especially given the rising cost of food.” All the produce in this garden is organic and demand is big from the well-heeled and organic-loving shoppers who visit the market to stock up too.

“Everyone with a garden – whether a large plot or a balcony – can start a veggie garden, you don’t have to start big,” enthuses Jenny. “A veggie garden the size of a door can meet a family’s need for fresh nourishing vegetables.”

You can volunteer or buy produce from the market on Tuesdays between 9-11am Somerset West Corner New and Drama Streets – choose from organic vegetables and herbs, browse apricot and grapefruit jams as well as lemon curd and honey supplied by Lourensford.

Visit <https://somersetwestvillagegarden.co.za> and check out their Facebook page for updates.



Why Women in STEM matters for Africa

by Chetan Mistry, Strategy and Marketing Manager – Xylem Africa



Chances are you've heard of ChatGPT, the artificial intelligence chatbot taking the world by storm. It's an impressive showcase of what we can achieve with today's technology. But ChatGPT is also a warning that major changes are coming to our world. Africa needs to be prepared, not just for digital technology but all the pieces that create a 21st-century society. This is why we need more women in the STEM fields.

Science, technology, engineering, and mathematics, collectively called STEM, are the foundation of modern society. Let's put that into perspective by defining a spectrum. On the leading side are breakthroughs such as ChatGPT that define what the next century will look like. On the other side is infrastructure, the physical foundations that empower progress and innovation.

Sub-Saharan Africa is still at the low end of this spectrum. We struggle with delivering electricity, connecting our populations to the internet, and reliably offering essential services. Water scarcity impacts one out of three Africans. Many Africans are unemployed, especially in South

Africa. Less than half of people in sub-Saharan Africa have access to modern healthcare. And only 22% of primary schools in sub-Saharan Africa have access to electricity.

Behind the curve

Our region is still behind the curve when it comes to modern infrastructure and offering the fundamentals of a 21st-century society.

STEM is how we will close that gap. Countries such as South Africa boast slightly above-average STEM rates. In the first decade of this century, sub-Saharan regions doubled the amount of research they produce. But these figures come from a low base: the region still produces less than 1% of global research. The World Economic Forum is concerned about Africa's low number of engineers and scientists, and the New York Academy of Sciences has estimated

that Sub-Saharan Africa requires 2.5 million more engineers to address our fundamental challenges.

The world is moving ahead. So, how do we catch up? How do we supercharge STEM?

Women are the answer. Much has been written about getting more women into STEM careers. But why specifically women? They are a massive untapped opportunity. Even though they represent half the population, women are still a rarity in STEM careers. Only 7 percent of women students enrol in engineering and construction courses compared with 22 percent of male students. Less than a third of researchers in sub-Saharan Africa are women. 32% of graduates in South Africa are women.

Encouraging women

Why are these numbers so lopsided? It's not that women don't want to become engineers, IT specialists, mathematicians or researchers. Africa has many prominent women engineers and technical leaders—but we need to encourage and support more women to pursue these careers.

At Xylem Africa, we fund the tertiary education of aspirant STEM professionals, primarily women.

And we represent a very engineer-focused industry. When you talk to these future engineers, they all say the same thing: they want to solve problems for their communities and see a STEM career as the best way to do that.

They are completely correct. While we should encourage all types of people to join the STEM ranks, there is a particular advantage and opportunity to bring more women into that world. We can achieve this goal through several actions. We can elevate female role models, create more inclusive learning resources, equip and support teachers, and spread the narrative that a prosperous Africa will stand on innovation, technology and engineering.

Our world will change faster than before, even during the rapid 20th century. Artificially intelligent software is just the start of a massive step forward for humanity. Yet while we call this Africa's century, Africa is not prepared. We still need to tackle our fundamental needs, such as water, energy, healthcare and edu

With more women in STEM, we can quickly move ahead on the spectrum and start joining the pack in the front.

Smart farming project to boost KZN food security

The KwaZulu-Natal province is revolutionising farming to increase productivity, through the use of the latest technology to water crops, monitor pesticides in fields and grow the economy.

The Smart Farming Project was launched by Dube-Ncube, in partnership with Fuze Institute and the University of KwaZulu-Natal, as part of a province-wide "Smart Province" drive to boost food security and economic growth at Fuze's Ukulinga Research Farm.

The farm has been the site of unique and ground-breaking research in several agricultural disciplines, providing an invaluable resource for close to 5,000 smallholder farmers in the region.

The innovative solution incorporates state-of-the-art technology, including smart sensors, automated irrigation, crop monitoring and automated harvesting, amongst others.

The smart farming system is designed to integrate seamlessly

into any farming operation, regardless of the size of the farm.

Automated irrigation

The key components include a smart greenhouse which incorporates smart automated irrigation systems, sustainable energy generation, and a mobile app for real-time insights and remote control of greenhouse functions.

Unveiling the project at Ukulinga Research Farm in Mkhondeni, Pietermaritzburg, on Saturday, Dube-Ncube emphasised the importance of investing in the province, and the role of technology in farming.

"We are proud to launch this ground-breaking smart farming technology solution that combines innovation, efficiency

and sustainability. Investing in technology is key to growing our economy and ensuring sustainable food production in the region.

"We need to embrace the concept of smart farming and the use of technology, to ensure that many more people are employed in the value chain and we have resilient farming," Dube-Ncube said.

The launch highlighted the importance of smart farming technologies to upskill and capacitate residents in the province, particularly rural women and youth, to improve the quality of life for rural communities, by reducing the need for manual labour and providing new opportunities for economic development.

Investment

The Premier said government investment through Unemployment Insurance Fund (UIF) Funded Projects, will ensure that 14 771 food handlers are

trained and employed by the provincial Education Department.

She noted that, with an average of five members per cooperative, each supporting an average of three family members, Fuze Institute Smart Farming initiative will uplift close to 80 000 lives out of poverty and boost family incomes.

"Over and above that, more than 3 000 unemployed youth graduates will be trained in smart farming, including agricultural drone operators. The smart farming technologies we introduced today can help farmers improve their sustainability by reducing their water usage and their reliance on pesticides and herbicides," the Premier said.

Moreover, she said, sensors can be used to monitor soil moisture and nutrient levels, and drones can be used to survey crops for pests and diseases.



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Let's Solve Water

Limpopo learners keep tabs on river water quality

Photos and story by Ashraf Hendricks

More than 200 schoolchildren in Limpopo have been trained to capture precious data about water quality from boreholes and rivers near their schools in a project linked to the United Nations and run by the University of the Western Cape (UWC).

For two days in May learners from Mara Primary, Komape Molapo Primary and Boetse Secondary School spent time in the field as part of the Diamonds on the Soles of Our Feet project.

The project, founded in 2019, currently focuses on the Hout Catchment to the north of Polokwane. Members of the community are trained by experts from UWC and these "citizen scientists" train learners in their area.

Water health

The children are taught about water health, and how to measure phosphates and nitrates (which are usually pollutants from agriculture and poorly functioning sewage plants) using a freshwater test kit and a mini SASS (Stream Assessment Scoring System). SASS evaluates the health of a body of water body by measuring the number and diversity of invertebrates (small animals) in the water.

The data is entered into a system using cellphones and sent to a platform run by EarthWatch Europe. From here it is sent to the United Nations SDG 6.3 water portal which aims to bring safe drinking water to all as part of Sustainable Development Goal 6, one of the United Nations' 17 global goals agreed to in 2015.

The importance of citizen scientists can be illustrated in the way volunteers in England have been helping to test for pollutants in rivers, and holding authorities to account for the deterioration of ecosystems.

"Water in South Africa is a scarce resource which must be taken care of," says Murendeni Mavhungu,

citizen scientist and field manager of the project. Murendeni says the goal is to create awareness and teach children and the community about water health.

The project first focused on measuring the impact of rainfall on borehole levels but has since expanded into checking water quality in nearby rivers. Learners start the project in class and then go into the field.

Mavhungu says they're teaching the children about water health, vegetation and pollutants in rivers and ponds. He wants them to be able to take care of these water sources in the future. If water sources are not protected, "we're going to have health problems, and water shortages, which might lead to famine," he says. "Water is a precious resource, and it cannot be replaced by any other resource."

The project was founded by Jacqueline Goldin, Associate Professor of Anthropology and Water Sciences at the Faculty of Natural Sciences at UWC.

"People who are on the ground are extremely knowledgeable, and we just need to tap into that. I think citizen science is a brilliant way of doing that," says Goldin.

She says the name "Diamonds on the Soles of Our Feet" comes from the idea that citizen scientists are 'diamonds', "not just because they're sparkling with the knowledge, but also because under their feet is all this experience and know-how."

Monitoring

Founder of the Diamonds on the Soles of Our Feet project, Jacqueline Goldin (with hands in

the air), addresses children at Komape-Molapo Primary School who are part of the environmental monitoring initiative in Limpopo. Goldin is an Associate Professor of Anthropology and Water Sciences at the University of the Western Cape.

The aim is not only for them to collect data but to eventually run the project in their communities.

Brendon Basson and his mother Catherine are subsistence farmers in Buysdorp who have been trained as citizen scientists. Water for their farm drains off the nearby Soutpansberg mountain, and they also have boreholes for irrigation.

"I need to know if my water is safe," says Basson. "People don't know what is going on within the water bodies."

Dorah Masehela is also a citizen scientist, from Ga-maleka. The issues she faces are very different from those in Buysdorp. In her village, she says government mismanagement and theft have reduced water supplies. Taps on the street and pumps that used to bring water from the river have been stolen and people have made their own water connections, draining off water before it reaches the taps.

She says if you don't have access to a borehole, you have to walk hundreds of metres for water or buy it from someone who does have a borehole. It costs R2 to fill a 20 litre container or R250 to fill a 2,400 litre JoJo Tank. She makes sure to fill her JoJo tank which can last her several weeks. Masehela says she hopes the Diamonds on the Soles of Our Feet project will inspire young scientists and environmentalists. "They say that education is a tool. You educate one child, you educate a village."

This article is courtesy
Groudup: <https://www.groudup.org.za>



Children from Mara Primary School participating in the Diamonds on the Soles of Our Feet program search for crabs in stream flowing from the Soutpansberg mountains.



Limpopo learners from Mara Primary check phosphorous levels in water samples.



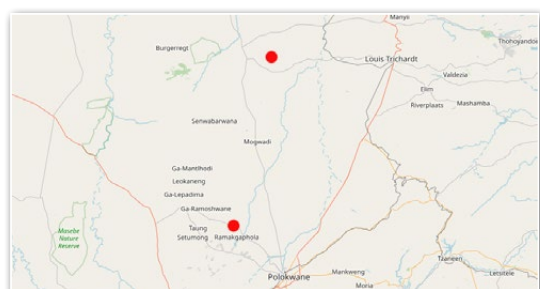
Founder of the Diamonds on the Soles of Our Feet project, Jacqueline Goldin (with hands in the air), addresses children at Komape-Molapo Primary School who are part of the environmental monitoring initiative in Limpopo. Goldin is an Associate Professor of Anthropology and Water Sciences at the University of the Western Cape.



Citizen scientist and field manager Murendeni Mavhungu measures the water depth at a river near Ga-Maleka.



Dorah Masehela, a citizen scientist from Ga-maleka in Limpopo, fills up her water tank. She says in her village, pumps have been stolen and illegal water connections mean some people don't have water.



The red dots are the approximate locations of where this story was reported from. Map source: OpenStreetMap (ODbI)

When steel bearings aren't tough enough Advance with polymer bearings And the brilliance of "enjoyneering" new era solutions



SABI magazine recently enjoyed the igus virtual press conference from Germany focussing on "enjoyneering" and the revolution in materials, sales and engineering - what a joy to witness.

As igus said of current developments: "The latest technologies revolutionize engineering and sales: Customers can enter virtual application worlds and coordinate the safe power supply of an oil rig in networked teams, program a robot with voice control or experience the revolutionary product search with AI: Under the motto "enjoyneering", igus showcases the latest technologies this year that playfully focus on topics such as sustainability, automation and stable supply chains."

Locally too igus is delivering a range of brilliant solutions with its materials and technologies.

For instance, in recent years, igus polymer bearings have emerged as a reliable alternative to traditional steel bearings, offering a wide range of benefits.

These include the fact that polymer bearings are maintenance-free, self-lubricating, and corrosion-resistant, making them suitable for use in harsh environments. They are also lightweight, wear-resistant, and offer excellent shock absorption, making them a popular choice for use in various applications.

The history of bearings dates back to ancient times, and while steel bearings have been the norm for a long time, they are not without their limitations. Defects and overloading can cause fractures in steel bearings, prompting the need for innovative solutions like polymer bearings. With their numerous advantages, it's no surprise that polymer bearings from the global leader in polymer bearings, igus, are gaining popularity in various industries.

Prime solution

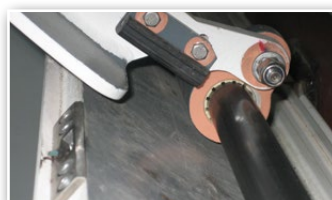
Juan-Eric Davidtz, product manager for igus says, "The proof is in the pudding; we can prove that after using polymer bearings your production line would run better, faster, cheaper and longer. Bearings are such a fundamental part, without them, most operations will come to a halt, which directly impacts the manufacturing process.

Bearings are a part of almost every machine that transfers motion and it's no wonder that the world is turning to maintenance and lubrication free bearings that far

outlast traditional alternatives. Here are benefits of using igus motion plastic bearing:

1. Maintenance-free because of the low coefficient of friction between plastic and stainless
2. Noise Control: Plastic has the inherent ability to dampen vibrations
3. Self-lubricating: Steel bearings require lubrication to reduce friction, dissipate heat and prevent corrosion. Due to the design of plastic ball bearings, there is no metal-to-metal contact, which results in less friction
4. Cost saving: with product integration a plastic bearing can be mounted into other components or parts such as plastic wheels, pulleys or

5. Reduce material waste: through custom designs that are readily and inexpensively made. This allows engineers the freedom to design the bearing around the device
6. Corrosion-resistant: ball bearings can be utilized in environments destructive to conventional bearings. Plastic, by its nature, does not corrode. Igus bearings can operate in hostile environments such as seawater, silicon wafer processing, plating solutions and swimming pools
7. Cleanliness: Plastic bearings generally operate cleaner than metal bearings because they do not need lubrication, they are resistant to corrosion, and they can be washed down which makes them a viable option for cleanroom environments, and wash-down applications
8. Weight saving: Lightweight: Plastic is five times lighter than steel, thereby reducing the weight and energy to move them
9. Wear-resistant Non-Magnetic: Plastic ball bearings become completely nonmagnetic when fitted with polymer, glass, or nonmagnetic 316 stainless balls. They are ideal for use in MRI X-ray equipment or sensors where there cannot be magnetic distortion
10. Shock Absorption: Plastic absorbs shock loads better than metal due to its elastic nature. Many conventional ball bearings fail due to the brinelling of the raceway, i.e., balls denting the raceway



Examples of igus polymer bearings

History of bearings

Sticking to what you know is a no-risk no-reward way of conducting business however when looking at the history of bearings dating back to ancient Egypt around 2,600 BC bearings have been long overdue for an update.

Bearings were discovered while building the pyramids, and since then bearings have developed from tree stumps to the wooden wheel. From uses in bicycles to planes until in 1794 the ball bearing as we know it was patented to a British inventor and ironmaster, Philip Vaughan.

Since then, ball bearings evolved tremendously in size, shape movement, and variety of applications in addition to different types of steel. However, defects such as microcracks, shrinkage cavities, bubbles, large foreign objects, overheated tissues, and local burns of bearing parts also cause defects or overload fractures where the reason why engineers had to come up with innovative solutions. Enter the latest innovation, the most advanced polymer bearings from igus.



Are you protecting your business against emerging water risks?

by Chetan Mistry, Strategy and Marketing Manager – Xylem Africa

Every business relies on water. It requires more than 140,000 litres of water to produce one car (Automotive World) and 2,700 litres to make a single t-shirt (University of Waterloo).

Daily consumption by offices and their employees is as staggering. Office buildings consume almost half of municipal water supply (Stellenbosch Business School) and large office buildings use an average of 75 litres of water per square foot and 50 litres per employee (Commercial Buildings Energy Consumption Survey). This scope also extends to the external: community relations, environmental concerns, and something as simple as customers needing water to remain economically viable.

South Africans are currently experiencing the ongoing impact of electricity undersupply, which gives us a reasonable expectation of what could happen when water supplies fail to meet demand. But unlike energy or practically any other resource input that businesses rely on, there is a tendency to treat water access as reliable and thus without many nuances in monitoring or risk management.

That attitude has to change because the world is changing. Water sources are under growing stress, weather events are becoming more intense, and urbanisation has already changed general water access and consumption patterns. If we consider that without water, every organisation will soon cease or severely curb operations, managing water risks should be a strategic priority.

Types of Water Risks

What are the water risks we should consider? Here are examples:

- **Are you spending too much on water?** Your water consumption might be a significant cost centre, but only tracking general consumption hides nuances problems such as leaks or other wastage, not to mention old pumps and other legacy equipment moving water around.
- **Are you assuming a regular supply?** Water is a human right, and events such as droughts or demographic changes can rapidly constrain how much water a business could access.
- **Are you contributing to worse water quality?** Whether for Environmental Social Governance (ESG) requirements or impact on surrounding communities, if your actions reduce a region's water quality, you may face backlash and punitive harm.
- **Are you at risk of water-related damage?** Floods, erosion, hail damage and drought can harm infrastructure and supply chains.
- **Can regulatory changes impact operations?** Since water is a public resource, State policies can suddenly and rapidly reduce water access, particularly during droughts.
- **Is there a reputational risk?** Poor water management can hurt your brands or corporate reputation, especially if customers link responsible behaviour to your business.

- **Are you exposed to climate change or urbanisation?** Your risks will grow if you operate in regions at growing risk from extreme weather events or high urbanisation rates.

Addressing water risks

The above are common examples. But water risks are often very specific, relating to a business's physical region, operations and supply chain. Knowing a business consumes X amount of water daily or weekly is insufficient. Companies must understand their reliance on water down to the specifics. Fortunately, you only need a small group of actions to address the broad church of water risks:

- **Do water footprinting:** Understand what types of water your business uses. At the highest level, a water footprint looks at your interactions with green (rain), blue (surface/underground), grey (usable but unfit for consumption) and black (contaminated) water. Water footprinting can show how much you rely on external sources and what mitigation options you have, such as recycling greywater or capturing rainwater.
- **Contextualise water use:** Know where your business uses water, such as consumption, cooling, dust management, or as an integral part of processes (cleaning vegetables, mixing chemicals, etc.). This context helps determine the different priorities water represents to your operations.
- **Track water more directly:** A monthly water bill tells you nothing about where exactly all that water is going. Once

you have a context for your business usage, measure key areas for a clear view of consumption. This is helpful for several reasons, such as knowing how to prioritise supply in the event of water restrictions.

- **Do water life cycle assessments:** Water flows in and out of your business and connects it to the outside world. Water life cycle assessments are crucial to understanding surrounding environmental and community impact, and will inform ESG and regulatory decisions. You can conduct assessments that include water with other resources—just be sure water is a priority in those assessments.

These four actions can cover most, if not all, of your water risk insights, and there are several ways to tackle each of them. The World Resources Institute and WWF provide tools covering many regional water concerns. More directly, options such as the Water Alternatives Corporate Water Risks Framework and Xylem Water Loss Management can give direct insight into business water usage. Modern analytics using historical data, smart metres and artificial intelligence can bring significant granularity to water strategies.

We mustn't ignore water-related risks to our companies. The more we rely on water to produce goods and services, the more severe the impact when that water supply runs low. But businesses can prepare and put measures in place. Is your business doing that yet?

Armani's Acqua for Life initiative supports Water access and water scarcity awareness in South Africa

With people's lives being tragically lost to cholera in Hammanskraal in a water health emergency and a humanitarian crisis in May, the importance of potable clean water once again was highlighted. The supply of clean safe potable water is a basic human right not to be denied and this was once again made clear by sad events in Hammanskraal.

It is shocking that today over 3 million people in South Africa still do not have access to basic water supply services, and only 64% of households have access to a reliable water.

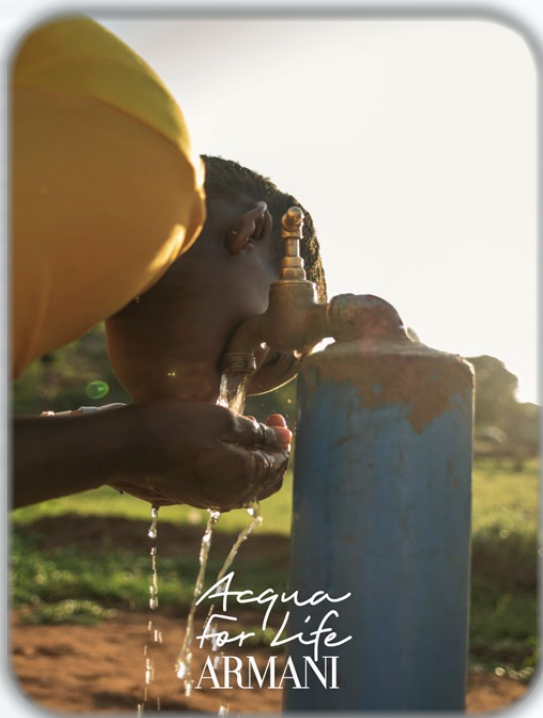
Worldwide today, more than 2 billion people lack access to a safely managed water supply and 1 in 10 do not have access to clean water close to home.

Since 2022, with the help of its strategic partner WaterAid, Armani's global water initiative focusing on universal access to water in water-scarce regions Acqua for Life has helped over 2 800 people to access clean water in the Mamburu and Maangane

villages, within Makhado Local Municipality in the Vhembe district of Limpopo Province.

Issues of clean water

Acqua for Life was created in 2010, the same year that the United Nations recognized the right to water and sanitation as a human right and focusses on delivering universal access to drinking water in water-scarce regions. As of today, Acqua for Life has invested more than 14 million euros in water projects across 23 countries, which has helped over 590,000 people worldwide. By 2030, Armani beauty aims to be a source of clean water for 1 million people.



Acqua for Life takes a comprehensive approach to the issues of clean water, hygiene, sanitation, and education. Its principal values encompass two key areas: firstly, undertaking activities that include the installation of water points, latrines, rainwater collection, water filtering, and water purification systems. Secondly, taking a sustainable approach to projects, including education for the community.

Acqua for Life also held a recent art exhibition in Johannesburg. Promoting and highlighting the transformations potable water access brings to communities is a vital endeavour and Armani are to be applauded for their efforts. The exhibition showed series of portraits of people who have been positively impacted by the Acqua for Life program in South Africa showing the concrete impact of access to water in people's lives.

Awareness through Art

Through this initiative, Armani aims to raise awareness about water scarcity, as by 2025 it is estimated that half of the world's population could be living in water-stressed areas.

The exhibition unveiled authentic, transparent, and optimistic portraits of people positively impacted by an Acqua for Life project in South Africa. The South African artists Justice and Fhatuwani Mukheli – with the help of videographers, Simba, and Wesley Takaedza, shine a light on the concrete impact that Acqua for Life projects have had on the Mamburu and Maangane villages, with a series of portraits of those who live there. These portraits illustrate how access to water allows people to flourish, enhancing the intrinsic connection between water and life.



Empowering South African farmers to export

The role of BPOs in streamlining the process

by Tenille Bell

South Africa boasts one of the world's most diverse agricultural sectors, encompassing both corporate and private intensive and extensive crop farming systems, spanning the production of vegetables, fruits, nuts, and grains.

In 2020, the sector contributed \$10.4 billion to global exports, with citrus, grapes, wine, apples, pears, maize, nuts, sugar, wool, and fruit juices being the primary exports into Africa and Europe. To enter the export market, farmers must meet rigorous inspections and product quality tests, which are costly and time intensive.

Even after obtaining certification, standards must be maintained, requiring extensive staff training. Fortunately, partnering with the right Business Process Outsourcing (BPO) provider can simplify the exporting process for farmers. By working with a trusted BPO partner, farmers can augment their staff capabilities, increase production, and ensure that their output meets export standards. For farming enterprises seeking to enter the export market, partnering with a reliable BPO provider can prove invaluable.

The current reality of agriculture

Other trends influencing the Agri-sector include rising demand for food crops, proportional to the continual growth in population size. Additionally, there has been a mindset shift for consumers, moving away from processed products to purchasing raw fruits and vegetables and healthier grains. While this increase in demand is positive for

the Agri-sector, it faces several challenges, such as livestock diseases and climate change. Rising prices in fuel, animal feed and fertiliser prices, as well as increases in the sugar tax and national minimum wage, are all taking their toll on the sector. Further setbacks include poorly functioning network industries – roads, rail, ports, water, and electricity – and service delivery problems in municipalities, all of which increase business costs.

Despite this challenging reality, there is a strong need to expand South Africa's export markets beyond traditional markets. The priority countries need to be China, South Korea, Japan, the USA, Vietnam, Taiwan, India, Saudi Arabia, Mexico, the Philippines, and Bangladesh. These countries have a sizable population and large imports of agricultural products, specifically fruits, wine, beef, and grains.

Outsourcing meets export agriculture

Preparing to enter the export industry means that farming businesses must ensure they can meet the demand and the legislative expectations of international trade. This requires businesses to always work efficiently and effectively. The most practical way to streamline processes and increase operational effectiveness while remaining agile

in a highly seasonal industry is to use a compliant and reputable BPO provider. A BPO partner in export agriculture can be particularly useful in navigating the complex export regulatory environment, ensuring compliance with export standards, and accessing new export markets.

Flexibility and compliance

In terms of human resources and productivity, outsourcing business functions can give farmers the flexibility they need to scale up and down with seasonal work demands, enhancing resources and capacity utilisation. Businesses in the sector using a BPO solution will see an increase in output within shorter timeframes. This is because BPO providers have made it their core business to increase productivity while operating within the legislative constraints of compliance specified for the industry. By outsourcing to a BPO provider, an agriculture business can hand over all aspects of risk and compliance management to its chosen partner. This gives the Agri-client confidence that their provider of choice is abiding by compliance and transparency requirements on their behalf. This is likely to be a huge relief for agricultural businesses that have always found compliance requirements cumbersome.

To be successful, profitable and gain a competitive edge in the international Agri-trade, businesses must operate optimally under pressure. The international market is more demanding and requires businesses to run leaner and smarter. Here, a

BPO provider becomes an extension of the business, providing the skills and support to drive innovation through efficiency.

Re-engineering agriculture

Bringing in a BPO provider is essential to boosting productivity in a sustainable but flexible manner. Such a provider will perform their due diligence, leveraging specialist skills such as industrial or process engineers to optimise processes achieving work at accurate capacity through resource planning. Fundamentally, the BPO provider's focus is to drive efficiency and effectiveness through a structured solution that hinges on a remuneration model that is incentivised. This builds a culture that drives resources toward fulfilling agri-business targets, because the higher their output, the higher their earnings.

Entering the international export market can be a daunting prospect for agricultural businesses, and it will be necessary for them to adapt rapidly to enhance their competitiveness. By joining forces with a compliant BPO provider that has extensive knowledge of the industry, the Agri-business will have the right kind of support and drive from a partner whose sole purpose is to help their business achieve efficiency, effectiveness, and optimal productivity.

Tenille Bell is GM: Sales at Programmed Process Outsourcing (PPO)

Saffron success

Saffron, the world's most expensive spice which needs only minute amounts of water to cultivate, has not always been grown in South Africa. However, in 2013, Saffricon founding member and MD Bennie Engelbrecht started looking into saffron and began Saffricon with the vision of introducing saffron as a new crop and opportunity in South Africa.

Bennie first started cultivating saffron in Pretoria and later in Calvinia in the Hantam Karoo, which is perfectly suited for saffron. Saffricon gives growers the opportunity via its trial packs or gardeners' packs to grow saffron.

Bennie tells us there are now around 180 active growers, with 12 in Namibia and three in Lesotho. There are 12 commercial growers in this group.

"The number of growers has decreased since there are growers from 2021 and 2022 that aren't part of the test run anymore. There are various reasons why they aren't continuing, but the main reason is due to unnaturally high rainfall last year where many growers had considerable losses to their crops.

Bennie relates that they chose to move to the Karoo to grow saffron as the conditions and climate are very similar to Iran, the largest producer of saffron in the world.

However, Saffricon have trialled saffron in many areas in South Africa and have proved that it can be grown in areas that are not exactly the same as Iran.

"There are more challenges in the summer rainfall areas than the winter areas, but saffron can definitely be maintained with good risk management."

The crop has definitely met Bennie's vision for saffron in Southern Africa.

"We are in awe at how well saffron, especially this year, is doing across South Africa, Namibia and Lesotho. It helps to give people a good forecast of the potential that saffron has to be successful in South Africa and our neighbouring countries," he says.

Saffricon however would like to caution consumers that they should be selective when choosing suppliers of corms.

"We are a bit worried about other corm suppliers that have started up recently. I would like to warn consumers and ask that they make sure these suppliers can offer them the necessary technical expertise for their crops before making a purchase. I don't want to see saffron as a crop blamed if a grower is unsuccessful."

A good year

Notably, this year is looking to be a good year for saffron.

Bennie elaborates for us: "Corms are usually under stress in the first year of planting since they have to adjust, however this year's corms have proven us wrong! All of our first time trials that saw flowering, get more than one flower per corm. Our own second year corms produce up to 5 flowers per corm. The season is still relatively early, and we will only have enough data to determine the harvest for 2023 in about 4 weeks. The 2023 climate is perfect for saffron cultivation. One of our trials in Gauteng managed to harvest 94 flowers in a single day! This plantation was from 700 corms in different sizes."

Drip irrigation is recommended for saffron.

"Saffricon uses drip irrigation and we also recommend it to our growers. Considering the fact that the crop needs very little water and



is sensitive to fungus, it is necessary to be precise with watering. There are growers who use flood irrigation, but we do not recommend it."

Drip irrigation

Saffron only needs small volumes of water.

"A lot of growers are shocked and unsure about how little water is needed for saffron. Saffron needs between 4-6mm per week water considering your soil type. Traditionally farmers are used to giving a lot of water with a heavy hand, but this can lead to fungal infections and can cause corm rot. Too much water is the enemy of saffron!" remarks Bennie.

Happily irrigating 5mm a week only needs two hours of electricity, so this is one industry that is not suffering loadshedding blues when irrigating. A lot of farmers also have solar panels for their boreholes and pumps.

What are Saffricon's tips for aspirant saffron farmers?

Bennie says it is important to realise that saffron cultivation has risks, but that all of it is manageable.

"A lot of our growers are not farmers, but we support them via our

production manual, tutorial videos and enquiries that we receive. You must be willing to take a chance, and to not immediately do the maths to see what your return on investment will be, because then you are doing it for the wrong reasons. Rather work with us to solidify saffron as a new crop in Southern Africa. You will require your own capital, soil, and water. For a ¼ ha plantation, you can already create a very good profit driven business that can be a very good second source of income," he advises.

Good quality

What is Bennie's vision for the ongoing success of Saffron?

He believes there will be more commercial growers starting up, especially after 2023's successful trials and that larger players in the saffron market will take note of Southern Africa. Our saffron measures up very well internationally.

"I've been saying from the start that our saffron is of the highest quality, and last year this was proven in a trial where Saffricon's saffron was compared with other countries' saffron, such as Iran and Spain. A very reputable and well known international supermarket group hosted this trial and Saffricon's saffron was judged based on colour, taste and aroma."

If you would like to purchase South African saffron – 100 Red Gold Experience Pure Saffron - you can visit Saffricon's online shop where it is available for purchase, www.saffricon.com. The saffron is also exported to the UAE.





One of the world's purest A healing honey From pristine Mozambique Poised to go big on world market

A Mozambican beekeeping operation founded by a South African beekeeper is aiming to capture not only global attention, but a significant share of the international market with its world-class product.

Situated in the south of Mozambique's Inhambane province, north-east of the capital Maputo, the AbelhaMoz Project has become the byword for certified organic, medical-grade honey that is on par with the best honey in the world.

CEO Steve Joubert points out that the analysis of AbelhaMoz honey was done by three highly rated institutions, German quality assurance giant Intertek, the Pietermaritzburg based food pathogen laboratory, SciCorp Laboratories and the University of Johannesburg.

Their verdict was unanimous: AbelhaMoz is one of the world's purest organic honeys. "When our product is measured to the three highest global organic standards in the world, we meet or exceed every parameter," Joubert explains. "Over and above this, there are very few areas in the world left that offer the possibility of producing high volumes of untainted, superior quality organic honey."

The secret of their success, he adds, is that their product hives are situated in a pristine environment more than 200 km away from any pollution-creating industry or chemical farming operations. "The result speaks for itself: the honey is certified free from any heavy metals, GMOs, pesticides, toxic chemicals, salmonella or bee diseases such as Varroa Mites or American Foul Brood," he says.

A match for Manuka Honey

Comparing AbelhaMoz honey to the world-famous Manuka honey from New Zealand, Joubert says the only ingredient making the latter superior to their offering is methylglyoxal (MGO). "While other types of honey also contain this organic compound, it is found in particularly high levels in Manuka," he explains. "MGO is one of the more than 200 components, of which roughly half are sugars, found in honey."

"However, globally accredited scientists have identified 14 elements in our honey, that are powerful, natural anti-carcinogenic chemicals. Once this has been verified by clinical trials, we believe that we will be able to call AbelhaMoz honey 'anti-carcinogenic' instead of merely saying it contains powerful anti-carcinogenic elements."

Another factor adding to the unique nature of AbelhaMoz honey is the fact that their bees feed not only on nectar and pollen. Most of the honey is produced by bees feeding on the secretions of other insects and plants, including the rare honey mushroom.

"Honey mushrooms grow in abundance in our forests, and the bees feed on its secretions," Joubert explains. "The honey produced from the honey mushroom and insect secretions is called honeydew honey. It is a very special type of honey

that contains many sought-after medicinal ingredients."

Improving on local traditions

AbelhaMoz has forged strong partnerships with traditional honey gatherers and communities in the area. Their objective, says Joubert, is to counteract the destructive effects of traditional methods by implementing more productive, environmentally friendly and financially rewarding modern beekeeping practices. "Previously, traditional honey gatherers would use age-old methods, including incinerating the entire swarm at harvest, typically harvesting an average of only two kilogram of honey for every bee colony lured into their tree-bark hives. For this they received less than \$2,50 per kilogram".

Covering an area of 200 000 hectares of unspoiled Mozambican forest, AbelhaMoz currently attends 1 000 hives, each producing approximately 30 kg of honey per year.

However, Joubert predicts that the project could have up to 20 000 hives in five years. "This will make us a significant player and hopefully help us achieve our objective of having the AbelhaMoz honey-producing area declared a UN World Heritage Site," he explains. "In fact, this is a key objective in the long-term viability of the AbelhaMoz Project and essential for halting any encroaching industries or chemical farming operations with potentially harmful intentions".

Going global

AbelhaMoz is targeting high-end organic retailers and international pharmaceutical companies that value the medicinal qualities of honey. To this end, the project is focusing on potential buyers in the UK, Germany, France, the USA, Middle East and India where it will be used in Ayurvedic medicine*. The group expects its premium product to fetch a price exceeding \$50/kg.

Given the rapid decline of the world's bee population, Corné Liebenberg, director of Laevel Agrochem (LAC), says the main reason for their involvement with the project is to help 'save the bee'.

"As a part of the food chain, bees are crucial for the planet," Liebenberg explains. "Without bees, there will be no pollination and without pollination we will eventually end up without food. We need to do everything we can to 'save the bee' or we are doomed."

Another priority for Liebenberg is to disprove the notion that agrochemical companies like LAC are destroying the bee population. "Wherever possible, we endeavour to use environmentally-friendly crop protection solutions in Integrated Pest control programs utilizing biological products," he explains.



Zinc plays a critical role in food security and crop yields

Zinc in a well managed fertiliser programme boosts crop production

Although zinc is an essential micronutrient for plant growth, zinc input has received far less attention than nitrogen or phosphorous.

"Almost half of cereal-growing areas globally have soils with a low level of plant-available zinc," says Simon Norton, executive director, International Zinc Association Africa.

In Sub-Saharan Africa soil health concerns are largely due to poor nutrient supply in the soil, the naturally low concentration of zinc in the soil and the lack of crop rotation. Additionally, there is insufficient support to small farmers to implement soil and cropping practices that could potentially reverse this depletion.

A consequence of poor soil health is an increased prevalence of food and nutrition insecurity due to lower agricultural production, reduced cattle fodder, reduced wood fuel for cooking and reduced crop residues and cattle manure to recycle nutrients to soils. Carbon dioxide emissions also increase

due to soil nutrient depletion and deforestation.

Maize yields

"The application of zinc fertilisers is essential in such soils to boost cereal yield and grain zinc concentration," says Norton. Numerous studies have indicated that maize grain yield, for example, increases significantly when zinc fertilisers are applied to zinc-deficient soils. This calls for a better understanding of the critical role that zinc fertilisers play.

Not only are half of the world's agricultural soils deficient in zinc, so is a third of the global population as a result.

The use of zinc-enriched fertiliser (for instance zinc-coated urea or zinc-enriched NPK) in Turkey, Australia, South Africa, or India has resulted in significant increases in

"It is critical to consider global micronutrient balances to improve crop yield and quality and human health."

yields, as well as boosting zinc concentration in rice and wheat. The best way to increase zinc density in grain has been demonstrated to be foliar applications.

In zinc-deficient soils, zinc application increases maize yield due to increased kernel numbers and kernel weight in inferior grains. An adequate zinc supply in maize plants maintains high pollen viability and a sufficient carbohydrate source. Here the critical shoot zinc concentrations for high pollen viability and high kernel numbers of inferior grains have been shown to be 31.2 and 33.6 mg/kg respectively.

Education

It is critical to consider global micronutrient balances to improve crop yield and quality as well as human

health. Ensuring optimal supply of zinc in a well-managed fertiliser programme can have a measurable increase in crop production and offer a return on the farmer's investment, while the increased concentration of zinc in plants is also beneficial to human health.

This calls for an enhanced agricultural education program based on strategic cooperation with the fertiliser industry supplying the products, scientific organisations assessing the extent and impact of micronutrient deficiencies in soils, plants and human populations, and governments which stimulate the adoption of biofortification practices by farmers through economic incentives and subsidies, together with technology and knowledge transfer, concludes Norton.

In maize zinc maintains high pollen viability and a sufficient carbohydrate source

Reinke opens an exciting new chapter With new premises and warehouse in Potch



Reinke recently proudly opened their new head office, manufacturing component and parts warehouse in Potchefstroom, effectively establishing the group more centrally in South Africa and Southern Africa.

Reinke, suppliers of world class centre pivots, celebrated the roof wetting of their new head office and warehouse on 15 May 2023 to introduce their products, services and role to business, agriculture and the community.

With larger premises at 37 Poortmanstraat, Potch Industria and centrally situated in the country Reinke says they will be able to play

a greater role and provide more efficient and prompt services.

The new warehouse is double the size of the previous one in Durban. This means twice as many parts can be kept and with the new central office and warehouse service will be quicker to all areas.

Great Opportunity

Patrick Ellis, the MD of Reinke South Africa, said: "This is a fantastic opportunity to expand our service to the next level. Potch is a well located town for our products and services. We are here to make a big difference and I am excited that we now have a manufacturing component right here in Potch. We are a highly skilled and knowledgeable team who understand our customers and the needs of the community well.

"The new expansion allows us to broaden our reach across South Africa as well as to our dealerships

in Botswana, Namibia, Mozambique and Zimbabwe," said Ellis.

The president of Reinke Chris Roth also flew in from the USA for the roof wetting in Potch, saying it was Reinke's goal to be at the forefront of market trends while responding swiftly to the requirements of farmers.

"We have much confidence in our local staff, and we know they are going to give fantastic service to the local community. With the manufacturing component, it is our hope that our volumes will increase in line with demand for irrigation systems."



CropX is screwed into the ground for data collection.

Reinke encourages farmers to use CropX for better water management on their irrigation systems. CropX specialises in irrigation and soil sensing technology for farmers. This advanced technology analyses field data to predict crop inputs. Reinke's pivots get better irrigation prescription and recommendations because

of the unique connection between soil and CropX field sensors.

For more information about Reinke's irrigation systems to suit your budget and needs, talk to Patrick Ellis at patrickellis@reinke.com.





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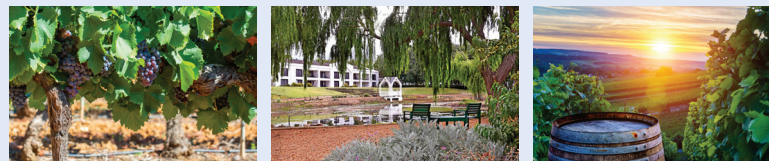
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Dagboek | Diary

SABI Technical Forum and Exhibition

15 - 17 August 2023
Lord Charles Hotel, Somerset West (Western Cape)



The SABI Technical Forum is a new SABI initiative, suited for this time in our history, taking place from 15-17 August 2023 at the Lord Charles Hotel in easily accessible Somerset West, Western Cape.

Attend the whole Forum or book for a day.

It is time to grapple with the issues and find solutions.

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To find out more and to book your place as a delegate or to exhibit please contact

Riana Lombard, riana@sabi.co.za

Registration Forms are available at www.sabi.co.za.



Africa Trade Week

18-20 June

Gallagher Convention Centre - Johannesburg, South Africa

Africa Trade Week is a collection of two trade shows covering the food and trade sectors. The shows, Africa's Big 7, and SAITEX gather together a range of South African and pan-African buyers to source products and services from a global manufacturing base. The shows take place from 18 – 20 June 2023.

Africa represents one of the last global markets opening to international investment and contains some of the fastest-growing economies in the world. International trade alone makes up approximately 25% of sub-Saharan Africa's GDP.

2023 Irrigation Show & Education Week

27 November-1 December - San Antonio, Texas, USA

<https://www.irrigation.org/2023Show/>

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