

## Tshepo Maeko: Rooted in Africa



**T**shepo Maeko is a young man with both feet firmly planted on South African soil.

As a Master's graduate of the University of Pretoria's Department of Plant Production and Soil Science, Tshepo has the kind of talent and passion for his subject that could open international doors. But, he says, he's not going anywhere just yet.

"Global experience would be great, but as an irrigation management specialist, I think there's a lot of work to be done here first," he smiles.

Most recently, this has involved the practical research and testing of a new irrigation management device, the Wetting Front Detector (WFD). Originally, WFD was developed by Professor Richard Stirzaker at

CSIRO in Australia, the commercial product is expected to be available on the local market towards the end of this year. Tshepo has played an integral role in the fieldwork conducted at the university, which has since led to the patenting of the product in South Africa.

The detector – an affordable irrigation management tool – addresses what Tshepo describes as a major

challenge facing the South African agricultural industry. "There is a huge resource gap between big commercial farmers and small-scale producers," he says. "For example, the new water laws mean farmers have to be far more knowledgeable about how they use and manage water for irrigation. But most irrigation management products and technologies in the market are complex and costly, and far beyond the reach of small-scale farmers. The Wetting Front Detector is a very simple, user-friendly and highly effective product that could cost less than a tenth of other irrigation management tools."

Tshepo explains that the detector enables farmers to monitor the depth of water penetration into the soil during and after irrigation or rainfall. The design is simple enough that anyone can use it without having to understand the science behind it.

"With this kind of information, farmers can quickly establish whether they are over- or under-watering, and can adjust the amount or regulate their irrigation accordingly. It also helps farmers to learn from previous irrigation patterns, and use this experience to make future decisions. By not over-watering farmers also prevent the leaching of nutrients in the soil."

### SCIENCE AND FARMING

It's not often that students get the chance to see their research in practice, and this quietly-spoken 23-year-old agrees that it has given him valuable new insight into the role of science in agriculture.

"Many people don't really appreciate the real value of science in farming," he says. "In terms of an academic career, farming is often

classed as 'dirty work', but – as any water professional or agriculturist knows – there is a lot more science behind it than you think. In South African agriculture, science seems to have a very low profile. It's time we gave it more credit."

Tshepo's fieldwork has also taught him that "science and technology" is more about people than it is about laboratories. "Good technology is useless without good communication," he says. "By working side by side with the farmers to establish their real needs, and by communicating our progress, we have been able to make a real difference in their lives. We need more effective communication between farmers, scientists and various organisations. Successful water management in South Africa depends on it."

### HOME TOWN

While Tshepo's recent experiences may have "unleashed" his research capabilities, the university's experimental farm is many miles from his home town, and he is quick to credit his parents for making his journey to academic excellence possible.

Born and raised in the rural village of Ga-Modjadji, north-east of Tzaneen, Tshepo attended the local primary school before his parents sent him to Tshebela High, a boarding school near Pietersburg (now Polokwane). Having discovered a passion for science, agricultural studies and geography, he matriculated in 1996 and completed his degree at the University of the North, before enrolling for his Master's in Pretoria, in 2001.

"I have a great deal of respect for Tukkies as a scientific and agricultural research institution," he says.

"What South African learners need is good mentorship, and I have been lucky enough to have it. I have been blessed with the guidance and tutorship of people like the department's Professor John Annandale, and Dr Martin Steyn, who I have worked with on a daily basis. Fellow researcher, South African-turned Aussie, Professor Richard Stirzaker, has also been the wind beneath my wings. They have all made it simple for me."

One of Tshepo's long-term goals, ("apart from making loads of money and establishing my reputation as a scientist", he laughs), is to improve general awareness of the importance of irrigation management in South Africa.

### WATER USE

"Despite our erratic rainfall and strict new water regulations, there is still vastly inefficient water use in South Africa. Greater awareness of the importance of irrigation management will lead to a more productive agricultural sector, sustainable crop production and therefore food security for a very large segment of the population. It will also allow us to build up a strong scientific basis for meeting the needs of local farmers."

Tshepo backs this up with a refreshingly positive view of the future of local agriculture.

"With the training and capacity building that is starting to take place, we can expect to see many more young people entering the market, who are well-equipped to give South African farming a boost," he says.

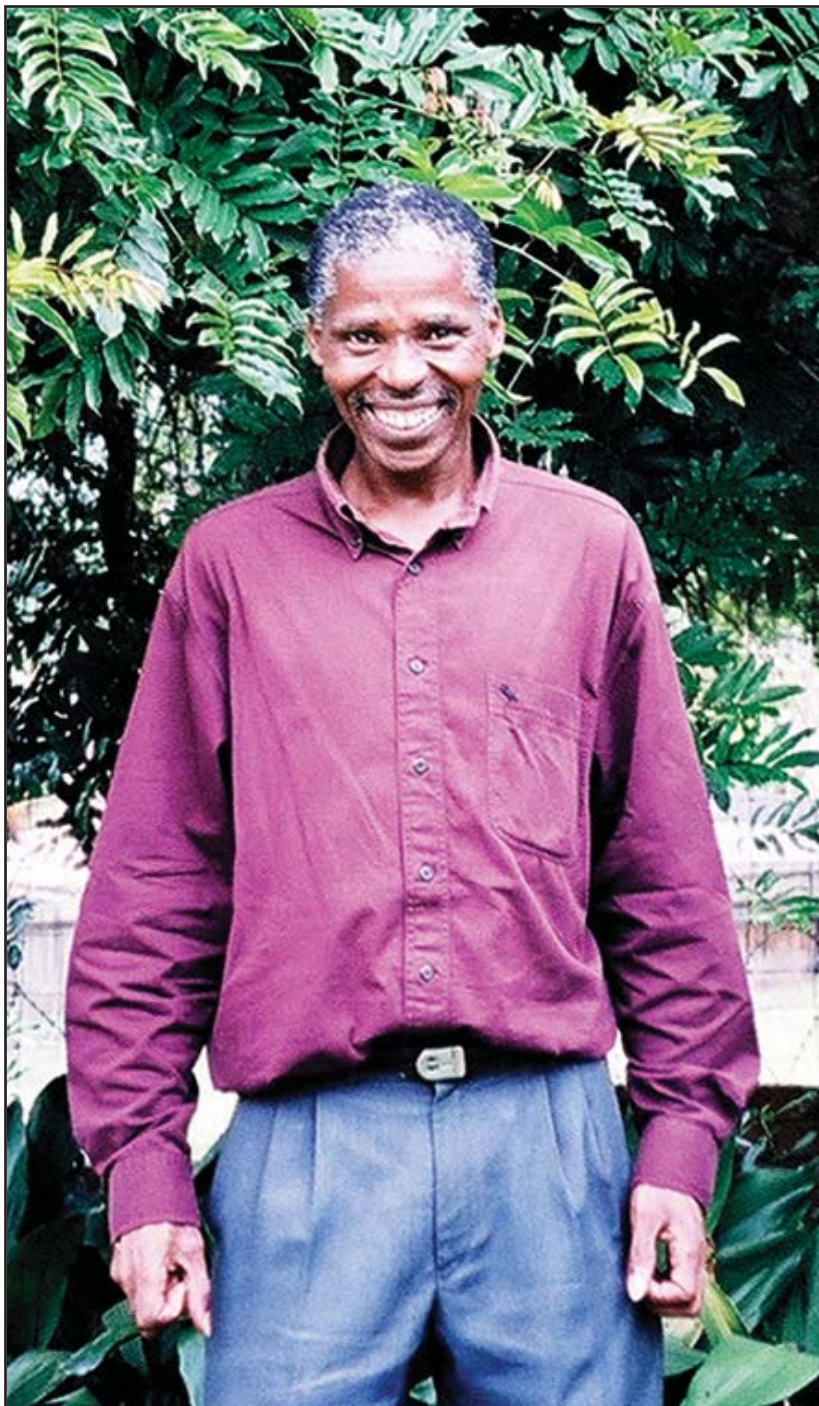
If they're anything like Tshepo, the industry has a lot to look forward to.





## Bongikhosi Mthembu

### – Committed to Saving Rainwater and Soil



**B**ongikhosi Mthembu lives in Durban, and works in a field of science for which he has a lifelong passion, i.e. soil and water, the most important resources and basis for all human, plant and animal life. Life on earth depends on these, and if we don't conserve these resources, use soil in a sustainable manner, and retain as much of our meagre rainfall as we can, our livelihoods will be affected adversely.

#### KWAZULU-NATAL

Bongi grew up in the Highflats area near Ixopo in the midlands of KwaZulu-Natal. In this rural area, people depend on farming and work the land. His interest in agriculture started early in his life, and he felt driven to make the most use of the piece of land available to his family. As a youngster, he kept his own garden, and planted vegetables and field crops, mostly maize and dried beans. He helped to fence the land and protect the crops from livestock. At the age of about eight or nine, he noticed that the yield from the land was low, especially during drought and times of little rainfall. While he observed this, he heard his elders speak about it, but no-one seemed to offer any solutions.

Rainfall is sparse in the low-lying area of Ixopo. Most of the land is steep, but it is all the people have to use. In summer, when most of the rain falls, the run-off of rainwater is dramatic, and the rain washes the soil away. He noticed as a youngster that plants growing along the Umzimkulu River did better, but



when the river burst its banks, these crops were washed away.

From Standard 5 to matric, Bongi looked after the vegetable garden at his rural school, and studied agriculture as a subject. He noticed many aspects of agricultural practices, and began to realise that these were not always effective. As a means of reducing soil erosion, strips were left between fields, so that grass could grow along these strips, and hold the soil better. However, the methods of ploughing did not help in the long-term. The mould board plough buries most of the residual plant when tilling, and exposes the soil to erosion, with the impact of rain drops. The disk plough does the same, whether pulled by oxen or tractor. These observations are still central to the research he is currently doing.

### CWAKA COLLEGE

After he completed his schooling, Bongi went to the Cwaka College of Agriculture (now renamed Owen Sithole College of Agriculture) near Empangeni, where he spent two years doing his diploma in agriculture. He went on to Fort Hare University where he did an honours degree in agriculture. Thereafter he joined the provincial Department of Agriculture, at Eshowe and worked as an agricultural scientist for eight years.

After this time, Bongi went to the USA from 1992 until 1995, and studied at North Carolina State University. He completed two masters degrees during this period in Plant Science and Agricultural Education (or as it is sometimes called Agricultural Extension).

Since 1996 he has lectured at Mangosuthu Technikon in Land Use Planning, Soil Science, Field Crop Production and Extension (of Agricultural and Development Issues).

The latter subject is concerned with transferring scientific information to farmers, and making this information accessible and understandable to communities.

Bongi is now doing his Ph.D. through the University of KwaZulu-Natal (UKZN) in Pietermaritzburg, through the School of Applied Environmental Sciences. The overall subject of his thesis falls under the discipline of Grassland Science (under Prof. Kevin Kirkman, co-supervisor and head of discipline). The title of his thesis is the *Impact of Agroforestry Systems on Soil Moisture Content and Fodder Production in Moist Transitional Tall Grass Veld*. He is doing this under his supervisor Dr Terry Everson, and Project Leader and Co-supervisor, Dr Colin Everson.

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As a youngster Bongi had observed the washing away of soil after heavy rains, and knew that something had to be done to stop this. The tillage systems used, promote soil erosion. Rainwater does not penetrate the soil, but runs off, and washes the soil away. This results in both water and soil loss.

### AGROFORESTRY


Bongi's current research involves the conservation tillage system, which is better because it conserves both water and soil. This involves agroforestry, whereby trees are planted between crops, e.g. fruit trees, or fodder trees, such as *Leucaena*, *Acacia* and mulberry trees. The roots of the trees hold

the soil and protect against wind and soil erosion.

Bongi has become involved in a CSIR project in collaboration with UKZN and Mangosuthu Technikon in the Bergville area in the foothills of the Drakensberg. Here he has been implementing a research project to determine the role of agroforestry and pasture species in solving the problem of fodder shortage in communal dairy farming systems. He has planted fodder trees, *Leucaena* (exotic) and *Acacia karoo* (indigenous). In between the trees he has planted pasture grasses – cocksfoot and tall fescue – for dairy cows, as well as maize and dolichos, a legume crop.

The project is still in its infancy, and the trees are now 1.6 m tall, but will not grow much this winter because they lose their leaves and become dormant. A small-scale dairy farmer, Simon Mbhele, is involved in this project, and the results will be extended through him. After the experiment, the results will be implemented on a larger basis.

Trees are a source of fertility, and Bongi will be looking at their impact during this experiment, and the impact of improved soil and water retention on fodder products. Trees make an impact on nitrogen provision, which improves soil fertility. Trees change the micro-climate, and can help to reduce evaporation and make conditions cooler. Bongi will be looking at the effect of these trees on pasture grasses.

In our country, where rainfall is low, erratic and unreliable, we have to conserve whatever rain we get. Bongi believes that agroforestry is a measure to conserve our most precious resources, rainwater and soil, and has committed himself to a lifetime of scientific study to help people to put this theory into practice. 

## Olivia's Rise from Street Sweeper to Manager

*Lebo Moncho reports*



**O**livia Radebe's brief career reads like a fairy tale. Recently promoted to Manager: Environmental Projects at Pikitup, Olivia's story is an inspiration to many young people struggling to get their careers off the ground.

Like many other youngsters, Olivia finished high school with great ambitions. She wanted to become a medical doctor, but due to circumstance was unable to register for the degree. Instead she enrolled at Pretoria Technikon where she began a Diploma in Environmental Engineering. By her own admission this was an unusual choice for a girl from Dobsonville, but as she says that is what was available at the time and she was determined to go to tertiary school.

As testament to her commitment to better herself, Olivia also interned in an Experiential Training programme at Sasol.

In 1999 she was forced to drop out of school and the Sasol programme. No one in her family was working and she could no longer afford her

school fees. She went looking for employment.

Again circumstance played a hand. She was told Pikitup was looking for street sweepers at the Selby depot. Selection was a simple process. All applicants put their ID documents in a bucket and those that were drawn out got the job.

Olivia remembers her feelings about getting the job as a night street sweeper. "I was relieved to get a job. But I never thought that I would end up as a street sweeper. In life you set standards for yourself and this is not what I wanted for myself. But my mother said when money comes it doesn't say where it comes from. On the other hand I made good friends with the various people I met on my route which made the experience bearable."

With very clear ideas about where she wanted to end up in life, Olivia was determined to turn her life around – circumstance or no. A year after starting at Pikitup her appointment was upgraded to full time which allowed her to re-register at Pretoria Technikon to complete her Diploma.

"I traveled to Pretoria by train every day," says Olivia. "In the day I went to school and at night I swept the streets of Johannesburg. It was a tough time. I would study and sleep on the train but it was worth it."

As a result of her sacrifices she graduated in 2001. She was also promoted to a position at Pikitup head office as a Community Education Facilitator. In 2002 she completed her B.Tech in Environmental Management and the following year enrolled for her master's degree which she is currently busy with.

### OPPORTUNITY AND WILL

When asked what she credits her success to Olivia is quick to respond, "Opportunity and will. You are the captain of your own ship. Your attitude determines your altitude. So grab what is available and make use of it."

She even sees value of having been a street sweeper in her current job. "My job now is very community-based. So being able to talk to anyone and having first hand understanding of what happens at street level is very helpful."

Olivia is also grateful for the assistance that Pikitup has given her along the way. The company helped finance her B.Tech degree. She also values the exposure she received at International Association of Impact Assessors (IAAIA) conferences which she attended through Pikitup.

Her family has also been a source of strength. Her younger brother is her biggest fan. He is always bragging about her and her accomplishments.

With so much under her belt at 27 years old where does she want to end up? "Ke batla ho ba MD!" she says with a laugh. Somehow, one can see it happening. 