



CAREERS FOCUS: Exciting STEM careers to tackle food security challenges

South Africa and other countries of the Southern African Development Community (SADC) have faced numerous challenges regarding food security. These issues pose a significant threat to the already struggling agricultural industry. Climate change and drought in South Africa have further exacerbated these challenges. Artificial intelligence and technological advancements have been identified as potential solutions to some of the agricultural issues we are facing. The government has also encouraged the youth to explore agricultural careers as a way to address these challenges. Read on if you are interested in a career in food, biological or agricultural sciences.

The responsibility for the future of our food now lies with the youth. For high school learners, particularly those in Grade 12 who are interested in science, technology, engineering, and mathematics (STEM), particularly a career in the food, biological or agricultural sciences, here is a list of career options available at various South African public universities and accredited private colleges:

Agronomist: Agronomy is the science of the successful growing of certain land crops, whether under dryland conditions or irrigation. The crops include corn, maize, grain sorghum, peanuts, sunflower, cotton, sugarcane, forage crops and fruit. Agronomists develop and implement production systems so that economical production is maximised without harming the environment. They investigate field crop problems and

develop new and improved growing methods for higher yields or better quality.

Biologist: Biology is a basic science. Biologists study humans, plants, animals and the environment. They investigate the world by looking at how life begins and develops, as well as the structure and function of life, collecting specimens from the natural environment where the plant, animal or insect lives. These collected specimens are then carefully examined, named and classified (if it is a new discovery). The findings are recorded and finally written up in reports or academic journals. Many biologists specialise in a specific field of study, such as zoology (animal life); botany (plant life); microbiology (microscopic plant and animal life); entomology (insect life) etc.

Chemical engineer: Chemical engineers use their knowledge of chemistry to solve practical problems concerned with turning raw materials into valuable products, and perform chemical plant design and construction. They may also invent new ways of doing things. Chemical engineers have contributed to the fields of atomic science, manufacturing, mineral processing, paper, dyes, medication, plastics, fertiliser, foods, environmental protection and fuel.

Ecologist: An ecologist is a scientist who studies how organisms (animals, plants, microbes, etc.) interact with their environment and one another. Ecologists investigate ecosystems, including the relationship between living organisms (such as plants and animals) and their physical surroundings (such as soil, water, climate, etc). Ecologists often do field research to gather data. They analyse the information to learn more about the patterns and processes that shape ecosystems. Ecologists may specialise in various sub-disciplines such as marine ecology, terrestrial ecology and conservation ecology. Their work is essential for understanding the natural world and the impact of our activities on the environment.

Environmental chemist: Environmental chemists are responsible for analysing the effects of chemicals on soil, air and water environments. They are also responsible for devising solutions to environmental problems. Their main aim is to locate and neutralise threats of pollution to people, animals and plants, using their knowledge of chemical properties and reactions.

Geneticist: Genetics is the study of genes, DNA, heredity and genetic variation in living organisms. Geneticists research the genetic causes of and possible gene therapies for diseases and disorders that result from a single genetic mutation or a combination of genetic traits. Some geneticists focus on isolating the gene or genes responsible for certain diseases and conditions in which the causes are not fully determined or understood.

Microbiologist: Microbiologists investigate the growth, structure, development and other characteristics of microscopic organisms, which are tiny living organisms that are too small to be seen with the naked eye. Microorganisms include bacteria, algae, viruses and fungi. Microbiologists work in a wide variety of settings, although most of the work is laboratory-based. Microbiologists isolate and make cultures of microorganisms, identify their characteristics, and observe their reactions to chemicals and other kinds of stimuli. They also study how microorganisms develop and reproduce, as well as their distribution in nature. Many microbiologists work for universities, where they teach and do research. Others work at medical centres, in private industry, or for government agencies. Their work helps us understand how microorganisms influence our lives, from causing diseases to offering solutions to challenges in medicine, agriculture and environmental management.

Nematologist: Nematologists are scientists that study nematodes, which are also called roundworms. They research various aspects of nematodes, including their biology, ecology, behaviour, and their interactions with other organisms and the environment. Some nematologists identify and study nematodes in the soil to help farmers grow enough healthy food for everyone. Plant and soil nematologists extract nematodes from samples they take from different environments. Nematologists use microscopes and can identify and count the nematodes found in soil and plant material. Nematologists are important for understanding the role of nematodes in ecosystems, agriculture, and human and animal health.

Zoologist: Zoology is a basic science. It is the scientific study of animals (living organisms excluding plants, fungi, viruses and bacteria) and their relationship with their habitats (environments). Zoologists are biologists who study the origin, classification, characteristics, structure, growth and development of animals. Zoologists are sometimes known as animal scientists or animal biologists. Like botany and microbiology, zoology is a major division of biology. As this field is so broad, zoologists usually specialise in a particular type of animal or animal family, or in certain aspects of animal life such as genetics or animal classification.

Are you unsure about your next career move? The National Science and Technology Forum (NSTF) has produced a [science-based career booklet](#) that exposes youth to a variety of careers in science, engineering, technology (SET). And it also produces career talk videos by professionals that are NSTF-South32 Award winners, which are available on the NSTF YouTube channel.

Below are the award winners whose work is contributing to the theme **“Feed the future”**:

[Dr Daniel Hart](#), Translational evolutionary biologist: University of Pretoria

[Dr Helen Dallas](#), Freshwater ecologist: Freshwater Research Centre (FRC) and Freshwater Biodiversity Information System (FBIS)

[Prof Evans Chirwa](#), Water engineer: University of Pretoria

[Dr Wynand Goosen](#), Molecular biologist: Stellenbosch University

[Prof Guy Midgley](#), Earth scientist: Stellenbosch University

[Dr Boitumelo Semete-Makokotlelay](#), Biochemist: South African Health Products Regulatory Authority (SAPHRA)

[Prof Paul Oberholster](#), Limnologist: University of the Free State

[Prof Tamiru Abiye](#), Hydrogeologist: University of the Witwatersrand

Article compiled by Itumeleng Ndlovu, Youth Outreach Officer at the National Science and Technology Forum (NSTF).