



Southern African Grain Laboratory NPC

Quality is our passion



The Value Of Crop Quality Reports And The Importance Of Providing Correct Samples To SAGL

AGBIZ GRAIN – Mini symposium 2015

Jolanda Nortjé

Crop Quality Survey funding:



WHEAT - FUNDED BY THE WINTER CEREAL TRUST
SINCE 1998/1999 (17 SURVEYS)

MAIZE - FUNDED BY THE MAIZE TRUST
SINCE 1997/1998 (17 SURVEYS)



SOYBEAN - FUNDED BY THE OIL & PROTEIN SEED DEVELOPMENT TRUST
SINCE 2011/2012 (3 SURVEYS)

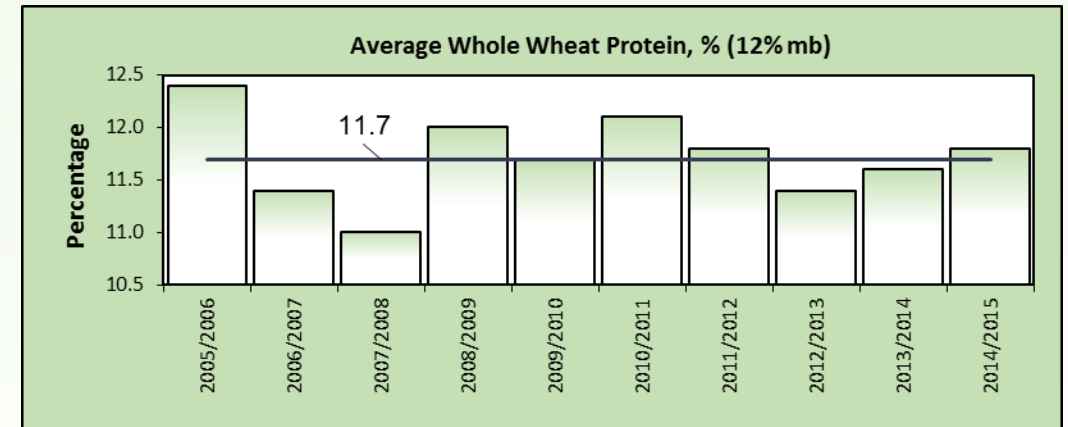
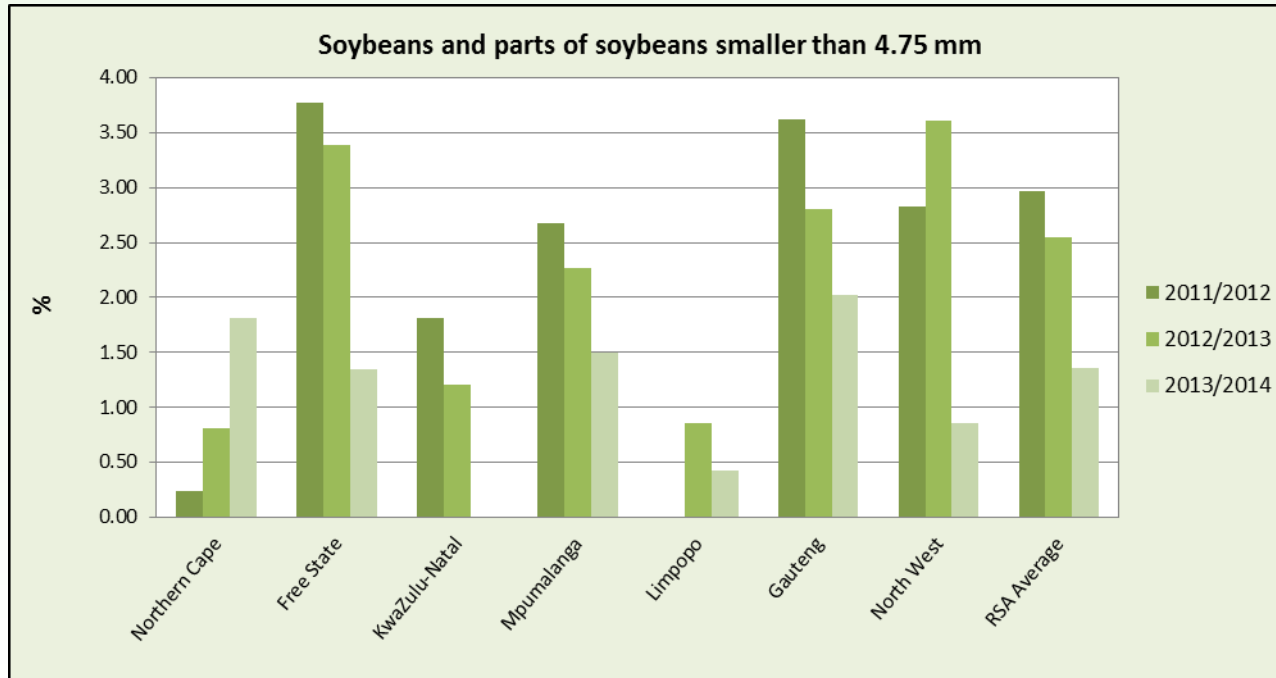
SUNFLOWER - FUNDED BY THE OIL & PROTEIN SEED DEVELOPMENT TRUST
SINCE 2012/2013 (2 SURVEYS)



What is the value of crop quality surveys?

- The goal of the crop quality surveys on each of the commercial crops is to accumulate quality data on a national level. This data may be used to:
 - Reveal **general tendencies**.
 - **Highlight quality differences** in the commercial grain produced *in different production regions and over different seasons*.
 - Provide information on the **quality of grain intended for export** (where applicable).
 - **Compare** the quality of **locally produced** grain with that of **imported** grain.
 - Influence the decisions taken by breeders regarding **development of new cultivars**.
 - Form the basis for decisions during **revision of grading regulations**.
 - Supply **reliable analytical data** for *targeted research projects*.

Examples of General trends revealed by the data



What type of information is provided in the report?

- **Quality information**
 - ✓Grading results
 - ✓Physical parameters
 - ✓Nutritional parameters
 - ✓Rheological (dough and baking) quality
 - ✓Mycotoxin
 - ✓GMO
- **Production figures** (obtained from the National Crop Estimates Committee (CEC)) relating to hectares planted, tons produced and yields obtained on a national as well as provincial basis over seasons.
- SAGIS (South African Grain Information Service) **supply and demand information** over several years.
- The national **grading regulations** as published in Government Gazette Notices.
- **Quality data of imported grain** compared to local quality.

Value addition

Up to now, the data has only been presented in table and graph format, but 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 maize data mining project, titled “Data Mining of past eleven years’ Milling Index and Crop Survey Results”.
- Project proposal submitted to the WCT titled “Data Mining and GIS mapping of the past thirteen years of Wheat Crop Quality Data”.

Question ???



Is it really necessary to continue with crop surveys on an annual basis?



Answer:

A detailed database containing information collected over **a number of seasons and regions** is essential to provide **scientific and statistically valid** data on which **reliable informed decisions** can be based.

Agriculture is not a static environment, data generated should keep track with changes to this environment:

- Climatic conditions
- Agricultural/cultivation practices (conservation agriculture, crop rotation systems, etc.)
- New Cultivars
- New production areas
- Type of production (dry land vs irrigation)
- Industry requirements
- National and international legislation



International organizations also performing crop quality surveys

- US Wheat Associates
- US Grains Council
- National Sunflower Association
- United States Soybean Export Council
- American Soybean Association – Soybean Crop Quality survey
- Canadian Grain Commission
- Australian Export Grains Innovation Centre

Crop Survey report format



- Results are reported as an Average, Minimum, Maximum and Standard Deviation per production region.
- Comparisons between production areas, regions and seasons are provided in both table and graph format.
- Reports:
 - Hard copy
 - PDF format for download from the SAGL website (www.sagl.co.za)
- *Weekly web updates of average results per production region as well as RSA averages per parameter as data becomes available.*
- *Silo owners as well as millers receive weekly e-mails containing the quality data of the samples supplied by them.*

Sampling plan background

- The basis for the sampling plan is the fact that samples have to be taken and graded for intake purposes.
- A working group (including representatives from the commercial grain silo industry, L&L Agricultural Services and the SAGL) has determined the process which needs to be followed to ensure that the crop quality samples which are sent to the SAGL are representative of the total crop.
- Sampling is carried out over the entire production area of a particular crop.
- All production regions are to be represented by the samples.
- The determination of the number of samples to be analysed annually to provide representative data of each of the commercial crops, is based on the crop size as well as the number of sampling points.
 - The predicted crop size figure is obtained from the NCEC's forecast estimates.
 - Each registered intake stand represents a sampling point.

Sampling plan background (continue)

According to information received from Agbiz Grain members, the number of intake stands handling each of the different crops are:

		Commodity			
		Maize	Soya	Sunflower	Wheat
Number of intake stands per commodity indicated by Agbiz Grain members		266	153	190	163
Number of intake stands per commodity from which samples have been received over the last 3 seasons	2011/2012	177	86	-	125
	2012/2013	180	89	92	113
	2013/2014	189	86	103	100
	Average	182	87	98	113
	%	68	57	51	69

From the above it can be deduced that either:

- *Not all of the intake stands receive all of the commodities every season or*
- *Some of the stands may not receive intake grain but is used for storage or*
- *Samples are not submitted by all intake stands*

Sampling plan background (continue)

- A further complication to the process is that samples are received over a 3 to 6 month period.
 - Due to time frames and practical issues, analysis is commenced immediately upon receipt of samples.
 - SAGL cannot wait until all samples are received to perform a truly representative sample selection.
- The SAGL survey surveys whole population without stratification (simple random sampling) for quality based on production.
- Suggestion for possible improvement: Proportional sampling of grain at consignment level or silo bin level to deliver a proportional sample of grain in a specific grading class for quality purposes. Some mechanism for proportional sampling has to be introduced, e.g. Take a 500 g sample for each 5 tons delivered.

Procedure communication

- A procedure for submitting crop quality samples to SAGL was documented.
- This procedure is e-mailed to Agbiz Grain members on commencement of the specific harvesting season, with reminders forwarded throughout the season.
- Follow-up requests done via telephone by SAGL's graders.
- Included in the procedure are:
 - SAGL's physical address as well as the courier information to be used for forwarding the samples to SAGL.
 - Important notes regarding the samples and procedure.
 - Request for contact details.
- *Please ensure that SAGL is in possession of the correct contact information to ensure effective communication, both with regards to the procedures but also with regards to the weekly quality data e-mails.*

Procedure for submitting crop quality samples to SAGL

80% of expected harvest received

● Sample and grade each delivery as per the grading regulations.

● Place samples in separate containers according to grade.

● Divide the content of each container with a whole grain divider in order to obtain a 3kg sample.

(Each grade separately).

● More than one container per grade: Mix, combined contents of containers thoroughly, divide to obtain the required 3kg sample.

● Mark the sample clearly:

- **Company name**
- **Name of Intake stand**
- **Bin/bag/bunker number(s)**
- **Class or grade**

Package the samples in sturdy bags and boxes.

Deliver/courier samples to SAGL.

Important notes:

- **Other grain and unthreshed ears, foreign matter, defects/deviating kernels separated from the sample during the grading process should be added back to the sample** prior to placing the grading sample in the container.
- This will ensure that the “same” samples are graded by the SAGL and the graders at the intake stands.
- This is very important since the SAGL’s grading results are reported and these results should be representative of the actual grain delivered.
- The class and/or grade of the samples reported by the sender is used for sample selection and comparison purposes.
- Do not mix different grades in one sample.



Important notes (continue)

- Grain **relocated between depots from different regions must be excluded from the samples forwarded to the SAGL** for crop quality purposes.
 - Sub samples of such consignments should therefore not be placed in the container available for each grade of wheat as referred to in the sampling procedure.
 - Inclusion of such samples in the project may lead to an inaccurate reflection of the quality of a specific region.
 - Duplication of samples and results may further affect the quality of the project.
- Samples of **imported grain should also be excluded** from the crop surveys.
- Post sampling handling of these samples is as important to the quality of the results obtained as the samples themselves.
- Samples are to be forwarded to the SAGL **as soon as possible**.
- **Storage conditions** prior to forwarding the samples also **crucial**.

Practical examples

- No wet pods were observed by SAGL during the grading of the soybean samples of the 2012/2013 season, while wet pods were reported by graders at the various intake stands.
- Two possible explanations:
 - During grading of the samples at the intake stands (prior to the samples being collected and forwarded to SAGL), the wet pods were removed from the samples for the determination of the percentage Wet pods and not replaced.
 - During the time elapsed (sometimes weeks) from the samples being taken to being forwarded to SAGL by the intake stands, the pods dried out and was no longer visible or identifiable as wet pods according to the definition.



Practical examples (continue)

- The 2014/2015 wheat crop survey reported the highest % samples downgraded to Utility grade (UT) (26%) and Class Other Wheat (COW) (7%) since the 2003/2004 season when the current grading system was implemented.
- 45% of the 89 samples downgraded to UT \Rightarrow % insect damaged kernels $>$ 2%.
(The percentage other grain and unthreshed ears was also a significant contributing factor as in previous seasons).
- 68% of the samples downgraded to COW \Rightarrow the presence of live insects, compared to the one or two samples in previous seasons.
- However, according to the class and grade information received from the senders, none of these samples were downgraded to either UT or COW.
- Which indicates the infestation to have taken place during storage/transport.



Conclusion

- Doubt should never exist whether “bad” grading or quality results is due to a “bad” sample and/or “bad” sample storage or as a result of actual external influences, e.g. climatic conditions, etc.
- **The results obtained from the samples must provide insight as to what is being experienced in practice, otherwise remarks like “what is being reported does not correspond to what is actually being seen/received/experienced” is proven valid and negate the motivations as to the importance and validity of crop quality surveys.**

Acknowledgements

- ✓ Symposium organisers
- ✓ Agricultural Trusts for financial support of the crop quality surveys



- ✓ Agbiz grain members for supplying crop samples
- ✓ NCM members and individual milling groups for supplying samples of direct deliveries
- ✓ SAGL personnel
- ✓ Audience for your attention