

Adapting to the ever-changing environment

Biostimulants help plants manage climate change stress

Agriculture is the backbone of any society and also the economic pillar in most African countries, contributing about 30% of the GDP and 55% of the total exports value. More than 70% of the African continent's population depend on the agriculture sector for their livelihood.

The global crop production system is facing a great balancing act between (1) increasing the quantity of food produced on the available farmland, (2) reducing agriculture's impact on the environment and human health, and (3) still providing quality, healthy food for an ever growing population. Farmers not only face these challenges but also changing environmental conditions as well as frequent weather extremes that can negatively affect their yield and quality.

Overcoming these challenges presents a major sustainability challenge to farmers which may influence the livelihood of millions. Adapting to the changing environment means ensuring food security. Some 75% of the world's food is generated from only 12 plants and 5 animal species, making the global food system highly vulnerable. Adaptation is the key defensive measurement in reducing the severity of damages to crops due to weather extremes. Adapting to the changing environment entails implementing the right measures to reduce the negative effects of climate change by making appropriate changes to current management and production practices. These crop adaptation strategies could include planting of drought tolerant crops or cultivars, crop diversification, mixed cropping, change in planting date, implementing soil

conservation measures, improved irrigation efficiency, optimising fertiliser utilisation and practises and enhancing the plant's natural defence systems.

Plants balance growth, development and energy generation through photosynthesis and stress signaling. Photosynthesis is the basis of life of earth. This process takes place in the chlorophyll (green) pigment found in the above-ground parts. It provides the energy that drives virtually all ecosystems. Photosynthesis and preservation of chlorophyll determine how well plants grow and be able to adapt to different stress conditions. Plants constantly attempt to balance growth and development with the need for survival. The exposure to stress conditions result in an immediate reallocation of energy to "defensive" strategies such as chlorophyll preservation, that can compromise yield and quality. Compounds such as amino acids, polyamines, phytohormones and enzymes

are produced by plants to regulate and overcome stress conditions. Intensive modern agricultural practices and changing environmental conditions have "overloaded" the plant's capability to produce these essential compounds. The cultivated plant therefore needs to be supplemented with these necessary compounds to reduce possible damage under these circumstances.

The implementation of a well-balanced nutritional programme and the incorporation of biostimulants and growth enhancers could assist crops to manage stress conditions more effectively. Plant biostimulants can be defined as "substances that, when applied to a plant, seed, soil or growing media – in conjunction with established fertilisation regimes, enhances the plant's nutrient use efficiency, or provides other direct or indirect benefits to plant development or stress response". ■

Hendri Botha, Introlab

"Farming isn't a battle against nature, but a partnership with it. It is respecting the basics of nature in action and ensuring that they continue"
~ Jeff Koehler

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