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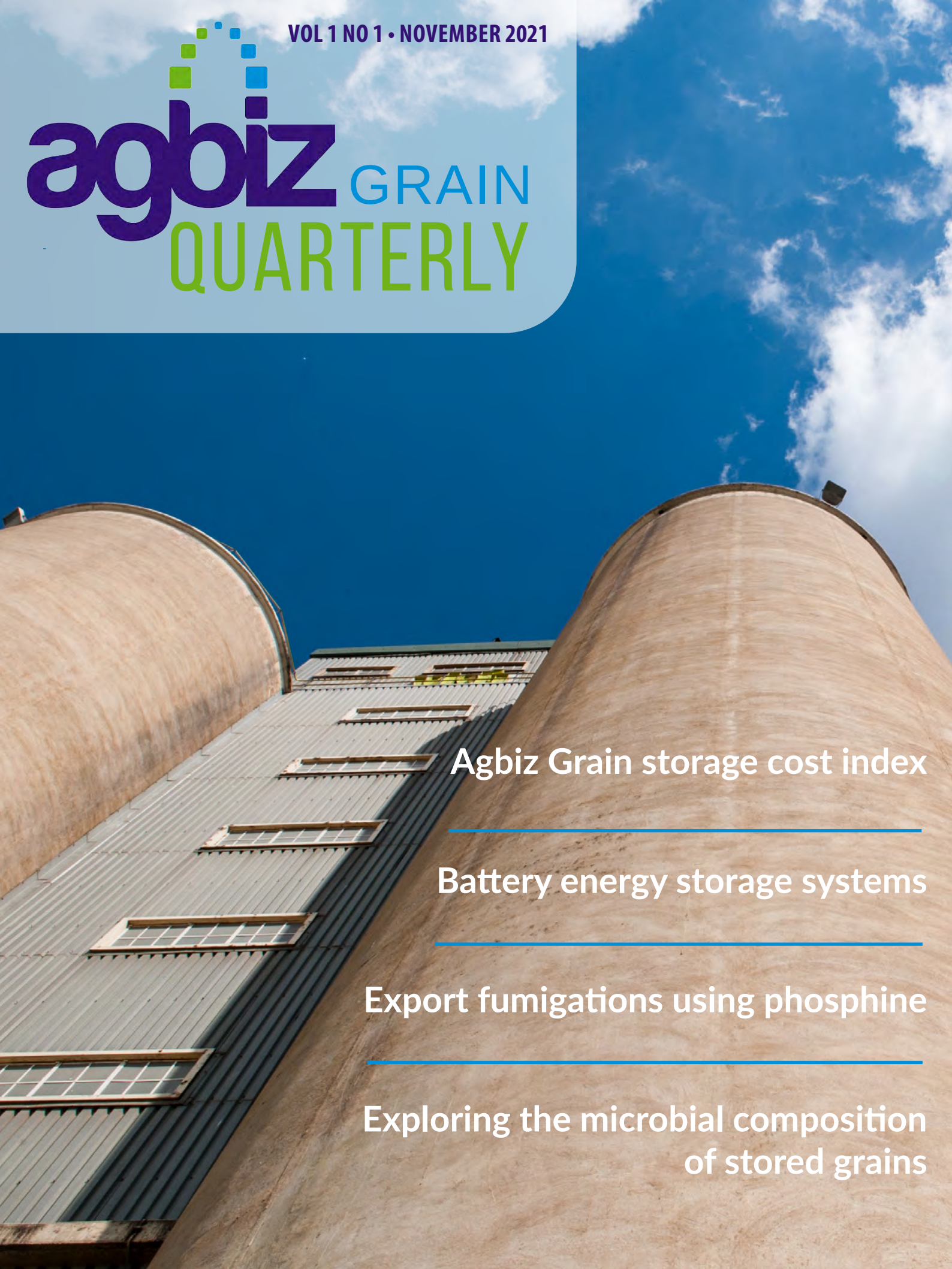
agbiz GRAIN QUARTERLY



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Agbiz Grain Quarterly: A new voice for a new year

By Wessel Lemmer, general manager, Agbiz Grain

The past year posed interesting challenges and, being an optimist, I want to believe that we have seen developments culminating from these challenges into exciting changes to improve the business environment. The most important aspects include the development of the Agbiz Grain Storage Cost Index, revision of the JSE rules, positioning of Agbiz Grain through our symposium, and opposing the potential introduction of assignees in the grain and oilseed storage sector.

Agbiz Grain supported the introduction of the South African Winter Cereal Industry Trust (SAWCIT) and the voluntary levies collected to continue the funding of industry functions, as has been done since deregulation. We also actively supported the quality monitoring projects by the Southern African Grain Laboratory (SAGL). However, we opposed the voluntary submission of the weekly producer delivery information utilised by the industry – the submission of the information needs to be inclusive before the next marketing season for soya bean and sunflower commences in 2022.

The dispute protocol has been finalised, and it is our view that a sampling protocol needs to follow soon in support of the dispute protocol. Speaking of protocols, the malting barley industry needs a unique protocol to improve communication and increase competitiveness among value chain partners.

Need for additional storage capacity

We are part of an exciting, growing sector and expect the annual need for additional storage capacity to continue to increase by between 2 to 3%. For example, the five-year average production of grains and oilseeds up until the 1997/98 marketing year was 12 866 945 tons. This increased to 19 774 331 by 2020/21. Based on these averages, the production of grains and oilseeds increased by an average of 2,3% per year, representing a total increase of 6,9 million tons, or 54%, over the past 23 years since deregulation.

In the European Union (EU), storage capacity meets the average production of grains and oilseeds. Investment in storage capacity does not exceed average production. The return on investment on additional unutilised storage capacity therefore is not worth the investment. If we apply this principle to South Africa without considering local variation in production compared to that of the EU, we need at least 19,8 million tons of storage capacity. (The members of Agbiz Grain store 67% of the country's production, while 33% is stored by non-members.)

To meet the growing demand, there has been an increase in the expansion of storage capacity by both Agbiz Grain and non-Agbiz Grain members since deregulation. The 2 to 3% annual expansion required offers several opportunities, including the development of new infrastructure and the implementation of new technologies in the handling and storage environment.

However, new technological developments can be disruptive to not only grain handlers and storers, but also to our partners in the South African value chain who need to compete in an increasingly competitive global environment. Three billion tons of grain and oilseeds are handled and stored annually. Consequently, the developers of artificial intelligence technologies in agriculture have shifted their focus over the past two years, from developing pre-harvest primary production technologies to creating solutions for the post-harvest handling and storage environment.

Information sharing is key

Agbiz Grain developed the Agbiz Grain Storage Cost Index to understand the future impact of factors such as electricity provision on the economy of grains and oilseeds handling and storage, as well as to share these insights with our value chain partners.

As a sector, we need to keep abreast of new developments. Therefore, a vehicle is needed to share topical issues such as these timely, to analyse economic developments impacting directly on the economy of handling and storage services, to identify current and new demand for research applicable to storage, as well as opportunities and threats that new technological developments pose to the South African sector. Lastly, we need to keep abreast of developments relating to regulations and operations.

The need for a publication to share information in the interest of every stakeholder involved in the handling and storage of grain commodities in South Africa is long overdue. I firmly believe that this first edition of *Agbiz Grain Quarterly* is the first step in the right direction to address that need. I would also like to invite readers to participate by way of comments and suggestions.

As the mouthpiece of the handling and storage sector, we encourage you to consider taking up membership at Agbiz and Agbiz Grain to support us in developing our business environment in the interest of all. Agbiz Grain membership is not only open to those involved in the handling and storage of grains, but value chain service providers can join our membership as associate members as well.

All the best with the remaining harvest and may you have a blessed festive season.

Wessel Lemmer
Editor

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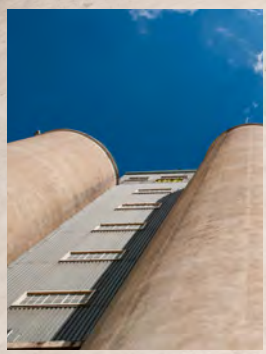

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Agbiz Grain Code of Practice anticipated

Self-regulation is a key focus of the grain industry, and the objective of the development of the *Agbiz Grain Code of Practice* is to support this self-regulation. The industry will be guided by outlines for minimum requirements of all involved in the grain handling and storage sector. This Code will be continuously reviewed with input from Agbiz Grain storage and associate members, to ensure that its integrity is maintained.

In adopting this Code, all participants accept that they will be individually responsible for implementing the necessary systems, procedures and processes to achieve the purpose of the Code. Adoption of this Code will provide all industry sectors, including governments, researchers and consumers with confidence that processes exist in South Africa to successfully ensure effective assessment, classification, storage and transport of grain, to promote the local industry and its grain in support of market access, and to supply grain that meets market expectations. – *Agbiz Grain*

PPECB requests BEE certificates to determine industry compliance

The Perishable Products Export Control Board (PPECB) has clarified that their request for exporters to submit their broad-based black economic empowerment (B-BBEE) certificate serves to determine the level of compliance of the sector as a whole. The PPECB confirmed that it will not be evaluating the level of compliance of individual entities, nor does it dictate that clients maintain a specific B-BBEE level before the PPECB will render a service.

According to Tina-Louise Rabie, marketing and communications manager of the PPECB, "the PPECB does not currently require its clients to be B-BBEE registered or that they achieve a specific B-BBEE rating. Furthermore, the PPECB will not suspend or withhold services from its clients who are not B-BBEE compliant. Therefore, companies that do not comply can still export at this stage."

For more information, clients of PPECB are welcome to contact Rabie at email Tina-LouiseR@ppecb.com. – *Ursula Human, AgriOrbit*

Agbiz Grain gains first associate member

Agbiz Grain received its first applications for associate membership from Agri Enviro Solutions (AES) and Santam Agriculture to become the first associated members to join Agbiz Grain. Previously, members hailed mainly from the grain and/or oilseeds storage services, whereas AES supplies laboratory instruments and services to the grain industry. Santam Agriculture offers insurance services to the grain storage sector.

This category of membership presents associate members with a number of benefits, such as the opportunity to be regarded as reputable service providers or suppliers to the industry. Agbiz Grain also serves as a platform where service providers and suppliers can relate to the users of their product as associate members.

Associate members can join a technical committee in their field of expertise and indirectly exercise influence on decisions in the industry. Members will also be invited to assist with their expertise during workshops. There are also several promotional benefits to companies that join Agbiz Grain. – *Ursula Human, Plaas Media*

Cultivars need to be made known

In the Western Cape, the winter grain harvest process (wheat, barley and oats) is well on its way. Other winter grain production areas will soon follow suit.

It is the responsibility of the South African Cultivar and Technology Agency (SACTA) to administer the statutory levy for breeding and technology. In order to divide the levy between the seed companies according to their market share, a formula is used of which one input is production declaration. SACTA therefore requests grain handlers, grain storers or grain traders that buy or store grains, to enquire from producers which cultivars are being delivered. This information will later be requested by SACTA. – *Press release, SACTA*

Agbiz Grain identifies research areas

Agbiz Grain, in collaboration with members and other role-players, has identified research areas that are necessary for the grain and oilseeds industry. The following research needs were identified: The storage capability of malting barley cultivars; the storage capability of maize cultivars; germination capacity and germination energy; pest control in stored grain; pre-harvest management practices affecting germination capacity and germination energy of malting barley; and optimised storage practices with available infrastructure.

Agbiz Grain invites interested parties to become involved in any of the aforementioned initiatives and to contact the office for more information. – *Press release, Agbiz Grain*

Industry bids JSE head farewell

Dr Raphael Karuaihe, head of commodities at the Johannesburg Stock Exchange (JSE) and a well-known figure in the agricultural sector, will be leaving the company at the end of 2021. This follows a career at the JSE that spanned almost ten years. Dr Karuaihe has been appointed as the chief executive officer (CEO) of the Agricultural Bank of Namibia.

To listen to the interview with Dr Karuaihe, click here.

During an interview with *RSG Landbou,* he said that he is looking forward to his new position and new challenges that await at the Agricultural Bank of Namibia. This institution is a state-owned enterprise equivalent to the Land Bank in South Africa. He will, however, not disappear from the South African scene – in his new position he will be exploring joint programmes to accomplish expansion in African trade. He believes that Agbiz Grain members can play an important part on the other side of South Africa's borders. – *Ursula Human, Agbiz Grain Quarterly*

GSCI should be adopted by JSE

The Grain Storage Cost Index (GSCI) developed by the Bureau for Economic Research (BER) can potentially meet the requirements to update the annual change in the JSE storage rates. However, the GSCI is published only once a year. An understanding is needed of how the annual publication of the GSCI will compare with the storage rate adjustments of the JSE which are done at the start of each marketing year.

Agbiz Grain is of the opinion that the producer price index (PPI) is not a true representation of the costs incurred, and hence secured the services of the BER to determine whether there is another method or better index to use. Following a submission of their findings by the BER economist, Nicolaas van der Wath, it was concluded that the difference in values, when using PPI or the customised GSCI from BER, is statistically less significant over the long term, rendering the adoption of the GSCI by industry participants likely.

The greatest benefit of using the GSCI is that it is less volatile from year to year as opposed to the PPI, which is a cumulative monthly figure. Therefore, Agbiz Grain is promoting the adoption of the GSCI among the JSE and industry participants. The GSCI will reflect the year-on-year change in the storage costs which will be less volatile, and to the benefit of the total value chain. – *Wessel Lemmer, Agbiz Grain*

Qualification recommendations made to SAQA

The Quality Council for Trades and Occupation (QCTO) has confirmed that recommendations for the registration of occupational certificates for the positions of grain depot manager and grain grader, among others, have been made to the South African Qualifications Authority (SAQA).

It will be registered on the National Qualifications Framework (NQF) under the Occupational Qualifications Sub Framework. The QCTO will inform relevant stakeholders once the qualifications are registered.

Training providers need to comply with requirements to offer the qualifications. Agbiz Grain invites interested training providers to register for a planned workshop that will provide clarity on these requirements. – *Press release, QCTO*

Grain storage mergers likely in Australia

The market for country grain storage in eastern Australia is massively over-supplied, with the big four handlers – GrainCorp, Grainflow (Cargill), Emerald (Sumitomo) and AGS (Ricegowers) – having over 27 million tons (Mt) of storage capacity. On-farm storage and smaller private operators have probably a similar amount.

This 50Mt plus of storage capacity is dwarfing average annual winter and summer grain production in Queensland, New South Wales and Victoria with about 25Mt. Competition is intense and it is possible that mergers and acquisitions will occur in future.

GrainCorp has been unsuccessfully targeted recently by Archer Daniels Midland and Long-Term Asset Partners. Sumitomo is rumoured to have sought bids for Emerald. There is also a number of smaller private storage operators in southeast Australia on the market. – *Grain Central*

Proposed location differentials with multiple reference points for soya beans

In 2019, the JSE contracted Dr Matthew Roberts to perform a follow-up review of the use of location differentials and provide an independent assessment in this regard. The JSE acknowledged his report and has since held various consultations and workshops to explore how the various recommendations could be implemented. It emanated from the report that continued use of location differentials was critical to a successful commodity derivatives contract in South Africa.

The JSE was approached by the University of the Free State to be part of an evaluation process for research proposing location differentials for soya beans with multiple reference points. The JSE debated the proposed methodology through interactive workshops providing input that was included in the report. Although some argue in favour of the model to be applied to the South African soya bean derivatives market, and the results be presented for a broader market consultation process, the industry is of opinion that additional proposals such as basis trading should be considered as well.

The JSE remains open to considering improvements to the current location differential methodology and encourages market participants to take a similar approach. – *Memorandum, JSE & Agbiz Grain*

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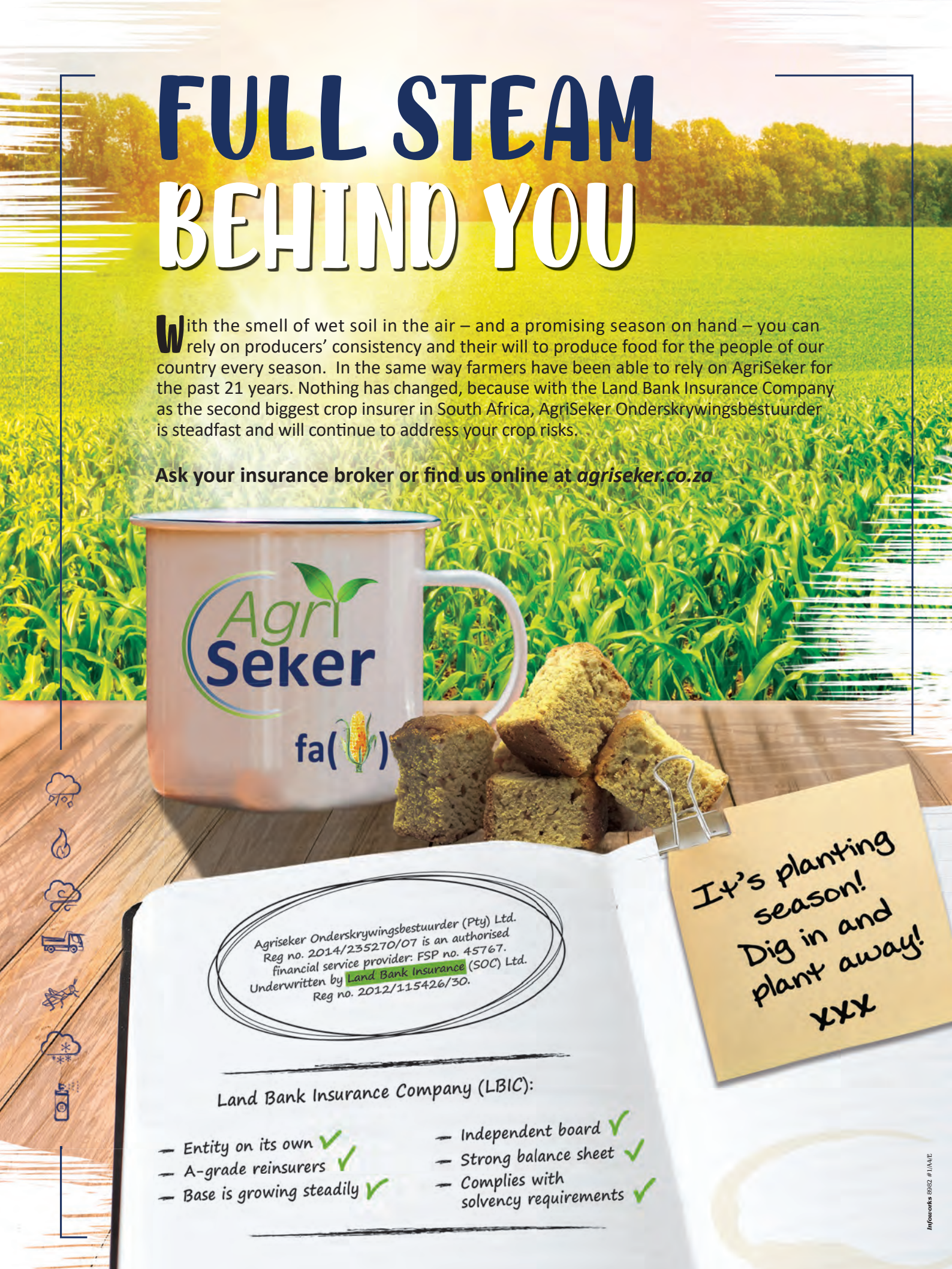

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Introduction of an assignee to render services: Why does industry appeal?

By Wessel Lemmer, general manager, Agbiz Grain

November 2021 will be remembered as the month in which industry stakeholders brought appeals against the Department of Agriculture, Land Reform and Rural Development (DALRRD) concerning the introduction of inspection services in the grain handling and storage sector.

A question that has been posed a number of times is why government feels the need to regulate an industry that has been sufficiently self-regulating since early 1998 when all control boards had ceased operations.

For over 23 years, the industry has been adhering to the *Agricultural Product Standards Act, 1990 (Act 119 of 1990)* or *APS Act* in an efficient manner. In dealing with the appeals the respondents focussed on, inter alia, the legal arguments on the one hand and the cost-efficient, practical operation of a reliable and sustainable inspection service that benefit all participants on the other.

However, there is one aspect that did not receive the attention it deserves and that is the motive behind the DALRRD's attempt to introduce inspection services. Or has their position changed since the introduction of the *Marketing of Agricultural Products Act, 1996 (Act 47 of 1996)*?

Before exploring the issue further, a definition of what it means to 'regulate' an industry is necessary. Merrian Webster defines the word 'regulate' as "to govern or direct according to a rule; to bring under the control of law or constituted authority; to make regulations for or concerning // regulate the industries of a country; to bring order, method, or uniformity to // regulate one's habits …".

Regulation of certain sectors

The last few months have seen a number of individuals calling for increased regulation of certain sectors of their economy, and with reason. The following are a few very apt quotes from these calls:

"*For decades, policymakers have appealed to the seemingly special nature of financial firms to heavily regulate them, often in the name of preventing turmoil from spreading to the rest of the economy*." – Norbert Michel, Forbes

"*Haugen's testimony about Facebook's dangers, and its refusal to adequately regulate itself, should be a call for Congress to act*." – Jill Filipovic, CNN

The quotes suggest that the case for increased regulation needs to be registered with the relevant authorities, and that appeals against these must be submitted by the opposing parties, as new developments call on the need for regulation.

In the case of self-regulation in South Africa, no known complaints were registered against self-regulation over the past 23 years. The grain handling sector is fully compliant with the *APS Act* and no allegation that the sector needs to be brought under the control of the *Act* has been registered. Hence there was no call from any of the sectors represented to institute regulations to regulate the habits of industry stakeholders.

The supply chain incurred costs without knowing for certain who brought the allegations against affected stakeholders in the value chain which led to the decision by government (of course, this necessitates an appeal).

Sectoral self-regulation

A self-regulatory organisation (SRO) is one that has the power to set industry standards and regulations through its own efforts. Effective SRO's are able to provide standards and enforcement of those standards on their members.

A regulated market, on the other hand, is a market over which government bodies or, less commonly, industry groups exert a level of oversight and control. In South Africa, this level of oversight and control are achieved through the respective forums and active recorded participation of sector representatives in these forums as proof. Is it fair that government is proposing increased regulation but does not attend the meetings of industry groups at these forums?

Australia developed the *Australian Grain Industry Code of Practice* to ensure that the integrity of self-regulation in that country's grain industry is maintained. According to the code, "self-regulation is a key focus of the grain industry. An objective of this Code is to support that purpose by providing guidance to industry that outlines minimum requirements of all involved in the Australian grain industry. GTA will continue to review this Code with input from industry, to ensure its integrity is maintained."

Clearly, South Africa's competitors elsewhere follow policies that support self-regulation.

Drive for increased regulation

It would seem that the sector is appealing against the following implied accusation: Self-regulation with regards to grading in the South African context is not, like in the case of Australia, under the control of the *APS Act*. It is necessary to bring order and therefore to regulate habits where regulation is not under the control of the *Act*.

If any affected stakeholder brings this forward in a case and if the DALRRD uses this as the basis for a decision to introduce additional regulations in a self-regulated sector, then this surely necessitates an appeal if the decision by DALRRD to enforce regulation on the industry is an oversight.

However, the decision by the DALRRD is not based on any known case brought forward by an affected stakeholder.

Deviation from the *Act*?

So, did government policy deviate from the *Marketing of Agricultural Products Act* and the intention of the *Act*?

A discussion document titled *Agricultural policy in South Africa* issued by the Ministry for Agriculture and Land Affairs in 1998 sheds light on government's intention at the time. From this, it would seem that government policy has deviated to some extent since then. One of the reasons may be the loss of institutional knowledge because of government or industry employees retiring or moving on to new positions.

When considering this, it is important to understand the intention of the *Act*, and a few quotes (indicated in colour blocks) from the discussion document on the *Marketing of Agricultural Products Act* reveal the intention of government at the time (it also speaks to the *APS Act*).

> At the end of 1996, the *Marketing of Agricultural Products Act, 1996 (Act 47 of 1996)* was passed, providing for certain limited interventions such as the collection of levies in very exceptional cases where proposals for their utilisation need to be fully justified in terms of the promotion of marketing efficiencies and the enhancement of the viability of the agricultural sector.

The fact that interventions should be limited may be one of the reasons why self-regulation was allowed to continue for over 23 years without any intervention. The introduction of inspection services was not regarded as an exceptional case where the utilisation of levy collection could be fully justified to promote market efficiencies. It was not foreseen that this type of intervention would lead to the promotion of market efficiencies.

The entire sector is appealing the introduction of costly structures that will not assist in promoting market efficiencies. Yet the DALRRD prefers to follow a costly appeal process instead.

> By early 1998, all control boards had ceased operation. As a result, many new small-, medium- and large-scale enterprises have entered the domestic and export markets which offer good prospects for future job creation and marketing services to new farmers. A futures and options market in agricultural commodities has been established since 1995 and is playing a central role in price stabilisation ... Finally, South Africa ranked in 1998 with countries such as New Zealand and Australia which have the lowest levels of market distortions.

It is important to note that self-regulation is a key focus of the grain industry in Australia and following the DALRRD's proposed introduction of increased regulation is not only against the DALRRD's own former policy views, but also a step backward compared to developments in countries with progressive agricultural policies such as Australia and New Zealand.

> The role of the government in agriculture is to create an enabling environment for the development of the sector in such a way that the overall economic, social, and environmental objectives can be achieved.
>
> Establishing accountability for services is one of three important considerations of government. The other two are the establishment of principles for government support for agriculture, and building partnerships with the private sector and farmer organisations.

Why does government regard the introduction of services as being accountable after 23 years? Not introducing unnecessary and costly regulations is also a very important matter.

> The role of government in regulating the market and determining agricultural product prices has been greatly reduced, which enhances the competitiveness and efficiency of the sector.

It would seem counter-productive to introduce additional regulations after 23 years, thereby pulling the plug on a cost-efficient, self-regulating system that adheres to the *Act*. An underlying system which supported competitiveness, efficiency and, above all, the succesful establishment of a world-class leading agricultural futures exchange at little cost to the consumer.

> An essential function of the government is to supply 'public goods' such as appropriate legal regulation. In short, the government will intervene where a public good can be achieved by its actions, which would not be achieved by decisions taken by the private sector and individual farmers.

The efficient manner in which self-regulation ran its course while adhering to the *APS Act*, and the manner in which self-regulation was achieved through decisions taken by the private sector and individual producers, is testament to its success. There is no need for increased regulation.

> Furthermore, all activities undertaken in the sector, whether they be regulatory or of a support nature, will be examined to determine if they best fit into the public or private domain, or can be achieved by a public/private partnership.

It seems that the DALRRD is therefore expected to examine the introduction of assignee services and whether the appropriate levies and services are the best fit for the public or private domain. The DALRRD did not take heed of objections by all the sectors of the grain and oilseed sector, including the end consumer, presented by the SANCU which unanimously rejected the proposed regulatory support.

Government itself will undertake only those activities for which it has the expertise and resources, to provide a better quality service than could be provided by contracting out. Even in areas of strategic importance, consideration will always be given to outsourcing if it is most cost-effective to do so, and if the quality and reliability of the function are not compromised by purchasing it from sources outside the government.

The intention here is to only outsource services if it is cost-effective to do so, and if the quality and reliability of the function are not compromised by purchasing it from sources outside of government. Government is ignoring industry's request that the services are not necessary, given that the source of a complaint can also not be substantiated and allows the process to be appealed at cost.

In supporting agriculture, the government is keenly aware of the contribution that the sector as a whole can make to enhance the effectiveness of its support. Partnerships will be sought with input suppliers, co-operatives and other farmer organisations, commodity organisations, financial institutions, and others in seeking mechanisms to support policy objectives.

In the case of the appointment of an assignee, this aspect is grossly overlooked in favour of the appointment of an assignee as opposed to the needs of the industry.

Market failures

Are there any market failures that justify the introduction of inspection services in the self-regulated market environment?

Market failures occur when costs and benefits that guide individuals/private sector differ from those that are economically optimal for society as a whole. This can result, for instance, from: private investors being unable to obtain benefit from certain investment because they cannot stop 'free-riders'; individuals/companies having incentive to impose costs of pollution to others; and information not being equally available to buyers and sellers of particular goods or an over-concentrated market.

The effects of market failures may include, among others:

- The private sector is under-investing in some goods and services which are needed for sustained growth, such as basic research and infrastructure.
- Buyers of seed or agrochemicals running the risk of buying sub-standard items.
- Environmental damage, especially to common property.

In such cases of market failure, government may intervene in several ways, including:

- Investing in rural infrastructure.
- Regulating to counter pollution of water-courses or other environmentally damaging practices.
- Assisting with funding research into untraded or non-hybrid crops or into farming systems or resource conservation where private sector organisations find it difficult to realise a return.
- Reducing anti-competitive behaviour.

The government will also seek to strengthen the efficiency of service provision by targeting those most in need of support, principally the resource-poor and emerging farmers. Where government-funded services are to be delivered, the government will look for the most efficient service provider, whether public, private, NGOs, or farmers' organisations. Where a good case can be made for outsourcing services, this will be done.

To date and to industry's knowledge, there was no known reason given which shows market failure as the reason for government to introduce costly inspection services that will add little value to the sector. It is hard to believe that government looked for the most efficient service provider if the process allowed only for the inclusion of one sevice provider with no significant outputs since 2016. What about competing service providers who would like to join the competition in rendering services?

Use-pay principle

In addition, government intends to apply the principle of user payment to those who can afford to pay for publicly provided services and where the costs of collection can be justified by the likely revenues. The government will only provide free services if there is a convincing argument for doing so. It will seek to recover at least part of the costs of activities such as inspection that benefit individual producers.

In this regard, it is important to keep in mind that the grading standards facilitate trade and price discovery for the specified grades. It has no bearing on food safety. The end consumer is not impacted, whether an inspection service is introduced or not. This falls within the mandate of the National Department of Health and not DALRRD or the *APS Act*.

Furthermore, there is little evidence that government seek to recover at least part of the costs of activities such as inspections by assignees, that benefit individual producers. Instead, profit-seeking assignees are allowed to determine the required fees at own discretion without competition from other assignees.

Exception or rule?

The *Marketing of Agricultural Products Act*, which came into effect in January 1997, is based on the view that state intervention in agricultural markets should be the exception rather than the rule. The *Act* does provide for a certain number of limited interventions, which include the collection of levies, the conducting of pools, the keeping of records and returns, export controls and compulsory registration.

This begs the question: When any intervention is proposed as in the case of the *APS Act* regarding the introduction of inspection services and the appointment of assignees, should it not demonstrate that one or more of the aims of the *Act* will be promoted without food security or employment being negatively affected in the process?

Furthermore, any proposed intervention in terms of the *Act* must be subjected to a consultative process involving the National Agricultural Marketing Council (NAMC).

Have the two aforementioned requirements been met with regard to Leaf Services, DALRRD, and industry before the appeal process commenced?

There may also be a third requirement that has been overlooked. Required services should be raised via the respective forums. In terms of their processes, the forum steering committees submit these requests to the NAMC and DALRRD. Where there is a need for inspection services, sector consensus is required in order for the inspection services to be introduced.

If consensus has in fact been reached and an inspectorate needs to be introduced, and if additional funding is required for this purpose, the respective trusts can apply to government for a mandatory levy to fund the venture needed by the industry. Which begs a further question: Why has DALRRD been allowed, without having collaborated with the NAMC and industry, to forge ahead and introduce a service which industry has not reached consensus on?

Clearly, current public and private structures implemented since deregulation and the introduction of the *Marketing of Agricultural Products Act* for this purpose were not recognised. It might even be another case of institutional knowledge within government and industry falling to the wayside when experts retired.

Ex post facto: Effective regulation

The deregulation of domestic agricultural markets and the liberalisation of international agricultural trade emphasised the need for a framework of standards stipulating the quality of outputs from such production. Industry stakeholders have since responded and through sufficient self-regulation, are adherering closely to the *APS Act* and are efficiently self-regulating and actively participating in industry forums where issues relating to grading can be shared inclusively to reach solutions proposed by independent consultants or researchers.

Recently, in 2021, a dispute protocol was adopted by the industry and a sampling protocol is due for finalisation. Standards are maintained collaboratively by representatives of the respective sectors. They frequently propose updates to the grading regulations and take part in the development of the Grain Manager and Grader Course that has now been recommended to the South African Qualifications Authority (SAQA) for registration on the National Qualifications Framework.

Agbiz Grain is developing an Industry Code of Conduct to ensure that the integrity of self-regulation is maintained in South Africa. As in Australia, the Code will provide guidance to industry that outlines minimum requirements of all involved in the grain handling and storage sector.

Government should ensure that regulations are not used to erect unfair barriers preventing those who wish to enter agricultural commerce from doing so, and subsequently limiting competitiveness. Wherever appropriate, the cost of regulation should be borne by those producers and stakeholders who benefit directly from such measures. Government should rather investigate the most cost-effective ways of implementing regulations after consensus has been reached within forums upon request to implement such regulations.

Sources used in this article:

- *https://www.nda.agric.za/docs/policy/policy98.htm*
- Agricultural Policy in South Africa – a discussion document, Ministry for Agriculture and Land Affairs

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Introducing the Agbiz Grain storage cost index

By Nicolaas van der Wath, economist, Bureau for Economic Research

The grain storage cost index (GSCI) originated around 2021 in response to some industry concerns. These concerns centred around the appropriateness of using the producer price index (PPI) to adjust for annual price changes in the storage component of JSE Grain Futures Contracts. The JSE seemingly started to use the PPI (with a lag of one year) in 2013 as a base for adjusting the daily storage costs of grain, as specified in their traded futures contracts.

A representative GSCI

Internationally, it seems as if there is no single best practice regarding the periodical adjustment of grain storage fees. The system used by the JSE, namely to adjust the storage costs by PPI on an annual basis, is different than those used in the Unites States (US), Australia or Brazil.

As such, Agbiz Grain requested the Bureau for Economic Research (BER) at Stellenbosch University to develop a representative GSCI for South Africa. The BER followed the International Labour Organization's (ILO) internationally accepted guidelines for the compilation of price indices.

According to the ILO, a price index is calculated by taking the period-to-period price growth for different expenditure groups in a basket, and using the average amount spent per expenditure group as weights. For every period, a weighted average price can then be calculated for the basket as a whole.

Domestically, one of the most widely used and best-known examples of a price index is Statistics South Africa's (Stats SA) consumer price index (CPI). The CPI measures the general level of price changes of consumer goods and services that households use. This is done by measuring the cost of buying a fixed basket of consumer goods and services of the same quality and characteristics over time.

Cost profile questionnaire

To determine a basket that represents the cost profile of the grain storage activity, the BER designed a financial questionnaire that was sent to the JSE-listed grain storage firms in South Africa.

The purpose of the questionnaire was threefold:

- Firstly, the aim was to determine the main cost items in the total cost basket of grain storage (as quoted to grain owners as a daily price per ton).
- Secondly, it aimed to determine the relative weight that each item carries in the total basket.
- The third goal is to track the annual percentage changes in labour costs.

The questionnaire was set up in Microsoft Excel and covered 34 financial cost items that were identified in consultation with industry members. It also included questions relating to the financial position of the silo operation, the number of employees, and the average annual increase in remuneration, storage fees and tonnage handled. The survey covered the three calendar years, 2018, 2019 and 2020. Respondents were prompted to apply the financial year that overlapped the most with the referred financial years.

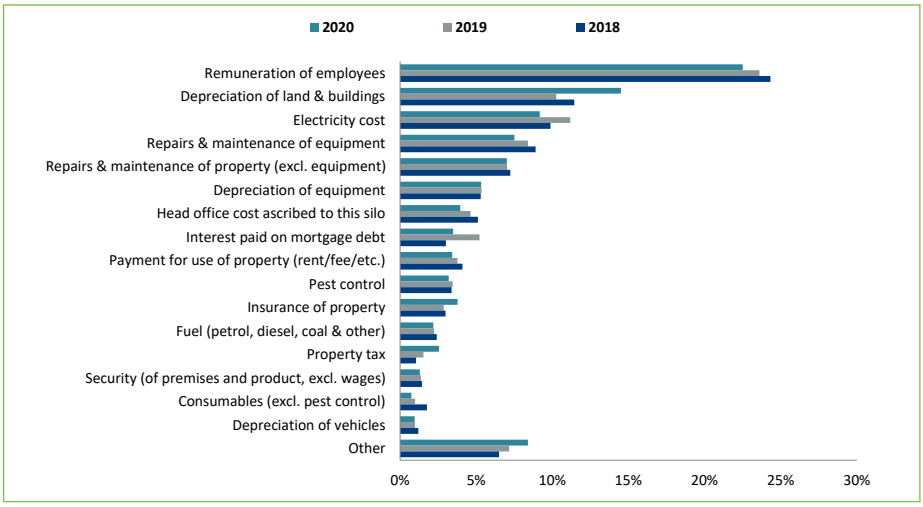
Of the 15 JSE-listed firms, eleven replied with data for 32 silo operations in South Africa. This yielded a sample-to-population ratio of 11%, which is satisfactory (the ratio for the *Stats SA Labour Force Survey* is around 0,13%). The BER cleaned the survey data from outliers, gaps and errors by interpolating with the sample average.

Expenditure per category

By using the cleaned dataset, the average spending per category of the 32 silos was used to calculate the weights for each of the three respective years. At the end, the weights per category were relatively stable from year to year – an indication that the sample was large enough.

As shown in *Figure 1*, employee remuneration contributed to more than one

Figure 1: Weights for the main cost components of storage (2018 to 2020).



fifth of total expenditure in all three years. This was followed by deprecation of land and buildings, electricity costs, repairs and maintenance of equipment, as well as repairs and maintenance of property. Together, these categories made up 60% or more of total expenditure in all three years. This implies that these cost components were the main drivers of the GSCI in 2018 to 2020.

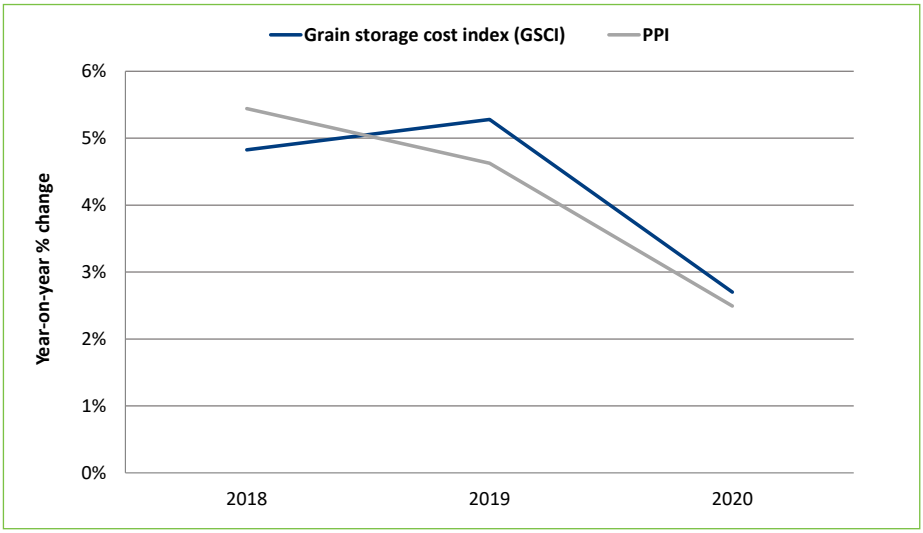
The next step was to assign an appropriate price growth statistic to each expenditure group in *Figure 1*. For the remuneration of employees, the BER used the salary index from the survey they had conducted. For depreciation of land and buildings, the CMPI Commercial or Industrial Buildings from Stats SA were used. In a similar way, most price indices selected were from Stats SA.

Tracking GSCI and PPI movement

The price indices were all set to 100 in 2017 (as a base year). As a final step, the GSCI was calculated by multiplying the price growth of each expenditure category with its respective weights and then summing the results. *Figure 2* shows that the GSCI moves very closely to the PPI.

In 2018, the GSCI was 0,6 percentage points (% points) below the PPI. For 2019 and 2020, the GSCI was respectively 0,7 and 0,2% points higher than PPI. Cumulatively, the GSCI increased by 12,8% from 2017 to 2020, while the PPI increased by 12,6% – indeed very close to each other.

Figure 2: Comparison between GSCI and PPI (2018 to 2020).



To verify whether this close tracking is also true in the long run, the BER back-casted the GSCI to 2012. Once again, the cumulative increase from 2012 to 2020 was very close: 49% for the GSCI and 50% for the PPI. The BER then concluded that, over the longer run, these two indices escalated at similar average rates. However, over the short run, the PPI seemed to be more volatile – something which could induce additional volatility into the income stream of grain storage operators.

The real yield of grain storage

Besides the expenditure information, the survey among grain storage firms also covered some other financial information. It was found that the sample-average grain storage silo is constructed of concrete with a storage capacity of just more than 70 000 tons.

It operates at 80 to 90% storage capacity. This results in a gross annual income, which is offset by operating expenses, leaving a profit equivalent to a real yield of 2,1 to 3% on the value of the property, which is not very lucrative (the five-year average earnings yield on the JSE was 5,3% from 2016 to 2020).

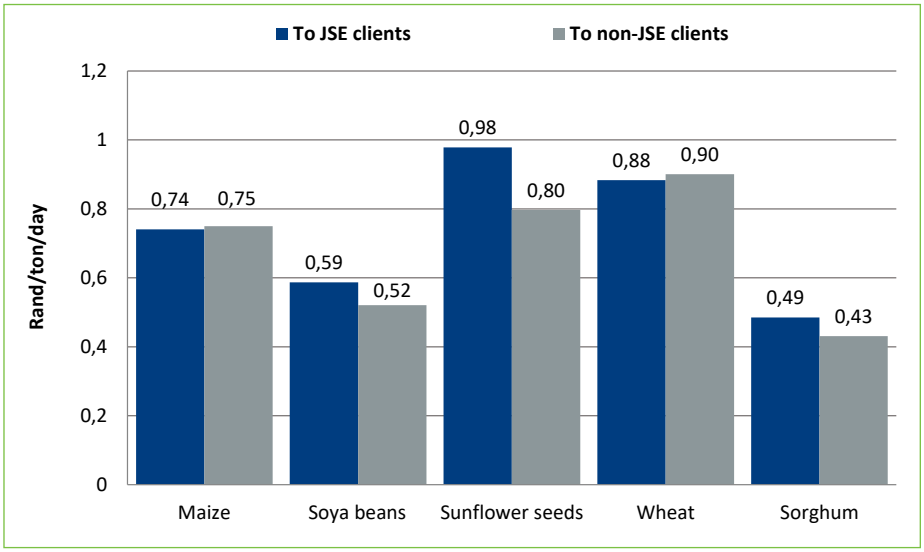
Daily storage fees

The respondents were also prompted to report the daily storage fees that they charge both JSE and non-JSE clients. *Figure 3* shows that the fees charged non-JSE clients are very close to those charged JSE clients.

For sunflower seeds, sorghum and soya beans, non-JSE clients paid somewhat less. It is unclear whether there might be other reasons for the differences and whether no inference to price discrimination should be made.

These results might serve as evidence that there is adequate competition in the market, and that JSE prescriptions are mostly not keeping fees artificially low. (Note that *Figure 3* presents the JSE fees as the survey respondents reported them on average, which is slightly different from what the JSE reports).

Figure 3: Average prices charged for storage per day (2020).



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Steady growth predicted for the year ahead

By Nicky Weimar, chief economist, Nedbank Group

South Africa's economy is slowly healing from the extreme shock inflicted by the Covid-19 pandemic and the near complete economic shutdown of April last year. The recovery continued in the first half of this year, with real gross domestic product (GDP) growing by a further 7,5% in the first half of this year compared to the same period last year.

A vicious third wave of Covid-19 infections, stricter lockdown rules including bans on alcohol sales and sit-in dining, as well as the destructive riots and looting in parts of the country disrupted this momentum in July. Fortunately, underlying growth conditions improved over August and September.

Calm was restored in the areas affected by social unrest and the third wave eventually ebbed, allowing government to ease lockdown to Adjusted Level 1 on 1 October. As a result, economic growth resumed in August and is likely to end the year on firmer ground.

Expected growth and spending

The economic expansion will continue in 2022, but the growth rate is likely to slow to around 2% as the steepest part of the climb out of strict lockdown is largely complete. Exports and consumer spending will continue to do the heavy lifting.

Healthy global demand and elevated commodity prices should underpin exports, while moderate gains in household incomes and positive wealth effects should support consumer spending. Fixed investment is also expected to turn the corner next year, after six years of relentless contraction.

Even off this low base, the recovery will be slow, with capital outlays undermined by fragile business confidence, persistent power shortages, other infrastructure constraints, continued policy uncertainty and weak government finances.

Finally, government spending is not expected to add much to economic growth in the year ahead, given the need to cut spending to reduce the budget deficit and to slow the rise in public debt to more sustainable levels.

Inflation likely to rise

There are, of course, considerable downside risks. South Africa will probably face new Covid-19 outbreaks and lockdowns, but accelerated adaptation by the private sector and continued progress with vaccinations should at least reduce the stringency of restrictions and lessen the blow to the economy.

Higher inflation, particularly on essential goods such as food, fuel and electricity, also poses risks to the recovery. So far, the rise in inflation has been driven by a surge in global producer inflation caused by lockdown-induced supply shortages and disruptions to global transport and logistic networks. These pressures will probably persist until the bulk of the world's population has been vaccinated against Covid-19 and its mutations.

The rand will also be more vulnerable as the United States (US) Federal Reserve starts to withdraw its aggressive monetary stimulus, which would tend to support the US dollar and encourage greater foreign capital outflows from developing countries. A weaker rand could amplify existing inflationary pressures.

The Reserve Bank already indicated that higher interest rates will be needed to ensure that inflation remains anchored around the 4,5% midpoint of the inflation targeting range. According to the Central Bank's forecast, the first hike of 25 basis points is recommended for November this year, followed by roughly another 100 basis points in both 2022 and 2023, taking the prime rate up to around 9,25%.

Nicky Weimar.

Forecast for the year ahead

Nedbank foresees a less aggressive tightening in monetary policy as cost-push inflation pressures are likely to be countered by subdued domestic demand, as well as the considerable slack in the domestic economy. We do not believe that producers, wholesalers, and retailers have the pricing power to pass cost increases onto consumers without volumes significantly hurting sales. Consequently, we forecast the prime rate to rise to 8% in 2022, before stabilising at this level throughout of 2023.

This mild increase in interest rates is unlikely to derail the recovery in 2022. Although South Africa will have to negotiate a difficult path in the year ahead, there is enough evidence to suggest the country is slowly moving in the right direction.

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The impact of comprehensive silo insurance on the cost of grain storage

By Philippa Wild, head of commercial underwriting services, Santam

As the leading general insurer in South Africa, Santam believes that insurance should be regarded not only as a protection mechanism, but as a partnership between the client and the insurer, with effective risk management at the core of said partnership.

A thriving insurance sector is critical to any healthy economy. It promotes financial stability and economic growth, and it allows different risks to be managed more efficiently to reduce financial loss.

"Insurance is the DNA of the economy. Without insurance, nothing is built, nobody works, nothing floats, nothing runs on tracks and nothing ships. It rebuilds lives, cities, and companies. The World Trade Center would not be rebuilt without the insurance industry, which pumped US$4,4 billion into it." – Joseph J Plumeri, former chairperson and CEO, Willis Group Holdings Plc.

Comprehensive insurance for silos

The insurance industry has a major role to play in protecting clients and businesses from losses that are diversifiable.

In the agricultural environment, silos have become an integral component of a grain storage management system. Therefore, it necessitates the need for comprehensive insurance of the asset against any eventuality, either weather-related events or other unexpected accidents.

It is imperative that clients are covered against losses, which can be extensive if large silos, bins, and equipment are damaged.

As with any structure, a silo must be properly designed, constructed, and maintained to enjoy insurance cover and ensure it has a long, useful, and safe life. Maintenance of a silo, required for insurance purposes, includes the repair of the walls and/or inner liner used to promote flow, and the periodic inspection of roof vents, level probes, feeders, dischargers, and gates.

In addition, it is helpful for silo owners to understand their main risk exposures and work with their intermediaries and insurers to make sure they have the right cover in place, as well as the right risk management practices.

Fires and explosions

All silo facilities are equipped to receive grain, and store and discharge it effectively. Drying and cleaning facilities are all part of the operations of grain storage. Grain dryer fires are one of the most significant risks a grain handling operation can face. The devastating results of fire can include death, serious injury, financial loss, property damage and business interruption with production downtime.

Dust explosions are a frequent hazard in grain elevators or oxygen-limiting silos. This hazard is more prevalent during the process of receiving and discharging grain as static electricity is generated in these processes. Without effective ways of discharging this static charge, the risk of dust explosion is increased.

Hazardous areas

The SANS Hazardous Area Classification and SANS 10108 certification are integral parts of regulating and managing hazardous areas and their electrical installations. They are especially important in safeguarding employees and equipment through the prevention of electrical fires and explosions. Special attention should be given to these regulations.

Grain storage risk management

The use of silo bags is another option to store grain. The contents can also be covered under the insurance policy. It is important to manage the surface area in terms of clearance of combustible material and the angle of the area so that rainwater can run off and not damage the grain. Theft cover is available to grain dealers when the necessary risk management is in place. This can refer to 24-hour security guards, floodlights, security gates, and so on.

A silo bunker is the latest innovation and is basically a large cement dam-like structure which holds the crop and is covered with a canvas-like sail (it can be exposed to the same risks being mentioned here).

Management is key

Other factors that must be noted in the risk management of silos are the importance of effective management of grain storage, as grain can rapidly deteriorate and runs the risk of severe damage from lightning strikes as silo bins are generally the tallest structures at storage depots. While lightning rod protection systems can prevent damage to the structure, damage and fire can still occur if lightning strikes hit the facility's electrical system.

Loading or unloading belts, pulleys, shafts, and other mechanical apparatus in silos are also subject to mechanical failure and overheating. New motors used in silos and feed rooms have safety devices; however, many older electrical motors have been modified while supporting wiring and circuitry may be substandard. Older or misapplied units such as these are prone to arcing and overheating.

Ultimately, it is vital that the client undertakes a proper needs analysis, in close co-operation with an intermediary to ensure all the risk factors are taken into consideration.

Contact your intermediary or visit *www.santam.co.za* for more details.

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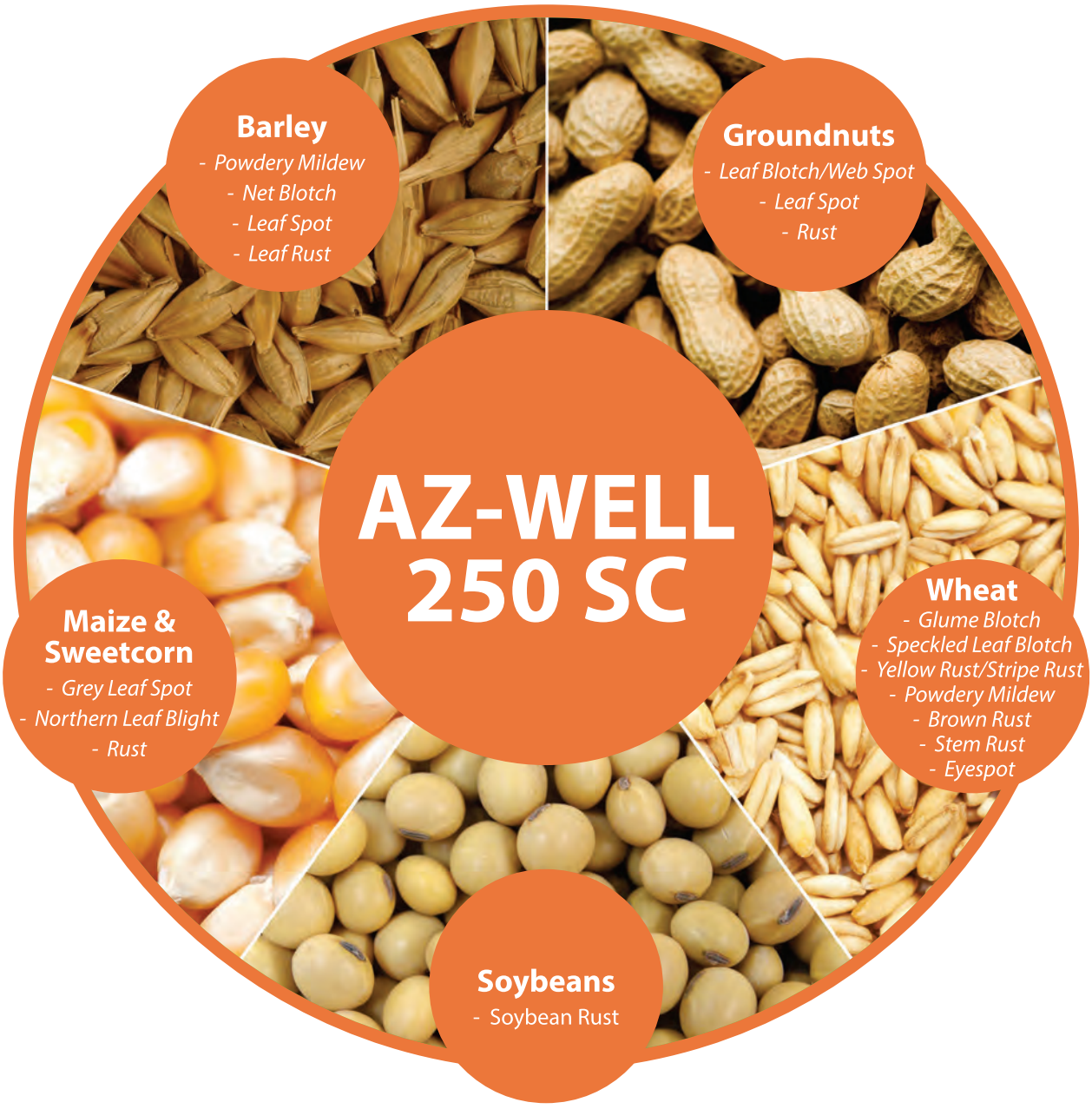

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Exploring the microbial composition of stored grains using next-generation DNA sequencing technology

By Francois Smit and Dr Shane Murray

Big data, which relies on the analysis of huge amounts of information to highlight or create useful data that can be utilised to improve productivity, is rapidly revolutionising the agricultural industry. Agricultural big data can be used in a myriad of different ways, including molecular technologies such as marker-assisted selection for grain improvement.

Not too long ago, only a few markers were available for breeders at a considerable cost, which is not the case anymore. Today, thousands of data points can be generated at a fraction of the cost, and even entire complex whole genomes can be sequenced.

This process has been driven by the advent of next-generation sequencing technology that can process multiple DNA sequences simultaneously. This technology has been successfully applied to assess the diversity and dynamics in food-based ecosystems, including the presence of microbes.

What's in a microbiome?

Microbes – bacteria, fungi, and viruses – are all around us and live in every possible environment in communities or biomes. They have a direct influence not only on agriculture, but on all aspects of human life. Microbiome, or microbiota, refers to all the micro-organisms living in a specific environment or biome – for example microbial communities associated with grains during storage.

Improving our knowledge of microbiomes has become a popular topic over the past two decades not only in the scientific community, but among the public, especially as an area of great promise for new medical treatments. The human microbiome is now even considered to be our 'last organ' by some.

The field of microbiome research originated in microbiology and started back in the seventeenth century. Research progress has often been driven by the development of new techniques and equipment. The development of the first microscopes allowed the discovery of a new, unknown world and led to the identification of micro-organisms. Access to this previously invisible world opened the eyes and the minds of researchers. With the discovery of DNA and the development of new sequencing technologies, we are still discovering new invisible worlds every day.

Grain-associated microbiota

Grains are colonised by complex microbial communities during crop growth, harvesting and postharvest drying and storage. The type of microbial colonisation varies according to the growing region and is heavily influenced by environmental conditions such as rainfall, temperature, soil type and sunlight, agricultural practices, harvesting and processing equipment, and storage conditions. Even transport conditions can have an influence on the diversity and structure of the microbial communities associated with grain.

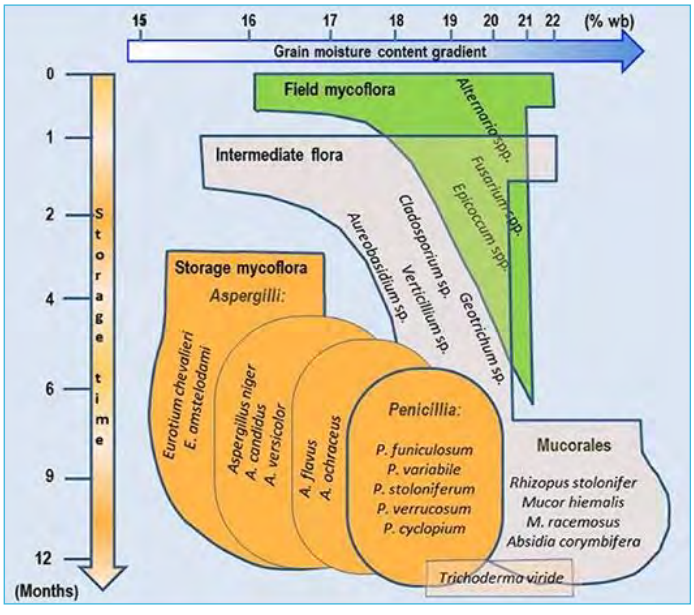
Some of the bacteria and fungi that are associated with seeds can be harmful to human health and cause plant diseases, while others can have beneficial effects on the host and actually improve nutrient uptake, in addition to increasing tolerance to biotic and abiotic stresses through multiple mechanisms.

For example, specific species of *Fusarium*, *Aspergillus*, *Penicillium* and *Alternaria* can cause spoilage in stored wheat grains. They also produce mycotoxins that severely decrease crop value and are harmful to animal and human health. Conversely, the plant protective ability of some bacterial epiphytes and endophytes against fungal pathogens has been reported in several crops.

Seed microbial communities are traditionally derived from two groups: The field community, being well adapted to the sometimes rapidly changing weather conditions, and the storage community, being more adapted to the more constant conditions. The original source of both groups, however, is in the field. Moreover, microbes might belong to both classes and colonise grains before and after harvest.

A better knowledge of the composition and dynamics of grain-associated microbiota is

Figure 1: Succession patterns of the main fungi species contaminating stored maize grain during prolonged storage time, illustrating the overlapping groups during grain drying and storage. (Source: *Journal of Stored Products Research Vol 71 (2017) 22-40*)



needed to identify novel beneficial micro-organisms that may improve crop health and suppress the growth of potential pathogens in a sustainable manner. Few studies, however, have characterised the microbiota of grains and the seeds of other crop species.

Accurate identification of microbes is essential to understand storage risks. Conventional quantitative culture-based methods have traditionally been used to determine the presence of certain microbes in different cereal grain samples.

These methods, however, can be time-consuming and biased towards selective growth media, in addition to fast-growing micro-organisms. They also require laboratories with specialists to identify high-risk organisms. This could potentially delay a critical intervention that will have an impact on the entire value chain.

Metagenomics sequencing

The genomic analysis of multiple organisms obtained from a single sample, commonly referred to as 'metagenomics', allows great insight into the genetic composition of microbial communities. Traditionally, micro-organisms have been studied through the culturing of individual species or strains using artificial culture media; however, it has been estimated that less than 2% of bacteria can be cultured in the laboratory.

For bacteriophages alone, it has been calculated that there are in the order of 100 million undiscovered types. As a result, we are currently only scratching the surface of understanding the genetic diversity of micro-organisms in the environment.

Figure 2: The SmidgION next-generation sequencer, which can potentially be used for field-based analysis of agricultural environments, currently in development for use with smartphones. (Source: *www.nanoporetech.com*)

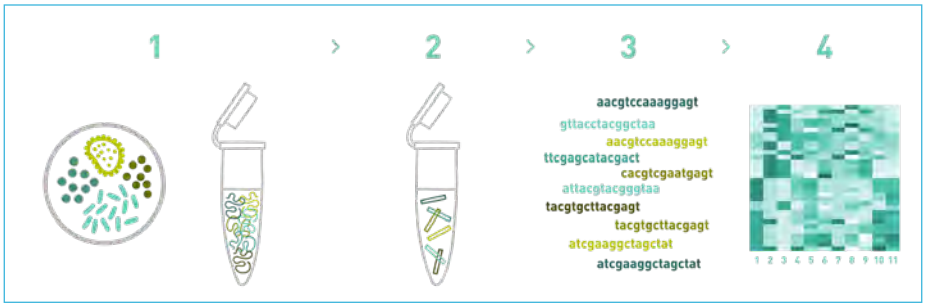
The advance of DNA sequencing technologies to allow genomic analysis of samples containing many species has made it possible to obtain complete or almost complete genome sequences from uncultured micro-organisms — providing an important means to study their biology, ecology and evolution.

Traditional sequencing technologies are typically bulky, fragile, cumbersome to ship and require substantial power infrastructure. This, coupled with a general lack of facilities and trained personnel, make such technologies difficult to deploy in remote locations or mobile settings. The newer sequencing technologies can be taken directly to the sample source, saving considerable time and reducing the potential for sample degradation — providing a more accurate representation of microbial composition.

When the concepts of the microbiome and high through-put metagenomics sequencing technology are combined, it can help to identify high-risk micro-organisms and to evaluate control measures.

Metagenomic sequencing can be used to investigate the field, intermediate and storage microflora of grain, and how these change over time. Other applications include identification of high-risk grains in-field before harvest, monitoring and quantifying the development of problematic microbes during storage, measuring the effectiveness of integrated control measures, identifying resistance development against control measures, identifying beneficial micro-organism during storage and ultimately reducing storage risk.

Figure 3: A simplified metagenomics sequencing workflow. (Source: *www.nanoporetech.com*)



An environmental sample containing a community of microbes is harvested and DNA is extracted (Step 1). A hypervariable region of the bacterial or fungal genome is targeted (Step 2) and sequencing reads corresponding to this region are generated in parallel for each microbe present (Step 3). These sequencing reads are compared against previously identified sequencing reads in a database to identify the presence of different microbes and the community structure of the sample (Step 4).

More about CenGen

CenGen is an innovative plant and microbe genomics research company based in Worcester, Western Cape. CenGen broadly aims to study the genetics of the useful characteristics of food plants, and to assist the agricultural sector to produce healthier and more food, improve resource management and processing, and reduce risk.

cengen

References available from the author at email francois@cengen.co.za. For enquiries, phone 023 342 5994 or visit *www.cengen.co.za*.

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Export fumigations using phosphine: The different techniques for success

Podcast by Degesch, transcribed and reworked by Carin Venter, Plaas Media

Not all fumigations are the same. Each facility, commodity and situation require many different approaches to achieve the same success. Everything from temperatures, target pests, exposure periods, structure types, commodity types and more can have a major effect on how well the fumigation occurs.

Phosphine is one of the oldest fumigants in use, and still has a very solid place in the United States' (US) grain industry.

To discuss some of the phosphine fumigation techniques as applied in the US, Ben Harl, marketing director at Degesch America Inc (DAI), and Blake Buckner shared a podcast episode on *Degesch America Presents*. Blake has served in various roles at DAI since the early 2000s and is currently its business development manager. He is a fumigation and pest control professional with many years' experience in the field, conducting fumigations, most of which are phosphine based.

On the different types of phosphine fumigations regularly undertaken in the US, Blake says the following: "Phosphine is highly effective and, in my opinion, one of the most important pest control formulations in history. It is such a versatile molecule, and our discussion on the types of phosphine fumigation is by no means all inclusive. For a new applicator, it can also be an extremely complex type of fumigant."

To listen to the original podcast, click here.

Popular types of fumigation

Most fumigations are conducted on containers, railcars and boxcars. These are particularly popular for two reasons. First, the container or rail vessel acts as a ready-made structure or chamber for fumigation and affords the client the opportunity to not have to shut down the internal operations of the facility, while still conducting the fumigation.

The second benefit in the case of rail- or boxcars is that, with the proper procedures in place, these vessels can be fumigated in-transit, which greatly reduces the total period during which the container and its contents are tied up in the process.

> "A big don't, according to Blake, is to never fumigate anything that will be transported on a public road while under fumigation, due to the many dangers associated with it."

Another type of fumigation which is generally allowed to take place in-transit is ship fumigations. This is a big box-type fumigation where the fumigant is applied to commodities that are stored in the holds of ocean-going vessels. One can have an entire conversation just on ship fumigation, but in a nutshell, when properly executed, ship fumigation allows clients to fumigate thousands and often tens of thousands of metric tons of commodity at the same time, while the cargo is en route to its destination.

Next is tape and seal, tarpaulin and whole warehouse fumigations. Tarpaulin fumigation is used when only a certain segment of a commodity needs to be fumigated. Here, the infested materials are isolated with plastic sheeting and the entire structure is fumigated. This type of fumigation comes in handy when fumigation needs to take place on materials within a structure that may not hold fumigation very well. It is not uncommon to tarp an entire structure full of a commodity, and then fog the airspace to treat the areas outside the tarps. Tarp fumigation can also take place outdoors as long as proper procedures are followed.

A favourite method, due to its effectiveness, is entire structural fumigation. In this instance the perimeters are taped and sealed to ensure the structures are as gas tight as possible. "This is the preferred method of fumigation in my book,

because one can control all the pests inside the designated area without the risk of reinfestation from the materials which weren't fumigated," says Blake. "Again, all these fumigations come with pros and cons, some difficulties and limitations, laws and such. But the long and short of it is that these are the most popular methods."

Parameters to achieve success

According to Blake, the big three parameters that contribute the most to successful fumigation are known as CTT, which comes down to concentration, temperature and time. "Adequate concentrations that are verified through careful monitoring and administered at the appropriate temperature for a sufficient amount of time are the three big parameters. They have a close relationship with each other, and one is not more important than the other; all three must be spot-on.

"If a fumigator is set for a particular temperature, it will dictate the time required at a designated concentration. So, in that respect, temperature is the driver of the bus and the starting point, but without the proper concentration and duration, a fumigator will find it very difficult to achieve the desired result. So, as far as physical fumigation parameters are concerned, if you stick with CTT you will almost always see positive results."

Blake mentions that there is a myriad other parameters that come into play, such as taking the weather into account, including humidity, wind, pressure and the like. There are also some legal parameters and local legal concerns where customers could have specific parameters in place.

Combat potential corrosion

As a rule of thumb, phosphine materials are corrosive to any precious metal, in particular metals and components in electronic equipment. Blake cautions that, almost without fail, one does not want to fumigate anything electronic such as computer systems and digital palatizing systems, among others. This is also important for entire facility fumigations where the necessary steps must be taken to remove or isolate such equipment if phosphine fumigation is planned for an allocated space.

Recirculation methods

Export fumigations take place across the world every single day. One method of fumigation that is extremely popular, both in grain storage as well as export ships, is the use of a method called recirculation. Ben has performed a lot of grain-bin recirculation and it is his preferred method of fumigation on grain bins, regardless of the fumigant being used.

"The goal is to still seal the facility or structure up and pull air through the grain mass, thus speeding up the process of equilibrium or getting equal parts of fumigant throughout the entire structure. The recirculation system actually pulls the phosphine down to the grain or product much faster, and the desired equilibrium is reached much quicker. To me, it is vital when one is doing these kinds of fumigations to use the recirculation method," says Ben.

Blake explains how it works. "Recirculating fumigation facilitates the air exchange within the grain mass. The J-System recirculation fan can be connected to the existing aeration system within the grain bin, or a network of tubing can be installed. Tubing, which is installed before loading, is most often used on motorised vessels.

"The system draws air from the overhead or the headspace. After the application of the fumigant, the recirculation system is activated, and the fan introduces the air drawn from the headspace into the grain mass from the bottom. This is critically important, because as the fumigant continuously reacts, the system brings the fumigated space to an equilibrium quickly and then maintains the balance throughout the fumigation period until the space is degassed.

"It is a highly versatile system and can be installed internally within the confines of the grain bin or the ship hold, or it can be installed externally. It can be permanent or temporary, and pretty much everything in-between. It is quite effective when fumigating dense materials."

Safe and successful fumigation

While export fumigations occur daily all over the world, Blake deems grains and tobacco as the most common phosphine fumigations taking place. He ventures to guess that soya beans are at the top of the grain list and that daily export fumigations are performed on tobacco.

"As far as treatment schedules go, I am not an expert on all schedules, but I am well-versed on locating the appropriate schedules. The US Department of Agriculture (USDA) has a treatment manual if which a large portion focusses only on treatment schedules. I guess that if you are going to perform export fumigations, you don't need to memorise the treatment schedules themselves, but you have to make certain that you can consult the treatment manual for the precise schedule that applies to the application you are going to perform."

Blake continues by saying that a person does not have to be an expert in the actual treatment schedule and that it never hurts to reach out to the proper authorities for guidance. However, you need to be an expert in finding the right one.

> One method of fumigation that is extremely popular, both in grain storage as well as export ships, is the use of a method called recirculation.

While export fumigations are not very complicated, there is, however, some extra footwork and paperwork to do that will assist in performing it correctly. According to Ben, every country that receives fumigated products from the US, for example, have more restrictions and very specific rules on how a commodity or product is to be fumigated before they will accept it into their country.

"Some have very specific application rates, depending on the complexity of the products, while some require very specific treatment methods, exposure periods, and temperature restrictions that are more restrictive than the standard common label," he says. "That is why it is so important to consult the USDA treatment manual and figure out what those treatment schedules are for the varying countries.

"If the rules and regulations are not followed properly, and a shipment is refused when it arrives at its destination country, that product will have to go all the way back to the country of origin to be fumigated. It might also be rejected or fumigated at a premium cost in the destination country. And guess who's going to foot that bill?

Probably the person who was supposed to have fumigated the product according to the schedule in the first place."

Therefore, says Blake, one should not only consult the treatment manual for the import country, but also clarify with the receiving customer what their expectations are, as the receiving customer will often even go a step further than the normal import and export regulations.

In-transit dos and don'ts

A brief definition of in-transit fumigation is the fumigation of materials that go in transit, generally on a railroad or on a shipping vessel.

Blake proposes the following two dos:

- Do adhere to the label and applicator's manual, particularly the sections outlining in-transit fumigations.
- Do make sure you communicate and arrange the safe receipt of the fumigated materials on the other side of the journey. Whether the cargo was sent by rail or across the water, there must be trained individuals, though not necessarily licensed, at the receiving end.

A big don't, according to Blake, is to never fumigate anything that will be transported on a public road while under fumigation, due to the many dangers associated with it.

Important safety tips

Along with the obvious measures which goes with any fumigant, Blake advises newcomers to fumigation to read the label and applicators manual carefully and familiarise themselves with it, especially the worker and bystander safety sections.

He also adds the following safety tips:

- Take your time and do not cut corners.
- Respiratory protection: As far as phosphine-specific advice goes, always keep in mind that smell is not an indicator of concentration. The odour of phosphine can be smelled at very low concentrations, but you can also not smell anything at high concentrations as phosphine tends to deaden one's sense of smell very quickly. A person can thus be exposed to high concentrations of phosphine and not smell it at all.
- Always use your monitoring devices and verify the actual concentration.
- There is no antidote for phosphine over-exposure and the only defence is wearing the proper personal protective equipment (PPE).
- Handle the clean-up process properly as un- or partially reacted phosphine can be extremely dangerous. Consult the applicators manual for deactivation. Follow this rule of thumb: If there is even a 1% chance that the materials are still green or partially unreacted, keep it dry and do not confine it until you are able to properly deactivate it.
- Finally, always ask questions when uncertain about anything. Do not make assumptions.

This conversation was framed by the USEPA approved label and US laws and regulations. To listen to the original podcast, visit *www.degeschamerica.podbean.com*.

For more information on fumigation processes and techniques used in South Africa, contact Eddie Engelbrecht, manager of Degesch SA on 082 450 9199 or email eddie.degesch@gmail.com.

Syngenta gee ’n nuwe dimensie aan siektebeheer op mielies

Nuwe gewasbeskermingprodukte is skaars; daarom is Syngenta se MIRAVIS® Neo swamdoder goeie nuus vir graanprodusente. Spesifiek geformuleer vir die voorkomende beheer van grysblaarvlek, noordelike blaarskroei en bruinroes, en die onderdrukking van oogvlek, maak MIRAVIS® Neo ’n verskil wat duidelik sigbaar is.

Elke jaar wanneer planttyd aanbreek, is mielieprodusente vasbeslote om ’n beter opbrengs as die vorige seisoen te behaal. Om dit te kan doen, moet hulle hul produksiepraktyke verfyn om by wisselende omgewingstoestande aan te pas en risiko’s so goed as moontlik te bestuur.

Mieliesiektes is ’n noemenswaardige produksierisiko en hul impak behoort nooit onderskat te word nie.

Noordelike blaarskroei, bruinroes en grysblaarvlek is die destruktiewe driemanskap van graansiektes in Suid-Afrika. As grysblaarvlek en noordelike blaarskroei nie beheer word nie, kan opbrengste met soveel as 70% per hektaar afneem. Bruinroes is minder skadelik, maar kan genoeg van die mielieplant se energie tap om sekondêre skade te veroorsaak, bv. mielies wat omval en pitte wat nie skepel nie, wat tot laer opbrengste lei.

Die heersende La Niña-verskynsel en hoë-opbrengskultivars wat meer vatbaar is vir hierdie drie belangrike mielieblaarsiektes, vereis dat produsente ’n holistiese benadering tot siektebeheer volg.

Syngenta se nuwe MIRAVIS® Neo swamdoder voldoen perfek aan hierdie behoefte.

Die MIRAVIS® Neo formulasie

MIRAVIS® Neo se trefkrag lê in die kragtige sinergie tussen sy drie aktiewe bestanddele wat rondom ADEPIDYN™ tegnologie geformuleer is. Geen ander mielieswamdoder op die Suid-Afrikaanse mark kan op ’n soortgelyke drieledige formulasie aanspraak maak nie. ADEPIDYN™ tegnologie is ’n nuwe karboksamiedgroep chemikalie wat deur Syngenta ontwikkel en onlangs wêreldwyd bekendgestel is.

Die grootste voordeel van ADEPIDYN™ tegnologie is sy hoë vlak van intrinsieke aktiwiteit wat beteken MIRAVIS® Neo is hoogs aktief teen laer dosisse, lewer uitstaande beheer van siektes en lei tot gesonder mielieplante. ADEPIDYN™ tegnologie word vinnig en effektief in die waslaag van die mielieblaar opgeneem om ’n reservoir te vorm van waar dit stadig in die plant vrygestel en teen metaboliese afbreking beskerm word. Hierdie kenmerk verseker verbeterde reënvastheid en nawerking teen siektes.

Saam met ADEPIDYN™ tegnologie, bevat die MIRAVIS® Neo formulasie ook AMISTAR® tegnologie en propikonasool, elk met sy eie metode van werking. As gevolg hiervan, pas MIRAVIS® Neo uitstekend in by ’n weerstandbestuurprogram en terselfdertyd word die nuwe aktiewe bestanddeel beskerm omdat dit in kombinasie met ander bestanddele gebruik word.

Volledige beskerming in een program

MIRAVIS® Neo mag die nuweling wees, maar die produk is ontwerp om saam met die Syngenta staatmakers AMISTAR® Top en ARTEA® ’n volledige oplossing vir swamsiektes te bied.

MIRAVIS® Neo is besonder effektief teen grysblaarvlek, terwyl AMISTAR® Top ’n goeie pasmaat is vir die beheer van noordelike blaarskroei. Deur die twee saam in ’n swamdoderprogram te gebruik, kan blaarsiektes dus behoorlik in toom gehou word. ARTEA® is ’n goeie aanvullende bespuiting later in die seisoen, na MIRAVIS® Neo, wanneer siektedruk hoog is en die plant se reproduktiewe fase beskerm moet word.

In gevalle waar twee of meer swamdodertoedienings die norm is, soos in besproeiingsgebiede of waar die siektedruk hoog is, moet ’n eerste toediening van AMISTAR® Top of MIRAVIS® Neo tydens die V5- of V6-groeistadium plaasvind. ’n Tweede MIRAVIS® Neo toediening, rondom die V8- tot V9-groeistadiums, sal die plant beskerm tydens die kritiese V10- tot

R1-groeistadiums wanneer landbouchemiese toedienings 'n risiko vir "arrested ear" sindroom kan inhou. Indien nodig kan ARTEA® aanbeveel word as n derde toediening.

In gebiede met laer siektedruk waar 'n enkele toediening gewoonlik genoeg is, moet MIRAVIS® Neo tussen die V6- en V8-groeistadiums gespuit word voordat infeksie plaasvind.

Voorkoming vs. genesing

Regoor Suid-Afrika is daar 'n groeiende behoefte aan swamdoders om mieliesiektes te beheer ten einde sterker, gesonder plante te verseker, selfs al is die siektedruk laag. Die effektiwiteit van 'n swamdoder lê in tydige toediening wat bepaal word deur die tipe siekte, infeksietyd,siektedruk en heersende omgewingstoestande.

Swamdoders word toegedien om swaminfeksies te verhoed, plantgesondheid te beskerm en opbrengs te verhoog. Dit word hoofsaaklik bereik deur die boonste blare van die mielieplant wat bokant die kop is, te beskerm wanneer die plant sy reproduktiewe stadium binnegaan. Die hoeveelheid suiker wat deur groen, gesonde blare geproduseer en in die pitte gestoor word, bepaal finale opbrengs.

Dit verduidelik waarom 'n genesende of korrektiewe benadering teenproduktief is. Teen die tyd dat siektesimptome sigbaar word, is daar alreeds genoeg skade aangerig om opbrengs met tot 15% te verminder. Die plant het dan ook al heelwat van die energie wat aan plantontwikkeling gewy moes word, afgestaan om siektes te beveg.

Wanneer 'n swamdoder te laat toegedien word, is die siekte alreeds goed gevestig en lei dit gewoonlik tot korter nawerking omdat meer van die aktiewe bestanddeel nodig is om die siekte te stop. Daar bly dus nie veel oor vir nawerkende beheer nie.

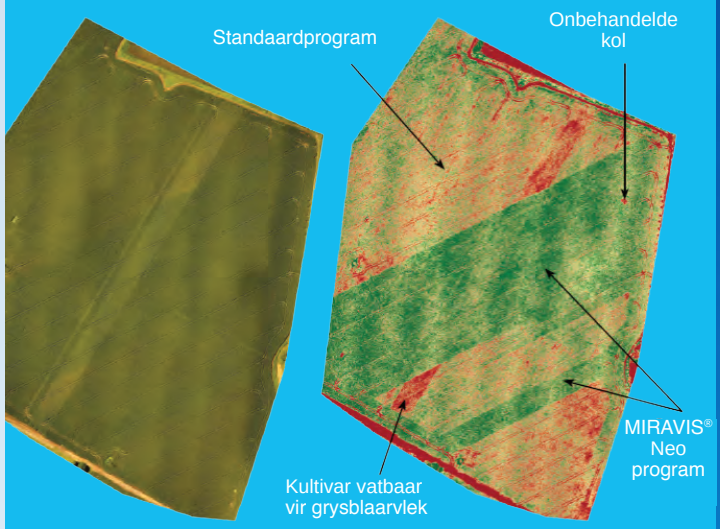
'n Laaste en uiters belangrike oorweging is dat genesende beheer die ontwikkeling van weerstand kan fasiliteer omdat die swampopulasie groot genoeg is om heel waarskynlik individue met natuurlike weerstand in te sluit.

Ekonomiese waarde

'n Swamdodertoediening se ekonomiese waarde word bepaal deur faktore wat siektedruk beïnvloed (temperatuur, vog, teenwoordigheid van die patogeen, vorige gewas en bewerkingspraktyk), vatbaarheid van die gewas en tydsberekening van die toediening.

Syngenta se nuwe drie-in-een formulasie slaan swamsiektes aan alle kante hok. Die veelsydigheid van MIRAVIS® Neo onder moeilike omstandighede, verseker gewasprestasie wanneer dit die meeste vereis word.

Sien die VERSKIL!



Die VARI ("visible atmospherically resistant index") algoritme is op die ortomosaïekkaart (regs) toegepas om 'n aanduiding van die relatiewe gesondheid van die plante in die gekarteerde (afgebeelde) gebied te verkry. Die tegnologie bepaal hoe groen 'n beeld is deur plante se weerkaatsingskoëffisiënt te gebruik. Die verskillende skakerings van groen verskyn op die plantgesondheidskaart as kleure wat wissel van groen tot rooi. (Bloedrooi, bv. waar paaie langs die land loop, dui 'n totale gebrek aan plantegroei aan.)

Fotokrediet: Adrian Bam

Hierdie foto's wys die verskil tussen 'n onbehandelde blok (links) en 'n program bestaande uit AMISTAR® Top, MIRAVIS® Neo en ARTEA® wat noordelike blaarskroei effektief beheer het.

Fotokrediet: Petrus Makoro

Hierdie foto's wys die verskil tussen 'n MIRAVIS® Neo program (links) en 'n standaardprogram teen grysblaarvlek. Die langdurige impak – plante wat langer groen bly – is duidelik sigbaar en lei tot beter graanvul vir hoër opbrengs. Fotokrediet: LUMICO

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Battery energy storage systems to boost reliability and the adoption of renewable energy

By Justin Schmidt, Head of New Sector Development, Absa Group

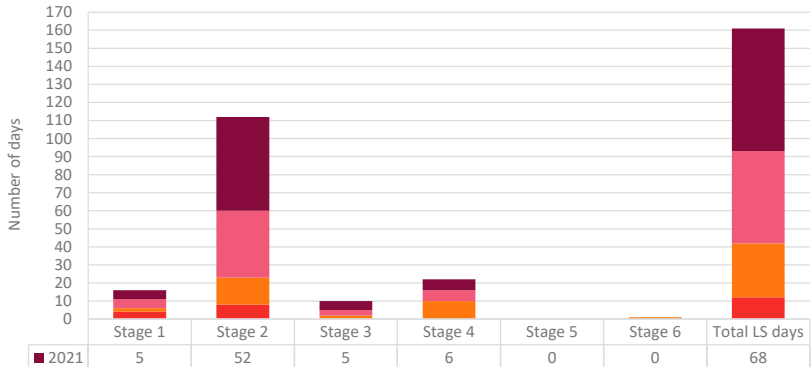
Despite historic declines in economic activity in 2020, we still saw a high intensity of load shedding. The trend of increasing hours of load shedding has continued into most of 2021. At Eskom, the problem of unreliable generation capacity is exacerbated by operational problems, resulting in unplanned outages at multiple generation plants – primarily because of a lack of maintenance.

Eskom's ageing fleet of power stations and unplanned outages have hurt the power producer's generation capacity for years, and these constraints remain a key challenge for future growth.

Increasing load shedding days since 2018 highlight the challenges that Eskom faces – a constrained power system with an old, unreliable and poorly maintained generation fleet, as well as the need for new generation capacity. The risk of load shedding will remain until substantial new power capacity is invested in.

In addition to load shedding, increasing tariffs by Eskom (15%) and municipalities (18%) have further improved the investment case for businesses into renewable energy generation and energy-efficient interventions. A growing number of business owners are also looking at the option of installing renewable energy technologies to power their daily operations, to hedge against steep increases in electricity costs.

Figure 1: Trend of increasing days of load shedding. (Source: Absa RBB Sectors)

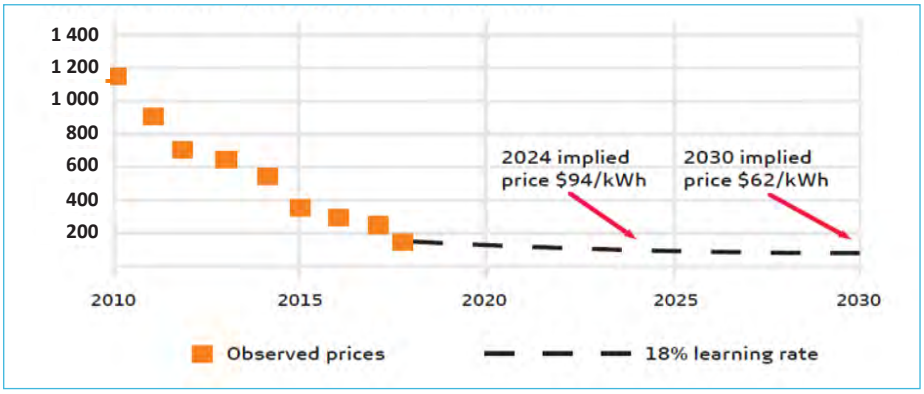


	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Total LS days
2021	5	52	5	6	0	0	68
2020	5	37	3	6	0	0	51
2019	2	15	2	10	0	1	30
2018	4	8	0	0	0	0	12

The rise of BESS

We have also seen a growing trend of businesses looking at and investing in battery energy storage systems (BESSes) to mitigate some of the effects of load shedding. The decline in prices of batteries (in this case lithium-ion), as well as their benefits at times of load shedding have made for a stronger business case.

Figure 2: Lithium-ion battery price outlook (real 2018 US$/kWh). (Source: Bloomberg New Energy Finance)



As a storage system, BESS applications are of interest because of their flexibility of use in many different applications independent of location, in contrast, for example, to pumped hydro storage.

The type of BESS application needs to be aligned with the right BESS technology to maximise value. Different BESS technologies are now available, such as lead-acid, lithium-ion (with many different subtypes), sodium-sulphur and vanadium redox. The BESS technologies have their own key strengths, weaknesses and performance characteristics. These characteristics include depth of discharge, power output, weight, energy density, response time, safety and thermal performance. The technology evaluation is usually done on a case-by-case basis to maximise value from the BESS.

The main uses for BESS are grouped into two categories: Firstly, in stationary applications, such as back-up power and peak demand shaving; secondly, in mobile applications, such as portable machinery, electric vehicles and cellphones.

Some of the more typical applications of BESS for businesses and farmers are

discussed, including increased photovoltaic (PV) self-consumption, peak shaving and arbitrage.

Increased PV self-consumption

The challenge with renewable energy, including PV panels, is that resource availability (e.g. the sun) does not always coincide with demand. This is especially problematic for residential or commercial customers, who are often not allowed to supply their excess PV energy back to the utility (generated when there is more solar supply than demand at their premises). BESS applications allow these customers to save this excess PV energy for later use (*Figure 3*), increasing these customers' consumption of their PV energy.

Peak shaving

As the demand for energy increases, so too does the cost of delivering this energy. Often the country's demand is so high that 'peaking generation' units, such as gas turbines, need to be used to meet demand. Because of the costs of running these peaking generation units, electricity tariffs during these 'peak' times are higher than during 'off-peak' times.

As shown in *Figure 4*, shaving this peak, through businesses and households discharging their energy stored in batteries to supply their peak needs, can be beneficial to both the utility (which saves on expensive fuel) and the end customer (who saves on monthly electricity costs).

Arbitrage

The value of energy, as with any commodity, is inherently linked to demand. The higher the demand, the higher the price of energy.

Figure 3: PV self-consumption. (Source: *www.redelectrical.co.uk*)

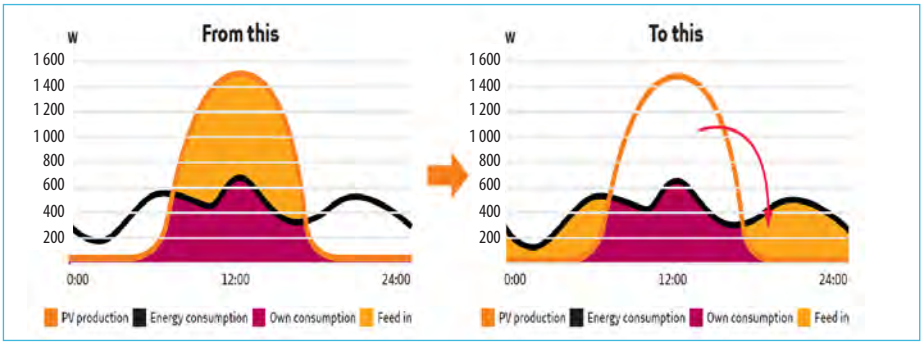
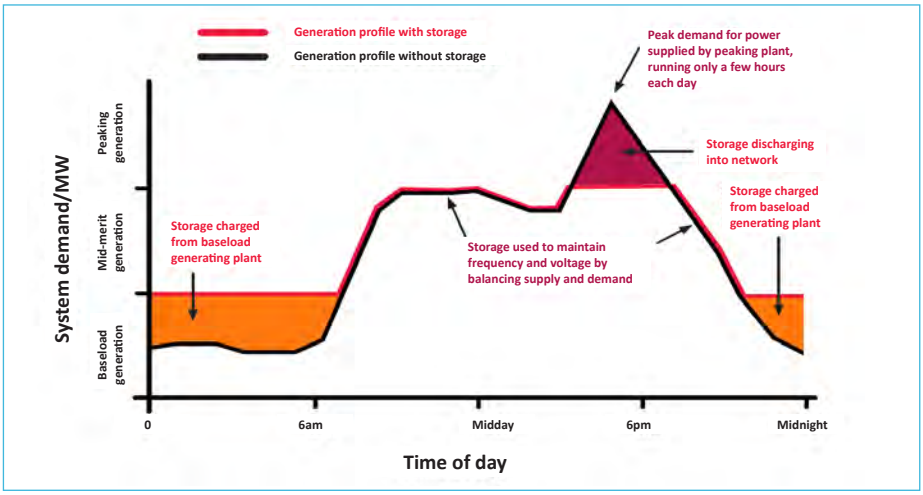


Figure 4: Peak shaving application for a BESS. (Source: EE Publishers)

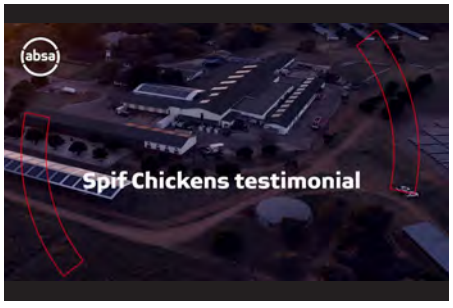


This pattern can be capitalised by charging a BESS during low-demand periods at a low cost and selling the stored energy at a competitive price during high-demand periods.

This is illustrated in *Figure 5*. The maroon zone indicates low energy prices, and the red zone indicates high energy prices. The difference between the two gives the value that can be obtained.

Figure 5: Arbitrage cycle for a BESS, demonstrating a value extraction opportunity. (Reconstructed from *www.energystorageconsultants.com*)

For your business' future energy mix, solar PV and BESSes are likely to be the most viable options. Given the declining costs of the technology, increasing energy costs, our abundant sunlight availability and the long lifespan of the technology, the business case is increasingly attractive. Solar PV is therefore a key enabler, ensuring affordable, reliable and sustainable energy for all.



To find out more on how an agro-processor was able to mitigate the constraints with solar systems and batteries, watch this video by Spif Chickens.

For more information and references, contact the author at email justin.schmidt@absa.africa.

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★ **Bill Gates** (Businessman and philanthropist)

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"Prevention is better than cure" with **K-Obiol® EC 25**

Production of grain crops, from sowing to harvest, and processing, requires considerable human and financial resource investment. Pre-harvest loss to biotic factors (pests, pathogens and weeds) is a major challenge translating to investment losses. Cumulative losses incurred during transport, pre-processing, storage, processing, packaging, and export can be substantial.

Each stage of the grain value chain is a source of grain losses, each with a different loss ratio. This article focuses on loss prevention during storage, particularly with those associated with insects.

// Farm *// Transport* *// Storage* *// Transport* *// Processing* *// Manufacturing* *// Export*

Storage is the most critical post-harvest operation in the grain value chain. Losses during storage are caused by several factors, both direct and indirect. Direct losses being the physical loss of grain, while indirect being the loss in quality and nutrition. Storage losses can further be classified into biotic factors (insect pests, mites, bacteria, fungi) and abiotic factors (temperature, humidity, rain).

It's estimated between ¼ - ⅓ of grain loss annually occurs during storage, much of which stems from insect damage. Damage caused by insects can be referred to as physical deterioration (e.g., holes in the grain) and quality (value) loss. Some important stored grain pests include the lesser grain borer, rice weevil and rust red flour beetle. Most grain pests inflict damage through direct feeding, thereby reducing the protein content of feed grain. This decreases viability, leading to poor seed germination. Additionally, insect excretions, moults and bodies contaminate the product, which is not commercially desirable.

// Prevention

When it comes to controlling stored grain pests, prevention is always the best course. It is essential that on-farm storage should limit the infestation of grain from the onset, ensuring acceptance and marketability of the grain in domestic and foreign channels. Pest management best-practice knowledge is key to avoiding or mitigating costly losses with on-farm storage. Through an integrated pest prevention approach, and a proactive attitude to quality assurance and control; avoiding grain insect pest infestation and the ensuing damage is possible. Successful pest prevention strategies combine hygiene and structural treatment, aeration cooling, monitoring and grain protectants.

// Store Hygiene and structural treatment

- Hygiene is the first line of defense in any grain storage system and involves the removal of grain residues from empty storages and grain handling equipment, including harvesters, augers, field bins and silos to ensure an uncontaminated start.
- Following storage and handling equipment cleaning, structures should be treated with a residual insecticide such as Bayer's **K-Obiol® EC 25**, which can provide residual protection up to ten months depending on the type of application method and surface.

// Aeration Cooling

Aeration of stored grain serves four main purposes. It assists in inhibiting insect development, maintaining seed viability and reducing grain moisture and preventing . Grain aeration allows growers to maintain grain quality during harvest and storage and, while aeration cooling may not eliminate the need for chemical insect control, it will dramatically slow insect development.

// Monitoring

Frequent monitoring allows early detection of problems to be managed before significant grain damage occurs. Monitoring entails regularly recording stored grain temperature and moisture to confirm they are within optimal parameters, as well as inspecting for insect activity and mold.

// Grain Protectants

Grain protectants are designed to prevent pest infestations, not to control pre-existing insect infestations. They should be applied only to clean, pest-free grain. To give protectants the best chance to defend stored grain, it is imperative to combine their use with storage hygiene practices before and after harvest.

Other than treating structures, **K-Obiol® EC 25** can be applied directly to the grain during grain intake. It can be used in any type of storage, sealed or unsealed and is suitable for use by grain growers and grain accumulators.

Grain markets and regulatory bodies have become less tolerant of protectants because of their residual activity and growing grain consumers' desire to avoid grain with excessive residual levels. Inappropriate treatment or multiple treatment as the grain moves along the supply chain due to inadequate quality assurance may result in higher residue levels. Applied appropriately, **K-Obiol® EC 25** guarantees the level of residues. Always read the chemical label before choosing a protectant to ensure it is registered for use on the desired grain target insects.

BAYER

ZoomAgri: Digital quality determination and cultivar identification

By Lucas Novaro Hueyo and Sebastian Bergada

ZoomAgri is an artificial intelligence (AI) driven AgTech company founded in 2017 with offices in Argentina, Spain and Australia. The company develops breakthrough technologies that improve the testing of agricultural supply chains, leading to healthier food and a more transparent and sustainable world.

Every time a truck, train, barge or vessel is loaded or discharged, its quality is analysed (from seed companies to farmers, from grain collectors, mills and grain processors, to export terminals). It is a vital process as it not only determines the final price of the products, but also the quality and efficiency of industrial processes.

Malting barley grains being tested in the ZoomBarley machine.

It is estimated that on average, every kernel produced is analysed at least three times during its life cycle; however, this can take place up to 14 times. Measuring quality in the right way allows the agricultural supply chain to use less transport, land, inputs and water. In addition, correct quality determination before discharge reduces the number of products being wasted or lost during storage.

With all the quality analyses taking place along the supply chain, the testing, inspection and certification (TIC) market of agricultural commodities and food is close to US$26 billion.

Leading the way to quality

Nevertheless, for the last 100 years, very little has changed when it comes to the quality and variety determination of agricultural supply chains. However, ZoomAgri is disrupting the TIC of agricultural commodities and food, combining technologies such as computer vision, machine learning and the Internet of Things (IoT).

With customers in 20 countries and a database of more than 100 million unique images of various grains and oilseeds, ZoomAgri has built the leading platform for physical quality and varietal purity determination of different agricultural commodities, pre-seeding and post-harvest. The company's solutions are being used by participants throughout the supply chain such as seed companies, farmers, grain handlers, mills, exporters, grain processors, surveying companies and laboratories.

ZoomBarley

In 2018, ZoomAgri successfully launched its first commercial product called ZoomBarley, which is able to determine the purity of malting barley varieties in real-time, and has revolutionised the beer and malt industry.

ZoomBarley has had a huge impact on the malting and beer industry because, as barley turns into malt via a germination process and each variety of barley reacts differently to that process, it is essential for each barley variety to be as close to 100% in purity as possible. To do visual recognition of the variety in real-time is an extremely difficult task and the costs of traditional methods such as DNA and electrophoresis are very high. ZoomBarley not only speeds up the process, but does so at a fraction of the cost.

ZoomBarley is currently commercialised in five continents, with clients such as AB InBev, Boortmalt, Soufflet, InVivo, Malteurop, Estrella Damm, Holland Malt, Maltería Oriental, Avangard Malz and Ireks. ZoomAgri is in advanced conversations with and has filed a formal request before the National Institute of Seeds (INASE) in Argentina to validate the technology as an official varietal purity identification method.

In addition, the technology is being ring-tested by Bipea in France, a renowned proficiency testing non-profit organisation, and by the Central European Brewery Analysis Commission (MEBAK), an organisation that represents the state and private brewing institutes and industries in Germany, Austria, the Czech Republic and Switzerland, with the same objective.

Up until now, ZoomAgri has installed six ZoomBarley devices in the facilities of AB InBev in Africa (four in South Africa and two in Uganda) to differentiate the malting barley variety Hessekwa from the other malting barley varieties.

Wheat and soya bean varieties

Besides malting barley, ZoomAgri has developed a solution to recognise wheat and soya bean varieties. The solution to recognise wheat varieties was tested in Argentina using blind samples from different seed companies and farmers, in co-operation with the Argentine Seed Producers' Association (ASA) and the

Argentine Association for the Protection of New Plant Varieties (ArPOV), with excellent results.

ZoomAgri is in advanced conversations with and has filed a formal request before the National Institute of Seeds (INASE) in Argentina to validate the technology as an official varietal purity identification method. Regarding the solution to recognise soya varieties, there have been huge advances and ZoomAgri expects to install trial devices in several seed companies during December 2021. This will allow ZoomAgri to use the feedback received to improve the device and have it on point for the harvesting season in Argentina, which starts in March 2022.

ZoomAgri's new solution to test wheat and soya bean varieties.

ZoomAgriSpex

The next solution that ZoomAgri has brought to the market is ZoomAgriSpex, which allows ZoomAgri's clients to determine the physical quality and classification of grains and oilseeds by analysing their size in real-time. For this, ZoomAgri built new double-sided scanning hardware that allows the algorithms of AI to analyse both sides of the kernel.

Each year, three billion metric tons of grains and oilseeds are produced and moved along the supply chain, with many participants experiencing issues relating to the physical quality determination of these products, including classification errors, delays, subjectivity, fraud and extremely high costs. ZoomAgriSpex has solved all these pain points with technology that can determine the physical quality of and classify barley and soya kernels according to size – the solution for (durum) wheat and maize is set to launch soon.

Where the solution to determine the physical quality of maize kernels is concerned, ZoomAgri is in conversation with Asian agri-food company, Japfa, to set up a co-development strategy to improve the quality inspection of maize samples in various pain points located in Japfa's internal supply chain.

Technology on a global scale

ZoomAgri's solutions are easy to use. The client puts the sample on the device, and it provides an image of the sample. Once this is done, it is processed by the proprietary AI algorithms that classify the sample, providing immediate results. This methodology allows for truck-by-truck analysis, which assists when having to make fast and valuable decisions.

Currently, the solution is provided via a hardware device, but the company is advancing in providing the same solutions via a portable device and/or smartphone. There are 500 million small- and medium-scale farmers in the world who do not have access to decent quality control measures due to extremely high prices and this new technology will change that.

Apart from the technological breakthrough, ZoomAgri has also been extremely innovative in terms of business models. Up to now, quality determination devices were sold, generating the need for huge capital investments by supply chain companies. With ZoomAgri's vision-as-a-service (VAAS) business model, customers receive the hardware devices at zero initial cost, and only pay for the analysis they perform – either paying for every individual analysis, or a monthly fee with an unlimited amount of analysis available.

The company is in constant contact with the African continent. Considering that 60% of its population works in agriculture and that agricultural activities represent approximately 23% of its GDP, the impact that ZoomAgri may have in Africa is massive, given that its solution can potentially empower small-scale farmers and improve the efficiency of the African agricultural system.

For more information, email info@zoomagri.com

ZoomAgriSpex to determine the physical quality and classification of grains and oilseeds.

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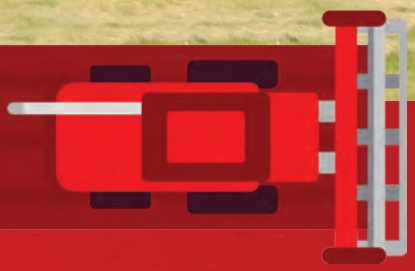

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