

# Towards Climate Proofing the Sugar Industry

*The concept of 'climate proofing' the sugar industry resonated with participants in a recent Climate Change workshop hosted by the South African Sugarcane Research Institute (SASRI). The phrase, coined by UKZN's Professor Roland Schulze, captures the essence of a desired future for the sugar industry.*



## Predicted Climate Changes



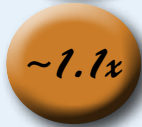
predicted mean annual increase in temperature in the SA sugar belt from the present to 2050s.



predicted increased likelihood of heat-waves in the rainfed regions of the industry, from the present to 2050s (heatwave = 3 consecutive days with maximum temperatures >30°C).



predicted increased variability in pattern of annual rainfall in the rainfed regions of the industry, from present to 2050s.



predicted increased annual crop evaporation in northern irrigated regions of the industry, from present to 2050s.

**S**ASRI HAS FOR THE PAST TWO DECADES BEEN ACUTELY AWARE OF THE CHALLENGES AND OPPORTUNITIES THAT PREDICTED CLIMATE CHANGE SCENARIOS WILL HOLD FOR THE INDUSTRY. CONSEQUENTLY, THE INDUSTRY, THE DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES (DAFF) AND THE WATER RESEARCH COMMISSION (WRC) SUPPORTED PROFESSOR SCHULZE AND HIS WORLD-RENOWNED AGRO-HYDROLOGY RESEARCH TEAM IN CONDUCTING AN ANALYSIS OF POTENTIAL IMPACTS OF PREDICTED CLIMATE CHANGE SCENARIOS ON SA AGRICULTURE, INCLUDING SUGARCANE. THE STUDY'S OUTCOMES WERE USED AT THE WORKSHOP AS A YARD-STICK AGAINST WHICH THE STATUS OF THE INSTITUTE'S CLIMATE CHANGE RESEARCH WAS GAUGED.

### Addressing Predicted Climate Change Scenarios

Potential responses of the industry to climate change scenarios may be either adaptive or mitigative and SASRI supports the industry with research in both areas. Adaptive research focuses on responses to predicted average increases of 2.0 to 2.5°C in mean annual temperature, greater rainfall variability and higher crop evaporation rates, amongst other changes. Mitigative research addresses the reduction of the industry's environmental footprint, thereby contributing to a slowing of the rate of global climate change.

#### Adapting to Climate Change

Of all the predicted climate changes in the SA sugar-belt, adapt-

ing to higher temperature and more sporadic rainfall will be the most challenging. Greater variety stress tolerance, efficient water management and increased vigilance in pest and disease monitoring will undoubtedly become the cornerstones for long-term industry sustainability.

#### Enhanced Varietal Stress Tolerance

SASRI is currently identifying potential gaps in available sugarcane breeding stock, with a view to accessing additional canes that may be used to enhance stress tolerance during breeding. This has been an ongoing process since the inception of sugarcane breeding in SA in the 1960s but is now being pursued with increased vigour.

#### Efficient Water Use and Conservation

Precise irrigation is an effective means to reduce water and electricity consumption. Over the years, SASRI has developed better management practices (BMPs) to sup-

port growers in their pursuit of these goals. More recently, however, investigations focused on developing tools to enable growers to make informed irrigation decisions when faced with water shortages. Other SASRI BMPs, aimed at improving on-farm water conservation and management, are also likely to gain additional traction as climate change effects become increasingly evident.

#### Increased Pest and Disease Vigilance

Increasing temperatures will have profound effects on the biology of sugarcane pests and pathogens. Of particular concern is the predicted expansion of the area infested by the stalk borers, Eldana and Chilo. To combat this threat, SASRI continues to devise and promote integrated pest management strategies and provide technical support to regional pest and disease control initiatives. Given the predictions, unfailing vigilance of all industry stakeholders, together with SASRI's technological know-how, will be essential for the industry's continued biosecurity.

## Mitigating Climate Change

The SA sugarcane agricultural sector is increasingly committed to reducing its environmental footprint and is actively pursuing this goal by adopting sustainable farming systems and environmentally benign agricultural practices, as well as exploring potential contributions to national bio-energy production initiatives.

# CLIMATE PROOFING

## Adaptation

- Enhanced varietal stress tolerance
- Efficient water use and conservation
- Increased pest and disease vigilance

## Mitigation

- Sustainable sugarcane farming
- Environmentally-benign practices and good stewardship
- Bio-energy production

# CLIMATE CHANGE

## Sustainable Sugarcane Farming

Through SASRI, the sugar industry is rolling out the Sustainable Sugarcane Farm Management System (SuSFarMST™). This system

arose from a partnership between the Mondi Wetlands Programme, the WWF and Noodsberg sugarcane growers and has become one of the first comprehensive sustainability frameworks for sugarcane growers, not only in Africa, but globally.

## Environmentally-Benign Agricultural Practices

Many of the better management practices devised and recommended by SASRI promote environmentally-benign agricultural practices and good stewardship. These recommendations span the entire spectrum of sugarcane cultivation, from minimum till agriculture, responsible agro-chemical stewardship to promoting supply-chain efficiencies.

## Bio-Energy Production

SASRI has an industry mandate to conduct research on agricultural practices relating to the use of sugarcane biomass for renewable electricity cogeneration and potential bioethanol production. For renewable cogeneration, current studies focus on unpacking logistical issues surrounding the in-field gathering and transport of low-density trash residues, as well as on the breeding and subsequent management requirements of high biomass sugarcane varieties. Developing the technologies required to breed sugarcane varieties with fibre characteristics suitable for second-generation bio-ethanol fermentation technologies

is a further focus of bio-energy associated research at the institute.

## Opportunities and Challenges

It is clear that the SA sugar industry has an important role to play in mitigating climate change by contributing to national bio-energy initiatives and promoting the adoption of sustainable and environmentally-benign agricultural practices. Further opportunities are also worthy of exploration, including the potentially beneficial effects of increasing temperatures on the length of cutting cycles and the range of sugarcane cultivation. However, there is no doubt that climate change will also pose considerable challenges for the industry, particularly in terms of the degree of variety stress tolerance, water conservation and the management of pests and diseases. Through SASRI, the industry is well-positioned to conduct research to promote the sustainability of sugarcane agriculture in South Africa in the face of climate change. ☑

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