South African

COMMERCIAL MAIZE QUALITY 2016/2017

Acknowledgments

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- *Agbiz Grain and its members for providing the samples to make this survey possible.*
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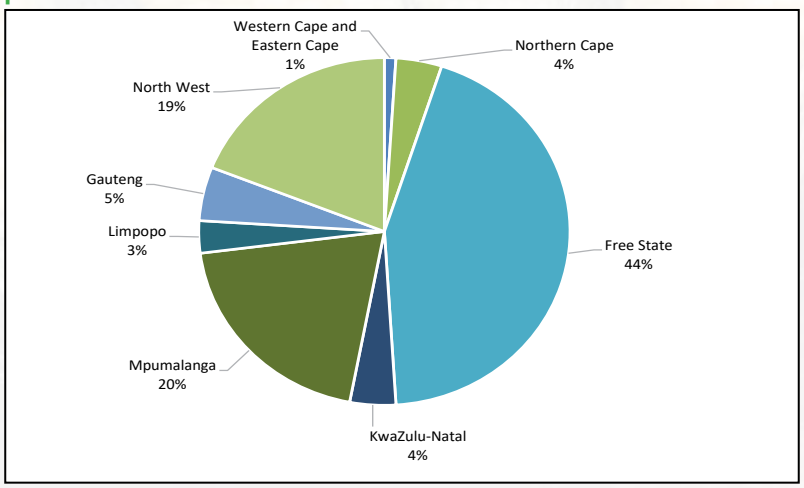
- *The Bureau for Food and Agricultural Policy (BFAP) for providing research based market analysis.*
- *South African Weather Service for providing seasonal climate watch and rainfall information.*

Introduction

During the harvesting season (April to August 2017), a representative sample of each delivery of maize at the various silos was taken according to the prescribed grading regulation. The sampling procedure for the samples used in this survey is described on page 92. A total of 1 000 composite samples, representing white and yellow maize of each production region, were received and analysed for quality. The samples consisted of 549 white and 451 yellow maize samples.

Graph 1: Contribution of the nine provinces to the 2016/2017 maize crop production



Figures provided by the CEC.

The quality attributes which were tested for, include:

1. RSA grading: All samples were graded according to the following factors, as defined in the South African grading regulation: defective kernels above and below the 6.35 mm sieve, total defective kernels, foreign matter, other colour kernels, combined deviations and pinked kernels.
2. USA grading according to regulation on all samples to determine the following factors: Test weight per bushel (pounds), heat damaged kernels, total damaged kernels, broken corn and foreign matter (BCFM) and other colour.
3. Nutritional values (on all samples): Moisture, crude protein, crude fat and starch.
4. Physical Quality factors (on all samples): Test weight (kg/hl), 100 kernel mass, kernel size, breakage susceptibility, stress cracks, milling index and grit yield all.
5. All white maize samples were milled on the Roff laboratory mill and the whiteness index of the maize meal determined.

Mycotoxin analyses were performed on 350 samples representative of white and yellow maize produced per region.

Testing for the presence of Genetically Modified (GM) maize were performed on 100 samples representative of white and yellow maize produced per region.

Please refer to pages 92 - 96 for the methodologies followed.

The maize crop quality survey is performed annually by the Southern African Grain Laboratory NPC (SAGL). SAGL was established in 1997 on request of the Grain Industry. SAGL is an ISO 17025 accredited testing laboratory and participates in a number of proficiency testing schemes, both nationally and internationally, as part of our ongoing quality assurance procedures to demonstrate technical competency and international comparability.

The results of this, as well as previous surveys are available on the SAGL website (www.sagl.co.za). Hard copy reports are distributed to all stakeholders and interested parties. The report is also available for download in a PDF format from the website.

In addition to the quality information, production figures (obtained from the Crop Estimates Committee (CEC)) relating to hectares planted, tons produced and yields obtained on a national as well as provincial basis, over an eleven season period, are provided in this report. SAGIS (South African Grain Information Service) supply and demand figures over several years are provided in table and graph format, as is import and export data. Information on the manufacture, import and export of maize products is also included in this report. The national grading regulations as published in the Government Gazette of 8 May 2009, are provided (pages 124 to 134), as is seasonal climate watch data from the South African Weather Service.

The goal of this crop quality survey is to accumulate quality data on the commercial maize crop on a national level. This valuable data reveals general tendencies, highlight quality differences in the commercial maize produced in different local production regions and provide important information on the quality of commercial maize intended for export. During seasons when maize is imported for domestic use, the quality of the imported maize can also be compared to that of locally produced maize.

The Maize Trust investment in the annual Crop Quality Surveys, has created a unique and extremely useful database of crop quality measurements over several seasons and regions. Up to now, the data has only been presented in table and graph format and has never been used for trend analyses or to assist in the development of prediction models such as the Milling Index Model.

In order to address this issue, SAGL undertook a data mining project, titled "Data Mining of past eleven years' Milling Index and Crop Survey Results", funded by the Maize Trust. A complete statistical analysis of the maize quality data from the 2001/2002 to 2011/2012 seasons were performed for the following measurements: Protein (crude), starch, fat (crude), hectolitre mass, 100 kernel mass, total deviations (grading data), Roff Milling Index, Break 1 flour yield, Break 2 flour yield, Break 3 flour yield, Grits yield and Bran yield (all Roff milling data). Data is added annually to this data set.

As part of the project, the possibility of developing a Geographic Information System (GIS) map system, where grain production regions (with the boundaries illustrated) are presented on a map of South Africa, was explored. SIQ (with additional data from Agbiz Grain on the regional boundary specifications) created a software package based on an open source GIS package (QGIS). These GIS maps show mean values for a trait for a specific region as an average for all seasons combined or as individual seasons on a year to year basis. The results of the crop quality traits are represented in a colour scale format – highest to lowest values are indicated by the darkest to the lightest colour. Mean values are showed as a legend. This GIS tool provides a good starting point but will however require further optimization in future.

The project outcome provides a decision-making tool to the maize industry stakeholders to assist in the identification of potential problem areas in maize quality and to focus future research activities.