

Bongikhosi Mthembu

— Committed to Saving Rainwater and Soil



Bongikhosi 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. 