

SOUTH AFRICAN MAIZE CROP

Quality Report
2017/2018
Season



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SOUTH AFRICAN

COMMERCIAL MAIZE QUALITY 2017/2018



Acknowledgments

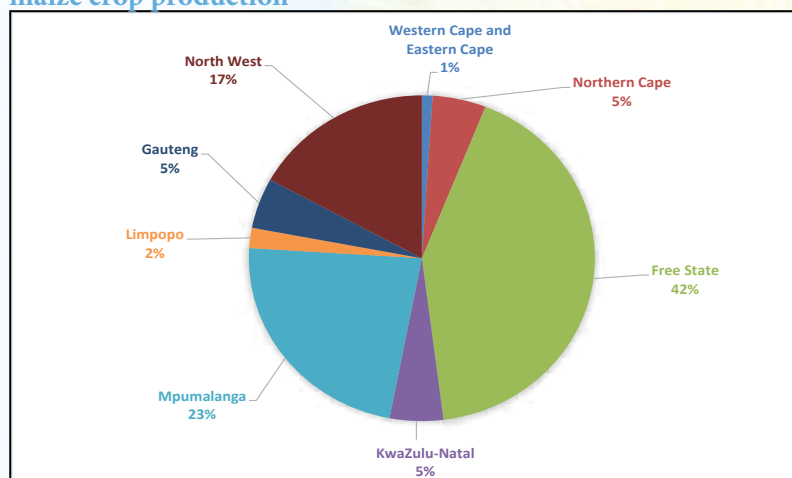
With gratitude to:

- The Maize Trust for financial support in conducting this survey.
- Agbiz Grain and its members for providing the samples to make this survey possible.
- The Crop Estimates Committee (CEC) of the Department of Agriculture, Forestry and Fisheries for providing production related figures.
- South African Grain Information Service (SAGIS) for providing supply and demand figures relating to maize and maize products.
- The Bureau for Food and Agricultural Policy (BFAP) for providing research based market analysis.

Introduction

During the 2018 harvesting season, a representative sample of each delivery of maize at the various grain intake points was taken according to the prescribed grading regulation. The sampling procedure for the samples used in this survey is described on page 91. A total of 900 composite samples, representing white and yellow maize of each production region, were received and analysed to determine the quality. The samples consisted of 451 white and 449 yellow maize samples.

Graph 1: Contribution of the nine provinces to the 2017/2018 maize crop production



Figures provided by the CEC.

The quality attributes which were tested for, include:

- RSA grading: 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.
- USA grading: Samples were graded according to the American Grading Regulations 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.
- Nutritional values: Moisture, crude protein, crude fat, crude fibre and starch.
- Physical Quality factors: Test weight (kg/hl), 100 kernel mass, kernel size, breakage susceptibility, stress cracks, milling index and grit yield all.
- 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 a selection of traits present in Genetically Modified (GM) maize were performed on 100 samples representative of white and yellow maize produced per region.

Please refer to pages 91 - 95 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 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, also 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 on pages 107 to 117.

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, Grit yield and Bran yield (all Roff milling data). Data is added annually to this data set.

As part of the project, the possibility was explored to develop a Geographic Information System (GIS) map system, where grain production regions (with the boundaries illustrated) are presented on a map of South Africa. 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 optimisation in future.

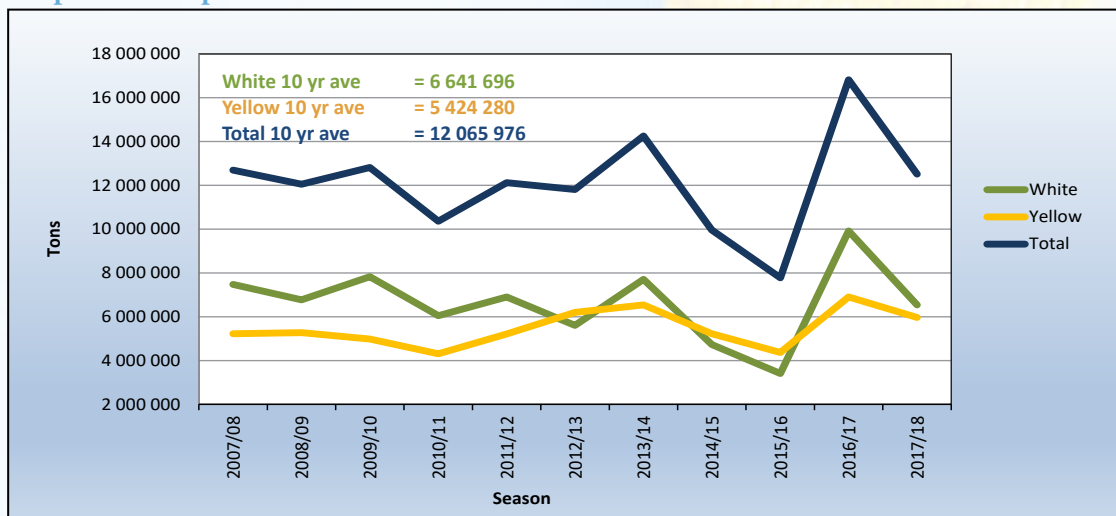
The project outcome provides a decision-making tool to the maize industry stakeholders to assist in the identification of potential problem areas in maize quality and to focus future research activities.

Production

The finalised crop figure for the 2017/2018 season commercial maize as overseen by the National Crop Estimates Liaison Committee (CELC) is 12,510 million tons. This figure represents a year on year decrease of 25.6% compared to the all-time high record crop of the previous season, but is however close to the previous 10-year crop average (12,065 million tons). White maize's contribution to the total production was 6,540 million tons (52%) and that of yellow maize 5,970 million tons (48%).

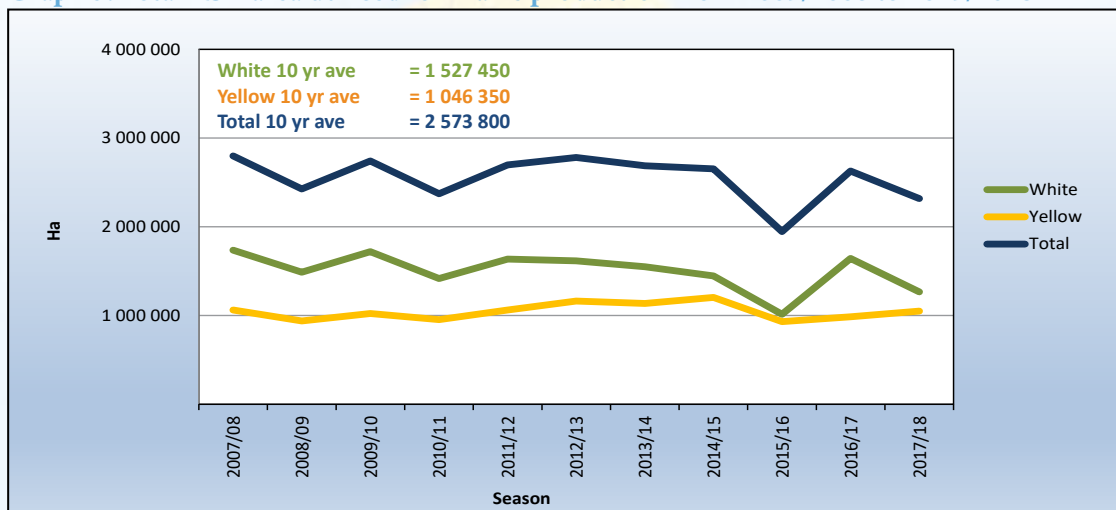
The national Crop Estimates Committee's (CEC) estimated total production figures were revised, using as basis for the calculations, the South African Grain Information Services' (SAGIS) published figures of actual deliveries. Figures to determine on-farm usage and retentions from the maize utilization survey, which was conducted by the Department of Agriculture, Forestry and Fisheries (DAFF) and the telephonic survey conducted by the National Crop Statistics Consortium (NCSC), were added to the SAGIS delivery figures to calculate the final crop production figures.

Graph 2: Maize production in RSA from 2007/2008 to 2017/2018



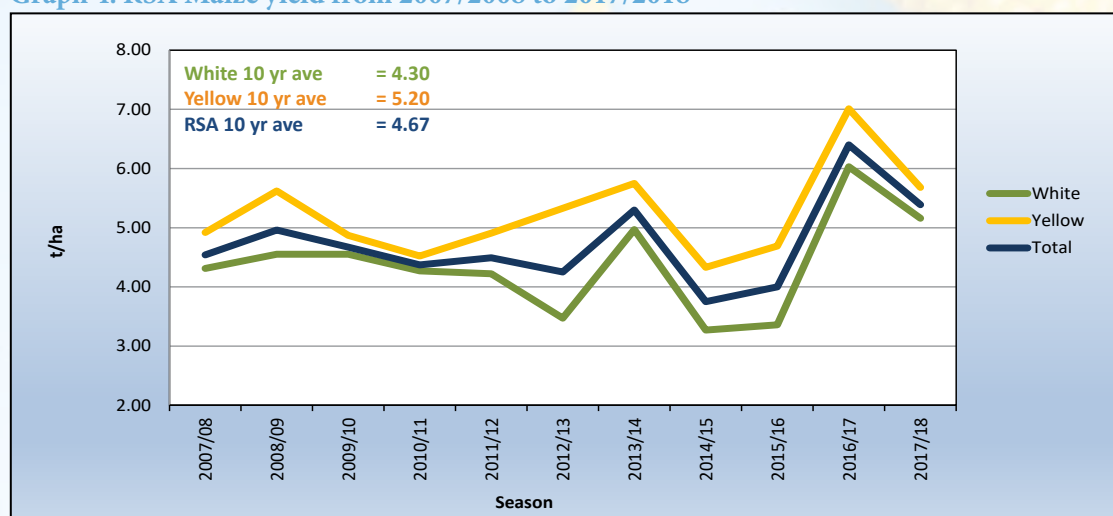
The total area utilised for maize production in the 2017/2018 season was 2 318 850 hectares, almost 12% less than the previous season and 10% lower than the previous 10-year average. White maize was planted on 1 268 100 hectares and yellow maize on 1 050 750 hectares (1 643 100 and 985 500 hectares respectively in the 2016/2017 season).

Graph 3: Total RSA area utilised for maize production from 2007/2008 to 2017/2018



The maize yield this season of 5.39 tons per hectare (t/ha), although 1.0 t/ha lower than the all-time high of the previous season, was still the second highest yield recorded. The previous 10-year average is 4.67 t/ha. White maize yielded 5.16 t/ha and yellow maize 5.68 t/ha.

Graph 4: RSA Maize yield from 2007/2008 to 2017/2018



As with commercial maize production, both the area planted as well as the crop size of maize planted in the non-commercial agricultural sector, decreased compared to the previous season. The expected maize crop for this sector is 593 975 tons. Approximately 40% of non-commercial maize is produced in the Eastern Cape.

Table 1: Maize production overview - 2017/2018 season

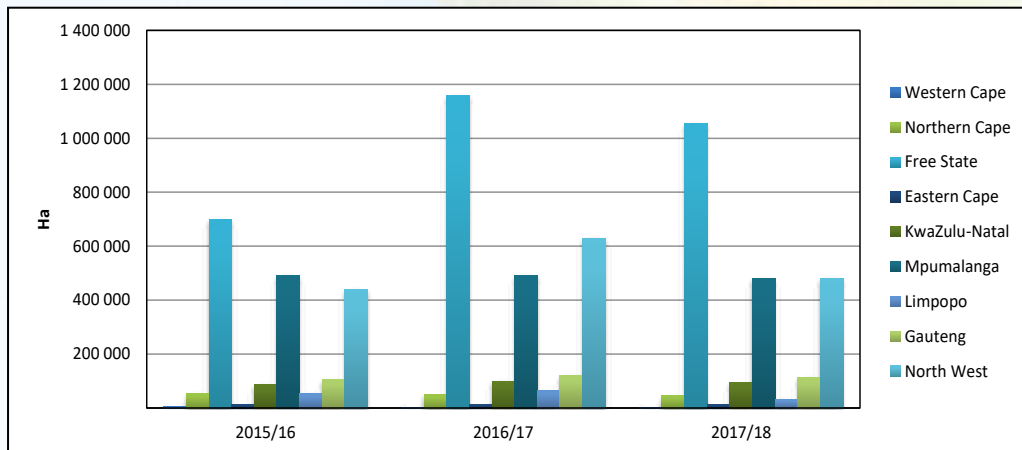
Province	Type of production	White			Yellow		
		Hectares planted, ha	Production, tons	Yield, t/ha	Hectares planted, ha	Production, tons	Yield, t/ha
Western Cape	Dryland	-	-	-	-	-	-
	Irrigation	-	-	-	3 750	33 750	9.00
	Total	-	-	-	3 750	33 750	9.00
Northern Cape	Dryland	-	-	-	-	-	-
	Irrigation	3 600	41 300	11.47	43 000	628 000	14.60
	Total	3 600	41 300	11.47	43 000	628 000	14.60
Free State	Dryland	622 000	3 119 000	5.01	380 000	1 616 000	4.25
	Irrigation	22 000	231 000	10.50	30 000	309 000	10.30
	Total	644 000	3 350 000	5.20	410 000	1 925 000	4.70
Eastern Cape	Dryland	2 450	10 100	4.12	7 000	26 500	3.79
	Irrigation	1 050	11 600	11.05	4 000	45 000	11.25
	Total	3 500	21 700	6.20	11 000	71 500	6.50
KwaZulu-Natal	Dryland	38 000	205 100	5.40	34 000	212 000	6.24
	Irrigation	7 000	74 900	10.70	16 000	168 000	10.50
	Total	45 000	280 000	6.22	50 000	380 000	7.60
Mpumalanga	Dryland	133 000	737 000	5.54	322 000	1 817 800	5.65
	Irrigation	7 000	75 000	10.71	18 000	187 200	10.40
	Total	140 000	812 000	5.80	340 000	2 005 000	5.90
Limpopo	Dryland	6 000	27 000	4.50	10 000	31 700	3.17
	Irrigation	6 000	63 000	10.50	11 000	110 000	10.00
	Total	12 000	90 000	7.50	21 000	141 700	6.75
Gauteng	Dryland	48 000	253 600	5.28	53 400	266 800	5.00
	Irrigation	2 000	21 400	10.70	8 600	89 700	10.43
	Total	50 000	275 000	5.50	62 000	356 500	5.75
North West	Dryland	350 000	1 462 000	4.18	102 000	353 350	3.46
	Irrigation	20 000	208 000	10.40	8 000	75 200	9.40
	Total	370 000	1 670 000	4.51	110 000	428 550	3.90
RSA	Dryland	1 199 450	5 813 800	4.85	908 400	4 324 150	4.76
	Irrigation	68 650	726 200	10.58	142 350	1 645 850	11.56
	Total	1 268 100	6 540 000	5.16	1 050 750	5 970 000	5.68

Figures provided by the CEC.

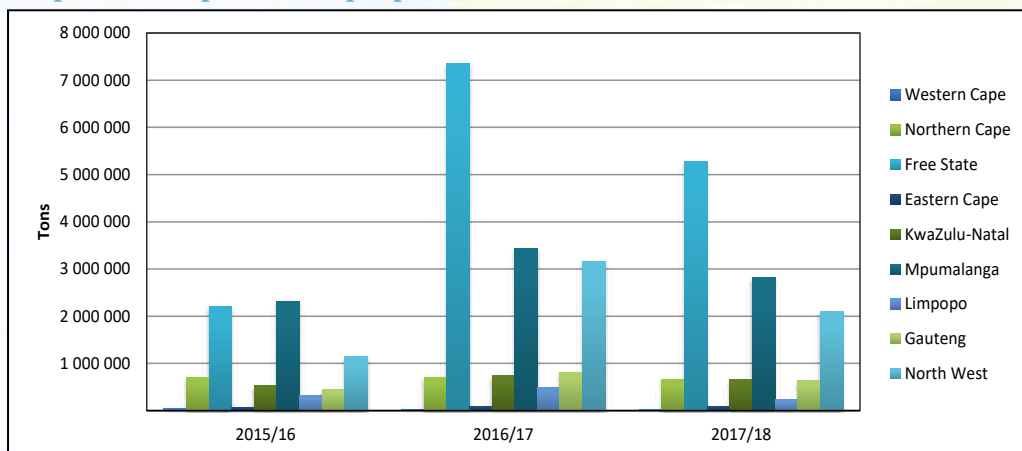
The major commercial maize-producing provinces are the Free State, Mpumalanga and North West, contributing 81% of the total maize production in the RSA. The Free State produced 5 275 000 tons of maize on 1 054 000 hectares with a yield of 5.00 t/ha. Mpumalanga produced 2 817 000 tons of maize on 480 000 hectares with a yield of 5.87 t/ha and North West harvested 2 098 550 tons of maize on 480 000 hectares yielding 4.37 t/ha. Yellow maize contributed 71% of the total maize production in Mpumalanga while the majority of maize produced in the North West (80%) and Free State (64%) was white.

Please see graphs 5 to 7 for provincial figures of area planted, production and yield over the last three seasons.

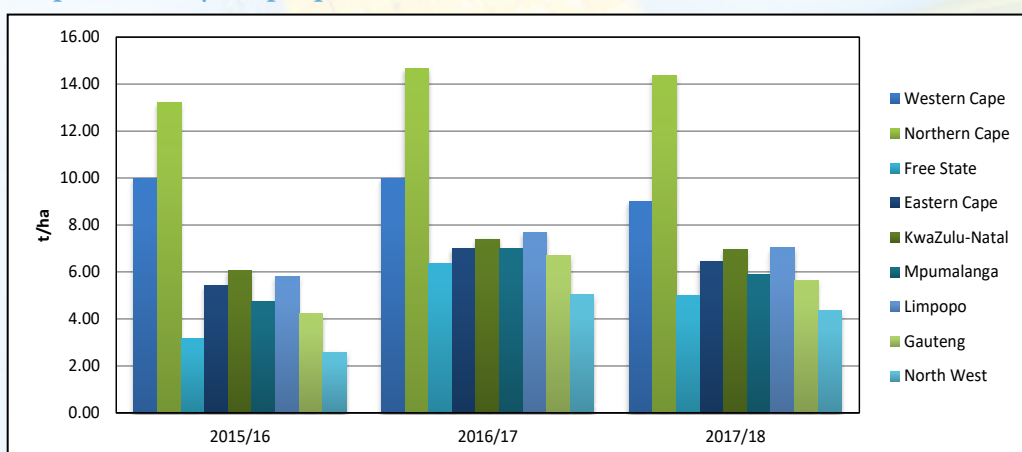
Graph 5: Area utilized for maize production per province over three seasons



Graph 6: Maize production per province over three seasons



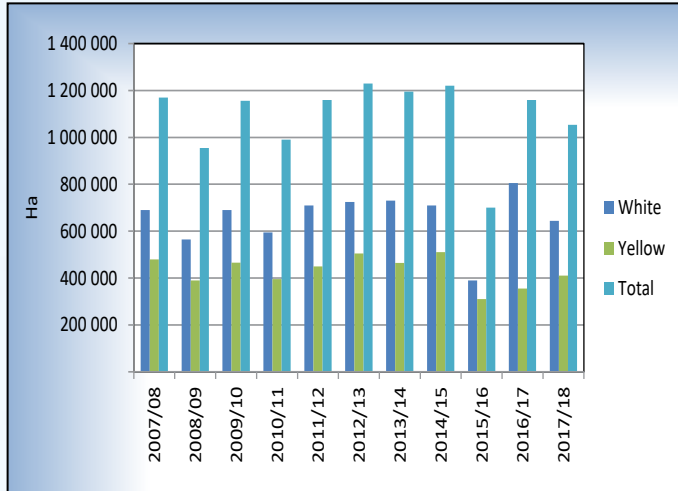
Graph 7: Maize yield per province over three seasons



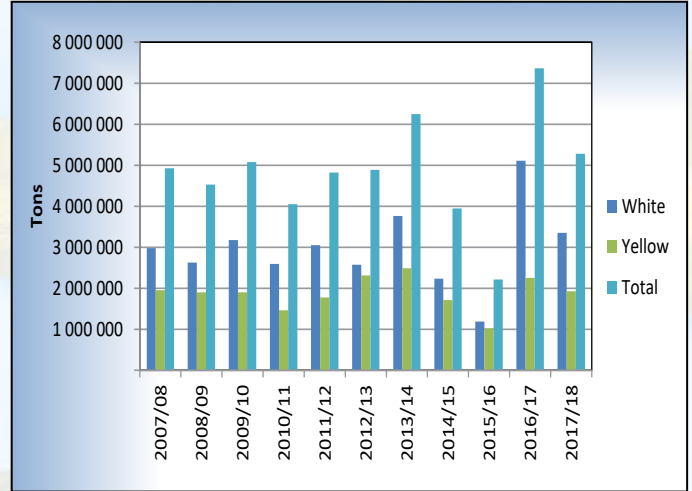
Figures provided by the CEC.

Graphs 8 to 13 provide an overview of the area planted and production figures for the Free State, Mpumalanga and North West from the 2007/2008 to 2017/2018 seasons.

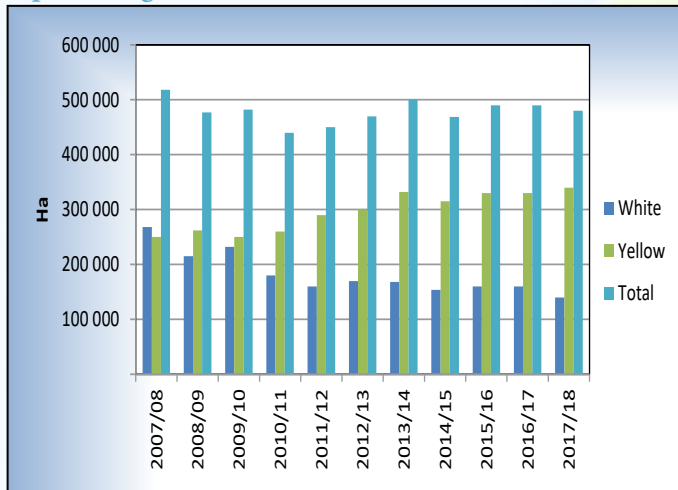
Graph 8: Area utilized for maize production in the Free State since 2007/2008



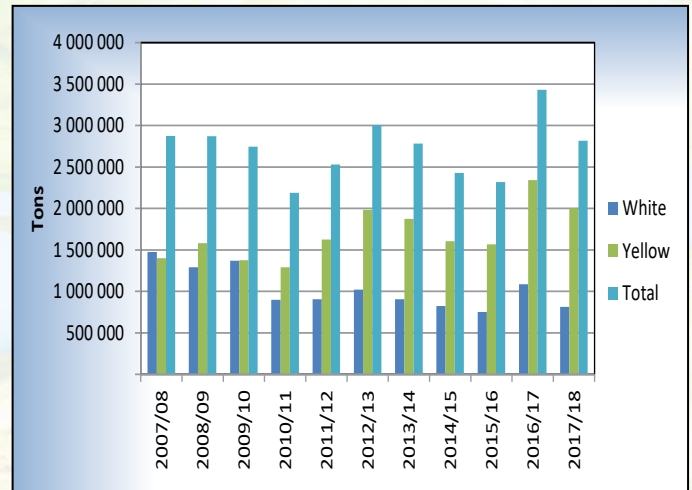
Graph 9: Maize production in the Free State since 2007/2008



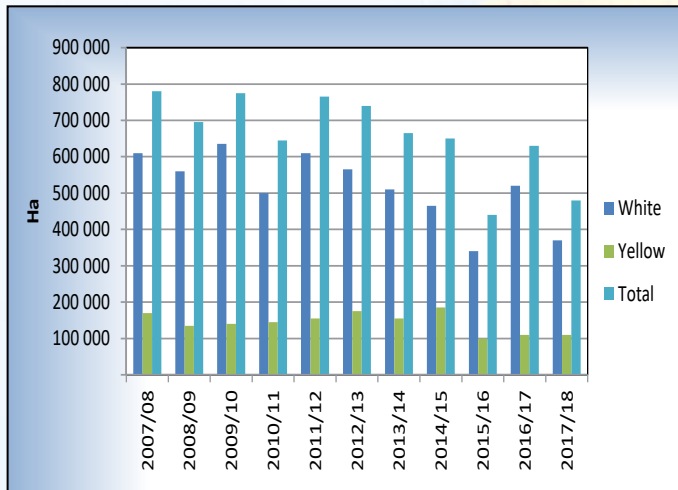
Graph 10: Area utilized for maize production in Mpumalanga since 2007/2008



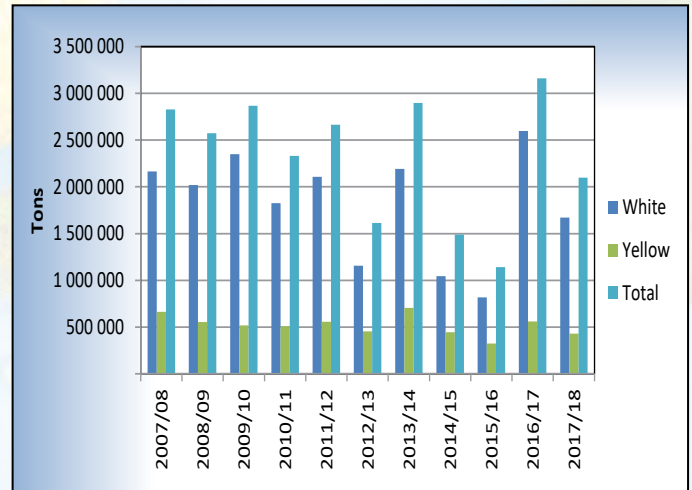
Graph 11: Maize production in Mpumalanga since 2007/2008



Graph 12: Area utilized for maize production in North West since 2007/2008



Graph 13: Maize production in North West since 2007/2008



Figures provided by the CEC.

Supply and Demand

World maize production for the 2017/2018 season was estimated at 1 091.6 million tons according to the *International Grains Council Grain Market Report GMR 499 – 30 May 2019*, with the major maize producing countries being the USA, China and Brazil. The USA, Brazil, Argentina and the Ukraine are the biggest exporters of maize. Maize usage figures are estimated at 124.5, 302.9 and 654.2 million tons respectively for food, industrial and feed purposes. World production for the 2018/2019 season is forecasted at 1 125.8 million tons and the 2019/2020 figure is projected to be 1 118.0 million tons.

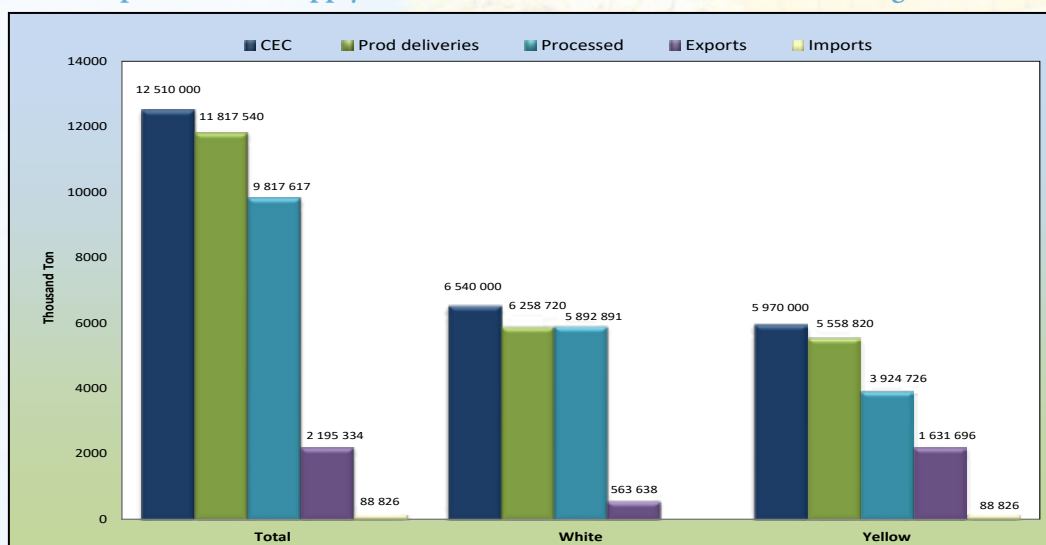
According to the *BFAP Agricultural Outlook 2018 – 2027*, demand growth prospects for white and yellow maize differs significantly over the next decade, due to the different underlying consumption trends. While white maize is consumed as a basic staple food, yellow maize provides the primary energy source in most animal feed rations. Growth in animal feed demand remains slow over the short-term following drought induced liquidation of the beef herd in 2016 and avian influenza induced culling in the layer industry in 2017. From 2020 onwards, growth in livestock production accelerates, resulting in a 21% increase in maize consumed as animal feed by 2027, relative to the 2015-2017 base period. The demand for yellow maize consequently grows much faster over the next decade than that of white maize.

Long-term trends in crop area also reflect the demand for feed related crops. In response to demand from the animal feed sector, yellow maize as well as soybean area planted has increased over the past decade at the expense of white maize. Going forward, yellow maize area continues to expand and is projected to surpass that of white maize by 2020, with sufficient yield gains in white maize production to supply fairly stagnant demand. White maize exports are also expected to slow. South Africa is facing increased competition from Zambia in many of the importing countries across Southern Africa. Zambia produces non-GM maize and faces a favourable transport differential relative to South African maize in key importing markets such as Zimbabwe. Some exports into the rest of Southern Africa however remain favourable to local maize, for example Maputo in the south of Mozambique.

Yellow maize production growth of 3.4% per annum over the next decade, is supported by a combination of area expansion and yield improvements. This growth is sufficient to supply the growing demand from livestock production, whilst also leaving an exportable surplus of approximately 1.3 million tonnes ($\pm 14\%$ of domestic production) by 2027.

Local Supply and Demand figures, compiled by SAGIS, are provided in graphs and tables below and on pages 8 to 13.

Graph 14: Maize supply and demand overview 2018/2019 marketing season



Information provided by SAGIS.

TOTAL MAIZE: SUPPLY AND DEMAND TABLE BASED ON SAGIS' INFO (TON)

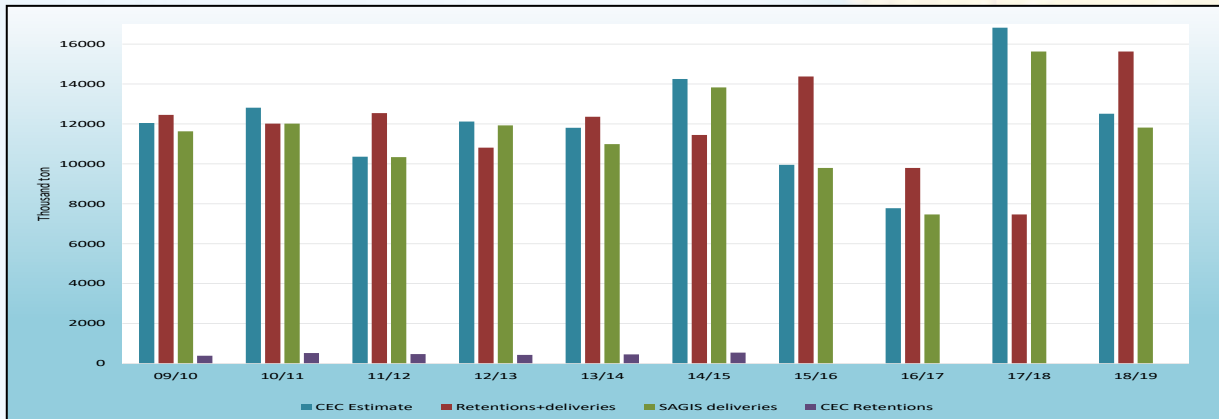
Publication date: 2019-04-26

Season	Marketing Season (May - Apr)																Current		10 Year average		
	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18		18/19	2008/9-2017/18

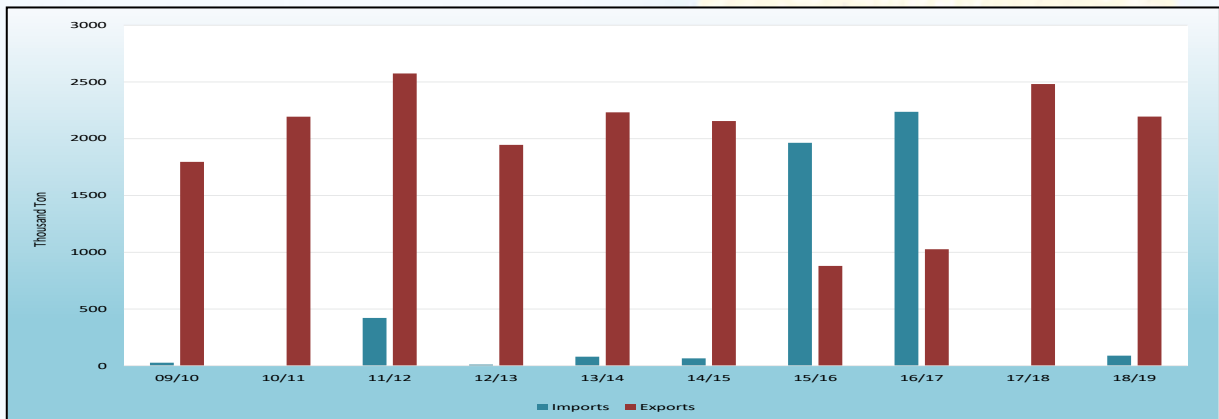
SUPPLY																					
CEC (Crop Estimate)	10 141 000	7 225 000	9 732 000	9 392 000	9 482 000	11 450 000	6 618 000	7 125 000	12 700 000	12 050 000	12 815 000	10 360 000	11 210 056	11 810 600	14 250 000	9 955 000	7 778 500	16 820 000	12 510 000	12 065 976	
CEC (Retention)	614 000	414 000	462 000	366 000	410 000	754 000	480 000	337 000	554 000	389 000	527 000	474 000	433 000	457 810	550 000	0	0	0	0	338 481	
Opening stock (1 May)	983 000	2 115 000	1 202 000	2 710 000	2 624 000	3 148 000	3 169 000	2 070 000	1 049 000	1 581 000	2 131 000	2 336 000	994 000	1 417 393	589 028	2 073 635	2 471 067	1 094 638	3 689 476	1 573 676	
Prod deliveries*	10 409 000	7 986 000	9 310 000	8 409 000	9 093 000	10 055 000	6 707 000	6 882 000	11 899 000	11 629 000	12 016 000	10 340 000	11 929 000	10 991 995	13 827 632	9 794 332	7 489 600	15 628 682	11 817 540	11 552 524	
Imports	0	395 000	925 000	441 000	219 000	360 000	931 000	1 120 000	27 000	27 000	0	421 000	11 000	79 682	66 250	1 963 610	2 236 743	0	888 826	483 129	
Surplus	0	0	0	40 000	0	0	32 000	29 000	30 000	68 000	77 000	54 000	42 000	122 608	26 153	52 930	44 417	46 657	23 582	56 377	
Total Supply	11 392 000	10 446 000	11 487 000	11 600 000	11 986 000	13 963 000	10 839 000	10 101 000	13 005 000	13 305 000	14 224 000	13 151 000	12 976 000	12 611 678	14 508 063	13 884 507	12 221 827	16 769 977	15 619 424	13 665 705	
DEMAND																					
Processed	6 852 000	7 151 000	6 983 000	7 243 000	7 283 000	7 462 000	7 660 000	8 029 000	8 613 000	8 658 000	8 857 000	8 941 000	8 935 000	9 348 670	9 926 519	10 248 994	9 838 709	10 299 680	9 817 617	9 366 657	
-human	3 589 000	3 877 000	3 708 000	3 712 000	3 740 000	3 825 000	3 816 000	3 809 000	4 524 000	4 471 000	4 513 000	4 512 000	4 499 000	4 582 310	4 840 021	4 686 482	4 809 221	4 993 476	4 740 558	4 644 251	
-animal/industrial	3 068 000	3 146 000	3 155 000	3 416 000	3 427 000	3 537 000	3 765 000	4 157 000	4 020 000	4 101 000	4 271 000	4 362 000	4 378 000	4 715 295	5 040 647	5 520 248	5 003 810	5 276 447	5 055 702	4 668 845	
-grishing	195 000	128 000	120 000	115 000	116 000	100 000	81 000	63 000	69 000	86 000	73 000	67 000	58 000	51 065	46 851	30 264	25 678	29 757	21 357	58 562	
-bio-fuel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Withdrawn by producers	500 000	325 000	301 000	299 000	255 000	315 000	241 000	217 000	273 000	291 000	267 000	142 000	138 000	148 909	124 508	76 888	94 948	102 906	59 321	166 916	
Released to end-consumers	267 000	214 000	206 000	224 000	351 000	340 000	235 000	230 000	220 000	378 000	526 000	484 000	478 000	280 432	205 577	186 296	157 460	180 544	141 251	309 631	
Net receipts(-)/disps(+)	2 000	63 000	35 000	25 000	18 000	28 000	36 000	42 000	49 000	51 000	44 000	15 000	62 000	12 043	22 100	21 451	9 770	15 663	11 637	30 203	
Deficit	168 000	156 000	14 000	0	49 000	12 000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Exports	1 488 000	1 335 000	1 188 000	1 185 000	832 000	2 237 000	597 000	534 000	2 269 000	1 796 000	2 194 000	2 575 000	1 946 000	2 232 596	2 155 724	879 811	1 026 302	2 481 708	2 195 334	1 955 614	
Products	65 000	54 000	118 000	89 000	100 000	94 000	49 000	62 000	107 000	126 000	128 000	129 000	133 000	176 978	198 319	186 383	189 112	192 874	191 698	156 667	
African Countries	28 000	38 000	61 000	34 000	48 000	56 000	28 000	35 000	67 000	87 000	84 000	86 000	95 000	123 040	137 742	132 900	144 229	117 797	124 769	107 471	
Other Countries	37 000	16 000	57 000	55 000	52 000	38 000	21 000	27 000	40 000	39 000	44 000	43 000	38 000	53 938	60 577	53 483	44 883	75 077	66 929	49 196	
Whole maize	1 423 000	1 281 000	1 070 000	1 096 000	732 000	2 143 000	548 000	472 000	2 162 000	1 670 000	2 066 000	2 446 000	1 813 000	2 055 618	1 957 405	693 428	837 190	2 288 834	2 003 636	1 798 948	
Border Posts	352 000	752 000	1 033 000	950 000	591 000	1 311 000	488 000	472 000	1 332 000	703 000	629 000	584 000	613 000	921 454	691 659	684 834	804 322	591 692	565 751	755 496	
Harbours	1 071 000	529 000	37 000	146 000	141 000	832 000	60 000	830 000	967 000	1 437 000	1 437 000	1 862 000	1 200 000	1 134 164	1 264 326	8 594	32 868	1 697 142	1 437 885	1 043 309	
Total Demand	9 277 000	9 244 000	8 727 000	8 976 000	8 788 000	10 394 000	8 769 000	9 052 000	11 424 000	11 174 000	11 888 000	12 157 000	11 559 000	12 022 650	12 434 428	11 413 440	11 117 189	13 080 501	12 225 160	11 828 021	
Ending Stock (30 Apr)	2 115 000	1 202 000	2 710 000	2 624 000	3 148 000	3 169 000	2 070 000	1 049 000	1 581 000	2 131 000	2 336 000	994 000	1 417 000	589 028	2 073 635	2 471 067	1 094 638	3 689 476	3 947 264	1 837 684	
- processed p/month	571 000	595 900	581 900	603 000	606 900	621 800	638 300	669 100	717 800	721 500	738 100	745 100	744 583	779 056	827 210	854 083	819 892	858 307	892 511	780 563	
- months' stock	3.7	2.0	4.7	4.3	5.2	5.1	3.2	1.6	2.2	3.0	3.2	1.3	1.9	.8	2.5	2.9	1.3	4.3	3.8	2	

Note: *** Figures for current season up to date

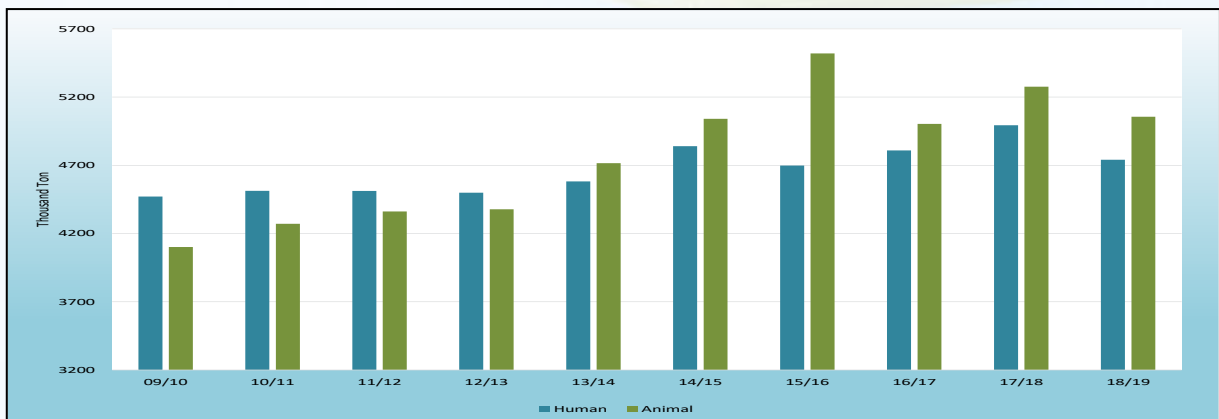
Graph 15: Maize: CEC Estimate, Retentions and SAGIS deliveries over 10 marketing seasons



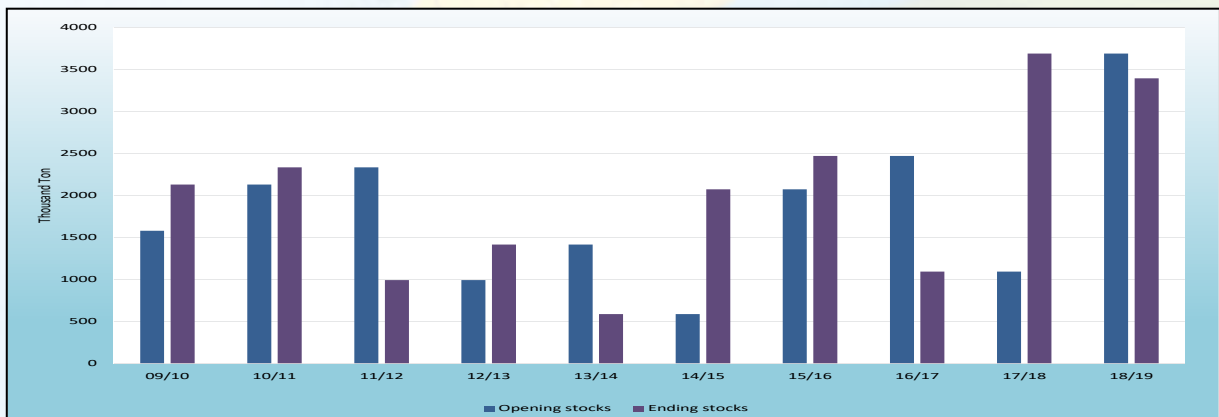
Graph 16: Maize: Imports and exports over 10 marketing seasons



Graph 17: Maize: RSA consumption over 10 marketing seasons



Graph 18: Maize: Opening and ending stocks over 10 marketing seasons



Information provided by SAGIS.

WHITE MAIZE: SUPPLY AND DEMAND TABLE BASED ON SAGIS' INFO (TON)

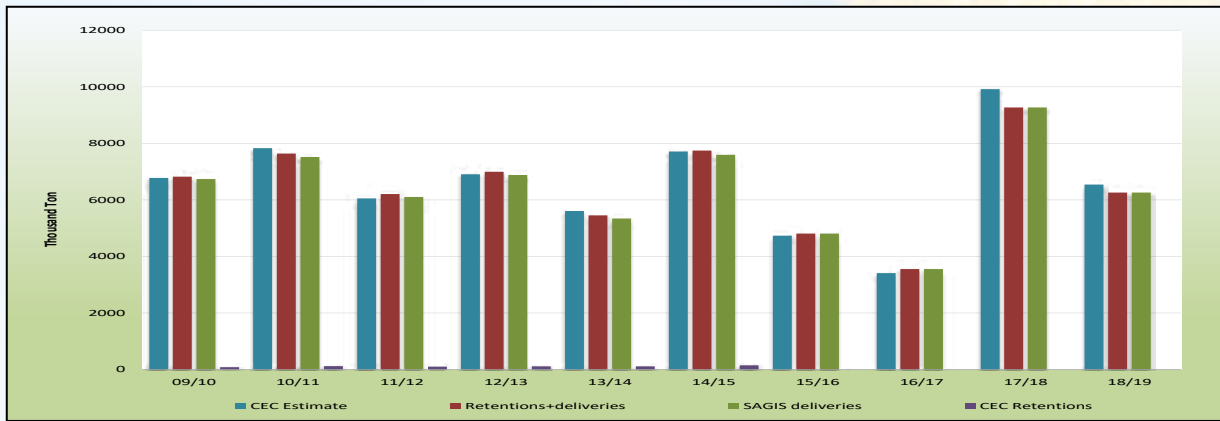
Publication date: 2019-04-26

Season	Marketing Season (May - Apr)																	Current		10 Year average
																		Season	18/19	
																		May - Mar		
	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	2008/9-2017/18

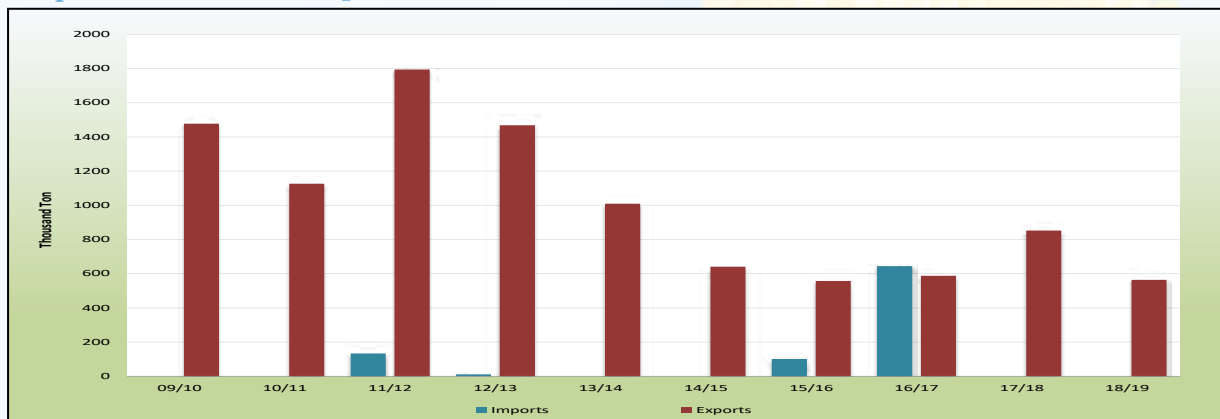
																			11	
SUPPLY																				
CEC (Crop Estimate)	6 155 000	4 110 000	5 538 000	6 366 000	5 805 000	6 541 000	4 187 000	4 315 000	7 480 000	6 775 000	7 830 000	6 052 000	6 903 656	5 606 800	7 710 000	4 735 000	3 408 500	9 916 000	6 540 000	6 641 696
CEC (Retention)	189 000	105 000	139 000	116 000	113 000	184 000	144 000	11 000	120 000	83 000	119 000	100 000	114 000	110 910	150 000	0	0	0	0	79 691
Opening stock (1 May)	609 000	1 273 000	559 000	1 718 000	2 123 000	2 402 000	2 301 000	1 630 000	618 000	762 000	1 362 000	1 609 000	518 000	757 214	274 318	1 282 581	1 307 867	597 837	2 428 653	908 882
Prod deliveries*	6 440 000	4 636 000	5 576 000	5 845 000	5 647 000	6 108 000	4 392 000	4 309 000	7 190 000	6 737 000	7 518 000	6 105 000	6 880 000	5 342 204	7 592 893	4 808 279	3 551 822	9 268 593	6 258 720	6 499 379
Imports	0	47 000	274 000	33 000	0	0	1 000	46 000	0	0	0	133 000	11 000	0	0	100 803	644 144	0	0	88 895
Surplus	0	0	0	40 000	0	4 000	20 000	19 000	25 000	48 000	45 000	18 000	22 000	69 859	8 808	17 474	31 994	21 751	4 829	30 789
Total Supply	7 049 000	5 956 000	6 409 000	7 636 000	7 770 000	8 514 000	6 714 000	6 004 000	7 833 000	7 547 000	8 925 000	7 865 000	7 481 000	6 169 277	7 876 019	6 209 137	5 535 827	9 885 181	8 692 302	7 527 944
DEMAND																				
Processed	4 342 000	4 202 000	3 679 000	4 212 000	4 313 000	4 186 000	4 385 000	4 751 000	4 922 000	4 555 000	5 871 000	5 374 000	5 047 000	4 808 674	5 862 438	4 319 697	4 331 787	6 533 966	5 892 891	5 162 556
-human	3 377 000	3 630 000	3 459 000	3 467 000	3 478 000	3 559 000	3 526 000	3 552 000	4 198 000	4 125 000	4 157 000	4 119 000	4 095 000	4 118 448	4 361 295	4 183 067	4 232 583	4 459 504	4 228 996	4 204 890
-animal/industrial	783 000	446 000	105 000	641 000	733 000	543 000	787 000	1 142 000	662 000	362 000	1 658 000	1 202 000	904 000	651 925	1 469 002	118 522	86 153	2 061 649	1 652 724	917 525
-grinding	182 000	126 000	115 000	104 000	102 000	84 000	72 000	57 000	62 000	68 000	56 000	53 000	48 000	38 301	32 141	18 108	13 051	12 813	11 171	40 141
-bio-fuel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Withdrawn by producers	349 000	164 000	144 000	144 000	107 000	101 000	112 000	107 000	111 000	81 000	108 000	46 000	36 000	32 409	36 940	13 385	14 083	35 885	11 897	51 470
Released to end-consumers	96 000	64 000	40 000	76 000	181 000	71 000	80 000	69 000	45 000	62 000	189 000	126 000	95 000	43 000	38 934	13 987	5 660	30 125	20 530	64 871
Net receipts(-)/dispt(+)	7 000	43 000	11 000	12 000	17 000	11 000	27 000	28 000	27 000	10 000	22 000	7 000	28 000	1 953	14 319	-2 862	-963	7 583	3 847	11 403
Deficit	121 000	112 000	81 000	1 069 000	712 000	1 844 000	480 000	431 000	1 966 000	1 477 000	1 126 000	1 794 000	1 468 000	1 008 923	640 807	557 063	587 423	851 969	563 938	1 147 719
Total Exports	861 000	812 000	73 000	65 000	44 000	58 000	20 000	31 000	69 000	69 000	77 000	60 000	68 000	82 877	93 307	83 636	41 042	42 038	61 077	68 590
Products	54 000	52 000	37 000	22 000	23 000	51 000	14 000	24 000	57 000	58 000	62 000	47 000	56 000	72 032	77 930	73 061	36 573	40 695	59 986	58 029
African Countries	17 000	15 000	36 000	43 000	21 000	7 000	6 000	7 000	12 000	11 000	15 000	13 000	12 000	10 845	15 377	10 575	4 469	1 343	1 491	10 561
Other Countries	37 000	15 000	36 000	1 004 000	668 000	1 786 000	460 000	400 000	1 897 000	1 408 000	1 049 000	1 734 000	1 400 000	926 046	547 500	473 427	546 381	809 931	502 951	1 079 129
Whole maize	807 000	760 000	744 000	881 000	527 000	1 210 000	400 000	400 000	1 241 000	566 000	509 000	439 000	462 000	727 989	538 128	473 427	520 200	417 327	355 987	589 407
Border Posts	319 000	671 000	737 000	123 000	141 000	576 000	60 000	0	656 000	842 000	540 000	1 295 000	938 000	198 057	9 372	0	26 181	392 604	1 461 714	489 721
Harbours	488 000	89 000	7 000	123 000	141 000	576 000	60 000	0	656 000	842 000	540 000	1 295 000	938 000	198 057	9 372	0	26 181	392 604	1 461 714	489 721
Total Demand	5 776 000	5 397 000	4 691 000	5 513 000	5 368 000	6 213 000	5 084 000	5 386 000	7 071 000	6 185 000	7 316 000	7 347 000	6 674 000	5 894 959	6 593 438	4 901 270	4 937 990	7 459 528	6 492 803	6 438 019
Ending Stock (30 Apr)	1 273 000	559 000	1 718 000	2 123 000	2 402 000	2 301 000	1 630 000	618 000	762 000	1 362 000	1 609 000	518 000	757 000	274 318	1 282 581	1 307 867	597 837	2 428 653	2 199 899	1 089 926
- processed p/month	361 900	350 200	306 600	351 000	359 400	348 800	365 400	395 900	410 200	379 600	489 300	447 800	420 583	400 723	488 537	359 975	360 982	544 497	535 717	430 220
- months' stock	3.5	1.6	5.6	6.0	6.7	6.6	4.5	1.6	1.9	3.6	3.3	1.2	1.8	0.7	2.6	3.6	1.7	4.5	4.1	3

Note: *** Figures for current season up to date

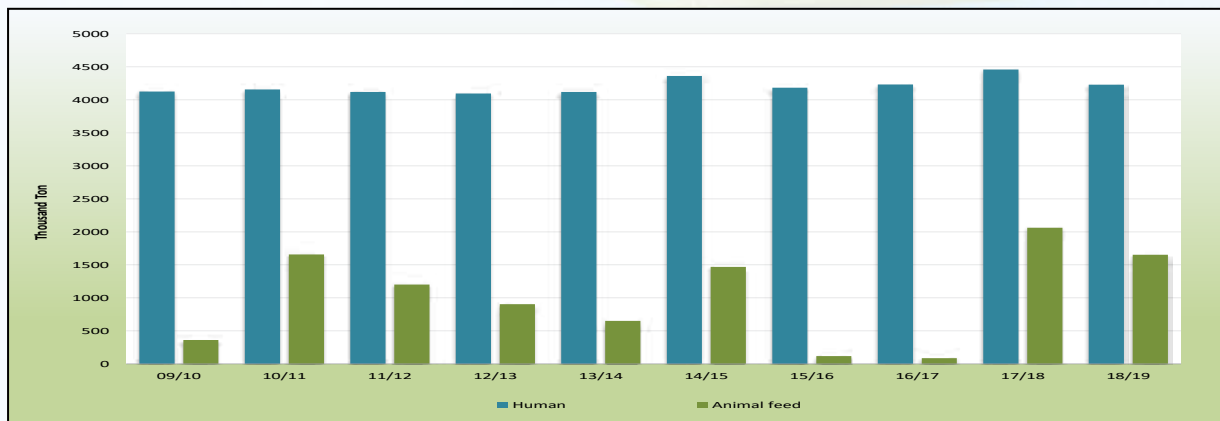
Graph 19: White Maize: CEC Estimate, Retentions and SAGIS deliveries over 10 marketing seasons



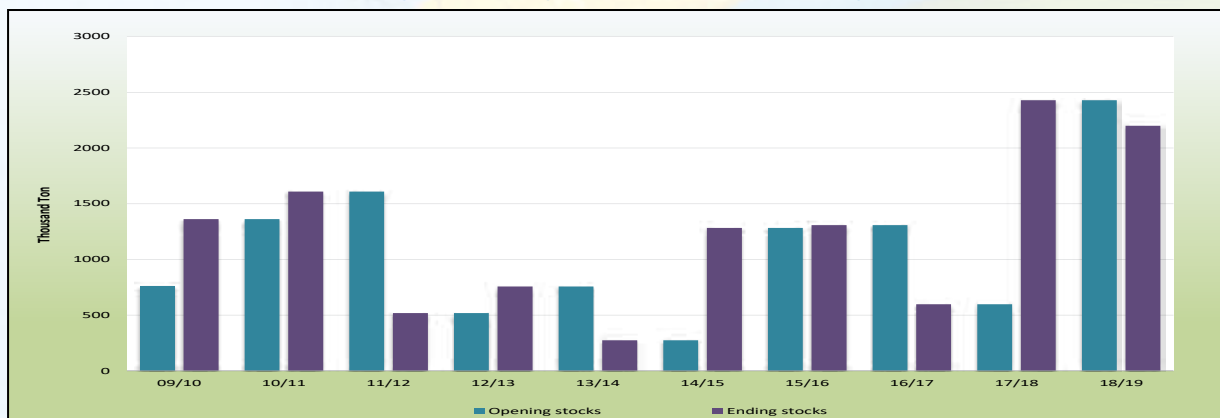
Graph 20: White Maize: Imports and exports over 10 marketing seasons



Graph 21: White Maize: RSA consumption over 10 marketing seasons



Graph 22: White Maize: Opening and ending stocks over 10 marketing seasons



Information provided by SAGIS.

YELLOW MAIZE: SUPPLY AND DEMAND TABLE BASED ON SAGIS' INFO (TON)

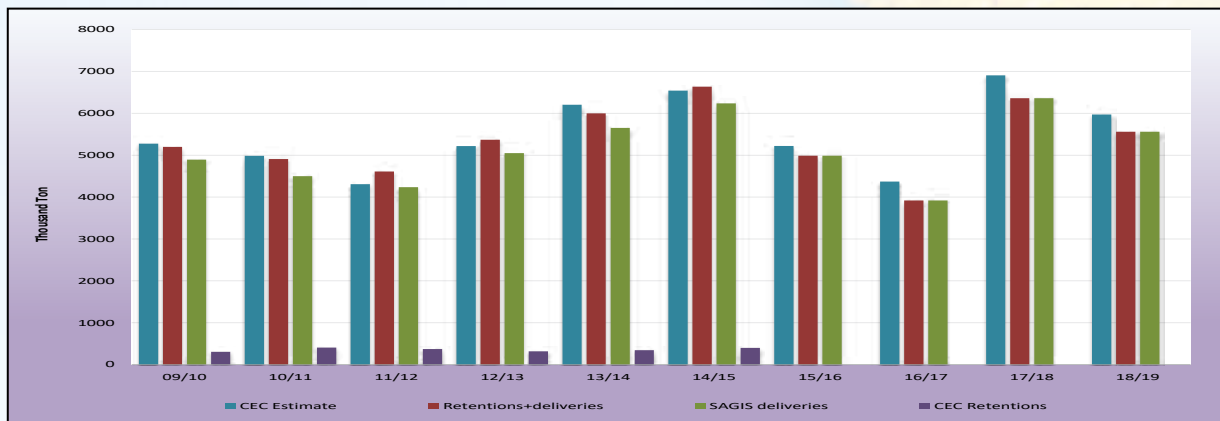
Publication date: 2019-04-26

Season	Marketing Season (May - Apr)																Current		10 Year average	
	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18		18/19

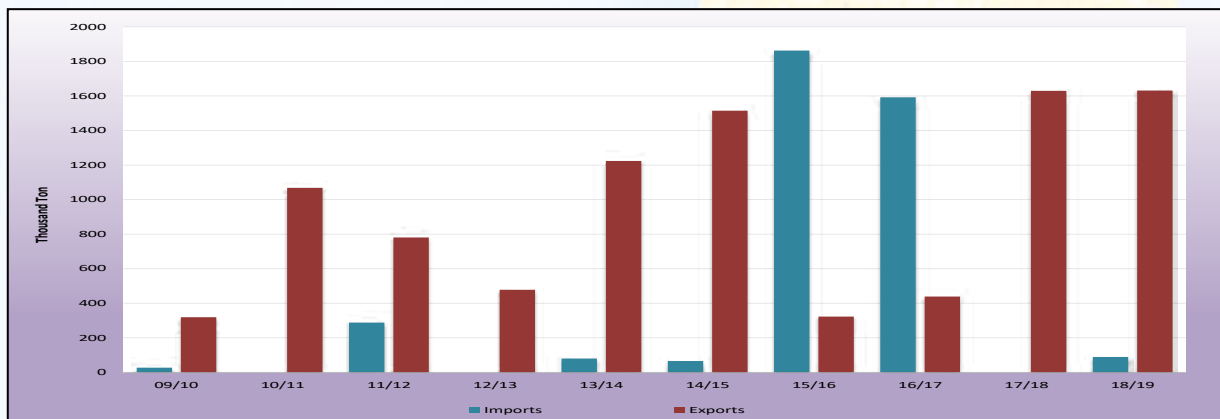
SUPPLY																				
CEC (Crop Estimate)	3 986 000	3 115 000	4 194 000	3 026 000	3 677 000	4 909 000	2 431 000	2 810 000	5 275 000	4 985 000	4 308 000	5 217 000	6 203 800	6 540 000	5 220 000	4 370 000	6 904 000	5 970 000	5 424 280	
CEC (Retention)	425 000	309 000	323 000	250 000	297 000	570 000	336 000	326 000	434 000	306 000	408 000	319 000	346 900	400 000	0	0	0	0	258 790	
Opening stock (1 May)	374 000	842 000	643 000	992 000	501 000	746 000	868 000	440 000	431 000	819 000	769 000	476 000	660 179	314 710	791 054	1 163 200	496 801	1 260 823	664 794	
Prod deliveries*	3 969 000	3 300 000	3 734 000	2 564 000	3 446 000	3 947 000	2 315 000	2 573 000	4 709 000	4 892 000	4 498 000	5 049 000	5 649 791	6 234 739	4 986 053	3 917 778	6 360 089	5 558 820	5 053 145	
Imports	0	348 000	651 000	408 000	219 000	360 000	930 000	1 074 000	27 000	27 000	0	288 000	79 682	65 250	1 862 807	1 592 959	0	88 826	394 234	
Surplus	0	0	0	0	0	0	12 000	10 000	5 000	20 000	32 000	20 000	52 749	17 345	35 456	12 423	24 906	18 753	25 588	
Total Supply	4 348 000	4 490 000	5 028 000	3 964 000	4 166 000	5 053 000	4 125 000	4 097 000	5 172 000	5 758 000	5 299 000	5 545 000	6 442 401	6 632 044	7 675 370	6 686 000	6 881 796	6 927 222	6 137 761	
DEMAND																				
Processed	2 510 000	2 949 000	3 304 000	3 031 000	2 970 000	3 276 000	3 275 000	3 278 000	3 691 000	4 103 000	2 886 000	3 888 000	4 539 996	4 064 081	5 929 297	5 506 922	3 765 714	3 924 726	4 204 101	
-human	212 000	247 000	249 000	245 000	262 000	266 000	290 000	257 000	326 000	346 000	356 000	404 000	463 862	478 726	515 415	576 638	533 972	511 562	439 361	
-animal/industrial	2 285 000	2 700 000	3 050 000	2 775 000	2 694 000	2 994 000	2 976 000	3 015 000	3 355 000	3 739 000	2 613 000	3 474 000	4 063 370	3 571 645	5 401 726	4 917 657	3 214 798	3 402 978	3 751 320	
-grinding	13 000	2 000	5 000	11 000	14 000	16 000	9 000	6 000	7 000	18 000	17 000	14 000	12 764	13 710	12 156	12 627	16 944	10 186	13 420	
-bio-fuel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Withdrawn by producers	151 000	161 000	157 000	155 000	148 000	214 000	129 000	110 000	162 000	210 000	159 000	102 000	116 500	87 568	63 503	80 865	67 021	47 424	114 446	
Released to end-consumers	171 000	150 000	166 000	148 000	170 000	269 000	155 000	161 000	175 000	316 000	337 000	383 000	237 432	166 643	172 309	151 800	150 419	120 721	244 760	
Net receipts (-)/debt(+)	-5 000	20 000	24 000	13 000	1 000	17 000	9 000	14 000	22 000	41 000	22 000	34 000	10 090	7 781	24 313	10 732	8 080	7 790	18 800	
Deficit	47 000	44 000	14 000	0	11 000	16 000	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Exports	627 000	523 000	371 000	116 000	120 000	393 000	117 000	103 000	303 000	319 000	1 068 000	478 000	1 223 673	1 514 917	322 748	438 679	1 629 739	1 631 696	807 896	
Products	11 000	2 000	45 000	24 000	56 000	36 000	29 000	31 000	38 000	57 000	51 000	65 000	94 101	105 012	102 747	148 070	150 836	136 621	88 077	
African Countries	11 000	1 000	24 000	12 000	25 000	5 000	14 000	11 000	10 000	29 000	22 000	39 000	51 008	59 812	59 839	107 656	77 102	65 183	49 442	
Other Countries	0	1 000	21 000	12 000	31 000	31 000	15 000	20 000	28 000	28 000	29 000	26 000	43 083	45 200	42 908	40 414	73 734	65 438	38 635	
Whole maize	616 000	521 000	326 000	92 000	64 000	357 000	88 000	72 000	265 000	262 000	1 017 000	413 000	1 129 572	1 409 905	220 001	290 809	1 478 903	1 501 075	719 819	
Border Posts	33 000	81 000	296 000	69 000	64 000	101 000	88 000	72 000	91 000	137 000	120 000	151 000	193 465	153 531	211 407	284 122	174 365	209 904	166 089	
Harbours	583 000	440 000	30 000	23 000	0	256 000	0	0	174 000	125 000	897 000	262 000	936 107	1 254 954	8 594	6 687	1 304 538	1 291 171	553 588	
Total Demand	3 501 000	3 847 000	4 036 000	3 463 000	3 420 000	4 185 000	3 685 000	3 666 000	4 353 000	4 989 000	4 572 000	4 885 000	6 127 691	5 840 990	6 512 170	6 189 199	5 620 973	5 732 357	5 390 002	
Ending Stock (30 Apr)	842 000	643 000	992 000	501 000	746 000	868 000	440 000	431 000	819 000	769 000	727 000	660 000	314 710	791 054	1 163 200	496 801	1 260 823	1 194 865	747 759	
- processed p/month	209 200	245 800	275 300	252 600	247 500	273 000	272 900	273 200	307 600	341 900	248 800	324 000	378 333	338 673	494 108	458 910	313 810	356 793	350 343	
- months' stock	4.0	2.6	3.6	2.0	3.0	3.2	1.6	1.6	2.7	2.2	2.9	2.0	0.8	2.3	2.4	1.1	4.0	3.3	2	

Note: *** Figures for current season up to date

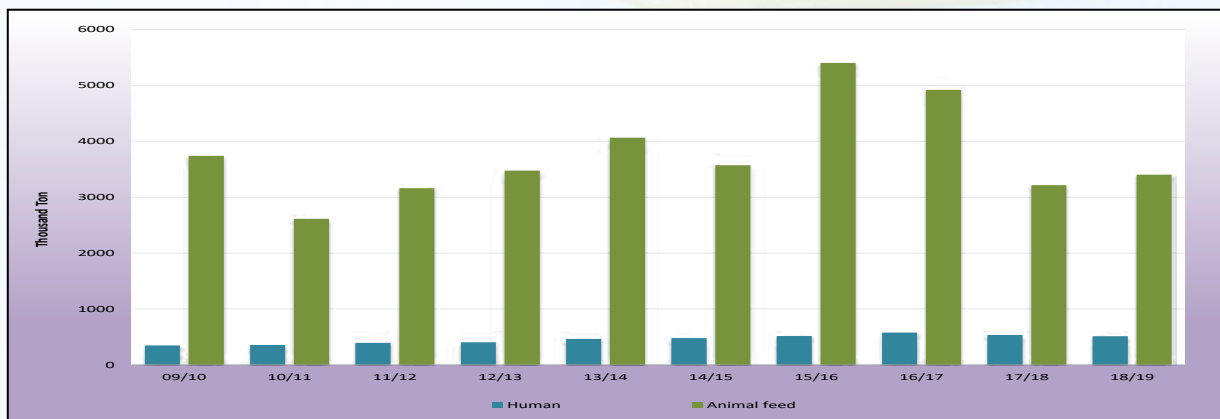
Graph 23: Yellow Maize: CEC Estimate, Retentions and SAGIS deliveries over 10 marketing seasons



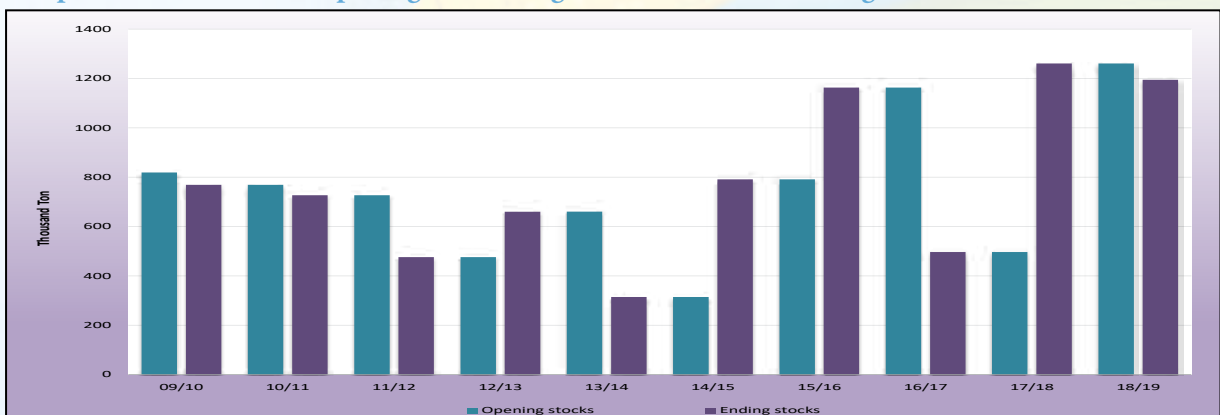
Graph 24: Yellow Maize: Imports and exports over 10 marketing seasons



Graph 25: Yellow Maize: RSA consumption over 10 marketing seasons



Graph 26: Yellow Maize: Opening and ending stocks over 10 marketing seasons



Information provided by SAGIS.

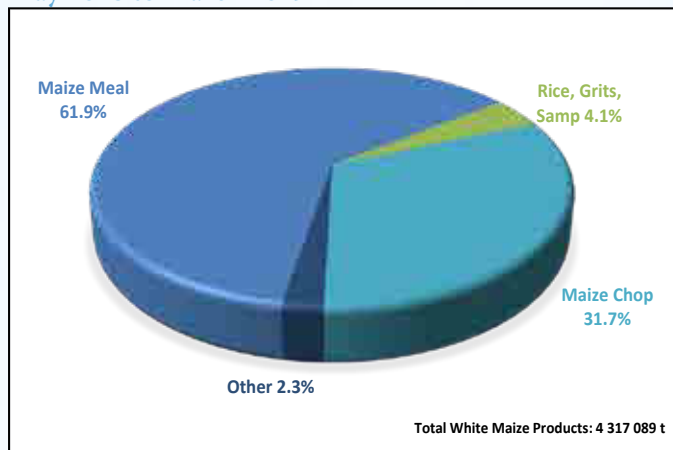
SAGIS Maize Product Information

On 14 November 2014, the Minister of Agriculture, Forestry & Fisheries announced new statutory measures for the manufacturing of maize & wheaten products.

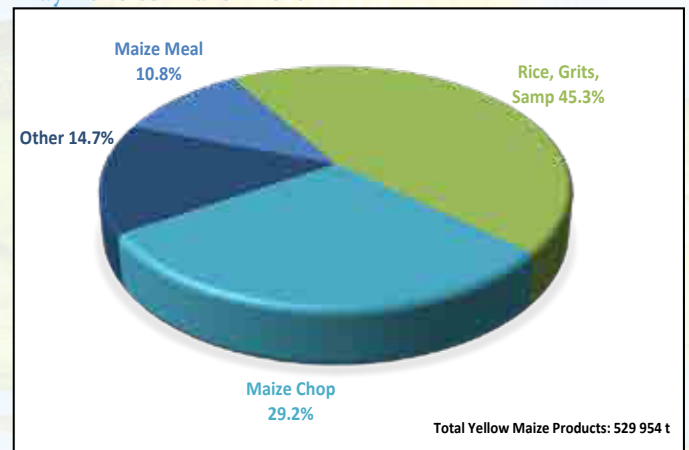
To comply with the abovementioned statutory measures, manufacturers of these products have to register with SAGIS and submit information with regards to the manufacture, import and export of maize products.

Please see graphs 27 to 30 below for an overview of the white and yellow maize products as well as white and yellow maize meal manufactured for the period May 2018 to March 2019. The tables on pages 15 to 17 provide a summary of the figures for maize products manufactured, imported and exported for the periods May 2016 to April 2017, May 2017 to April 2018 as well as May 2018 to March 2019.

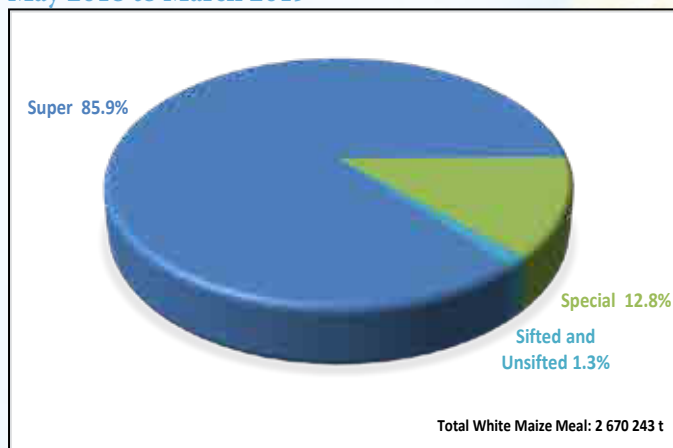
Graph 27: White maize products manufactured from May 2018 to March 2019



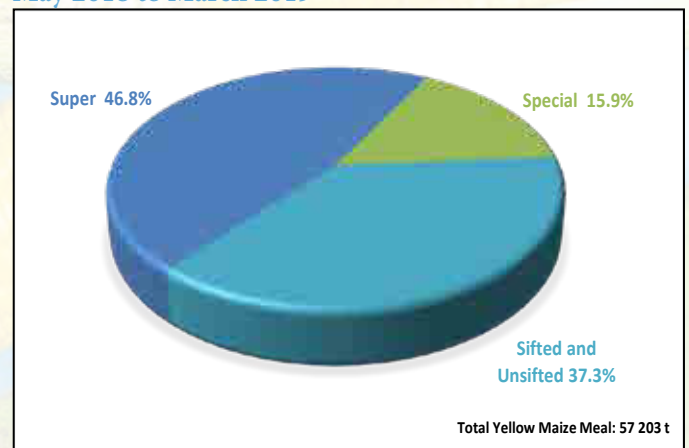
Graph 28: Yellow maize products manufactured from May 2018 to March 2019



Graph 29: White maize meal manufactured from May 2018 to March 2019



Graph 30: Yellow maize meal manufactured from May 2018 to March 2019



MAIZE PRODUCTS MANUFACTURED PER MARKETING YEAR												
	Marketing year: May 2016 - Apr 2017			Marketing year: May 2017 - Apr 2018			Marketing year: May 2018 - March 2019			Date Published: 2019/05/03		
	Manufactured Tons			Manufactured Tons			Manufactured Tons					
	White Maize	Yellow Maize	Total Maize	White Maize	Yellow Maize	Total Maize	White Maize	Yellow Maize	Total Maize	White Maize	Yellow Maize	Total Maize
Maize Chop	1 305 565	184 130	1 489 695	1 430 700	171 566	1 602 266	1 370 163	154 995	1 525 158			
Maize Rice	8 894	*	8 894	8 727	*	8 727	7 633	*	7 633			7 633
Maize Grits	47 392	*	47 392	60 423	*	60 423	58 384	*	58 384			58 384
Samp	107 965	*	107 965	112 676	*	112 676	109 995	*	109 995			109 995
* Total Yellow Maize Rice / Maize Grits / Samp		290 388	290 388		266 524	266 524		240 028	240 028			240 028
Sifted Maize Meal	28 005	43 582	71 587	37 556	33 355	70 911	25 870	21 318	47 188			47 188
Special Maize Meal	401 344	16 087	417 431	357 886	3 978	361 864	342 869	9 112	351 981			351 981
Super Maize Meal	2 275 099	38 777	2 313 876	2 388 000	31 789	2 419 789	2 293 654	26 768	2 320 422			2 320 422
Unsifted Maize Meal	12 290	1 202	13 492	10 376	2	10 378	7 850	5	7 855			7 855
Other maize products intended for Human consumption	90 475	60 437	150 912	113 303	56 325	169 628	100 671	77 728	178 399			178 399
Total	4 277 029	634 603	4 911 632	4 519 647	563 539	5 083 186	4 317 089	529 954	4 847 043			4 847 043

* Included total for yellow rice, grits and samp

	Date Published: 2019/05/03											
	Marketing year: May 2016 - Apr 2017				Marketing year: May 2017 - Apr 2018				Marketing year: May 2018 - March 2019			
	Imported Tons				Imported Tons				Imported Tons			
	Progressive: 12 Months			Progressive: 12 Months - Mar			Progressive: 11 Months (May - Mar)			Progressive: 11 Months (May - Mar)		
	White Maize	Yellow Maize	Total Maize	White Maize	Yellow Maize	Total Maize	White Maize	Yellow Maize	Total Maize	White Maize	Yellow Maize	Total Maize
Maize Chop	4 985	0	4 985	1 505	0	1 505	1 088	0	1 088			
Maize Rice	0	*	0	0	*	0	0	*	0			
Maize Grits	0	*	0	0	*	0	0	*	0			
Samp	0	*	0	0	*	0	0	*	0			
* Total Yellow Maize Rice / Maize Grits / Samp		44	44		22	22		0	0			
Sifted Maize Meal	0	0	0	5 942	0	5 942	5 423	0	5 423			
Special Maize Meal	5 618	0	5 618	0	0	0	0	0	0			
Super Maize Meal	0	0	0	0	0	0	3	0	3			
Unsifted Maize Meal	0	0	0	0	0	0	0	0	0			
Other maize products intended for Human consumption	0	0	0	0	0	0	0	4	4			
Total	10 603	44	10 647	7 447	22	7 469	6 514	4	6 518			

* Included total for yellow rice, grits and samp

	Date Published: 2019/05/03									
	Marketing year: May 2016 - Apr 2017			Marketing year: May 2017 - Apr 2018			Marketing year: May 2018 - March 2019			
	Exported Tons			Exported Tons			Exported Tons			
	Progressive: 12 Months			Progressive: 12 Months			Progressive: 11 Months (May - Mar)			
	White Maize	Yellow Maize	Total Maize	White Maize	Yellow Maize	Total Maize	White Maize	Yellow Maize	Total Maize	Total Maize
Maize Chop	37	30	67	0	0	0	33	0	33	33
Maize Rice	0	*	0	20	*	20	8	*	8	8
Maize Grits	0	*	0	0	*	0	0	*	0	0
Samp	1 285	*	1 285	1 183	*	1 183	757	*	757	757
* Total Yellow Maize Rice / Maize Grits / Samp		41 762	41 762		20 453	20 453		13 374	13 374	13 374
Sifted Maize Meal	377	3 757	4 134	76	5 964	6 040	0	5 413	5 413	5 413
Special Maize Meal	11 551	0	11 551	316	4	320	16 433	2 458	18 891	18 891
Super Maize Meal	17 313	6 806	24 119	22 702	2 183	24 885	22 663	1 075	23 738	23 738
Unsifted Maize Meal	0	893	893	0	0	0	0	0	0	0
Other maize products intended for Human consumption	56	0	56	8 623	5	8 628	10 711	1 242	11 953	11 953
Total	30 619	53 248	83 867	32 920	28 609	61 529	50 605	23 562	74 167	74 167

* Included total for yellow rice, grits and samp

Maize Crop Quality 2017/2018 - summary of results

RSA Grading

The maize crop was of good quality, with 78% of white and 89% of yellow maize, graded as maize grade one, compared to the 85% and 92% of the 2016/2017 season. The percentage total defective kernels above and below the 6.35 mm sieve, 5.5% for white and 4.9% for yellow maize, was respectively 0.8% and 0.5% higher than the previous season. Slightly less *Diplodia* infected kernels was observed on both white and yellow maize this season. *Fusarium* infected kernels were also lower on white maize, but on yellow maize the average percentage increased with 0.4% to 1.2% compared to the previous season.

Foreign matter did not pose significant problems, with white and yellow maize each having four samples downgraded to class other maize due to foreign matter exceeding 0.75%. Only one yellow maize sample was downgraded as a result of other colour maize that exceeded 5%. The average percentage combined deviations of white maize was 5.9% compared to the 5.1% of the 2016/2017 season, that of yellow maize was also higher, 5.1% compared to 4.7% previously.

Please refer to Tables 3 to 7 on pages 28 to 36.

USA Grading

Of the 900 maize samples graded according to USA grading regulations, 51.3% were graded US1, 28.9% US2, 9.9% US3, 2.6% US4, 2.9% US5, while sample grade and class mixed corn represented 3.0% and 1.4% respectively. The percentage samples graded as US1 varies substantially over seasons, comparing 51% to 71%, 58%, 64%, 42% and 79% over the previous five seasons. The percentage samples graded as US2 was higher than the 20%, 22% and 23% of the previous three seasons respectively. The main reason for downgrading the samples was the percentage total damaged kernels exceeding the maximum limit per grade, followed by broken corn and foreign material. Please see Tables 8 and 9 on pages 38 to 43.

Physical Quality characteristics

Bushel weight/Test weight is applied as a grading factor in the USA grading regulations, but is also routinely done at most intake points locally. White maize had an average test weight of 77.0 kg/hl compared to the 77.2 kg/hl of yellow maize. White maize's average test weight was 0.7 kg/hl lower

than the previous season and that of yellow maize 0.3 kg/hl higher. The test weight in total varied from 59.6 kg/hl to 82.5 kg/hl. Only 23 samples reported Bushel weight values below the minimum requirement (56.0 lbs or 72.1 kg/hl) for USA grade 1 maize, 13 of these samples were from the North West production regions, eight from the Free State and two from Mpumalanga.

The 100 kernel mass ("as is" basis) of white maize was 34.3 g and averaged higher than yellow maize (31.5 g) as in previous seasons. The kernel size of white maize was larger than in the previous season. The yellow maize kernels below the 10 mm sieve was also slightly larger than the previous season. The percentage yellow maize kernels above the 10 mm sieve were on average 15.1% lower than white kernels and the percentage kernels below the 8 mm sieve 11.2% higher than that of white maize.

Both white and yellow maize were slightly less susceptible to breakage than during the previous season. The percentage stress cracks observed varied overall from 1 to 38%, and averaged 11% for white and 9% for yellow maize, on average 3% higher than in the previous season.

Please refer to Tables 12 to 16 on pages 45 to 53.

The milling index obtained from the SAGL Milling Index 2018 model, varied from an average of 78.3 for white maize to 79.4 for yellow maize. Grit Yield All (GYA) values averaged 64.4 for white maize and 64.6 for yellow maize. Please see page 94 under the Methods Section for more information on this new parameter which was reported for the first time last season.

Roff milling and whiteness index (WI)

The average % extraction of total meal in white maize obtained with the Roff mill, averaged 79.1% (0.5% higher than the previous season) and varied from 70.9% to 83.8%.

The whiteness index averaged 29.8 for unsifted and 19.2 for sifted maize meal. Sieving the sample eliminates differences in the readings as a result of particle size. The whiteness index of the previous season averaged 25.4 and 17.4 for unsifted and sifted maize meal respectively.

The higher the WI value obtained, the whiter the meal sample. The main contributing factors causing differences in WI values are the presence of other colour maize like yellow maize, the presence of defective kernels, the type of cultivar as well as the soil composition. The sample with the lowest sifted whiteness index value of -5.8 this season, also had

the highest percentage other colour maize, namely 6.2%. Please see Tables 17 and 18 on pages 56 to 58.

Nutritional Values

The fat, starch and protein nutritional components are reported as % (g/100 g) on a dry base.

From historical data, white maize in general tends to have a higher fat content than yellow maize, but a lower starch content. However, during the last three seasons, white maize's starch content exceeded that of yellow maize. No clear trend can be observed with regards to the protein content, although over the past two seasons yellow maize had a slightly higher protein content on average (0.2 – 0.3%).

The average fat content of white maize was 0.1% higher than yellow maize this season. The protein content of yellow maize averaged 9.0%, which was 0.3% higher than that of white maize. The protein content of both white and yellow maize was similar than in the previous season.

The average starch content of white maize (73.2%) was 0.9% lower than in the previous season and yellow maize (72.0%) averaged 1.7% lower. Yellow maize's starch content was also lower than the 10-year average of 72.9%.

Please refer to Tables 19 to 22 on pages 59 to 65.

The maize industry requested that crude fibre be added to the scope of analysis performed on the annual maize crop quality survey. As a result, crude fibre analyses were done on every tenth sample (99 samples in total) by means of the primary analysis method used by SAGL (In-house method 020). The aim is to gather data to investigate the development of a calibration on the Infratec 1241 Grain Analyser (NIT) with the assistance of Foss.

Genetic Modification (GM)

The SAGL screened 100 of the crop samples to test for the presence of the Cry1Ab, Cry2Ab and/or CP4 EPSPS traits. Important to remember is that the crop quality samples received by the SAGL are composite samples per class and grade, made up of individual deliveries to grain silos.

SAGL used the EnviroLogix QuickComb kit for bulk grain to quantitatively determine the presence of genetically modified maize.

The sensitivity of the measurements for Cry1Ab using the above-mentioned kit is 0.8%, i.e. approximately 6 GM kernels in 800 conventional maize kernels. The limit of detection (LOD) for measurements of the Cry1Ab protein is 0.4%.

The sensitivity of the measurements for Cry2Ab using the above-mentioned kit is 0.9%, i.e. approximately 8 GM kernels in 800 conventional maize kernels. The limit of detection (LOD) for measurements of the Cry1Ab protein is 0.5%.

The sensitivity of the measurements for CP EPSPS using the above-mentioned kit is 0.5%, i.e. 4 GM kernels in 800 conventional maize kernels. The limit of detection (LOD) for measurements of the Roundup Ready protein is 0.25%.

Values higher than 5%, the highest value of the detection range for all three traits, are reported as > 5%.

Please see Table 23 on page 67 for the results obtained as well as page 95 for a summary of the Events and Trade names/Brands represented by these three traits.

Mycotoxins

None of the 350 samples tested positive for Aflatoxin, Ochratoxin A, HT-2 or T-2 toxin residues.

The average Fumonisin level (Sum of B₁, B₂ and B₃) on all 350 samples tested, was 244 µg/kg (ppb) and ranged from not detected (ND) to 8 356 µg/kg. This average is higher than the previous season's 191 µg/kg. Of the 350 samples tested, 154 samples (44%) tested positive for fumonisin levels and the average of these positive results was 554 µg/kg. The previous season, 44% also of the samples tested positive, with an average of 431 µg/kg.

The highest Deoxynivalenol (DON) level detected was 3 510 µg/kg, compared to the 7 698 µg/kg of last season. The average level of all samples tested this season was 393 µg/kg, 339 µg/kg the previous season. 37% of the samples tested positive for DON last season compared to 58% this season. The average of the positive results decreased from 919 µg/kg in 2016/2017 to 674 µg/kg in 2017/2018.

18% of the samples tested positive for 15-acetyl-deoxynivalenol (15-ADON) residues. The average of the positive results was 163 µg/kg compared to 254 µg/kg in the previous season.

Zearalenone residues were found in 8% of the samples, as in the previous season. Values ranged from ND to 361 µg/kg. The average of the positive samples was 61 µg/kg compared to the 89 µg/kg of the previous season.

Mycotoxin levels lower than the limit of quantitation (< LOQ) as well as limit of detection (< LOD) were seen as having tested negative for calculation purposes. Please see mycotoxin results in Table 24 on pages 78 to 89.

TABLE 2: SOUTH AFRICAN MAIZE CROP QUALITY 2017/2018 (Weighted Averages)

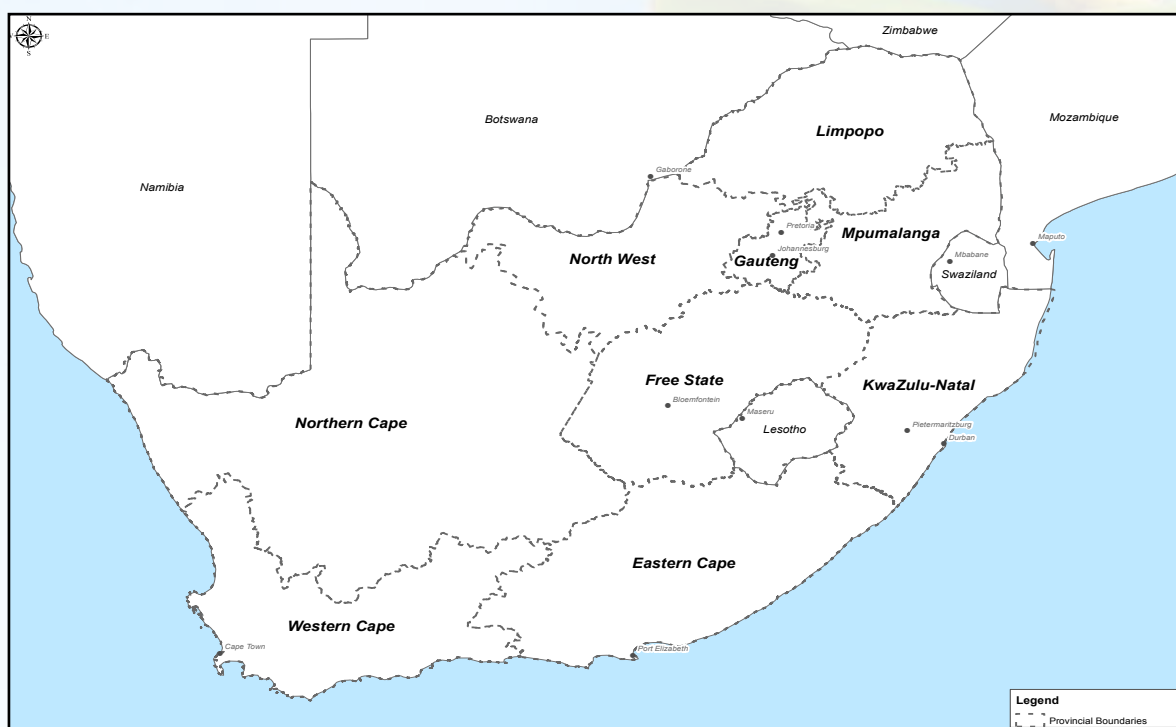
Class and grade of maize	WM1	WM2	WM3	WCOM	YM1	YM2	YM3	YCOM	Weighted Ave.
RSA Grading									
Defective kernels above 6.35 mm sieve, %	2.7	6.1	9.5	16.0	2.7	5.5	11.5	2.3	3.4
Defective kernels below 6.35 mm sieve, %	1.4	2.6	4.9	2.5	1.5	3.8	4.4	1.0	1.8
Total defective kernels, %	4.1	8.7	14.4	18.4	4.2	9.4	15.9	3.3	5.2
Other colour maize kernels, %	0.3	0.5	1.0	0.5	0.1	0.5	0.2	1.4	0.2
Foreign matter, %	0.0	0.1	0.1	1.4	0.0	0.1	0.3	0.8	0.1
Combined deviation, %	4.4	9.2	15.5	20.3	4.4	9.9	16.4	5.5	5.5
Pinked maize kernels, %	0.4	0.4	0.2	0.2	0.0	0.0	0.0	0.0	0.2
Physical Factors									
Test weight, kg/hl	77.5	75.9	74.1	75.1	77.5	75.4	73.3	76.3	77.1
100 Kernel mass, g	34.6	33.8	32.0	32.7	31.7	29.3	27.5	33.9	32.9
Stress cracks, %	10	14	14	11	9	13	14	9	10
Milling Index	79.3	76.3	70.4	74.6	79.9	75.3	75.2	78.7	78.9
Kernel Size									
% on top 10 mm	26.1	27.7	24.4	21.3	11.2	9.8	7.4	17.5	18.7
% on top 8 mm	62.8	62.3	63.3	67.7	67.0	64.5	63.3	65.2	64.7
% through 8 mm	11.2	9.9	12.3	10.9	21.8	25.7	29.4	17.2	16.6
Breakage susceptibility									
% Below 6.35 mm sieve	0.9	1.5	1.4	1.2	0.9	1.4	1.8	0.9	1.0
% Below 4.75 mm sieve	0.7	1.1	1.0	0.8	0.6	1.0	1.2	0.7	0.7
Nutritional Values									
Protein, % (db)	8.7	8.6	8.8	8.7	9.0	9.0	9.3	9.1	8.8
Fat, % (db)	4.1	4.0	3.9	4.2	4.0	4.0	3.8	4.0	4.0
Starch, % (db)	73.2	73.3	72.9	72.6	72.0	71.8	71.6	71.9	72.6
Number of samples	352	71	23	5	400	34	10	5	900
Mycotoxins									
Total Aflatoxin, µg/kg (ppb) [max. value]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]
Total Fumonisin, µg/kg (ppb) [max. value]	226 [8 356]	393 [7 328]	100 [499]	538 [1 075]	230 [6 082]	304 [2 109]	233 [708]	0 [0]	244 [8 356]
Deoxynivalenol, µg/kg (ppb) [max. value]	441 [3 510]	788 [2 812]	558 [2 246]	153 [306]	263 [2 348]	373 [1 956]	404 [949]	54 [214]	393 [3 510]
15-ADON, µg/kg (ppb) [max. value]	28 [394]	65 [310]	91 [391]	0 [0]	20 [263]	23 [244]	61 [192]	0 [0]	30 [394]
Ochratoxin A, µg/kg (ppb) [max. value]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]
Zearalenone, µg/kg (ppb) [max. value]	6 [361]	8 [91]	3 [32]	0 [0]	3 [86]	6 [121]	12 [58]	0 [0]	5 [361]
HT-2 Toxin, µg/kg (ppb) [max. value]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]
T - 2 Toxin, µg/kg (ppb) [max. value]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]	0 [0]
Number of samples	131	32	10	2	141	25	5	4	350
GMO									
Cry1Ab, % Samples positive (>LOQ of 0.4%)	97	90	60	100	87	100	100	-	91
Cry2Ab, % Samples positive (>LOQ of 0.5%)	88	80	60	100	82	88	67	-	83
CP4 EPSPS, % Samples positive (>LOQ of 0.25%)	100	100	100	100	100	100	100	-	100
Number of samples	34	10	5	1	39	8	3	-	100

Note: Not detected mycotoxin results are reported as 0, see LOQ in Table 24 page 78.

RSA Production Regions

The Republic of South Africa is divided into 9 provinces as illustrated in Figure 1.

Figure 1: RSA Provinces



Provincial map with gratitude to SiQ.

The Republic of South Africa is divided into 9 provinces as illustrated in Figure 1.

The 9 provinces are divided into 36 grain production regions.

The regions are distributed as follows:

Region 1: Namakwaland

Regions 2 to 4: Swartland

Regions 5 and 6: Rûens

Regions 7 and 8: Eastern Cape

Region 9: Karoo

Region 10: Griqualand West

Region 11: Vaalharts

Regions 12 to 20: North West

Regions 21 to 28: Free State

Regions 29 to 33: Mpumalanga

Region 34: Gauteng

Region 35: Limpopo

Region 36: KwaZulu-Natal

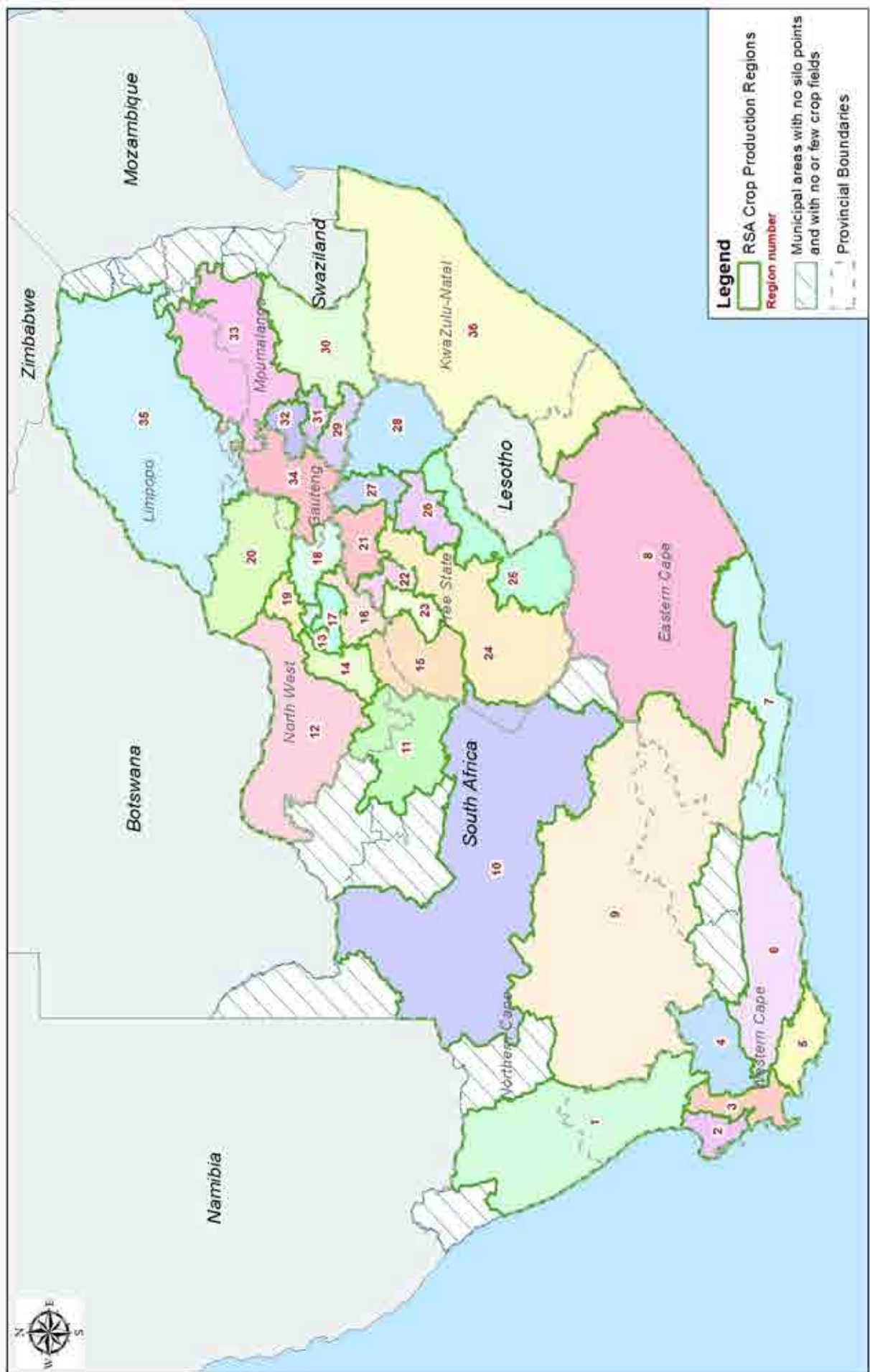
Please see the Crop Production Regions map on the next page.

The production regions from which maize samples have been received for the crop quality survey of the 2017/2018 production season, are named and described on pages 23 to 26. All the silo/intake stands as well as the type of storage structure, situated in a particular region, are provided.

The mostly rain-fed maize production area is divided into four major maize production regions according to climatological characteristics:

- The Warm Western Region (western parts of the Free State and most of the North West)
- The Temperate Eastern Region (Gauteng and the central parts of the Free State)
- The Cold Eastern Region (Mpumalanga Highveld and eastern Free State)
- The KwaZulu-Natal Region (the western/upland and central/midland parts of KZN)

Figure 2: RSA Crop Production Regions



Regional map with gratitude to Agbiz Grain and SiQ.

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

Region 10: Griqualand West Region

GWK	Douglas (Bags/Bins)	GWK	Trans Oranje (Bags/Bins/Bunkers)
GWK	Luckhoff (Bins)	OVK	Havenga Brug (Bins)
GWK	Marydale (Bins)	OVK	Morgenzon (Bins)
GWK	Modderrivier (Bags/Bins/Bulk)	OVK	Oranjerivier (Bins/Bunkers)
GWK	Prieska (Bins/Dams)	OVK	Prieska (Bins/Bunkers)
GWK	Rietrivier (Bins)	OVK	Rietrivier (Bins)

Region 11: Vaalharts Region

GWK	Barkly-Wes (Bins/Bulk)	Senwes	Jan Kempdorp (Bins)
GWK	Jan Kempdorp (Bags/Bunkers)	Senwes	Magogong (Bins)
Senwes	Hartswater (Bins)		

Region 12: North West Western Region

NWK	Blaauwbank (Bins)	NWK	Mareetsane (Bins)
NWK	Bühmannsdrif (Bins)	Suidwes	Kameel (Bins)
NWK	Kameel (Bins)	Suidwes	Vryburg (Bins)

Region 13: North West Central Region (Sannieshof)

NWK	Biesiesvlei (Bins)	NWK	Oppaslaagte (Bins)
NWK	Bossies (Bins)	NWK	Sannieshof (Bins)
NWK	Gerdau (Bins)		

Region 14: North West Southern Region

NWK	Barberspan (Bins)	NWK	Taaibospan (Bins)
NWK	Delareyville (Bins)	Suidwes	Amalia (Bins)
NWK	Excelsior (Bins)	Suidwes	Hallatshope (Bins)
NWK	Geysdorp (Bins)	Suidwes	Migdol (Bins)
NWK	Migdol (Bins)	Suidwes	Schweizer-Reneke (Bins)
NWK	Nooitgedacht (Bins)		

Region 15: North West South-Eastern Region

Suidwes	Bloemhof (Bins)	Suidwes	Kingswood (Bins)
Suidwes	Christiana (Bins)	Suidwes	Kruising (Bunkers)
Suidwes	Hertzogville (Bins)	Suidwes	Poppieland (Bunkers)
Suidwes	Hoopstad (Bins)		

Region 16: North West Central-Eastern Region

Senwes	Klerksdorp (Bins)	Suidwes Landbou	Makwassie (Bins)
Senwes	Regina (Bins)	Suidwes Landbou	Strydpoort (Bins)
Suidwes Landbou	Bamboesspruit (Bins)	Suidwes Landbou	Wolmaranstad (Bins)
Suidwes Landbou	Leeudoringstad (Bins)		

Region 17: North West Central-Northern Region (Ottosdal)

NWK	Boschpoort (Bags/Bins/Bulk)	NWK	Vermaas (Bins)
NWK	Kleinharts (Bins)	Senwes	Hartbeesfontein (Bins)
NWK	Ottosdal (Bins)	Senwes	Melliodora (Bins)
NWK	Rostrataville (Bins)	Senwes	Werda (Bins)



Grain Production Regions (continue)

Silo/Intake stands per region indicating type of storage structure

Region 18: North West Central Region (Ventersdorp)

NWK	Bodenstein (Bins)	Senwes	Makokskraal (Bins)
NWK	Coligny (Bins)	Senwes	Potchefstroom (Bins)
Senwes	Buckingham (Bins)	Senwes	Ventersdorp (Bins)
Senwes	Enselspruit (Bins)		

Region 19: North West Central Region (Lichtenburg)

Afgri	Lichtenburg (Bunkers)	NWK	Lottie Halte (Bins)
NWK	Grootpan (Bins)	NWK	Lusthof (Bins)
NWK	Halfpad (Bins)	NWK	Lichtenburg Silo 3 (Bins)
NWK	Hibernia (Bins)	NWK	Lichtenburg Silo 5 (Bins)

Region 20: North West Eastern Region

Afgri	Battery (Bins)	NWK	Koster (Bins)
Afgri	Brits (Bins)	NWK	Swartruggens (Bins)
NWK	Boons (Bins)	NWK	Syferbult (Bins)
NWK	Derby (Bins)		

Region 21: Free State North-Western Region (Viljoenskroon)

Senwes	Attie (Bins)	Senwes	Vierfontein (Bins)
Senwes	Groenebloem (Bins)	Senwes	Viljoenskroon (Bins)
Senwes	Heuningspruit (Bins)	Senwes	Vredefort (Bins)
Senwes	Koppies (Bins)	Senwes	Weiveld (Bins)
Senwes	Rooiwal (Bins)		

Region 22: Free State North-Western Region (Bothaville)

Senwes	Allanrigde (Bins)	Senwes	Schoonspruit (Bins)
Senwes	Bothaville (Bins)	Senwes	Schuttesdraai (Bins)
Senwes	Mirage (Bins)	Suidwes	Misgunst (Bunkers)
Senwes	Odendaalsrus (Bins)		

Region 23: Free State North-Western Region (Bultfontein)

Senwes	Bultfontein (Bins)	Senwes	Tierfontein (Bins)
Senwes	Losdoorns (Bins)	Senwes	Wesselsbron (Bins)
Senwes	Protespan (Bins)	Senwes	Willemsrus (Bins)

Region 24: Free State Central Region

Senwes	Bloemfontein (Bins)	Senwes	Petrusburg (Bins)
Senwes	Brandfort (Bins)	Senwes	Theunissen (Bins)
Senwes	De Brug (Bins)	Senwes	Van Tonder (Bins)
Senwes	Geneva (Bins)	Senwes	Welgeleë (Bins)
Senwes	Hennenman (Bins)	Senwes	Winburg (Bins)
Senwes	Kroonstad (Bins)		



Grain Production Regions (continue)

Silo/Intake stands per region indicating type of storage structure

Region 25: Free State South-Western Region

Afgri	Bethlehem (Bins)	OVK	Marseilles (Bins)
Afgri	Slabberts (Bins)	OVK	Modderpoort (Bins)
OVK	Clocolan (Bins)	OVK	Tweespruit (Bins)
OVK	Ficksburg (Bins)	OVK	Westminster (Bins)
OVK	Fouriesburg (Bins)		

Region 26: Free State South-Eastern Region

Afgri	Kaallaagte (Bins)	Afgri	Monte Video (Bins)
Afgri	Libertas (Bins)	Afgri	Senekal (Bins)
Afgri	Marquard (Bins)	Senwes	Arlington (Bins)
Afgri	Meets (Bins)	Senwes	Steynsrus (Bins)

Region 27: Free State Northern Region

Senwes	Gottenburg (Bins)	Senwes	Mooigeleë (Bins)
Senwes	Heilbron (Bins)	Senwes	Wolwehoek (Bins)
Senwes	Hoogte Grainlink (Bins)	VKB	Petrus Steyn (Bins)

Region 28: Free State Eastern Region

Afgri	Afrikaskop (Bins/Bunkers)	VKB	Jim Fouché (Bins)
Afgri	Eeram (Bins)	VKB	Memel (Bins)
Afgri	Harrismith (Bins)	VKB	Reitz (Bins)
Afgri	Kransfontein (Bins/Bunkers)	VKB	Tweeling (Bins)
VKB	Ascent (Bins)	VKB	Villiers (Bins/Bulk)
VKB	Cornelia (Bins)	VKB	Vrede (Bins)
VKB	Daniëlsrus (Bins)	VKB	Warden (Bins)
VKB	Frankfort (Bins)	VKB	Windfield (Bins)

Region 29: Mpumalanga Southern Region

Afgri	Balfour (Bins)	Afgri	Leeuspruit (Bins)
Afgri	Greylingstad (Bins)	Afgri	Platrand (Bins)
Afgri	Grootvlei (Bins)	Afgri	Standerton (Bins)
Afgri	Harvard (Bins)	Afgri	Val (Bins)
Afgri	Holmdene (Bins)		

Region 30: Mpumalanga Eastern Region

Afgri	Amersfoort (Bins)	Afgri	Lothair (Bins)
Afgri	Carolina (Bins)	Afgri	Maizefield (Bins)
Afgri	Davel (Bins)	Afgri	Morgenzon (Bins)
Afgri	Eerstelingsfontein (Bunkers)	Afgri	Overtaal (Bins)
Afgri	Ermelo (Bins)	Afgri	Sandspruit (Bunkers)
Afgri	Estancia (Bins)	TWK	Mkondo (Bins)
Afgri	Hendriksvallei (Bunkers)	TWK	Panbult (Bins)



Grain Production Regions (continue)

Silo/Intake stands per region indicating type of storage structure

Region 31: Mpumalanga Central Region

Afgri	Bakenlaagte (Bunkers)	Afgri	Klipfontein (Bunkers)
Afgri	Bethal (Bins)	Afgri	Leslie (Bins)
Afgri	Brakfontein (Bunkers)	Afgri	Palmietfontein (Bunkers)
Afgri	Devon (Bins)	Afgri	Trichardt (Bins)
Afgri	Kinross (Bins/Bunkers)	Afgri	Vaalkrantz (Bunkers)

Region 32: Mpumalanga Western Region

Afgri	Argent (Bins/Bunkers)	Afgri	Hawerklip (Bins)
Afgri	Dryden (Bins)	Afgri	Kendal (Bins)
Afgri	Eloff (Bins)	Afgri	Ogies (Bins)
Afgri	Endicott (Bins)		

Region 33: Mpumalanga Northern Region

Afgri	Arnot (Bins)	Afgri	Middelburg (Bins)
Afgri	Driefontein (Bins)	Afgri	Pan (Bins)
Afgri	Lydenburg (Bins)	Afgri	Stoffberg (Bins)
Afgri	Marble Hall (Bins)	Afgri	Wonderfontein (Bins)

Region 34: Gauteng Region

Afgri	Bloekomspruit (Bins)	Afgri	Nigel (Bins)
Afgri	Bronkhorstspruit (Bins)	Afgri	Pretoria Wes (Bins)
Afgri	Glenroy (Bins)	Afgri	Vogelvallei (Bunkers)
Afgri	Goeie Hoek (Bins)	Senwes	Middelvlei (Bins)
Afgri	Kaalfontein (Bins)	Senwes	Oberholzer (Bins)
Afgri	Kliprivier (Bunkers)	Senwes	Raathsvlei (Bins)
Afgri	Meyerton (Bunkers)		

Region 35: Limpopo Region

Afgri	Northam (Bins)	NTK (VKB)	Nylstroom (Modimolle) (Bins)
NTK (VKB)	Alma (Bins)	NTK (VKB)	Potgietersrus (Mokopane) (Bins)
NTK (VKB)	Lehau (Bins)	NTK (VKB)	Roedtan (Bins)
NTK (VKB)	Naboomspruit (Mookgophong) (Bins)	NTK (VKB)	Settlers (Bins)
NTK (VKB)	Nutfield (Bins)	NTK (VKB)	Warmbad (Bela-Bela) (Bins)

Region 36: KwaZulu-Natal Region

Afgri	Bergville (Bins/Bunkers)	Afgri	Paulpietersburg (Bins)
Afgri	Bloedrivier (Bins)	Afgri	Pietermaritzburg (Bins)
Afgri	Dannhauser (Bins)	Afgri	Vryheid (Bins)
Afgri	Dundee (Bins)	Afgri	Winterton (Bins/Bunkers)
Afgri	Mizpah (Bins)		



Main maize producing provinces – comparison of results

The quality of the maize produced in the three main maize production provinces, namely the Free State (regions 21 to 28), Mpumalanga (regions 29 to 33) and North West (regions 12 to 20) are compared below, the figures provided are all weighted averages.

Average test weights expressed in kilogram per hectoliter for white maize, varied from 76.6 in North West to 77.4 in both Mpumalanga and the Free State. Yellow maize ranged between 76.2 kg/hl in the Free State to 77.1 kg/hl in Mpumalanga. The white maize 100 kernel mass values ranged from 33.9 g in Mpumalanga to 34.7 g in the Free State, North West averaged 34.0 g. Yellow maize kernels had the highest average 100 kernel mass in Mpumalanga with 31.3 g, followed by 30.6 g in the Free State and 30.3 g in North West.

Kernel sizes are indicated by the percentage of sample above a 10 mm sieve as well as the percentages above and below a 8 mm sieve. The largest white kernel size with regards to percentage of kernels above the 10 mm sieve, was found in North West (29.5%), in the previous season, North West had the smallest kernel size. The Free State followed closely with 28.8% and the smallest kernel sizes on average was found in Mpumalanga, namely 19.6%. Yellow maize kernels in North West was found to be the largest (as with white maize), averaging 11.9%, followed by Mpumalanga with 11.5% and the Free State with 10.6%.

Little variation was observed with regards to breakage susceptibility between the provinces. North West and the Free State, both with 1.1% had the highest percentage of white maize passing through the 6.35 mm sieve, Mpumalanga averaged 0.9%. Yellow maize varied from 0.9% in Mpumalanga, to 1.0% in North West and 1.1% in the Free State. This indicates that the maize in the Mpumalanga was slightly less susceptible to breakage. The percentage stress cracks on white maize ranged from 9% in Mpumalanga, to 11% in the Free State and 12% in North West. Stress cracks on yellow maize varied from 8% in Mpumalanga to 12% in the Free State, North West averaged 11%. These percentages are slightly higher than in previous seasons.

The percentage total defective kernels, is the sum total of the defective kernels that remained above the 6.35 mm sieve and the defective kernels which passed through the 6.35 mm sieve. Defective kernels include amongst others, mouldy, discoloured, insect damaged and small kernels that can pass through the 6.35 mm round hole sieve. White maize averages ranged from a low of 3.9% in Mpumalanga to a high of 6.0% in North West. The Free State averaged 5.7%. The highest percentage total defective kernels on yellow maize was found in the Free State (5.7%), followed by North West with 5.5% and Mpumalanga with 3.7%. Please see page 91 for the definition of Defective maize kernels as quoted from the Grading Regulations.

The average milling index on white and yellow maize (yellow maize in brackets) was as follows: Mpumalanga averaged 80.3 (78.7), the Free State 77.3 (76.6) and North West 76.4 (84.7). The highest percentage total extraction as determined on the Roff laboratory mill, was found on white maize from Mpumalanga (79.3%), followed by North West with 79.0% and the Free State with 78.8%.

The meal obtained from the white maize in North West gave an average whiteness index of 31.0 (unsifted) and 20.2 (sifted). The Free State had an average of 29.5 (unsifted) and 19.0 (sifted) and Mpumalanga 28.9 (unsifted) and 18.4 (sifted). All averages were higher than last season, indicating slightly whiter meal this season.

The nutritional component analyses namely fat, protein and starch compared well between the three provinces. North West and the Free State both averaged 4.1% fat on white maize, Mpumalanga averaged 3.9%. The average fat content of yellow maize ranged from 4.0% in Mpumalanga to 4.1% for both North West and the Free State (as with white maize). The lowest average protein content on white maize was found in North West (8.6%), the Free State and Mpumalanga both averaged 8.8%. The protein content of yellow maize varied from 9.0% in North West to 9.1% in Mpumalanga and 9.2% in the Free State. North West had the highest average starch content on white maize of 73.4%, followed by the Free State and Mpumalanga both with 72.9%. The yellow maize starch content ranged from a low of 71.4% in the Free State to 71.9% in Mpumalanga and 72.0% in North West. These values are all reported on a dry basis.

TABLE 3: RSA GRADING OF WHITE MAIZE ACCORDING TO GRADE (2017/2018)

Number of samples	Region	% Defective Kernels						% Total defective		% Foreign matter		% Other Colour		% Combined Deviations		% Pinked Kernels		% Diplodia Kernels		% Fusarium Kernels		% Cobrot Kernels									
		Above 6.35 mm sieve		Below 6.35 mm sieve		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.								
		ave.	min.	max.	ave.																			min.	max.	ave.	min.	max.	ave.	min.	max.
GRADE: WM1																															
4	Region 11	2.7	1.1	4.2	1.2	0.6	2.5	3.8	1.8	6.7	0.0	0.0	0.1	0.2	0.0	0.7	4.1	1.8	6.9	0.1	0.0	0.3	0.0	0.0	0.0	0.9	0.2	1.5	0.9	0.2	1.5
14	Region 12	2.7	0.9	5.9	1.8	0.4	5.6	4.5	3.0	6.6	0.0	0.0	0.3	0.0	0.0	0.3	4.5	3.0	6.6	0.7	0.0	5.4	0.2	0.0	1.0	0.4	0.0	1.3	0.6	0.0	2.3
20	Region 13	2.5	0.9	5.1	1.8	0.6	5.0	4.3	1.7	6.4	0.0	0.0	0.2	0.2	0.0	1.2	4.6	1.7	7.3	0.2	0.0	0.7	0.1	0.0	1.2	0.4	0.0	1.0	0.5	0.0	1.9
33	Region 14	2.9	0.2	5.7	1.0	0.1	2.7	3.9	0.3	6.6	0.0	0.0	0.2	0.1	0.0	1.0	4.0	0.3	6.8	0.3	0.0	1.7	0.0	0.0	0.5	0.5	0.0	3.1	0.6	0.0	3.1
7	Region 15	2.8	1.6	3.8	2.0	0.1	3.9	4.8	2.1	6.8	0.0	0.0	0.1	0.0	0.0	0.0	4.8	2.1	6.9	0.2	0.0	0.5	0.1	0.0	0.5	0.8	0.0	2.1	0.9	0.0	2.6
6	Region 16	2.4	0.8	5.3	1.5	0.0	3.0	4.0	0.8	6.7	0.0	0.0	0.0	0.2	0.0	0.8	4.2	1.2	6.8	0.8	0.2	1.4	0.2	0.0	1.5	0.6	0.0	1.7	0.8	0.0	3.2
25	Region 17	2.9	1.0	5.2	1.7	0.5	4.5	4.6	2.6	6.9	0.0	0.0	0.2	0.3	0.0	1.0	4.9	3.0	7.1	0.6	0.0	6.0	0.2	0.0	0.6	0.6	0.0	2.1	0.8	0.0	2.8
14	Region 18	2.7	1.7	4.3	1.7	0.4	3.2	4.4	2.8	7.0	0.1	0.0	0.3	0.2	0.0	0.7	4.7	2.8	7.7	0.5	0.0	1.6	0.2	0.0	1.0	1.0	0.0	2.4	1.2	0.0	2.4
23	Region 19	1.6	0.5	5.4	1.3	0.4	3.8	2.9	1.5	6.8	0.0	0.0	0.2	0.2	0.0	0.7	3.1	1.5	6.8	1.1	0.0	5.5	0.0	0.0	0.0	0.3	0.0	2.9	0.3	0.0	2.9
9	Region 20	2.4	1.2	3.5	1.3	0.6	2.3	3.7	2.2	5.1	0.1	0.0	0.1	0.5	0.0	1.3	4.2	2.9	5.7	0.7	0.0	2.8	0.1	0.0	0.5	0.6	0.0	1.1	0.6	0.0	1.4
11	Region 21	3.2	1.6	4.4	1.6	0.8	2.9	4.8	3.0	6.9	0.1	0.0	0.3	0.2	0.0	0.8	5.1	3.5	7.0	0.1	0.0	0.6	0.2	0.0	0.9	1.1	0.0	2.5	1.2	0.0	3.0
7	Region 22	2.7	1.3	5.4	1.1	0.4	1.9	3.9	2.7	6.3	0.0	0.0	0.2	0.2	0.0	0.7	4.1	2.8	6.6	0.3	0.0	0.7	0.2	0.0	1.0	0.9	0.2	2.1	1.1	0.2	2.4
11	Region 23	2.8	0.8	4.6	1.4	0.4	3.3	4.1	1.3	6.9	0.0	0.0	0.3	0.2	0.0	0.9	4.4	1.3	7.5	0.6	0.0	2.3	0.0	0.0	0.3	0.5	0.0	1.3	0.6	0.0	1.3
12	Region 24	3.7	0.9	6.0	1.8	0.5	4.7	5.5	1.4	7.0	0.0	0.0	0.2	0.2	0.0	0.9	5.7	1.4	7.6	0.3	0.0	1.6	0.0	0.0	0.3	0.7	0.0	1.7	0.7	0.0	1.7
6	Region 26	4.4	3.3	5.6	1.3	0.9	1.6	5.6	4.4	6.9	0.0	0.0	0.2	0.4	0.0	0.8	6.1	4.9	7.5	0.0	0.0	0.1	0.0	0.0	0.0	1.9	1.3	2.5	1.9	1.3	2.5
3	Region 27	2.0	0.9	2.7	2.2	1.1	3.3	4.2	3.1	6.1	0.0	0.0	0.0	0.3	0.0	0.5	4.5	3.1	6.5	0.2	0.2	0.3	0.1	0.0	0.2	0.2	0.0	0.6	0.3	0.0	0.8
13	Region 28	2.7	1.4	4.0	0.9	0.2	1.8	3.6	1.9	4.9	0.0	0.0	0.1	0.1	0.0	0.8	3.7	1.9	5.0	0.4	0.0	2.6	0.1	0.0	0.4	1.0	0.0	2.1	1.1	0.0	2.3
14	Region 29	2.2	0.9	4.2	1.2	0.4	2.7	3.4	1.6	5.5	0.0	0.0	0.2	0.4	0.0	2.1	3.8	1.8	6.9	0.2	0.0	1.4	0.0	0.0	0.2	0.7	0.0	1.9	0.8	0.0	1.9
18	Region 30	2.4	0.5	4.6	1.3	0.3	2.2	3.7	2.0	6.6	0.0	0.0	0.2	0.3	0.0	1.9	4.1	2.2	7.4	0.1	0.0	0.7	0.0	0.0	0.2	0.9	0.0	3.4	1.0	0.0	3.4
9	Region 31	2.4	1.5	3.5	1.0	0.3	1.5	3.4	1.9	4.8	0.0	0.0	0.1	0.6	0.0	2.4	4.0	2.1	7.2	0.4	0.0	1.4	0.1	0.0	0.6	0.7	0.2	1.7	0.7	0.3	1.7
25	Region 32	2.3	0.7	4.6	1.2	0.1	3.2	3.5	1.6	5.8	0.1	0.0	0.2	0.3	0.0	1.4	3.8	1.6	6.9	0.5	0.0	5.8	0.2	0.0	0.7	0.7	0.0	2.1	0.8	0.0	2.9
21	Region 33	3.3	1.3	5.5	1.2	0.2	2.4	4.4	2.2	6.8	0.0	0.0	0.2	0.3	0.0	1.0	4.7	2.2	7.1	0.2	0.0	0.9	0.1	0.0	0.5	0.8	0.0	3.4	0.9	0.0	3.4
30	Region 34	2.7	0.8	5.2	1.5	0.4	2.8	4.2	2.3	6.7	0.0	0.0	0.2	0.5	0.0	2.1	4.8	2.6	7.0	0.6	0.0	2.6	0.0	0.0	0.4	0.9	0.0	2.0	1.0	0.0	2.0
6	Region 35	2.9	1.8	4.7	1.2	0.5	2.1	4.2	2.7	6.9	0.0	0.0	0.1	0.1	0.0	0.2	4.2	2.7	6.9	0.2	0.0	0.4	0.1	0.0	0.5	0.5	0.0	1.0	0.6	0.0	1.5
11	Region 36	3.4	0.8	5.6	1.1	0.1	2.9	4.5	1.0	7.0	0.0	0.0	0.1	0.3	0.0	1.1	4.8	1.0	7.2	0.8	0.0	3.5	0.2	0.0	0.5	0.8	0.0	1.9	0.9	0.2	1.9
352	Ave. WM1	2.7	1.4	4.1	1.4	0.0	0.0	4.4	0.3	7.0	0.0	0.0	0.3	0.3	0.0	2.4	4.4	0.3	7.7	0.4	0.0	6.0	0.1	0.0	1.5	0.7	0.0	3.4	0.8	0.0	3.4
	Min. WM1	0.2	0.0	0.3	0.0	0.0	0.3	0.3	0.0	7.0	0.0	0.0	0.3	0.0	0.0	2.4	4.4	0.3	7.7	0.0	0.0	6.0	0.0	0.0	1.5	0.0	0.0	3.4	0.0	0.0	3.4
	Max. WM1	6.0	5.6	7.0	5.6	0.3	7.0	7.0	0.3	7.0	0.3	0.3	0.3	2.4	2.4	2.4	4.4	0.3	7.7	0.4	0.0	6.0	0.1	0.0	1.5	0.7	0.0	3.4	0.8	0.0	3.4

TABLE 3: RSA GRADING OF WHITE MAIZE ACCORDING TO GRADE (2017/2018) (continue)

Number of samples	Region	% Defective Kernels						% Total defective		% Foreign matter		% Other Colour		% Combined Deviations		% Pinked Kernels		% Diplodia Kernels		% Fusarium Kernels		% Cobrot Kernels										
		Above 6.35 mm sieve		Below 6.35 mm sieve		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.									
		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.							
GRADE: WM2																																
3	Region 13	6.2	5.6	6.8	2.3	1.5	2.8	8.6	7.8	9.5	0.0	0.0	0.0	0.5	0.3	0.7	9.0	8.4	9.8	0.1	0.0	0.4	0.2	0.0	0.5	1.6	0.0	2.6	1.7	0.0	2.6	
3	Region 14	8.5	7.0	9.7	1.4	1.0	1.7	10.2	8.0	11.3	0.1	0.0	0.4	0.5	0.3	0.7	10.8	9.1	11.8	0.1	0.0	0.2	0.3	0.0	0.8	0.9	0.0	2.0	1.2	0.0	2.8	
7	Region 15	6.6	3.8	10.3	2.1	1.1	3.8	8.7	7.4	12.7	0.0	0.0	0.1	0.0	0.0	0.1	8.8	7.4	12.7	0.8	0.0	1.8	0.0	0.0	0.0	0.5	0.0	1.1	0.5	0.0	1.1	
9	Region 16	4.2	1.8	10.3	5.0	0.8	8.8	9.2	7.4	11.3	0.0	0.0	0.1	0.2	0.0	1.4	9.5	7.5	12.2	0.5	0.0	1.2	0.2	0.0	0.8	1.2	0.0	5.0	1.4	0.0	5.0	
2	Region 17	5.2	3.8	6.7	3.0	1.0	5.0	8.2	7.6	8.8	0.0	0.0	0.0	0.5	0.0	0.9	8.7	8.5	8.8	0.7	0.2	1.3	0.0	0.0	0.0	1.3	0.6	1.9	1.3	0.6	1.9	
1	Region 18	1.4	-	-	11.4	-	-	12.8	-	-	0.0	-	-	0.2	-	-	13.0	-	-	0.0	-	-	0.0	-	-	0.7	-	-	0.7	-	-	
5	Region 19	3.6	1.9	7.4	3.4	1.0	6.9	7.0	2.8	11.0	0.2	0.0	0.5	0.9	0.0	3.9	8.1	3.8	11.3	0.3	0.0	0.7	0.2	0.0	0.9	0.9	0.2	2.6	1.1	0.2	3.5	
3	Region 20	6.5	3.8	8.4	2.5	1.2	3.6	9.0	7.4	9.9	0.2	0.0	0.5	0.1	0.0	0.2	9.2	7.6	10.2	0.3	0.2	0.4	0.1	0.0	0.2	1.1	0.0	2.6	1.2	0.0	2.6	
1	Region 21	9.1	-	-	1.6	-	-	10.7	-	-	0.0	-	-	0.0	-	-	10.7	-	-	0.0	-	-	1.2	-	-	1.9	-	-	3.2	-	-	
2	Region 22	7.5	6.7	8.2	1.0	0.8	1.1	8.4	7.5	9.3	0.0	0.0	0.0	0.1	0.0	0.2	8.6	7.8	9.3	0.2	0.2	0.2	0.3	0.0	0.6	1.7	1.5	2.0	2.0	2.0	2.1	
4	Region 23	7.3	6.7	7.9	2.5	1.7	4.1	9.7	8.4	11.2	0.1	0.0	0.2	0.1	0.0	0.6	9.9	8.4	11.8	0.3	0.0	0.7	0.1	0.0	0.3	2.1	0.9	3.3	2.3	0.9	3.6	
5	Region 24	5.9	3.2	8.5	3.3	1.0	5.8	9.2	7.7	10.8	0.0	0.0	0.1	0.1	0.0	0.5	9.3	7.8	10.8	0.2	0.0	0.7	0.0	0.0	0.0	0.6	0.0	1.6	0.6	0.0	1.6	
4	Region 26	5.8	3.6	7.3	1.8	0.6	4.3	7.6	4.4	9.4	0.0	0.0	0.1	2.5	0.0	5.5	10.1	8.4	14.8	0.2	0.0	0.4	0.0	0.0	0.2	1.4	0.0	2.4	1.4	0.0	2.6	
1	Region 28	11.1	-	-	1.3	-	-	12.4	-	-	0.0	-	-	0.3	-	-	12.7	-	-	0.2	-	-	0.0	-	-	6.0	-	-	6.0	-	-	
1	Region 29	10.7	-	-	1.1	-	-	11.9	-	-	0.0	-	-	2.1	-	-	14.0	-	-	0.0	-	-	0.0	-	-	3.3	-	-	3.3	-	-	
3	Region 30	3.2	1.5	6.5	1.5	1.1	2.1	4.6	2.7	7.5	0.3	0.0	0.5	0.5	0.0	0.9	5.4	3.8	8.4	0.2	0.0	0.3	0.1	0.0	0.2	0.8	0.5	1.1	0.9	0.5	1.3	
3	Region 32	4.9	1.7	7.7	1.7	0.8	2.3	6.5	2.5	10.0	0.1	0.0	0.4	1.7	0.2	4.5	8.4	3.1	14.5	0.2	0.0	0.3	0.3	0.0	0.5	1.6	0.5	2.2	1.8	0.8	2.4	
2	Region 33	6.9	6.8	7.1	0.9	0.7	1.1	7.9	7.8	7.9	0.0	0.0	0.0	0.2	0.0	0.3	8.0	7.8	8.2	0.6	0.0	1.3	0.5	0.0	1.0	2.0	1.4	2.6	2.5	1.4	3.5	
7	Region 34	6.8	4.7	9.9	1.9	0.7	2.7	8.7	7.2	11.3	0.0	0.0	0.2	0.1	0.0	0.5	8.8	7.2	11.3	0.8	0.0	2.0	0.5	0.0	1.7	3.0	0.9	5.7	3.6	1.1	6.4	
2	Region 35	9.7	9.0	10.3	1.2	0.9	1.5	10.9	10.6	11.2	0.2	0.1	0.4	0.2	0.0	0.4	11.3	10.6	12.0	0.0	0.0	0.0	0.5	0.5	0.5	0.9	0.7	1.0	1.4	1.2	1.6	
3	Region 36	6.2	4.4	9.0	1.7	0.2	3.1	8.0	7.1	9.3	0.0	0.0	0.1	0.1	0.0	0.2	8.0	7.1	9.3	0.7	0.5	1.0	0.2	0.0	0.4	2.1	1.2	3.3	2.3	1.6	3.3	
71	Ave. WM2	6.1			2.6			8.7			0.1			0.5			9.2			0.4			0.2			1.5			1.7			
	Min. WM2	1.4			0.2			2.5			0.0			0.0			3.1			0.0			0.0			0.0			0.0			
	Max. WM2	11.1			11.4			12.8			0.5			5.5			14.8			2.0			1.7			6.0			6.4			
GRADE: WM3																																
1	Region 12	20.0	-	-	6.0	-	-	26.0	-	-	0.0	-	-	0.4	-	-	26.3	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-	
1	Region 13	8.4	-	-	5.8	-	-	14.2	-	-	0.4	-	-	0.2	-	-	14.7	-	-	0.0	-	-	0.0	-	-	0.7	-	-	0.7	-	-	
2	Region 14	12.3	11.3	13.3	1.5	0.1	2.9	13.8	13.4	14.2	0.1	0.0	0.2	1.6	0.0	3.2	15.5	13.4	17.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	Region 15	19.3	-	-	3.9	-	-	23.2	-	-	0.0	-	-	0.0	-	-	23.2	-	-	0.0	-	-	0.0	-	-	0.9	-	-	0.9	-	-	

TABLE 3: RSA GRADING OF WHITE MAIZE ACCORDING TO GRADE (2017/2018) (continue)

Number of samples	Region	% Defective Kernels						% Total defective			% Foreign matter			% Other Colour			% Combined Deviations			% Pinked Kernels			% Diplodia Kernels			% Fusarium Kernels			% Cobrot Kernels		
		Above 6.35 mm sieve		Below 6.35 mm sieve		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.		
		ave.	min.	max.	ave.																									min.	max.
GRADE: WM3																															
6	Region 16	5.5	1.2	12.4	10.7	1.1	20.7	16.2	13.2	21.9	0.0	0.0	0.3	0.2	0.0	0.5	16.4	13.2	22.1	0.3	0.0	1.4	0.5	0.0	3.1	2.1	0.0	6.5	2.6	0.0	7.3
1	Region 17	3.9	-	-	4.5	-	-	8.3	-	-	0.6	-	-	0.2	-	-	9.1	-	-	0.2	-	-	0.0	-	-	0.6	-	-	0.6	-	-
1	Region 18	12.7	-	-	1.9	-	-	14.6	-	-	0.2	-	-	0.5	-	-	15.3	-	-	2.6	-	-	5.0	-	-	4.4	-	-	9.4	-	-
1	Region 20	9.1	-	-	3.5	-	-	12.6	-	-	0.0	-	-	5.0	-	-	17.6	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-
1	Region 22	12.2	-	-	2.0	-	-	14.2	-	-	0.0	-	-	0.0	-	-	14.2	-	-	0.2	-	-	0.0	-	-	7.1	-	-	7.1	-	-
1	Region 23	10.2	-	-	2.9	-	-	13.1	-	-	0.0	-	-	0.0	-	-	13.1	-	-	0.0	-	-	0.0	-	-	0.5	-	-	0.5	-	-
1	Region 31	1.6	-	-	2.2	-	-	3.8	-	-	0.3	-	-	6.2	-	-	10.4	-	-	0.3	-	-	0.0	-	-	0.5	-	-	0.5	-	-
1	Region 32	2.6	-	-	2.0	-	-	4.6	-	-	0.1	-	-	6.2	-	-	11.0	-	-	0.2	-	-	0.4	-	-	0.2	-	-	0.6	-	-
4	Region 33	11.2	1.6	25.9	1.7	1.0	2.1	13.0	2.6	27.8	0.3	0.0	0.6	0.2	0.0	0.4	13.5	3.4	28.3	0.1	0.0	0.4	0.0	0.0	0.0	0.9	0.5	1.2	0.9	0.5	1.2
1	Region 35	16.2	-	-	2.9	-	-	19.1	-	-	0.0	-	-	0.2	-	-	19.2	-	-	0.0	-	-	0.0	-	-	6.1	-	-	6.1	-	-
23	Ave. WM3	9.5			4.9			14.4			0.1			1.0			15.5			0.2			0.4			1.6			2.0		
	Min. WM3	1.2			0.1			2.6			0.0			0.0			3.4			0.0			0.0			0.0			0.0		
	Max. WM3	25.9			20.7			27.8			0.6			6.2			28.3			2.6			5.0			7.1			9.4		
CLASS: COM																															
1	Region 13	5.7	-	-	2.4	-	-	8.1	-	-	1.0	-	-	0.0	-	-	9.1	-	-	0.0	-	-	0.0	-	-	1.1	-	-	1.1	-	-
2	Region 18	20.6	2.5	38.6	3.3	0.9	5.6	23.8	3.4	44.2	1.5	0.0	3.0	1.1	0.2	2.0	26.4	6.7	46.2	0.1	0.0	0.2	0.0	0.0	0.0	0.9	0.7	1.2	0.9	0.7	1.2
1	Region 20	26.1	-	-	2.6	-	-	28.7	-	-	1.8	-	-	0.0	-	-	30.5	-	-	0.2	-	-	0.0	-	-	0.0	-	-	0.0	-	-
1	Region 21	6.9	-	-	0.7	-	-	7.7	-	-	1.1	-	-	0.2	-	-	8.9	-	-	0.3	-	-	0.5	-	-	5.7	-	-	6.2	-	-
5	Ave. COM	16.0			2.5			18.4			1.4			0.5			20.3			0.2			0.1			1.7			1.8		
	Min. COM	2.5			0.7			3.4			0.0			0.0			6.7			0.0			0.0			0.0			0.0		
	Max. COM	38.6			5.6			44.2			3.0			2.0			46.2			0.3			0.5			5.7			6.2		
451	Ave. white maize	3.7			1.8			5.5			0.1			0.3			5.9			0.4			0.1			0.9			1.0		
	Min. white maize	0.2			0.0			0.3			0.0			0.0			0.3			0.0			0.0			0.0			0.0		
	Max. white maize	38.6			20.7			44.2			3.0			6.2			46.2			6.0			5.0			7.1			9.4		
900	Ave. maize	3.4			1.8			5.2			0.1			0.2			5.5			0.2			0.1			1.0			1.2		
	Min. maize	0.2			0.0			0.3			0.0			0.0			0.3			0.0			0.0			0.0			0.0		
	Max. maize	38.6			20.7			44.2			3.0			6.2			46.2			6.0			5.0			7.1			16.4		

TABLE 4: RSA GRADING OF WHITE MAIZE (2017/2018)

Number of samples	Region	% Defective Kernels						% Total defective		% Foreign matter		% Other Colour		% Combined Deviations		% Pinked Kernels		% Diplodia Kernels		% Fusarium Kernels		% Cobrot Kernels												
		Above 6.35 mm sieve		Below 6.35 mm sieve		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.											
		ave.	min.	max.	ave.																			min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.
GRADE: WHITE																																		
4	Region 11	2.7	1.1	4.2	1.2	0.6	2.5	3.8	1.8	6.7	0.0	0.0	0.1	0.2	0.0	0.7	4.1	1.8	6.9	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.9	0.2	1.5	0.9	0.2	1.5	
15	Region 12	3.8	0.9	20.0	2.1	0.4	6.0	5.9	3.0	26.0	0.0	0.0	0.3	0.0	0.0	0.4	6.0	3.0	26.3	0.7	0.0	5.4	0.2	0.0	1.0	0.4	0.0	1.3	0.6	0.0	2.3	0.6	0.0	2.3
25	Region 13	3.3	0.9	8.4	2.1	0.6	5.8	5.4	1.7	14.2	0.1	0.0	1.0	0.3	0.0	1.2	5.8	1.7	14.7	0.2	0.0	0.7	0.1	0.0	1.2	0.6	0.0	2.6	0.7	0.0	2.6	0.7	0.0	2.6
38	Region 14	3.8	0.2	13.3	1.0	0.1	2.9	4.9	0.3	14.2	0.1	0.0	0.4	0.2	0.0	3.2	5.2	0.3	17.7	0.3	0.0	1.7	0.0	0.0	0.8	0.5	0.0	3.1	0.6	0.0	3.1	0.6	0.0	3.1
15	Region 15	5.7	1.6	19.3	2.2	0.1	3.9	7.9	2.1	23.2	0.0	0.0	0.1	0.0	0.0	0.1	7.9	2.1	23.2	0.5	0.0	1.8	0.0	0.0	0.5	0.7	0.0	2.1	0.7	0.0	2.1	0.7	0.0	2.1
21	Region 16	4.1	0.8	12.4	5.7	0.0	20.7	9.7	0.8	21.9	0.0	0.0	0.3	0.2	0.0	1.4	10.0	1.2	22.1	0.5	0.0	1.4	0.3	0.0	3.1	1.3	0.0	6.5	1.6	0.0	7.3	1.6	0.0	7.3
28	Region 17	3.1	1.0	6.7	1.9	0.5	5.0	5.0	2.6	8.8	0.0	0.0	0.6	0.3	0.0	1.0	5.3	3.0	9.1	0.6	0.0	6.0	0.1	0.0	0.6	0.7	0.0	2.1	0.8	0.0	2.8	0.8	0.0	2.8
18	Region 18	5.2	1.4	38.6	2.4	0.4	11.4	7.6	2.8	44.2	0.2	0.0	3.0	0.3	0.0	2.0	8.2	2.8	46.2	0.5	0.0	2.6	0.4	0.0	5.0	1.2	0.0	4.4	1.6	0.0	9.4	1.6	0.0	9.4
28	Region 19	2.0	0.5	7.4	1.7	0.4	6.9	3.6	1.5	11.0	0.1	0.0	0.5	0.3	0.0	3.9	4.0	1.5	11.3	1.0	0.0	5.5	0.0	0.0	0.9	0.4	0.0	2.9	0.5	0.0	3.5	0.5	0.0	3.5
14	Region 20	5.4	1.2	26.1	1.8	0.6	3.6	7.2	2.2	28.7	0.2	0.0	1.8	0.7	0.0	5.0	8.1	2.9	30.5	0.5	0.0	2.8	0.0	0.0	0.5	0.6	0.0	2.6	0.7	0.0	2.6	0.7	0.0	2.6
13	Region 21	4.0	1.6	9.1	1.5	0.7	2.9	5.5	3.0	10.7	0.2	0.0	1.1	0.2	0.0	0.8	5.8	3.5	10.7	0.1	0.0	0.6	0.3	0.0	1.2	1.5	0.0	5.7	1.8	0.0	6.2	1.8	0.0	6.2
10	Region 22	4.6	1.3	12.2	1.2	0.4	2.0	5.8	2.7	14.2	0.0	0.0	0.2	0.2	0.0	0.7	6.0	2.8	14.2	0.2	0.0	0.7	0.2	0.0	1.0	1.7	0.2	7.1	1.9	0.2	7.1	1.9	0.2	7.1
16	Region 23	4.3	0.8	10.2	1.7	0.4	4.1	6.1	1.3	13.1	0.0	0.0	0.3	0.2	0.0	0.9	6.3	1.3	13.1	0.5	0.0	2.3	0.1	0.0	0.3	0.9	0.0	3.3	1.0	0.0	3.6	1.0	0.0	3.6
17	Region 24	4.4	0.9	8.5	2.2	0.5	5.8	6.6	1.4	10.8	0.0	0.0	0.2	0.2	0.0	0.9	6.8	1.4	10.8	0.3	0.0	1.6	0.0	0.0	0.3	0.7	0.0	1.7	0.7	0.0	1.7	0.7	0.0	1.7
10	Region 26	5.0	3.3	7.3	1.5	0.6	4.3	6.4	4.4	9.4	0.0	0.0	0.2	1.3	0.0	5.5	7.7	4.9	14.8	0.1	0.0	0.4	0.0	0.0	0.2	1.7	0.0	2.5	1.7	0.0	2.6	1.7	0.0	2.6
3	Region 27	2.0	0.9	2.7	2.2	1.1	3.3	4.2	3.1	6.1	0.0	0.0	0.0	0.3	0.0	0.5	4.5	3.1	6.5	0.2	0.2	0.3	0.1	0.0	0.2	0.2	0.0	0.6	0.3	0.0	0.8	0.3	0.0	0.8
14	Region 28	3.3	1.4	11.1	0.9	0.2	1.8	4.2	1.9	12.4	0.0	0.0	0.1	0.1	0.0	0.8	4.4	1.9	12.7	0.4	0.0	2.6	0.1	0.0	0.4	1.4	0.0	6.0	1.5	0.0	6.0	1.5	0.0	6.0
15	Region 29	2.8	0.9	10.7	1.2	0.4	2.7	3.9	1.6	11.9	0.0	0.0	0.2	0.5	0.0	2.1	4.5	1.8	14.0	0.2	0.0	1.4	0.0	0.0	0.2	0.9	0.0	3.3	0.9	0.0	3.3	0.9	0.0	3.3
21	Region 30	2.5	0.5	6.5	1.3	0.3	2.2	3.9	2.0	7.5	0.1	0.0	0.5	0.4	0.0	1.9	4.3	2.2	8.4	0.1	0.0	0.7	0.0	0.0	0.2	0.9	0.0	3.4	0.9	0.0	3.4	0.9	0.0	3.4
10	Region 31	2.4	1.5	3.5	1.1	0.3	2.2	3.5	1.9	4.8	0.0	0.0	0.3	1.2	0.0	6.2	4.7	2.1	10.4	0.4	0.0	1.4	0.1	0.0	0.6	0.7	0.2	1.7	0.7	0.3	1.7	0.7	0.3	1.7
29	Region 32	2.6	0.7	7.7	1.2	0.1	3.2	3.8	1.6	10.0	0.1	0.0	0.4	0.7	0.0	6.2	4.6	1.6	14.5	0.4	0.0	5.8	0.2	0.0	0.7	0.7	0.0	2.2	0.9	0.0	2.9	0.9	0.0	2.9
27	Region 33	4.7	1.3	25.9	1.3	0.2	2.4	6.0	2.2	27.8	0.1	0.0	0.6	0.2	0.0	1.0	6.3	2.2	28.3	0.3	0.0	1.3	0.1	0.0	1.0	0.9	0.0	3.4	1.0	0.0	3.5	1.0	0.0	3.5
37	Region 34	3.5	0.8	9.9	1.5	0.4	2.8	5.1	2.3	11.3	0.0	0.0	0.2	0.4	0.0	2.1	5.5	2.6	11.3	0.6	0.0	2.6	0.1	0.0	1.7	1.3	0.0	5.7	1.5	0.0	6.4	1.5	0.0	6.4
9	Region 35	5.9	1.8	16.2	1.4	0.5	2.9	7.3	2.7	19.1	0.1	0.0	0.4	0.1	0.0	0.4	7.5	2.7	19.2	0.1	0.0	0.4	0.2	0.0	0.5	1.2	0.0	6.1	1.4	0.0	6.1	1.4	0.0	6.1
14	Region 36	4.0	0.8	9.0	1.2	0.1	3.1	5.2	1.0	9.3	0.0	0.0	0.1	0.2	0.0	1.1	5.5	1.0	9.3	0.8	0.0	3.5	0.2	0.0	0.5	1.0	0.0	3.3	1.2	0.2	3.3	1.2	0.2	3.3
451	Ave. White	3.7	1.8	38.6	1.8	0.0	20.7	5.5	0.3	44.2	0.1	0.0	3.0	0.3	0.0	6.2	5.9	0.3	46.2	0.4	0.0	6.0	0.1	0.0	5.0	0.9	0.0	7.1	1.0	0.0	9.4	1.0	0.0	9.4
	Min. White	0.2	0.0	38.6	0.0	0.0	20.7	0.3	0.3	44.2	0.1	0.0	3.0	0.0	0.0	6.2	5.9	0.3	46.2	0.0	0.0	6.0	0.0	0.0	5.0	0.0	0.0	7.1	0.0	0.0	9.4	0.0	0.0	9.4
	Max. White	3.7	1.8	38.6	1.8	0.0	20.7	5.5	0.3	44.2	0.1	0.0	3.0	0.3	0.0	6.2	5.9	0.3	46.2	0.4	0.0	6.0	0.1	0.0	5.0	0.9	0.0	7.1	1.0	0.0	9.4	1.0	0.0	9.4

TABLE 5: RSA GRADING OF YELLOW MAIZE ACCORDING TO GRADE (2017/2018)

Number of samples	Region	% Defective Kernels						% Total defective		% Foreign matter		% Other Colour		% Combined Deviations		% Pinked Kernels		% Diplodia Kernels		% Fusarium Kernels		% Cobrot Kernels													
		Above 6.35 mm sieve			Below 6.35 mm sieve			ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.										
		ave.	min.	max.	ave.	min.	max.																												
GRADE: YM1																																			
15	Region 10	1.0	0.2	2.3	1.7	0.4	2.7	2.8	0.8	4.8	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.8						
14	Region 11	1.0	0.3	2.5	1.6	0.5	2.7	2.6	1.0	4.5	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.9	0.3	0.0	1.3				
6	Region 12	1.9	1.4	2.2	1.5	0.2	3.2	3.4	2.3	5.4	0.0	0.0	0.1	0.1	0.0	0.2	3.5	2.5	5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.0	1.2				
8	Region 13	2.5	1.0	5.5	1.5	1.1	2.4	4.0	2.3	6.9	0.0	0.0	0.2	0.0	0.0	0.2	4.1	2.3	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.6	1.3	0.3	3.3				
12	Region 14	2.8	0.3	8.0	1.0	0.0	3.4	3.8	1.0	8.0	0.0	0.0	0.2	0.2	0.0	0.8	4.1	1.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	3.2				
1	Region 15	2.5	-	-	1.5	-	-	4.0	-	-	0.0	-	-	0.0	-	-	4.0	-	-	0.0	-	0.0	-	0.0	-	0.0	-	0.6	-	0.6	-				
4	Region 16	2.6	1.2	5.3	2.8	2.0	3.7	5.3	3.3	8.9	0.0	0.0	0.0	0.5	0.0	1.8	5.9	3.7	8.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.7	0.4	0.0	0.7		
7	Region 17	2.1	1.0	3.5	2.0	1.1	3.9	4.1	2.9	4.8	0.0	0.0	0.1	0.4	0.0	1.5	4.5	3.2	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.6	0.0	1.7	0.6	0.0	2.0	
6	Region 18	2.6	1.1	4.7	1.8	0.6	2.7	4.4	2.7	6.0	0.0	0.0	0.2	0.2	0.0	0.6	4.7	2.7	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.3	0.3	3.5	1.3	0.3	3.8	
8	Region 19	1.5	0.2	2.5	1.4	0.4	2.3	2.8	1.7	4.1	0.1	0.0	0.3	0.1	0.0	0.2	3.1	1.7	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.0	1.3	0.4	0.0	1.3	
6	Region 20	3.2	1.1	4.2	1.6	0.2	3.0	4.8	1.3	6.3	0.0	0.0	0.1	0.1	0.0	0.6	4.9	1.9	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	1.0	0.0	2.5	1.1	0.0	2.8	
8	Region 21	2.5	1.5	4.0	1.8	1.0	2.7	4.2	2.4	5.4	0.0	0.0	0.1	0.2	0.0	1.2	4.5	2.4	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.5	1.1	0.0	2.1	1.3	0.0	2.6	
4	Region 22	2.6	2.1	2.9	1.3	0.6	2.3	3.8	3.0	5.2	0.1	0.0	0.1	0.5	0.0	1.3	4.4	3.0	6.6	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.7	0.0	1.2	0.8	0.0	1.2	
4	Region 23	1.5	0.7	2.2	1.3	0.8	1.8	2.8	2.3	3.2	0.0	0.0	0.0	0.0	0.0	0.2	2.8	2.4	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.2	0.7	0.4	0.2	0.7	
7	Region 24	2.7	1.1	4.6	2.1	1.2	3.3	4.8	2.4	5.8	0.1	0.0	0.1	0.4	0.0	1.2	5.2	2.7	6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.0	0.0	2.2	1.0	0.0	2.2	
1	Region 25	1.5	-	-	0.4	-	-	1.8	-	-	0.0	-	-	0.0	-	-	1.8	-	-	0.0	-	0.0	-	0.0	-	0.0	-	-	1.0	-	-	1.0	-	-	
10	Region 26	3.0	1.2	5.1	1.9	0.7	3.4	5.0	1.9	7.4	0.1	0.0	0.3	0.0	0.0	0.1	5.1	2.1	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.2	3.0	1.4	0.2	3.0	
8	Region 27	3.8	2.7	5.6	2.0	0.9	3.4	5.8	4.5	7.6	0.0	0.0	0.1	0.0	0.0	0.2	5.8	4.5	7.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.1	1.1	4.0	2.1	1.1	4.0	
12	Region 28	2.8	0.9	5.6	1.2	0.3	3.0	4.0	2.3	6.6	0.0	0.0	0.0	0.0	0.0	0.2	4.0	2.4	6.6	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.5	1.4	0.2	3.7	1.5	0.2	3.7	
46	Region 29	2.9	0.8	7.0	1.5	0.5	3.4	4.4	1.4	8.2	0.0	0.0	0.2	0.0	0.0	0.5	4.5	1.4	8.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.9	1.5	0.0	3.4	1.6	0.0	4.3	
43	Region 30	2.6	0.6	5.6	1.7	0.3	3.6	4.4	2.3	6.2	0.0	0.0	0.2	0.1	0.0	0.7	4.4	2.3	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	1.3	1.0	0.0	3.1	1.1	0.0	3.8	
51	Region 31	3.2	0.8	5.7	1.5	0.2	3.6	4.8	1.9	7.2	0.0	0.0	0.3	0.0	0.0	0.5	4.8	1.9	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.9	0.9	0.0	3.6	1.1	0.0	4.0	
65	Region 32	3.0	0.8	7.4	1.4	0.0	3.2	4.4	2.1	8.8	0.0	0.0	0.3	0.1	0.0	1.2	4.5	2.1	8.8	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	2.1	1.0	0.0	2.7	1.4	0.0	4.1	
4	Region 33	3.3	2.1	6.4	1.4	0.7	2.2	4.7	2.8	8.0	0.0	0.0	0.1	0.2	0.0	0.7	4.9	3.4	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.4	1.5	0.9	0.4	1.5	
26	Region 34	2.4	0.4	5.2	1.4	0.3	3.8	3.8	2.4	6.0	0.0	0.0	0.2	0.1	0.0	0.2	3.9	2.6	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	1.5	1.1	0.0	3.1	1.3	0.0	3.3	
6	Region 35	3.2	1.8	7.2	1.9	0.9	3.2	5.2	2.7	8.4	0.0	0.0	0.1	0.0	0.0	0.2	5.2	2.7	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	1.4	0.6	0.0	1.4	
18	Region 36	3.4	1.7	6.2	1.0	0.3	2.5	4.4	2.5	6.9	0.0	0.0	0.2	0.1	0.0	1.3	4.5	2.7	8.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	1.4	1.1	0.3	2.4	1.4	0.3	3.7	
400	Ave. YM1	2.7			1.5			4.2	0.8	8.9	0.0	0.0	0.3	0.1	0.0	1.8	4.4	0.8	8.9	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	2.1	1.0	0.0	4.0	1.2	0.0	4.3	
	Min. YM1	0.2			0.0			0.8		8.9			0.3	0.0	0.0	1.8			8.9							0.0						0.0			
	Max. YM1						3.9																			2.1									

TABLE 5: RSA GRADING OF YELLOW MAIZE ACCORDING TO GRADE (2017/2018) (continue)

Number of samples	Region	% Defective Kernels						% Total defective			% Foreign matter			% Other Colour			% Combined Deviations			% Pinked Kernels			% Diplodia Kernels			% Fusarium Kernels			% Cobrot Kernels														
		Above 6.35 mm sieve		Below 6.35 mm sieve		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.														
		ave.	min.	max.	ave.																									min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.
GRADE: YM2																																											
1	Region 12	4.3	-	-	0.2	-	-	4.5	-	-	0.0	-	-	3.2	-	-	7.7	-	-	0.0	-	-	0.0	-	-	2.9	-	-	2.9	-	-	2.9	-	-	0.0	-	-	2.9	-	-			
1	Region 16	1.7	-	-	9.0	-	-	10.7	-	-	0.0	-	-	0.0	-	-	10.7	-	-	0.0	-	-	0.0	-	-	0.8	-	-	0.8	-	-	0.8	-	-	0.8	-	-	0.8	-	-			
1	Region 17	6.9	-	-	3.1	-	-	10.0	-	-	0.2	-	-	0.5	-	-	10.7	-	-	0.0	-	-	0.0	-	-	0.4	-	-	0.4	-	-	0.4	-	-	0.4	-	-	0.4	-	-			
4	Region 18	5.0	2.0	11.0	4.7	2.1	9.0	9.7	6.1	13.2	0.0	0.0	0.0	1.3	0.0	3.7	11.0	8.3	14.7	0.0	0.0	0.0	0.8	0.0	3.1	2.2	0.0	6.0	3.0	0.0	9.1	2.2	0.0	6.0	3.0	0.0	9.1	2.2	0.0	6.0	3.0	0.0	9.1
1	Region 19	5.8	-	-	7.7	-	-	13.5	-	-	0.0	-	-	1.1	-	-	14.6	-	-	0.0	-	-	0.0	-	-	0.5	-	-	0.5	-	-	0.5	-	-	0.5	-	-	0.5	-	-	0.5	-	-
3	Region 20	8.4	2.0	13.1	3.4	1.5	7.1	11.8	9.1	14.8	0.0	0.0	0.1	0.0	0.0	0.0	11.8	9.1	14.9	0.0	0.0	0.0	0.0	0.0	0.0	5.4	0.1	9.7	5.4	0.1	9.7	5.4	0.1	9.7	5.4	0.1	9.7	5.4	0.1	9.7	5.4	0.1	9.7
4	Region 24	3.1	1.5	7.1	4.2	0.5	6.5	7.3	2.8	11.1	0.2	0.1	0.4	0.3	0.0	1.1	7.8	3.2	12.3	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	2.5	1.0	0.0	2.5	1.0	0.0	2.5	1.0	0.0	2.5	1.0	0.0	2.5	1.0	0.0	2.5
2	Region 26	9.4	7.1	11.8	2.7	2.0	3.5	12.1	9.1	15.2	0.1	0.0	0.2	0.0	0.0	0.0	12.2	9.1	15.4	0.0	0.0	0.0	1.2	1.1	1.3	4.8	1.3	8.3	6.0	2.3	9.6	4.8	1.3	8.3	6.0	2.3	9.6	4.8	1.3	8.3	6.0	2.3	9.6
1	Region 27	3.4	-	-	9.4	-	-	12.8	-	-	0.0	-	-	0.2	-	-	13.1	-	-	0.0	-	-	0.2	-	-	2.3	-	-	2.3	-	-	2.3	-	-	2.3	-	-	2.3	-	-	2.3	-	-
4	Region 28	4.7	0.7	10.7	3.8	0.5	6.6	8.6	3.1	11.4	0.1	0.0	0.4	0.6	0.2	1.3	9.3	3.9	11.9	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	4.7	1.5	0.0	4.7	1.5	0.0	4.7	1.5	0.0	4.7	1.5	0.0	4.7	1.5	0.0	4.7
4	Region 29	5.2	0.6	7.9	2.4	1.3	4.1	7.6	4.7	10.3	0.1	0.0	0.4	0.0	0.0	0.0	7.7	4.7	10.3	0.0	0.0	0.0	0.3	0.0	0.8	3.4	0.2	6.6	3.8	0.2	7.5	3.4	0.2	6.6	3.8	0.2	7.5	3.4	0.2	6.6	3.8	0.2	7.5
2	Region 30	1.8	0.8	2.7	4.6	4.4	4.7	6.3	5.6	7.1	0.0	0.0	0.1	0.0	0.0	0.0	6.4	5.6	7.1	0.0	0.0	0.0	0.1	0.0	0.3	0.2	0.1	0.4	0.4	0.1	0.6	0.2	0.1	0.4	0.4	0.1	0.6	0.2	0.1	0.4	0.4	0.1	0.6
1	Region 33	2.2	-	-	1.0	-	-	3.2	-	-	0.0	-	-	2.2	-	-	5.4	-	-	0.0	-	-	0.0	-	-	1.3	-	-	1.3	-	-	1.3	-	-	1.3	-	-	1.3	-	-	1.3	-	-
1	Region 34	2.8	-	-	4.1	-	-	6.9	-	-	0.1	-	-	0.1	-	-	7.0	-	-	0.0	-	-	0.0	-	-	1.0	-	-	1.0	-	-	1.0	-	-	1.0	-	-	1.0	-	-	1.0	-	-
4	Region 36	10.0	5.8	13.9	2.8	0.2	7.4	12.8	8.6	14.8	0.1	0.0	0.4	0.4	0.0	0.8	13.3	9.4	15.2	0.0	0.0	0.0	2.2	0.8	3.8	4.8	1.9	8.5	7.0	3.1	11.6	4.8	1.9	8.5	7.0	3.1	11.6	4.8	1.9	8.5	7.0	3.1	11.6
34	Ave. YM2	5.5			3.8			9.4			0.1			0.5			9.9			0.0			0.5			2.6			3.0			2.6			0.5			0.0			3.0		
	Min. YM2	0.6			0.2			2.8			0.0			0.0			3.2			0.0			0.0			0.0			0.0			0.0			0.0			0.0			0.0		
	Max. YM2	13.9			9.4			15.2			0.4			3.7			15.4			0.0			3.8			9.7			11.6			9.7			3.8			9.7			11.6		

TABLE 5: RSA GRADING OF YELLOW MAIZE ACCORDING TO GRADE (2017/2018) (continue)

Number of samples	Region	% Defective Kernels						% Total defective		% Foreign matter		% Other Colour		% Combined Deviations		% Pinked Kernels		% Diplodia Kernels		% Fusarium Kernels		% Cobrot Kernels		
		Above 6.35 mm sieve		Below 6.35 mm sieve		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	
		ave.	min.	max.	ave.																			min.
GRADE: YM3																								
1	Region 12	21.2	-	-	6.8	-	-	28.0	-	-	0.0	-	-	28.0	-	-	0.0	-	-	0.0	-	-	0.0	-
1	Region 15	20.4	-	-	2.5	-	-	22.9	-	-	0.1	-	-	23.0	-	-	0.0	-	-	0.0	-	-	0.0	-
1	Region 22	20.5	-	-	4.0	-	-	24.5	-	-	0.1	-	-	24.7	-	-	0.0	-	-	16.4	-	-	16.4	-
1	Region 24	15.9	-	-	6.0	-	-	21.9	-	-	0.4	-	-	22.3	-	-	0.0	-	-	0.0	-	-	0.0	-
1	Region 26	4.8	-	-	2.0	-	-	6.8	-	-	0.7	-	-	7.5	-	-	0.0	-	-	1.4	-	-	1.4	-
1	Region 30	2.5	-	-	2.7	-	-	5.1	-	-	0.6	-	-	5.7	-	-	0.0	-	-	0.9	-	-	1.1	-
2	Region 31	3.0	1.6	4.4	2.1	1.3	2.8	5.1	4.4	5.7	0.7	0.6	0.7	5.9	5.2	6.6	0.0	0.0	0.0	0.6	0.5	0.6	0.6	0.5
1	Region 32	4.9	-	-	13.5	-	-	18.5	-	-	0.0	-	-	18.5	-	-	0.0	-	-	2.6	-	-	2.8	-
1	Region 33	18.4	-	-	2.2	-	-	20.6	-	-	0.0	-	-	22.7	-	-	0.0	-	-	1.3	-	-	1.3	-
10	Ave. YM3	11.5			4.4			15.9			0.3			16.4			0.0			0.0			2.4	
	Min. YM3	1.6			1.3			4.4			0.0			5.2			0.0			0.0			0.0	
	Max. YM3	21.2			13.5			28.0			0.7			28.0			0.0			0.0			16.4	
CLASS: COM																								
1	Region 17	2.8	-	-	0.7	-	-	3.5	-	-	0.8	-	-	4.9	-	-	0.0	-	-	0.5	-	-	2.0	-
1	Region 24	1.4	-	-	0.6	-	-	2.1	-	-	0.9	-	-	3.0	-	-	0.0	-	-	1.1	-	-	1.1	-
1	Region 26	2.8	-	-	1.1	-	-	4.0	-	-	1.1	-	-	5.0	-	-	0.0	-	-	0.5	-	-	0.5	-
1	Region 31	2.3	-	-	1.3	-	-	3.7	-	-	1.3	-	-	5.1	-	-	0.0	-	-	0.6	-	-	0.6	-
1	Region 33	1.9	-	-	1.4	-	-	3.3	-	-	0.0	-	-	9.5	-	-	0.0	-	-	0.9	-	-	0.9	-
5	Ave. COM	2.3			1.0			3.3			0.8			5.5			0.0			0.1			0.9	
	Min. COM	1.4			0.6			2.1			0.0			3.0			0.0			0.0			0.5	
	Max. COM	2.8			1.4			4.0			1.3			9.5			0.0			0.5			1.4	
449	Ave. yellow maize	3.1			1.8			4.9			0.1			5.1			0.0			0.2			1.2	
	Min. yellow maize	0.2			0.0			0.8			0.0			0.8			0.0			0.0			0.0	
	Max. yellow maize	21.2			13.5			28.0			1.3			28.0			0.0			3.8			16.4	
900	Ave. maize	3.4			1.8			5.2			0.1			5.5			0.2			0.1			1.0	
	Min. maize	0.2			0.0			0.3			0.0			0.3			0.0			0.0			0.0	
	Max. maize	38.6			20.7			44.2			3.0			46.2			6.0			5.0			16.4	

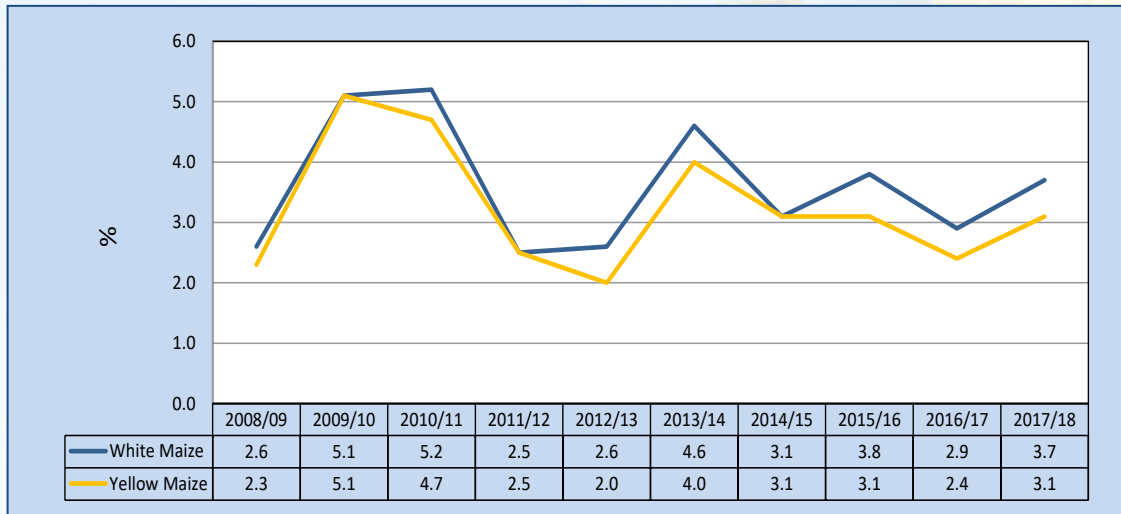
TABLE 6: RSA GRADING OF YELLOW MAIZE (2017/2018)

Number of samples	Region	% Defective Kernels				% Total defective		% Foreign matter		% Other Colour		% Combined Deviations		% Pinked Kernels		% Diplodia Kernels		% Fusarium Kernels		% Cobrot Kernels			
		Above 6.35 mm sieve		Below 6.35 mm sieve		ave.	max.	ave.	max.	ave.	max.	ave.	max.	ave.	max.	ave.	max.	ave.	max.	ave.	max.		
		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	
GRADE: YELLOW																							
15	Region 10	1.0	0.2	2.3	1.7	0.4	2.7	2.8	0.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	
14	Region 11	1.0	0.3	2.5	1.6	0.5	2.7	2.6	1.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	
8	Region 12	4.6	1.4	21.2	2.0	0.2	6.8	6.6	2.3	28.0	0.0	0.0	0.1	0.4	0.0	3.2	7.1	2.5	28.0	0.0	0.0	0.0	2.9
8	Region 13	2.5	1.0	5.5	1.5	1.1	2.4	4.0	2.3	6.9	0.0	0.0	0.2	0.0	0.0	0.2	4.1	2.3	7.0	0.0	0.0	0.0	4.0
12	Region 14	2.8	0.3	8.0	1.0	0.0	3.4	3.8	1.0	8.0	0.0	0.0	0.2	0.2	0.0	0.8	4.1	1.0	8.0	0.0	0.0	0.0	3.2
2	Region 15	11.4	2.5	20.4	2.0	1.5	2.5	13.4	4.0	22.9	0.1	0.0	0.1	0.0	0.0	0.0	13.5	4.0	23.0	0.0	0.0	0.0	0.6
5	Region 16	2.4	1.2	5.3	4.0	2.0	9.0	6.4	3.3	10.7	0.0	0.0	0.0	0.4	0.0	1.8	6.8	3.7	10.7	0.0	0.0	0.0	0.8
9	Region 17	2.7	1.0	6.9	2.0	0.7	3.9	4.7	2.9	10.0	0.1	0.0	0.8	0.4	0.0	1.5	5.2	3.2	10.7	0.0	0.0	0.0	2.0
10	Region 18	3.6	1.1	11.0	3.0	0.6	9.0	6.5	2.7	13.2	0.0	0.0	0.2	0.6	0.0	3.7	7.2	2.7	14.7	0.0	0.0	0.0	9.1
9	Region 19	1.9	0.2	5.8	2.1	0.4	7.7	4.0	1.7	13.5	0.1	0.0	0.3	0.2	0.0	1.1	4.4	1.7	14.6	0.0	0.0	0.0	1.3
9	Region 20	5.0	1.1	13.1	2.2	0.2	7.1	7.1	1.3	14.8	0.0	0.0	0.1	0.1	0.0	0.6	7.2	1.9	14.9	0.0	0.0	0.0	9.7
8	Region 21	2.5	1.5	4.0	1.8	1.0	2.7	4.2	2.4	5.4	0.0	0.0	0.1	0.2	0.0	1.2	4.5	2.4	6.4	0.0	0.0	0.0	2.6
5	Region 22	6.2	2.1	20.5	1.8	0.6	4.0	8.0	3.0	24.5	0.1	0.0	0.1	0.4	0.0	1.3	8.4	3.0	24.7	0.0	0.0	0.0	16.4
4	Region 23	1.5	0.7	2.2	1.3	0.8	1.8	2.8	2.3	3.2	0.0	0.0	0.0	0.0	0.0	0.2	2.8	2.4	3.2	0.0	0.0	0.0	0.7
13	Region 24	3.7	1.1	15.9	2.9	0.5	6.5	6.7	2.1	21.9	0.2	0.0	0.9	0.3	0.0	1.2	7.1	2.7	22.3	0.0	0.0	0.0	2.5
1	Region 25	1.5	-	-	0.4	-	-	1.8	-	-	0.0	-	0.0	-	-	-	1.8	-	-	0.0	-	-	-
14	Region 26	4.1	1.2	11.8	2.0	0.7	3.5	6.1	1.9	15.2	0.2	0.0	1.1	0.0	0.0	0.1	6.3	2.1	15.4	0.0	0.0	0.0	9.6
9	Region 27	3.8	2.7	5.6	2.8	0.9	9.4	6.6	4.5	12.8	0.0	0.0	0.1	0.1	0.0	0.2	6.7	4.5	13.1	0.0	0.0	0.0	4.0
16	Region 28	3.2	0.7	10.7	1.9	0.3	6.6	5.2	2.3	11.4	0.0	0.0	0.4	0.2	0.0	1.3	5.4	2.4	11.9	0.0	0.0	0.0	4.7
50	Region 29	3.1	0.6	7.9	1.6	0.5	4.1	4.7	1.4	10.3	0.0	0.0	0.4	0.0	0.0	0.5	4.7	1.4	10.3	0.0	0.0	0.0	7.5
46	Region 30	2.6	0.6	5.6	1.9	0.3	4.7	4.5	2.3	7.1	0.0	0.0	0.6	0.1	0.0	0.7	4.6	2.3	7.1	0.0	0.0	0.0	3.8
54	Region 31	3.2	0.8	5.7	1.5	0.2	3.6	4.7	1.9	7.2	0.1	0.0	1.3	0.0	0.0	0.5	4.9	1.9	7.4	0.0	0.0	0.0	4.0
66	Region 32	3.1	0.8	7.4	1.6	0.0	13.5	4.6	2.1	18.5	0.0	0.0	0.3	0.1	0.0	1.2	4.7	2.1	18.5	0.0	0.0	0.0	4.1
7	Region 33	5.1	1.9	18.4	1.5	0.7	2.2	6.6	2.8	20.6	0.0	0.0	0.1	1.6	0.0	6.2	8.2	3.4	22.7	0.0	0.0	0.0	1.5
27	Region 34	2.4	0.4	5.2	1.5	0.3	4.1	3.9	2.4	6.9	0.0	0.0	0.2	0.1	0.0	0.2	4.0	2.6	7.0	0.0	0.0	0.0	3.3
6	Region 35	3.2	1.8	7.2	1.9	0.9	3.2	5.2	2.7	8.4	0.0	0.0	0.1	0.0	0.0	0.2	5.2	2.7	8.4	0.0	0.0	0.0	1.4
22	Region 36	4.6	1.7	13.9	1.3	0.2	7.4	5.9	2.5	14.8	0.0	0.0	0.4	0.2	0.0	1.3	6.1	2.7	15.2	0.0	0.0	0.0	11.6
449	Ave. Yellow	3.1	1.8	21.2	1.8	0.0	13.5	4.9	0.8	28.0	0.1	0.0	1.3	0.1	0.0	6.2	5.1	0.8	28.0	0.0	0.0	0.0	16.4
	Min. Yellow	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Max. Yellow	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4

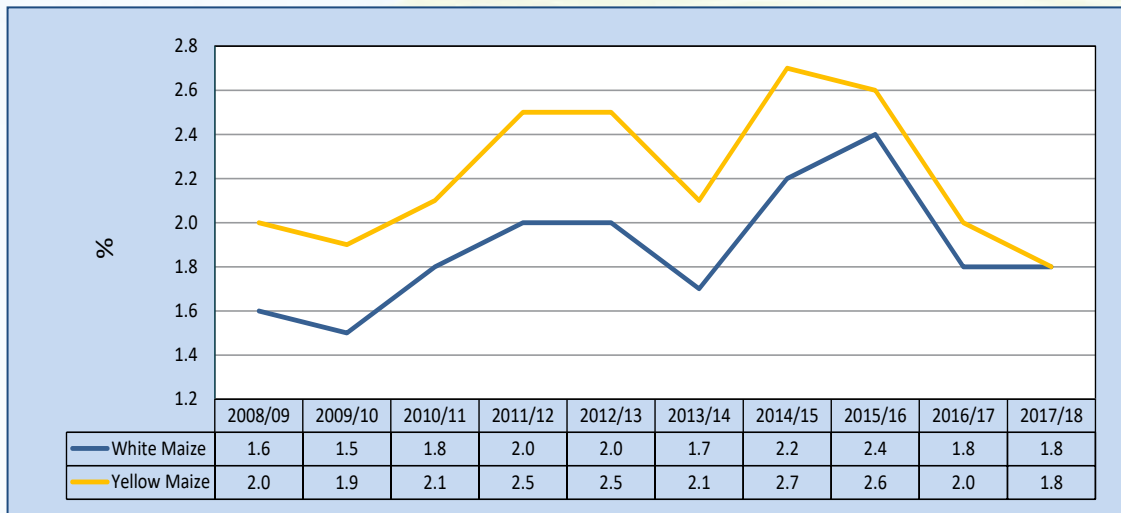
**TABLE 7: GRADING QUALITY OF SOUTH AFRICAN
WHITE AND YELLOW MAIZE 2008/2009 - 2017/2018**

Season	Number of samples	% Defective kernels above 6.35 mm sieve			% Defective kernels below 6.35 mm sieve			% Foreign matter			% Other colour			% Combined deviations		
		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.
White Maize																
2008/09	483	2.6	0.4	16.9	1.6	0.0	5.5	0.2	0.0	4.0	0.2	0.0	5.0	4.5	1.0	20.2
2009/10	458	5.1	1.0	40.1	1.5	0.2	14.0	0.1	0.0	0.4	0.2	0.0	6.5	6.9	1.4	41.4
2010/11	413	5.2	0.5	67.1	1.8	0.1	13.3	0.2	0.0	0.8	0.4	0.0	23.2	7.5	0.9	95.1
2011/12	577	2.5	0.3	21.6	2.0	0.0	8.1	0.1	0.0	1.1	0.3	0.0	43.7	5.0	0.7	51.2
2012/13	508	2.6	0.0	20.8	2.0	0.2	11.4	0.1	0.0	1.5	0.3	0.0	6.5	4.9	1.0	22.4
2013/14	451	4.6	0.6	24.7	1.7	0.1	9.8	0.1	0.0	4.5	0.4	0.0	9.2	6.8	1.9	29.2
2014/15	485	3.1	0.0	30.0	2.2	0.0	25.5	0.1	0.0	1.2	0.4	0.0	9.6	5.8	0.0	35.3
2015/16	415	3.8	0.7	79.9	2.4	0.0	14.5	0.2	0.0	2.2	0.4	0.0	8.0	6.7	1.9	91.5
2016/17	549	2.9	0.3	25.5	1.8	0.1	12.7	0.2	0.0	6.9	0.2	0.0	7.0	5.1	1.1	36.7
2017/18	451	3.7	0.2	38.6	1.8	0.0	20.7	0.1	0.0	3.0	0.3	0.0	6.2	5.9	0.3	46.2
Weighted Average		3.5			1.9			0.1			0.3			5.8		
Minimum			0.0			0.0		0.0			0.0			0.0		
Maximum				79.9			25.5			6.9			43.7			95.1
Yellow Maize																
2008/09	327	2.3	0.5	15.1	2.0	0.0	10.6	0.2	0.0	3.1	0.2	0.0	13.3	4.7	0.9	29.6
2009/10	342	5.1	0.3	23.8	1.9	0.1	12.9	0.2	0.0	4.1	0.1	0.0	4.2	7.2	0.6	25.0
2010/11	280	4.7	0.8	30.9	2.1	0.1	9.6	0.2	0.0	0.4	0.2	0.0	6.2	7.2	1.3	36.9
2011/12	423	2.5	0.4	66.3	2.5	0.2	22.9	0.1	0.0	3.6	0.2	0.0	5.6	5.2	1.0	90.4
2012/13	492	2.0	0.2	23.1	2.5	0.1	14.0	0.1	0.0	1.8	0.2	0.0	8.4	4.8	0.8	25.0
2013/14	479	4.0	0.5	32.3	2.1	0.1	10.5	0.1	0.0	1.9	0.2	0.0	7.8	6.4	1.7	33.7
2014/15	515	3.1	0.6	23.0	2.7	0.0	19.0	0.1	0.0	2.5	0.3	0.0	13.6	6.2	0.6	34.4
2015/16	505	3.1	0.5	24.4	2.6	0.0	18.1	0.2	0.0	1.7	0.2	0.0	4.5	6.0	0.6	32.4
2016/17	451	2.4	0.4	24.3	2.0	0.0	27.4	0.2	0.0	2.8	0.2	0.0	6.9	4.7	1.3	33.5
2017/18	449	3.1	0.2	21.2	1.8	0.0	13.5	0.1	0.0	1.3	0.1	0.0	6.2	5.1	0.8	28.0
Weighted Average		3.1			2.3			0.1			0.2			5.7		
Minimum			0.2			0.0		0.0			0.0			0.6		
Maximum				66.3			27.4			4.1			13.6			90.4
White and Yellow Maize																
2008/09	810	2.5	0.4	16.9	1.8	0.0	10.6	0.2	0.0	4.0	0.2	0.0	13.3	4.6	0.9	29.6
2009/10	800	5.1	0.3	40.1	1.7	0.1	14.0	0.1	0.0	4.1	0.2	0.0	6.5	7.1	0.6	41.4
2010/11	693	5.0	0.5	67.1	1.9	0.1	13.3	0.2	0.0	0.8	0.3	0.0	23.2	7.4	0.9	95.1
2011/12	1000	2.5	0.3	66.3	2.2	0.0	22.9	0.1	0.0	3.6	0.3	0.0	43.7	5.1	0.7	90.4
2012/13	1000	2.0	0.0	23.1	2.3	0.1	14.0	0.1	0.0	1.8	0.3	0.0	8.4	4.9	0.8	25.0
2013/14	930	4.3	0.5	32.3	1.9	0.1	10.5	0.1	0.0	4.5	0.3	0.0	9.2	6.6	1.7	33.7
2014/15	1000	3.1	0.0	30.0	2.5	0.0	25.5	0.1	0.0	2.5	0.3	0.0	13.6	6.0	0.0	35.3
2015/16	920	3.4	0.5	79.9	2.5	0.0	18.1	0.2	0.0	2.2	0.3	0.0	8.0	6.3	0.6	91.5
2016/17	1000	2.6	0.3	25.5	1.9	0.0	27.4	0.2	0.0	6.9	0.2	0.0	7.0	4.9	1.1	36.7
2017/18	900	3.4	0.2	38.6	1.8	0.0	20.7	0.1	0.0	3.0	0.2	0.0	6.2	5.5	0.3	46.2
Weighted Average		3.3			2.1			0.1			0.3			5.8		
Minimum			0.0			0.0		0.0			0.0			0.0		
Maximum				79.9			27.4			6.9			43.7			95.1

Graph 31: Percentage Defective Kernels above the 6.35 mm sieve over 10 seasons



Graph 32: Percentage Defective Kernels below the 6.35 mm sieve over 10 seasons



Graph 33: Percentage Combined deviations over 10 seasons

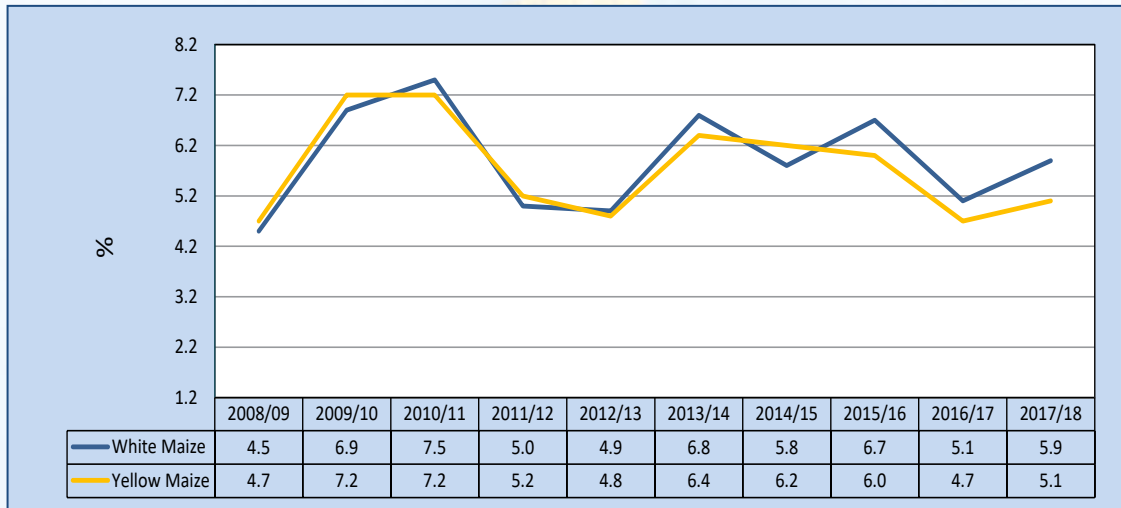


TABLE 8: USA GRADING OF WHITE MAIZE (2017/2018)

Number of samples	Region	Damaged kernels						% Broken corn and foreign material			Bushel weight (lbs)			% Other colour		
		% Heat damaged			% Total damaged			ave.	min.	max.	ave.	min.	max.	ave.	min.	max.
		ave.	min.	max.	ave.	min.	max.									
GRADE: US No.1																
3	Region 11	0.0	0.0	0.0	2.3	1.2	3.0	0.2	0.0	0.3	62.8	62.6	63.1	0.2	0.0	0.7
7	Region 12	0.0	0.0	0.0	2.1	1.1	2.7	0.5	0.1	1.1	60.0	58.4	61.5	0.0	0.0	0.0
12	Region 13	0.0	0.0	0.0	2.3	1.2	3.0	0.4	0.1	0.8	59.4	57.9	60.6	0.2	0.0	0.9
18	Region 14	0.0	0.0	0.0	2.2	0.2	3.0	0.3	0.0	0.8	60.6	58.5	62.8	0.1	0.0	0.7
3	Region 15	0.0	0.0	0.0	2.4	2.0	3.0	1.0	0.0	1.8	60.9	60.4	61.6	0.0	0.0	0.0
5	Region 16	0.0	0.0	0.0	2.0	0.8	2.9	0.6	0.0	1.3	60.0	59.3	61.0	0.3	0.0	0.8
14	Region 17	0.0	0.0	0.1	2.4	1.0	3.0	0.5	0.2	1.1	59.7	58.5	60.6	0.3	0.0	1.0
8	Region 18	0.0	0.0	0.0	2.4	1.8	3.0	0.5	0.1	1.3	60.1	58.7	61.4	0.2	0.0	0.7
22	Region 19	0.0	0.0	0.0	1.4	0.6	2.4	0.4	0.1	1.8	60.4	58.5	62.7	0.2	0.0	0.6
6	Region 20	0.0	0.0	0.0	2.2	1.5	3.0	0.4	0.1	1.1	59.8	59.1	61.6	0.3	0.0	1.2
5	Region 21	0.0	0.0	0.0	2.6	2.3	3.0	0.6	0.1	1.3	61.1	60.3	62.9	0.1	0.0	0.5
3	Region 22	0.0	0.0	0.0	2.4	1.7	2.7	0.3	0.1	0.8	61.2	60.3	61.8	0.1	0.0	0.2
6	Region 23	0.0	0.0	0.0	2.2	0.9	2.9	0.2	0.0	0.7	60.9	59.8	62.6	0.2	0.0	0.9
4	Region 24	0.0	0.0	0.0	2.1	0.9	2.8	0.6	0.1	1.4	60.5	58.5	62.2	0.0	0.0	0.1
3	Region 27	0.0	0.0	0.0	2.2	1.0	3.0	0.7	0.1	1.4	60.2	56.7	62.2	0.3	0.0	0.5
8	Region 28	0.0	0.0	0.0	2.3	1.4	2.9	0.1	0.0	0.2	61.5	60.6	62.7	0.2	0.0	0.8
11	Region 29	0.0	0.0	0.0	2.0	1.1	2.9	0.3	0.1	0.7	60.9	58.1	62.9	0.3	0.0	0.8
12	Region 30	0.0	0.0	0.0	1.9	0.7	2.9	0.5	0.1	1.5	60.3	59.2	61.0	0.4	0.0	1.9
6	Region 31	0.0	0.0	0.0	1.9	1.6	2.6	0.3	0.2	0.7	61.7	61.0	62.5	0.5	0.0	1.4
20	Region 32	0.0	0.0	0.0	1.9	0.9	2.8	0.4	0.0	1.7	60.3	57.7	62.2	0.3	0.0	1.4
8	Region 33	0.0	0.0	0.0	2.0	1.3	2.6	0.5	0.1	1.0	59.7	58.2	61.8	0.4	0.0	1.0
17	Region 34	0.0	0.0	0.0	2.3	0.9	2.9	0.5	0.1	1.6	60.5	58.9	62.3	0.3	0.0	1.0
3	Region 35	0.0	0.0	0.0	2.2	2.2	2.3	0.2	0.0	0.4	60.5	59.4	62.0	0.0	0.0	0.0
4	Region 36	0.0	0.0	0.0	2.0	0.8	2.8	0.2	0.0	0.4	60.4	59.7	61.0	0.3	0.0	1.0
208	Ave. US No.1	0.0			2.1			0.4			60.4			0.2		
	Min. US No.1	0.0			0.2			0.0			56.7			0.0		
	Max. US No.1	0.1			3.0			1.8			63.1			1.9		
GRADE: US No.2																
1	Region 11	0.0	-	-	4.3	-	-	1.1	-	-	62.7	-	-	0.0	-	-
4	Region 12	0.0	0.0	0.2	3.7	3.2	4.9	0.3	0.1	0.6	60.7	60.2	61.3	0.1	0.0	0.3
7	Region 13	0.0	0.0	0.0	3.0	1.1	4.6	0.8	0.2	2.3	58.3	55.3	59.8	0.3	0.0	1.2
12	Region 14	0.0	0.0	0.0	3.7	3.1	4.4	0.2	0.0	0.5	59.6	58.7	61.6	0.2	0.0	1.0
6	Region 15	0.0	0.0	0.0	3.8	3.1	4.4	1.0	0.0	2.1	60.9	60.2	61.3	0.0	0.0	0.1
2	Region 16	0.0	0.0	0.0	3.4	3.2	3.7	2.8	2.7	2.9	59.8	58.8	60.8	0.2	0.0	0.5
9	Region 17	0.0	0.0	0.0	3.8	2.5	5.0	1.1	0.3	2.9	59.5	57.1	60.7	0.2	0.0	0.9
5	Region 18	0.0	0.0	0.0	4.0	3.1	4.8	0.7	0.3	1.5	60.4	58.4	61.2	0.3	0.0	0.5
2	Region 19	0.0	0.0	0.0	3.6	3.5	3.7	0.2	0.1	0.3	60.3	59.4	61.1	0.4	0.0	0.7
4	Region 20	0.0	0.0	0.0	3.5	3.2	4.0	0.8	0.1	1.2	58.6	58.2	59.1	0.6	0.2	1.3
6	Region 21	0.0	0.0	0.0	4.3	4.0	4.6	0.8	0.4	1.4	60.3	58.9	62.7	0.2	0.0	0.8
2	Region 22	0.1	0.0	0.2	2.9	2.1	3.8	0.6	0.2	1.0	60.1	60.0	60.1	0.4	0.1	0.7
3	Region 23	0.0	0.0	0.0	3.7	3.2	4.5	0.2	0.1	0.2	61.4	61.2	61.6	0.1	0.0	0.3
5	Region 24	0.0	0.0	0.0	3.7	2.2	4.8	1.5	0.1	2.8	59.2	58.5	59.9	0.3	0.0	0.9
4	Region 26	0.0	0.0	0.0	4.2	3.5	4.9	0.2	0.1	0.3	56.5	55.8	58.2	0.3	0.0	0.7
5	Region 28	0.0	0.0	0.0	3.7	3.1	4.0	0.2	0.0	0.3	62.3	61.8	63.4	0.1	0.0	0.3
2	Region 29	0.0	0.0	0.0	3.7	3.1	4.3	0.5	0.5	0.5	60.9	59.9	61.8	0.3	0.0	0.6
8	Region 30	0.0	0.0	0.0	3.5	1.2	4.8	0.3	0.1	0.7	59.0	55.3	61.0	0.3	0.0	0.8
2	Region 31	0.0	0.0	0.0	3.6	3.5	3.6	0.2	0.1	0.3	61.0	60.8	61.1	0.0	0.0	0.0
6	Region 32	0.0	0.0	0.0	3.8	3.2	4.7	0.6	0.0	1.8	59.8	57.2	61.7	0.3	0.0	0.9
13	Region 33	0.0	0.0	0.0	3.9	3.3	4.9	0.4	0.0	1.3	60.2	58.4	61.5	0.2	0.0	0.4

TABLE 8: USA GRADING OF WHITE MAIZE (2017/2018) (continue)

Number of samples	Region	Damaged kernels						% Broken corn and foreign material			Bushel weight (lbs)			% Other colour		
		% Heat damaged			% Total damaged			ave.	min.	max.	ave.	min.	max.	ave.	min.	max.
		ave.	min.	max.	ave.	min.	max.									
12	Region 34	0.0	0.0	0.2	3.8	2.5	4.9	0.4	0.0	1.2	59.7	57.3	60.9	0.8	0.0	1.8
2	Region 35	0.1	0.0	0.2	3.5	3.2	3.8	0.3	0.1	0.6	60.8	60.7	60.8	0.2	0.2	0.2
7	Region 36	0.0	0.0	0.0	4.3	3.1	5.0	0.3	0.0	0.9	61.1	59.3	62.8	0.2	0.0	1.1
129	Ave. US No.2	0.0			3.8			0.6			59.9			0.3		
	Min. US No.2	0.0			1.1			0.0			55.3			0.0		
	Max. US No.2	0.2			5.0			2.9			63.4			1.8		
GRADE: US No.3																
3	Region 12	0.0	0.0	0.0	3.3	1.0	5.9	1.6	0.0	3.6	57.9	53.6	61.1	0.0	0.0	0.0
4	Region 13	0.1	0.0	0.2	6.0	5.3	6.4	0.8	0.3	2.0	58.6	58.0	59.1	0.6	0.0	1.0
3	Region 14	0.0	0.0	0.0	5.7	5.5	6.0	0.2	0.1	0.3	59.7	58.9	61.3	0.1	0.0	0.4
2	Region 15	0.0	0.0	0.0	6.7	6.5	6.8	0.2	0.1	0.2	58.5	56.7	60.3	0.0	0.0	0.0
4	Region 16	0.0	0.0	0.0	5.3	4.8	5.9	1.5	0.2	3.5	59.8	58.9	61.0	0.0	0.0	0.1
5	Region 17	0.0	0.0	0.0	5.0	3.2	6.9	0.9	0.1	3.1	59.0	53.5	61.7	0.2	0.0	0.9
2	Region 18	0.1	0.0	0.3	2.9	2.6	3.1	2.0	0.7	3.2	57.2	53.7	60.6	0.1	0.0	0.2
2	Region 19	0.0	0.0	0.0	5.4	5.1	5.6	1.9	0.7	3.1	60.5	59.5	61.4	0.1	0.0	0.2
1	Region 21	0.0	-	-	7.0	-	-	1.2	-	-	62.7	-	-	0.2	-	-
2	Region 22	0.0	0.0	0.0	6.2	5.5	6.8	0.2	0.2	0.2	59.0	58.5	59.4	0.2	0.2	0.2
3	Region 23	0.1	0.0	0.4	5.3	3.8	6.9	1.0	0.7	1.2	60.5	60.3	60.7	0.2	0.0	0.7
6	Region 24	0.1	0.0	0.5	5.5	4.4	6.6	0.5	0.2	1.0	59.3	57.4	61.0	0.2	0.0	0.5
2	Region 26	0.0	0.0	0.0	5.5	5.2	5.8	0.3	0.2	0.5	55.7	55.6	55.8	0.7	0.6	0.8
1	Region 30	0.0	-	-	6.5	-	-	0.2	-	-	60.5	-	-	0.9	-	-
1	Region 32	0.0	-	-	5.5	-	-	0.5	-	-	60.8	-	-	0.5	-	-
3	Region 33	0.0	0.0	0.0	5.9	5.2	7.0	0.4	0.2	0.6	60.7	59.6	61.8	0.2	0.1	0.3
4	Region 34	0.0	0.0	0.0	5.8	5.4	6.1	0.5	0.2	0.7	57.3	57.1	57.6	0.0	0.0	0.0
1	Region 35	0.0	-	-	5.2	-	-	0.4	-	-	61.9	-	-	0.0	-	-
2	Region 36	0.0	0.0	0.0	5.6	5.4	5.7	0.3	0.2	0.4	60.5	60.2	60.8	0.1	0.0	0.2
51	Ave. US No.3	0.0			5.4			0.8			59.2			0.2		
	Min. US No.3	0.0			1.0			0.0			53.5			0.0		
	Max. US No.3	0.5			7.0			3.6			62.7			1.0		
GRADE: US No.4																
2	Region 13	0.0	0.0	0.0	8.1	7.1	9.0	1.9	1.0	2.7	58.7	58.4	58.9	0.2	0.2	0.3
3	Region 14	0.0	0.0	0.0	8.8	7.2	9.9	0.4	0.1	0.8	56.6	55.1	58.5	0.5	0.3	0.7
2	Region 15	0.0	0.0	0.0	7.4	7.2	7.5	0.4	0.3	0.5	57.5	56.2	58.7	0.0	0.0	0.0
1	Region 16	0.0	-	-	1.9	-	-	4.3	-	-	60.5	-	-	0.2	-	-
1	Region 19	0.0	-	-	7.7	-	-	1.6	-	-	59.0	-	-	0.0	-	-
2	Region 20	0.0	0.0	0.0	8.2	7.7	8.7	1.0	1.0	1.1	57.7	54.3	61.0	0.0	0.0	0.0
2	Region 22	0.0	0.0	0.0	8.4	8.4	8.5	0.5	0.4	0.6	60.7	59.8	61.5	0.1	0.0	0.2
2	Region 23	0.0	0.0	0.0	8.0	7.6	8.4	0.8	0.6	0.9	58.3	56.5	60.0	0.0	0.0	0.0
2	Region 24	0.0	0.0	0.0	8.0	7.4	8.6	0.5	0.2	0.7	59.0	58.4	59.5	0.0	0.0	0.0
2	Region 26	0.0	0.0	0.0	7.4	7.3	7.5	0.2	0.1	0.3	58.0	55.9	60.1	0.4	0.0	0.8
1	Region 33	0.0	-	-	7.2	-	-	0.2	-	-	59.8	-	-	0.0	-	-
2	Region 34	0.0	0.0	0.0	8.0	7.2	8.8	0.1	0.1	0.1	57.2	57.0	57.3	0.3	0.0	0.5
1	Region 36	0.0	-	-	9.0	-	-	0.0	-	-	59.7	-	-	0.0	-	-
23	Ave. US No.4	0.0			7.8			0.8			58.4			0.2		
	Min. US No.4	0.0			1.9			0.0			54.3			0.0		
	Max. US No.4	0.0			9.9			4.3			61.5			0.8		
GRADE: US No.5																
1	Region 14	0.0	-	-	13.3	-	-	0.1	-	-	52.6	-	-	0.0	-	-
1	Region 15	0.0	-	-	10.6	-	-	0.4	-	-	59.9	-	-	0.0	-	-
6	Region 16	0.0	0.0	0.0	7.8	3.0	12.8	3.2	0.4	7.0	58.5	56.2	60.6	0.3	0.0	1.4
2	Region 18	0.0	0.0	0.0	7.7	2.3	13.1	3.1	0.5	5.7	59.3	58.8	59.8	0.4	0.2	0.5
1	Region 21	2.2	-	-	9.1	-	-	0.4	-	-	62.0	-	-	0.0	-	-

TABLE 8: USA GRADING OF WHITE MAIZE (2017/2018) (continue)

Number of samples	Region	Damaged kernels						% Broken corn and foreign material			Bushel weight (lbs)			% Other colour		
		% Heat damaged			% Total damaged			ave.	min.	max.	ave.	min.	max.	ave.	min.	max.
		ave.	min.	max.	ave.	min.	max.									
1	Region 22	0.0	-	-	12.5	-	-	0.5	-	-	59.4	-	-	0.0	-	-
2	Region 23	0.6	0.0	1.1	9.0	7.1	10.8	1.8	1.2	2.4	59.4	58.8	60.0	0.3	0.0	0.6
1	Region 28	0.0	-	-	11.8	-	-	0.3	-	-	59.5	-	-	0.3	-	-
1	Region 33	0.0	-	-	14.6	-	-	0.6	-	-	59.8	-	-	0.2	-	-
1	Region 34	0.0	-	-	10.3	-	-	0.2	-	-	59.6	-	-	0.0	-	-
17	Ave. US No.5	0.2			9.6			1.9			58.9			0.2		
	Min. US No.5		0.0			2.3			0.1			52.6			0.0	
	Max.US No.5			2.2		14.6			7.0			62.0				1.4
GRADE: Sample Grade																
1	Region 12	13.2	-	-	20.1	-	-	2.2	-	-	58.7	-	-	0.4	-	-
1	Region 15	0.0	-	-	20.5	-	-	1.1	-	-	57.2	-	-	0.0	-	-
3	Region 16	0.0	0.0	0.0	1.9	1.4	2.7	14.6	10.9	17.4	59.4	58.2	60.2	0.1	0.0	0.3
1	Region 18	32.7	-	-	39.2	-	-	2.7	-	-	58.8	-	-	2.0	-	-
1	Region 20	20.2	-	-	26.6	-	-	2.6	-	-	57.8	-	-	0.0	-	-
1	Region 33	0.0	-	-	26.5	-	-	0.6	-	-	58.8	-	-	0.4	-	-
3	Region 35	2.3	0.0	3.9	12.0	9.0	16.6	0.4	0.1	0.7	59.0	58.5	59.8	0.2	0.0	0.4
11	Ave. Sample Grade	6.6			15.9			4.9			58.8			0.3		
	Min. Sample Grade		0.0			1.4			0.1			57.2			0.0	
	Max. Sample Grade			32.7		39.2			17.4			60.2				2.0
CLASS: Mixed corn																
1	Region 14	0.0	-	-	13.5	-	-	0.6	-	-	49.5	-	-	3.2	-	-
1	Region 19	0.0	-	-	1.9	-	-	0.1	-	-	59.5	-	-	3.9	-	-
1	Region 20	0.0	-	-	9.4	-	-	1.8	-	-	55.0	-	-	5.0	-	-
2	Region 26	0.0	0.0	0.0	4.5	3.7	5.3	0.1	0.1	0.1	59.9	58.9	60.8	4.7	3.9	5.5
2	Region 29	0.0	0.0	0.0	7.3	3.7	10.9	0.3	0.1	0.5	59.4	59.1	59.6	2.1	2.1	2.1
2	Region 31	0.0	0.0	0.0	2.7	1.7	3.7	1.0	0.3	1.8	59.6	58.2	61.0	4.5	2.4	6.5
2	Region 32	0.0	0.0	0.0	5.5	2.9	8.1	0.7	0.7	0.8	60.0	58.9	61.0	5.3	4.5	6.2
1	Region 34	0.0	-	-	1.8	-	-	0.2	-	-	60.6	-	-	2.1	-	-
12	Ave. Mixed corn	0.0			5.6			0.6			58.5			4.0		
	Min. Mixed corn		0.0			1.7			0.1			49.5			2.1	
	Max. Mixed corn			0.0		13.5			1.8			61.0				6.5
451	Ave. white maize	0.2			3.9			0.7			59.9			0.3		
	Min. white maize		0.0			0.2			0.0			49.5			0.0	
	Max. white maize			32.7		39.2			17.4			63.4				6.5
900	Ave. maize	0.1			3.6			0.6			59.9			0.2		
	Min. maize		0.0			0.2			0.0			46.3			0.0	
	Max. maize			32.7		39.2			17.4			64.1				6.5

TABLE 9: USA GRADING OF YELLOW MAIZE (2017/2018)

Number of samples	Region	Damaged kernels						% Broken corn and foreign material			Bushel weight (lbs)			% Other colour		
		% Heat damaged			% Total damaged			ave.	min.	max.	ave.	min.	max.	ave.	min.	max.
		ave.	min.	max.	ave.	min.	max.									
GRADE: US No.1																
15	Region 10	0.0	0.0	0.0	1.2	0.2	2.5	0.5	0.1	1.0	62.0	61.4	62.7	0.0	0.0	0.0
14	Region 11	0.0	0.0	0.0	1.1	0.4	2.9	0.3	0.1	0.6	61.6	59.6	63.6	0.0	0.0	0.0
6	Region 12	0.0	0.0	0.0	1.9	1.4	2.4	0.6	0.0	2.0	60.1	58.3	61.4	0.1	0.0	0.2
5	Region 13	0.0	0.0	0.0	1.8	1.1	2.9	0.5	0.2	0.8	60.1	58.9	60.8	0.1	0.0	0.2
8	Region 14	0.0	0.0	0.0	1.7	0.3	2.3	0.3	0.0	1.1	60.7	58.9	62.2	0.2	0.0	0.8
3	Region 16	0.0	0.0	0.0	1.7	1.3	2.6	0.5	0.4	0.8	60.3	59.6	60.7	0.7	0.0	1.8
5	Region 17	0.0	0.0	0.0	2.2	1.4	2.9	0.8	0.2	1.5	59.9	58.3	60.9	0.3	0.0	0.5
4	Region 18	0.0	0.0	0.0	1.9	1.4	2.2	0.5	0.1	0.8	60.2	60.1	60.4	0.3	0.0	0.6
8	Region 19	0.0	0.0	0.0	1.5	0.3	2.6	0.4	0.1	0.7	60.5	57.8	62.8	0.1	0.0	0.2
1	Region 20	0.0	-	-	1.1	-	-	0.1	-	-	60.4	-	-	0.6	-	-
6	Region 21	0.0	0.0	0.0	2.4	1.7	2.9	0.5	0.1	0.9	60.2	59.4	61.1	0.1	0.0	0.3
4	Region 22	0.0	0.0	0.0	2.6	2.2	2.9	0.6	0.1	1.6	60.7	59.2	62.0	0.5	0.0	1.3
3	Region 23	0.0	0.0	0.0	1.8	1.4	2.4	0.3	0.2	0.5	61.6	60.2	64.1	0.0	0.0	0.0
5	Region 24	0.0	0.0	0.0	1.9	1.2	2.4	0.8	0.1	1.4	58.5	57.6	59.4	0.0	0.0	0.2
1	Region 25	0.0	-	-	1.5	-	-	0.1	-	-	60.2	-	-	0.0	-	-
6	Region 26	0.0	0.0	0.0	2.3	1.5	3.0	0.6	0.2	1.4	58.7	57.4	60.8	0.0	0.0	0.1
2	Region 27	0.0	0.0	0.0	2.9	2.9	3.0	0.5	0.1	0.8	59.1	58.9	59.3	0.0	0.0	0.0
9	Region 28	0.0	0.0	0.0	2.1	0.8	2.9	0.2	0.0	0.7	59.6	57.1	61.0	0.1	0.0	0.4
24	Region 29	0.0	0.0	0.0	1.9	0.8	3.0	0.3	0.1	0.9	60.6	58.4	63.0	0.1	0.0	0.5
30	Region 30	0.0	0.0	0.0	2.0	0.6	2.9	0.5	0.1	1.2	59.1	56.1	61.3	0.1	0.0	0.7
22	Region 31	0.0	0.0	0.0	2.1	1.1	3.0	0.5	0.0	1.8	59.9	57.5	62.5	0.1	0.0	0.5
36	Region 32	0.0	0.0	0.0	2.0	0.8	2.9	0.3	0.0	1.1	59.7	56.5	61.5	0.1	0.0	1.2
4	Region 33	0.0	0.0	0.0	2.5	2.3	3.0	0.2	0.1	0.4	59.0	58.2	59.8	0.7	0.0	2.2
21	Region 34	0.0	0.0	0.0	2.1	0.7	3.0	0.5	0.1	2.0	60.9	58.1	62.9	0.1	0.0	0.2
4	Region 35	0.0	0.0	0.0	2.2	1.8	2.6	0.2	0.1	0.3	60.8	60.4	61.2	0.0	0.0	0.0
8	Region 36	0.0	0.0	0.0	2.3	1.7	3.0	0.2	0.0	0.3	60.9	58.6	62.2	0.1	0.0	0.5
254	Ave. US No.1	0.0			1.9			0.4			60.2			0.1		
	Min. US No.1	0.0			0.2			0.0			56.1			0.0		
	Max. US No.1	0.0			3.0			2.0			64.1			2.2		
GRADE: US No.2																
1	Region 12	0.0	-	-	4.3	-	-	0.1	-	-	58.8	-	-	3.2	-	-
2	Region 13	0.0	0.0	0.0	3.2	3.1	3.4	0.4	0.4	0.4	59.5	59.1	59.8	0.0	0.0	0.0
3	Region 14	0.0	0.0	0.0	4.4	4.0	4.7	0.4	0.1	0.9	59.2	55.8	61.1	0.4	0.2	0.7
1	Region 15	0.2	-	-	2.5	-	-	0.3	-	-	58.9	-	-	0.0	-	-
3	Region 17	0.0	0.0	0.0	2.6	1.0	3.8	1.1	0.3	2.4	59.8	58.1	61.1	0.6	0.0	1.5
4	Region 18	0.0	0.0	0.0	4.0	3.4	4.8	0.9	0.2	2.6	60.8	59.1	61.8	0.1	0.0	0.2
6	Region 20	0.0	0.0	0.0	3.5	2.3	4.4	1.1	0.2	2.8	61.1	60.0	62.7	0.0	0.0	0.0
2	Region 21	0.0	0.0	0.0	3.7	3.2	4.3	0.4	0.2	0.7	60.6	59.6	61.5	0.6	0.0	1.2
5	Region 24	0.0	0.0	0.0	3.2	1.7	4.6	0.8	0.1	2.9	57.6	54.1	59.1	0.5	0.0	1.2
4	Region 26	0.0	0.0	0.0	4.0	3.2	5.0	0.6	0.2	1.2	58.4	55.7	59.9	0.0	0.0	0.0
5	Region 27	0.0	0.0	0.2	3.7	2.5	4.7	0.2	0.0	0.6	59.7	59.1	60.0	0.0	0.0	0.2
3	Region 28	0.0	0.0	0.0	3.7	3.2	4.4	0.2	0.1	0.2	60.6	59.5	61.6	0.1	0.0	0.2
21	Region 29	0.0	0.0	0.0	3.9	3.1	4.8	0.4	0.1	1.2	60.1	57.6	61.8	0.0	0.0	0.3
13	Region 30	0.0	0.0	0.0	3.8	2.7	4.7	0.6	0.1	2.7	59.5	56.8	62.1	0.0	0.0	0.3
24	Region 31	0.0	0.0	0.2	4.0	3.1	4.9	0.4	0.1	1.2	60.4	57.0	62.3	0.0	0.0	0.2
21	Region 32	0.0	0.0	0.2	3.8	2.8	4.7	0.5	0.0	1.7	60.1	58.9	63.5	0.0	0.0	0.4
4	Region 34	0.0	0.0	0.0	4.2	3.2	4.9	0.1	0.1	0.2	59.6	59.1	60.1	0.0	0.0	0.1
1	Region 35	0.0	-	-	3.8	-	-	1.3	-	-	60.8	-	-	0.2	-	-

TABLE 9: USA GRADING OF YELLOW MAIZE (2017/2018) (continue)

Number of samples	Region	Damaged kernels						% Broken corn and foreign material			Bushel weight (lbs)			% Other colour		
		% Heat damaged			% Total damaged			ave.	min.	max.	ave.	min.	max.	ave.	min.	max.
		ave.	min.	max.	ave.	min.	max.									
8	Region 36	0.0	0.0	0.2	4.1	3.1	4.8	0.2	0.0	0.6	60.1	57.4	61.8	0.0	0.0	0.2
131	Ave. US No.2	0.0			3.8			0.5			59.9			0.1		
	Min. US No.2	0.0			1.0			0.0			54.1			0.0		
	Max. US No.2	0.2			5.0			2.9			63.5			3.2		
GRADE: US No.3																
1	Region 13	0.0	-	-	5.6	-	-	0.6	-	-	59.6	-	-	0.0	-	-
2	Region 16	0.0	0.0	0.0	3.6	1.9	5.3	2.4	1.6	3.3	56.9	55.6	58.1	0.0	0.0	0.0
1	Region 19	0.0	-	-	5.8	-	-	3.0	-	-	58.7	-	-	1.1	-	-
1	Region 23	0.3	-	-	0.9	-	-	0.5	-	-	59.5	-	-	0.2	-	-
1	Region 24	0.0	-	-	1.7	-	-	3.5	-	-	57.9	-	-	0.0	-	-
2	Region 26	0.0	0.0	0.0	5.3	5.3	5.3	0.8	0.6	1.0	58.8	57.3	60.3	0.0	0.0	0.0
2	Region 27	0.0	0.0	0.0	4.8	3.9	5.7	2.2	0.4	4.0	58.1	56.6	59.6	0.1	0.0	0.2
3	Region 28	0.0	0.0	0.0	4.7	2.8	5.7	1.5	0.2	3.2	59.0	57.6	60.6	0.6	0.0	1.3
2	Region 29	0.1	0.0	0.2	5.3	5.2	5.4	0.3	0.2	0.3	59.7	58.8	60.6	0.0	0.0	0.0
3	Region 30	0.0	0.0	0.0	5.4	5.3	5.7	0.2	0.1	0.3	61.6	60.6	62.2	0.1	0.0	0.4
8	Region 31	0.2	0.0	0.5	5.2	3.6	6.1	0.4	0.0	1.3	60.2	58.5	61.5	0.0	0.0	0.2
6	Region 32	0.1	0.0	0.3	5.7	5.1	6.7	0.5	0.0	1.4	60.2	59.2	61.9	0.0	0.0	0.0
1	Region 33	0.0	-	-	6.9	-	-	0.4	-	-	58.1	-	-	0.0	-	-
2	Region 34	0.0	0.0	0.0	5.2	5.2	5.2	0.2	0.1	0.2	60.4	60.2	60.5	0.0	0.0	0.0
3	Region 36	0.2	0.0	0.5	5.6	4.9	6.2	0.4	0.0	1.1	58.9	57.3	61.0	0.7	0.0	1.3
38	Ave. US No.3	0.1			5.1			0.8			59.5			0.2		
	Min. US No.3	0.0			0.9			0.0			55.6			0.0		
	Max. US No.3	0.5			6.9			4.0			62.2			1.3		
GRADE: US No.4																
1	Region 14	0.0	-	-	8.0	-	-	0.0	-	-	57.9	-	-	0.0	-	-
1	Region 17	0.0	-	-	7.8	-	-	0.7	-	-	57.7	-	-	0.5	-	-
1	Region 24	0.0	-	-	7.6	-	-	0.8	-	-	57.7	-	-	1.1	-	-
3	Region 29	0.0	0.0	0.0	7.8	7.3	8.2	0.6	0.2	0.9	60.1	59.4	60.9	0.0	0.0	0.0
2	Region 32	0.0	0.0	0.0	7.4	7.2	7.6	0.2	0.1	0.3	59.3	58.2	60.3	0.0	0.0	0.0
1	Region 35	0.0	-	-	7.4	-	-	0.2	-	-	58.4	-	-	0.0	-	-
1	Region 36	0.0	-	-	8.0	-	-	3.7	-	-	57.9	-	-	0.0	-	-
10	Ave. US No.4	0.0			7.7			0.8			58.8			0.2		
	Min. US No.4	0.0			7.2			0.0			57.7			0.0		
	Max. US No.4	0.0			8.2			3.7			60.9			1.1		
GRADE: US No.5																
2	Region 18	0.0	0.0	0.0	6.8	2.3	11.3	2.9	0.6	5.2	60.3	59.6	61.0	0.8	0.0	1.6
2	Region 20	0.0	0.0	0.0	11.8	10.2	13.4	0.3	0.2	0.4	56.7	55.4	57.9	0.0	0.0	0.0
2	Region 26	1.2	0.0	2.4	10.4	7.4	13.4	0.7	0.5	0.8	58.9	58.5	59.3	0.0	0.0	0.0
1	Region 28	0.0	-	-	10.7	-	-	0.1	-	-	57.9	-	-	0.2	-	-
2	Region 36	0.0	0.0	0.0	13.5	13.0	14.1	0.1	0.1	0.1	59.6	58.0	61.2	0.3	0.0	0.6
9	Ave. US No.5	0.3			10.6			0.9			58.8			0.3		
	Min. US No.5	0.0			2.3			0.1			55.4			0.0		
	Max. US No.5	2.4			14.1			5.2			61.2			1.6		

TABLE 9: USA GRADING OF YELLOW MAIZE (2017/2018) (continue)

Number of samples	Region	Damaged kernels						% Broken corn and foreign material			Bushel weight (lbs)			% Other colour		
		% Heat damaged			% Total damaged			ave.	min.	max.	ave.	min.	max.	ave.	min.	max.
		ave.	min.	max.	ave.	min.	max.									
GRADE: Sample Grade																
1	Region 12	0.0	-	-	24.3	-	-	0.9	-	-	46.3	-	-	0.0	-	-
1	Region 15	19.4	-	-	20.4	-	-	1.1	-	-	60.7	-	-	0.0	-	-
1	Region 22	0.0	-	-	21.5	-	-	1.3	-	-	57.7	-	-	0.0	-	-
1	Region 24	0.0	-	-	16.1	-	-	3.1	-	-	54.3	-	-	0.0	-	-
1	Region 32	0.0	-	-	5.4	-	-	11.3	-	-	59.7	-	-	0.0	-	-
1	Region 33	0.0	-	-	18.6	-	-	0.9	-	-	59.5	-	-	2.1	-	-
6	Ave. Sample Grade	3.2			17.7			3.1			56.4			0.4		
	Min. Sample Grade	0.0			5.4			0.9			46.3			0.0		
	Max. Sample Grade	19.4			24.3			11.3			60.7			2.1		
CLASS: Mixed corn																
1	Region 33	0.0	-	-	2.0	-	-	0.5	-	-	60.3	-	-	6.3	-	-
1	Ave. Mixed corn	0.0			2.0			0.5			60.3			6.3		
	Min. Mixed corn	-			-			-			-			-		
	Max. Mixed corn	-			-			-			-			-		
449	Ave. yellow maize	0.1			3.3			0.5			60.0			0.1		
	Min. yellow maize	0.0			0.2			0.0			46.3			0.0		
	Max. yellow maize	19.4			24.3			11.3			64.1			6.3		
900	Ave. maize	0.1			3.6			0.6			59.9			0.2		
	Min. maize	0.0			0.2			0.0			46.3			0.0		
	Max. maize	32.7			39.2			17.4			64.1			6.5		

TABLE 10: STANDARDS FOR GRADES OF CLASS WHITE MAIZE AND CLASS YELLOW MAIZE

Deviation		Maximum permissible deviation					
		White maize			Yellow maize		
		WM1	WM2	WM3	YM1	YM2	YM3
1	Foreign matter	0.3%	0.5%	0.75%	0.3%	0.5%	0.75%
2	Defective maize kernels, above and below the 6.35 mm round-hole sieve	7%	13%	30%	*	*	*
3	Defective maize kernels that can pass through the 6.35 mm round-hole sieve	*	*	*	4%	10%	30%
4	Defective maize kernels that can not pass through the 6.35 mm round-hole sieve	*	*	*	9%	20%	30%
5	Other colour maize kernels	3%	6%	10%	2%	5%	5%
6	Deviations referred to in items 1, 2, 3, 4 and 5 collectively: Provided that the deviations are individually within the specified limits	8%	16%	30%	9%	20%	30%
7	Pinked maize kernels	12%	12%	12%	*	*	*

A consignment of maize shall be classified as Class Other Maize if the consignment does not comply with the standards for Class White Maize or Class Yellow Maize.

* Not specified

Regulations relating to the Grading, Packing and Marking of Maize intended for sale in the Republic of South Africa as published in the Government Gazette No. 32190, Government Notice No. R. 473 of 8 May 2009.

TABLE 11: GRADES AND GRADE REQUIREMENTS FOR CLASS WHITE AND YELLOW MAIZE ACCORDING TO USA GRADING REGULATIONS

Grades	Minimum test weight per bushel (pounds)		Maximum limits of -		
			Damaged kernels		Broken corn and foreign material (percent)
			Heat damaged kernels (percent)	Total (percent)	
U.S. No. 1	56.0	72.1 kg/hl	0.1	3.0	2.0
U.S. No. 2	54.0	69.5 kg/hl	0.2	5.0	3.0
U.S. No. 3	52.0	66.9 kg/hl	0.5	7.0	4.0
U.S. No. 4	49.0	63.1 kg/hl	1.0	10.0	5.0
U.S. No. 5	46.0	59.2 kg/hl	3.0	15.0	7.0
U.S. Sample Grade	< 46.0	<59.2 kg/hl	>3.0	>15.0	>7.0
U.S. Sample grade is corn that:					
a) Does not meet the requirements for the grades U.S. Nos. 1, 2, 3, 4 or 5; or					
b) Contains stones which have an aggregate weight in excess of 0.1 percent of the sample weight, 2 or more pieces of glass, 3 or more crotalaria seeds (<i>Crotalaria spp.</i>), 2 or more castor beans (<i>Ricinus communis L.</i>), 4 or more particles of an unknown foreign substance(s) or a commonly recognized harmful or toxic substance(s), 8 or more cockleburrs (<i>Xanthium spp.</i>) or similar seeds singly or in combination, or animal filth in excess of 0.20 percent in 1,000 grams; or					
c) Has a musty, sour, or commercially objectionable foreign odor; or					
d) Is heating or otherwise of distinctly low quality.					
Mixed corn class	When % other colour in yellow maize samples > 5% and white maize samples > 2%				

Source: Official United States Standard of Grain (excluding metric conversions).

TABLE 12: PHYSICAL QUALITY CHARACTERISTICS OF WHITE MAIZE ACCORDING TO GRADE (2017/2018)

Number of samples	Region	Test weight (kg/ht)			100 kernel mass (g)			Kernel size (%)						Breakage susceptibility (%)						Stress cracks (%)			SAGL Milling index 2018			GVA					
		ave.	min.	max.	ave.	min.	max.	Above 10 mm sieve		Above 8 mm sieve		Below 8 mm sieve		< 6.35 mm sieve		< 4.75 mm sieve		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.					
								ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.										min.	max.			
GRADE: WM1																															
4	Region 11	80.8	80.6	81.2	37.7	32.3	45.8	22.5	5.3	39.0	61.7	56.8	68.1	15.8	4.2	26.6	0.7	0.3	1.1	0.5	0.3	0.9	6	4	8	84.8	79.8	91.9	65.9	64.7	67.7
14	Region 12	76.9	69.0	79.1	34.5	21.9	39.3	37.6	12.8	52.1	54.9	44.8	69.0	7.5	3.1	18.2	0.9	0.4	2.7	0.6	0.1	1.5	13	7	28	77.0	47.9	90.6	64.1	57.0	67.4
20	Region 13	75.9	71.2	77.9	34.2	27.6	41.4	26.3	13.5	42.2	63.2	54.5	72.3	10.5	2.5	24.1	1.0	0.3	2.4	0.8	0.2	1.7	11	5	26	75.5	68.3	89.1	63.7	62.0	67.0
33	Region 14	77.4	75.3	80.9	33.7	27.1	40.9	29.5	11.2	49.6	61.5	46.9	71.8	9.0	3.5	17.0	1.1	0.4	2.4	0.9	0.3	2.0	12	5	30	80.4	65.2	98.6	64.9	61.2	69.3
7	Region 15	78.6	77.8	79.3	36.2	34.6	39.4	40.0	32.2	58.7	54.8	39.8	64.2	5.2	1.5	8.7	0.9	0.5	1.4	0.7	0.3	1.3	10	6	14	81.5	73.9	89.4	65.1	63.3	67.0
6	Region 16	77.5	76.3	78.6	34.7	32.5	39.2	31.1	23.0	50.4	59.8	44.3	66.8	9.1	5.3	11.4	0.7	0.4	1.0	0.6	0.4	0.8	9	5	15	80.7	71.6	88.9	65.0	62.7	66.9
25	Region 17	76.7	68.9	79.4	35.3	22.8	39.7	31.9	8.8	53.8	59.5	41.1	78.0	8.6	4.4	30.7	0.8	0.0	2.2	0.6	0.0	1.6	11	4	23	75.6	48.9	93.2	63.7	57.2	68.0
14	Region 18	77.5	75.2	79.0	33.4	26.6	37.3	24.2	2.8	52.4	62.5	45.4	75.0	13.3	2.2	31.2	1.3	0.3	2.2	1.0	0.1	1.6	11	5	15	77.6	69.1	86.5	64.2	62.2	66.4
23	Region 19	77.9	75.8	80.8	35.6	29.4	43.0	28.7	12.9	44.2	62.7	51.4	75.3	8.6	2.8	15.7	0.6	0.1	1.4	0.4	0.0	1.0	8	2	13	80.1	68.9	90.1	64.8	62.1	67.2
9	Region 20	76.5	75.0	79.3	35.1	32.1	37.1	28.0	15.8	36.2	64.2	56.9	72.9	7.8	4.5	11.3	0.8	0.0	1.4	0.6	0.0	1.1	10	6	16	73.6	64.7	88.3	63.2	61.1	66.8
11	Region 21	78.1	75.9	81.0	36.5	30.3	43.3	33.6	18.5	39.5	59.7	55.4	68.7	6.8	1.9	13.5	0.8	0.1	1.8	0.6	0.0	1.3	8	4	12	81.8	69.9	102.1	65.2	62.3	70.1
7	Region 22	77.9	75.3	79.6	35.8	34.4	37.1	31.9	20.4	45.2	62.3	50.9	72.2	5.8	3.0	7.8	1.1	0.6	1.8	0.9	0.6	1.6	10	6	15	83.5	74.7	88.6	65.6	63.5	66.9
11	Region 23	78.5	76.9	80.6	36.4	33.0	39.0	39.0	30.2	52.4	55.1	42.8	60.3	5.9	3.2	10.5	1.0	0.3	2.1	0.7	0.2	1.6	9	3	14	83.3	72.3	93.1	65.6	62.9	67.9
12	Region 24	77.0	73.9	80.1	33.7	30.3	37.7	27.7	8.7	45.3	62.5	51.8	71.4	9.9	2.9	23.6	1.3	0.1	2.9	1.0	0.0	1.9	11	6	23	79.5	69.1	95.5	64.6	62.1	68.5
6	Region 26	72.4	71.6	74.9	32.5	31.3	34.0	19.9	15.0	29.8	69.7	61.9	73.0	10.4	8.3	12.0	1.0	0.6	1.2	0.7	0.4	1.0	11	9	14	44.7	32.0	60.3	56.3	53.2	60.0
3	Region 27	77.5	73.0	80.1	32.5	31.1	35.1	21.7	18.6	26.6	65.0	62.7	67.1	13.3	8.2	17.4	0.4	0.3	0.4	0.2	0.2	0.3	6	5	8	79.3	64.8	89.1	64.6	61.2	67.0
13	Region 28	79.5	77.9	81.7	34.9	32.0	37.8	19.0	5.4	34.3	68.0	58.1	77.4	13.1	5.9	21.5	0.8	0.3	1.4	0.6	0.2	1.3	9	5	15	81.7	62.4	93.4	65.2	60.5	68.0
14	Region 29	78.3	74.8	80.9	35.6	31.1	41.5	19.1	1.5	34.6	65.8	57.0	76.0	15.1	7.3	26.7	1.0	0.2	2.3	0.7	0.2	1.7	9	3	22	85.2	72.8	98.8	66.0	63.0	69.3
18	Region 30	76.9	71.2	78.6	34.1	29.5	37.2	23.1	8.7	49.1	64.5	43.9	76.7	12.4	7.0	20.0	1.0	0.2	3.8	0.6	0.2	2.4	10	2	29	81.8	74.1	91.0	65.2	63.3	67.5
9	Region 31	78.7	74.9	80.5	34.2	29.5	37.9	17.9	3.4	37.5	67.5	50.4	83.7	14.6	6.6	23.7	0.8	0.1	1.8	0.6	0.1	1.2	7	2	14	79.0	61.6	89.0	64.5	60.4	67.0
25	Region 32	77.6	73.6	80.1	33.7	29.6	36.9	19.9	2.5	36.6	64.6	57.2	76.8	15.4	5.9	32.1	1.0	0.1	2.6	0.7	0.1	1.9	10	3	25	80.9	72.9	96.6	65.0	63.0	68.8
21	Region 33	77.6	74.9	79.6	33.5	29.4	37.3	19.1	7.1	38.2	66.1	49.9	75.8	14.8	5.8	23.2	0.6	0.0	1.1	0.3	0.0	1.0	7	2	14	78.2	65.0	99.2	64.3	61.1	69.4
30	Region 34	77.5	73.9	80.2	35.5	30.4	42.3	24.3	4.5	53.4	63.2	40.4	72.1	12.4	3.6	31.2	0.8	0.2	2.0	0.6	0.1	1.3	8	1	18	80.2	63.0	94.5	64.8	60.7	68.3
6	Region 35	78.3	76.5	79.8	34.3	27.3	43.8	18.9	3.4	51.2	66.1	43.0	73.7	15.0	5.8	27.2	0.6	0.2	0.7	0.5	0.2	0.7	7	4	12	84.4	78.7	91.1	65.9	64.5	67.5
11	Region 36	78.4	76.3	80.9	34.5	28.9	39.6	16.3	3.8	48.8	66.0	49.6	74.6	17.7	1.6	31.1	0.8	0.0	1.8	0.6	0.0	1.2	10	1	22	83.9	76.3	92.6	65.7	63.9	67.9
352	Ave. WM1	77.5	68.9	81.7	34.6	21.9	45.8	26.1	1.5	58.7	62.8	39.8	83.7	11.2	1.5	32.1	0.9	0.0	3.8	0.7	0.0	2.4	10	1	30	79.3	32.0	102.1	64.6	53.2	70.1

TABLE 12: PHYSICAL QUALITY CHARACTERISTICS OF WHITE MAIZE ACCORDING TO GRADE (2017/2018)
(continue)

Number of samples	Region	Test weight (kg/hl)			100 kernel mass (g)			Kernel size (%)			Breakage susceptibility (%)			Stress cracks (%)			SAGL Milling index 2018			GYA											
		ave.	min.	max.	ave.	min.	max.	Above 10 mm sieve	Above 8 mm sieve	Below 8 mm sieve	ave.	min.	max.	< 6.35 mm sieve	< 4.75 mm sieve	ave.	min.	max.	ave.	min.	max.										
GRADE: WM2																															
3	Region 13	75.5	74.7	76.0	30.3	28.2	31.7	21.0	16.9	25.7	65.1	62.8	68.6	13.9	11.5	15.8	1.2	1.1	1.5	0.9	0.7	1.2	16	14	19	74.9	71.2	78.8	63.5	62.6	64.5
3	Region 14	72.9	70.9	75.3	26.8	22.1	33.6	21.9	14.2	35.1	64.5	57.0	70.0	13.5	7.9	16.9	2.3	1.0	3.2	1.7	0.9	2.4	19	8	27	60.2	52.8	72.2	59.9	58.1	62.9
7	Region 15	75.9	72.3	77.9	30.8	25.7	33.8	32.9	24.1	41.0	59.5	53.2	64.9	7.6	5.5	11.0	1.4	1.0	2.0	1.0	0.7	1.3	13	8	28	74.2	62.4	83.5	63.4	60.5	65.6
9	Region 16	76.5	73.1	78.3	35.6	28.6	40.5	34.7	20.9	44.0	57.2	52.4	69.7	8.1	2.7	19.9	1.4	0.4	3.5	1.1	0.3	2.7	14	3	29	76.6	67.9	84.2	64.0	61.8	65.8
2	Region 17	77.5	76.8	78.2	35.4	33.8	36.9	25.5	21.6	29.3	66.0	62.5	69.4	8.6	8.2	9.0	0.8	0.8	0.8	0.6	0.5	0.7	11	8	14	81.1	78.4	83.7	65.0	64.4	65.7
1	Region 18	76.9	-	-	31.8	-	-	28.0	-	-	61.6	-	-	10.4	-	-	0.7	-	-	0.3	-	-	11	-	-	74.7	-	-	63.5	-	-
5	Region 19	76.3	75.3	77.2	34.8	32.4	36.3	35.2	21.3	45.1	55.8	49.9	64.2	9.1	5.0	14.5	1.0	0.4	1.9	0.7	0.3	1.0	12	5	19	76.3	66.2	80.5	63.9	61.4	64.9
3	Region 20	74.4	69.9	78.5	31.8	24.0	42.0	27.4	9.6	57.1	60.1	41.3	69.8	12.6	1.6	20.6	2.1	1.0	3.8	1.3	0.7	2.5	13	10	17	69.3	53.8	81.1	62.2	58.4	65.0
1	Region 21	79.8	-	-	34.4	-	-	21.7	-	-	69.4	-	-	8.9	-	-	0.4	-	-	0.3	-	-	5	-	-	95.1	-	-	68.4	-	-
2	Region 22	76.8	76.5	77.0	34.8	34.2	35.3	37.1	36.4	37.8	57.8	57.4	58.1	5.2	4.8	5.5	0.6	0.4	0.7	0.3	0.2	0.4	10	8	12	77.2	76.5	77.9	64.1	63.9	64.3
4	Region 23	76.2	72.8	77.7	33.3	30.6	35.5	33.7	24.9	42.9	59.2	50.8	67.3	7.1	6.3	7.8	1.9	1.4	3.0	1.4	0.9	2.5	14	8	18	73.9	68.6	81.3	63.3	62.0	65.1
5	Region 24	75.7	74.9	76.6	33.9	31.1	35.9	30.1	26.7	36.1	62.8	58.3	68.2	7.1	4.9	9.8	2.4	1.8	3.0	1.7	1.3	2.2	21	9	27	74.3	67.3	82.1	63.4	61.7	65.3
4	Region 26	75.8	71.9	78.2	32.7	31.2	34.2	22.7	14.4	28.6	66.6	61.9	75.8	10.8	9.5	12.5	1.0	0.5	2.5	0.6	0.3	1.3	12	6	26	64.7	44.0	82.6	61.1	56.1	65.4
1	Region 28	76.6	-	-	35.7	-	-	39.2	-	-	55.8	-	-	5.0	-	-	2.0	-	-	1.6	-	-	4	-	-	72.8	-	-	63.0	-	-
1	Region 29	76.0	-	-	35.7	-	-	10.7	-	-	73.2	-	-	16.1	-	-	2.4	-	-	2.1	-	-	15	-	-	70.2	-	-	62.4	-	-
3	Region 30	77.6	76.7	78.1	31.7	30.9	32.4	12.9	4.0	17.6	69.3	65.7	72.6	17.9	13.5	23.4	0.7	0.4	1.2	0.5	0.3	0.8	4	4	5	79.3	72.4	83.1	64.6	63.0	65.5
3	Region 32	76.1	74.2	78.3	35.2	27.6	41.4	20.7	12.0	34.6	67.6	62.6	74.7	11.7	2.8	18.9	1.8	1.5	2.1	1.2	0.8	1.6	16	13	18	86.1	80.2	89.4	66.3	64.8	67.0
2	Region 33	76.9	76.7	77.0	31.4	29.0	33.8	13.5	8.7	18.2	70.6	69.3	71.9	16.0	9.9	22.0	0.2	0.1	0.3	0.2	0.1	0.3	9	7	10	70.3	64.4	76.3	62.4	61.0	63.9
7	Region 34	74.1	73.3	76.7	38.1	36.0	41.3	28.6	13.9	45.5	62.7	51.1	74.4	8.7	3.4	13.9	1.6	0.7	2.4	1.2	0.6	1.9	18	9	24	86.7	83.1	89.9	66.4	65.5	67.1
2	Region 35	76.2	75.3	77.0	36.3	33.9	38.7	22.5	12.9	32.1	65.9	57.9	73.9	11.6	10.0	13.2	2.0	0.9	3.0	1.4	0.8	2.0	19	8	30	83.6	78.2	89.0	65.6	64.3	66.9
3	Region 36	77.2	76.9	77.5	35.3	32.7	40.2	21.8	13.5	29.3	66.4	59.9	73.0	11.7	10.8	13.5	1.4	0.9	1.8	1.0	0.6	1.5	11	8	16	83.3	79.6	87.0	65.6	64.7	66.5
71	Ave. WM2	75.9			33.8			27.7	4.0	57.1	62.3	41.3	75.8	9.9	1.6	23.4	1.5	0.1	3.8	1.1	0.1	2.7	14	3	30	76.3	44.0	95.1	63.9	56.1	68.4
	Min. WM2	69.9			22.1			4.0		57.1	41.3	75.8	9.9	1.6	23.4	1.5	0.1	3.8	1.1	0.1	2.7	14	3	30	76.3	44.0	95.1	63.9	56.1	68.4	
	Max. WM2	79.8			42.0			57.1		57.1	41.3	75.8	9.9	1.6	23.4	1.5	0.1	3.8	1.1	0.1	2.7	14	3	30	76.3	44.0	95.1	63.9	56.1	68.4	

TABLE 12: PHYSICAL QUALITY CHARACTERISTICS OF WHITE MAIZE ACCORDING TO GRADE (2017/2018)
(continue)

Number of samples	Region	Test weight (kg/ha)			100 kernel mass (g)			Kernel size (%)						Breakage susceptibility (%)						Stress cracks (%)			SAGL Milling index 2018			GYA					
		ave.	min.	max.	ave.	min.	max.	Above 10 mm sieve	Above 8 mm sieve	Below 8 mm sieve	< 6.35 mm sieve	< 4.75 mm sieve	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.				
GRADE: WM3																															
1	Region 12	75.6	-	-	34.0	-	-	30.8	-	-	63.8	-	-	5.4	-	-	1.1	-	-	0.8	-	-	18	-	-	84.5	-	-	65.9	-	-
1	Region 13	75.2	-	-	33.5	-	-	11.6	-	-	67.5	-	-	20.9	-	-	1.8	-	-	1.3	-	-	18	-	-	81.2	-	-	65.1	-	-
2	Region 14	65.8	63.7	67.8	19.7	18.3	21.0	7.6	6.5	8.7	65.6	65.3	65.8	26.9	25.5	28.2	2.0	1.1	2.8	1.6	0.8	2.4	17	13	20	34.6	26.5	42.8	53.7	51.7	55.7
1	Region 15	73.7	-	-	28.8	-	-	30.2	-	-	59.9	-	-	9.9	-	-	2.8	-	-	1.9	-	-	20	-	-	69.8	-	-	62.2	-	-
6	Region 16	75.6	72.3	77.5	34.3	32.0	37.5	27.4	13.3	34.9	64.2	57.4	74.8	8.5	3.8	11.9	1.4	0.4	2.7	1.0	0.3	1.8	14	8	22	75.0	65.6	84.7	63.6	61.3	65.9
1	Region 17	73.5	-	-	32.9	-	-	14.0	-	-	72.9	-	-	13.1	-	-	1.7	-	-	1.2	-	-	14	-	-	64.4	-	-	61.0	-	-
1	Region 18	75.7	-	-	31.1	-	-	18.7	-	-	67.9	-	-	13.4	-	-	1.8	-	-	0.9	-	-	11	-	-	68.8	-	-	62.0	-	-
1	Region 20	70.8	-	-	26.8	-	-	29.3	-	-	61.5	-	-	9.2	-	-	2.6	-	-	1.7	-	-	18	-	-	53.7	-	-	58.3	-	-
1	Region 22	76.4	-	-	35.1	-	-	41.1	-	-	53.0	-	-	5.9	-	-	2.1	-	-	1.4	-	-	16	-	-	66.1	-	-	61.4	-	-
1	Region 23	75.7	-	-	33.0	-	-	40.9	-	-	53.2	-	-	5.9	-	-	1.1	-	-	0.8	-	-	11	-	-	72.4	-	-	62.9	-	-
1	Region 31	78.5	-	-	36.1	-	-	35.6	-	-	55.1	-	-	9.3	-	-	0.7	-	-	0.5	-	-	8	-	-	77.0	-	-	64.1	-	-
1	Region 32	78.5	-	-	30.2	-	-	9.0	-	-	72.8	-	-	18.2	-	-	0.7	-	-	0.5	-	-	11	-	-	74.8	-	-	63.5	-	-
4	Region 33	72.5	63.4	75.7	33.0	31.6	35.5	18.5	7.0	30.9	66.2	60.0	73.1	15.4	6.9	19.9	0.7	0.3	1.4	0.4	0.2	0.9	15	8	30	73.7	68.1	78.3	63.2	61.9	64.4
1	Region 35	75.5	-	-	36.7	-	-	46.7	-	-	46.8	-	-	6.5	-	-	1.8	-	-	1.2	-	-	6	-	-	92.9	-	-	67.9	-	-
23	Ave. WM3	74.1			32.0			24.4			63.3			12.3			1.4			1.0			14			70.4			62.4		
	Min. WM3	63.4			18.3			6.5			46.8			3.8			0.3			0.2			6			26.5			51.7		
	Max. WM3	78.5			37.5			46.7			74.8			28.2			2.8			2.4			30			92.9			67.9		
CLASS: COM																															
1	Region 13	75.5	-	-	34.9	-	-	39.9	-	-	54.2	-	-	5.9	-	-	2.2	-	-	1.3	-	-	17	-	-	70.3	-	-	62.4	-	-
2	Region 18	72.4	69.1	75.7	32.0	31.6	32.3	19.7	12.7	26.7	68.4	60.3	76.5	11.9	10.8	13.0	0.8	0.1	1.5	0.4	0.0	0.8	8	5	11	62.0	52.3	71.8	60.4	58.1	62.7
1	Region 20	74.4	-	-	28.0	-	-	13.8	-	-	71.1	-	-	15.1	-	-	1.8	-	-	1.5	-	-	15	-	-	70.5	-	-	62.5	-	-
1	Region 21	80.7	-	-	36.6	-	-	13.6	-	-	76.5	-	-	9.9	-	-	0.3	-	-	0.3	-	-	6	-	-	108.0	-	-	71.6	-	-
5	Ave. COM	75.1			32.7			21.3			67.7			10.9			1.2			0.8			11			74.6			63.5		
	Min. COM	69.1			28.0			12.7			54.2			5.9			0.1			0.0			5			52.3			58.1		
	Max. COM	80.7			36.6			39.9			76.5			15.1			2.2			1.5			17			108.0			71.6		
451 Ave. white maize																															
	Min. white maize	77.0			34.3			26.2			62.8			11.0			1.0			0.7			11			78.3			64.4		
	Max. white maize	81.7			45.8			58.7			83.7			32.1			3.8			2.7			30			108.0			71.6		
900 Ave. maize																															
	Min. maize	77.1			32.9			18.7			64.7			16.6			1.0			0.7			10			78.9			64.5		
	Max. maize	82.5			45.8			72.4			83.7			62.0			4.7			3.3			38			108.0			71.6		

TABLE 14: PHYSICAL QUALITY CHARACTERISTICS OF YELLOW MAIZE ACCORDING TO GRADE (2017/2018)

Number of samples	Region	Test weight (kg/hl)			100 kernel mass (g)			Kernel size (%)						Breakage susceptibility (%)						Stress cracks (%)			SAGL Milling Index 2018			GYA					
		ave.	min.	max.	ave.	min.	max.	Above 10 mm sieve		Below 8 mm sieve		Below 6.35 mm sieve		< 4.75 mm sieve		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.							
								ave.	min.	max.	ave.	min.	max.	ave.	min.										max.						
GRADE: YM1																															
15	Region 10	79.9	79.0	80.8	38.1	34.7	40.7	5.5	2.0	9.1	73.4	58.4	78.0	21.1	14.8	39.6	0.3	0.1	0.6	0.2	0.1	0.4	8	3	16	78.6	72.4	84.4	64.4	63.0	65.9
14	Region 11	79.3	76.8	81.7	34.6	28.9	39.6	9.9	1.4	72.4	66.5	24.2	76.7	23.6	3.4	33.6	0.9	0.2	4.5	0.6	0.2	3.3	8	3	15	75.2	54.4	88.1	63.6	58.6	66.7
6	Region 12	77.4	75.0	79.0	32.2	28.5	35.6	13.1	6.3	21.7	71.2	66.4	76.6	15.7	8.0	23.6	1.0	0.4	1.5	0.8	0.3	1.3	10	6	14	89.0	71.3	102.4	67.0	62.7	70.2
8	Region 13	77.1	75.8	78.3	29.1	26.0	33.9	9.5	5.5	20.3	71.1	63.0	75.9	19.4	9.9	28.7	0.9	0.5	1.4	0.6	0.3	0.9	10	6	14	88.9	77.7	95.2	66.9	64.2	68.5
12	Region 14	77.4	71.9	80.1	31.4	25.0	40.2	13.7	4.0	25.6	67.4	58.8	73.5	18.9	8.0	36.5	1.0	0.0	1.9	0.8	0.0	1.6	11	3	17	86.8	60.2	98.3	66.4	59.9	69.2
1	Region 15	75.8	-	-	32.2	-	-	5.5	-	-	65.3	-	-	29.2	-	-	0.9	-	-	0.8	-	-	12	-	-	61.0	-	-	60.2	-	-
4	Region 16	76.9	74.8	78.1	30.6	28.0	34.7	11.9	1.4	20.3	64.4	48.7	74.3	23.7	10.3	49.9	1.1	0.6	2.0	0.9	0.6	1.4	12	2	17	81.2	65.4	93.4	65.0	61.2	68.0
7	Region 17	77.2	74.8	78.7	30.3	27.5	32.1	13.8	6.4	19.9	67.3	63.5	76.0	18.9	13.5	24.0	0.9	0.2	1.6	0.8	0.1	1.4	12	11	14	85.0	78.8	93.3	66.0	64.5	68.0
6	Region 18	78.2	77.3	79.5	29.6	28.1	33.8	8.9	4.1	16.9	67.0	61.7	76.0	24.1	15.4	32.1	1.0	0.4	1.5	0.8	0.4	1.1	9	7	12	86.7	80.6	95.3	66.4	64.9	68.4
8	Region 19	77.9	74.4	80.9	31.7	29.0	33.6	15.9	8.7	31.8	67.2	59.2	74.0	16.9	9.0	28.0	0.6	0.2	1.0	0.4	0.0	0.7	9	5	12	90.8	82.0	99.7	67.4	65.3	69.5
6	Region 20	78.1	77.2	79.5	31.0	27.0	34.1	12.5	6.8	26.0	69.7	66.0	76.6	17.9	8.0	24.4	0.9	0.3	2.7	0.7	0.1	1.9	10	6	17	86.1	81.1	88.9	66.3	65.0	66.9
8	Region 21	77.6	76.5	79.2	32.6	29.9	34.3	13.3	5.6	23.8	70.2	64.9	75.3	16.5	11.3	25.6	1.0	0.4	1.8	0.8	0.3	1.5	10	5	19	85.6	76.9	93.0	66.1	64.0	67.9
4	Region 22	78.2	76.2	79.8	30.9	28.2	35.1	13.2	9.5	15.9	71.0	68.7	72.8	15.9	11.3	18.4	0.9	0.5	1.6	0.7	0.3	1.2	13	7	17	92.0	85.5	99.9	67.6	66.1	69.6
4	Region 23	78.6	76.6	82.5	30.5	29.2	31.8	10.1	5.9	12.4	67.7	64.2	72.0	22.2	18.1	29.9	0.8	0.6	1.1	0.6	0.4	0.9	10	7	16	85.9	78.8	94.4	66.2	64.5	68.2
7	Region 24	75.4	74.1	76.5	29.4	27.6	34.1	8.7	3.4	17.0	66.1	59.7	71.3	25.3	11.7	31.9	1.3	0.5	2.0	1.0	0.5	1.3	12	7	19	72.4	61.7	78.7	62.9	60.3	64.4
1	Region 25	77.5	-	-	32.6	-	-	18.1	-	-	69.9	-	-	12.0	-	-	0.3	-	-	0.3	-	-	11	-	-	83.5	-	-	65.6	-	-
10	Region 26	75.6	73.8	77.7	29.7	27.8	31.8	9.5	5.1	13.9	65.6	59.3	75.2	24.9	19.7	32.4	0.9	0.1	2.0	0.5	0.1	1.6	9	4	14	67.1	56.2	79.4	61.6	59.0	64.6
8	Region 27	76.6	75.9	77.2	30.1	27.8	32.1	8.9	4.6	15.3	66.3	61.9	70.2	24.8	14.5	31.3	0.8	0.2	1.3	0.5	0.2	1.0	12	7	23	75.0	67.0	85.5	63.5	61.6	66.1
12	Region 28	77.3	73.5	79.3	31.4	28.6	34.6	9.2	1.2	19.5	65.9	60.5	75.5	24.9	18.7	34.6	0.9	0.4	1.6	0.6	0.2	1.1	7	3	13	74.3	64.1	82.4	63.4	60.9	65.3
46	Region 29	77.7	74.1	81.1	31.8	23.4	39.4	10.5	1.8	54.1	65.7	43.4	78.4	23.8	2.5	44.2	0.7	0.0	2.3	0.5	0.0	1.5	7	3	15	78.8	57.5	93.3	64.5	59.3	68.0
43	Region 30	76.5	72.2	80.0	31.0	24.5	37.5	11.6	2.5	26.8	66.5	47.3	77.2	21.9	8.6	50.2	0.8	0.0	2.9	0.5	0.0	1.7	8	1	35	77.5	62.1	87.8	64.2	60.4	66.7
51	Region 31	77.6	73.3	80.5	31.3	25.7	40.5	12.3	1.3	22.2	66.3	44.7	77.7	21.4	10.4	54.0	0.8	0.1	1.8	0.6	0.0	1.6	7	2	14	79.7	69.8	91.2	64.7	62.3	67.5
65	Region 32	77.0	72.8	81.8	31.6	24.6	38.4	12.1	1.1	23.7	67.1	35.9	82.2	20.8	6.2	60.7	1.1	0.2	4.1	0.8	0.0	2.7	10	3	20	79.0	67.6	95.8	64.5	61.7	68.6
4	Region 33	75.7	74.8	77.0	29.5	28.1	31.4	9.2	5.9	15.3	66.7	64.9	68.4	24.2	16.8	28.7	0.9	0.4	1.4	0.5	0.1	0.9	5	1	9	74.3	72.2	79.3	63.4	62.9	64.6
26	Region 34	78.1	74.8	81.0	32.0	29.1	36.1	11.9	4.6	26.7	64.8	52.7	73.2	23.3	9.8	42.7	0.8	0.0	2.1	0.6	0.0	1.5	6	2	11	84.4	72.5	94.7	65.8	62.9	68.3
6	Region 35	77.8	75.2	78.8	31.7	23.8	37.4	12.3	0.0	29.1	63.0	41.4	71.8	24.7	6.4	58.6	0.8	0.4	1.6	0.6	0.2	1.3	7	3	15	83.6	74.7	94.8	65.6	63.5	68.3
18	Region 36	77.8	73.9	80.0	33.6	27.9	38.0	9.7	1.6	25.6	67.3	49.8	75.3	23.0	6.5	46.4	0.8	0.0	2.2	0.5	0.0	1.7	11	2	21	77.9	49.8	94.8	64.3	57.4	68.3
400	Ave. YM1	77.5	71.9	82.5	31.7	23.4	40.7	11.2	0.0	72.4	67.0	24.2	82.2	21.8	2.5	60.7	0.9	0.0	4.5	0.6	0.0	3.3	9	1	35	79.9	49.8	102.4	64.7	57.4	70.2
	Min. YM1																														
	Max. YM1																														

TABLE 14: PHYSICAL QUALITY CHARACTERISTICS YELLOW MAIZE ACCORDING TO GRADE (2017/2018)
(continue)

Number of samples	Region	Test weight (kg/ha)			100 kernel mass (g)			Kernel size (%)			Breakage susceptibility (%)						Stress cracks (%)			SAGL Milling Index 2018			GYA								
		ave.	min.	max.	ave.	min.	max.	Above 10 mm sieve	Above 8 mm sieve	Below 8 mm sieve	< 6.35 mm sieve	< 4.75 mm sieve	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.							
GRADE: YM2																															
1	Region 12	75.7	-	-	36.1	-	-	22.3	-	-	70.3	-	-	7.4	-	-	1.1	-	-	0.8	-	-	14	-	-	80.3	-	-	64.8	-	-
1	Region 16	71.6	-	-	23.4	-	-	3.9	-	-	51.2	-	-	44.9	-	-	1.5	-	-	0.9	-	-	13	-	-	62.3	-	-	60.5	-	-
1	Region 17	74.3	-	-	26.8	-	-	5.8	-	-	69.6	-	-	24.6	-	-	2.5	-	-	1.5	-	-	19	-	-	78.4	-	-	64.4	-	-
4	Region 18	77.3	76.0	78.5	27.5	26.0	29.7	5.2	3.1	6.9	64.1	60.7	70.8	30.8	23.7	34.0	1.0	0.7	1.3	0.8	0.6	0.9	11	6	19	83.9	78.0	89.6	65.7	64.3	67.1
1	Region 19	75.6	-	-	26.9	-	-	5.7	-	-	52.9	-	-	41.4	-	-	2.8	-	-	1.5	-	-	20	-	-	96.4	-	-	68.8	-	-
3	Region 20	75.5	71.3	80.7	28.5	28.0	29.2	8.6	6.7	10.7	62.0	45.2	72.2	29.4	19.5	48.1	1.3	1.0	1.8	1.0	0.9	1.1	11	5	15	64.5	42.2	83.8	61.0	55.5	65.7
4	Region 24	73.4	69.6	75.0	30.4	26.8	33.5	14.2	4.4	30.9	69.1	63.3	74.1	16.8	5.8	26.7	1.5	1.0	2.1	1.1	0.7	1.3	19	13	30	81.1	75.5	87.8	65.0	63.7	66.6
2	Region 26	75.8	75.3	76.3	27.6	25.7	29.4	5.6	5.5	5.6	64.1	58.9	69.3	30.4	25.1	35.6	2.1	1.6	2.6	1.6	1.5	1.7	19	15	22	69.0	62.0	76.0	62.1	60.4	63.8
1	Region 27	72.9	-	-	27.3	-	-	11.0	-	-	67.6	-	-	21.4	-	-	4.4	-	-	2.5	-	-	38	-	-	67.8	-	-	61.8	-	-
4	Region 28	75.0	74.1	75.9	31.5	27.6	34.1	13.4	6.0	22.2	67.4	62.6	71.9	19.2	15.2	28.8	1.0	0.4	1.8	0.7	0.3	0.9	14	10	18	73.8	68.1	80.0	63.3	61.9	64.7
4	Region 29	76.7	74.9	78.4	29.7	23.1	34.2	7.6	2.2	12.3	63.4	49.3	73.0	29.0	16.5	48.5	0.8	0.3	1.1	0.6	0.3	0.9	6	2	10	80.8	72.2	87.2	65.0	62.9	66.5
2	Region 30	75.5	74.8	76.1	26.9	23.4	30.3	9.5	5.0	13.9	59.9	59.4	60.3	30.7	25.8	35.6	0.9	0.7	1.1	0.6	0.5	0.8	8	4	12	78.9	72.8	85.1	64.5	63.0	66.0
1	Region 33	76.0	-	-	27.6	-	-	21.5	-	-	62.8	-	-	15.7	-	-	1.4	-	-	0.5	-	-	5	-	-	75.9	-	-	63.8	-	-
1	Region 34	77.1	-	-	33.1	-	-	9.3	-	-	59.1	-	-	31.6	-	-	1.4	-	-	1.3	-	-	10	-	-	81.2	-	-	65.1	-	-
4	Region 36	75.5	73.8	78.8	31.2	29.0	33.0	9.0	5.3	12.2	67.8	60.9	71.7	23.2	16.1	33.8	1.5	0.6	2.0	1.2	0.6	1.7	14	10	18	62.3	43.1	74.2	60.5	55.8	63.4
34	Ave. YM2	75.4			29.3			9.8			64.5			25.7			1.4			1.0			13			75.3			63.6		
	Min. YM2	69.6			23.1			2.2			45.2			5.8			0.3			0.3			2			42.2			55.5		
	Max. YM2	80.7			36.1			30.9			74.1			48.5			4.4			2.5			38			96.4			68.8		
GRADE: YM3																															
1	Region 12	59.6	-	-	15.6	-	-	0.5	-	-	37.5	-	-	62.0	-	-	4.7	-	-	3.2	-	-	25	-	-	41.8	-	-	55.4	-	-
1	Region 15	78.1	-	-	34.7	-	-	14.1	-	-	74.8	-	-	11.1	-	-	0.7	-	-	0.5	-	-	14	-	-	90.6	-	-	67.3	-	-
1	Region 22	74.3	-	-	36.0	-	-	15.6	-	-	71.1	-	-	13.3	-	-	1.7	-	-	1.3	-	-	15	-	-	77.8	-	-	64.2	-	-
1	Region 24	69.9	-	-	21.8	-	-	3.3	-	-	66.0	-	-	30.7	-	-	4.0	-	-	1.9	-	-	33	-	-	72.0	-	-	62.7	-	-
1	Region 26	71.7	-	-	25.6	-	-	5.1	-	-	69.7	-	-	25.2	-	-	2.0	-	-	1.2	-	-	14	-	-	80.4	-	-	64.9	-	-
1	Region 30	75.2	-	-	33.6	-	-	14.2	-	-	59.0	-	-	26.8	-	-	0.5	-	-	0.2	-	-	3	-	-	73.0	-	-	63.1	-	-
2	Region 31	75.3	74.6	75.9	23.7	21.0	26.3	3.4	0.9	5.9	59.8	50.2	69.4	36.8	24.7	48.9	0.9	0.8	1.1	0.6	0.5	0.8	11	10	12	80.0	77.6	82.5	64.7	64.1	65.4
1	Region 32	76.9	-	-	30.8	-	-	7.9	-	-	67.2	-	-	24.9	-	-	2.3	-	-	1.7	-	-	11	-	-	77.8	-	-	64.2	-	-
1	Region 33	76.6	-	-	29.7	-	-	6.4	-	-	67.7	-	-	25.9	-	-	0.5	-	-	0.2	-	-	1	-	-	78.1	-	-	64.3	-	-
10	Ave. YM3	73.3			27.5			7.4			63.3			29.4			1.8			1.2			14			75.2			63.5		
	Min. YM3	59.6			15.6			0.5			37.5			11.1			0.5			0.2			1			41.8			55.4		
	Max. YM3	78.1			36.0			15.6			74.8			62.0			4.7			3.2			33			90.6			67.3		

TABLE 14: PHYSICAL QUALITY CHARACTERISTICS OF YELLOW MAIZE ACCORDING TO GRADE (2017/2018)
(continue)

Number of samples	Region	Test weight (kg/ha)			100 kernel mass (g)			Kernel size (%)			Breakage susceptibility (%)			Stress cracks (%)			SAGL Milling index 2018			GYA					
		ave.	min.	max.	ave.	min.	max.	Above 10 mm sieve	Above 8 mm sieve	Below 8 mm sieve	< 6.35 mm sieve	< 4.75 mm sieve	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.				
CLASS: COM																									
1	Region 17	76.7	-	-	33.7	-	-	31.9	-	-	9.6	-	-	0.3	-	-	6	-	-	86.8	-	-	66.4	-	-
1	Region 24	75.0	-	-	37.4	-	-	20.1	-	-	13.0	-	-	0.8	-	-	8	-	-	76.8	-	-	64.0	-	-
1	Region 26	78.3	-	-	33.5	-	-	12.3	-	-	18.0	-	-	0.1	-	-	7	-	-	76.8	-	-	64.0	-	-
1	Region 31	74.0	-	-	30.4	-	-	7.7	-	-	19.7	-	-	2.7	-	-	19	-	-	74.1	-	-	63.3	-	-
1	Region 33	77.7	-	-	34.5	-	-	15.6	-	-	25.9	-	-	0.7	-	-	6	-	-	78.8	-	-	64.5	-	-
5	Ave. COM	76.3			33.9			17.5			17.2			0.9			9			78.7			64.4		
	Min. COM	74.0			30.4			7.7			9.6			0.1			6			74.1			63.3		
	Max. COM	78.3			37.4			31.9			25.9			2.7			19			86.8			66.4		
449Ave. yellow maize																									
	Min. yellow maize	77.2			31.5			11.1			22.2			0.9			9			79.4			64.6		
	Max. yellow maize	59.6			15.6			0.0			2.5			0.0			1			41.8			55.4		
900 Ave. maize																									
	Min. maize	77.1			32.9			18.7			16.6			1.0			10			78.9			64.5		
	Max. maize	59.6			15.6			0.0			1.5			0.0			1			26.5			51.7		
108.0																									

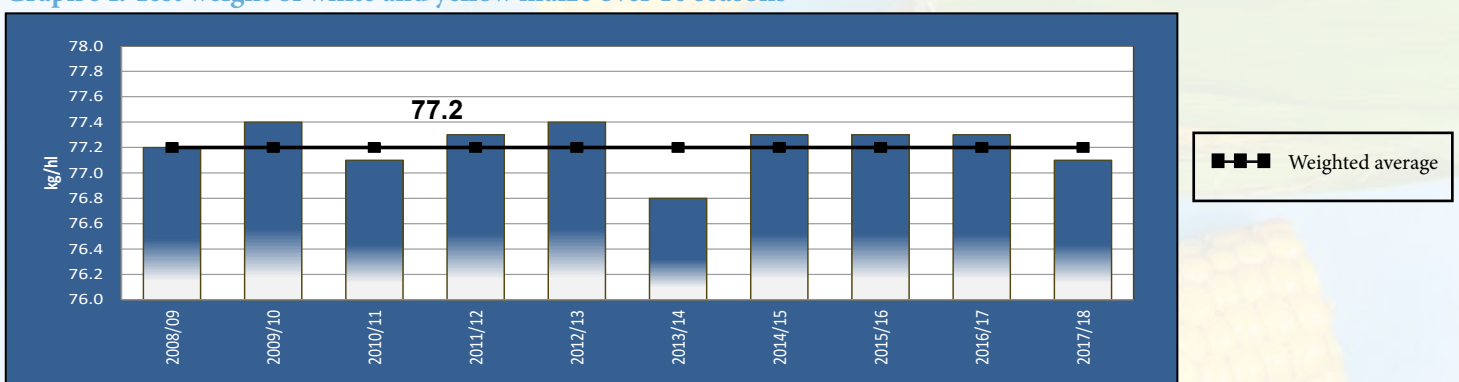
TABLE 15: PHYSICAL QUALITY CHARACTERISTICS OF YELLOW MAIZE (2017/2018)

Number of samples	Region	Test weight (kg/ht)			100 kernel mass (g)			Kernel size (%)						Breakage susceptibility (%)						Stress cracks (%)			SAGL Milling index 2018			GYA						
		ave.	min.	max.	ave.	min.	max.	Above 10 mm sieve		Above 8 mm sieve		Below 8 mm sieve		< 6.35 mm sieve		< 4.75 mm sieve		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.						
								ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.										min.	max.				
15	Region 10	79.9	79.0	80.8	38.1	34.7	40.7	5.5	2.0	9.1	73.4	58.4	78.0	21.1	14.8	39.6	0.3	0.1	0.6	0.2	0.1	0.4	8	3	16	78.6	72.4	84.4	64.4	63.0	65.9	
14	Region 11	79.3	76.8	81.7	34.6	28.9	39.6	9.9	1.4	72.4	66.5	24.2	76.7	23.6	3.4	33.6	0.9	0.2	4.5	0.6	0.2	3.3	8	3	15	75.2	54.4	88.1	63.6	58.6	66.7	
8	Region 12	74.9	59.6	79.0	30.6	15.6	36.1	12.7	0.5	22.3	66.9	37.5	76.6	20.5	7.4	62.0	1.4	0.4	4.7	1.1	0.3	3.2	12	6	25	82.0	41.8	102.4	65.2	55.4	70.2	
8	Region 13	77.1	75.8	78.3	29.1	26.0	33.9	9.5	5.5	20.3	71.1	63.0	75.9	19.4	9.9	28.7	0.9	0.5	1.4	0.6	0.3	0.9	10	6	14	88.9	77.7	95.2	66.9	64.2	68.5	
12	Region 14	77.4	71.9	80.1	31.4	25.0	40.2	13.7	4.0	25.6	67.4	58.8	73.5	18.9	8.0	36.5	1.0	0.0	1.9	0.8	0.0	1.6	11	3	17	86.8	60.2	98.3	66.4	59.9	69.2	
2	Region 15	77.0	75.8	78.1	33.5	32.2	34.7	9.8	5.5	14.1	70.1	65.3	74.8	20.2	11.1	29.2	0.8	0.7	0.9	0.7	0.5	0.8	13	12	14	75.8	61.0	90.6	63.7	60.2	67.3	
5	Region 16	75.8	71.6	78.1	29.1	23.4	34.7	10.3	1.4	20.3	61.7	48.7	74.3	28.0	10.3	49.9	1.2	0.6	2.0	0.9	0.6	1.4	12	2	17	77.4	62.3	93.4	64.1	60.5	68.0	
9	Region 17	76.8	74.3	78.7	30.3	26.8	33.7	14.9	5.8	31.9	66.6	58.5	76.0	18.5	9.6	24.6	1.0	0.2	2.5	0.8	0.1	1.5	12	6	19	84.5	78.4	93.3	65.8	64.4	68.0	
10	Region 18	77.8	76.0	79.5	28.7	26.0	33.8	7.4	3.1	16.9	65.8	60.7	76.0	26.8	15.4	34.0	1.0	0.4	1.5	0.8	0.4	1.1	10	6	19	85.6	78.0	95.3	66.1	64.3	68.4	
9	Region 19	77.6	74.4	80.9	31.1	26.9	33.6	14.7	5.7	31.8	65.6	52.9	74.0	19.7	9.0	41.4	0.8	0.2	2.8	0.5	0.0	1.5	10	5	20	91.4	82.0	99.7	67.5	65.3	69.5	
9	Region 20	77.2	71.3	80.7	30.2	27.0	34.1	11.2	6.7	26.0	67.1	45.2	76.6	21.7	8.0	48.1	1.1	0.3	2.7	0.8	0.1	1.9	10	5	17	78.9	42.2	88.9	64.5	55.5	66.9	
8	Region 21	77.6	76.5	79.2	32.6	29.9	34.3	13.3	5.6	23.8	70.2	64.9	75.3	16.5	11.3	25.6	1.0	0.4	1.8	0.8	0.3	1.5	10	5	19	85.6	76.9	93.0	66.1	64.0	67.9	
5	Region 22	77.4	74.3	79.8	31.9	28.2	36.0	13.7	9.5	15.9	71.0	68.7	72.8	15.3	11.3	18.4	1.1	0.5	1.7	0.8	0.3	1.3	13	7	17	89.1	77.8	99.9	66.9	64.2	69.6	
4	Region 23	78.6	76.6	82.5	30.5	29.2	31.8	10.1	5.9	12.4	67.7	64.2	72.0	22.2	18.1	29.9	0.8	0.6	1.1	0.6	0.4	0.9	10	7	16	85.9	78.8	94.4	66.2	64.5	68.2	
13	Region 24	74.3	69.6	76.5	29.7	21.8	37.4	10.8	3.3	30.9	67.0	59.7	74.1	22.1	5.8	31.9	1.5	0.5	4.0	1.0	0.5	1.9	15	7	33	75.4	61.7	87.8	63.6	60.3	66.6	
1	Region 25	77.5	-	-	32.6	-	-	18.1	-	-	69.9	-	-	12.0	-	-	0.3	-	-	0.3	-	-	11	-	-	83.5	-	-	65.6	-	-	-
14	Region 26	75.5	71.7	78.3	29.4	25.6	33.5	8.8	5.1	13.9	66.0	58.9	75.2	25.2	18.0	35.6	1.1	0.1	2.6	0.7	0.1	1.7	11	4	22	69.0	56.2	80.4	62.1	59.0	64.9	
9	Region 27	76.2	72.9	77.2	29.8	27.3	32.1	9.1	4.6	15.3	66.5	61.9	70.2	24.4	14.5	31.3	1.2	0.2	4.4	0.8	0.2	2.5	14	7	38	74.2	67.0	85.5	63.3	61.6	66.1	
16	Region 28	76.7	73.5	79.3	31.5	27.6	34.6	10.2	1.2	22.2	66.3	60.5	75.5	23.5	15.2	34.6	0.9	0.4	1.8	0.6	0.2	1.1	9	3	18	74.2	64.1	82.4	63.4	60.9	65.3	
50	Region 29	77.7	74.1	81.1	31.6	23.1	39.4	10.3	1.8	54.1	65.5	43.4	78.4	24.2	2.5	48.5	0.7	0.0	2.3	0.5	0.0	1.5	7	2	15	79.0	57.5	93.3	64.5	59.3	68.0	
46	Region 30	76.4	72.2	80.0	30.9	23.4	37.5	11.5	2.5	26.8	66.0	47.3	77.2	22.4	8.6	50.2	0.8	0.0	2.9	0.5	0.0	1.7	8	1	35	77.5	62.1	87.8	64.2	60.4	66.7	
54	Region 31	77.5	73.3	80.5	31.0	21.0	40.5	11.9	0.9	22.2	66.2	44.7	77.7	22.0	10.4	54.0	0.8	0.1	2.7	0.6	0.0	1.8	8	2	19	79.6	69.8	91.2	64.7	62.3	67.5	
66	Region 32	77.0	72.8	81.8	31.6	24.6	38.4	12.0	1.1	23.7	67.1	35.9	82.2	20.9	6.2	60.7	1.1	0.2	4.1	0.8	0.0	2.7	10	3	20	79.0	67.6	95.8	64.5	61.7	68.6	
7	Region 33	76.1	74.8	77.7	29.9	27.6	34.5	11.5	5.9	21.5	65.1	58.5	68.4	23.4	15.7	28.7	0.9	0.4	1.4	0.5	0.1	0.9	4	1	9	75.7	72.2	79.3	63.7	62.9	64.6	
27	Region 34	78.1	74.8	81.0	32.0	29.1	36.1	11.8	4.6	26.7	64.6	52.7	73.2	23.6	9.8	42.7	0.8	0.0	2.1	0.6	0.0	1.5	6	2	11	84.2	72.5	94.7	65.8	62.9	68.3	
6	Region 35	77.8	75.2	78.8	31.7	23.8	37.4	12.3	0.0	29.1	63.0	41.4	71.8	24.7	6.4	58.6	0.8	0.4	1.6	0.6	0.2	1.3	7	3	15	83.6	74.7	94.8	65.6	63.5	68.3	
22	Region 36	77.4	73.8	80.0	33.2	27.9	38.0	9.6	1.6	25.6	67.3	49.8	75.3	23.0	6.5	46.4	1.0	0.0	2.2	0.6	0.0	1.7	11	2	21	75.1	43.1	94.8	63.6	55.8	68.3	
449	Ave. yellow	77.2			31.5			11.1			66.7			22.2			0.9			0.7			9			79.4			64.6			
	Min. yellow	59.6			15.6			0.0			24.2			2.5			0.0			0.0			1			41.8			55.4			
	Max. yellow	82.5			40.7			72.4			82.2			62.0			4.7			4.7			3.3			102.4			70.2			

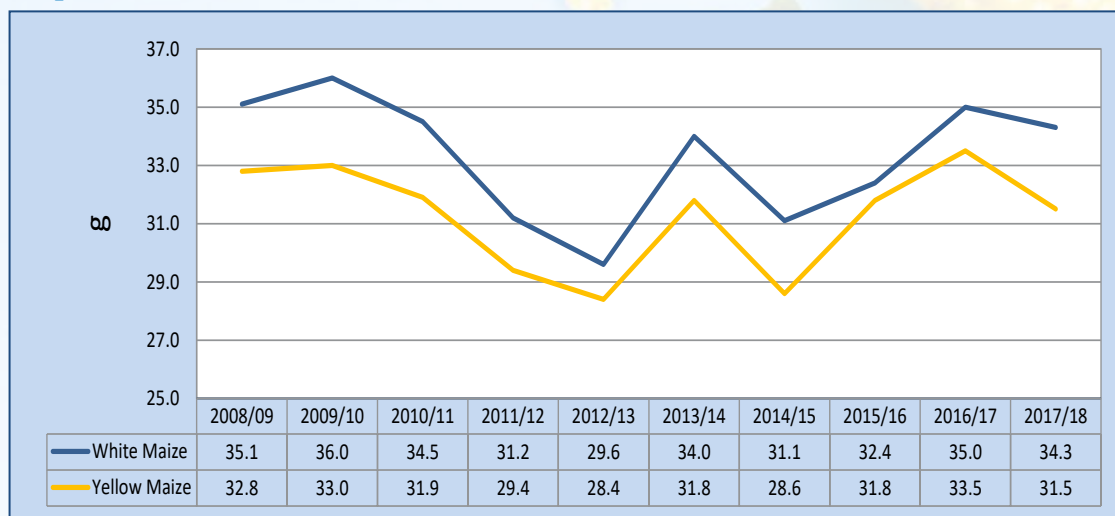
**TABLE 16: PHYSICAL QUALITY CHARACTERISTICS OF WHITE AND YELLOW MAIZE
2008/2009 - 2017/2018**

Season	Number of samples	Test weight (kg/hl)			100 kernel mass (g)			Kernel size (%)									Breakage susceptibility (%)						Stress cracks (%)		
		ave.	min.	max.	ave.	min.	max.	Above 10 mm sieve			Above 8 mm sieve			Below 8 mm sieve			< 6.35 mm sieve			< 4.75 mm sieve			Stress cracks (%)		
								ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.
White Maize																									
2008/09	483	77.6	61.6	82.8	35.1	27.1	44.0	26.2	0.5	46.4	63.3	43.1	84.0	10.5	2.1	51.0	1.5	0.2	11.7	1.1	0.1	8.7	5	0	50
2009/10	458	77.9	60.2	84.4	36.0	24.1	59.1	26.3	1.2	90.7	62.6	9.2	82.0	11.2	0.1	53.5	1.5	0.2	24.3	1.2	0.1	23.1	4	0	36
2010/11	413	77.7	71.3	81.8	34.5	25.0	44.0	24.9	1.4	55.8	63.5	33.5	83.9	11.6	1.7	65.1	1.6	0.0	8.4	1.2	0.0	5.9	5	0	31
2011/12	577	78.2	71.8	82.0	31.2	17.4	44.4	18.8	0.8	63.3	64.9	26.2	79.7	16.3	2.8	72.4	0.8	0.0	8.6	0.6	0.0	4.9	5	0	25
2012/13	508	78.2	69.7	82.9	29.6	17.7	46.0	15.1	0.0	59.9	65.0	16.2	80.5	20.0	3.1	83.5	1.0	0.0	6.6	0.7	0.0	4.6	4	0	37
2013/14	451	77.6	68.7	81.9	34.0	26.0	46.5	24.7	0.7	71.3	64.7	23.4	82.7	10.6	1.1	37.7	1.3	0.0	7.2	1.0	0.0	4.2	7	0	37
2014/15	485	78.3	70.2	83.1	31.1	20.3	48.3	15.4	0.3	86.7	66.1	13.1	81.8	18.4	0.0	51.5	1.1	0.0	12.1	0.8	0.0	5.6	6	0	61
2015/16	415	78.1	68.5	83.9	32.4	20.8	40.8	15.2	0.3	99.4	66.7	0.1	89.5	18.2	0.0	63.8	0.9	0.0	7.2	0.4	0.0	4.3	5	0	30
2016/17	549	77.7	70.0	81.8	35.0	22.8	43.8	22.1	1.8	64.2	64.1	13.6	82.4	13.7	0.7	62.6	1.2	0.0	9.9	0.8	0.0	9.0	8	0	42
2017/18	451	77.0	63.4	81.7	34.3	18.3	45.8	26.2	1.5	58.7	62.8	39.8	83.7	11.0	1.5	32.1	1.0	0.0	3.8	0.7	0.0	2.7	11	1	30
Weighted Average		77.8			33.3			21.4			64.4			14.3			1.2			0.8			6		
Minimum		60.2			17.4			0.0			0.1			0.0			0.0			0.0			0		
Maximum		84.4			59.1			99.4			89.5			83.5			24.3			23.1			61		
Yellow Maize																									
2008/09	327	76.6	69.9	81.2	32.8	24.2	45.4	15.7	1.3	52.8	66.5	44.3	79.9	17.8	1.6	44.6	1.8	0.1	10.3	1.3	0.0	9.9	6	0	32
2009/10	342	76.6	69.0	81.6	33.0	23.3	42.5	14.3	0.0	41.7	68.5	50.9	79.9	17.2	4.0	47.7	2.1	0.4	10.3	1.6	0.3	8.4	5	0	27
2010/11	280	76.2	69.0	81.5	31.9	22.0	40.4	14.4	1.1	43.7	68.6	39.5	79.6	16.9	1.9	58.7	2.1	0.5	8.1	1.6	0.0	5.0	5	0	24
2011/12	423	76.1	68.1	81.0	29.4	14.5	40.9	11.3	0.0	38.3	63.9	13.7	79.4	24.8	6.5	86.3	1.3	0.2	15.6	1.0	0.0	8.3	6	0	27
2012/13	492	76.6	67.8	81.6	28.4	15.2	41.3	9.8	0.0	42.6	61.7	10.1	80.9	28.5	3.4	89.9	1.7	0.1	8.2	1.1	0.0	5.4	5	0	31
2013/14	479	76.0	56.6	80.9	31.8	18.6	43.1	14.9	0.3	52.7	67.1	21.4	79.7	18.0	2.6	64.8	1.9	0.1	14.5	1.4	0.0	9.9	7	0	53
2014/15	515	76.3	67.3	83.1	28.6	17.8	38.2	8.8	0.0	30.2	63.4	9.2	78.9	27.8	4.2	90.4	1.3	0.1	6.8	0.9	0.0	4.8	5	0	56
2015/16	505	76.7	59.8	81.7	31.8	17.1	43.1	11.8	0.3	34.1	66.6	15.6	93.6	21.6	0.2	77.9	1.0	0.0	4.5	0.5	0.0	4.1	5	0	31
2016/17	451	76.9	67.6	82.4	33.5	18.4	43.3	11.4	0.0	71.9	65.6	13.0	90.9	23.0	1.6	69.7	1.1	0.1	8.6	0.8	0.0	5.3	8	0	50
2017/18	449	77.2	59.6	82.5	31.5	15.6	40.7	11.1	0.0	72.4	66.7	24.2	82.2	22.2	2.5	62.0	0.9	0.0	4.7	0.7	0.0	3.3	9	1	38
Weighted Average		76.5			31.1			12.1			65.6			22.3			1.5			1.0			6.1		
Minimum		56.6			14.5			0.0			9.2			0.2			0.0			0.0			0		
Maximum		83.1			45.4			72.4			93.6			90.4			15.6			9.9			56		
White & Yellow Maize																									
2008/09	810	77.2	61.6	82.8	34.2	24.2	45.4	21.9	0.5	52.8	64.6	43.1	84.0	13.4	1.6	51.0	1.6	0.1	11.7	1.2	0.0	9.9	5	0	50
2009/10	800	77.4	60.2	84.4	34.7	23.3	59.1	21.1	0.0	90.7	65.1	9.2	82.0	13.7	0.1	53.5	1.8	0.2	24.3	1.4	0.1	23.1	4	0	36
2010/11	693	77.1	69.0	81.8	33.5	22.0	44.0	20.7	1.1	55.8	65.6	33.5	83.9	13.8	1.7	65.1	1.8	0.0	8.4	1.3	0.0	5.9	5	0	31
2011/12	1000	77.3	68.1	82.0	30.4	14.5	44.4	15.6	0.0	63.3	64.5	13.7	79.7	19.9	2.8	86.3	1.0	0.0	15.6	0.7	0.0	8.3	6	0	27
2012/13	1000	77.4	67.8	82.9	29.0	15.2	46.0	12.5	0.0	59.9	63.4	10.1	80.9	24.2	3.1	89.9	1.4	0.0	8.2	0.9	0.0	5.4	5	0	37
2013/14	930	76.8	56.6	81.9	32.9	18.6	46.5	19.6	0.3	71.3	65.9	23.4	82.7	14.4	1.1	64.8	1.6	0.0	14.5	1.2	0.0	9.9	7	0	53
2014/15	1000	77.3	67.3	83.1	29.8	17.8	48.3	12.0	0.0	86.7	64.7	9.2	81.8	23.2	0.0	90.4	1.2	0.0	12.1	0.8	0.0	5.6	6	0	61
2015/16	920	77.3	59.8	83.9	32.1	17.1	43.1	13.3	0.3	99.4	66.7	0.1	93.6	20.0	0.0	77.9	1.0	0.0	7.2	0.5	0.0	4.3	5	0	31
2016/17	1000	77.3	67.6	82.4	34.3	18.4	43.8	17.3	0.0	71.9	64.8	13.0	90.9	17.9	0.7	69.7	1.2	0.0	9.9	0.8	0.0	9.0	8	0	50
2017/18	900	77.1	59.6	82.5	32.9	15.6	45.8	18.7	0.0	72.4	64.7	24.2	83.7	16.6	1.5	62.0	1.0	0.0	4.7	0.7	0.0	3.3	10	1	38
Weighted Average		77.2			32.2			17.0			65.0			18.0			1.3			0.9			6		
Minimum		56.6			14.5			0.0			0.1			0.0			0.0			0.0			0		
Maximum		84.4			59.1			99.4			93.6			90.4			24.3			23.1			61		

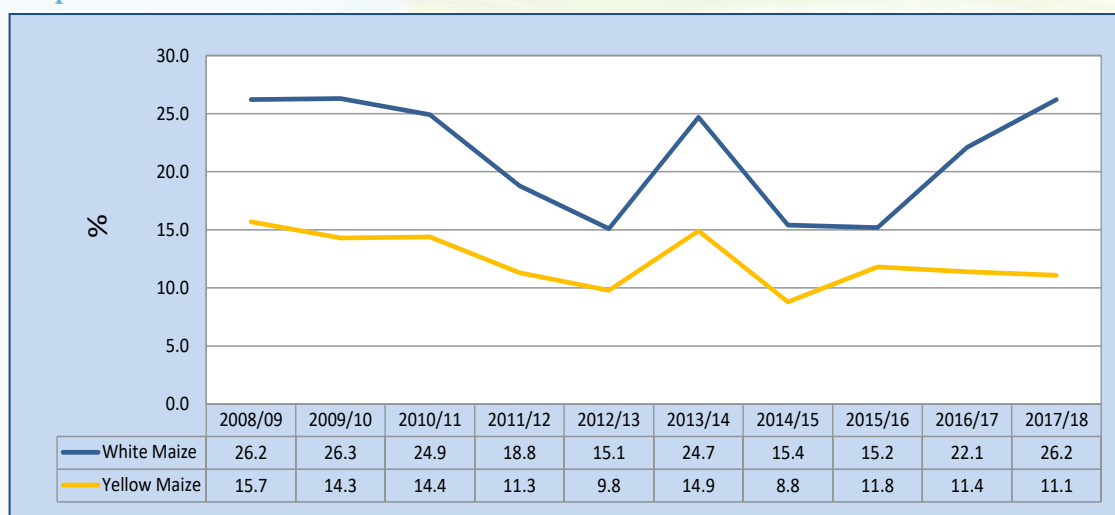
Graph 34: Test weight of white and yellow maize over 10 seasons



Graph 35: 100 Kernel mass over 10 seasons



Graph 36: Kernel size above 10 mm sieve over 10 seasons



Graph 37: Kernel size below 8 mm sieve over 10 seasons

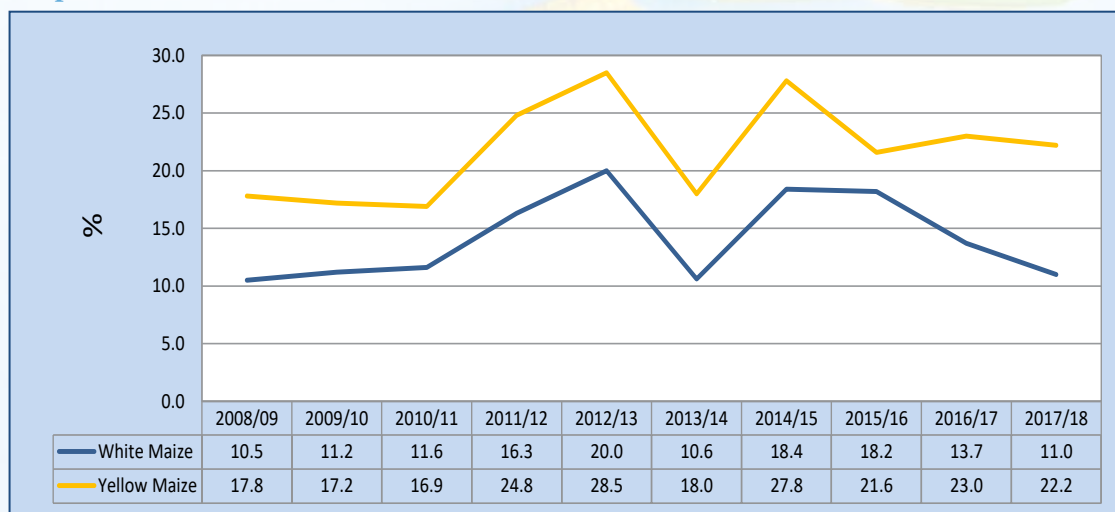


TABLE 17: ROFF MILLING AND WHITENESS INDEX OF WHITE MAIZE ACCORDING TO GRADE (2017/2018) (continue)

Number of samples	Region	Roff Milling												Whiteness index											
		Break 1, %			Break 2, %			Break 3, %			Grits, %			Chop, %			Extraction, % (Total meal)			Whiteness index unsifted			Whiteness index sifted 87-13		
		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.
GRADE: WM2																									
3	Region 13	14.5	13.7	15.0	10.2	10.0	10.4	18.3	18.1	18.8	35.2	34.7	35.6	21.7	20.9	22.7	78.3	77.3	79.1	30.3	29.4	30.8	21.0	19.2	23.9
3	Region 14	16.3	15.9	16.6	10.4	10.1	10.7	17.8	17.6	18.0	31.6	30.6	33.3	23.9	23.1	24.5	76.1	75.5	76.9	34.0	30.8	35.9	21.9	18.3	25.3
7	Region 15	14.5	12.5	16.2	10.4	10.1	10.9	19.0	18.3	19.5	34.5	30.8	37.1	21.6	20.2	23.3	78.4	76.7	79.8	35.2	34.1	37.9	24.5	23.5	25.5
9	Region 16	14.7	13.2	16.0	10.3	9.7	11.0	19.0	18.2	21.8	34.6	33.6	36.4	21.4	16.2	23.5	78.6	76.5	83.8	30.3	22.2	35.5	19.6	10.5	26.9
2	Region 17	13.4	13.2	13.6	10.2	9.8	10.6	18.9	18.1	19.6	35.6	35.0	36.2	22.0	21.6	22.4	78.0	77.6	78.4	30.7	28.5	33.0	19.0	15.7	22.4
1	Region 18	14.3	-	-	10.0	-	-	19.3	-	-	36.1	-	-	20.4	-	-	79.6	-	-	31.4	-	-	20.4	-	-
5	Region 19	14.9	13.7	16.1	10.4	10.0	10.8	19.0	17.3	19.8	34.2	31.1	35.8	21.5	19.0	23.8	78.5	76.2	81.0	30.8	21.0	36.3	19.7	13.1	24.9
3	Region 20	15.6	14.1	17.1	10.8	10.5	11.1	19.2	18.0	20.3	32.4	27.7	35.5	22.1	19.5	26.0	77.9	74.0	80.5	34.5	31.4	39.6	24.0	21.4	28.4
1	Region 21	12.9	-	-	11.1	-	-	19.2	-	-	39.1	-	-	17.7	-	-	82.3	-	-	27.4	-	-	17.7	-	-
2	Region 22	13.7	13.6	13.8	10.2	10.1	10.3	18.5	18.4	18.5	36.4	36.2	36.6	21.2	21.2	21.2	78.8	78.8	78.8	32.1	30.8	33.4	22.7	21.1	24.2
4	Region 23	14.9	13.8	15.5	10.8	10.4	11.8	18.5	17.6	19.3	33.9	33.2	35.5	21.9	19.9	23.0	78.1	77.0	80.1	31.3	28.2	36.6	20.9	18.9	25.0
5	Region 24	13.6	13.0	14.1	10.1	9.9	10.3	18.6	17.9	19.2	35.3	33.4	37.7	22.5	21.5	23.7	77.5	76.3	78.5	32.0	30.8	33.3	21.3	19.6	23.8
4	Region 26	16.3	13.2	20.2	10.4	10.0	11.2	18.0	16.7	18.8	32.8	25.3	37.6	22.5	21.0	26.6	77.5	73.4	79.0	22.5	16.2	27.1	10.1	0.4	16.4
1	Region 28	14.9	-	-	11.8	-	-	19.1	-	-	34.9	-	-	19.2	-	-	80.8	-	-	23.9	-	-	14.8	-	-
1	Region 29	15.9	-	-	12.2	-	-	20.1	-	-	31.6	-	-	20.2	-	-	79.8	-	-	25.6	-	-	14.0	-	-
3	Region 30	14.2	12.6	16.0	10.4	7.5	11.9	19.0	17.8	20.4	36.2	34.5	37.9	20.2	19.3	21.6	79.8	78.4	80.7	25.6	23.7	28.2	15.0	12.3	18.6
3	Region 32	12.4	11.9	13.0	10.1	7.9	11.3	20.2	19.8	20.5	35.7	34.5	36.7	21.7	20.8	22.2	78.3	77.8	79.2	25.9	18.4	33.9	14.5	5.5	23.6
2	Region 33	15.0	14.8	15.2	13.1	10.2	15.9	18.4	18.3	18.4	33.0	30.3	35.8	20.5	20.2	20.8	79.5	79.2	79.8	32.4	30.5	34.2	20.6	18.9	22.3
7	Region 34	12.9	11.4	15.3	11.7	11.5	12.0	18.0	16.8	19.9	35.9	34.5	37.0	21.5	18.8	23.3	78.5	76.7	81.2	30.2	25.7	33.1	20.7	14.6	23.3
2	Region 35	13.1	12.1	14.0	9.7	9.6	9.7	18.9	18.4	19.4	37.2	36.3	38.0	21.2	20.5	21.8	78.8	78.2	79.5	25.7	24.6	26.8	13.1	13.0	13.3
3	Region 36	13.6	12.7	14.8	12.6	7.6	15.3	18.5	18.0	19.1	34.9	32.5	37.7	20.3	18.9	22.9	79.7	77.1	81.1	27.8	24.5	30.7	16.4	12.2	20.1
71	Ave. WM2	14.4			10.7			18.7			34.7			21.5			78.5			30.2			19.4		
	Min. WM2	11.4			7.5			16.7			25.3			16.2			73.4			16.2			0.4		
	Max. WM2	20.2			15.9			21.8			39.1			26.6			83.8			39.6			28.4		

TABLE 17: ROFF MILLING AND WHITENESS INDEX OF WHITE MAIZE ACCORDING TO GRADE (2017/2018) (continue)

Number of samples	Region	Roff Milling																		Whiteness index								
		Break 1, %			Break 2, %			Break 3, %			Grits, %			Chop, %			Extraction, % (Total meal)			Whiteness index unsifted			Whiteness index sifted 87:13					
		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.			
GRADE: WM3																												
1	Region 12	12.7	-	-	9.8	-	-	18.3	-	-	18.3	-	-	36.7	-	-	22.6	-	-	77.4	-	-	24.2	-	-	12.4	-	-
1	Region 13	13.5	-	-	10.3	-	-	18.8	-	-	18.8	-	-	35.3	-	-	22.1	-	-	77.9	-	-	30.7	-	-	18.8	-	-
2	Region 14	18.7	18.0	19.5	10.3	10.2	10.4	17.5	16.9	18.1	17.5	16.9	18.1	25.4	24.2	26.7	28.1	27.1	29.1	71.9	70.9	72.9	36.7	36.2	37.1	23.0	22.6	23.3
1	Region 15	14.7	-	-	10.6	-	-	20.1	-	-	20.1	-	-	34.5	-	-	20.1	-	-	79.9	-	-	33.9	-	-	21.5	-	-
6	Region 16	14.4	13.3	14.9	10.2	9.8	10.9	18.4	17.9	19.3	18.4	17.9	19.3	34.0	32.3	35.7	23.0	20.9	24.4	77.0	75.6	79.1	30.6	23.1	33.1	19.2	14.0	22.1
1	Region 17	16.8	-	-	10.6	-	-	17.4	-	-	17.4	-	-	31.2	-	-	23.9	-	-	76.1	-	-	32.0	-	-	21.7	-	-
1	Region 18	17.1	-	-	11.1	-	-	20.4	-	-	20.4	-	-	32.6	-	-	18.9	-	-	81.1	-	-	31.3	-	-	19.1	-	-
1	Region 20	16.7	-	-	11.1	-	-	18.6	-	-	18.6	-	-	29.1	-	-	24.4	-	-	75.6	-	-	33.7	-	-	21.1	-	-
1	Region 22	13.6	-	-	9.8	-	-	18.3	-	-	18.3	-	-	37.0	-	-	21.3	-	-	78.7	-	-	22.6	-	-	15.1	-	-
1	Region 23	13.1	-	-	9.8	-	-	19.1	-	-	19.1	-	-	35.5	-	-	22.5	-	-	77.5	-	-	30.1	-	-	22.1	-	-
1	Region 31	15.6	-	-	12.4	-	-	18.1	-	-	18.1	-	-	34.7	-	-	19.3	-	-	80.7	-	-	11.2	-	-	-5.8	-	-
1	Region 32	14.0	-	-	7.8	-	-	21.2	-	-	21.2	-	-	35.0	-	-	22.0	-	-	78.0	-	-	21.1	-	-	6.7	-	-
4	Region 33	14.5	14.3	14.9	10.5	10.0	11.4	17.5	16.6	18.2	17.5	16.6	18.2	35.7	34.3	36.4	21.8	20.4	24.0	78.2	76.0	79.6	34.7	33.8	35.4	24.7	23.0	26.6
1	Region 35	11.9	-	-	10.8	-	-	18.4	-	-	18.4	-	-	37.4	-	-	21.4	-	-	78.6	-	-	25.5	-	-	19.6	-	-
23	Ave. WM3	14.9	11.9	19.5	10.3	7.8	12.4	18.4	16.6	21.2	18.4	16.6	21.2	33.8	24.2	37.4	22.6	18.9	29.1	77.4	70.9	81.1	30.1	11.2	37.1	18.8	-5.8	26.6
CLASS: COM																												
1	Region 13	15.1	-	-	10.1	-	-	18.3	-	-	18.3	-	-	35.0	-	-	21.6	-	-	78.4	-	-	34.9	-	-	24.0	-	-
2	Region 18	17.0	15.2	18.9	10.5	10.3	10.8	17.9	17.1	18.7	17.9	17.1	18.7	32.0	30.0	34.0	22.6	21.8	23.3	77.4	76.7	78.2	24.0	15.1	32.9	11.8	1.9	21.7
1	Region 20	14.7	-	-	10.0	-	-	19.6	-	-	19.6	-	-	33.9	-	-	21.8	-	-	78.2	-	-	25.5	-	-	13.3	-	-
1	Region 21	9.4	-	-	10.0	-	-	17.7	-	-	17.7	-	-	44.9	-	-	17.9	-	-	82.1	-	-	16.0	-	-	8.5	-	-
5	Ave. COM	14.6	9.4	18.9	10.2	10.0	10.8	18.3	17.1	19.6	18.3	17.1	19.6	35.6	30.0	44.9	21.3	17.9	23.3	78.7	76.7	82.1	24.9	15.1	34.9	13.9	1.9	24.0
451	Ave. white maize	14.1	8.8	21.5	10.5	7.2	15.9	19.0	15.9	23.0	19.0	15.9	23.0	35.5	24.2	44.9	20.9	16.2	29.1	79.1	70.9	83.8	29.8	11.2	39.6	19.2	-5.8	28.7

TABLE 18: ROFF MILLING AND WHITENESS INDEX OF WHITE MAIZE (2017/2018)

Number of samples	Region	Roff Milling												Whiteness index												
		Break 1, %			Break 2, %			Break 3, %			Grits, %			Chop, %			Extraction, % (Total meal)			Whiteness index unsifted			Whiteness index sifted 87-13			
		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	
4	Region 11	14.4	13.3	14.8	11.7	11.6	12.1	19.0	17.9	19.7	36.6	35.8	37.7	18.2	17.8	18.7	81.8	81.3	82.2	26.4	22.9	29.3	16.4	11.1	20.9	
15	Region 12	14.3	11.7	17.6	10.3	9.6	11.1	18.9	17.0	20.4	35.4	28.0	39.3	21.1	18.3	25.6	78.9	74.4	81.7	32.1	24.2	39.3	22.0	12.4	28.7	
25	Region 13	14.7	12.6	17.7	10.8	9.8	15.0	18.9	17.6	21.0	34.8	32.2	39.1	20.8	18.4	23.0	79.2	77.0	81.6	30.3	26.1	35.1	19.4	14.3	24.2	
38	Region 14	14.2	11.4	19.5	10.1	9.5	10.7	18.9	16.9	20.9	35.5	24.2	39.8	21.2	17.8	29.1	78.8	70.9	82.2	31.4	25.0	38.6	20.8	16.3	28.6	
15	Region 15	14.2	12.5	16.2	10.3	9.9	10.9	19.5	18.3	21.0	35.5	30.8	39.3	20.5	17.8	23.3	79.5	76.7	82.2	33.5	27.1	37.9	23.0	15.9	25.5	
21	Region 16	14.4	13.1	16.0	10.3	9.7	11.0	18.7	17.9	21.8	34.9	32.3	39.3	21.7	16.2	24.4	78.3	75.6	83.8	30.5	22.2	35.5	19.6	10.5	26.9	
28	Region 17	14.5	10.6	16.8	10.1	7.4	11.3	19.1	17.3	21.9	34.9	29.1	40.5	21.4	18.8	26.7	78.6	73.3	81.2	30.7	21.7	37.1	20.0	9.3	27.1	
18	Region 18	14.7	13.2	18.9	10.1	8.0	12.0	19.3	17.1	21.3	35.2	30.0	38.7	20.6	18.5	23.3	79.4	76.7	81.5	29.7	15.1	33.6	18.8	1.9	22.3	
28	Region 19	14.1	12.3	16.1	10.5	9.7	15.3	19.3	17.3	20.7	35.7	31.1	38.5	20.3	17.9	23.8	79.7	76.2	82.1	30.2	21.0	36.3	18.8	13.1	24.9	
14	Region 20	15.2	11.6	17.1	10.5	9.3	11.1	18.9	18.0	20.3	33.7	27.7	41.0	21.7	19.5	26.0	78.3	74.0	80.5	32.5	25.5	39.6	21.5	13.3	28.4	
13	Region 21	13.1	8.8	15.5	10.3	8.2	11.2	18.7	17.2	21.4	37.4	33.0	44.9	20.5	17.4	24.1	79.5	75.9	82.6	27.7	16.0	35.8	17.4	7.8	24.2	
10	Region 22	13.7	12.2	15.2	10.3	8.0	11.7	18.8	18.2	20.4	36.9	35.1	38.1	20.3	17.2	21.6	79.7	78.4	82.8	30.0	22.6	34.4	20.5	15.1	24.3	
16	Region 23	13.8	11.4	15.5	10.3	7.9	11.8	18.7	16.9	22.0	36.1	33.2	39.2	21.2	18.9	23.0	78.8	77.0	81.1	31.4	28.2	36.6	21.4	18.9	25.0	
17	Region 24	14.0	10.9	16.3	10.1	7.5	12.2	18.9	17.1	23.0	35.6	33.4	42.2	21.4	16.3	23.7	78.6	76.3	83.7	31.2	24.2	36.8	20.5	15.6	26.7	
10	Region 26	18.6	13.2	21.5	10.8	10.0	11.3	17.0	15.9	18.8	29.4	25.3	37.6	24.2	21.0	27.0	75.8	73.0	79.0	27.3	16.2	32.1	14.8	0.4	19.4	
3	Region 27	13.9	12.5	16.1	10.1	9.4	10.7	18.6	17.7	19.1	35.2	30.6	38.2	22.1	20.1	24.8	77.9	75.2	79.9	30.8	28.7	31.8	18.7	16.6	19.9	
14	Region 28	13.7	11.6	15.6	10.9	9.9	12.3	18.9	17.4	20.4	36.6	32.9	38.9	19.9	17.7	24.0	80.1	76.0	82.3	27.9	22.1	34.2	17.9	12.6	24.4	
15	Region 29	13.3	10.9	15.9	11.4	10.6	12.2	18.9	16.9	20.1	37.1	31.6	40.1	19.4	17.7	20.9	80.6	79.1	82.3	25.8	21.4	31.5	15.6	10.6	22.0	
21	Region 30	13.8	11.8	16.2	10.9	7.5	15.3	18.2	17.0	20.4	36.1	31.7	38.9	20.9	19.3	22.9	79.1	77.1	80.7	28.8	23.2	34.6	18.4	12.3	23.6	
10	Region 31	13.7	11.6	18.1	10.3	7.2	12.5	19.5	17.9	21.8	35.9	30.2	38.3	20.6	19.3	22.1	79.4	77.9	80.7	25.9	11.2	33.3	15.4	-5.8	23.9	
29	Region 32	13.5	10.6	15.7	9.3	7.4	11.7	20.6	18.3	22.9	35.6	32.5	38.5	21.0	18.5	23.1	79.0	76.9	81.5	29.5	18.4	35.9	18.7	5.5	26.6	
27	Region 33	14.0	9.4	15.7	11.2	7.4	15.9	18.3	16.4	21.6	35.6	30.3	40.3	21.0	18.3	24.0	79.0	76.0	81.7	31.1	27.8	36.7	20.8	16.2	26.6	
37	Region 34	13.8	10.4	16.7	11.0	7.8	12.0	19.2	16.8	21.6	35.2	32.1	40.2	20.8	18.6	23.5	79.2	76.5	81.4	28.4	22.2	33.8	18.4	12.5	24.4	
9	Region 35	12.6	10.6	14.4	10.8	9.6	11.9	18.5	17.2	19.4	38.0	36.3	40.2	20.1	17.7	21.8	79.9	78.2	82.3	25.8	22.8	27.4	16.1	13.0	19.6	
14	Region 36	13.4	11.9	14.8	9.9	7.4	15.3	19.5	18.0	21.3	36.3	32.5	39.1	20.8	17.9	22.9	79.2	77.1	82.1	28.1	23.8	33.2	17.4	11.0	23.5	
451	Ave. white	14.1	8.8	21.5	10.5	7.2	15.9	19.0	15.9	23.0	35.5	24.2	44.9	20.9	16.2	29.1	79.1	70.9	83.8	29.8	11.2	39.6	19.2	-5.8	28.7	
	Min. white																									
	Max. white																									

TABLE 19: NUTRITIONAL VALUES OF WHITE MAIZE ACCORDING TO GRADE (2017/2018)												TABLE 20: NUTRITIONAL VALUES OF YELLOW MAIZE ACCORDING TO GRADE (2017/2018)																				
Number of samples	Region	Fat % (db)			Protein % (db)			Starch % (db)			Number of samples	Region	Fat % (db)			Protein % (db)			Starch % (db)													
		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.			ave.	min.	max.	ave.	min.	max.	ave.	min.	max.											
GRADE: WM1												GRADE: YM1																				
-	Region 10	-	-	-	-	-	-	-	-	-	15	Region 10	3.5	3.2	4.1	8.1	7.5	8.3	74.0	73.1	74.6	15	Region 10	3.5	3.2	4.1	8.1	7.5	8.3	74.0	73.1	74.6
4	Region 11	4.0	3.7	4.1	8.7	8.5	9.3	73.1	72.8	73.4	14	Region 11	3.8	3.5	4.2	8.3	7.0	8.8	73.0	72.3	73.6	14	Region 11	3.8	3.5	4.2	8.3	7.0	8.8	73.0	72.3	73.6
14	Region 12	4.1	3.7	4.7	8.6	7.9	9.5	73.7	71.8	74.6	6	Region 12	4.1	3.8	4.3	9.2	7.3	9.9	72.2	71.3	73.4	6	Region 12	4.1	3.8	4.3	9.2	7.3	9.9	72.2	71.3	73.4
20	Region 13	4.2	3.9	4.5	8.5	7.5	9.3	73.4	72.6	74.5	8	Region 13	4.1	3.6	4.3	9.0	8.3	9.5	72.2	71.3	72.8	8	Region 13	4.1	3.6	4.3	9.0	8.3	9.5	72.2	71.3	72.8
33	Region 14	4.1	3.8	4.4	8.9	7.6	9.9	73.2	72.0	74.5	12	Region 14	4.2	3.6	5.0	9.3	8.2	11.1	71.7	69.8	73.0	12	Region 14	4.2	3.6	5.0	9.3	8.2	11.1	71.7	69.8	73.0
7	Region 15	4.1	3.9	4.3	8.7	8.2	9.4	73.9	73.1	74.6	1	Region 15	3.8	-	-	7.8	-	-	73.3	-	-	1	Region 15	3.8	-	-	7.8	-	-	73.3	-	-
6	Region 16	4.1	3.9	4.2	8.6	8.1	9.4	73.6	73.1	74.1	4	Region 16	4.1	3.6	4.4	9.4	8.2	11.0	71.5	69.1	73.4	4	Region 16	4.1	3.6	4.4	9.4	8.2	11.0	71.5	69.1	73.4
25	Region 17	4.2	3.9	4.5	8.4	7.6	10.1	73.4	71.5	74.8	7	Region 17	4.3	4.2	4.4	8.6	8.3	9.1	72.1	71.6	72.6	7	Region 17	4.3	4.2	4.4	8.6	8.3	9.1	72.1	71.6	72.6
14	Region 18	4.1	3.9	4.4	8.4	7.9	8.8	73.5	73.0	74.5	6	Region 18	4.1	3.8	4.2	8.8	8.5	9.2	72.2	71.8	72.5	6	Region 18	4.1	3.8	4.2	8.8	8.5	9.2	72.2	71.8	72.5
23	Region 19	4.2	3.9	4.4	8.5	7.8	9.4	73.5	72.1	74.3	8	Region 19	4.3	3.9	4.7	9.0	8.5	9.2	72.4	71.9	73.2	8	Region 19	4.3	3.9	4.7	9.0	8.5	9.2	72.4	71.9	73.2
9	Region 20	4.0	3.9	4.3	8.3	7.8	9.3	73.8	73.0	74.4	6	Region 20	4.2	4.0	4.4	9.1	8.7	9.4	72.2	71.9	72.5	6	Region 20	4.2	4.0	4.4	9.1	8.7	9.4	72.2	71.9	72.5
11	Region 21	4.2	3.9	4.8	9.0	7.9	11.1	73.0	69.4	74.3	8	Region 21	4.2	3.9	4.4	9.6	9.2	10.3	71.3	70.1	72.1	8	Region 21	4.2	3.9	4.4	9.6	9.2	10.3	71.3	70.1	72.1
7	Region 22	4.1	4.0	4.2	8.8	8.0	9.1	73.6	72.7	74.0	4	Region 22	4.3	4.2	4.4	9.8	9.3	10.2	71.1	70.0	72.0	4	Region 22	4.3	4.2	4.4	9.8	9.3	10.2	71.1	70.0	72.0
11	Region 23	4.0	3.9	4.3	8.9	8.2	9.3	73.6	72.8	74.2	4	Region 23	4.2	4.1	4.2	9.5	8.8	10.0	71.6	71.0	72.3	4	Region 23	4.2	4.1	4.2	9.5	8.8	10.0	71.6	71.0	72.3
12	Region 24	4.1	3.8	4.7	8.8	8.1	9.5	73.2	72.4	73.9	7	Region 24	4.0	3.7	4.4	9.4	8.3	9.9	71.1	70.4	71.7	7	Region 24	4.0	3.7	4.4	9.4	8.3	9.9	71.1	70.4	71.7
-	Region 25	-	-	-	-	-	-	-	-	-	1	Region 25	4.0	-	-	10.9	-	-	69.2	-	-	1	Region 25	4.0	-	-	10.9	-	-	69.2	-	-
6	Region 26	4.2	4.1	4.5	7.3	6.8	8.5	73.4	72.9	73.9	10	Region 26	4.1	3.7	4.6	9.0	6.8	10.1	71.2	69.8	73.2	10	Region 26	4.1	3.7	4.6	9.0	6.8	10.1	71.2	69.8	73.2
3	Region 27	4.3	4.1	4.7	8.8	8.3	9.1	72.8	72.5	72.9	8	Region 27	3.9	3.6	4.1	8.8	8.1	9.3	72.0	71.6	72.5	8	Region 27	3.9	3.6	4.1	8.8	8.1	9.3	72.0	71.6	72.5
13	Region 28	4.0	3.7	4.3	8.8	8.3	9.6	73.0	71.6	73.9	12	Region 28	4.0	3.4	4.5	8.7	8.2	9.2	71.9	71.2	72.6	12	Region 28	4.0	3.4	4.5	8.7	8.2	9.2	71.9	71.2	72.6
14	Region 29	4.0	3.6	4.4	9.1	7.9	10.3	72.7	71.6	73.5	46	Region 29	4.0	3.4	4.7	9.2	7.9	11.0	71.9	68.5	72.9	46	Region 29	4.0	3.4	4.7	9.2	7.9	11.0	71.9	68.5	72.9
18	Region 30	4.0	3.5	4.6	8.8	7.9	9.6	73.1	71.6	74.0	43	Region 30	4.0	3.3	4.8	8.9	7.5	10.0	72.0	70.7	74.2	43	Region 30	4.0	3.3	4.8	8.9	7.5	10.0	72.0	70.7	74.2
9	Region 31	3.9	3.7	4.2	8.9	7.1	10.0	72.8	71.4	74.3	51	Region 31	3.9	3.5	4.4	9.1	7.8	10.6	72.0	70.0	73.3	51	Region 31	3.9	3.5	4.4	9.1	7.8	10.6	72.0	70.0	73.3
25	Region 32	3.9	3.6	4.6	8.7	8.0	10.6	72.9	71.2	74.2	65	Region 32	4.1	3.5	4.9	9.0	7.5	11.3	71.9	69.7	74.0	65	Region 32	4.1	3.5	4.9	9.0	7.5	11.3	71.9	69.7	74.0
21	Region 33	4.0	3.4	4.8	8.8	8.0	10.5	72.9	71.3	73.8	4	Region 33	4.0	3.9	4.1	8.8	8.6	9.0	72.2	71.8	72.6	4	Region 33	4.0	3.9	4.1	8.8	8.6	9.0	72.2	71.8	72.6
30	Region 34	4.0	3.5	4.4	8.6	7.6	10.8	73.2	70.5	74.8	26	Region 34	4.2	3.6	4.7	9.1	8.2	10.5	71.8	70.1	72.5	26	Region 34	4.2	3.6	4.7	9.1	8.2	10.5	71.8	70.1	72.5
6	Region 35	4.3	3.7	5.0	9.1	8.4	10.1	72.3	70.7	73.1	6	Region 35	4.1	3.6	4.9	9.1	8.6	10.2	72.2	71.3	73.2	6	Region 35	4.1	3.6	4.9	9.1	8.6	10.2	72.2	71.3	73.2
11	Region 36	4.1	3.5	4.8	8.4	7.8	9.4	73.3	71.5	74.3	18	Region 36	3.8	3.5	4.6	8.6	7.7	9.4	72.9	71.9	73.9	18	Region 36	3.8	3.5	4.6	8.6	7.7	9.4	72.9	71.9	73.9
352	Ave. WM1	4.1	3.4	5.0	8.7	6.8	11.1	73.2	69.4	74.8	400	Ave. YM1	4.0	3.2	5.0	9.0	6.8	11.3	72.0	68.5	74.6	400	Ave. YM1	4.0	3.2	5.0	9.0	6.8	11.3	72.0	68.5	74.6
	Min. WM1											Min. YM1											Min. YM1									
	Max. WM1											Max. YM1											Max. YM1									

TABLE 19: NUTRITIONAL VALUES OF WHITE MAIZE ACCORDING TO GRADE (2017/2018) (continue)													TABLE 20: NUTRITIONAL VALUES OF YELLOW MAIZE ACCORDING TO GRADE (2017/2018) (continue)												
Number of samples	Region	Fat % (db)			Protein % (db)			Starch % (db)			Number of samples	Region	Fat % (db)			Protein % (db)			Starch % (db)						
		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.			ave.	min.	max.	ave.	min.	max.	ave.	min.	max.				
GRADE: WM2													GRADE: YM2												
-	Region 12	-	-	-	-	-	-	-	-	-	1	Region 12	3.8	-	-	9.1	-	-	72.2	-	-				
3	Region 13	4.1	4.0	4.2	8.6	8.3	9.1	73.0	72.4	73.4	-	Region 13	-	-	-	-	-	-	-	-	-				
3	Region 14	3.9	3.8	4.2	8.6	8.1	8.9	72.6	72.1	73.4	-	Region 14	-	-	-	-	-	-	-	-	-				
7	Region 15	3.9	3.8	4.0	8.9	8.4	9.4	73.6	73.4	74.0	-	Region 15	-	-	-	-	-	-	-	-	-				
9	Region 16	4.1	3.9	4.3	8.4	7.8	9.1	73.9	72.8	74.7	1	Region 16	3.8	-	-	9.7	-	-	71.3	-	-				
2	Region 17	4.1	4.1	4.1	8.6	8.5	8.6	73.7	73.6	73.8	1	Region 17	4.3	-	-	10.2	-	-	70.2	-	-				
1	Region 18	4.0	-	-	8.2	-	-	74.0	-	-	4	Region 18	3.9	3.7	4.0	8.8	7.8	9.7	72.1	71.4	72.3				
5	Region 19	4.0	3.9	4.1	8.1	7.6	8.6	74.1	74.0	74.3	1	Region 19	4.3	-	-	10.2	-	-	71.6	-	-				
3	Region 20	3.9	3.7	4.1	8.6	8.0	9.2	73.3	72.4	74.1	3	Region 20	3.8	3.5	4.0	8.5	8.2	8.7	72.2	71.7	72.8				
1	Region 21	4.0	-	-	9.5	-	-	73.3	-	-	-	Region 21	-	-	-	-	-	-	-	-	-				
2	Region 22	4.0	3.9	4.0	8.5	8.4	8.6	73.9	73.9	73.9	-	Region 22	-	-	-	-	-	-	-	-	-				
4	Region 23	3.9	3.8	4.0	8.9	8.7	9.3	73.0	72.5	73.8	-	Region 23	-	-	-	-	-	-	-	-	-				
5	Region 24	4.0	3.9	4.1	9.4	8.9	9.8	72.4	71.5	72.8	4	Region 24	4.3	4.0	4.5	9.0	8.5	9.5	71.9	71.6	72.0				
4	Region 26	4.3	4.2	4.3	8.2	6.9	9.4	73.0	72.0	73.7	2	Region 26	4.1	4.0	4.2	7.7	6.7	8.6	72.0	71.8	72.2				
-	Region 27	-	-	-	-	-	-	-	-	-	1	Region 27	3.6	-	-	8.6	-	-	71.9	-	-				
1	Region 28	3.8	-	-	8.5	-	-	72.3	-	-	4	Region 28	4.2	3.8	4.6	9.9	9.4	10.3	70.8	69.6	71.5				
1	Region 29	4.0	-	-	8.1	-	-	74.4	-	-	4	Region 29	3.9	3.7	4.2	9.1	8.7	9.4	72.3	71.6	73.2				
3	Region 30	4.2	4.0	4.5	8.8	7.8	9.3	72.6	72.2	73.0	2	Region 30	3.9	3.3	4.5	9.5	9.0	10.0	71.7	71.0	72.3				
3	Region 32	4.0	3.8	4.3	8.9	8.6	9.1	73.0	72.2	74.3	-	Region 32	-	-	-	-	-	-	-	-	-				
2	Region 33	3.7	3.6	3.8	8.5	8.2	8.7	73.0	72.4	73.6	1	Region 33	4.1	-	-	8.9	-	-	72.2	-	-				
7	Region 34	3.9	3.7	4.1	8.7	8.0	9.1	73.5	72.7	74.4	1	Region 34	3.8	-	-	9.3	-	-	72.0	-	-				
2	Region 35	4.1	3.8	4.4	9.1	8.6	9.6	72.8	72.0	73.5	-	Region 35	-	-	-	-	-	-	-	-	-				
3	Region 36	4.0	3.8	4.4	8.6	8.2	9.0	73.6	72.8	74.0	4	Region 36	4.0	3.6	4.3	8.3	7.5	10.1	72.2	71.4	72.8				
71	Ave. WM2	4.0	3.6	4.5	8.6	6.9	9.8	73.3	71.5	74.7	34	Ave. YM2	4.0	3.3	4.6	9.0	6.7	10.3	71.8	69.6	73.2				
	Min. WM2											Min. YM2													
	Max. WM2											Max. YM2													

TABLE 19: NUTRITIONAL VALUES OF WHITE MAIZE ACCORDING TO GRADE (2017/2018) (continue)													TABLE 20: NUTRITIONAL VALUES OF YELLOW MAIZE ACCORDING TO GRADE (2017/2018) (continue)												
Number of samples	Region	Fat % (db)			Protein % (db)			Starch % (db)			Number of samples	Region	Fat % (db)			Protein % (db)			Starch % (db)						
		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.			ave.	min.	max.	ave.	min.	max.	ave.	min.	max.				
GRADE: WM3													GRADE: YM3												
1	Region 12	4.7	-	-	8.9	-	-	72.8	-	-	1	Region 12	3.8	-	-	10.5	-	-	69.5	-	-				
1	Region 13	4.4	-	-	8.5	-	-	73.4	-	-	-	Region 13	-	-	-	-	-	-	-	-	-				
2	Region 14	3.6	3.4	3.8	9.2	9.1	9.3	70.9	70.6	71.2	-	Region 14	-	-	-	-	-	-	-	-	-				
1	Region 15	3.8	-	-	9.3	-	-	72.8	-	-	1	Region 15	3.9	-	-	9.1	-	-	72.1	-	-				
6	Region 16	4.1	3.9	4.3	8.7	8.2	9.3	73.3	72.3	73.9	-	Region 16	-	-	-	-	-	-	-	-	-				
1	Region 17	4.4	-	-	7.9	-	-	72.9	-	-	-	Region 17	-	-	-	-	-	-	-	-	-				
1	Region 18	3.5	-	-	8.1	-	-	74.3	-	-	-	Region 18	-	-	-	-	-	-	-	-	-				
1	Region 20	3.5	-	-	9.3	-	-	72.6	-	-	-	Region 20	-	-	-	-	-	-	-	-	-				
1	Region 22	4.1	-	-	9.3	-	-	72.4	-	-	1	Region 22	3.2	-	-	9.6	-	-	71.4	-	-				
1	Region 23	3.9	-	-	9.0	-	-	73.0	-	-	-	Region 23	-	-	-	-	-	-	-	-	-				
-	Region 24	-	-	-	-	-	-	-	-	-	1	Region 24	3.8	-	-	9.8	-	-	70.8	-	-				
-	Region 26	-	-	-	-	-	-	-	-	-	1	Region 26	4.1	-	-	9.3	-	-	71.7	-	-				
-	Region 30	-	-	-	-	-	-	-	-	-	1	Region 30	4.2	-	-	8.9	-	-	72.1	-	-				
1	Region 31	4.1	-	-	8.0	-	-	73.7	-	-	2	Region 31	3.8	3.7	3.9	9.7	9.4	9.9	71.2	70.7	71.7				
1	Region 32	3.8	-	-	8.5	-	-	72.6	-	-	1	Region 32	3.9	-	-	8.1	-	-	72.6	-	-				
4	Region 33	3.7	3.4	4.1	8.6	8.2	9.0	73.4	72.7	73.7	1	Region 33	3.8	-	-	8.4	-	-	73.1	-	-				
1	Region 35	4.3	-	-	10.1	-	-	71.6	-	-	-	Region 35	-	-	-	-	-	-	-	-	-				
23	Ave. WM3	3.9	3.4	4.7	8.8	7.9	10.1	72.9	70.6	74.3	10	Ave. YM3	3.8	3.2	4.2	9.3	8.1	10.5	71.6	69.5	73.1				
	Min. WM3											Min. YM3													
	Max. WM3											Max. YM3													

TABLE 19: NUTRITIONAL VALUES OF WHITE MAIZE ACCORDING TO GRADE (2017/2018)
(continue)

Number of samples	Region	Fat % (db)			Protein % (db)			Starch % (db)		
		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.
CLASS: COM										
1	Region 13	4.1	-	-	8.8	-	-	73.7	-	-
2	Region 18	4.2	3.7	4.7	7.7	7.2	8.2	73.2	72.7	73.6
1	Region 20	3.9	-	-	7.8	-	-	73.6	-	-
1	Region 21	4.5	-	-	11.2	-	-	69.5	-	-
-	Region 33	-	-	-	-	-	-	-	-	-
5	Ave. COM	4.2	3.7	4.7	8.7	7.2	11.2	72.6	69.5	73.7
	Min. COM									
	Max. COM									
451	Ave. White	4.1	3.4	5.0	8.7	6.8	11.2	73.2	69.4	74.8
	Min. White									
	Max. White									
900	Ave. Maize	4.0	3.2	5.0	8.8	6.7	11.3	72.6	68.5	74.8
	Min. Maize									
	Max. Maize									

TABLE 20: NUTRITIONAL VALUES OF YELLOW MAIZE ACCORDING TO GRADE (2017/2018)
(continue)

Number of samples	Region	Fat % (db)			Protein % (db)			Starch % (db)		
		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.
CLASS: COM										
1	Region 17	4.2	-	-	9.1	-	-	71.9	-	-
1	Region 24	4.4	-	-	10.0	-	-	71.2	-	-
1	Region 26	4.0	-	-	8.8	-	-	71.8	-	-
1	Region 31	3.8	-	-	9.1	-	-	72.2	-	-
1	Region 33	3.8	-	-	8.5	-	-	72.5	-	-
5	Ave. COM	4.0	3.8	4.4	9.1	8.5	10.0	71.9	71.2	72.5
	Min. COM									
	Max. COM									
449	Min. Yellow	4.0	3.2	5.0	9.0	6.7	11.3	72.0	68.5	74.6
	Min. Yellow									
	Max. Yellow									
900	Ave. Maize	4.0	3.2	5.0	8.8	6.7	11.3	72.6	68.5	74.8
	Min. Maize									
	Max. Maize									

**TABLE 21: NUTRITIONAL VALUES OF WHITE AND YELLOW
MAIZE (2017/2018)**

Number of samples	Region	Fat % (db)			Protein % (db)			Starch % (db)		
		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.
WHITE										
4	Region 11	4.0	3.7	4.1	8.7	8.5	9.3	73.1	72.8	73.4
15	Region 12	4.2	3.7	4.7	8.6	7.9	9.5	73.6	71.8	74.6
25	Region 13	4.2	3.9	4.5	8.5	7.5	9.3	73.4	72.4	74.5
38	Region 14	4.0	3.4	4.4	8.9	7.6	9.9	73.0	70.6	74.5
15	Region 15	4.0	3.8	4.3	8.9	8.2	9.4	73.7	72.8	74.6
21	Region 16	4.1	3.9	4.3	8.5	7.8	9.4	73.6	72.3	74.7
28	Region 17	4.2	3.9	4.5	8.4	7.6	10.1	73.4	71.5	74.8
18	Region 18	4.1	3.5	4.7	8.3	7.2	8.8	73.5	72.7	74.5
28	Region 19	4.2	3.9	4.4	8.4	7.6	9.4	73.6	72.1	74.3
14	Region 20	4.0	3.5	4.3	8.4	7.8	9.3	73.6	72.4	74.4
13	Region 21	4.2	3.9	4.8	9.2	7.9	11.2	72.7	69.4	74.3
10	Region 22	4.1	3.9	4.2	8.8	8.0	9.3	73.5	72.4	74.0
16	Region 23	4.0	3.8	4.3	8.9	8.2	9.3	73.4	72.5	74.2
17	Region 24	4.1	3.8	4.7	9.0	8.1	9.8	72.9	71.5	73.9
10	Region 26	4.3	4.1	4.5	7.7	6.8	9.4	73.3	72.0	73.9
3	Region 27	4.3	4.1	4.7	8.8	8.3	9.1	72.8	72.5	72.9
14	Region 28	4.0	3.7	4.3	8.8	8.3	9.6	73.0	71.6	73.9
15	Region 29	4.0	3.6	4.4	9.0	7.9	10.3	72.8	71.6	74.4
21	Region 30	4.0	3.5	4.6	8.8	7.8	9.6	73.1	71.6	74.0
10	Region 31	3.9	3.7	4.2	8.8	7.1	10.0	72.9	71.4	74.3
29	Region 32	3.9	3.6	4.6	8.7	8.0	10.6	72.9	71.2	74.3
27	Region 33	3.9	3.4	4.8	8.8	8.0	10.5	73.0	71.3	73.8
37	Region 34	4.0	3.5	4.4	8.6	7.6	10.8	73.3	70.5	74.8
9	Region 35	4.3	3.7	5.0	9.2	8.4	10.1	72.3	70.7	73.5
14	Region 36	4.0	3.5	4.8	8.5	7.8	9.4	73.4	71.5	74.3
451	Ave. white	4.1			8.7			73.2		
	Min. white		3.4			6.8			69.4	
	Max. white			5.0			11.2			74.8
YELLOW										
15	Region 10	3.5	3.2	4.1	8.1	7.5	8.3	74.0	73.1	74.6
14	Region 11	3.8	3.5	4.2	8.3	7.0	8.8	73.0	72.3	73.6
8	Region 12	4.0	3.8	4.3	9.3	7.3	10.5	71.8	69.5	73.4
8	Region 13	4.1	3.6	4.3	9.0	8.3	9.5	72.2	71.3	72.8
12	Region 14	4.2	3.6	5.0	9.3	8.2	11.1	71.7	69.8	73.0
2	Region 15	3.9	3.8	3.9	8.5	7.8	9.1	72.7	72.1	73.3
5	Region 16	4.0	3.6	4.4	9.5	8.2	11.0	71.5	69.1	73.4
9	Region 17	4.3	4.2	4.4	8.8	8.3	10.2	71.8	70.2	72.6
10	Region 18	4.0	3.7	4.2	8.8	7.8	9.7	72.1	71.4	72.5
9	Region 19	4.3	3.9	4.7	9.1	8.5	10.2	72.3	71.6	73.2
9	Region 20	4.1	3.5	4.4	8.9	8.2	9.4	72.2	71.7	72.8
8	Region 21	4.2	3.9	4.4	9.6	9.2	10.3	71.3	70.1	72.1
5	Region 22	4.1	3.2	4.4	9.7	9.3	10.2	71.2	70.0	72.0
4	Region 23	4.2	4.1	4.2	9.5	8.8	10.0	71.6	71.0	72.3
13	Region 24	4.1	3.7	4.5	9.3	8.3	10.0	71.3	70.4	72.0
1	Region 25	4.0	-	-	10.9	-	-	69.2	-	-

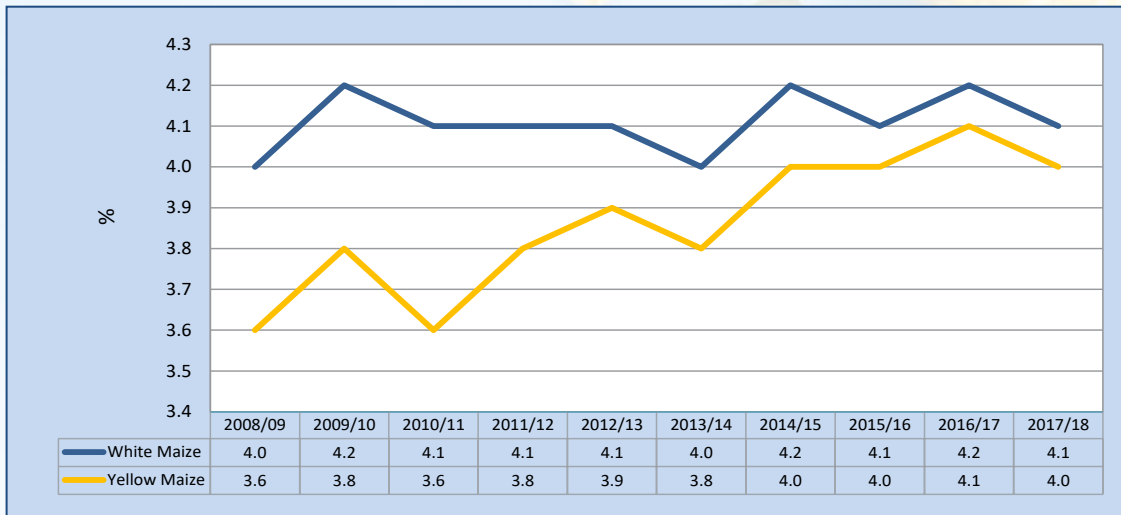
**TABLE 21: NUTRITIONAL VALUES OF WHITE AND YELLOW
MAIZE (2017/2018) (continue)**

Number of samples	Region	Fat % (db)			Protein % (db)			Starch % (db)		
		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.
YELLOW										
14	Region 26	4.1	3.7	4.6	8.8	6.7	10.1	71.4	69.8	73.2
9	Region 27	3.8	3.6	4.1	8.8	8.1	9.3	71.9	71.6	72.5
16	Region 28	4.1	3.4	4.6	9.0	8.2	10.3	71.6	69.6	72.6
50	Region 29	4.0	3.4	4.7	9.2	7.9	11.0	71.9	68.5	73.2
46	Region 30	4.0	3.3	4.8	9.0	7.5	10.0	72.0	70.7	74.2
54	Region 31	3.9	3.5	4.4	9.1	7.8	10.6	71.9	70.0	73.3
66	Region 32	4.1	3.5	4.9	9.0	7.5	11.3	71.9	69.7	74.0
7	Region 33	4.0	3.8	4.1	8.7	8.4	9.0	72.3	71.8	73.1
27	Region 34	4.2	3.6	4.7	9.1	8.2	10.5	71.8	70.1	72.5
6	Region 35	4.1	3.6	4.9	9.1	8.6	10.2	72.2	71.3	73.2
22	Region 36	3.9	3.5	4.6	8.5	7.5	10.1	72.7	71.4	73.9
449	Ave. yellow	4.0			9.0			72.0		
	Min. yellow	3.2			6.7			68.5		
	Max. yellow	5.0			11.3			74.6		
WHITE AND YELLOW										
15	Region 10	3.5	3.2	4.1	8.1	7.5	8.3	74.0	73.1	74.6
18	Region 11	3.8	3.5	4.2	8.4	7.0	9.3	73.1	72.3	73.6
23	Region 12	4.1	3.7	4.7	8.9	7.3	10.5	73.0	69.5	74.6
33	Region 13	4.2	3.6	4.5	8.6	7.5	9.5	73.1	71.3	74.5
50	Region 14	4.1	3.4	5.0	9.0	7.6	11.1	72.7	69.8	74.5
17	Region 15	4.0	3.8	4.3	8.8	7.8	9.4	73.6	72.1	74.6
26	Region 16	4.1	3.6	4.4	8.7	7.8	11.0	73.2	69.1	74.7
37	Region 17	4.2	3.9	4.5	8.5	7.6	10.2	73.0	70.2	74.8
28	Region 18	4.0	3.5	4.7	8.5	7.2	9.7	73.0	71.4	74.5
37	Region 19	4.2	3.9	4.7	8.6	7.6	10.2	73.3	71.6	74.3
23	Region 20	4.0	3.5	4.4	8.6	7.8	9.4	73.0	71.7	74.4
21	Region 21	4.2	3.9	4.8	9.3	7.9	11.2	72.2	69.4	74.3
15	Region 22	4.1	3.2	4.4	9.1	8.0	10.2	72.7	70.0	74.0
20	Region 23	4.0	3.8	4.3	9.0	8.2	10.0	73.0	71.0	74.2
30	Region 24	4.1	3.7	4.7	9.1	8.1	10.0	72.2	70.4	73.9
1	Region 25	4.0	-	-	10.9	-	-	69.2	-	-
24	Region 26	4.2	3.7	4.6	8.4	6.7	10.1	72.2	69.8	73.9
12	Region 27	4.0	3.6	4.7	8.8	8.1	9.3	72.2	71.6	72.9
30	Region 28	4.0	3.4	4.6	8.9	8.2	10.3	72.2	69.6	73.9
65	Region 29	4.0	3.4	4.7	9.2	7.9	11.0	72.1	68.5	74.4
67	Region 30	4.0	3.3	4.8	8.9	7.5	10.0	72.3	70.7	74.2
64	Region 31	3.9	3.5	4.4	9.1	7.1	10.6	72.1	70.0	74.3
95	Region 32	4.1	3.5	4.9	8.9	7.5	11.3	72.2	69.7	74.3
34	Region 33	3.9	3.4	4.8	8.8	8.0	10.5	72.8	71.3	73.8
64	Region 34	4.1	3.5	4.7	8.8	7.6	10.8	72.7	70.1	74.8
15	Region 35	4.2	3.6	5.0	9.2	8.4	10.2	72.3	70.7	73.5
36	Region 36	3.9	3.5	4.8	8.5	7.5	10.1	73.0	71.4	74.3
900	Ave. white & yellow	4.0			8.8			72.6		
	Min. white & yellow	3.2			6.7			68.5		
	Max. white & yellow	5.0			11.3			74.8		

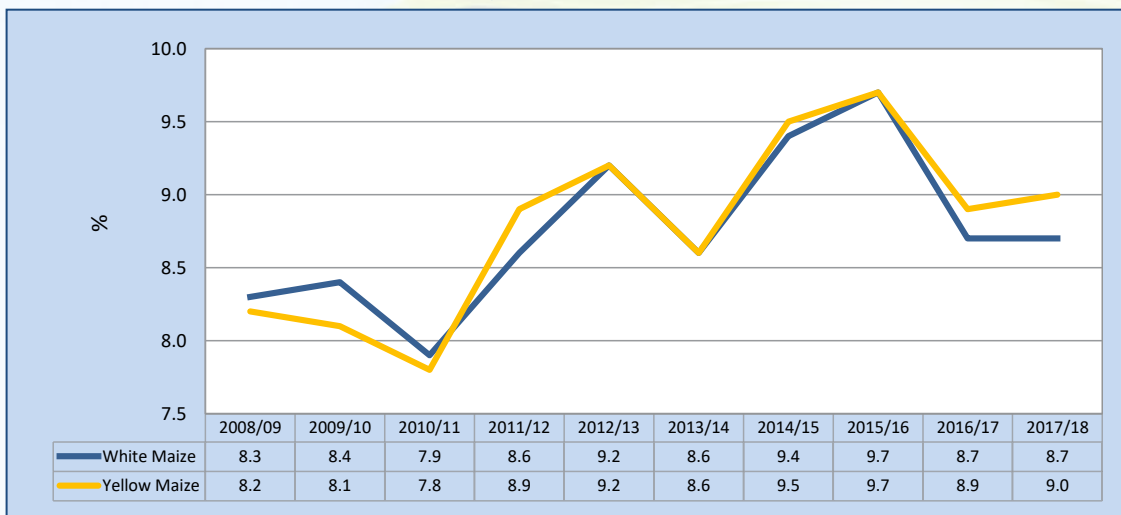
TABLE 22: NUTRITIONAL VALUES OF SOUTH AFRICAN WHITE AND YELLOW MAIZE 2008/2009 - 2017/2018

Season	Number of samples	Fat % (db)			Protein % (db)			Starch % (db)		
		ave.	min.	max.	ave.	min.	max.	ave.	min.	max.
White Maize										
2008/09	483	4.0	3.5	5.1	8.3	6.4	10.4	72.4	70.7	74.2
2009/10	458	4.2	3.5	5.8	8.4	6.6	10.0	72.6	70.6	74.6
2010/11	413	4.1	2.8	4.6	7.9	6.1	9.5	73.6	71.9	77.0
2011/12	577	4.1	3.3	4.7	8.6	6.3	11.2	72.6	70.6	74.3
2012/13	508	4.1	3.3	5.3	9.2	6.4	11.5	71.4	68.5	73.6
2013/14	451	4.0	3.4	5.0	8.6	6.7	10.1	72.9	70.9	75.1
2014/15	485	4.2	3.3	5.8	9.4	6.3	11.2	72.6	69.8	74.9
2015/16	415	4.1	3.5	5.2	9.7	7.5	12.2	72.6	69.8	76.3
2016/17	549	4.2	3.4	5.3	8.7	6.8	11.5	74.1	69.8	75.9
2017/18	451	4.1	3.4	5.0	8.7	6.8	11.2	73.2	69.4	74.8
Weighted Average		4.1			8.8			72.8		
Minimum			2.8			6.1			68.5	
Maximum				5.8			12.2			77.0
Yellow Maize										
2008/09	327	3.6	2.9	4.7	8.2	6.2	10.6	73.2	71.1	74.8
2009/10	342	3.8	3.3	4.7	8.1	6.5	10.1	73.4	71.0	75.4
2010/11	280	3.6	2.8	4.4	7.8	6.3	9.8	74.2	72.2	76.0
2011/12	423	3.8	3.0	4.6	8.9	7.0	11.3	73.0	71.0	75.0
2012/13	492	3.9	2.9	4.7	9.2	7.1	12.8	71.9	69.4	73.9
2013/14	479	3.8	3.0	4.8	8.6	6.0	11.3	73.1	70.8	75.7
2014/15	515	4.0	3.1	5.1	9.5	7.1	11.9	72.9	70.8	75.2
2015/16	505	4.0	3.3	5.1	9.7	7.7	12.6	72.3	70.0	75.3
2016/17	451	4.1	3.3	5.1	8.9	7.1	10.8	73.7	71.3	76.2
2017/18	449	4.0	3.2	5.0	9.0	6.7	11.3	72.0	68.5	74.6
Weighted Average		3.9			8.9			72.9		
Minimum			2.8			6.0			68.5	
Maximum				5.1			12.8			76.2
White and Yellow Maize										
2008/09	810	3.8	2.9	5.1	8.3	6.2	10.6	72.7	70.7	74.8
2009/10	800	4.0	3.3	5.8	8.3	6.5	10.1	72.9	70.6	75.4
2010/11	693	3.9	2.8	4.6	7.9	6.1	9.8	73.8	71.9	77.0
2011/12	1000	4.0	3.0	4.7	8.7	6.3	11.3	72.8	70.6	75.0
2012/13	1000	4.0	2.9	5.3	9.2	6.4	12.8	71.6	68.5	73.9
2013/14	930	3.9	3.0	5.0	8.6	6.0	11.3	73.0	70.8	75.7
2014/15	1000	4.1	3.1	5.8	9.4	6.3	11.9	72.8	69.8	75.2
2015/16	920	4.1	3.3	5.2	9.7	7.5	12.6	72.4	69.8	76.3
2016/17	1000	4.1	3.3	5.3	8.8	6.8	11.5	73.9	69.8	76.2
2017/18	900	4.0	3.2	5.0	8.8	6.7	11.3	72.6	68.5	74.8
Weighted Average		4.0			8.8			72.8		
Minimum			2.8			6.0			68.5	
Maximum				5.8			12.8			77.0

Graph 38: Fat content of white and yellow maize over 10 seasons



Graph 39: Protein content of white and yellow maize over 10 seasons



Graph 40: Starch content of white and yellow maize over 10 seasons

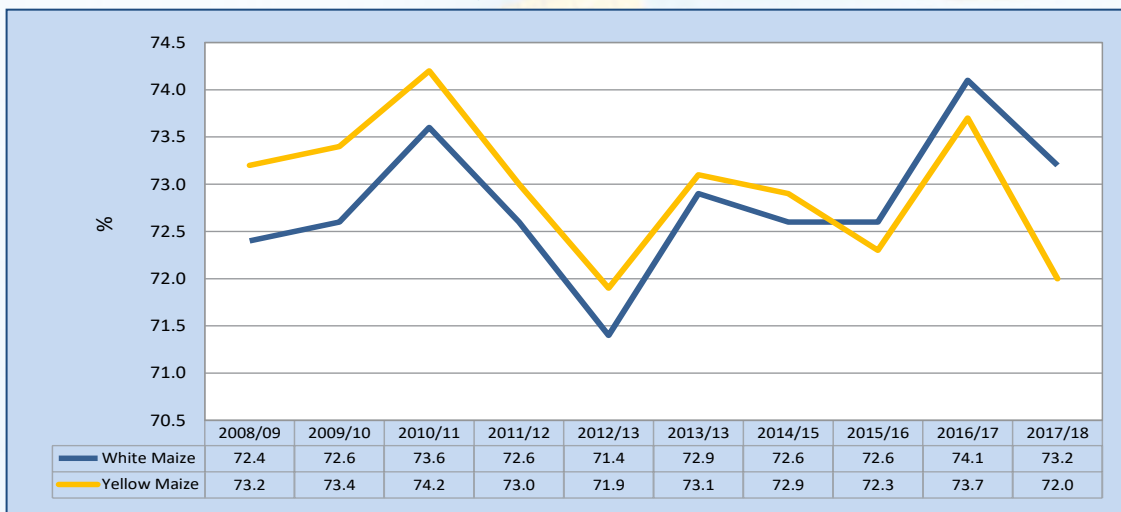


TABLE 23: PRESENCE OF GENETICALLY MODIFIED MAIZE (2017/2018)

REGION	W/Y	Cry1Ab % (LOD: 0.4%)	Cry2Ab % (LOD: 0.5%)	CP4 EPSPS % (LOD: 0.25%)	REGION	W/Y	Cry1Ab % (LOD: 0.4%)	Cry2Ab % (LOD: 0.5%)	CP4 EPSPS % (LOD: 0.25%)	REGION	W/Y	Cry1Ab % (LOD: 0.4%)	Cry2Ab % (LOD: 0.5%)	CP4 EPSPS % (LOD: 0.25%)
10	Y	0.86	2.1	2.6	21	W	>5.0	>5.0	>5.0	31	W	0.75	<5.0	3.3
11	W	>5.0	>5.0	>5.0	22	Y	>5.0	>5.0	>5.0	31	W	0.70	0.60	1.8
11	Y	>5.0	>5.0	>5.0	22	W	>5.0	>5.0	>5.0	31	Y	<0.4	<0.5	0.66
12	Y	5.0	2.0	>5.0	23	Y	>5.0	4.0	>5.0	31	W	>5.0	>5.0	>5.0
12	W	>5.0	>5.0	>5.0	23	W	>5.0	>5.0	>5.0	31	Y	>5.0	0.55	>5.0
13	Y	>5.0	>5.0	>5.0	24	W	>5.0	>5.0	>5.0	32	W	<0.4	<0.5	>5.0
13	W	>5.0	>5.0	>5.0	24	W	>5.0	>5.0	>5.0	32	Y	<0.4	<0.5	0.51
13	Y	>5.0	>5.0	>5.0	24	Y	>5.0	>5.0	>5.0	32	Y	0.64	<0.5	>5.0
13	W	>5.0	>5.0	>5.0	24	Y	1.8	<0.5	>5.0	32	W	>5.0	>5.0	>5.0
14	W	>5.0	>5.0	>5.0	26	W	>5.0	0.48	>5.0	32	W	<0.4	<0.5	1.1
14	W	>5.0	>5.0	>5.0	26	Y	>5.0	>5.0	>5.0	32	Y	<0.4	<0.5	0.74
14	Y	>5.0	>5.0	>5.0	27	W	>5.0	>5.0	>5.0	32	W	>5.0	>5.0	>5.0
14	W	>5.0	>5.0	>5.0	27	Y	>5.0	>5.0	>5.0	32	W	1.6	1.8	2.0
14	Y	>5.0	>5.0	>5.0	28	W	>5.0	>5.0	4.7	32	Y	0.50	<0.5	0.51
14	Y	0.70	1.0	>5.0	28	W	>5.0	>5.0	4.1	33	Y	>5.0	>5.0	>5.0
15	Y	>5.0	>5.0	>5.0	28	Y	>5.0	>5.0	>5.0	33	Y	<0.4	<0.5	>5.0
15	W	>5.0	>5.0	>5.0	28	Y	>5.0	>5.0	>5.0	33	W	0.61	<0.5	4.2
16	Y	>5.0	>5.0	>5.0	29	Y	>5.0	>5.0	>5.0	33	W	>5.0	>5.0	>5.0
16	W	>5.0	>5.0	>5.0	29	Y	>5.0	>5.0	>5.0	34	Y	>5.0	>5.0	>5.0
17	Y	>5.0	>5.0	>5.0	29	Y	<0.4	<0.5	0.93	34	W	1.6	1.2	>5.0
17	W	>5.0	>5.0	>5.0	29	Y	1.9	1.4	>5.0	34	W	<0.4	<0.5	1.2
17	W	>5.0	>5.0	>5.0	29	W	>5.0	0.83	>5.0	34	W	>5.0	>5.0	>5.0
17	Y	>5.0	>5.0	>5.0	29	W	2.7	1.5	3.4	34	Y	>5.0	>5.0	>5.0
18	Y	2.4	2.7	>5.0	29	W	>5.0	>5.0	>5.0	34	Y	>5.0	0.82	>5.0
18	Y	>5.0	>5.0	>5.0	30	Y	>5.0	3.0	>5.0	34	Y	>5.0	>5.0	>5.0
18	W	>5.0	>5.0	>5.0	30	Y	4.7	<0.5	>5.0	34	W	>5.0	>5.0	>5.0
18	W	>5.0	>5.0	>5.0	30	W	>5.0	>5.0	>5.0	35	Y	>5.0	>5.0	>5.0
19	Y	>5.0	>5.0	>5.0	30	Y	>5.0	>5.0	>5.0	35	W	>5.0	>5.0	>5.0
19	W	>5.0	>5.0	>5.0	30	W	>5.0	>5.0	>5.0	36	Y	>5.0	2.9	>5.0
19	Y	>5.0	>5.0	>5.0	30	W	1.6	<0.5	>5.0	36	Y	>5.0	>5.0	>5.0
19	W	>5.0	>5.0	>5.0	30	W	<0.4	<0.5	2.3	36	W	>5.0	3.6	>5.0
20	W	>5.0	>5.0	>5.0	31	W	>5.0	>5.0	>5.0	36	W	0.76	<0.5	1.7
20	Y	>5.0	>5.0	>5.0	31	Y	>5.0	>5.0	>5.0	36	W			
21	Y	>5.0	>5.0	>5.0	31	Y	>5.0	>5.0	>5.0					
n	Season	% Samples positive for Cry1Ab			n	Season	% Samples positive for Cry2Ab			n	Season	% Samples positive for CP4 EPSPS		
100	2017/18	91	91	100	2017/18	83	83	100	100	2017/18	100	100	100	100
100	2016/17	98	98	100	2016/17	84	84	100	100	2016/17	100	100	100	100
100	2015/16	94	94	100	2015/16	78	78	100	100	2015/16	99	99	99	99
100	2014/15	94	94	100	2014/15	81	81	100	100	2014/15	98	98	98	98
100	2013/14	96	96	100	2013/14	90	90	100	100	2013/14	94	94	94	94

LOD: Limit of Detection

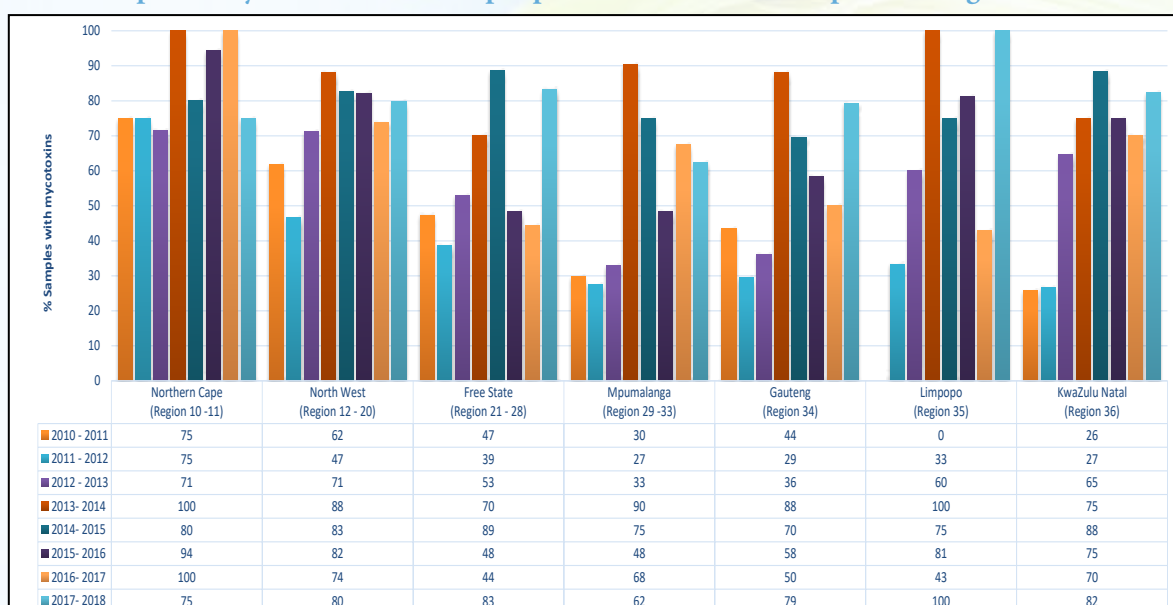
MYCOTOXINS

Annual survey results of mycotoxin contamination in the main staple foods are world-wide critically important for developing sound practices to reduce the mycotoxin contamination along the value chain. The results of the 13 mycotoxins monitored in the SA commercial maize over the past eight seasons, provide insight to producers, traders and processors on the occurrence trends in white and yellow maize over all the production regions. Approximately 35% of the maize crop samples were selected every season for multi-mycotoxin analyses to proportionally represent all the production regions as well as both white and yellow maize.

The 13 mycotoxins (listed in the Methods Section) analysed with the LC-MS/MS instrument include the SA regulated mycotoxins, aflatoxin B₁ (and Aflatoxin total), fumonisin (FUM) B₁ + B₂ and deoxynivalenol (DON) as well as the mycotoxins listed for grains in the Codex General Standard.

In the 2017/2018 season, 75% of the tested samples contained one or more mycotoxin. This is a 13% increase compared to the 62% of the 2016/2017 season's tested maize samples. The percentage samples with mycotoxins in the Free State and Limpopo increased 2-fold when compared with the previous season. The percentage samples containing one or more mycotoxins in the different provinces showed notable differences and the trends in occurrence confirmed that mycotoxin risk varies significantly between production regions, seasons and maize class (white/yellow). A summary of % occurrence per region is provided in graph 41.

Graph 41: Mycotoxin occurrence per province of selected samples over eight seasons

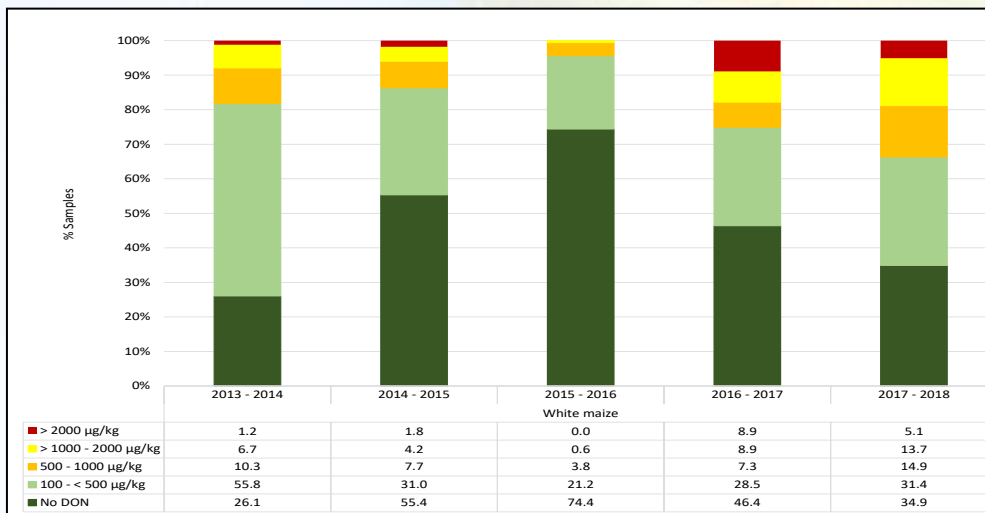


The survey confirmed the absence of aflatoxin B₁ (classified as a cancer-causing hazard), B₂, G₁ and G₂, T₂-toxin, HT-2 toxin and ochratoxin A in commercial maize produced in all the regions over the past eight seasons. Zearalenone (ZON) was detected in only 9% of the white maize samples and 7% of the yellow maize samples. The highest ZON concentration, (361 µg/kg) was found in a white maize sample. The most predominant mycotoxins observed in all the seasons in most regions on both white and yellow maize are FUM B₁, B₂, B₃ (in 44% of the samples) and DON (in 58% of the samples).

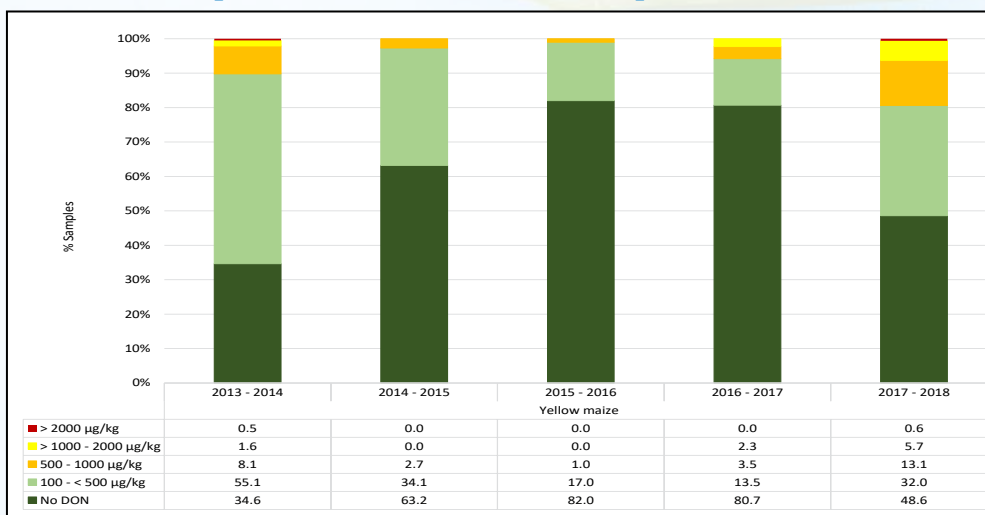
The number of samples containing DON this season increased with 21%; from 37% in 2016/2017 to 58% in the 2017/2018 season. In contrast to the previous season, the highest increase in % samples with DON was observed in yellow maize; from 19% in the previous season to 51% of the samples this season. With the amendment of the SA Regulation in 2016 to include maximum allowable levels for human consumption, it is important to focus on the % samples with FUM and DON concentrations just below and above the maximum allowable levels; namely 4 000 µg/kg FUM B₁+ B₂ and 2 000 µg/kg DON in unprocessed maize.

The % samples with DON at different concentration levels in the past five seasons for both white and yellow maize, are summarised in graphs 42 and 43. This season, only 34.9% of white maize samples contained no DON and a notable increase was observed in the % samples with DON concentrations larger than (>) 1 000 µg/kg over the last three consecutive seasons. Five percent of the white maize samples (9 samples) were contaminated with DON concentrations above the regulated maximum allowable level of 2 000 µg/kg, as illustrated in graph 42. The highest DON concentration of 3 510 µg/kg was also observed on a white maize sample. In contrast to the 81% yellow maize samples containing no DON in 2016/2017, only 49% yellow maize samples this season contained no DON and the percentage yellow maize with DON > 1 000 µg/kg increased from 2% in 2016/2017 to 6% in 2017/2018, see graph 43.

Graph 42: 2017/2018 White maize crop - DON occurrence

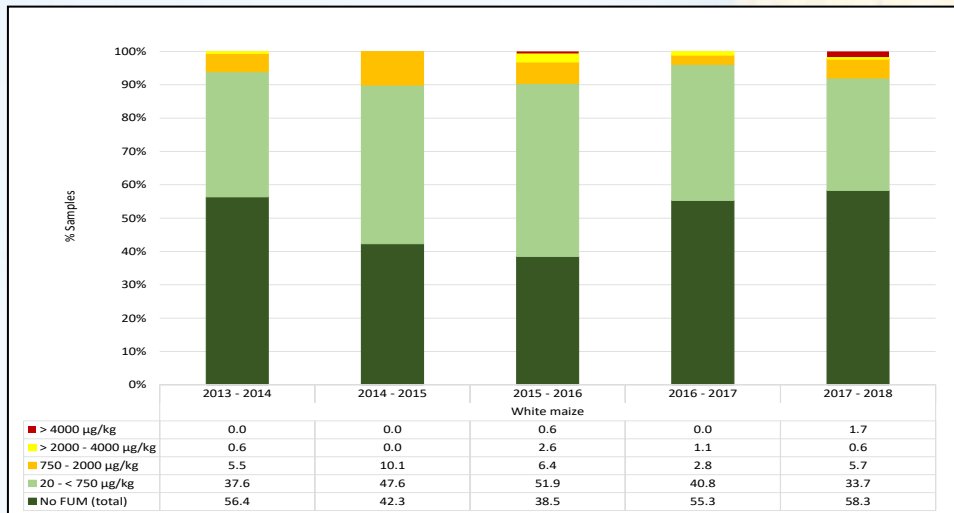


Graph 43: 2017/2018 Yellow maize crop - DON occurrence

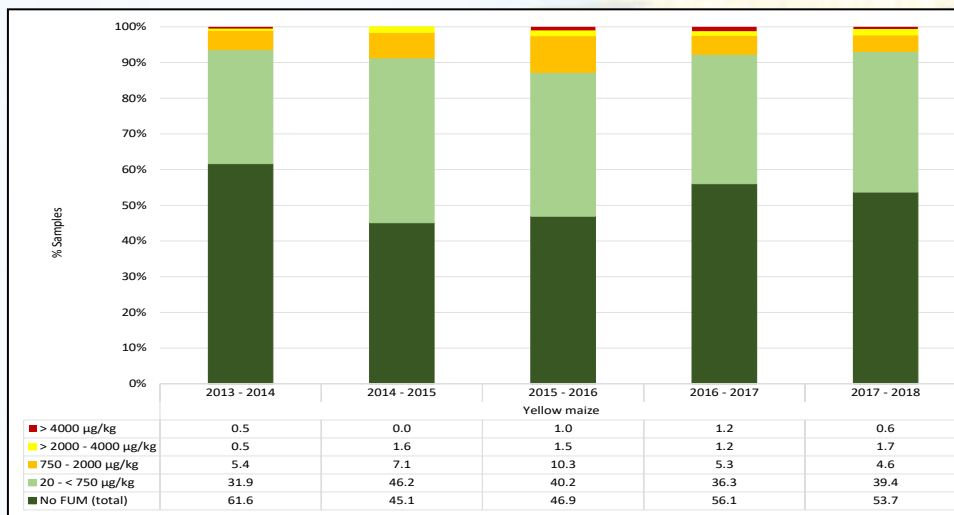


Fumonisin were found in 44% of the samples, similar to the eight-year average, while white and yellow maize also had almost the same incidence rates every season. However, in contrast to the 2016/2017 season, white maize samples containing FUM above 4 000 µg/kg were found this season, concentrations as high as 8 356, 7 328 and 4 505 µg/kg were reported in three different provinces. The following two graphs are summaries of the % white and yellow maize with different FUM concentration levels over the past five seasons.

Graphs 44: 2017/2018 White Maize crop - Fumonisin occurrence

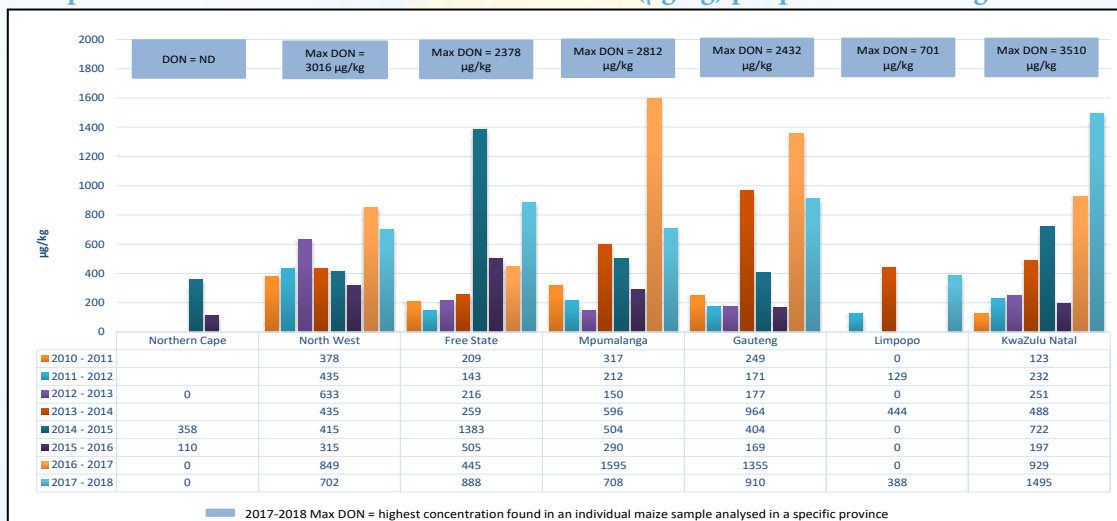


Graph 45: 2017/2017 Yellow Maize crop - Fumonisin occurrence

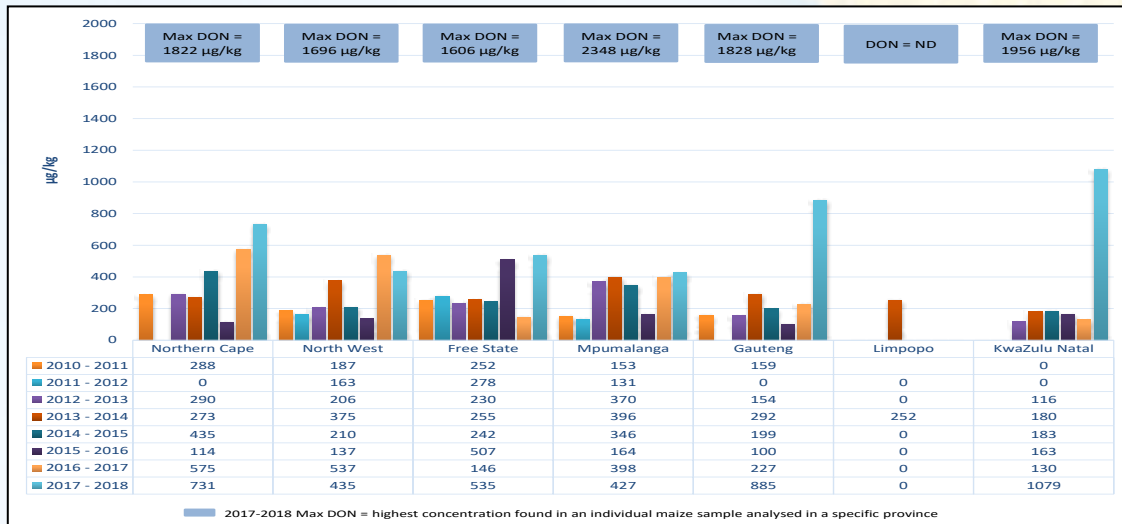


The different patterns of the mean concentrations FUM, DON and ZON over the eight seasons in the different regions, confirmed again the well-known fact that the mycotoxin risk in maize produced, differ from season to season in the same region and also from region to region, because the occurrence and concentration levels of mycotoxins are influenced by climatic factors during the pre-harvest production period.

Graph 46: White maize DON mean concentration (µg/kg) per province over eight seasons

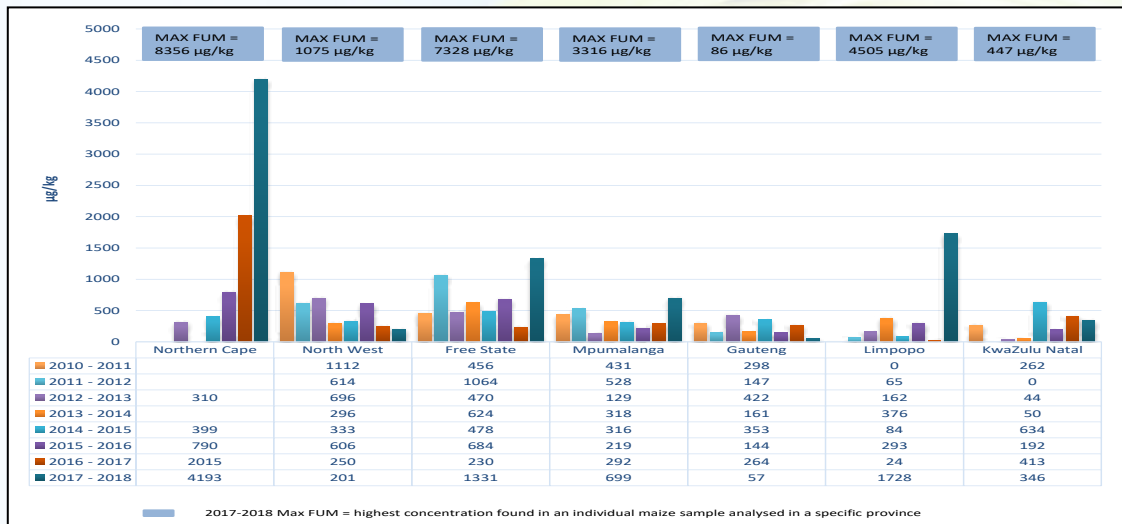


Graph 47: Yellow maize DON mean concentration (µg/kg) per province over eight seasons

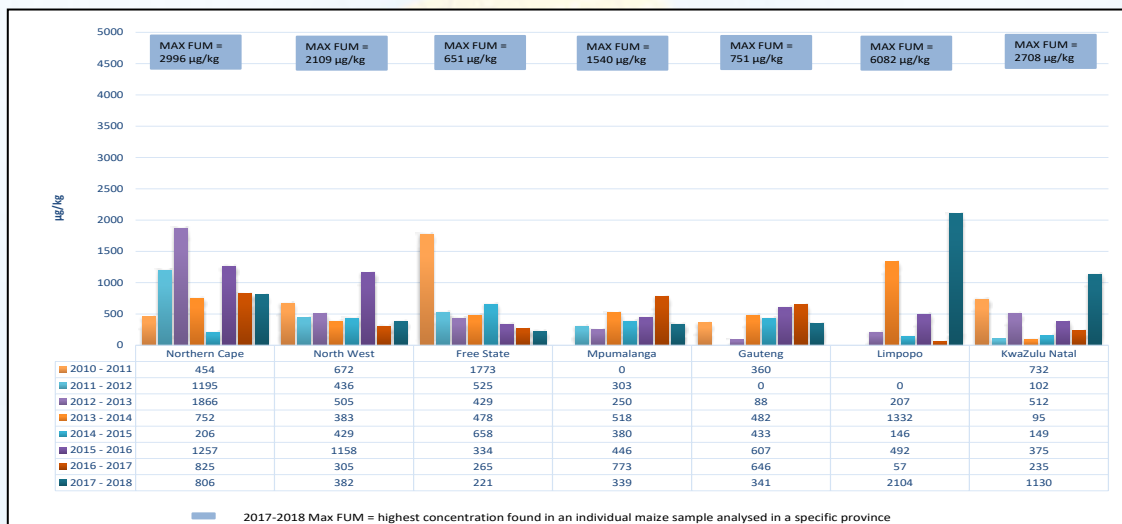


This season, the white maize FUM mean concentrations increased notably in four provinces as illustrated in Graph 48. Yellow maize mean concentrations increased notably in two provinces, see Graph 49.

Graph 48: White maize FUM mean concentration (µg/kg) per province over eight seasons

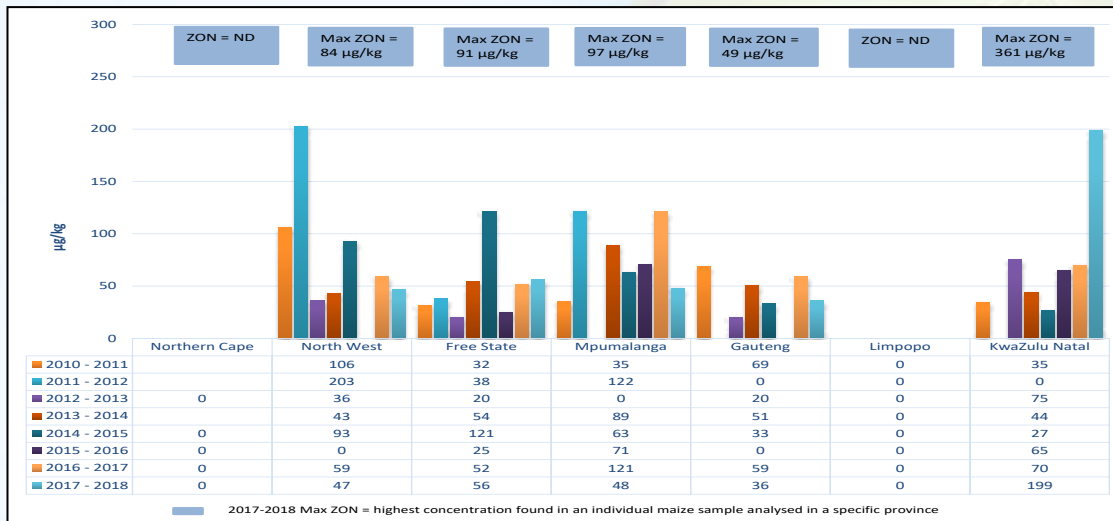


Graph 49: Yellow maize FUM mean concentration (µg/kg) per province over eight seasons

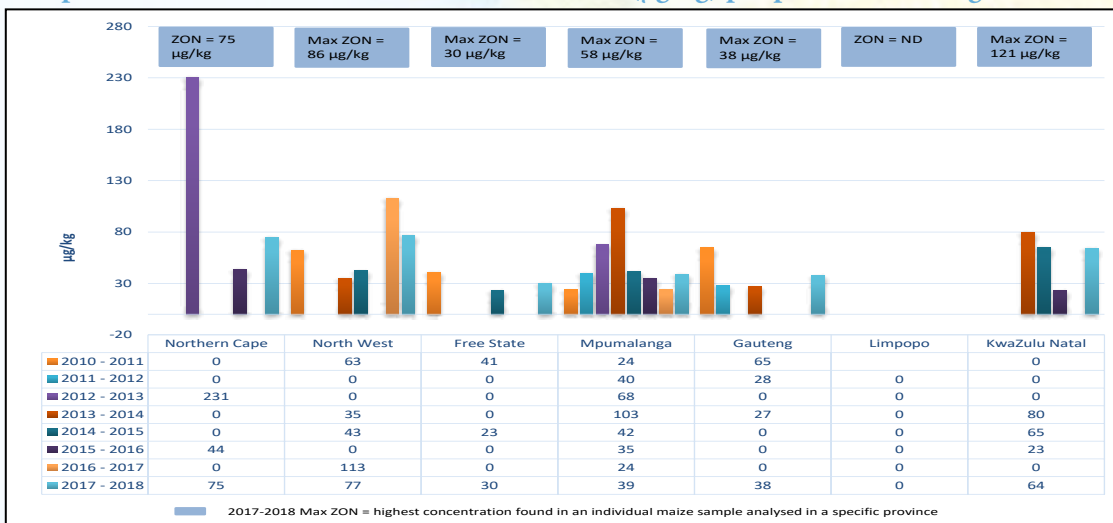


ZON in white maize, was found in the same five provinces as in the previous seasons. In contrast to the previous season when ZON in yellow maize was only found in two provinces, this season ZON was reported in all the provinces except Limpopo. It must be noted that ZON was not found in any maize samples from the Limpopo region over the past eight seasons.

Graph 50: White maize ZON mean concentration (µg/kg) per province over eight seasons



Graph 51: Yellow maize ZON mean concentration (µg/kg) per province over eight seasons



National Mycotoxin Regulations

According to the Foodstuffs, Cosmetics and Disinfectants Act (Act 54 of 1972) and regulations published in Government Notice No. R. 1145, dated 8 October 2004, all foodstuffs, ready for human consumption, may not contain more than 10 µg/kg of aflatoxin, of which aflatoxin B₁ may not exceed 5 µg/kg.

Amendments to Government Notice No. R. 1145, dated 8 October 2004, published in Government Notice No. 987 of 05 September 2016, specify that

- Cereal grains (wheat, maize and barley) intended for further processing, may not contain more than 2 000 µg/kg of Deoxynivalenol.
- Flour, meal, semolina and flakes derived from wheat, maize or barley, ready for human consumption, may not contain more than 1 000 µg/kg of Deoxynivalenol.
- Raw maize grain, intended for further processing, may not contain more than 4 000 µg/kg of Fumonisin (B₁ + B₂), the whole commodity.
- Maize flour and maize meal, ready for human consumption, may not contain more than 2 000 µg/kg of Fumonisin (B₁ + B₂), the whole commodity.
- Further processing means any other treatment or processing method that has been proven to reduce levels of fungus produced toxins in foodstuffs intended for human consumption.

According to the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act 36 of 1947) as well as amendments published in Government Notices No. R. 70 of 12 February 2010 and R. 789 of 10 September 2010, the maximum allowable levels of mycotoxins in animal feeds, are as follows:

Substance, Products	Farm Feeds	MAXIMUM CONTENT IN mg/kg (ppm) relative to a farm feed with a moisture content of 120 g/kg	MAXIMUM CONTENT IN µg/kg (ppb) relative to a farm feed with a moisture content of 120 g/kg
Aflatoxin B ₁	Feed ingredients with the exception of:	0.05	50
	groundnut, copra, palm-kernel cotton seed, maize and products derived from the processing thereof	0.02	20
	Complete farm feeds for cattle, sheep and goats with the exception of:	0.05	50
	dairy cattle	0.005	5
	calves and lambs	0.01	10
	complete feeds for pigs and poultry (except young animals)	0.02	20
	other complete farm feeds (including pets)	0.01	10
	maize products intended for feedlot	0.3	300
	supplement/concentrates for cattle, sheep and goats (except for dairy animals, calves and lambs)	0.05	50
Deoxynivalenol (DON)	Feeding stuffs on a full ration basis for:		
	Pigs	1	1 000
	cattle	5	5 000
	calves up to 4 months	2	2 000
	dairy cattle	3	3 000
	poultry	4	4 000
	pets	1	1 000
Fumonisin B ₁	Horses and pets	5	5 000
	Pigs	10	10 000
	Beef and poultry	50	50 000
	Fish	10	10 000
Ochratoxin A	Feeding stuffs on full ration basis for:		
	Pigs	0.05	50
	poultry	0.2	200
Zearalenone	Feeding stuffs on full ration basis for:		
	sows and pigs	5	5 000
	piglets	3	3 000
	calves and dairy cattle	0.5	500

International Mycotoxin Regulations

The Maximum, advisory and guidance levels for mycotoxins on maize, maize products and cereals from the European Union, USA and China are provided below for comparison purposes.

The European Union specifies the following maximum levels for mycotoxins on maize in foodstuffs:

Aflatoxin

- Maize and rice to be subjected to sorting or other physical treatment before human consumption or used as an ingredient in foodstuffs, 5.0 µg/kg (B₁) and 10.0 µg/kg (Sum of B₁, B₂, G₁ and G₂).

Fumonisin

- Unprocessed maize with the exception of unprocessed maize intended to be processed by wet milling, 4 000 µg/kg.
- Maize intended for direct human consumption, maize-based foods for direct consumption, with certain exceptions, 1 000 µg/kg.
- Maize-based breakfast cereals and maize-based snacks, 800 µg/kg.
- Processed maize-based foods and baby foods for infants and young children, 200 µg/kg.
- Milling fractions and other milling products with particle size > 500 µm not used for direct human consumption, 1 400 µg/kg.
- Milling fractions and other milling products with particle size < 500 µm not used for direct human consumption, 2 000 µg/kg.

Deoxynivalenol (DON)

- Unprocessed maize, with the exception of unprocessed maize intended to be processed by wet milling, 1 750 µg/kg.
- Cereals intended for direct human consumption, cereal flour, bran and germ as end product marketed for direct human consumption, 750 µg/kg.
- Processed cereal based baby and baby foods for infants and young children, 200 µg/kg.
- Milling fractions of maize and other milling products with particle size > 500 µm not used for direct human consumption, 750 µg/kg.
- Milling fractions of maize and other milling products with particle size < 500 µm not used for direct human consumption, 1 250 µg/kg.

Zearalenone

- Unprocessed maize with the exception of unprocessed maize intended to be processed by wet milling, 350 µg/kg.
- Cereals intended for direct human consumption, cereal flour, bran and germ as end product marketed for direct human consumption, 75 µg/kg.
- Maize intended for direct human consumption, maize-based snacks and maize-based breakfast cereals, 100 µg/kg.
- Processed maize-based foods for infants and young children, 20 µg/kg.
- Milling fractions and other milling products with particle size > 500 µm not used for direct human consumption, 200 µg/kg.
- Milling fractions and other milling products with particle size < 500 µm not used for direct human consumption, 300 µg/kg.

Ochratoxin A

- Unprocessed cereals, 5 µg/kg.
- All products derived from unprocessed cereals, including processed cereal products and cereals intended for direct human consumption with the exception of food for infants and young children, 3 µg/kg.⁽¹⁾

The European Union recommends the following maximum levels for Aflatoxin B₁ on products intended

for animal feeds with a moisture content of 12%:

- Complementary and complete feedingstuffs depending on the class and age of the animal, 5 – 20 µg/kg.

The European Union recommends the following guidance levels for mycotoxins on products intended for animal feeds with a moisture content of 12%:

Fumonisin B₁ + B₂

- Maize and maize products, 60 000 µg/kg.
- Complementary and complete feedingstuffs depending on the class and age of animal, 5 000 – 50 000 µg/kg.

Deoxynivalenol (DON)

- Cereals and cereal products with the exception of maize by-products, 8 000 µg/kg.
- Maize by-products, 12 000 µg/kg.
- Complementary and complete feedingstuffs depending on the class and age of animal, 900 – 5 000 µg/kg.

Zearalenone

- Cereals and cereal products with the exception of maize by-products, 2 000 µg/kg.
- Maize by-products, 3 000 µg/kg.
- Complementary and complete feedingstuffs depending on the class of animal, 100 – 500 µg/kg.

Ochratoxin A

Cereals and cereal products, 250 µg/kg.

Complementary and complete feedingstuffs depending on the class of animal, 50 – 100 µg/kg.⁽²⁾⁽⁶⁾

In the USA, the Food and Drug Administration (FDA) actions levels for Aflatoxin in animal feeds vary between 20 µg/kg and 300 µg/kg, depending on the intended use (species of animal). The action level for all commodities intended for human consumption is 20 µg/kg (excluding Aflatoxin M₁ (milk) where the maximum level is 0.5 µg/kg).

Advisory maximum levels for DON in animal feed varies between 5 000 and 10 000 µg/kg in grains and grain by-products and 1 000 to 10 000 µg/kg in the complete diet, depending on the species of animal as well as the percentage portion of the diet represented by the grain. Distillers grains, brewers grains, gluten feeds and gluten meals should not exceed 30 000 µg/kg.⁽³⁾

Recommended maximum levels for Total Fumonisin (FB₁ + FB₂ + FB₃) in maize and maize by-products used in animal feeds varies between 5 000 µg/kg and 100 000 µg/kg based on the class of animal and proportion of the diet (dry weight basis).

Recommended maximum levels for Total Fumonisin (FB₁ + FB₂ + FB₃) in human foods are as follows: Degermed dry milled maize products (e.g. flaking grits, maize grits, maize meal, maize flour with fat content of < 2.25%, dry weight basis), 2 000 µg/kg. Whole or partially degermed dry milled maize products (e.g. flaking grits, maize grits, maize meal, maize flour with fat content of > 2.25%, dry weight basis), 4 000 µg/kg. Dry milled maize bran, 4 000 µg/kg. Cleaned maize intended for popcorn and masa production, 3 000 and 4 000 µg/kg respectively.⁽⁴⁾

In China, the maximum limit for Aflatoxin B₁ in maize, maize flour (grits, flakes) and maize products, is 20 µg/kg. The maximum limit for DON in maize and maize flour (grits, flake) is 1 000 µg/kg. Ochratoxin A maximum limits are 5.0 µg/kg for both grains (including maize) and milled grain products which include maize flour (grits, flake). The maximum limit for Zearalenone in maize and maize flour (grits, flake) is 60 µg/kg.⁽⁵⁾

The following information was obtained from the Mycotoxins.info webpage supported by Biomin:⁽⁶⁾

Country	Commodity	Sum of mycotoxins	Limit (µg/kg)
China	Corn processing products, peanut cake (dreg)	Aflatoxin B ₁	≤50
	Vegetable fat (except corn oil and peanut oil)		≤10
	Corn oil and peanut oil		≤20
	Other flora feed ingredients		≤30
	Piglet and young bird concentrated feeds		≤10
	Concentrated feeds for broiler ducks at later period, growing ducks, laying ducks		≤15
	Other concentrated feeds		≤20
	Calf and lamb concentrate supplements		≤20
	Concentrate supplements used in lactation period		≤10
	Other concentrate supplements		≤30
	Formula feeds of piglets and young poultry		≤10
	Formula feeds for broiler ducks at later period, growing ducks, laying ducks		≤15
	Other formula feeds		≤20
	Corn and its processed products, DDGS products, corn silage, and corn straws		Fumonisin FB (B ₁ +B ₂)
	Calf and lamb concentrate supplements	≤20 000	
	Horse and rabbit concentrate supplements	≤5 000	
	Other ruminant concentrate supplements	≤50 000	
	Concentrated feeds of swine	≤5 000	
	Concentrated feeds of poultry	≤20 000	
	Formula feeds of swine, rabbit, and horse	≤5 000	
	Formula feeds of poultry	≤20 000	
	Formula feeds of fish	≤10 000	
	Cereal and its processed products	Ochratoxin A	
	Formula feeds		≤100
	Corn and its processed products (except corn husk, sprayed corn husk, dried corn steep liquor powder)	Zearalenone	≤500
	Corn husk, sprayed corn husk, dried corn steep liquor powder, DDGS products		≤1 500
	Other flora feed ingredients		≤1 000
	Concentrate supplements for calf, lamb, and in lactation		≤500
	Formula feeds of piglet		≤150
	Formula feeds of young sow		≤100
	Other formula feeds of swine		≤250
	Other formula feeds		≤500
	Plant feed ingredients		T-2 Toxin
Formula feeds of swine and poultry	≤500		
Plant feed ingredients	Deoxynivalenol (Vomitoxin)	≤5 000	
Concentrate supplements for calf, lamb, and in lactation		≤1 000	
Other concentrate supplements		≤3 000	
Formula feeds of swine		≤1 000	
Other formula feeds		≤3 000	
<i>Source: National Standard of the People's Republic of China GB 13078-2017, Hygienical Standard for Feeds</i>			
Japan	Corn	Aflatoxin	20
	Formula feed for cattle (except dairy cattle and calves), pig (except piglet), domestic fowl (except chicken and broiler), quails		20
	Formula feed for suckling period		20
	Formula feed for dairy cattle		10

Japan (continue)	Formula feed	Zearalenone	1 000
	Formula feed (cows over 3 months after birth)	Deoxynivalenol	4 000
	Formula feed (except for cows over 3 months after birth)		1 000
Source: https://www.romerlabs.com/en/knowledge-center/knowledge-library/articles/news/worldwide-mycotoxin-regulations/			
Republic of Korea	Feeds for young calves, dairy, piglet, grower, layer/broiler breeders, milk replacer, fiber source for ruminants and all other diets for young animals.	Aflatoxin B ₁ ,B ₂ ,G ₁ ,G ₂	10
	All other compound feeds except premix products		20
	All plant originated materials		50
	All compound feeds	Ochratoxin A	200
	All plant originated materials		250
	All swine diets	Deoxynivalenol	900
	All young ruminant diets		2 000
	All other compound feeds except premix products		5 000
	All plant originated		10 000
	Swine diets for piglet, grower, gilt, gestation, lactation	Zearalenone	100
	All other swine diets		250
	Ruminant diets		500
	All other feeds		1 000
	All plant originated materials		3 000
	Diets for swine, horse and rabbit, milk replacer, pet	Fumonisin	5 000
	Aquaculture		10 000
	Ruminant diets except young calves, fiber diets		50 000
	All other compound feeds except premix products		30 000
	All compound diets	T- ₂ /HT- ₂	250
	Oat, oat processed materials		2 000
All other plant originated materials except oat	500		
Taiwan, Republic of China	peanut, corn, maize	Aflatoxin B ₁ ,B ₂ ,G ₁ ,G ₂	15
	rice, sorghum, legumes, nuts, wheat and barley, oats	Aflatoxin B ₁ ,B ₂ ,G ₁ ,G ₂	10
	other foods		10
	maize (raw material)	Aflatoxin B ₁ ,B ₂ ,G ₁ ,G ₂	50
	all feedstuffs	Aflatoxin B ₁	25-100
Vietnam	foodstuffs	Aflatoxin B ₁ ,B ₂ ,G ₁ ,G ₂	10
	foodstuffs	total of other mycotoxins	35
Source: FAO corporate documents repository. Worldwide regulation for mycotoxins in food and feed 2003.			

References:

1. COMMISSION REGULATION (EC) No 1881/226 of 19 December 2006 setting maximum levels for certain contaminants in foodstuffs.
2. COMMISSION RECOMMENDATION 2006/576/EC of 17 August 2006 on the presence of deoxynivalenol, zearalenone, ochratoxin A, T-2 and HT-2 and fumonisins in products intended for animal feeding.
3. FDA Mycotoxin Regulatory Guidance, A Guide for Grain Elevators, Feed Manufacturers, Grain Processors and Exporters, August 2011.
4. <http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/ChemicalContaminantsMetalsNaturalToxinsPesticides/ucm109231.htm>.
5. National Food Safety Standard, Maximum Levels of Mycotoxins in Foods, GB 2761-2017.
6. <http://www.mycotoxins.info/en/regulations/>.

TABLE 24: MYCOTOXIN RESULTS - MAIZE CROP QUALITY 2017/2018

Region	Grade	Aflatoxin µg/kg				Total	Fumonisin µg/kg			DON µg/kg LOQ: 100 µg/kg	15-ADON µg/kg LOQ: 100 µg/kg	Ochratoxin A µg/kg LOQ: 5 µg/kg	Zearalenone µg/kg LOQ: 20 µg/kg	HT-2 µg/kg LOB: 20 µg/kg	T-2 µg/kg LOQ: 20 µg/kg
		B ₁ LOQ: 5 µg/kg	B ₂ LOQ: 5 µg/kg	G ₁ LOQ: 5 µg/kg	G ₂ LOQ: 5 µg/kg		B ₁ LOQ: 20 µg/kg	B ₂ LOQ: 20 µg/kg	B ₃ LOQ: 20 µg/kg						
10	YM1	ND	ND	ND	ND	ND	398	59	ND	457	ND	ND	ND	ND	ND
10	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10	YM1	ND	ND	ND	ND	ND	108	ND	ND	108	130	ND	ND	ND	ND
10	YM1	ND	ND	ND	ND	ND	551	114	43	708	504	125	ND	ND	ND
11	YM1	ND	ND	ND	ND	ND	53	ND	ND	53	162	ND	ND	ND	ND
11	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	1 037	136	ND	ND	ND
11	WM1	ND	ND	ND	ND	ND	30	ND	ND	30	ND	ND	ND	ND	ND
11	WM1	ND	ND	ND	ND	ND	5 627	2 316	413	8 356	ND	ND	ND	ND	ND
11	YM1	ND	ND	ND	ND	ND	365	113	34	512	ND	ND	ND	ND	ND
11	YM1	ND	ND	ND	ND	ND	2 190	592	214	2 996	1 822	263	75	ND	ND
11	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
12	YM2	ND	ND	ND	ND	ND	ND	ND	ND	ND	299	ND	ND	ND	ND
12	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
12	YM1	ND	ND	ND	ND	ND	187	50	ND	237	ND	ND	ND	ND	ND
12	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	129	ND	ND	ND	ND
12	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	1 085	141	ND	ND	ND
12	YM1	ND	ND	ND	ND	ND	187	45	ND	232	424	ND	ND	ND	ND
12	WM1	ND	ND	ND	ND	ND	21	ND	ND	21	ND	ND	ND	ND	ND
12	YM1	ND	ND	ND	ND	ND	209	68	ND	277	431	ND	ND	ND	ND
12	WM1	ND	ND	ND	ND	ND	56	ND	ND	56	ND	ND	ND	ND	ND
13	WM1	ND	ND	ND	ND	ND	34	ND	ND	34	258	ND	ND	ND	ND
13	YM1	ND	ND	ND	ND	ND	233	73	ND	306	808	140	ND	ND	ND
13	WM2	ND	ND	ND	ND	ND	116	50	ND	166	572	128	ND	ND	ND
13	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
13	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	1 159	ND	ND	ND	ND
13	WM1	ND	ND	ND	ND	ND	291	108	20	419	910	ND	ND	ND	ND
13	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	485	155	ND	ND	ND
13	WM2	ND	ND	ND	ND	ND	193	57	ND	250	1 254	139	ND	ND	ND
13	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	196	ND	ND	ND	ND

TABLE 24: MYCOTOXIN RESULTS - MAIZE CROP QUALITY 2017/2018 (continue)

Region	Grade	Aflatoxin µg/kg				Fumonisin µg/kg				DON µg/kg	15-ADON µg/kg	Ochratoxin A µg/kg	Zearalenone µg/kg	HT-2 µg/kg	T-2 µg/kg
		B ₁	B ₂	G ₁	G ₂	B ₁	B ₂	B ₃	Total						
		LOQ: 5 µg/kg	LOQ: 5 µg/kg	LOQ: 5 µg/kg	LOQ: 5 µg/kg	LOQ: 20 µg/kg	LOQ: 20 µg/kg	LOQ: 20 µg/kg	LOQ: 20 µg/kg						
13	WM1	ND	ND	ND	ND	ND	ND	ND	ND	193	ND	ND	ND	ND	ND
13	YM1	ND	ND	ND	ND	126	31	ND	157	357	103	ND	ND	ND	ND
13	WM1	ND	ND	ND	ND	221	52	ND	273	123	ND	ND	ND	ND	ND
13	WM1	ND	ND	ND	ND	23	ND	ND	23	ND	ND	ND	ND	ND	ND
14	WM1	ND	ND	ND	ND	180	59	20	259	107	ND	ND	ND	ND	ND
14	WM1	ND	ND	ND	ND	ND	ND	ND	ND	766	ND	ND	ND	ND	ND
14	WM1	ND	ND	ND	ND	125	37	ND	162	3 016	ND	ND	ND	ND	ND
14	YM1	ND	ND	ND	ND	32	ND	ND	32	473	ND	ND	ND	ND	ND
14	WM2	ND	ND	ND	ND	ND	ND	ND	32	981	ND	ND	ND	ND	ND
14	YM1	ND	ND	ND	ND	ND	ND	ND	ND	251	ND	ND	ND	ND	ND
14	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
14	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
14	WM1	ND	ND	ND	ND	ND	ND	ND	ND	130	ND	ND	ND	ND	ND
14	WM1	ND	ND	ND	ND	48	21	ND	69	783	ND	ND	ND	ND	ND
14	YM1	ND	ND	ND	ND	175	39	ND	214	ND	ND	ND	ND	ND	ND
14	WM1	ND	ND	ND	ND	ND	ND	ND	ND	1 574	114	ND	ND	ND	ND
14	WM1	ND	ND	ND	ND	ND	ND	ND	ND	1 204	106	ND	ND	ND	ND
14	YM1	ND	ND	ND	ND	ND	ND	ND	ND	942	ND	ND	ND	ND	ND
14	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
14	YM1	ND	ND	ND	ND	45	ND	ND	45	ND	ND	ND	ND	ND	ND
14	WM1	ND	ND	ND	ND	ND	ND	ND	ND	325	ND	ND	ND	ND	ND
14	YM1	ND	ND	ND	ND	57	ND	ND	57	916	ND	ND	ND	ND	ND
14	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
14	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
14	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
15	WM1	ND	ND	ND	ND	ND	ND	ND	ND	508	ND	ND	ND	ND	ND
15	YM1	ND	ND	ND	ND	ND	ND	ND	ND	169	ND	ND	ND	ND	ND
15	WM1	ND	ND	ND	ND	ND	ND	ND	ND	328	ND	ND	ND	ND	ND
15	WM2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
15	YM3	ND	ND	ND	ND	515	131	28	674	ND	ND	ND	ND	ND	ND
15	WM2	ND	ND	ND	ND	63	ND	ND	63	1 365	207	ND	ND	ND	ND

TABLE 24: MYCOTOXIN RESULTS - MAIZE CROP QUALITY 2017/2018 (continue)

Region	Grade	Aflatoxin µg/kg				Fumonisin µg/kg				DON µg/kg	15-ADON µg/kg	Ochratoxin A µg/kg	Zearalenone µg/kg	HT-2 µg/kg	T-2 µg/kg
		B ₁	B ₂	G ₁	G ₂	B ₁	B ₂	B ₃	Total						
		LOQ: 5 µg/kg	LOQ: 5 µg/kg	LOQ: 5 µg/kg	LOQ: 5 µg/kg	LOQ: 20 µg/kg	LOQ: 20 µg/kg	LOQ: 20 µg/kg	Total						
15	WM1	ND	ND	ND	ND	ND	ND	ND	ND	177	ND	ND	ND	ND	ND
15	WM1	ND	ND	ND	ND	141	43	ND	184	225	ND	ND	ND	ND	ND
15	WM3	ND	ND	ND	ND	ND	ND	ND	ND	876	135	ND	ND	ND	ND
16	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
16	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
16	WM1	ND	ND	ND	ND	ND	ND	ND	ND	1 106	146	ND	ND	ND	ND
16	WM3	ND	ND	ND	ND	51	ND	ND	51	1 776	261	ND	ND	ND	ND
16	YM1	ND	ND	ND	ND	ND	ND	ND	ND	337	ND	ND	ND	ND	ND
16	WM3	ND	ND	ND	ND	ND	ND	ND	ND	365	125	ND	ND	ND	ND
16	WM3	ND	ND	ND	ND	ND	ND	ND	ND	469	ND	ND	ND	ND	ND
16	YM2	ND	ND	ND	ND	ND	ND	ND	ND	321	ND	ND	ND	ND	ND
16	WM2	ND	ND	ND	ND	ND	ND	ND	ND	246	ND	ND	ND	ND	ND
16	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
16	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
17	WM1	ND	ND	ND	ND	58	ND	ND	58	130	ND	ND	ND	ND	ND
17	YM2	ND	ND	ND	ND	494	165	27	686	ND	ND	ND	ND	ND	ND
17	COM	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
17	WM1	ND	ND	ND	ND	ND	ND	ND	ND	127	ND	ND	ND	ND	ND
17	YM1	ND	ND	ND	ND	45	ND	ND	45	124	ND	ND	ND	ND	ND
17	WM1	ND	ND	ND	ND	139	22	ND	161	468	ND	ND	ND	ND	ND
17	WM1	ND	ND	ND	ND	ND	ND	ND	ND	528	ND	ND	ND	ND	ND
17	YM1	ND	ND	ND	ND	ND	ND	ND	ND	258	ND	ND	ND	ND	ND
17	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
17	YM1	ND	ND	ND	ND	ND	ND	ND	ND	247	ND	ND	ND	ND	ND
17	WM3	ND	ND	ND	ND	371	107	21	499	315	ND	ND	ND	ND	ND
17	WM1	ND	ND	ND	ND	222	120	ND	342	474	104	ND	ND	ND	ND
17	YM1	ND	ND	ND	ND	ND	ND	ND	ND	549	145	ND	ND	ND	ND
17	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
17	WM1	ND	ND	ND	ND	70	25	ND	95	308	ND	ND	ND	ND	ND
17	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 24: MYCOTOXIN RESULTS - MAIZE CROP QUALITY 2017/2018 (continue)

Region	Grade	Aflatoxin µg/kg				Fumonisin µg/kg				DON µg/kg	15-ADON µg/kg	Ochratoxin A µg/kg	Zearalenone µg/kg	HT-2 µg/kg	T-2 µg/kg
		B ₁ LOQ: 5 µg/kg	B ₂ LOQ: 5 µg/kg	G ₁ LOQ: 5 µg/kg	G ₂ LOQ: 5 µg/kg	Total	B ₁ LOQ: 20 µg/kg	B ₂ LOQ: 20 µg/kg	B ₃ LOQ: 20 µg/kg						
18	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
18	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
18	YM2	ND	ND	ND	ND	400	153	26	579	ND	ND	ND	ND	ND	ND
18	YM1	ND	ND	ND	ND	227	81	ND	308	ND	ND	ND	ND	ND	ND
18	COM	ND	ND	ND	ND	ND	ND	ND	ND	306	ND	ND	ND	ND	ND
18	WM1	ND	ND	ND	ND	127	37	ND	164	222	ND	ND	ND	ND	ND
18	YM1	ND	ND	ND	ND	328	109	ND	437	1 696	132	ND	ND	ND	ND
18	WM3	ND	ND	ND	ND	199	55	ND	254	ND	ND	ND	ND	ND	ND
18	YM2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
18	WM1	ND	ND	ND	ND	276	58	ND	334	205	ND	ND	ND	ND	ND
18	YM2	ND	ND	ND	ND	480	113	27	620	1 018	244	ND	ND	ND	ND
19	WM1	ND	ND	ND	ND	118	67	ND	185	444	ND	ND	ND	ND	ND
19	WM1	ND	ND	ND	ND	116	53	ND	169	289	ND	ND	ND	ND	ND
19	YM1	ND	ND	ND	ND	178	90	ND	268	203	ND	86	ND	ND	ND
19	WM2	ND	ND	ND	ND	ND	ND	ND	ND	591	ND	ND	ND	ND	ND
19	YM2	ND	ND	ND	ND	752	175	52	979	ND	ND	ND	ND	ND	ND
19	WM2	ND	ND	ND	ND	ND	ND	ND	ND	248	ND	ND	ND	ND	ND
19	WM1	ND	ND	ND	ND	ND	ND	ND	ND	259	ND	ND	ND	ND	ND
19	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
19	YM1	ND	ND	ND	ND	108	29	ND	137	293	ND	ND	ND	ND	ND
19	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
19	YM1	ND	ND	ND	ND	45	ND	ND	45	ND	ND	ND	ND	ND	ND
19	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
19	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
19	WM1	ND	ND	ND	ND	554	186	31	771	242	ND	ND	ND	ND	ND
19	YM1	ND	ND	ND	ND	71	ND	ND	71	253	ND	ND	ND	ND	ND
19	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
20	YM2	ND	ND	ND	ND	1 412	543	154	2 109	ND	ND	ND	ND	ND	ND
20	WM2	ND	ND	ND	ND	191	57	ND	248	1 812	100	84	ND	ND	ND
20	YM1	ND	ND	ND	ND	ND	ND	ND	ND	156	ND	ND	ND	ND	ND

TABLE 24: MYCOTOXIN RESULTS - MAIZE CROP QUALITY 2017/2018 (continue)

Region	Grade	Aflatoxin µg/kg				Fumonisin µg/kg				DON µg/kg	15-ADON µg/kg	Ochratoxin A µg/kg	Zearalenone µg/kg	HT-2 µg/kg	T-2 µg/kg
		B ₁	B ₂	G ₁	G ₂	B ₁	B ₂	B ₃	Total						
		LOQ: 5 µg/kg	LOQ: 5 µg/kg	LOQ: 5 µg/kg	LOQ: 5 µg/kg	LOQ: 20 µg/kg	LOQ: 20 µg/kg	LOQ: 20 µg/kg	Total						
20	WM3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
20	WM1	ND	ND	ND	ND	ND	ND	ND	ND	298	ND	ND	ND	ND	ND
20	YM2	ND	ND	ND	ND	ND	ND	ND	ND	248	ND	ND	ND	ND	ND
20	WM1	ND	ND	ND	ND	ND	ND	ND	ND	1 263	115	ND	ND	ND	ND
20	YM1	ND	ND	ND	ND	467	182	27	676	288	ND	67	ND	ND	ND
20	WM1	ND	ND	ND	ND	22	ND	ND	22	ND	ND	ND	ND	ND	ND
21	YM1	ND	ND	ND	ND	140	42	ND	182	718	ND	ND	ND	ND	ND
21	COM	ND	ND	ND	ND	790	235	50	1 075	ND	ND	ND	ND	ND	ND
21	YM1	ND	ND	ND	ND	61	ND	ND	61	ND	ND	ND	ND	ND	ND
21	WM2	ND	ND	ND	ND	147	40	ND	187	ND	ND	ND	ND	ND	ND
21	YM1	ND	ND	ND	ND	316	128	22	466	117	ND	ND	ND	ND	ND
21	YM1	ND	ND	ND	ND	81	30	ND	111	ND	ND	ND	ND	ND	ND
21	WM1	ND	ND	ND	ND	ND	ND	ND	ND	137	ND	ND	ND	ND	ND
21	WM1	ND	ND	ND	ND	219	41	ND	260	1 052	ND	ND	ND	ND	ND
21	WM1	ND	ND	ND	ND	ND	ND	ND	ND	1 004	105	ND	ND	ND	ND
22	YM1	ND	ND	ND	ND	431	113	46	590	ND	ND	ND	ND	ND	ND
22	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
22	WM1	ND	ND	ND	ND	29	ND	ND	29	ND	ND	ND	ND	ND	ND
22	YM1	ND	ND	ND	ND	ND	ND	ND	ND	118	ND	ND	ND	ND	ND
22	WM1	ND	ND	ND	ND	24	ND	ND	24	748	ND	25	ND	ND	ND
22	YM1	ND	ND	ND	ND	96	27	ND	123	435	ND	ND	ND	ND	ND
22	WM2	ND	ND	ND	ND	ND	ND	ND	ND	1 865	305	ND	ND	ND	ND
23	WM1	ND	ND	ND	ND	64	ND	ND	64	ND	ND	ND	ND	ND	ND
23	WM1	ND	ND	ND	ND	180	70	ND	250	187	ND	ND	ND	ND	ND
23	WM1	ND	ND	ND	ND	26	ND	ND	26	ND	ND	ND	ND	ND	ND
23	YM1	ND	ND	ND	ND	504	157	24	685	ND	ND	ND	ND	ND	ND
23	WM2	ND	ND	ND	ND	ND	ND	ND	ND	959	ND	ND	ND	ND	ND
23	YM1	ND	ND	ND	ND	259	64	ND	323	502	ND	ND	ND	ND	ND
23	WM1	ND	ND	ND	ND	119	32	ND	151	1 270	119	ND	ND	ND	ND
23	YM1	ND	ND	ND	ND	108	31	ND	139	273	ND	ND	ND	ND	ND

TABLE 24: MYCOTOXIN RESULTS - MAIZE CROP QUALITY 2017/2018 (continue)

Region	Grade	Aflatoxin µg/kg				Fumonisin µg/kg				DON µg/kg	15-ADON µg/kg	Ochratoxin A µg/kg	Zearalenone µg/kg	HT-2 µg/kg	T-2 µg/kg
		B ₁ LOQ: 5 µg/kg	B ₂ LOQ: 5 µg/kg	G ₁ LOQ: 5 µg/kg	G ₂ LOQ: 5 µg/kg	Total	B ₁ LOQ: 20 µg/kg	B ₂ LOQ: 20 µg/kg	B ₃ LOQ: 20 µg/kg						
23	WM3	ND	ND	ND	ND	ND	ND	ND	ND	2 246	391	ND	32	ND	ND
24	WM1	ND	ND	ND	ND	21	ND	ND	21	2 373	226	ND	25	ND	ND
24	YM1	ND	ND	ND	ND	128	47	ND	175	143	ND	ND	ND	ND	ND
24	WM1	ND	ND	ND	ND	ND	ND	ND	ND	159	ND	ND	ND	ND	ND
24	WM2	ND	ND	ND	ND	ND	ND	ND	ND	904	205	ND	ND	ND	ND
24	WM2	ND	ND	ND	ND	127	37	ND	164	160	ND	ND	ND	ND	ND
24	YM1	ND	ND	ND	ND	ND	ND	ND	ND	243	ND	ND	ND	ND	ND
24	WM2	ND	ND	ND	ND	40	30	ND	70	360	ND	ND	ND	ND	ND
24	WM1	ND	ND	ND	ND	133	35	ND	168	1 316	183	ND	ND	ND	ND
24	WM2	ND	ND	ND	ND	ND	ND	ND	ND	1 798	207	ND	ND	ND	ND
24	YM2	ND	ND	ND	ND	490	133	28	651	926	ND	ND	ND	ND	ND
24	YM2	ND	ND	ND	ND	194	71	ND	265	489	ND	ND	ND	ND	ND
24	YM2	ND	ND	ND	ND	38	ND	ND	38	350	ND	ND	ND	ND	ND
24	COM	ND	ND	ND	ND	ND	ND	ND	ND	214	ND	ND	ND	ND	ND
25	YM1	ND	ND	ND	ND	ND	ND	ND	ND	870	106	ND	ND	ND	ND
26	YM2	ND	ND	ND	ND	ND	ND	ND	ND	1 606	217	30	ND	ND	ND
26	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
26	YM1	ND	ND	ND	ND	ND	ND	ND	ND	424	ND	ND	ND	ND	ND
26	WM2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
26	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
26	WM1	ND	ND	ND	ND	ND	ND	ND	ND	544	ND	ND	ND	ND	ND
26	COM	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
26	WM2	ND	ND	ND	ND	ND	ND	ND	ND	543	ND	ND	ND	ND	ND
26	YM1	ND	ND	ND	ND	ND	ND	ND	ND	805	ND	ND	ND	ND	ND
26	WM2	ND	ND	ND	ND	ND	ND	ND	ND	923	214	ND	ND	ND	ND
26	YM3	ND	ND	ND	ND	ND	ND	ND	ND	949	115	ND	ND	ND	ND
27	YM1	ND	ND	ND	ND	31	ND	ND	31	170	ND	ND	ND	ND	ND
27	WM1	ND	ND	ND	ND	ND	ND	ND	ND	116	ND	ND	ND	ND	ND
27	WM1	ND	ND	ND	ND	ND	ND	ND	ND	214	ND	ND	ND	ND	ND
27	YM1	ND	ND	ND	ND	ND	ND	ND	ND	473	ND	ND	ND	ND	ND

TABLE 24: MYCOTOXIN RESULTS - MAIZE CROP QUALITY 2017/2018 (continue)

Region	Grade	Aflatoxin µg/kg				Fumonisin µg/kg				DON µg/kg	15-ADON µg/kg	Ochratoxin A µg/kg	Zearalenone µg/kg	HT-2 µg/kg	T-2 µg/kg
		B ₁ LOQ: 5 µg/kg	B ₂ LOQ: 5 µg/kg	G ₁ LOQ: 5 µg/kg	G ₂ LOQ: 5 µg/kg	Total	B ₁ LOQ: 20 µg/kg	B ₂ LOQ: 20 µg/kg	B ₃ LOQ: 20 µg/kg						
27	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
28	WM1	ND	ND	ND	ND	ND	ND	ND	ND	847	111	ND	ND	ND	ND
28	YM1	ND	ND	ND	ND	ND	ND	ND	ND	456	ND	ND	ND	ND	ND
28	WM2	ND	ND	ND	ND	4 774	2 153	401	7 328	2 378	ND	91	ND	ND	ND
28	YM1	ND	ND	ND	ND	123	43	ND	166	158	ND	ND	ND	ND	ND
28	WM1	ND	ND	ND	ND	ND	ND	ND	ND	1 215	ND	51	ND	ND	ND
28	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
28	WM1	ND	ND	ND	ND	ND	ND	ND	ND	881	180	ND	ND	ND	ND
28	WM1	ND	ND	ND	ND	ND	ND	ND	ND	718	103	ND	ND	ND	ND
28	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
28	YM2	ND	ND	ND	ND	ND	ND	ND	ND	529	ND	ND	ND	ND	ND
28	WM1	ND	ND	ND	ND	194	43	ND	237	536	ND	ND	ND	ND	ND
28	YM2	ND	ND	ND	ND	ND	ND	ND	ND	295	ND	ND	ND	ND	ND
29	WM1	ND	ND	ND	ND	509	206	53	768	142	ND	ND	ND	ND	ND
29	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
29	YM1	ND	ND	ND	ND	27	ND	ND	27	ND	ND	ND	ND	ND	ND
29	YM2	ND	ND	ND	ND	42	ND	ND	42	ND	ND	ND	ND	ND	ND
29	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
29	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
29	YM1	ND	ND	ND	ND	ND	ND	ND	ND	126	ND	ND	ND	ND	ND
29	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
29	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
29	WM1	ND	ND	ND	ND	21	ND	ND	21	725	ND	ND	ND	ND	ND
29	YM2	ND	ND	ND	ND	ND	ND	ND	ND	131	ND	ND	ND	ND	ND
29	YM1	ND	ND	ND	ND	ND	ND	ND	ND	711	ND	ND	ND	ND	ND
29	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
29	WM2	ND	ND	ND	ND	664	187	68	919	ND	ND	ND	ND	ND	ND
29	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
29	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
29	YM2	ND	ND	ND	ND	198	83	ND	281	829	114	ND	ND	ND	ND

TABLE 24: MYCOTOXIN RESULTS - MAIZE CROP QUALITY 2017/2018(continue)

Region	Grade	Aflatoxin µg/kg						Fumonisin µg/kg				DON µg/kg	15-ADON µg/kg	Ochratoxin A µg/kg	Zearalenone µg/kg	HT-2 µg/kg	T-2 µg/kg
		B ₁	B ₂	G ₁	G ₂	Total	B ₁	B ₂	B ₃	Total							
		LOQ: 5 µg/kg	LOQ: 5 µg/kg	LOQ: 5 µg/kg	LOQ: 5 µg/kg		LOQ: 20 µg/kg	LOQ: 20 µg/kg	LOQ: 20 µg/kg								
29	WM1	ND	ND	ND	ND	ND	359	123	20	502	120	ND	ND	ND	ND	ND	ND
29	YM1	ND	ND	ND	ND	ND	200	53	ND	253	833	155	ND	ND	ND	ND	ND
30	WM2	ND	ND	ND	ND	ND	ND	ND	ND	ND	176	ND	ND	ND	ND	ND	ND
30	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	YM2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	YM3	ND	ND	ND	ND	ND	ND	ND	ND	ND	131	ND	ND	ND	ND	ND	ND
30	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	531	ND	ND	ND	ND	ND	ND
30	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	163	121	ND	ND	ND	ND	ND
30	WM2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	114	106	ND	ND	ND	ND	ND
30	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	YM1	ND	ND	ND	ND	ND	20	ND	ND	20	ND	ND	ND	ND	ND	ND	ND
30	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	WM2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	494	ND	ND	ND	ND	ND	ND
30	YM2	ND	ND	ND	ND	ND	ND	ND	ND	ND	215	ND	ND	ND	ND	ND	ND
30	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	352	ND	ND	ND	ND	ND	ND
30	YM1	ND	ND	ND	ND	ND	30	ND	ND	30	270	ND	ND	24	ND	ND	ND
30	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
31	WM1	ND	ND	ND	ND	ND	612	219	70	901	ND	ND	ND	ND	ND	ND	ND
31	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
31	WM3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
31	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	198	ND	ND	ND	ND	ND	ND

TABLE 24: MYCOTOXIN RESULTS - MAIZE CROP QUALITY 2017/2018(continue)

Region	Grade	Aflatoxin µg/kg				Fumonisin µg/kg				DON µg/kg	15-ADON µg/kg	Ochratoxin A µg/kg	Zearalenone µg/kg	HT-2 µg/kg	T-2 µg/kg
		B ₁	B ₂	G ₁	G ₂	B ₁	B ₂	B ₃	Total						
		LOQ: 5 µg/kg	LOQ: 5 µg/kg	LOQ: 5 µg/kg	LOQ: 5 µg/kg	LOQ: 20 µg/kg	LOQ: 20 µg/kg	LOQ: 20 µg/kg	Total						
31	YM1	ND	ND	ND	ND	ND	ND	ND	ND	747	156	ND	ND	ND	ND
31	WM1	ND	ND	ND	ND	ND	ND	ND	ND	612	ND	ND	ND	ND	ND
31	YM1	ND	ND	ND	ND	ND	ND	ND	ND	187	ND	ND	ND	ND	ND
31	YM1	ND	ND	ND	ND	21	ND	ND	21	ND	ND	ND	ND	ND	ND
31	YM1	ND	ND	ND	ND	ND	ND	ND	ND	158	ND	ND	ND	ND	ND
31	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
31	YM1	ND	ND	ND	ND	58	ND	ND	58	115	ND	ND	ND	ND	ND
31	WM1	ND	ND	ND	ND	88	ND	ND	88	115	ND	ND	ND	ND	ND
31	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
31	YM1	ND	ND	ND	ND	608	176	21	805	ND	ND	ND	ND	ND	ND
31	WM1	ND	ND	ND	ND	ND	ND	ND	ND	180	ND	ND	ND	ND	ND
31	YM1	ND	ND	ND	ND	ND	ND	ND	ND	158	ND	ND	ND	ND	ND
31	YM1	ND	ND	ND	ND	1 057	410	73	1 540	100	ND	ND	ND	ND	ND
31	YM1	ND	ND	ND	ND	682	218	27	927	ND	ND	ND	ND	ND	ND
31	YM1	ND	ND	ND	ND	120	ND	ND	120	2 348	121	ND	35	ND	ND
32	WM2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
32	WM1	ND	ND	ND	ND	23	ND	ND	23	1 447	160	ND	25	ND	ND
32	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
32	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
32	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
32	WM2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
32	YM1	ND	ND	ND	ND	386	150	21	557	ND	ND	ND	ND	ND	ND
32	YM1	ND	ND	ND	ND	31	ND	ND	31	ND	ND	ND	ND	ND	ND
32	YM3	ND	ND	ND	ND	31	ND	ND	31	938	192	ND	58	ND	ND
32	YM1	ND	ND	ND	ND	ND	ND	ND	ND	132	ND	ND	ND	ND	ND
32	WM1	ND	ND	ND	ND	1 236	394	99	1 729	ND	ND	ND	ND	ND	ND
32	WM1	ND	ND	ND	ND	120	65	ND	185	131	ND	ND	ND	ND	ND
32	YM1	ND	ND	ND	ND	423	160	30	613	ND	ND	ND	ND	ND	ND
32	YM1	ND	ND	ND	ND	ND	ND	ND	ND	184	ND	ND	ND	ND	ND
32	WM2	ND	ND	ND	ND	1 434	410	96	1 940	1 927	133	ND	28	ND	ND

TABLE 24: MYCOTOXIN RESULTS - MAIZE CROP QUALITY 2017/2018 (continue)

Region	Grade	Aflatoxin µg/kg				Fumonisin µg/kg				DON µg/kg LOQ: 100 µg/kg	15-ADON µg/kg LOQ: 100 µg/kg	Ochratoxin A µg/kg LOQ: 5 µg/kg	Zearalenone µg/kg LOQ: 20 µg/kg	HT-2 µg/kg LOD: 20 µg/kg	T-2 µg/kg LOQ: 20 µg/kg	
		B ₁ LOQ: 5 µg/kg	B ₂ LOQ: 5 µg/kg	G ₁ LOQ: 5 µg/kg	G ₂ LOQ: 5 µg/kg	Total	B ₁ LOQ: 20 µg/kg	B ₂ LOQ: 20 µg/kg	B ₃ LOQ: 20 µg/kg							Total
		ND	ND	ND	ND	ND	ND	ND	ND							ND
34	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
34	YM1	ND	ND	ND	ND	402	113	ND	515	1 828	130	ND	ND	ND	ND	
34	YM1	ND	ND	ND	ND	ND	ND	ND	ND	1 567	162	ND	ND	ND	ND	
34	WM2	ND	ND	ND	ND	ND	ND	ND	ND	2 432	310	ND	ND	ND	ND	
34	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
34	WM1	ND	ND	ND	ND	ND	ND	ND	ND	791	103	ND	28	ND	ND	
34	WM1	ND	ND	ND	ND	ND	ND	ND	ND	1 556	162	ND	ND	ND	ND	
34	WM1	ND	ND	ND	ND	ND	ND	ND	ND	863	ND	ND	49	ND	ND	
34	YM1	ND	ND	ND	ND	544	172	35	751	ND	ND	ND	ND	ND	ND	
34	YM1	ND	ND	ND	ND	241	85	26	352	957	ND	ND	38	ND	ND	
34	WM1	ND	ND	ND	ND	58	28	ND	86	1 049	139	ND	ND	ND	ND	
34	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
34	WM1	ND	ND	ND	ND	55	22	ND	77	149	ND	ND	ND	ND	ND	
34	YM1	ND	ND	ND	ND	ND	ND	ND	ND	131	ND	ND	ND	ND	ND	
34	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
34	YM1	ND	ND	ND	ND	82	24	ND	106	102	ND	ND	ND	ND	ND	
34	WM1	ND	ND	ND	ND	42	ND	ND	42	1 095	128	ND	38	ND	ND	
34	YM1	ND	ND	ND	ND	226	48	25	299	723	163	ND	ND	ND	ND	
34	YM2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
34	WM1	ND	ND	ND	ND	21	ND	ND	21	126	ND	ND	ND	ND	ND	
34	YM1	ND	ND	ND	ND	25	ND	ND	25	ND	ND	ND	ND	ND	ND	
34	WM1	ND	ND	ND	ND	ND	ND	ND	ND	1 388	238	ND	28	ND	ND	
34	WM1	ND	ND	ND	ND	ND	ND	ND	ND	418	ND	ND	ND	ND	ND	
35	YM1	ND	ND	ND	ND	630	120	53	803	ND	ND	ND	ND	ND	ND	
35	WM1	ND	ND	ND	ND	ND	ND	ND	ND	701	ND	ND	ND	ND	ND	
35	WM1	ND	ND	ND	ND	ND	ND	ND	ND	161	ND	ND	ND	ND	ND	
35	WM1	ND	ND	ND	ND	2 979	1 279	247	4 505	ND	ND	ND	ND	ND	ND	
35	YM1	ND	ND	ND	ND	204	60	ND	264	ND	ND	ND	ND	ND	ND	
35	WM1	ND	ND	ND	ND	832	277	67	1 176	ND	ND	ND	ND	ND	ND	
35	WM1	ND	ND	ND	ND	197	54	ND	251	ND	ND	ND	ND	ND	ND	

TABLE 24: MYCOTOXIN RESULTS - MAIZE CROP QUALITY 2017/2018 (continue)

Region	Grade	Aflatoxin µg/kg				Total	Fumonisin µg/kg			DON µg/kg LOQ: 100 µg/kg	15-ADON µg/kg LOQ: 100 µg/kg	Ochratoxin A µg/kg LOQ: 5 µg/kg	Zearalenone µg/kg LOQ: 20 µg/kg	HT-2 µg/kg LOD: 20 µg/kg	T-2 µg/kg LOQ: 20 µg/kg
		B ₁ LOQ: 5 µg/kg	B ₂ LOQ: 5 µg/kg	G ₁ LOQ: 5 µg/kg	G ₂ LOQ: 5 µg/kg		B ₁ LOQ: 20 µg/kg	B ₂ LOQ: 20 µg/kg	B ₃ LOQ: 20 µg/kg						
35	YM1	ND	ND	ND	ND	ND	4 213	1 432	437	6 082	ND	ND	ND	ND	ND
35	WM2	ND	ND	ND	ND	ND	710	225	45	980	301	ND	ND	ND	ND
35	YM1	ND	ND	ND	ND	ND	952	210	103	1 265	ND	ND	ND	ND	ND
36	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
36	YM1	ND	ND	ND	ND	ND	281	57	29	367	ND	ND	ND	ND	ND
36	WM1	ND	ND	ND	ND	ND	357	61	29	447	3 510	165	ND	ND	ND
36	YM1	ND	ND	ND	ND	ND	1 931	664	113	2 708	ND	ND	ND	ND	ND
36	YM2	ND	ND	ND	ND	ND	930	339	62	1 331	ND	ND	ND	ND	ND
36	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
36	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
36	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	1 158	125	ND	29	ND
36	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	1 910	174	ND	ND	ND
36	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	138	ND	ND	ND	ND
36	YM2	ND	ND	ND	ND	ND	ND	ND	ND	ND	102	ND	ND	ND	ND
36	WM2	ND	ND	ND	ND	ND	213	32	ND	245	453	ND	ND	ND	ND
36	YM1	ND	ND	ND	ND	ND	93	20	ND	113	616	ND	ND	ND	ND
36	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	2 603	210	ND	ND	ND
36	YM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	729	ND	73	ND	ND
36	YM2	ND	ND	ND	ND	ND	ND	ND	ND	ND	1 956	ND	121	ND	ND
36	WM1	ND	ND	ND	ND	ND	ND	ND	ND	ND	773	112	ND	ND	ND
Total number of samples		350	350	350	350	350	350	350	350	350	350	350	350	350	350
Average of total number of samples		0	0	0	0	0	175	58	11	244	393	30	5	0	0
Number of positive results		0	0	0	0	0	154	110	50	154	204	64	28	0	0
Average of positive results		0	0	0	0	0	397	184	79	554	674	163	61	0	0
Maximum of positive results		0	0	0	0	0	5 627	2 316	437	8 356	3 510	394	361	0	0

Note:

Limit of quantitation (LOQ) means the lowest concentration level that can be quantified with acceptable precision and accuracy by the LC-MS/MS.

A concentration measured below the LOQ is reported as <LOQ.

Limit of detection (LOD) is the lowest concentration level that can be detected but not quantified and is 50% of the LOQ of each mycotoxin.

A concentration measured below the LOD is reported as not detected (ND).

µg/kg = ppb (parts per billion)

TABLE 25: MYCOTOXIN RESULTS - SUMMARY OF SEASONS 2006/2007 TO 2017/2018

Season	Total Number of samples received	Number of samples tested for mycotoxins	Aflatoxin µg/kg		Fumonisin µg/kg		Deoxynivalenol µg/kg		Zearalenone µg/kg		Ochratoxin A µg/kg		T-2 Toxin µg/kg					
			ave.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.	ave.	min.	max.		
2006/2007	900	90	<1	9	640	0	4 500	530	0	3 100	0	0	0	0	6.5			
2007/2008	900	100	0	2	470	0	5 500	240	0	1 700	0	0	100	0	2			
2008/2009	810	90	0	0	490	0	3 300	430	0	2 900	0	0	160	0	1			
**2009/2010	800	90	0	0	251	0	4 035	206	0	1 845	0	0	0	0	0			
**2010/2011	693	325	0	0	468	0	7 048	165	0	1835	33	0	270	0	0			
**2011/2012	1 000	350	0	0	383	0	11 297	146	0	911	33	0	297	0	0			
**2012/2013	1 000	350	0	0	530	0	11 243	186	0	1 175	30	0	426	0	0			232
**2013/2014	930	350	0	0	451	0	5 357	243	0	6 134	38	0	445	0	0			0
**2014/2015	1 000	350	2	0	357	0	3 382	397	0	9 736	36	0	337	0	0			0
**2015/2016	920	350	0	0	444	0	11 347	175	0	1 585	16	0	127	0	0			0
**2016/2017	1 000	350	0	0	471	0	6 059	513	0	7 698	36	0	399	0	0			0
**2017/2018	900	350	0	0	991	0	8 356	656	0	3 510	51	0	361	0	0			0
Total	11 753	3 235																
	Min.		0			0									0			0
	Max.			48		11 347				9 736			445		7			232

* Sum of Aflatoxin (B₁; B₂; G₁; G₂) and sum of Fumonisin (B₁; B₂)

** Sum of Aflatoxin (B₁; B₂; G₁; G₂) and sum of Fumonisin (B₁; B₂; B₃)

 RSA averages calculated from averages per province.

Mycotoxin methodology

Technique used for season 2005/2006 - 2006/2007

The mycotoxin analyses were carried out in accordance with the Vicam Immunoaffinity Column Chromatography method using the different Vicam Instruction Manuals for the different mycotoxins. Detection of the toxins was done on a Fluorometer. The following range and limit of detection apply for each toxin:

Mycotoxin	Assay range µg/kg	LOD for maize µg/kg
Aflatoxin	0 - 300	1
Fumonisin	0 - 10 000	250
Deoxynivalenol	500 - 50 000	500
Zearalenone	0 - 5 000	100
Ochratoxin A	0 - 50	2
T - 2 Toxin	150 - 2 000	150

Notes:

Limit of detection (LOD) means the lowest level that can be detected accurately by the technique.

Limit of quantitation (LOQ) means the lowest level that can be quantified accurately by the technique.

A result above zero but lower than the limit of detection/quantitation, is reported as <LOD/<LOQ.

µg/kg = ppb (parts per billion)

Technique used for season 2007/2008 - 2008/2009

The SAGL used the ROSA (Rapid One Step Assay) Quantitative test, which is a lateral flow immuno assay test, together with the ROSA-M Reader for measuring the mycotoxin content. The following range and limit of detection apply for each toxin:

Mycotoxin	Assay range µg/kg	LOD for maize µg/kg
Aflatoxin	0 - 100	2
Fumonisin	0 - 60 000	100
Deoxynivalenol	0 - 5 000	250
Zearalenone	0 - 1 000	25
Ochratoxin A	0 - 150	1

Technique used for season 2009/2010 - 2017/2018

During 2010 SAGL implemented a multi-mycotoxin screening method using UPLC-MS/MS. The following limit of detection applies for each toxin:

Mycotoxin	LOQ for maize µg/kg	LOD for maize µg/kg
Aflatoxin G ₁	5	2.5
Aflatoxin B ₁	5	2.5
Aflatoxin G ₂	5	2.5
Aflatoxin B ₂	5	2.5
Fumonisin B ₁	20	10
Fumonisin B ₂	20	10
Fumonisin B ₃	20	10
Deoxynivalenol	100	50
Zearalenone	20	10
Ochratoxin A	5	2.5
T - 2 Toxin	20	10

METHODS

SAMPLING PROCEDURE

A working group determined the process to be followed to ensure that the crop quality samples sent to the SAGL by the various grain silo owners/agricultural businesses, are representative of the total crop.

Each delivery is sampled as per the grading regulations for grading purposes.

Once grading has been completed, a sub-sample of each of these grading samples are placed in separate containers according to class and grade, per silo bin at each silo.

After 80% of the expected harvest has been received, the content of each container was divided with a multi slot divider in order to obtain a 3 kg sample (this should be done for each class and grade separately).

If there was more than one container per class and grade per silo bin, the combined contents of the containers were mixed thoroughly before dividing it with a multi slot divider to obtain the required 3 kg sample.

The samples were marked clearly with the name of the depot, the bin/bag/bunker/dam number(s) represented by each individual sample as well as the class and grade and were then forwarded to the SAGL.

RSA GRADING

RSA grading was done in accordance with the Grading Regulations for maize, as published in the Government Gazette No. 32190, Government Notice No. R. 473 of 8 May 2009 and amended by Industry-Wide Dispensation REF NO: 20/4/14/1, dated 15 April 2010.

Description of deviations relating to RSA grading:

Defective maize kernels

The following definition of Defective maize kernels is quoted from the Grading Regulations:

“Defective maize kernels” means maize kernels and pieces of maize kernels –

- (a) that are shrivelled, obviously immature, frost-damaged, heat damaged, water damaged, mouldy or chalky;
- (b) that are discoloured by external factors such as water and sun: Provided that discoloration on both sides of the maize

kernel limited to less than a quarter from the bottom tip of the maize kernel shall not be considered as defective, oxidation stained maize kernels, coffee stained maize kernels and pinked maize kernels shall not be considered as defective;

- (c) that have sprouted, including kernels which the shoot (plumule) in the germ is visibly discoloured;
- (d) that have cavities in the germ or endosperm caused by insects or rodents;
- (e) that are visibly soiled (smeared) or contaminated by smut, fire, soil, smoke or coal-dust;
- (f) all matter that can pass through the 6.35 mm round-hole sieve; and
- (g) that are of subspecies other than *Zea mays indentata* or *Zea mays indurata*.

Provided that –

- (i) irregularity of shape and size of maize kernels shall not affect the grading thereof;
- (ii) chipped or cracked maize kernels or pieces of maize kernels which are in a sound condition and which appear in a sample of maize, but which do not pass through a 6.35 mm round-hole sieve, shall not be regarded as defective maize kernels under these regulations.”

Foreign matter

The term “foreign matter” means all matter above the sieve other than maize, glass, stones, coal, dung or metal.

Other colour

“Other colour maize kernels” in relation to -

- (a) white maize, means maize kernels or pieces of maize kernels of which the endosperm as a result of genetic (characteristics) composition have another colour than white, excluding pinked maize kernels;
- (b) yellow maize, means maize kernels or pieces of maize kernels of which the endosperm as a result of genetic (characteristics) composition have another colour than yellow.

Combined deviation

The term “combined deviation” means the sum of

defective kernels (above and below the 6.35 mm sieve), foreign matter and other colour kernels.

Pinked kernels

The term “pinked maize kernels” means kernels and pieces of kernels of white maize of which the pericarp or part thereof is shaded red or pink in colour. The specification, according to the Grading Regulations for classes 1 to 3 of white maize is a maximum of 12%. No specification for pinked kernels in yellow maize according to the Grading Regulations.

Fungal infection

Kernels which are mouldy (fungi infected) are reported as defective kernels according to the grading regulations.

“Mouldy” means kernels and pieces of kernels that –

- (a) are visibly infected by fungi and are characterised by black, blue, green, yellow or white fungi growth anywhere on the kernel, or are characterised by fungi growth underneath the bran layer of the kernel;
- (b) are infected by ear-rot and are characterised by red, pink or brown discolorations. The kernel are partially to completely infected.

All samples were also inspected for the visual symptoms of *Diplodia* and *Fusarium* infection, which were reported separately.

Fusarium spp infections are localized on the cob with discoloured maize kernels, which become reddish (light pink to lilac).

Diplodia maydis normally rots the entire maize cob and infected maize kernels are recognized by a light ash colour to black colour that appears at the germ and can infest the whole kernel.

The % Cobrot reported, represents the percentage maize kernels that are both *Fusarium* and *Diplodia* infected.

USA GRADING

USA grading was determined in accordance with the American Grading Regulations (United States Department of Agriculture).

The US grading system makes provision for three classes of maize/corn based on colour, namely Class White corn, Class Yellow corn and Class Mixed corn. Each class is divided into five U.S. numerical

grades (Nos. 1 to 5) and U.S. Sample Grade. US No.1 is the most desirable grade followed by No. 2 down to sample grade.

Description of deviations relating to USA grading:

Damaged kernels

Kernels and pieces of corn kernels that are badly ground-damaged, badly weather-damaged, diseased, frost-damaged, germ-damaged, heat-damaged, insect-bored, mould-damaged, sprout-damaged or otherwise materially damaged.

Heat damaged kernels

Kernels and pieces of kernels which are materially discoloured and damaged by heat, including material discolouration caused by artificial drying methods.

Broken corn and foreign material

Broken corn is all matter that passes readily through a 12/64-inch (4.76 mm) round-hole sieve and over a 6/64-inch (2.38 mm) round-hole sieve according to procedures prescribed in Federal Grain Inspection Service (FGIS) instructions.

Foreign material is all matter that passes readily through a 6/64-inch round-hole sieve and all matter other than corn that remains on top of the 12/64-inch round-hole sieve after sieving according to procedures prescribed in FGIS instructions.

Broken corn and foreign material is all matter that passes readily through a 12/64-inch round-hole sieve and all matter other than corn that remains in the sieved sample after sieving according to procedures prescribed in FGIS instructions.

Bushel weight

The specific mass (or grain density) of maize/corn (expressed as test weight or bushel weight) is a quality characteristic which is important to some maize consumers and is applied as a grading factor in the USA grading regulations.

Test weight is the weight per Winchester bushel (2,150.42 cubic inches) as determined using an approved device according to procedures prescribed in FGIS instructions.

Other colour

Maize samples are deemed to be Class mixed corn when maize kernels of another colour exceeds 2% for white maize and 5% for yellow maize.

PHYSICAL CHARACTERISTICS

Test weight

Bushel weight in pounds (lbs) was determined on the maize crop samples and the results converted to test weight reported in kilogram/hectoliter (kg/hl), by multiplication with a factor of 1.2872.

The specific mass (or grain density) of maize expressed as test weight is influenced by amongst other, factors like cultivar, moisture content, foreign matter, other grain and damaged kernels like insect damaged and immature kernels.

Hundred (100) kernel mass - Industry accepted method 001

100 kernel mass is the weight in grams of one hundred whole maize kernels and provides a measure of grain size and density. The results are reported on an “as is” basis.

Kernel size - Industry accepted method 017

Kernel size is important to the sophisticated starch manufacturing industry. Kernels that are too small hamper the separation of kernel fractions in the wet milling process. The result is a lower starch yield. A mixture of small and large kernels causes additional problems, as homogeneous steeping cannot be achieved. On the other hand, very large kernels can also cause problems since the ratio between volume and mass is unfavourable to proper steeping.

The dry milling industry also prefers fairly larger maize kernels. However, uniform kernel size is of particular importance to this industry, since too large kernels create problems especially when mixed with smaller kernels.

Kernel size is less important to the animal feed manufacturing industry. Larger kernels are nevertheless preferred, as small kernels are easily lost during the screening stage of processing. The determination of kernel size comprises the sieving of a 100 g representative whole maize sample through both 8 mm and 10 mm round-hole grading sieves, routinely used in the seed industry.

Breakage susceptibility - Industry accepted method 007

Maize is normally cleaned before processing. In the cleaning process, broken kernels are removed together with other impurities, causing losses.

Broken kernels are further broken during handling, resulting in excessive grain dust being generated. This creates the potential for dust explosions, health hazards, hygiene problems, etc. Maize containing a high percentage of broken kernels is more prone to insect infestation and is subject to general deterioration.

In the modern dry milling industry, maize is cleaned first and then conditioned by dampening before the germ is removed. Broken kernels cause many problems during these stages of processing. Broken kernels can also lead to a lower extraction of the so-called high-quality products, like samp and maize grits. The presence of many broken kernels causes problems with the fibre and fat content of maize products (e.g. the various grades of maize meal), because the quantity of germ required to be returned to the milled endosperm cannot be determined accurately.

In the wet milling process broken kernels steep more rapidly than whole kernels and by the time the whole kernels have been sufficiently steeped, the broken kernels have been over-steeped, causing an ineffective separation of protein and starch.

In the livestock feed industry breakability is not an important quality characteristic, except for dust and hygiene reasons.

All samples were subjected to a breakage susceptibility test. After the sample of whole maize kernels was propelled in a Stein Breakage tester for 4 minutes, the fractions below the 6.35 mm and 4.75 mm sieves were collected and the percentages broken kernels smaller than (<) 6.35 mm and < 4.75 mm determined.

Stress cracks - Industry accepted method 006

Stress cracks are determined by visual inspection of a certain amount of whole maize kernels examined on top of a light box for small internal cracks in the endosperm. Some kernels may even have two or more internal cracks. Any form of stress may cause internal cracks, for example rapid moisture loss in the field, during harvest or during drying.

MILLING INDEX - Industry accepted method 015

Milling Index is an indication of the milling abilities and milling quality of maize kernels where a higher milling index means a higher extraction of the high-grade and most profitable products like samp,

maize rice and maize grits (degermed products) that are manufactured from the corneous part of the endosperm.

The milling index is a model developed on the Foss NIT Infratec 1241- Generation 3 Standard Version Grain Analyser where the NIT spectra were modelled against the Roff milling fractions. In the previous seasons (until 2015/2016) the Milling index of the samples were determined with the calibration model developed by the Grain Crops Institute of the ARC. With this model, the average milling index of a sample with good milling characteristics is about 95 with a variation of about 55 (low milling quality) to about 115 (very good milling quality).

The SAGL was tasked by the Maize Trust to develop a new model for Milling Index using samples from maize cultivar trials supplied by the ARC-GCI and by commercial seed breeders over four seasons (from 2012/2013 onward). The trials included a range of hardness levels. The New Milling Index (NMI) that was developed is similar to the original ARC formula but on a 14% moisture basis, and with the constants removed. The NMI model has improved precision compared to the older version, due to the almost tenfold increase in the number of samples used to build the calibration model.

During the fifth year, samples of commercial hybrids, selected imported maize samples and outlier samples from the 2014/2015 and 2015/2016 seasons were included to develop a robust model with the assistance of FOSS to produce accurate results. The latest version of the improved new model, SAGL Milling Index 2018, includes two parameters, SAGL Milling Index (SAGL MI) as well as Grit Yield All (GYA).

SAGL MI indicates the relative ratio of total hard endosperm products (B2 grits, B3 fine grits and B3 coarse grits) to offal products (B1 fine flour and total chop/bran) as determined on a Roff mill and used for calibration of the NIT. It is expressed as a dimensionless index value according to the following scale:

SAGL MI	<40	40-60	60-80	80-100	>100
Description	Soft	Medium	Moderately hard	Hard	Very hard

GYA is defined as the sum of the mass fractions of the Roff B2 grits, B3 fine grits and B3 coarse grits fractions expressed as a mass percentage of the total mass of the whole maize before milling. GYA is linearly correlated with the SAGL MI and indicates the true amount of total hard endosperm that can be extracted from the maize during Roff milling. The

NIT calibration value for GYA provides this estimate directly from the whole maize without need for further milling tests. GYA is also reported on a 14% moisture base.

The 2017/2018 season maize samples were measured with the NIT on the SAGL Milling Index 2018 model.

MILLING OF MAIZE ON ROFF MAIZE MILL - Industry accepted method 013

The Roff 150 Series maize mill is used to mill representative samples of 500 g. The mill is pre-set to the following specifications: Break 1 roll nip - 0.3 mm, Break 2 roll nip - 0.18 mm and Break 3 roll nip - 0.08 mm. These settings are according to the specifications in the method developed by the ARC Grain Crops Institute. Every mill has three separations, namely chop, grits and maize meal. The grits from Break 1 are transferred to the Break 2 rolls and the grits from Break 2 are transferred to Break 3 rolls.

The following fractions are weighed and determined as percentages: Break 1 meal, Break 2 meal, Break 3 meal and Break 3 grits. Break 1, 2 and 3 chop are combined and then weighed for determination of % Chop. Break 3 grits are weighed for determination of % Grits. The percentage extraction total meal is determined as the sum of the percentages Break 1, 2 and 3 meal as well as the % Grits.

WHITENESS INDEX - Industry accepted method 004

Whiteness index of white maize meal was determined with the HunterLab ColorFlex 45°/0°. Whiteness is associated with a region or volume in colour space in which objects are recognized as white. The degree of whiteness is measured by the degree of departure of the object from a perfect white. The higher the whiteness index value, the whiter the sample.

Whiteness index was done on unsifted and sifted maize meal obtained from Break 2 and 3 of the Roff mill. The sifted samples were obtained by sieving the unsifted samples through a 300 µm sieve. The fractions on top and below the sieve were then combined to result in sifted samples that contain 87% of maize meal > 300 µm and 13% of maize meal < 300 µm.

NUTRITIONAL VALUES

The moisture, fat, protein and starch contents are measured with an Infratec 1241 - Generation 3

Standard Version Whole Grain Analyser. The measurements are based on the fact that the constituents to be measured in the grain, absorb electromagnetic radiation in the near-infrared region of the spectrum. Since the Infratec 1241 Grain Analyser uses transmission absorption, the test is done on intact maize kernels. The results are reported on a dry (moisture free) basis.

The calibration loaded on the Infratec 1241 Grain Analyser (NIT) at the SAGL, is updated annually by Foss using NIT spectra and international primary chemical method results of maize crop quality samples from the specific season under discussion, provided by SAGL.

The chemical methods used to check the calibration were:

- Moisture on whole maize kernels: Sample is dried in an oven for 72 hours at 103 °C (AACCI 44-15.02)
- Moisture on milled maize: Sample is dried in an oven for 1 hours at 130 °C (AACCI 44-15.02)
- Crude fat: Petroleum ether extraction (Soxhlet) method (In house method 024)
- Crude protein: Dumas (Leco) method (AACCI 46-30.01)
- Starch: Hydrochloric Acid dissolution method (Polarimeter) (In house method 019)

The results obtained by the Infratec 1241 Grain Analyser (NIT) on the 2017/2018 season's samples, were checked by analysing every tenth sample by means of the primary methods.

The maize industry requested that crude fibre be added to the scope of analysis performed on the annual maize crop quality survey. As a result, crude fibre analyses were also done on every tenth sample by means of the primary analysis method used by SAGL (In-house method 020). The aim is to gather data to investigate the development of a calibration

on the Infratec 1241 Grain Analyser (NIT) with the assistance of Foss.

MYCOTOXIN ANALYSES

Mycotoxins are fungal metabolites, toxic to animals and humans, that are produced by moulds commonly found in almost all types of grain.

350 of the 900 maize crop samples were tested for Aflatoxin B₁, B₂, G₁, G₂, Fumonisin B₁, B₂ and B₃, Deoxynivalenol, 15-ADON, HT-2 Toxin, T-2 Toxin, Zearalenone and Ochratoxin A by means of a multi-mycotoxin screening method using UPLC - MS/MS.

Limit of quantitation (LOQ) means the lowest concentration level that can be quantified with acceptable precision and accuracy by the mass spectrometer. A concentration measured below the LOQ is reported as <LOQ.

Limit of detection (LOD) is the lowest concentration level that can be detected but not quantified and is 50% of the LOQ of each mycotoxin. A concentration measured below the LOD is reported as not detected (ND).

GMO (Genetically Modified Organisms)

The EnviroLogix QuickComb kit for bulk grain was used to quantitatively determine the presence of genetically modified maize. The kit is designed to extract and detect the presence of certain proteins at the levels typically expressed in genetically modified bulk maize grain. The procedure prescribed in the EnviroLogix - QuickScan Instruction Manual, latest edition was followed. Results were scanned and interpreted quantitatively with the EnviroLogix QuickScan system.

100 crop samples were tested for Cry1Ab, Cry2Ab and CP4 EPSPS modified maize. Cry1Ab protein in maize is produced from a gene derived from *Bacillus thuringiensis* (Bt).

Cry1Ab	MON810	Trade name / Brand
Cry1Ab	MON810 Cry1A.105 Bt11	YieldGard®
Cry2Ab	MON89034	<i>in</i> SmartStax™
CP4 EPSPS	NK603	Roundup Ready®

MAIZE IMPORTS AND EXPORTS

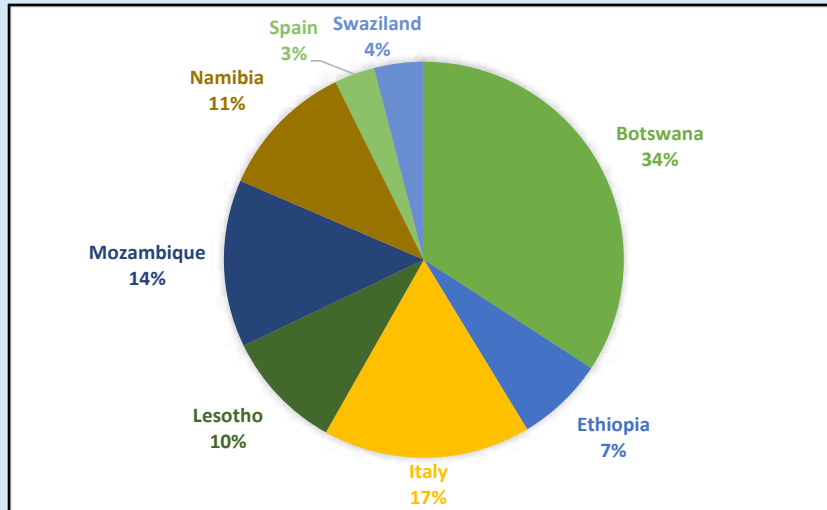


WHITE MAIZE EXPORT/IMPORTS

2018/2019 Season (28 Apr 2018 - 26 Apr 2019)

RSA EXPORTS		IMPORTS FOR RSA		IMPORTS FOR OTHER COUNTRIES		EXPORTS OF IMPORTED MAIZE		IMPORTS PER HARBOUR		EXPORTS PER HARBOUR	
To Country	Tons	From Country	Tons	From Country	Tons	To Country	Tons	Harbour	Tons	Harbour	Tons
Botswana	184 627	-	-	-	-	-	-	-	-	Durban	146 714
Ethiopia	38 509	-	-	-	-	-	-	-	-		
Italy	90 629	-	-	-	-	-	-	-	-		
Lesotho	52 357	-	-	-	-	-	-	-	-		
Mozambique	73 751	-	-	-	-	-	-	-	-		
Namibia	60 477	-	-	-	-	-	-	-	-		
Spain	17 576	-	-	-	-	-	-	-	-		
Swaziland	21 662	-	-	-	-	-	-	-	-		
Total	539 588	Total	0	Total	0	Total	0	Total	0	Total	146 714

Graph 52: Major destinations for RSA white maize exported during the 2018/2019 marketing season

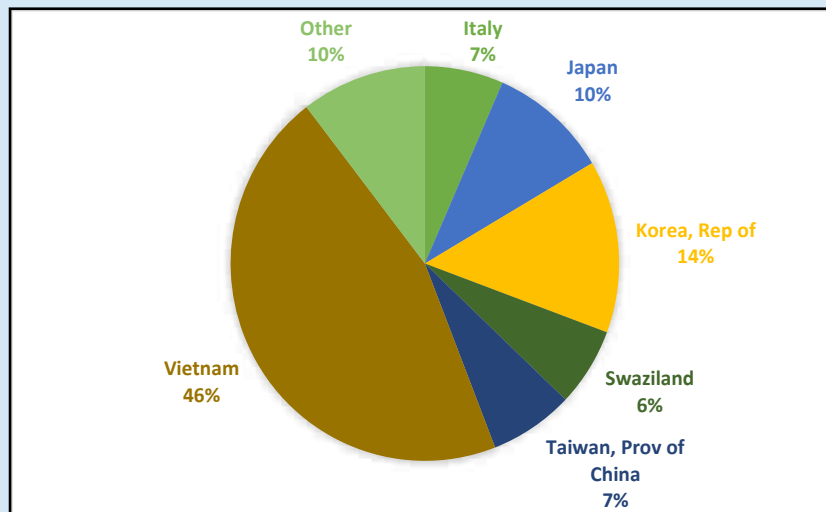


YELLOW MAIZE EXPORT/IMPORTS

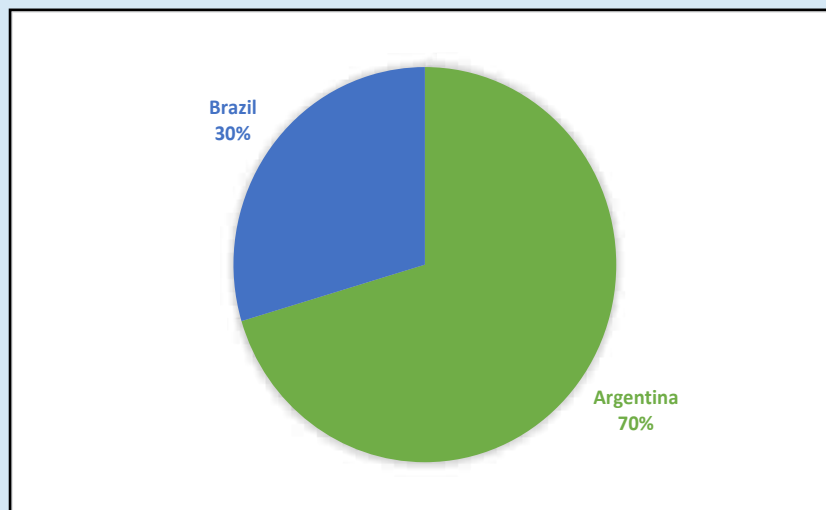
2018/2019 Season (28 Apr 2018 - 26 Apr 2019)

RSA EXPORTS		IMPORTS FOR RSA		IMPORTS FOR OTHER COUNTRIES		EXPORTS OF IMPORTED MAIZE		IMPORTS PER HARBOUR		EXPORTS PER HARBOUR	
To Country	Tons	From Country	Tons	From Country	Tons	To Country	Tons	Harbour	Tons	Harbour	Tons
Botswana	39 887	Argentina	120 766	-	-	-	-	Cape Town	156 481	Durban	1 292 167
Ghana	20 000	Brazil	50 812	-	-	-	-	Port Elizabeth	15 097		
Italy	99 450			-	-	-	-				
Japan	151 517			-	-	-	-				
Korea, Dem People's Rep	8 138			-	-	-	-				
Korea, Rep of	215 416			-	-	-	-				
Lesotho	9 996			-	-	-	-				
Mozambique	34 211			-	-	-	-				
Namibia	46 381			-	-	-	-				
Swaziland	97 994			-	-	-	-				
Taiwan, Prof of China	106 398			-	-	-	-				
Vietnam	691 248			-	-	-	-				
Total	1 520 636	Total	171 578	Total	0	Total	0	Total	171 578	Total	1 292 167

Graph 53: Major destinations for RSA yellow maize exported during the 2018/2019 marketing season



Graph 54: Country of origin for yellow maize imports for local use during the 2018/2019 marketing season



Maize Imports and Exports during the 2018/2019 marketing season

A total of 171 578 tons of yellow maize was imported from Argentina and Brazil for local use during the period 28 April 2018 to 26 April 2019. No white maize was imported during this period. Fifteen samples, ten representing imported Argentinian maize and five representing imported Brazilian maize, were received at the SAGL for quality analyses purposes. One sample each from Argentina and Brazil was graded YM2, the rest were all graded YM1 according to South African grading regulations.

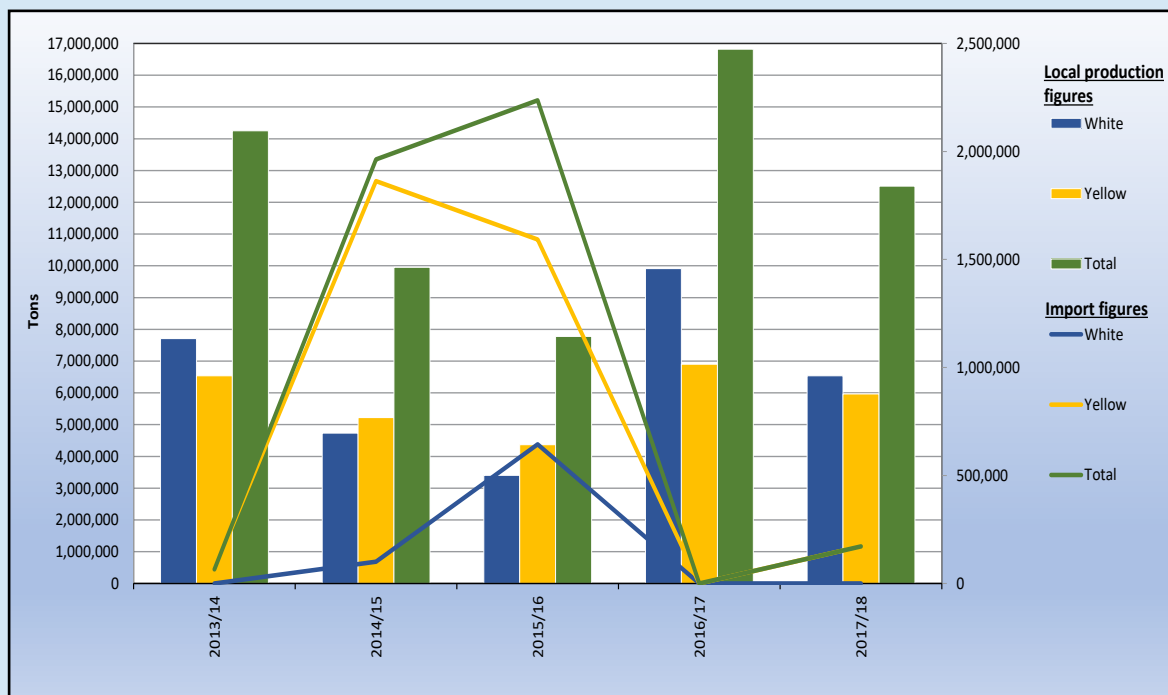
The results of the quality analyses performed on the imported maize are compared to those of the local maize crop of the corresponding grade and period (2017/2018). Please see the summary of results on pages 100 and 101. The average percentages total defective kernels on the imported maize were 1.0 – 1.3% higher than that of local maize. The 100 kernel mass and test weight of the imported maize was lower on average than local maize, while the percentage stress cracks were higher. The kernel sizes of the imported maize were smaller, values above the 10 mm sieve were on average 6.6 – 8.9% lower. The average protein content of the imported maize was lower than that of the RSA maize, while the average fat content was 0.2 – 0.4% higher. The starch content of the Argentinian maize compared well with local maize, the Brazilian starch content was on average 3.3% lower.

Multi-mycotoxin analyses were done on two Argentinian and one Brazilian composite sample per shipment. The mycotoxin results did not raise any concerns. The Fumonisin and DON residues observed, were well below the national maximum Fumonisin (B₁ + B₂) and DON levels for cereal grains and raw maize intended for further processing.

During the season under review, 539 588 tons of local white maize and 1 520 636 tons of local yellow maize were exported to countries in Africa and overseas. Botswana was the largest importer of South African white maize, while Vietnam was the largest importer of yellow maize. Please see tables and graphs on pages 97 and 98 for the major destinations for exports of RSA maize as well as origins of import for local use.

All figures were obtained from SAGIS.

Graph 55: Local maize production versus import figures over the last five seasons



IMPORTED MAIZE QUALITY

Quality of maize imported from 28 April 2018 to 26 April 2019 compared to RSA crop quality 2017/2018

Country of origin	Argentina			RSA Crop Average		
Class and grade yellow maize	YM1	YM2	Average	YM1	YM2	Average
RSA Grading						
Defective kernels above 6.35 mm sieve, %	2.6	3.2	2.7	2.7	5.5	3.1
Defective kernels below 6.35 mm sieve, %	3.1	4.1	3.2	1.5	3.8	1.8
Total defective kernels, %	5.7	7.3	5.9	4.2	9.4	4.9
Other colour maize kernels, %	0.0	0.0	0.0	0.1	0.5	0.1
Foreign matter, %	0.0	4.0	0.4	0.0	0.1	0.1
Combined deviations, %	5.7	7.7	5.9	4.4	9.9	5.1
Pinked maize kernels, %	0.0	0.0	0.0	0.0	0.0	0.0
Physical Factors						
100 Kernel mass, g	29.0	27.6	28.9	31.7	29.3	31.5
Stress cracks, %	12	5	11	9	13	9
Milling Index	74.5	71.7	74.2	79.9	75.3	79.4
Test weight, kg/hl	75.3	76.1	75.4	77.5	75.4	77.2
Kernel Size						
% above 10 mm sieve	2.2	1.7	2.2	11.2	9.8	11.1
% above 8 mm sieve	55.6	40.1	54.0	67.0	64.5	66.7
% below 8 mm sieve	42.2	58.2	43.8	21.8	25.7	22.2
Breakage susceptibility						
% Below 6.35 mm sieve	0.4	0.3	0.4	0.9	1.4	0.9
% Below 4.75 mm sieve	0.4	0.1	0.3	0.6	1.0	0.7
Nutritional Factors						
Protein, % (db)	8.3	8.7	8.3	9.0	9.0	9.0
Fat, % (db)	4.4	4.1	4.4	4.0	4.0	4.0
Starch, % (db)	72.4	70.9	72.3	72.0	71.8	72.0
Number of samples	9	1	10	400	34	449
Mycotoxins						
Afla G ₁ (µg/kg) [max. value]	0 [0]			0 [0]	0 [0]	0
Afla B ₁ (µg/kg) [max. value]	0 [0]			0 [0]	0 [0]	0
Afla G ₂ (µg/kg) [max. value]	0 [0]			0 [0]	0 [0]	0
Afla B ₂ (µg/kg) [max. value]	0 [0]			0 [0]	0 [0]	0
Fum B ₁ (µg/kg) [max. value]	421 [781]			170 [4213]	218 [1412]	173
Fum B ₂ (µg/kg) [max. value]	78 [156]			50 [1432]	71 [543]	51
Fum B ₃ (µg/kg) [max. value]	32 [64]			<20 [437]	<20 [154]	<20
Deoxynivalenol (µg/kg) [max. value]	56 [112]			263 [2348]	373 [1956]	278
15-ADON [max. value]	0 [0]			<100 [263]	<100 [244]	<100
Ochratoxin A (µg/kg) [max. value]	0 [0]			0 [0]	0 [0]	0
Zearalenone (µg/kg) [max. value]	0 [0]			<20 [86]	<20 [121]	<20
HT2 [max. value]	0 [0]			0 [0]	0 [0]	0
T-2 Toxin (µg/kg) [max. value]	0 [0]			0 [0]	0 [0]	0
Number of samples	2			141	25	175
GMO						
Cry1Ab, % [max value]	>5.0 [>5.0]			3.9 [>5.0]	4.3 [>5.0]	4.0
Cry2Ab, % [max value]	>5.0 [>5.0]			3.6 [>5.0]	3.3 [>5.0]	3.5
CP4 EPSPS, % [max value]	>5.0 [>5.0]			4.4 [>5.0]	>5.0 [>5.0]	4.5
Number of samples	2			39	8	50

IMPORTED MAIZE QUALITY

Quality of maize imported from 28 April 2018 to 26 April 2019 compared to RSA crop quality 2017/2018

Country of origin	Brazil			RSA Crop Average		
Class and grade yellow maize	YM1	YM2	Average	YM1	YM2	Average
RSA Grading						
Defective kernels above 6.35 mm sieve, %	2.9	3.1	2.9	2.7	5.5	3.1
Defective kernels below 6.35 mm sieve, %	2.3	7.2	3.3	1.5	3.8	1.8
Total defective kernels, %	5.2	10.3	6.2	4.2	9.4	4.9
Other colour maize kernels, %	0.0	0.0	0.0	0.1	0.5	0.1
Foreign matter, %	0.0	0.0	0.0	0.0	0.1	0.1
Combined deviations, %	5.2	10.3	6.2	4.4	9.9	5.1
Pinked maize kernels, %	0.0	0.0	0.0	0.0	0.0	0.0
Physical Factors						
100 Kernel mass, g	29.7	29.5	29.7	31.7	29.3	31.5
Stress cracks, %	15	15	15	9	13	9
Milling Index	85.5	88.9	86.2	79.9	75.3	79.4
Test weight, kg/hl	77.0	76.5	76.9	77.5	75.4	77.2
Kernel Size						
% above 10 mm sieve	4.4	5.0	4.5	11.2	9.8	11.1
% above 8 mm sieve	59.1	55.4	58.3	67.0	64.5	66.7
% below 8 mm sieve	36.6	39.6	37.2	21.8	25.7	22.2
Breakage susceptibility						
% Below 6.35 mm sieve	0.2	0.3	0.2	0.9	1.4	0.9
% Below 4.75 mm sieve	0.3	0.3	0.3	0.6	1.0	0.7
Nutritional Factors						
Protein, % (db)	8.7	8.7	8.7	9.0	9.0	9.0
Fat, % (db)	4.2	4.2	4.2	4.0	4.0	4.0
Starch, % (db)	68.7	68.7	68.7	72.0	71.8	72.0
Number of samples	4	1	5	400	34	449
Mycotoxins						
Afla G ₁ (µg/kg) [max. value]	0 [0]			0 [0]	0 [0]	0
Afla B ₁ (µg/kg) [max. value]	0 [0]			0 [0]	0 [0]	0
Afla G ₂ (µg/kg) [max. value]	0 [0]			0 [0]	0 [0]	0
Afla B ₂ (µg/kg) [max. value]	0 [0]			0 [0]	0 [0]	0
Fum B ₁ (µg/kg) [max. value]	415 [415]			170 [4213]	218 [1412]	173
Fum B ₂ (µg/kg) [max. value]	137 [137]			50 [1432]	71 [543]	51
Fum B ₃ (µg/kg) [max. value]	53 [53]			<20 [437]	<20 [154]	<20
Deoxynivalenol (µg/kg) [max. value]	0 [0]			263 [2348]	373 [1956]	278
15-ADON [max. value]	0 [0]			<100 [263]	<100 [244]	<100
Ochratoxin A (µg/kg) [max. value]	0 [0]			0 [0]	0 [0]	0
Zearalenone (µg/kg) [max. value]	0 [0]			<20 [86]	<20 [121]	<20
HT2 [max. value]	0 [0]			0 [0]	0 [0]	0
T-2 Toxin (µg/kg) [max. value]	0 [0]			0 [0]	0 [0]	0
Number of samples	1			141	25	175
GMO						
Cry1Ab, % [max value]	>5.0 [>5.0]			3.9 [>5.0]	4.3 [>5.0]	4.0
Cry2Ab, % [max value]	>5.0 [>5.0]			3.6 [>5.0]	3.3 [>5.0]	3.5
CP4 EPSPS, % [max value]	>5.0 [>5.0]			4.4 [>5.0]	>5.0 [>5.0]	4.5
Number of samples	1			39	8	50

WHITE MAIZE EXPORT/IMPORTS

2019/2020 Season (28 Apr 2019 - 24 May 2019)

RSA EXPORTS		IMPORTS FOR RSA		IMPORTS FOR EXPORTS		EXPORTS OF IMPORTED MAIZE		IMPORTS PER HARBOUR		EXPORTS PER HARBOUR	
To Country	Tons	From Country	Tons	From Country	Tons	To Country	Tons	Harbour	Tons	Harbour	Tons
Botswana	12 790	-	-	-	-	-	-	-	-	-	-
Lesotho	2 297	-	-	-	-	-	-	-	-	-	-
Mozambique	5 049	-	-	-	-	-	-	-	-	-	-
Namibia	8 336	-	-	-	-	-	-	-	-	-	-
Swaziland	4 278	-	-	-	-	-	-	-	-	-	-
Total	32 750	Total	0	Total	0	Total	0	Total	0	Total	0

YELLOW MAIZE EXPORT/IMPORTS

2019/2020 Season (28 Apr 2019 - 24 May 2019)

RSA EXPORTS		IMPORTS FOR RSA		IMPORTS FOR EXPORTS		EXPORTS OF IMPORTED MAIZE		IMPORTS PER HARBOUR		EXPORTS PER HARBOUR	
To Country	Tons	From Country	Tons	From Country	Tons	To Country	Tons	Harbour	Tons	Harbour	Tons
Botswana	6 754	Argentina	23 121	-	-	-	-	Cape Town	23 121	Durban	1 218
Korea, Dem People's Rep	230			-	-	-	-				
Korea, Rep of	988			-	-	-	-				
Lesotho	26			-	-	-	-				
Mozambique	3 601			-	-	-	-				
Namibia	3 721			-	-	-	-				
Swaziland	5 782			-	-	-	-				
Total	21 102	Total	23 121	Total	0	Total	0	Total	23 121	Total	1 218

Maize Imports and Exports during the 2019/2020 marketing season

23 121 tons of yellow maize from Argentina were imported to date (28 April 2019 – 24 May 2019) for local use during the 2019/2020 marketing season. No samples representing these consignments have been received at the SAGL yet.

During the same period, a total of 32 750 tons of white maize and 21 102 tons of yellow maize were exported to countries in Africa and Asia.

All figures were obtained from SAGIS.



CERTIFICATE OF ACCREDITATION

In terms of section 22(2) (b) of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act, 2006 (Act 19 of 2006), read with sections 23(1), (2) and (3) of the said Act, I hereby certify that:-

SOUTHERN AFRICAN GRAIN LABORATORY NPC
Co. Reg. No.: 1997/018518/08

Facility Accreditation Number: **T0116**

is a South African National Accreditation System accredited Testing laboratory
provided that all SANAS conditions and requirements are complied with

This certificate is valid as per the scope as stated in the accompanying schedule of accreditation
Annexure "A", bearing the above accreditation number for

CHEMICAL AND PHYSICAL ANALYSIS

The facility is accredited in accordance with the recognised International Standard

ISO/IEC 17025:2005

The accreditation demonstrates technical competency for a defined scope and the operation of a
laboratory quality management system

While this certificate remains valid, the Accredited Facility named above is authorised to use the
relevant SANAS accreditation symbol to issue facility reports and/or certificates




Mr R Jorgias
Chief Executive Officer

Effective Date: 01 November 2014
Certificate Expires: 31 October 2019

ANNEXURE A
SCHEDULE OF ACCREDITATION

Facility Number: **T0116**

Permanent Address of Laboratory:

South African Grain Laboratory (NPC)
Agri-Hub Office Park - Grain Building
477 Witherite Road
The Willows
Pretoria
0040

Technical Signatories:

Ms J Nortje (All Methods excl. In-house method 029)
Ms M Bothma (All Chemical Methods)
Ms M Hammes (All Chemical Methods)
Ms A de Jager (Nutrients & Contaminants Methods)
Ms W Louw (In-house Methods 001, 002, 003, 010 & 026)
Ms D Moleke (Rheological Methods)
Ms I Terblanche (Rheological Methods)
Ms H Meyer (All Chemical, Nutrients and Contaminants & Grading Methods)
Ms J Kruger (All Chemical Methods)
Ms P Modiba (All Chemical Methods)
Ms M Motlanthe (In-house Methods 001, 003 & 026)
Mr B van Der Linde (Grading)
Ms M Ramare (All Chemical Methods Excl. In-House Method 012 and SOP MC23)
Ms Z Skhosana (In-house Method 026)
Ms T de Beer (Rheological Methods)

Postal Address:

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Private Bag X1
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Fax: N/A

E-mail: Paulina.Modiba@sagl.co.za

Nominated Representative:

Ms PM Modiba

Issue No.: 28

Date of Issue: 20 December 2018

Expiry Date: 31 October 2019

Material or Products Tested	Type of Tests / Properties Measured, Range of Measurement	Standard Specifications, Techniques / Equipment Used
CHEMICAL		
Ground Barley	Moisture (Oven Method)	Analytical EBC Method 3.2, latest Edition (2 hour; 130 ⁰ C)
Cereal and cereal products specifically-wheat, rice, (hulled paddy), barley, millet, rye, and oats as grain, semolina and flour	Moisture (Oven Method)	ICC Std No.110/1, Latest Edition (90 min; 130 ⁰ C) (2 hour; 130 ⁰ C)
Flour, semolina, bread, all kind of grains and cereal products and food products (except those that	Moisture (Oven Method)	AACCI 44-15.02, Latest Edition (1 hour; 130 ⁰ C)

Facility Number: T0116

are sugar coated)		(72 hour; 103°C)
Maize Grits	Moisture (Oven Method)	Analytical EBC Method 6.2.2, latest edition (4 hours, 130°C)
Animal feed, Plant tissue and Sunflower (Milled)	Moisture (Oven Method)	AgriLASA 2.1, Latest Edition (5 hours, 105°C)
All flours, cereal grains, oilseeds and animal feeds	Nitrogen and protein (Combustion method - Dumas)	AACCI 46-30.01, Latest Edition
Cereal based food stuff	Dietary fibres (Total)	In-house method 012
Food stuff and feeds	Carbohydrates (by difference) (calculation) Energy value (calculation) Total digestible nutritional value (calculation)	SOP MC 23
Food Stuff and feeds	Determination of Ash	In-house method 011
Wheat Kernels	Moisture (Oven Method)	Government Gazette Wheat Regulation, Latest Edition (72 hour, 103°C)
Flours of grains e.g. barley, oats, triticale, maize, rye, sorghum and wheat; oilseeds like soybeans and sunflower, feeds and mixed feeds and foodstuffs	Crude fat (Ether extraction by Soxhlet)	In-house method 024
Meal and flour of wheat, rye, barley, other grains, starch containing and malted products	Falling number	ICC Std 107/1, Latest Edition
NUTRIENTS AND CONTAMINANTS		
Vitamin fortified food and feed products and fortification mixes grain based	Vitamin A as all trans Retinol (Saponification) (HPLC)	In-house method 001
	Thiamine Mononitrate (HPLC) Riboflavin (HPLC) Nicotinamide (HPLC) Pyridoxine Hydrochloride (HPLC)	In-house method 002
	Folic Acid (HPLC)	In-house method 003
Grain based food and feed products (fortified and unfortified) and fortification mixes	Total Sodium (Na) Total Iron (Fe) Total Zinc (Zn)	In-house method 010
Yeast and Bread	Vitamin D ₂ (HPLC)	In-House method 029

Facility Number: T0116

Food and feed	Multi-Mycotoxin: -Aflatoxin G ₁ , B ₁ , G ₂ , B ₂ and total -Deoxynivalenol (DON), 15-ADON -Fumonisin B ₁ , B ₂ , B ₃ -Ochratoxin A -T2, HT-2 -Zearalenone	In-house method 026
GRADING		
Maize	Defective kernels (White maize/ yellow maize)	Government Gazette Maize Regulation, Latest Edition
Cereal as grains (Wheat, barley, rye and oats)	Hectolitre mass (Kern222)	ISO 7971-3, Latest edition
Wheat	Screenings	Government Gazette Wheat Grading Regulation, Latest Edition
RHEOLOGICAL		
Wheat flour	Alveograph (Rheological properties)	ICC Std.121, Latest Edition
Flours	Farinograph (Rheological properties)	AACCI 54.02, Latest Edition (Rheological behaviour of flour Farinograph: Constant Flour Weight procedure)
Hard, soft and durum wheat (flour and whole wheat flour)	Mixograph (Rheological properties)	Industry accepted method 020 (Based on AACCI 54-40.02, Latest Edition Mixograph Method)

Original Date of Accreditation: 01 November 1999

ISSUED BY THE SOUTH AFRICAN NATIONAL ACCREDITATION SYSTEM



Accreditation Manager

GOVERNMENT NOTICES GOEWERMENTSKENNISGEWINGS

DEPARTMENT OF AGRICULTURE DEPARTEMENT VAN LANDBOU

No. R. 473

8 May 2009

AGRICULTURAL PRODUCT STANDARDS ACT, 1990 (ACT No. 119 OF 1990)

REGULATIONS RELATING TO THE GRADING, PACKING AND MARKING OF MAIZE INTENDED FOR SALE IN THE REPUBLIC OF SOUTH AFRICA

The Minister of Agriculture, acting under section 15 of the Agricultural Product Standards Act, 1990 (Act No. 119 of 1990),

- (a) made the regulations in the Schedule; and
- (b) determined that the said regulations shall come into operation on date of publication.

SCHEDULE

Definitions

1. In these regulations any word or expression to which a meaning has been assigned in the Act shall have that meaning and, unless the context otherwise indicates -

"bag" means a bag manufactured from -

- (a) jute or phormium or a mixture of jute and phormium; or
- (b) polypropylene that complies with SABS specification CKS632;

"bulk container" means any vehicle or container in which bulk maize is stored or transported-

"consignment" means -

- (a) a quantity of maize of the same class, which belongs to the same owner, delivered at any one time under cover of the same consignment note, delivery note or receipt note, or delivered by the same vehicle or bulk container, or loaded from the same bin of a grain elevator or from a ship's hold; or
- (b) in the case where a quantity referred to in paragraph (a), is subdivided into different grades, each such quantity of each of the different grades;

"coffee stained maize kernels" means maize kernels with a shiny brown colour that occurs anywhere on the pericarp of the maize kernel;

"container" means a bag or a bulk container;

"defective maize kernels" means maize kernels and pieces of maize kernels-

- (a) that are shrivelled, obviously immature, frost-damaged, heat damaged, water damaged, mouldy or chalky;
- (b) that are discoloured by external factors such as water and sun: Provided that discoloration on both sides of the maize kernel limited to less than a quarter from the bottom tip of the maize kernel shall not be considered as defective; oxidation stained maize kernels; coffee stained maize kernels; and pinked maize kernels shall not be considered as defective;
- (c) that have sprouted, including kernels of which the shoot (plumule) in the germ is visibly discoloured;

- (d) that have cavities in the germ or endosperm caused by insects or rodents;
- (e) that are visibly soiled (smeared) or contaminated by smut, fire, soil, smoke or coal-dust;
- (f) all matter that can pass through the 6,35 mm round-hole sieve; and
- (g) that are of subspecies other than *Zea mays indentata* or *Zea mays indurata*.

Provided that:

- (i) Irregularity of shape and size of maize kernels shall not affect the grading thereof;
- (ii) chipped or cracked maize kernels or pieces of maize kernels which are in a sound condition and which appear in a sample of maize, but which do not pass through a 6,35 mm round-hole sieve, shall not be regarded as defective maize kernels under these regulations;

"discoloured maize kernels" means maize kernels that are as a result of environmental conditions more than 25% discoloured on both sides of the kernel, excluding coffee stained maize kernels, oxidation stained maize kernels and pinked maize kernels;

"foreign matter" means all matter above the sieve other than maize, glass, stone, coal, dung or metal;

"frost damaged" means maize kernels that are covered with wrinkles on both sides of the kernel to the crown and have a pearl-like appearance. Maize kernels of which the bran is flaking is considered frost damaged if signs of frost damage are present;

"heat damaged" means kernels that are as a result of external heat or internal fermentation affected with excess moisture and have at least one of the following characteristics:

- (a) Kernels or pieces of kernels that are amber, brown, dark-brown or black discoloured;
- (b) Kernels of which the germ has dark-brown to black discoloration;

"insect" in relation to maize, means any live insect which is injurious to stored grain, irrespective of the stage of development of the insect;

"maize" means the threshed kernels or pieces of kernels of the plants of *Zea mays indurata* and *Zea mays indentata* or one or more crossings of the two types;

"mouldy" means kernels or pieces of kernels that-

- (a) are visibly infected by fungi and are characterised by black, blue, green, yellow or white fungi growth anywhere on the kernel, or are characterised by fungi growth underneath the bran layer of the kernel;
- (b) are infected by ear-rot and are characterised by red, pink or brown discolorations. The kernels are partially to completely infected;

"other colour maize kernels" in relation to -

- (a) white maize, means maize kernels or pieces of maize kernels of which the endosperm as a result of genetic (characteristics) composition have another colour than white, excluding pinked maize kernels;
- (b) yellow maize, means maize kernels or pieces of maize kernels of which the endosperm as a result of genetic (characteristics) composition have another colour than yellow;

"oxidation stained maize kernels" means maize kernels with a shiny light brown colour that are discoloured from the crown and not from the tip cap;

"pinked maize kernels" means kernels and pieces of kernels of white maize of which the pericarp or part thereof is shaded red or pink in colour;

"poisonous seeds" means seeds or part of seeds of plant species that may in terms of the Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act No. 54 of 1972) represent a hazard to human or animal health when consumed, including seeds of *Argemone mexicana*, *Convolvulus* spp., *Crotalaria* spp., *Datura* spp., *Ipomoea* spp. *Lolium temulentum*, *Ricinus communis* or *Xanthium* spp;

"shrivelled or obviously immature maize kernels" means maize kernels with a thin and shrunken appearance;

"sprouted maize kernels" means maize kernels which have sprouted so far that developing roots and/or sprouts are clearly visible, or the shoot (plumule) in the germ is visibly discoloured;

"the Act" means the Agricultural Product Standards Act, 1990 (Act No. 119 of 1990);

"the 6,35 mm round-hole sieve" means a sieve-

- (a) with a flat metal sheet bottom of 1,0 mm thickness perforated with round holes of 6,35 mm ($\pm 0,05$ mm) in diameter that are arranged with the centres of the holes at the points of intersection of an equilateral triangular grid with a pitch of 8 mm;
- (b) of which the upper surface of the bottom is smooth;
- (c) the frame of which is at least 40 mm high;
- (d) with the inner width of at least 200 mm and the inner length of at least 300 mm, or, in the case of a circular sieve, the inner diameter of at least 278 mm;
- (e) with a minimum area of 600cm² and a maximum of 750cm²; and
- (f) that fits onto a tray with a solid bottom and must be at least 20mm above the bottom of the tray; and

"water damaged maize kernels" means maize kernels with a light yellow shine from the tip cap in a band around the maize kernel.

Scope of regulations

2. These regulations are the minimum standards applicable to maize that are destined for sale in the Republic of South Africa but does not include –

- (a) maize in retail quantities; and
- (b) maize for seed production purposes.

Restrictions on sale of maize

3. (1) No person shall sell maize in the Republic of South Africa -
 - (a) unless the maize is sold according to the classes set out in regulation 4;

- (b) unless the maize complies with the standards for the class concerned set out in regulation 5;
 - (c) unless the maize complies with the grades of maize and the standards for grades, where applicable, set out in regulations 6 and 7 respectively;
 - (d) unless the maize is packed in accordance with the packing requirements set out in regulation 8;
 - (e) unless the containers or sale documents, as the case may be, are marked in accordance with the marking requirements set out in regulation 9; and
 - (f) if such maize contains a substance that renders it unfit for human consumption or for processing into or utilisation thereof as food or feed.
- (2) The Executive Officer may grant written exemption, entirely or partially to any person on such conditions as he or she may deem necessary, from the provisions of subregulation 1: Provided that such exemption is done in terms of section 3 (1) (c) of the Act.

PART I QUALITY STANDARDS

Classes of maize

4. The classes of Maize shall be -

- (a) Class White Maize;
- (b) Class Yellow Maize; and
- (c) Class Other Maize.

Standards for classes of maize

5. (1) A consignment of maize shall be classified as Class White Maize if -
- (a) subject to the allowable deviation in respect of other colour maize kernels that apply to the different grades of white maize, it consists of maize the endosperm of which is by nature white in colour; and
 - (b) it complies with the standards for one of the grades of white maize set out in regulation 7.
- (2) A consignment of maize shall be classified as Class Yellow Maize if -
- (a) subject to the allowable deviation in respect of other colour maize kernels that apply to the different grades of yellow maize, it consists of maize the endosperm of which is by nature yellow in colour; and
 - (b) it complies with the standards for one of the grades of yellow maize set out in regulation 7.
- (3) A consignment of maize shall be classified as Class Other Maize if the consignment does not comply with the standards for Class White Maize or Class Yellow Maize.

Grades of maize

6. (1) Maize of the Class White Maize shall be graded as WM1, WM2 or WM3.
- (2) Maize of the Class Yellow Maize shall be graded as YM1, YM2 or YM3.
- (3) No grades are determined for Class Other Maize.

Standards for grades of Class White Maize and Class Yellow Maize

7. All grades of maize -
 - (a) shall be free from a musty, sour or other undesired odour;
 - (b) shall be free from glass, metal, coal or dung;
 - (c) shall be free from a substance which renders it unfit for human consumption or for processing into or utilisation thereof as food or feed;
 - (d) shall be free from insects;
 - (e) shall be free from stones which cannot pass through the 6,35 mm round-hole sieve;
 - (f) shall contain not more than one gram of stones, which can pass through the 6,35 mm round-hole sieve, per 10 kg;
 - (g) shall contain not more poisonous seeds than permitted in terms of the Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act No. 54 of 1972);
 - (h) shall have a moisture content of not more than 14 per cent; and
 - (i) shall not exceed the maximum percentage of permissible deviation as determined in the table in the Annexure for each grade.

**PART II
PACKING AND MARKING REQUIREMENTS****Packing requirements**

8. Maize of different classes and grades shall be packed in different containers.

Marking requirements

9. Each container or the accompanying sales document of a consignment of maize shall be marked or endorsed with -
 - (a) the class of the maize;
 - (b) the grade, in the case of Class White Maize or Class Yellow Maize; and

**PART III
SAMPLING****Obtaining sample**

10. (1) A sample of a consignment of maize shall -

- (a) in the case of maize delivered in bags and subject to regulation 11, be obtained by sampling at least ten per cent of the bags, chosen from that consignment at random, with a bag probe: Provided that at least 25 bags in a consignment shall be sampled and where a consignment consists of less than 25 bags, all the bags in that consignment shall be sampled; and
 - (b) in the case of maize delivered in bulk and subject to regulation 10, be obtained by sampling that consignment throughout the whole depth of the layer, in at least six different places, chosen at random in that bulk quantity, with a bulk sampling apparatus.
- (2) The collective sample obtained in subregulation (1) (a) or (b) shall -
- (a) have a total mass of at least 10 kg; and
 - (b) be thoroughly mixed by means of dividing before further examination.
- (3) If it is suspected that the sample referred to in subregulation (1)(a) is not representative of that consignment, an additional five per cent of the remaining bags, chosen from that consignment at random, shall be emptied into a suitable bulk container and sampled in the manner contemplated in subregulation (1)(b).
- (4) A sample taken in terms of these regulations shall be deemed representative of the consignment from which it was taken.

Sampling if contents differ

11. (1) If, after an examination of the maize taken from different bags in a consignment in terms of regulation 10(1), it appears that the contents of those bags differ substantially -
- (a) the bags concerned shall be placed separately;
 - (b) all the bags in the consignment concerned shall be sampled in order to do such separation; and
 - (c) each group of bags with similar contents in that consignment shall for the purposes of these regulations be deemed to be a separate consignment.
- (2) If, after the discharge of a consignment of maize in bulk has commenced, it is suspected that the consignment could be of a class or grade other than that determined by means of the initial sampling, the discharge shall immediately be stopped and the part of the consignment remaining in the bulk container, as well as the grain that is already in the collecting tray, shall be sampled anew with a bulk sampling apparatus or by catching at least 20 samples at regular intervals throughout the whole offloading period with a suitable container from the stream of grain that is flowing in bulk.

Working sample

12. A working sample shall be obtained by dividing the representative sample of the consignment according to the ICC 101/1 method.

**PART IV
DETERMINATION OF OTHER SUBSTANCES**

Determination of undesirable odours and harmful substances

13. A sample of a consignment of maize shall be sensorial assessed or chemically analysed in order to determine -

- (a) whether it has a musty, sour or other undesirable odour: Provided that a working sample of unscreened maize that is ground in a grain mill to a fine meal may be used for the determination concerned; and
- (b) whether it contains a substance that renders the maize unfit for human consumption or for processing into or for utilisation as food or feed.

Determination of glass, metal, coal, dung, stone, poisonous seed and insect content

14. A consignment of maize shall be sensorial assessed and a sample of that consignment shall be sensorial assessed and sorted by hand in order to determine whether the sample contains glass, metal, coal, dung, insects, stones and poisonous seeds.

Determination of percentage of foreign matter

15. The percentage of foreign matter in a consignment of maize shall be determined as follows:
- (a) Obtain a working sample with a mass of at least 150g from the sample of the consignment.
 - (b) Remove all foreign matter from the working sample and determine the mass thereof.
 - (c) Express the mass thus determined as a percentage of the total mass of the working sample.
 - (d) Such percentage shall represent the percentage of foreign matter in the consignment concerned.

**PART V
MAIZE KERNELS**

Determination of percentage of defective maize kernels

16. The percentage of defective maize kernels in a consignment of maize shall be determined as follows:
- (a) Obtain a working sample with a mass of at least 150g from the sample of the consignment.
 - (b) Place the working sample on the 6, 35 mm round-hole sieve and screen the sample by moving the sieve 20 strokes to and fro, alternately away from and towards the operator of the sieve. Move the sieve, which rests on a table or other suitable smooth surface, 250 mm to 460 mm away from and towards the operator with each stroke. The prescribed 20 strokes must be completed within 20 to 30 seconds.
 - (c) Determine the mass of the matter that has passed through the sieve and express it as a percentage of the mass of the working sample.
 - (d) Remove all defective maize kernels from that part of the working sample remaining on the sieve and determine the mass thereof.
 - (e) Express the mass as a percentage of the mass of the working sample.
 - (f) Calculate the sum of the masses determined in terms of paragraphs (c) and (d).
 - (g) Express the combined mass calculated in terms of paragraph (f) as a percentage of the mass of the working sample.
 - (h) In the case of yellow maize the percentage obtained -

- (i) in terms of paragraph (c), represents the percentage of defective maize kernels in the consignment concerned, which can pass through the 6,35 mm round-hole sieve; and
 - (ii) in terms of paragraph (e), represents the percentage of defective maize kernels in the consignment concerned, which can not pass through the 6,35 mm round-hole sieve.
- (i) In the case of white maize, the percentage obtained in terms of paragraph (g) represents the percentage of defective maize kernels in the consignment concerned.

Determination of percentage of other colour maize kernels

17. The percentage of other colour maize kernels in a consignment of maize shall be determined as follows:

- (a) Obtain a working sample with a mass of at least 150g from the sample of the consignment.
- (b) Remove all other colour maize kernels from the working sample and determine the mass thereof.
- (c) Express the mass thus determined as a percentage of the mass of the working sample.
- (d) Such percentage shall represent the percentage of other colour maize kernels in the consignment concerned.

Determination of percentage of pinked maize kernels

18. The percentage of pinked maize kernels in a consignment of maize shall be determined as follows:

- (a) Obtain a working sample with a mass of at least 150g from the sample of the consignment.
- (b) Remove all pinked maize kernels from the working sample and determines the mass thereof.
- (c) Express the mass thus determined as a percentage of the mass of the working sample.
- (d) Such percentage shall represent the percentage of pinked maize kernels in the consignment concerned.

**PART VI
MOISTURE CONTENT**

Determination of moisture content

19. The moisture content of a consignment of maize may be determined according to any suitable method: Provided that the results thus obtained are in accordance with the maximum permissible deviation for a class 1 moisture meter as detailed in ISO 7700/1 based on the results of the 72 hour, 103°C oven dried method (AACC Method 44-15A).

OFFENCE AND PENALTIES

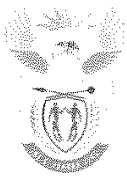
20. Any person who contravenes or fails to comply with any provision of these regulations shall be guilty of an offence and upon conviction be liable to a fine or imprisonment in terms of section 11 of the Act.

**ANNEXURE/AANHANGSEL
TABLE/TABEL**

**STANDARDS FOR GRADES OF CLASS WHITE MAIZE AND CLASS YELLOW MAIZE/
STANDAARDE VIR GRADE VAN KLAS WITMIELIES EN KLAS GEELMIELIES**

Deviation/Afwyking	Maximum permissible deviation/ Maksimum toelaatbare afwyking					
	White maize/ Witmielies			Yellow maize/ Geelmielies		
	WM1	WM 2	WM 3	YM1	YM2	YM3
1	2	3	4	5	6	7
1. Foreign matter [regulation 15]/ Vreemde voorwerpe [regulasie 15]	0,3%	0,5%	0,75 %	0,3%	0,5%	0,75%
2. Defective maize kernels, above and below the 6,35 mm round-hole sieve [regulations 16]/ <i>Gebrekkige mieliepitte, bo en onder die 6,35 mm-rondegatsif [regulasies 16]</i>	7%	13%	30%	*	*	*
3. Defective maize kernels that can pass through the 6,35 mm round-hole sieve [regulation 16(c)]/ <i>Gebrekkige mieliepitte wat deur die 6,35 mm rondegatsif kan gaan [regulasie 16(c)]</i>	*	*	*	4%	10%	30%
4. Defective maize kernels that can not pass through the 6,35 mm round-hole sieve [regulation 16(e)]/ <i>Gebrekkige mieliepitte wat nie deur die 6,35 mm-rondegatsif kan gaan nie [regulasie 16(e)]</i>	*	*	*	9%	20%	30%
5. Other colour maize kernels [regulation 17]/ <i>Mieliepitte van 'n ander kleur [regulasie 17]</i>	3%	6%	10%	2%	5%	5%
6. Deviations referred to in items 1, 3, 4 and 5 individually within the specified limits/ <i>Afwykinge in items 1, 3, 4 en 5 bedoel, gesamentlik: met dien verstande dat die afwykinge individueel binne die gespesifiseerde perke is</i>	8%	16%	30%	9%	20%	30%
7. Pinked maize kernels [regulation 18]/ <i>Verrooide mieliepitte [regulasie 18]</i>	12%	12%	12%	*	*	*

* Not specified/Nie gespesifiseer nie.



agriculture,
forestry & fisheries

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REPUBLIC OF SOUTH AFRICA

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FAX COVER SHEET

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REF NO: 20/4/14/1 / Dispensation

FAX: (012) 319 6055

SERIAL NO:

NO. PAGES: 1

DATE: 15 April 2010

Subject

INDUSTRY-WIDE DISPENSATION: AMENDMENT OF THE REGULATION RELATING TO THE GRADING, PACKING AND MARKING OF MAIZE INTENDED FOR SALE IN THE REPUBLIC OF SOUTH AFRICA.

Please refer to the e-mail dated 29th March 2010 from Grain Silo Industry

Permission is hereby granted by the Executive Officer: Agricultural Product Standards, in terms of Section (3) of the Agricultural Products Standards Act, 1990 (Act No. 119 of 1990), to all producers, wholesalers, traders, retailers and importers of Maize to sell and import maize whereby the definition of "Foreign matter" is amended in the English version in order to align it to the Afrikaans one of the above mentioned Regulation to read as follows : **"Foreign matter" means all matter other than maize, glass, stones above the sieve, coal, dung or metal.**

This dispensation is extended further to apply to item 6 of the Annexure in the Table relating to Standards for grades of Class White and Yellow maize which is amended and replaced with the following item: Provided that all provisions of the regulations shall be complied with:

ANNEXURE/AANHANGSEL
TABLE/TABEL

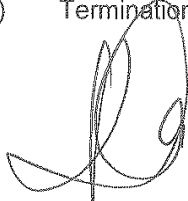
STANDARDS FOR GRADES OF CLASS WHITE MAIZE AND CLASS YELLOW MAIZE/
STANDAARDE VIR GRADE VAN KLAS WITMIELIES EN KLAS GEELMIELIES

Deviation/Afwyking	Maximum permissible deviation/ Maksimum toelaatbare afwyking					
	White maize/ Witmielies			Yellow maize/ Geelmielies		
	WM 1	WM2	WM3	YM1	YM2	YM3
1	2	3	4	5	6	7
6. Deviations referred to in items 1, 2, 3, 4 and 5 collectively: Provided that the deviations are individually within the specified limits/Afwykinge in items 1, 2, 3,4 en 5 bedoel, gesamentlik: Met dien verstande dat die afwykinge individueel binne die gespesifiseerde perke is	8%	16%	30%	9%	20%	30%

INDUSTRY-WIDE DISPENSATION: AMENDMENT OF THE REGULATION RELATING TO THE GRADING, PACKING AND MARKING OF MAIZE INTENDED FOR SALE IN THE REPUBLIC OF SOUTH AFRICA.

This permission is subject to the following conditions:

- (a) All other conditions of the regulations shall be complied with.
- (b) It may be withdrawn at any time should a valid complaint be received
- (c) All producers, wholesalers, traders, retailers and importers of Maize, Indemnifies this Directorate and the Department from any detrimental effect, financially or otherwise, which may emanate as a result of this permission.
- (d) Termination date: until the regulation is reviewed and gazetted.



EXECUTIVE OFFICER:

AGRICULTURAL PRODUCT STANDARDS ACT, NO. 119 OF 1990

Copies: APIS : NPPIS North – Attention: Jimmy Mogodi

