

SALMINA MOKGEHLE

A plant scientist who is building a resilient future through knowledge, people and practice

From her position as Senior Lecturer at the University of Mpumalanga, agricultural scientist Dr Salmina Mokgehle is growing a community of researchers and farmers who can help unlock the power of underutilised indigenous crops for a sustainable future.

Article by Petro Kotzé.

“Water,” says Dr Salmina Mokgehle, “lies at the centre of agricultural sustainability.” And, for research to matter, she adds, it must generate knowledge that helps communities and decision-makers manage this resource responsibly.

A Senior Lecturer in Horticulture at the University of Mpumalanga, Mokgehle has carefully crafted a career that achieves exactly that. Her work brings together indigenous knowledge, horticultural science, and climate-smart agriculture. Her research, she explains, chips away at one core question: how medicinal plants and underutilised crops can contribute to climate-resilient food systems, biodiversity conservation and rural livelihoods in South Africa.

Just over a decade into her career, she is recognised for her growing contribution to agricultural and environmental research (as reflected in her NRF Y2 rating, awarded in 2024), but the foundations for her journey were laid many years earlier.

A career rooted in childhood knowledge

Mokgehle was born and raised in Overdyk (Ga-Moleele), Bochum, a small rural village outside Polokwane in Limpopo. Growing up, agriculture was a part of everyday life. “My mother has always been cultivating plants,” she recalls. She saw firsthand how agriculture supports families and communities. She also learned about the traditional use of plants for healing and everyday health. “We used them for food, but my mother also used some to treat different ailments,” she says. The local African ginger (*Siphonochilus aethiopicus*), for example, was used to treat the common flu.

These early experiences sparked her curiosity about the relationship between plants, water, and people’s well-being, she says. Consequently, she pursued studies in agricultural science to better understand how plants grow and how natural resources



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such as water can be managed responsibly. And when it came to choosing a topic for her PhD, she focused on a plant well known from her childhood. Her thesis, completed in 2017 at the University of KwaZulu-Natal, investigated variations in plant growth, yield, and metabolites in response to different irrigation regimes and nitrogen levels of the African ginger. In essence, she wanted to understand how to commercially produce the plants and develop medicinal products.

African ginger (*Siphonochilus aethiopicus*) is a highly valued medicinal plant that is threatened by overharvesting and habitat loss in South Africa. The plant is widely used in traditional medicine to treat ailments such as respiratory illnesses, pain, and malaria. Wild populations of the endangered species are declining and facing a loss of genetic diversity. Yet, there is limited scientific understanding of how cultivation practices influence its growth and medicinal properties.

To address this gap, Mokgehle's PhD study identified growing conditions that optimise both biomass production and the accumulation of valuable secondary metabolites, including antioxidants and volatile compounds. She found that cultivation can serve as a viable alternative to wild harvesting, supporting both conservation and commercial use.

Today, that early interest continues to shape her research, she explains, as she works to find solutions that balance agricultural production with environmental protection. However, Mokgehle's research has expanded beyond individual crops to consider entire farming systems. Her work now explores how water, soil, plant growth and farming practices interact to support sustainable agriculture.

Underutilised crops remain a key focus of her work, particularly those that are both water-efficient and nutritionally valuable. Still often overlooked in mainstream agriculture, the plants are

well adapted to local conditions and can play a significant role in food security and resilience. Her current work on indigenous and underutilised fruit trees reflects this integrated approach. The research examines both nutritional composition and water use, positioning these crops within broader food and health systems.

A WRC-funded project, led by Mokgehle, is exploring how the milkwood (*Mimusops zeyheri*), an indigenous fruit tree, can improve farmers' and communities' food security and nutritional intake. This tree is naturally suited to local conditions but is often overlooked in farming systems. The project (*Prospect of unlocking the potential and sustainable integration of the underutilized indigenous fruit tree milk wood (Mimusops zeyheri) in the cropping system for combating food and nutritional insecurities*) explores ways to grow and integrate the tree alongside other crops so that it can provide additional food, income, and health benefits. By promoting its use, the project aims to help communities become more food-secure while adopting sustainable farming practices that protect the environment.

In this way, Mokgehle's work sits at the intersection of water management, agriculture and community well-being. It is not only about how to grow the right crops, but about how they can support people's lives in water-constrained environments.

Research rooted in reality

While research forms the foundation of her work, Mokgehle is clear that knowledge must reach those who can use it most.

In her first Water Research Commission (WRC)-funded project, conducted while she was at the Agricultural Research Council (ARC), she worked directly with smallholder farmers in the Vhembe district. The project focused on underutilised crops and water-use practices, combining scientific research with practical,

on-the-ground support. "We were able to provide training to the farmers about cultivating some of these plants," she explains. "We were also able to buy them some resources that make it easier for them to know about water utilisation and water application."

One farmer's story stands out. When the project began, the farmer was producing vegetables on a small scale, with limited access to markets. Through training, support and improved water-use practices, the farmer's production increased significantly. By the end of the project, she was able to take her produce to market and generate income.

"When we did the exit strategy, for me, this outcome was a plus," Mokgehle says. "Initially, she [the farmer] was not producing high amounts of crops, but by the time we were leaving, she was already taking her produce to the market. I was very glad."

For Mokgehle, the value of the project lay not only in the research results but also in the relationships built along the way. For that project, she says, farmer engagement meetings brought together the WRC, local municipalities and traditional leaders, creating a platform for dialogue and support. "We had very fruitful discussions to support the farmers' initiatives," she says.

An ongoing WRC-funded project on Mokgehle's plate focuses on supporting rural communities in Mpumalanga (more specifically, Luphisi and Salubindza in the Mbombela Municipality) to improve their farming practices. The project (*Farmer-led agricultural production interventions through sustainable farming practices for underutilised indigenous crops by rural communities in Mpumalanga*) places farmers at the centre of decision-making. "In these areas, many farmers are interested in growing indigenous crops and medicinal plants, but often lack access to information about how to cultivate them effectively," Mokgehle explains.

To address this, Mokgehle and her team organised training workshops and practical demonstrations for farmers. During these sessions, farmers learned simple cultivation practices that help medicinal plants grow well under local conditions. The training covered topics such as soil preparation, planting methods, crop spacing, watering practices, and natural methods for managing pests and diseases.

Farmers were also introduced to ways to use water more efficiently, protect soil health, and grow crops well-suited to their local environment. The workshops encouraged open discussion, allowing farmers to ask questions, share their own knowledge, and learn from one another.

In addition to workshops, the team conducted field demonstrations where farmers could see the cultivation methods being applied directly in the field. These demonstrations helped farmers understand how small improvements in planting and water management can make a big difference in crop growth and yield.

By encouraging farmers to take the lead in adopting these practices, the project aims to improve food security, increase household income, and make farming more resilient to climate change while making better use of available water resources.



As part of the research taking place under Mokgehle's helm, smallholder farmers in Luphisi are trained in the correct use of an irrigation pump.



Mokgehle's work advocates for agriculture as a connected system in which water, soil, crops and people are interdependent. She works closely with all stakeholders, including community partners, students, and technical experts.

This approach reflects a broader philosophy of her work: research should not be something done **to** communities, but something developed **with** them.

Beyond collaborating with local stakeholders, a central theme running through Mokgehle's work is capacity building. WRC-funded projects have not only supported farmers but also provided opportunities for postgraduate students to train. In one project alone, she supervised three Master's students, including one recruited directly from the local community.

At the University of Mpumalanga, she teaches more than 200 students each semester, combining theoretical knowledge with practical field experience. She encourages students to engage with real-world challenges and to see science as something that connects directly to society.

By supervising postgraduate and honours students, she helps develop the next generation of agricultural scientists, equipping them with both technical skills and an understanding of community-based research.

This deliberate approach to building local expertise is part of a longer-term vision that she is consistently working towards. She says she aims to grow both a community of researchers working on underutilised crops and a network of farmers who can build sustainable enterprises around them.

Throughout, the WRC's support has run like a vein through Mokgehle's career. Her first WRC grant was valued at approximately R800 000, and she explains that it provided her with an opportunity to lead a project, manage public funds and demonstrate impact. For an early-career researcher, this was a significant step.

"I was very excited at that time," she recalls, "because these funds were not only going to add value to me as a researcher, but they were also going to be used to capacitate our smallholder farmers."

Successfully completing this project laid the foundation for future work. "It was easier for me to write the next proposal," she explains, "because the WRC had already seen that I had completed the project, shown impact, and trained students." A subsequent project, after she moved to the University of Mpumalanga, received funding of around R1 million, helping her further work towards her vision.

Today, Mokgehle continues to work with the WRC, with ongoing research projects that build on this foundation. The partnership has supported not only her research but also her broader role in community engagement and institutional development.

Over time, her work has continually evolved towards understanding agriculture as a connected system in which water, soil, crops and people are interdependent. She works closely with agronomists, soil scientists, postgraduate students, and community partners, she says, creating opportunities to share ideas and develop solutions together.

In fact, throughout the conversation about her career, Mokgehle returns to the importance of relationships. Whether working with farmers, students, funders or collaborators, her approach is grounded in trust and long-term engagement. She describes these connections as central to both the success and sustainability of her work.

To achieve that, she emphasises the importance of translating research findings into accessible formats for farmers,



The research team from the University of Mpumalanga that participated in a smallholder farmers' workshop in Salubindza, Mbombela.

communities and other stakeholders. She lists examples, including newsletters written in simple language, as well as media engagement and outreach activities.

This commitment to communication reflects her broader approach to research: knowledge should not remain within academic institutions, but should be shared in ways that are practical and meaningful.

Bridging knowledge for sustainable futures

Building a research career within a developing institution like the University of Mpumalanga, established in 2014, has required resilience and determination, Mokgehle says. But she adds that securing research funding, managing field projects, and responding to the challenges of research proposals have all helped strengthen her focus on what she wants to achieve and her determination to get there.

On that, she is very clear. Her goal is to help position underutilised crops and medicinal plants within sustainable food and health systems. In a country where water scarcity and climate variability increasingly affect farming, understanding how to use water responsibly is essential for both food security and environmental sustainability.

Her progress towards that has been steady. Through her research, teaching, and community engagement, Mokgehle continues to build bridges between science, farming communities, and sustainable development, ensuring that knowledge about medicinal plants and water management benefits both people and the environment, now and into the future.

To read more about Salmina Mokgehle's research, visit: <https://scholar.google.com/citations?user=8tm-LUoAAAAJ&hl=en>



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