VOL 2 NO 1 • FEBRUARY 2022

# agbiz GRAIN QUARTERLY

## Blockchain: Possibilities for grain and oilseeds handling and storage

## The value of commercial grain silos

## Potential quality and grading problems: 2021/22 maize production season

## Cyber attacks in the grain industry

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# Sophisticated services and facilities for an essential market

*By Jerry Maritz, chairperson, Agbiz Grain, and managing director, AFGRI Grain Management*

The history of the grain and oilseeds sector dates to the early 1950s. Due to the high cost involved in the handling of grain in bags at the time, millers and the respective grain boards requested government to encourage the erection of grain silos for the bulk handling of grain.

Agricultural businesses played (and still play) a major role in the grain value chain and took the risk of investing heavily in the establishment of grain storage infrastructure in the rural areas. They were instrumental in positioning South Africa among international agricultural leaders in the provision of sufficient, well distributed, highly effective and operational bulk storage facilities.

Today, South Africa has 283 commercial bulk grain storage facilities with a total storage capacity of 15,7 million tons. Total grain and oilseed production in the country hovers around 19 million tons per annum. The members of Agbiz Grain are involved in more than 67% of the storage, handling and rendering of services in the sector.

## Local futures contracts

South Africa is globally recognised for its successful move from a regulated to a free market. With the success in liquidity, Safex and the Johannesburg Stock Exchange (JSE) were able to set up the agricultural commodity derivatives market to such a degree, that it was independently recognised in a study conducted by the United Nations Conference on Trade and Development (UNCTAD) some years back.

The success of the exchange can be attributed mainly to the support and commitment from JSE members and clearing members, South Africa's solid banking system, as well as the support and integrity of Agbiz Grain members to guarantee quality and quantity of grain products on silo receipts.

Local agricultural products – primarily grain and oilseeds – are physically settled at expiry in fulfilment of a futures contract. The JSE exchange accepts only electronic receipts issued by JSE registered storage operators, of which there are currently 17. There are also 200 registered delivery points across the country where sellers can decide to tender their delivery.

## Services and facilities

The agricultural grain handling and storage businesses of today offer sophisticated services and an increasing number of value-added products. Agbiz Grain members offer producers, traders, buyers and processors a range of services and facilities that include:

***Time solution:*** The grain harvested by producers can be quickly collected and stored over a short period, and then dispatched and stored for processors over a longer period.

***Choice of secure storage:*** Facilities such as grain silos, bunkers and bagging depots are geographically well distributed throughout South Africa and offer secure and extensive protection of commodities in storage.

***Issuing of silo receipts:*** Storage operators play a vital role in the issuing of both JSE and general silo receipts, which guarantee quantity and quality. Agbiz Grain members ensure that the relevant stock as indicated by JSE and general silo certificates are available when trades take place. Therefore, our members play a key role in the price discovery of agricultural commodities, and is the reason why the storage sector collaborates closely with the JSE.

***Strategic engagement with Transnet:*** Transport provides grid linkage between storage facilities and the market through 90% road and 10% rail transport. However, the rapid growth in local and export demand is limited by scarce financial, physical, and human resources and skills that can keep up with grain production, failing infrastructure, and strained systems and information. During this period of high demand, the cost of transport and related activities increased rapidly.

If agricultural logistics is to succeed in improving costs and efficiencies to meet future agricultural production, the industry needs to initiate and pursue engagement, in collaboration with Agbiz and Agbiz Grain, with Transnet and relevant government departments.

***Cost-efficient grading:*** Since deregulation, the storage sector has been ensuring that grain and oilseeds are graded correctly in alignment with the published grading regulations and requirements set out in the *Agricultural Product Standards Act, 1990 (Act 119 of 1990)*. Thus, the sector safeguards a self-regulated grading environment without additional costs or functions to the producer, or the lower-income end consumer of staple foods.

***Quality maintenance:*** Quality is maintained through frequent inspections and preventive procedures.

***Compliance:*** Agbiz Grain members comply with regulations and adhere to all required legislation.

***Storage of niche products:*** A variety of niche products with specific attributes – for example good milling quality, high oil content or being GMO-free – can be stored separately for suppliers and buyers.

Compared to other sectors in the economy, the storage sector is relatively small. However, its members add essential value to a large portion of our population, ensuring the safe storage of commodities that are processed into staple food and animal feed, thereby contributing directly to the country's economic growth and food security.

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**On the cover:**
Cover image courtesy of AFGRI. Blockchain is becoming an increasingly important component in value chains across the world. Read more about how this can impact the grain storage and handling sector in this issue.

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# AGBIZ GRAIN GAZETTE

## Nico Hawkins greets the grain industry

The name Nico Hawkins is synonymous with the grain industry, where he played a major role in establishing structures to assist farmers after the deregulation of a controlled agricultural market. After 39 years in the industry, Hawkins has retired from his position as the general manager of the South African Grain Information Service (SAGIS).

After studying agricultural economics, he joined organised agriculture in 1983, starting his career at the old South African Agricultural Union. He joined Grain SA in 1999 and took up the reins at SAGIS in 2012.

Hawkins says the establishment of structures to help grain farmers transition from a controlled market to a free market is one of the highlights of his career. The data analysis of grain trading will always be his passion, and this is what he will be keeping himself busy with now that he has stepped down from the industry. – *Ursula Human, Plaas Media*

**Click here to listen to Lise Roberts talking to Nico about his career.**

## Developments in grain qualifications

The grain depot manager qualification has been recommended to the South African Qualifications Authority (SAQA) for registration on the national qualifications framework under the occupational qualifications sub-framework. The Quality Council for Trades and Occupations (QCTO) will inform AgriSeta once the qualification is registered. This is the only grain depot manager training material that will be registered by SAQA. Please inform your training service providers about the latest developments. – *Agbiz Grain*

**For more information on the study material for the grain depot manager qualification, click here.**

**Follow this link to access the study material for the grain grader (part qualification).**

## Reporting of intentions to import or export wheat

Although the reporting of intentions to import or export wheat would be beneficial to the management of resources, there may be possible legal ramifications. It must be ensured that the proposed statutory measure will not contravene the provisions of the *Competition Act, 1998, (Act 89 of 1998).*

The National Agricultural Marketing Council has been requested to obtain a formal opinion from the Competition Commission to advance with the introduction of a statutory measure regarding the reporting of intentions to import or export grains and oilseeds. – *Agbiz Grain*

## Identified research needs for the storage sector

Agbiz Grain and stakeholders with interests in the grain handling and storage sector, listed several research needs to be considered for the development of research proposals and funding. Interested research institutions are encouraged to discuss research proposals with the Agbiz Grain Research Committee by emailing Annelien@agbizgrain.co.za.

The following research needs were identified: storage capability of malting barley cultivars; storage capability of maize cultivars; pest control in stored grain; pre-harvest management practices affecting germination capacity and germination energy of malting barley; optimised storage practices with available infrastructure; and an analysis of the average grain-handling losses for maize and soya beans. – *Agbiz Grain*

## Agbiz Grain membership base growing

The Agbiz Grain membership base is growing. Silostrat has announced that the company will be joining Agbiz Grain as a main storage member, as well as Agbiz as a corporate member from 1 March 2022. Agbiz Grain's first applications for associate membership from Agri-Enviro Solutions (AES) and Santam Agriculture have also been approved.

The recruitment of associate members is an ongoing process and various companies have shown interest after being contacted in January 2022. Follow-up meetings will be scheduled with those companies that need clarity on their benefits and questions. – *Agbiz Grain*

**You can access the contact details of Agbiz Grain's associate members by clicking here.**

## Amendments to grading regulations for maize

The amendments to the grading regulations for maize were submitted to the Department of Agriculture, Land Reform and Rural Development. The amendments are anticipated to be implemented before the commencement of the new marketing season on 1 May 2022.

Agbiz Grain, in collaboration with grading experts, has identified additional elements that could be considered for further revision within the grading regulations to be submitted. All industry role-players, including Agbiz Grain, will be provided with an opportunity to comment on the revised regulation before the implementation thereof. – *Agbiz Grain*

## EISA online workshop to be hosted in 2022

AgriSeta will request two proposed dates from the Quality Council for Trades and Occupations (QCTO) for Agbiz Grain to set up an external integrated summative assessment (EISA) online workshop in the first quarter of 2022. The session will be facilitated by QCTO.

Joining the session will be members of the Community of Expert Practitioners (CEP), appointed by the grain handling industry via Agbiz Grain, which will consist of subject matter experts in grain handling and storage. Lizelle Jacobs and Herman van Deventer of AgriSeta will act as moderators.

Training providers are required to register with Agbiz Grain via Annelien@agbizgrain.co.za to attend the EISA online workshop in 2022. – *Agbiz Grain*

**Follow the link to access the contact details of the training providers listed with Agbiz Grain.**

## Considerations needed regarding the GSCI

The Johannesburg Stock Exchange (JSE) can easily adopt the Grain Storage Cost Index (GSCI) to update the annual change in the JSE storage rates. However, the GSCI is published only once a year compared to the monthly publication of the producer price index (PPI).

The JSE has three different marketing years starting on the first trading day of March, May and October. An agreement is needed on how the annual publication of the GSCI will be implemented to adjust the annual storage rate of the JSE at the start of each marketing year.

The industry, as represented by the JSE Advisory Committee, needs to be convinced that the introduction of the GSCI will be an improvement in the interest of all stakeholders. The JSE also needs to agree on the adoption of the GSCI. The GSCI proves to be less volatile than the respective PPI's applicable to March, May and October. – *Agbiz Grain*

## Statutory measure for weekly producer deliveries of grains

The administrator of the Maize and Winter Forum Steering Committee has drafted letters in support of the statutory measure for the weekly producer deliveries of soya beans, sunflower seed, maize and wheat expected to be introduced in 2022. This follows after Agbiz Grain indicated early in 2021 that the voluntary submission of the weekly producer deliveries for soya beans and sunflower seed will be discontinued by the end of February 2022, maize by the end of April 2022, and wheat by the end of September 2022. Currently the voluntary submission of the weekly producer delivery information is not inclusive throughout the industry. – *Agbiz Grain*

## Comments to be submitted on SOP for assignees

On 13 December 2021, the Department of Agriculture, Land Reform and Rural Development (DALRRD) requested that affected stakeholders submit their comments on the Standard Operating Procedure or SOP for assignees. The comments are necessary in order to reach agreement on modalities for the introduction of inspection services in the grain handling and storage sector. The DALRRD indicated that it will not accept any request for meetings with sectors before comments have been received from stakeholders by 15 February. – *Agbiz Grain*

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# Introduction of inspection services unlawful

The appeal board that was appointed by the director-general of the Department of Agriculture, Land Reform and Rural Development (DALRRD) to rule on the implementation of the inspection services on grain and oilseeds, announced that it was unlawful and not procedurally fair. The board found that the fees cannot be rationally linked to the capabilities that need to be exercised, or to the duties that need to be performed. The board received five applications against *Notice 382*.

This follows the appointment of Leaf Services in 2016, as an assignee of the DALRRD, to render inspection services on behalf of the department. It was announced in the *Government Gazette* of 25 June 2021 that inspection fees on grain and oilseeds will be applicable from 12 July 2021. The inspection fees would have been R1,80/ton on raw grain and oilseeds, and 2c per bread.

Agbiz Grain opposed the introduction of inspection services and argued that the sectors in the grain value chain are sufficiently self-regulated. None of the sectors required the introduction of inspection services by the DALRRD and there is no evidence of complaints or transgressions submitted that justifies the inspection of stakeholders. The introduction of inspection services will lead to 13 000 inspections. Although it can be legally justified, it is not justifiable to add a layer of cost of about R74 million on the food value chain.

Agbiz Grain declared that the association proposed to Leaf Services to consider a volume-based approach to collect the fees at the first point of sale. It will be the most efficient way to collect the money in line with how statutory levies are collected according to the *Marketing of Agricultural Products Act, 1996 (Act 47 of 1996)*. It should be noted that different statutory levies are collected for different products, while Leaf Services proposed a single levy of R1,80/ton across different commodities. Imposing a single levy across commodities would impair certain product types while it would benefit others. This will lead to cross-subsidisation that will not result in a fair outcome. In addition, care must be exercised not to subsidise the tariffs on processed products from the tariffs raised on raw commodities.

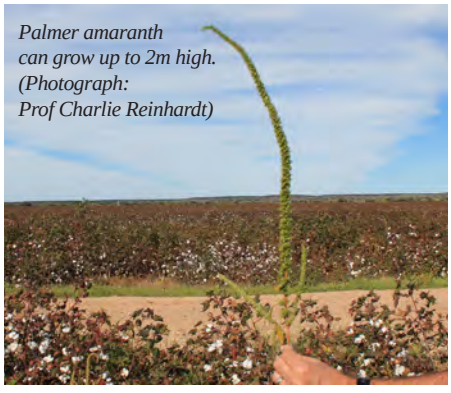
Agbiz Grain has also raised the concern that Leaf Services may accumulate and control potential reserves and made proposals on how this can be addressed. Finally, Agbiz Grain objected against a couple of procedural issues, how the R1,80 per ton was determined and emphasised the fact that Leaf Services failed to reach an agreement on the frequency of inspections needed before they decided to announce it in the *Government Gazette*.

The board further recommended that the director-general should consider additional regulations to facilitate appeals of this nature, as the current arrangements are insufficient. – *Agbiz Grain*

# Palmer amaranth threat increases

Palmer amaranth or *Amaranthus palmeri* has been regarded as the most threatening weed in the US since 2005 and is especially destructive in maize, cotton and soya bean fields. Research has shown this weed to be highly resistant to a number of herbicides, including glyphosate.

The weed was first detected in South Africa in 2018 in a cotton field in the Douglas district in the Northern Cape. Since then, it has also been detected in Howick in KwaZulu-Natal, in the northern parts of the Kruger Park, at Kasane in Botswana, and more recently in the Potchefstroom district.



*Palmer amaranth can grow up to 2m high. (Photograph: Prof Charlie Reinhardt)*

Its resistance to herbicides that are usually known for its good control of amaranth types is a major cause for concern. The weed has proven resistance to a total of nine important herbicide modes of action or sites of action. Another major threat, says Prof Charlie Reinhardt of the North-West University, is the possibility of hybridisation between common pigweed (a type of amaranth) and Palmer amaranth. Prof Reinhardt is the project leader of the South African Herbicide Resistance Initiative (SAHRI) at the University of Pretoria.

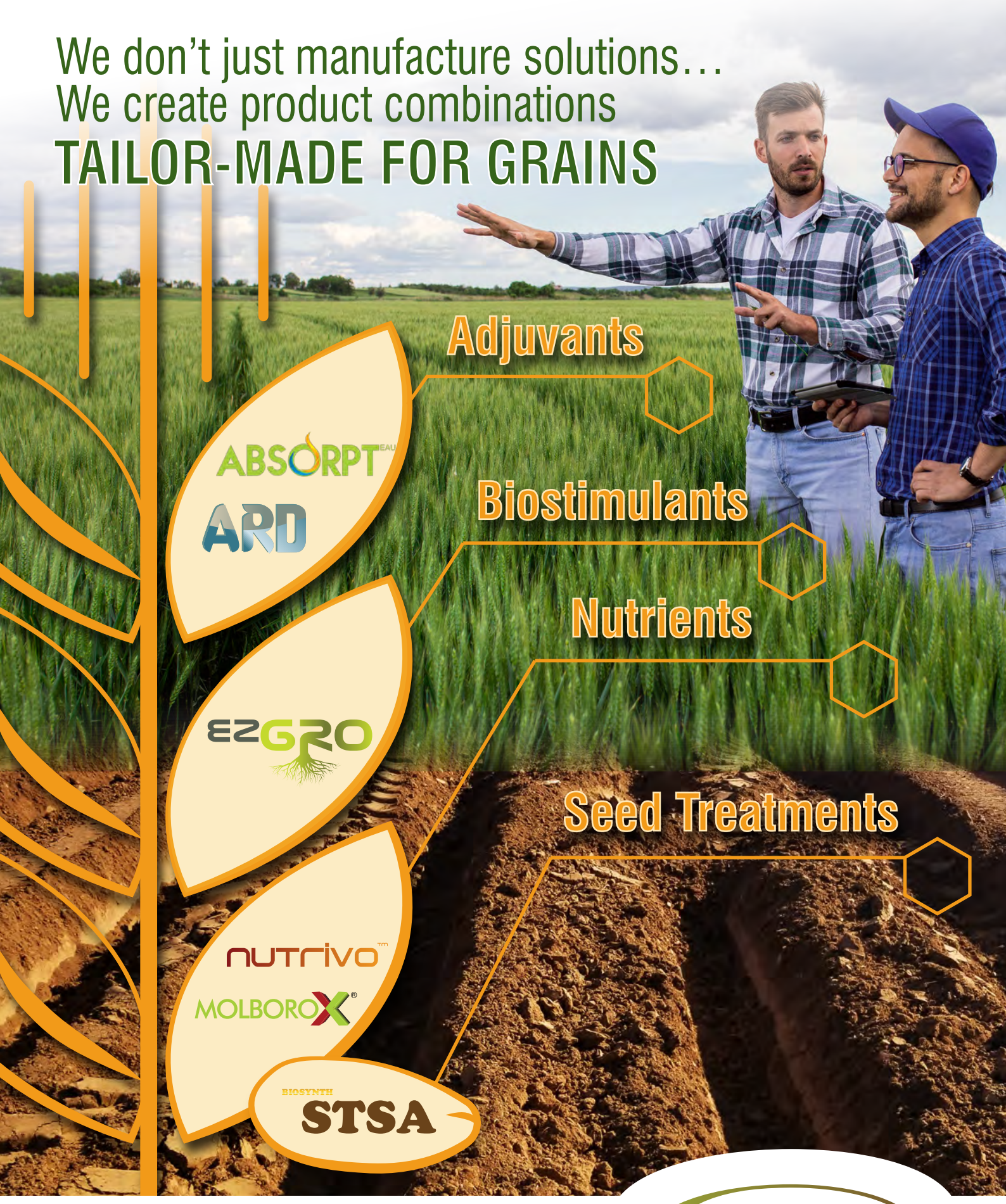
Researchers at SAHRI have conducted research into herbicide resistance in Palmer amaranth since it was first confirmed in South Africa and, to date, 14 herbicide actives have been assessed. Resistance to two herbicides, glyphosate and chlorimuron-ethyl, was confirmed while varying tolerance levels were recorded for other herbicides. On the positive side, several of the herbicides tested provided good control.

South Africa is home to approximately 17 other types of amaranth, which makes it difficult to identify Palmer amaranth. For this reason, SAHRI has developed a guide for the identification of Palmer amaranth. In addition, readers are also encouraged to contact the researchers should they come across possible Palmer amaranth infestations. – *Plaas Media*

The guide is freely available and contains photographs and descriptions of Palmer amaranth in various stages. The guide will be regularly updated.

**Click here for a free copy of the guide.**

Contact Prof Charlie Reinhardt at 083 442 3427 or email dr.charlie.reinhardt@gmail.com. Photographs of suspected Palmer amaranth can also be sent to him via WhatsApp.

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# Agbiz and Agbiz Grain: More than just a name

*By Theo Boshoff, CEO, Agbiz*

The Agricultural Business Chamber (Agbiz) and Agbiz Grain share a name, a membership base and address; however, the co-operation between the two establishments runs deeper than just the names.

Agbiz was established in 1946 as a co-operative council aimed at representing the interests of agricultural co-operatives in South Africa. In 2010, Agbiz became an independent organisation and expanded its membership base to serve all companies operating up or down the agricultural value chain. It acts as a liaison between government and the industry, to create an enabling environment for agribusinesses.

In 2014, the grain silo industry was incorporated into Agbiz and moulded into a dedicated desk to serve the needs that are specific to the grain storage industry. While the pages of this publication are filled with the good work that Agbiz Grain does for the grain storage industry, it is worth highlighting the impact Agbiz's cross-cutting work may have on businesses in the grain value chain.

## A three-pronged approach

Agbiz follows a three-pronged approach focussing on economic, legal and trade intelligence. The economic, legal and trade information is used to provide businesses with insights into how economic forces, new regulatory requirements, or developments in trade could impact their businesses. At the same time, this intelligence is used to formulate and lobby for changes to improve the operating conditions for businesses in agricultural value chains.

### 1 Economic intelligence

From an economic point of view, we compile the *Agbiz/IDC Agribusiness Confidence Index* and provide members with insights regarding the political economy, important statistical trends relating to employment, equipment sales, plantings, and the impact of international developments on local markets.

Our members are direct competitors, and we are therefore very careful not to share any information that could give any business an economic advantage, but instead focus on broad insights and predictions.

### 2 Legal intelligence

From a legal intelligence point of view, we focus on legislation, policies and regulations that directly affect businesses in the agricultural value chain. While Agbiz Grain focusses on regulations specific to the silo handling and storage industry, Agbiz focuses on cross-cutting aspects such as:

- BBBEE, land reform policy and farmer development incentives.
- Water rights, environmental law and the just transition to a carbon-neutral economy.
- Commercial law, including competition policy, tax, credit legislation and the regulatory environment that all companies must adhere to.
- Labour law such as employment equity and national minimum wage adjustments.
- Sector-specific regulations including GMOs, agricultural inputs and product standards, to name a few.

### 3 Trade intelligence

Trade intelligence is a major focal point as the sector requires two key enablers to grow: efficient logistics infrastructure and competitive access to international markets. The industry has seen significant growth and investment, but we need access to international markets to sustain this growth. Currently, 49% of our agricultural products are exported in value terms annually. We therefore need to retain our competitive access with existing markets while pushing for increased access to new markets.

Market access is about more than trade agreements – we also need the capacity to deliver. Our logistics infrastructure sets South Africa up as a gateway to Africa, but we risk losing that status if our port efficiency (land and sea) continues to decline. Likewise, South Africa's rail and road infrastructure requires urgent interventions to prevent these economic enablers from becoming dis-enablers.

## Rural development in the works

At Agbiz, we follow a value-chain approach. While the work outlined here may not directly impact your business, it creates opportunities that will stimulate demand. While this work remains a priority, there are several new initiatives that Agbiz will undertake in 2022, such as a strategy for rural development.

Many rural municipalities are in a state of decline, posing significant threats to the agribusinesses operating in that environment. While there are limits to what a national organisation can do, Agbiz will drive a rural development strategy in 2022 to share best practices for companies under these difficult circumstances.

This can be supplemented by lobbying for policy changes that will allow businesses to be more self-reliant (such as the 100MW exemption for electricity generation), and reduce costs where agribusinesses take the initiative to improve the environment they operate in and assist communities that depend on them.

## Creating an enabling environment

Agribusinesses are and will always remain an important link and service provider in the South African food, beverage and fibre value chains. Much time and effort have been spent enhancing the profile and optimising the impact of Agbiz, to promote the image and especially the value of agribusinesses to the agricultural sector and the country's economy.

While the impact is not always easy to measure, the detailed work done by Agbiz Grain and the cross-cutting work done by Agbiz both contribute to creating an enabling environment, so that companies in the grain storage and handling sector can focus on building their businesses.

For enquires, send an email to Theo Boshoff at theo@agbiz.co.za.

# A perfect fit to kick off 2022

When Annelize Crosby joined Agbiz earlier this year to head its legal intelligence division, the agricultural industry agreed unanimously that this was indeed a perfect fit. With many years of successful legal service to the industry behind her, she is sure to make a difference and continue with the great work done by Theo Boshoff, who went on to become the organisation's chief executive officer.

## A solid background

Annelize is a legal professional who has been working in the agricultural sector for most of her working life. After obtaining her BLC, LLB and LLM degrees at the University of Pretoria, she became an admitted attorney in 1994 and soon after kicked off her career at Agri SA, then known as the South African Agricultural Union. There, she filled the post of legal advisor and was later promoted to director of legal affairs.

She spent a year as a commercial attorney at MacRobert Inc from 2003 to 2004, before returning to the agricultural sector as an independent contractor. During the period from 2004 to 2017, she was contracted by Agri SA and also performed parliamentary liaison for Agbiz and a number of other clients. She returned to Agri SA full time in 2017, where she headed the land and legal affairs portfolio.

## All things agriculture

Annelize has a special interest in land reform and constitutional law, an area in which she has been specialising since entering the agricultural industry in 1995. Besides this focus area, she also has vast experience in agriculture-related legislation and policy, as well as parliamentary processes, Nedlac processes and other consultative and negotiation processes over many years.

Her understanding of sector politics and knowledge of agricultural legislative issues has made her a well known and much respected role-player in the industry. She is also well known among journalists and the agricultural media, and has put pen to paper numerous times to convey sensitive and policy-related issues to the broader agricultural community, and those with an interest in agricultural affairs.

Agbiz spearheads a wide variety of activities, across a wide range of disciplines, to advocate for policies, legislation and regulations that the organisation believes are in the best interest of, firstly, its members and secondly, the agricultural sector as a whole. Annelize's role in serving the interests of both Agbiz and the agricultural sector is a critical one. The various platforms and initiatives Agbiz is involved in include a number of current issues and processes, such as the Agricultural Master Plan, the *Expropriation Bill*, and other legislation relating to competition, labour, natural resources, black economic empowerment and blended finance.

## Policy and legislative processes

"My new post entails a very strong element of policy influencing," she explains. "This means participating in numerous policy and legislative processes that have an impact on the agricultural sector. In the past, I have drafted many submissions on land and agriculture-related policy documents and legislation, and made numerous oral submissions to Parliament and other fora. This landscape is well known to me and I look forward to the challenge," she says.

With her solid background in Parliamentary reporting and liaison, she will be monitoring Parliamentary processes and keeping Agbiz and Agbiz Grain members informed of important legislation and legislative amendments.

*Annelize Crosby.*

Agbiz also actively participates in the processes that take place within Business Unity SA (BUSA), and the National Economic and Labour Advisory Council (Nedlac). "These are the spaces in which policy and legislation affecting business are analysed, debated and then negotiated with government, unions and civil society in general. Sector-specific issues such as agricultural product standards also come to mind. This is certainly a space in which I will be actively involved and hope to make a difference."

Agbiz Grain congratulates Annelize on her appointment and at the same time wishes to congratulate Theo on his promotion to CEO of Agbiz. We believe that they form a great team and, along with all the other Agbiz staff and desks, will serve the agricultural industry well.

# The value of commercial grain silos: An income-producing property

*By Christiaan Winckler, professional valuer (Photographs supplied)*

Silos are commonly used to store food products such as grain or silage. The types of silos used vary from between tower and bunker silos to bag and trench or pile silos. Focussing in this addition on tower silos, its concrete structure is usually vertically orientated and designed for the sole purpose of storing bulk materials. In addition, grain silos also serve as a specialised form of real estate thanks to its construction, use and income generation.

A grain silo is essentially an income-producing property and here comes the snag: Because the tenant is harvesting grain, the income will fluctuate. This fluctuation in the demand for storage space is the result of the location of the grain silo, the yield of the crops in the area, and the desire of grain owners to store their produce at third-party facilities.

So, what do we take into consideration when valuating a concrete grain silo with a remaining lifetime of over 50 years, with the exclusion of grain silos constructed with corrugated iron, grain bunkers, silo bags and other storage systems due to their shorter lifetime?

## Demand for silo storage

Producers make use of grain storage space to store their harvested grains, while large grain-processing companies, traders, importers and exporters that have purchased grain, require storage until the grain is needed.

Demand for storage space is the single most important factor for determining the method of grain silo valuation. One must keep in mind that while the location of a grain silo will not change, demand could alter should an area change from a grain cultivation area to something else. It so happens that the amount of rainfall may affect annual demand year-on-year, while technological progress can positively impact grain production.

Storage space is leased at an amount-per-ton basis, which is determined at a daily rate or a longer-term rate. Therefore, due to its unique characteristics, construction, buyers and sellers, grain silos are income-producing properties of a specialised nature.

## Value of buildings and structures

The generally accepted methods or approaches to valuation are the sales comparison, the income capitalisation, the depreciated replacement cost, the residual and the profits method. Grain silos are valued using the income capitalisation method of valuation, which means the income is calculated by analysing long-term occupancy figures and applying market-related tariffs.

Financial information is used to calculate expenses, and business-related expenses are deducted. Thereafter, net income is capitalised at the capitalisation rate, which is determined by adding the extra risk associated with silos to a baseline capitalisation rate of general storage properties.

Considering that the value of grain silos can be successfully established by the income capitalisation method, the valuer must still ensure that ample information and knowledge of the grain production industry is obtainable to perform the valuation.

The capitalisation rate is determined by basing it on normal storage and light industrial properties, with added risk. The main limitation when using the income capitalisation method is the determination of the capitalisation rate of a grain silo. Because there are no sales of grain silos to calculate a capitalisation rate from, other methods must be applied.


*TWK's grain silos in Panbult, Mpumalanga. A grain silo is essentially an income-producing property and because the tenant is harvesting grain, the income will fluctuate.*

Further testing is needed to determine the income and capitalisation rate, while substantial financial and business information may be difficult to obtain. In addition, the silo owner in many cases will not want to disclose this information. Yet another hurdle in utilising the income capitalisation method, is that valuers are not certain how they should apply the information acquired from financial documents.

## Determining the true value

The valuation of grain silos is a complex exercise thanks to the variables that affect its value. In this regard, it is important to include equipment such as conveyor belts, lifts and weighing equipment when determining the value of a grain silo, since it is an integral part of its functioning and simply due to the need for a silo to produce revenue. Taking away the equipment will produce a negative value, and the silo will then have to be demolished as there is no alternative use for it.

The future income of a grain silo cannot be foreseen due to the variables that affect the demand for its space. Therefore, these methods are difficult to apply to the valuation of grain silos in their standard form.

In the end, the selected method and information used will establish whether a valuation is market related or not. Indications are that grain silos should be valued using the income capitalisation method where income is calculated based on a long-term trend; expenses are calculated on financial information, and a capitalisation rate is calculated by adding risk to a baseline capitalisation rate.

## Valuation of commercial grain silos

The rate charged by most silo owners is based on a daily or a long-term rate. In the case of a silo with a long-term rate for a year's storage, grain can be stored for an entire season. In turn, grading and testing fees can be charged upon intake and dispatch of the grain.

The marketing years for each grain type differ due to the diverse types of grain harvested at different times of the year, including the grain and oilseed fees charged by the industry during a marketing year.

The storage and handling fees of a grain silo are based on marketing years. Let's for example look at storage cost, which can be the new escalated price for soya beans in April, while the maize price may still reflect the same price as the previous year. One should also take note that the income of a silo is based on the marketing year and not on the production year. Thus, there is a production year for grain, and it differs from the marketing year.

*Mkhondo grain silos in Mpumalanga. Demand for storage space is the single most important factor for determining the method of grain silo valuation.*

Silos sometimes have dryers that dry the grain to an acceptable standard for storing. Drying is charged on a R/ton basis and this is needed only if the moisture levels in the grain are too high. Some silos have equipment for sifting and these fees are also charged on a R/ton basis, which is applied when the grain sample consists of too much foreign material. Sifting, drying and other costs are viewed as pure equipment income, and movable equipment does not form part of valuations.

## Expenses to deduct

A silo manager usually supplies the valuer with a list of grain silo expenses, which typically include many business-related expenses such as clothing, vehicles, snacks and meals.

It is important for the valuer to have extensive knowledge of how a grain silo operates, and this person must be able to distinguish between property-related and business-related expenses. If the valuer cannot quite determine the actual expenses that have a direct influence on the property, he will have to discuss this with the silo manager who will be able to clarify the expenses that must be included and excluded.

Although something such as fumigation may seem like a business expense, it must be included in the expense. To ensure that the expenses included in the budget or financial statements are market related, it is important to cross-check all expenses.

The major expenses on a silo budget usually comes down to the following:

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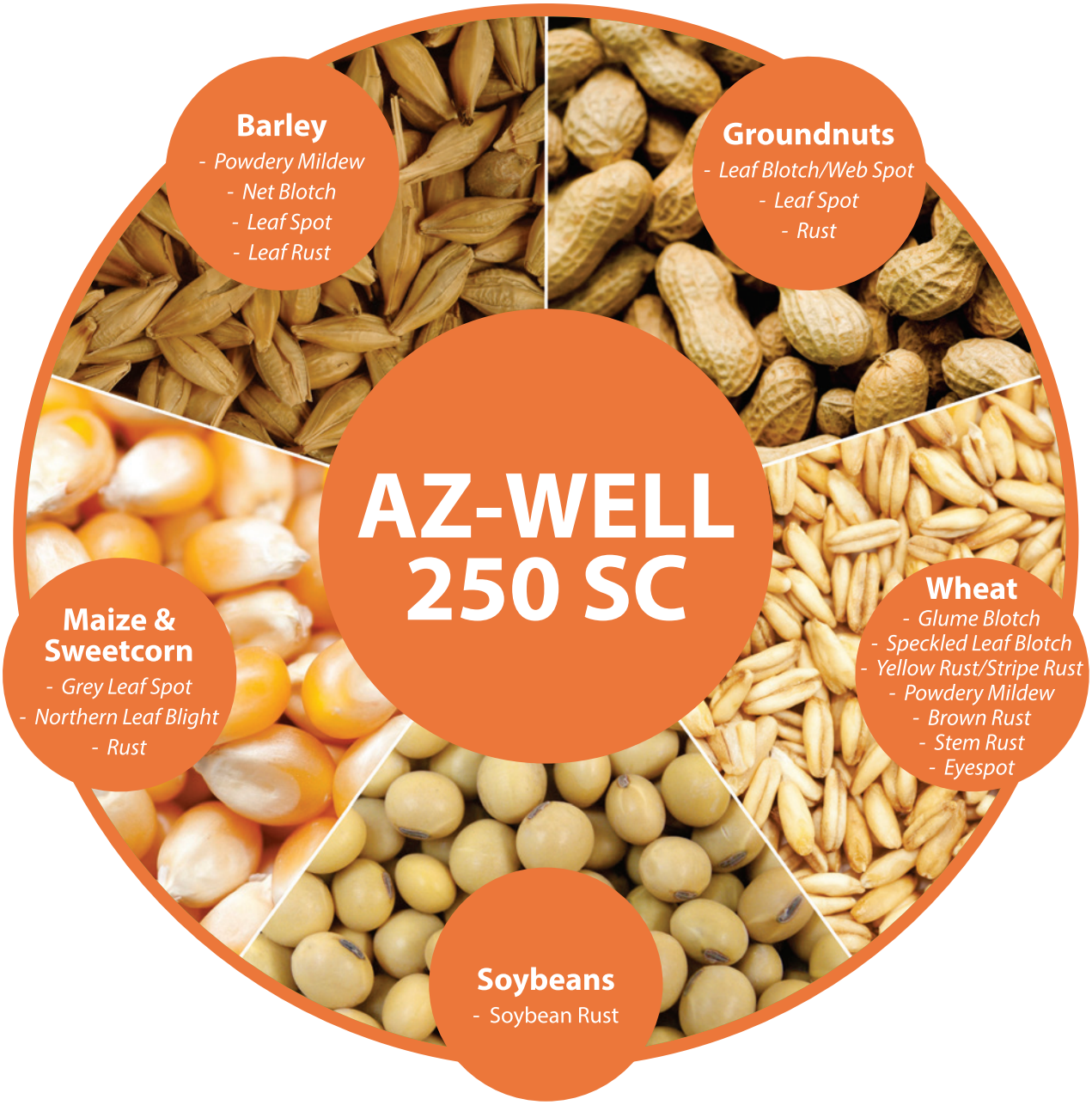



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*The grain silos of AFGRI in Ermelo, Mpumalanga. Grain silos are valued using the income capitalisation method of valuation, which means the income is calculated by analysing long-term occupancy figures and applying market-related tariffs.*

- Administrative expenses.
- Salaries and wages (excluded from valuation since it is considered a business-related expense rather than a property-related expense).
- Maintenance expenses (most of the property-related expenses fall under maintenance expenses, where the bulk of the outgoings should be).
- Financial expenses (these should be excluded from the valuation because they are business-related and not property-related expenses).

The net annual income is determined by deducting the expenses from the gross annual income. No deduction is made from the net annual income for vacancies (these are included in the calculation of the gross annual income based on a normalised occupancy rate).

## Capitalisation rate of a grain silo

It is not an easy feat to determine the capitalisation rate of a grain silo due to the lack of comparable sales. Therefore, the capitalisation rate must be calculated using information other than that of a comparable sale. The baseline capitalisation rate for grain silos is storage space or light industrial property.

It is, on the other hand, easy to determine a capitalisation rate of storage in industrial space by analysing sales of properties. A capitalisation rate is made up of a risk-free return, with the associated risk added to the risk-free rate.

The South African Institute of Valuers suggests that the valuer calculate the capitalisation rate by taking the following risks into consideration:

- Quality of tenants.
- Quality of the property.
- Length of the leases.
- Rental level.
- Terms of the lease agreement (how the rentals are renewed, escalation, etc.).
- Environmental and external deterioration.

## Grain silo-associated risks

The capitalisation rate for normal storage space typically includes a risk premium. To determine the additional risks associated with a grain silo compared to a normal storage building, one would have to compare the risks involved. The risk with a grain silo is slightly higher than with normal storage space due to the fluctuations in income, as well as the fact that the property has no alternative use.

Grain silos have proven over time that they have steady occupancy and, thanks to the fact that grain production will continue in future, the risk related to alternative use is relatively small. Let's say a grain silo was located in an area with an irrigation scheme where the occupancy of the silo is 75% or higher (an area where summer and winter grains are harvested in one year), then no additional risk would probably be added.

More research is needed on the following:

- Valuation methods must be tested with more grain silos to consider the effect of market volatility on the underlying asset.
- The impact of modern storage systems on the value of traditional concrete grain silos.
- The valuation of grain silos based on the rental of entire silos.
- A method of valuation to value silos with a lifetime of less than 50 years.

For more information, contact Christiaan Winckler on 072 434 5776 or christiaan@valuersa.co.za.

# Financing and grain storage: Change brings new opportunities

*By Derick Dahms, Corporate Coverage Banker: Agriculture, CIB Absa, and Kobus Truter, Head: Structured Commodity Finance, CIB Absa*

South Africa has one of the best developed agricultural sectors in the world. To have achieved this, the sector had to overcome infrastructure and logistical challenges, volatile rainfall and to a large extent, unequal domestic government support programmes. Despite this, the South African agricultural sector is one of only a few, if not the only in Africa, net exporters of agricultural produce to the rest of the world.

The grain industry developed over centuries to become the breadbasket for Southern Africa, with world-class technologies being employed to produce surplus stock, not only to be self-sufficient in the domestic market, but also to export grain worldwide.

> "Absa funds several million tons of grain annually. The cornerstone of the funding is Absa's confidence in the grain storage industry in South Africa."

Part of the grain industry's earlier success was the establishment of a silo storage network to accommodate the bulk of our grain produce. By introducing a network of intake points that were able to accept stock, and grade and maintain its quality over a period of time, the industry was able to support food security for a growing population and, in the process, also support economic growth.

The history of the development of the grain industry (grain marketing boards prior to deregulation), and the associated storage infrastructure, is well documented. Be that as it may, it should be reiterated that it established a basis for the further development of the physical and financial expansion of the industry after the deregulation of the industries in the 1990s.

After the deregulation of the grain marketing boards in the 1990s, producers were left to their own devices to find markets (price/buyers) for their produce. Grain prices were uncertain until Safex was established to act as the price-determining channel for primary grain commodities. Although no system is without challenges, the building blocks were now in place to support the development of the grain industry in the following decades.

## Financiers and commodity finance

Absa has since the early 2000s become an active participant in the funding of grains in South Africa. This applies to food processors, animal feed manufacturers, vegetable oil crushers, and traders who supply to end users and primary producers.

This opportunity was created only because of the following factors:

- A world-class reputable and capable storage operator industry.
- The independent and transparent Safex which allowed for physical delivery of stock.
- A well-established grain sector.
- A well-established financial industry that understood the agricultural sector and grain industry.
- Clients who supported the initiative and provided their knowledge and financial support to develop innovative funding solutions.

## Storage as a key enabler of finance

Absa funds several million tons of grain annually. The cornerstone of the funding is Absa's confidence in the grain storage industry in South Africa. By accepting that this industry is able and capable of managing the harvest, and ensuring that quality is maintained and guaranteed, banks can monetise the stock and provide funding to producers, traders, and the grain processing industry.

Many countries on the continent envy the South African grain industry for its ability to provide a world-class grain funding and trading solution with very few, if any, that have been able to duplicate the South African model. Among the reasons for this is the fact that the storage industry is entirely privatised as well as managed by the industry, for the industry, on a commercial basis. By offering storage on a commercial basis, infrastructure is well maintained, new facilities are being built in areas with demand, and staff are skilled in the very technical science of grain storage.

## Industry developments

Producers and non-traditional storers have been entering the grain storage market since the mid-2000s. The Maize Trust started to conduct research in 2008 to determine grain storage capacity and the location of grain storage facilities in South Africa. The findings were released in 2011 and indicated that approximately 1,66 million tons of additional new storage capacity had been created by 2 000 independent storers. This equates to an average of 830 tons per storer, which is too small to be offered as commercial storage facilities. What can be assumed is that this number is higher in 2021/22 and that more producers have built on-site storage capacity for own use.

Since 2019, the request from independent storers to fund grain in silos has escalated to the point where

it no longer can be considered the exception, but rather that a noticeable portion of the grain harvest is slowly being channelled to non-traditional silo facilities. The reasons are part commercial, part emotional; however, the fact of the matter is that the trend is not slowing down.

For the South African grain market, the benefit of an increase in storage capacity is that we are able to store more and more grains and, after the last few record grain harvests, the direct impact on the traditional storage industry was negligible. In a season when the country's grain harvest is again much smaller, the direct impact may be more noticeable.

## Criteria for funding

Absa has always done its best to be open to new and innovative ways of supporting the grain industry when it comes to client and industry needs. To this end, Absa was one of the first banks to fund grain in silo bags, which allowed for the establishment of alternative storage facilities closer to producers and end users. The development was an industry collaboration to meet the expectations of the client, storer and financier.

In the case of the financier, the following points need to be addressed when it comes to storage:

- The quality needs to be guaranteed/secure. This means the storage facility should be constructed in such a way that the quality can be managed. This includes the control of moisture levels; keeping breakage of kernels within industry parameters; keeping foreign material within industry norms; grading that must meet the standards set out in the *Agricultural Product Standards Act, 1990 (Act 119 of 1990)*; and possibly the most important aspect, the storer must possess the required knowledge and experience to manage the facility.
- The quantity needs to be guaranteed. This means the financier must at all times be comfortable that the funded stock will be in the silo, and that in- and out-loading will be done in accordance with the financier's approvals.
- The stock must be insured against natural perils such as water, fire, combustion, pests/diseases, and the facility must be insured against structural risks.
- The facility structure needs to be approved by an engineer.
- The storer must be financially sound and able to secure adequate working capital to manage the storage facility. In general, the storer would be expected to absorb part of the risk, such as quality disputes or stock swaps if out-loading is not possible.

*Photograph supplied by VKB.*

Over time, financiers have developed their own risk models to mitigate their funding risk, in co-operation with the client and storer. Some of these measures include:

- Pre-approval of all non-Safex storage facilities by an independent collateral auditor. These auditors have years of experience in grain storage and storage site management.
- Use of collateral managers to oversee the daily storage operations. This also means they act as the financier's intervention point when stock is in- and out-loaded.
- Use of internal auditors to oversee storage processes and annual review of service providers.

## In conclusion

The South African grain storage industry is a world-class industry which is supporting an ever growing and changing sector. New developments will continue to be part of the industry and are welcomed by Absa, with the expectation that change brings with it opportunities that will benefit the entire industry in the long term. Absa would like to thank the industry for their support and continued engagement.

For more information, contact Derick Dahms at 079 880 4476 or derick.dahms@absa.africa or Kobus Truter at Kobus.Truter@absa.africa.

# Potential quality and grading problems in the 2021/22 maize production season

*By Sierk Ybema, managing director, SYGS*

Summer in South Africa is currently characterised by extremely wet conditions and lower temperatures. These conditions have a negative influence on yield, grain quality and grading. However, higher temperatures and dryer conditions during February and March will create an improvement in yield potential and quality.

In terms of rainfall, comparative figures between 2005/06 and 2021/22 (marketing year to date) are shown in *Figures 1*, *2* and *3*. Given the similarity in rainfall, the industry can expect the same quality and grading problems as in the 2005/06 marketing year. From this, added Marlene Louw, senior agricultural economist at Absa, it is evident that the above-average rainfall was more severe towards the west of the country.

## The maize yield

Far below average temperatures in the first part of summer were experienced in the summer rainfall regions, especially in the Eastern Free State. As a result, the development of maize plants was delayed, putting potential yield under pressure – maize needs a certain amount of heat units to be able to produce a high-quality crop.

In the Western Free State, the extreme wet conditions created water-logged fields, with a major reduction in yield.

## Quality of grain

Maize kernels tend to become a lot softer in wet seasons, with a big reduction in milling index. This means a huge decrease in the commercial value of maize for processing facilities. The vitreous endosperm part of the kernel becomes smaller and softer, and this factor decreases the flour yield considerably. The reduction in the vitreous endosperm also has a negative effect on the breakfast and snack cereal industries.

According to a 2005/06 report by the South African Grain Laboratory (SAGL), the quality of white maize samples during that

**Figure 1: Comparative rainfall between 2005/06 and 2021/22 to date for the Free State. (Source: Weather SA, 2022)**

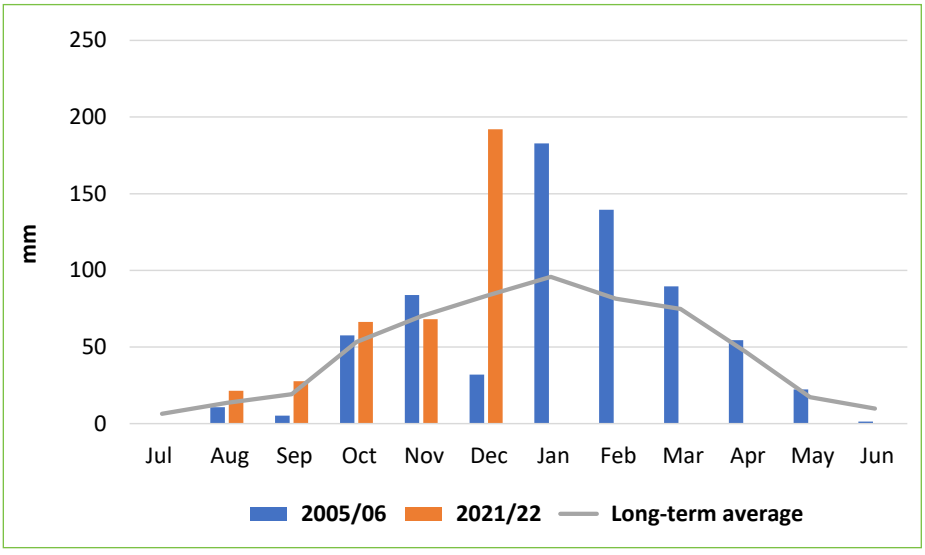
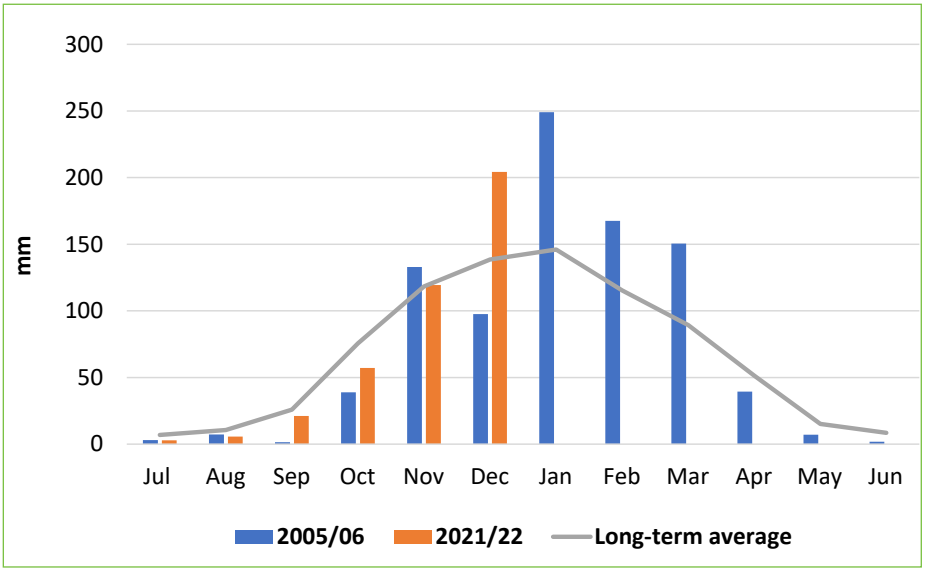



**Figure 2: Comparative rainfall between 2005/06 and 2021/22 to date for Mpumalanga. (Source: Weather SA, 2022)**



season was below average and downgrading was mainly due to *Fusarium* and *Diplodia*. In addition, explains Wiana Louw of the SAGL, the percentage of defective kernels was higher than the previous season, while the protein was somewhat lower that the ten-year average. Although the occurrence of stress cracks was not higher than in the previous season, the report does point to more break damage.

## Grading of grain

***Ear rot:*** Most pathogenic fungi species responsible for maize plant diseases prefer wet conditions. *Diplodia* and *Fusarium* ear rot are the most important types of ear rot that attacks kernels. Ear-rot infected kernels are part of mouldy kernels and count as defective maize kernels in the grading regulations for maize.

***Broken kernels:*** Maize kernels become considerably softer in wet seasons. Soft kernels tend to break easily during harvesting and handling, with an increase in defective maize that measures below the 6,35mm round-hole sieve, resulting in lower grades.

***Sprouted maize:*** Wet conditions late in the season, after the maize kernels are already physiologically matured, cause sprouting in maize kernels. Sprouted kernels count as defective kernels and may be responsible for lower grades.

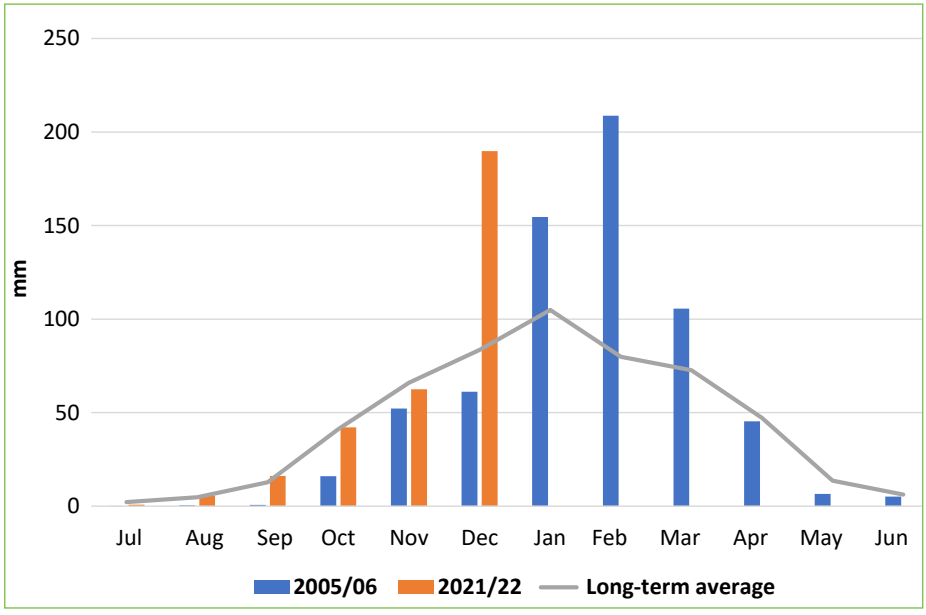
*Soft kernels tend to break easily during harvesting and handling, with an increase in defective maize that measures below the 6,35mm round-hole sieve.*

*Diplodia infected maize (count as defective).*

*Sprouted maize (count as defective).*

*Discolouration near the tip of a maize kernel (does not count).*

**Figure 3: Comparative rainfall between 2005/06 and 2021/22 to date for the North West. (Source: Weather SA, 2022)**




***Discolouration of kernels:*** Wet weather during the last part of the season leads to an increase in discoloured kernels. Maize kernels that are discoloured by external factors such as water and sun, count as defective kernels; however, discolouration on both sides of the maize kernel that is limited to less than a quarter from the bottom tip of the kernel, is not considered defective.

For more information, send an email to Sierk Ybema at zirk.ybema@gmail.com, Marlene Louw at marlene.louw@absa.africa or Wiana Louw at wiana.louw@sagl.co.za.

# Storage trends: Lessons from the European Union

*By Wessel Lemmer, general manager, Agbiz Grain*

According to a study commissioned by the European Commission in 2017, total storage capacity for grains and oilseeds amounted to 359 million tons. Storage capacity increased by 20% between 2005 and 2015, while crop production increased by 11% from 312 million tons to 346 million tons over the same period.

The increase in storage capacity was greater than that of production, with certain European Union (EU) countries having wiped out the shortfall in adequate storage capacity since 2005. France has the largest storage capacity (91 million tons), followed by Germany (48 million tons) and Spain (30 million tons).

## On-farm and co-operative storage

On-farm storage accounts for 40% (143 million tons) of total storage capacity in the EU. Co-operatives have limited storage capacity, amounting to 11% (38 million tons). Farming co-operatives in France are mostly vertically integrated in the value chain, and operate primarily as processors and traders. These businesses have sufficient storage capacity and are mainly located close to transportation hubs such as ports.

Countries such as Finland (78%), Poland (67%) and the United Kingdom (62%) have high storage capacity. The share held by farming co-operatives play an important role in countries such as Austria (37%), Lithuania (34%) and Germany (29%).

## Retail and wholesale storage

The sector plays a critically important role in terms of storage in the EU and makes up 115,5 million tons (32%) of the EU's total storage capacity. The share of storage capacity available to traders and managed by the latter is 56% in France, 49% in Bulgaria and 42% in Romania.

## Processor storage

Thanks to a high turnover rate, the processing industry in the EU can handle large quantities of grain and oilseeds, with a relatively limited storage capacity of 31 million tons (9% of total EU storage capacity). The same applies to the storage capacity at transportation hubs such as ports, which also amounts to 9% – this is of great strategic value for the trade in grain and oilseeds.

> "The EU Commission found that if storage requirements were based on the maximum storage capacity required during peak periods to handle production and exports, 22 member states would fall short."

In countries such as Slovenia, the processing industry holds 42% of the country's storage capacity, while it is 31% in the Czech Republic and 29% in Belgium. Storage capacity at transportation hubs (e.g. ports) amounts to 52% in Slovenia, 31% in Estonia and 30% in Belgium. These countries handle so-called transit storage and do not have the capacity to handle large production volumes.

## Storage capacity in the EU

The EU Commission found that if storage requirements were based on the maximum storage capacity required during peak periods to handle production and exports, 22 member states would fall short. It seems that storers guard against having too much storage space available that will probably stand empty most of the time. In the EU additional investment in storage capacity is thus limited to the average production level (plus a buffer) and not to the levels that would be required in peak production and export years.

Exports play a major role in the EU; when as much grain as possible needs to be exported during seasonal peaks, having enough storage capacity is crucial. The availability of temporary storage facilities such as silo bags and bunkers also help to address the need for storage during peak periods.

Investment in the construction of new storage facilities was seen mainly in the Eastern EU member states, where the production and export of grain were on the rise. Investments in Western Europe, on the other hand, focussed mainly on expanding on-farm storage capacity and upgrading the technology in existing silo infrastructure. Technological upgrades included handling equipment with greater loading and offloading capacity, an increase in the number of tubes or size of tubes receiving grain, as well as investment in aeration at facilities that did not have this previously.

Higher yields and associated exports increased the need for storage. Rising price volatility meant that more emphasis was being placed on strategic grain management, which in turn necessitated

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the availability of surplus storage capacity.

Processors such as mills, oil extractors and animal feed manufacturers had switched to 'just-in-time' inventory management models, which led to an increase in the concentration of storage facilities in the first section of the supply chain. As a result, the percentage share taken up by farms and agricultural companies in terms of storage capacity increased, while that of processors remained constant at 9%.

The need for differentiated products based on specific quality requirements also led to an increase in investment in storage capacity. Finally, the policy considerations of some governments played a role in the expansion in storage capacity.

## Investment in storage capacity

There are three types of investors that play a role in the expansion of storage capacity in the EU. Firstly, agribusinesses and co-operatives are upgrading their existing infrastructure by adding new technology. These businesses are also reorganising (rationalising) their existing business models in a bid to increase their operational efficiency. This may lead to acquisitions of other businesses or downsizing existing businesses, as well as a change in policy or strategy to increase revenue or save costs.

Secondly, similar rationalisation is taking place among processors in Western Europe, while businesses in Eastern Europe are investing in new storage facilities. Thirdly, there are export-oriented traders that invest in storage facilities at transportation hubs such as ports.

Investments in storage facilities can come from a few sources, such as own investments and venture capital provided by especially large-scale processers and traders. Producers and agribusinesses/ co-operatives have access to public funds to expand their storage capacity.

## Role of transport infrastructure

Due to the sharp increase in EU exports, more emphasis is being placed on the need for adequate transport infrastructure to eliminate bottlenecks. The biggest cause of the transport-related bottlenecks in the EU was in fact due to expansion in storage infrastructure to accommodate increasing production and exports.

Similar to what is seen at the Port of Durban, the EU is also experiencing serious congestion problems in its waterways, such as the Danube River, and parts of the German railway network that have not been electrified. This is why the importance and needs of the storage sector should not be overlooked in the agricultural and agro-processing master plan (AAMP). This would be a costly mistake when viewed against the impact the storage sector can have on economic growth.

Exports in France, for example, experience few bottlenecks thanks to surplus storage capacity and state-of-the-art logistics infrastructure. Hungary, Romania and Bulgaria's exports also increased sharply due to sufficient surplus storage capacity.

"Investments in storage facilities can come from a few sources, such as own investments and venture capital provided by especially large-scale processers and traders."

Export-oriented traders in the EU have learned that investing in additional storage infrastructure, especially at ports, is critical to support grain and oilseeds production and exports. An integrated approach – taking into account both transport and storage infrastructure – is needed during the planning phase. From this it is clear that South Africa does have its share of problems, but that these problems are not unique to the country.

## The South Africa scenario

From a study commissioned by Agbiz Grain, the Bureau for Economic Research (BER) found that the average size of silo complexes included in the study was 70 000 tons (storage utilisation is 80 to 90%). The BER also found that the profit realised varied between 2,1 to 3%.

Compared to the five-year average return of 5,3% that can be earned on the JSE, grain storage is not an attractive option for investors. To boost investment in storage capacity, either the income from storage must increase, or the productivity and utilisation of silo complexes in South Africa must improve in order to maximise profits. With an efficiency factor of between 80 and 90% utilisation, chances are slim that the available storage capacity can be expanded through improved productivity to maximise cost-effectiveness.

Agbiz Grain members, which include eleven agribusinesses, are involved in more than just the storage of grain and oilseeds. These eleven agribusinesses handle 67% of the volume of grain and oilseeds, while on-farm storage by new entrants in the storage sector and producers has increased to around 33% of the local market since deregulation.

Some of the former co-operatives that were only involved in storage during the single-channel marketing system are today large agricultural companies that, as in the EU, are vertically integrated into the value chain. These agribusinesses are members of Agbiz, Agbiz Grain, the South African Cereals and Oilseeds Traders Association (Sacota), the Animal Feed Manufacturers' Association (Afma) and even the South African Chamber of Milling.

In the EU, the storage sector also enjoys government support for building new storage capacity, while this is not the case in South Africa. Similar to the EU, South Africa's production and export of grain crops have also increased over time. The storage capacity needed to meet these new requirements must be set up somewhere without government support. Observations indicate that new processing plants and associated storage facilities are being erected without taking transport into account.

Portions of this article were adapted from the *Study on storage capacities and logistical infrastructure for EU agricultural commodities trade (with special focus on Cereals, the Oilseed Complex and Protein Crops (COP)). European Commission, Brussels, November 2017*. For more information, email Wessel Lemmer at wessel@agbizgrain.co.za.

ReMaCon YFEL

# A quick-to-install versatile storage solution

Yfel is a range of versatile precast concrete barriers, inspired by the Eiffel Tower, which is finding favour across industries as a quick-to-install and effective means of creating bunkers which separate areas and products.

The speed of installation is but one of the many benefits of the Yfel system. The Yfel barrier, designed and manufactured by Concrete Manufacturers Association (CMA) member, ReMaCon, is an ingenious barrier that can be easily transported and erected on site as an alternative to permanent immovable structures. Whether in a stockyard to prevent material contamination, a security barrier with an anti-climb curve, or even as a traffic or noise barrier, the Yfel system has few peers when it comes to its sturdiness and versatility.

The steel reinforced Yfel has a strength of more than 45MPa, which allows the product to withstand significant forces in comparison to a standard double-brick wall. Yfel can also be reinforced for heavier material storage, should it be necessary.

According to Silvio Ferraris of ReMaCon, the idea behind the Yfel is to provide easy-up barriers with sufficient sturdiness to be used in heavy-duty or even permanent applications. Should the need arise, however, they can be uploaded with a forklift and their positions changed, or they can be transported to a new area. What's more, the barriers are available in several other configurations, including corner units and a variety of angles, should corners need to be rounder in shape.

## Benefits from a project perspective

Yfel obviates the need for a project team as it is a temporary structure and, provided the ground has been prepared, is a simple placement operation. This reduces the number of people on site for an extended period, thus minimising the health and safety aspects of having other workers on site, an aspect that has become more relevant in terms of Covid-related concerns and compliance.

The speed of installation can also mean a significant cost saving in terms of not requiring a project team to manage the process, with all the associated costs of time allocated to the project and the generation of tenders.

> "The speed of installation is but one of the many benefits of the Yfel system."

The product is an asset as it can be reconfigured, moved to another site according to a new requirement, and even be sold off once it has served its purpose.

## An ultra-versatile barrier

The moulds are standard steel moulds sized in accordance with the standard product line-up. Additional fitments

*Yfel barriers being used to separate fertiliser products in storage.*

*Yfel barriers at one of GWK's bunkers.*

can be bolted on to produce anti-climb curves or other shapes as required by the customer. Reinforcing and concrete strengths are done in accordance with the original design, but can be modified to allow for the special requirements of customers.

ReMaCon also recommends placing the Yfel barriers onto flat, hard surfaces, anchored into the compacted ground or concrete slab through the base holes provided, and joined with linking plates. While they can be free standing, this limits movement when machines get too close. If the prevention of cross contamination between the Yfel joints is critical, the option of full-length linking plates between the barriers are easily added.

## Customer sectors

Yfel barriers have been well received across several industries and are already in use in industrial applications such as chemical facilities, aggregate stores and building suppliers' yards where they are used as bunkers to separate different grades of products. The curved anti-climb barrier types have further been used to deflect wind to prevent fine particles from being blown away in these yards, as was done at Consol Glass in Nigel.

The fertiliser industry has found the Yfel's versatility of value with companies such as GWK, AFGRI, VS Agri, VKB, Multi Green, Beefmaster and Kimleigh using these barriers for product separation. VKB is using Yfel barriers to prevent spillage into doorways, thereby allowing more effective use of their storage space, while Sappi makes use of these barriers to separate pallets, thereby promoting fire safety. Customers are finding new applications of Yfel barriers all the time!

> "Yfel barriers have been well received across several industries and are already in use in industrial applications"

ReMaCon is based in Chloorkop, Kempton Park, allowing the company to service the market in KwaZulu-Natal, with customers such as Grindrod in Durban and Access World in Richards Bay. Bathco in Maputo is also making use of this system, and the logistics of backloads make serving these widespread geographic markets effective. Locally, Yfel has also found favour in the agricultural sector.

## ReMwall, feed troughs and vaults

The ReMwall is used for boundary purposes, with heights ranging from 2 to 4m with the option to have the anti-climb feature. The ReMwall is produced from self-compacting concrete, with steel reinforcing offering a more secure barrier than brick or palisade fencing.

After numerous requests from producers who were unhappy with what was available, ReMaCon developed feed troughs for sheep and cattle which are strong enough to stand up to the tough demands of feeding the animals. The units


*The AFGRI project is described in more detail in the YouTube video, Remacon Yfel in action at AFGRI Devon.*

are modular and come in 1,2m sections, which can be added on as required.

Adding to our impressive array of products, ReMaCon has developed high security vaults which are designed to prevent the theft of valuable items, such as cell phone tower batteries and pumps. This is especially applicable where items are stored remotely, as the heavily reinforced vault with its rebar and recessed lids make access very difficult.

For more information, contact Christopher Cosgrove (Yfel and ReMwall products) on 082 880 0184 or christopher@remacon.co.za; Joetsie (Yfel products) on 027 217 1600 or visit *www.joetsie.co.za*; Stephnie du Plessis (ReMaCon feed troughs) on 011 393 5504; Silvio Ferraris (ReMaCon vaults) on 082 851 9512; or visit *www.yfel.co.za* or *www.remacon.co.za*.

# Possibilities of blockchain for grain and oilseeds handling and storage

*By Sinisa Vukovic, R&D scientist, MineRP*

Blockchain is a concept of a distributed ledger for digital transactions. Its most popular version, and one of its earliest, is the digital currency Bitcoin. It allows any two willing parties to transact directly with each other without the need for a trusted third party. The implementation of blockchain technology for tracking the movement of grain and oilseeds between the farm and market, seems to be a perfect match.

## Anonymous and transparent

Similar implementations have already been demonstrated in other sectors. A popular example is Blockchain Chicken Farm where free-range chickens were equipped with bracelets and tracked via GPS. The farmer never knew who the buyer was, the buyer did not know the farmer, neither one knew how blockchain worked, but both knew exactly where each chicken was at all times.

This example demonstrates two great advantages of blockchain technology, namely anonymity and transparency. Participants in a blockchain network are assured of their anonymity and given the opportunity to audit all transactions on the network at any time. These are two features unique to blockchain.

Anyone on the blockchain network can use its attributes (in the case of the chicken its position) as information to plan – alone or with other participants – for a more predictable future. An important assumption built into blockchain is that a predictable future is better for all participants. Of course, a minority of participants can use anonymity to conduct dishonest acts; but not to worry, another great advantage of blockchain is that it has a built-in mechanism to defend itself from such actions.

These advantages – and risks – are not exclusive to blockchain. Other technologies have them as well. However, there is obviously buzz about blockchain. Furthermore, one might ask: why not show other examples of successful implementation of blockchain concepts? The reason is that the success cannot be correctly interpreted unless one is aware of the inner workings of blockchain and the motivation to make it work the way it does.

## The way blockchain works

When a network of computers receives a call for a transaction, it adds an additional string of characters (hash) to an existing chain (information) of blocks (encrypted), which is then shared with all other computers in the network (distributed ledger). Therefore, the longest chain (one with the latest additions) is the one that the network takes as truth.

Now, how does it eliminate the need for trust? If an attacker wants to 'double spend' its digital tokens (in other words, try to use the same digital tokens before the previous transaction has been authenticated by the majority of other machines in the network), one will not be able to do that since other computers will be aware of the history of transactions (in the longest chain) and will deny such request.

The attacker is faced with an impossible task of speeding up generation of a false chain (the second fraudulent transaction of double spending) that is longer than the initial transaction, while submitting for authentication after the initial transaction.

The only option for an attacker is then to change the truth by introducing a majority of computers into the network to support its own version of the truth. Therefore, the provider of blockchain technology mediating peer-to-peer transactions, cannot appear to be a third party in a process whose explicit purpose is to eliminate the third party.

## Disadvantages of blockchain

This gives rise to some disadvantages of blockchain technology, namely that machines participating in the distribution of a digital ledger must contain mostly honest participants, and authentication is not even close to real-time. The time it takes to confirm and accept the latest chain as the truth – especially if on a global scale – can be as much as 24 hours.

However, real-time information flow might not be crucial for storing grains and oilseeds. For example, the network covering farmers, silos and buyers in South Africa could be easily handled in an hour. Yet the speed of trading contracts, futures and options cannot be handled. There are approximation methods to speed up the time to authenticate transactions. This is done by assuming the validity of the transaction and checking it later. However, approximation destroys the purpose of creating this technology (i.e. trusted transactions are trusted because they are verified, not assumed to be verified by other participants).

Approximation has the same effect on the number of honest machines in the network. Many companies have tried to introduce blockchain to prospective clients with a genuine offer to improve the process by providing the required servers in their own supercomputing centres. However,

the mere fact that they (or companies associated with them) are controlling the machines (as a third party) casts doubt on the original blockchain motivation.

"The system is secure as long as honest nodes collectively control more CPU power than any co-operating group of attacker nodes". This may be applicable to a tech savvy cryptocurrency participant, but farmers cannot maintain the top-of-the-line machines at home which are required to hash and process transactions of all other participants in the network.

> "Only a part of the information that blockchain distributes is information relating to the items being tracked. These items can be containers on a ship, a chicken, iron ore or grain."

This brings us to the overheads brought on by blockchain. The need for computational power is evident only after one realises how much computation is required to maintain redundancy of information and keep track of even a single transaction. Running the network for 24 hours requires an exuberant amount of computation time. This, in turn, requires distributed hardware infrastructure, which in turn requires continuous power backup, maintenance support, cooling facilities and occasional replacement of all hardware to stay ahead of attackers.

## No third parties allowed

Perhaps the disadvantages tell us something about required modifications to blockchain implementation. Blockchain is a peer-to-peer tool so there cannot be a third party. Whoever is to enable peer-to-peer technology must not have an interest, or a perception of interest, in the transactions themselves. A farm signing up for blockchain cannot be put in a position to be at the mercy of those who are there to help them. This is the position into which banks place their users and the reason why Bitcoin has been invented.

As social media users, most of us are aware of the predatory behaviour of the big tech companies. This happens because the network is maintained by a third party with its own goals, instead of by the group of users themselves. To avoid this pitfall, big companies offering blockchain are transferring their technology to open-source foundations, making them participants in the technical process instead of being able to manipulate it from the inside.

## Tracking of commodities

Successful implementation of blockchain for storing grains and oilseeds is highly dependent on the tolerance for uncertainty by all the parties involved. Maize, wheat, sunflower, soya bean and sorghum arrive from different farms and are stored in their respective concrete silos – so mixing of products from different suppliers is unavoidable. In addition, tracking of every kernel of grain is impossible. As such, the balance between tagging every grain and avoiding grain mixing must be in everyone's interest.

An identical situation is dealt with in mining. For example, multiple mining sites bring iron ore to a central site that processes it, stores it on stockpiles and moves it onto trains according to buyers' specifications. Mixing of ore at stockpiles or on trains is unavoidable. Tracking every rock is impossible.

One way to track ore is with steel balls that contain a code with a complete specification of the ore's attributes (this code can be part of blockchain). The amount of steel balls is determined by the amount of mixing. This puts a burden on storage handlers. However, blockchain offers relief to storage handlers because frequent tagging and constant transparency in terms of government oversight is a type of digital passport that eliminates the need for costly (and in this case redundant) inspections.

## Parties involved in transactions

The most important parties are the farmers and clients. They are the reason for the blockchain in the first place. Then comes the storage providers. They are a necessary physical enabler between farmer and buyer. The third interest to be represented is that of the government or regulatory body. Lastly is the interest of the blockchain provider. They consider others' interests and enable farmers to provide transparency of chemical content, physical condition, geographical trajectory and chronological history of their grains to other parties.

Blockchain also offers storage providers information that may be used for smart contracts. Smart contracts are automated what-if scenarios (which has nothing to do with blockchain). However, when information gained from tagging is added, then contracts gain much more certainty to what is traded, what is delivered, what is exchanged, even what options and futures can be offered.

Finally, if eliminating a trusted third party is not the goal, but tracking and transparency of information is still paramount, then blockchain is not the only option. Only a part of the information that blockchain distributes is information regarding the items being tracked. These items can be containers on a ship, a chicken, iron ore or grain. Or they can be virtual such as images or videos using nonfungible tokens (NFTs). Or it does not have to be items themselves, but records of the item's transaction (monetary or not).

However, if information about the item is what needs to be trusted during the handling and storage, then radio frequency identification tags (RFID) can be used for grain and oilseeds, while a variety of bank seals used for tracking and authenticating every single banknote on the planet can be applied for smart contracts. Of course, one can mix-and-match and try a blockchain-like approach.

References available upon request. For enquiries, contact Sinisa Vukovic at svukovic@minerp.com, or Empie Strydom, vice president: marketing at MineRP South Africa (Pty) Ltd, on 083 254 4138 or estrydom@minerp.com.

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santam agriculture

# Blockchain technology: Uses and opportunities in agriculture

*By Jaco Maass, co-founder and CEO, SDX Africa*

The world food production sector remains one of the few bright stars in an otherwise dysfunctional and disrupted world economy. All indications are that this will remain the case, driven by underlying forces such as population, urbanisation and the expanding middle classes. Not only are the economic foundations healthy, but food security, along with health care, are topping the list of most governments' priorities.

Food plays a crucial part in human culture and is necessary for the wellbeing of people. However, the industry is faced with a fundamental transformation if it is to meet the challenges of an increasing global population. The reality is that we need to produce 30% more over the next 25 years through a healthier and more nutritious food system that is sustainable, efficient and inclusive.

A revolutionary approach based on technological investments, mutually inclusive collaboration ecosystems and value chain incentives is required to address food-system issues. The food and agricultural sector lags considerably behind other technological investment and uptake sectors, despite the need for agricultural technology to address these needs.

## Transformative technologies

The World Economic Forum identified twelve technology-affecting food systems that, if scaled, could have significant positive impacts on food systems by 2030. These T12 technologies, which can be categorised into three groups, are shown in *Figure 1*.

The South African producer can testify first-hand to the advancements of precision farming, the enhancement of crop resilience, gene editing and biological-based crop protection. Even off-grid renewable energy generation projects are visible all over the country.

Over the past four years, a lot of investment has gone into developing technologies that support traceability initiatives. Foodborne illnesses alone cost South Africa some US$2,5 billion in 2016, and this does not even include the effect of the foot-and-mouth disease outbreak that halted the trade of wool

**Figure 1: The T12 technologies that could have a sizable impact on food systems.**

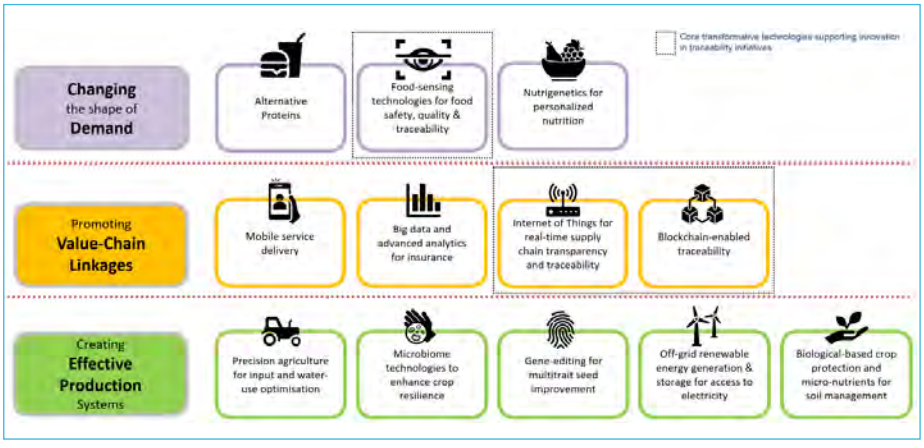
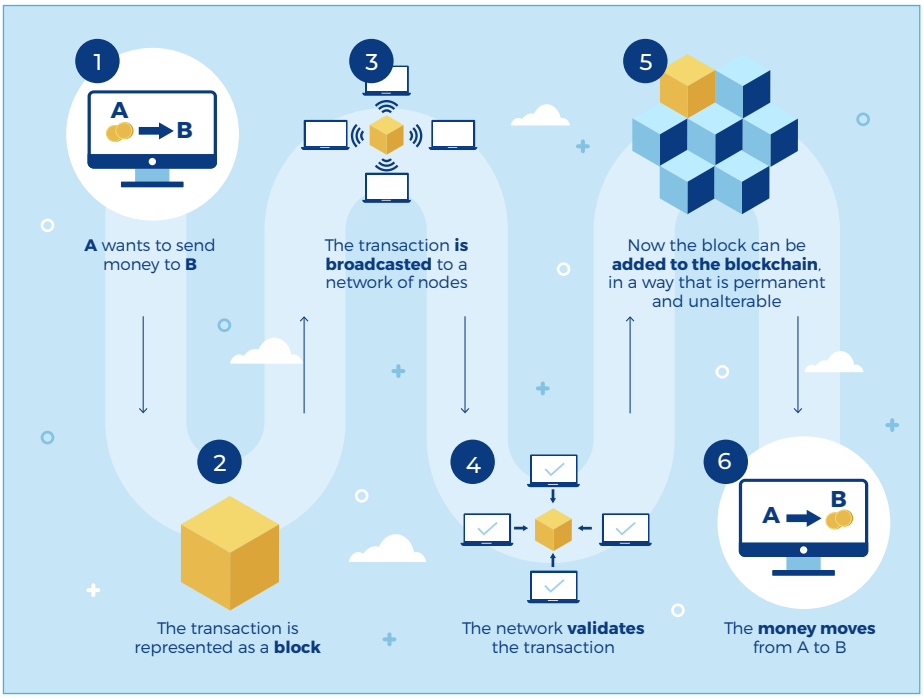


**Figure 2: How a blockchain transaction works.**




and livestock in 2019. Technologies that support traceability has the potential to address some of the biggest challenges of the food supply chain.

## Food supply chain traceability

Traceability can improve supply-chain visibility to provide demand-driven customers with more transparency when it comes to food production. It minimises fraud, improves food safety, increases supply-chain efficiency and reduces food loss. Furthermore, this visibility may enable the recording and calculation of food system externalities to support sustainability goals, as well as help empower producers by connecting them to markets and offering affordable access to capital.

End-to-end traceability enabled by technology would be a significant shift in today's supply chains. It can provide comprehensive and consistent data collection along the supply chain. The use of new distributed ledger technology (also known as blockchains) allows for easy sharing, aggregation and analysis of data, which could significantly benefit the supply chain.

If you've heard of blockchain, it is probably because of its importance in cryptocurrencies such as Bitcoin. The same qualities that make blockchain so crucial for safe cryptocurrency transactions also make it helpful in various other situations. In reality, blockchain can assist food supply chains, which are notoriously complicated, to become more transparent and traceable, if properly utilised.

## Blockchain technology

Blockchain aims to provide a new method of working together through decentralisation. At the same time, it is important to remember that decentralisation is not an all-or-nothing goal, but rather a balanced one that often necessitates trade-offs for practical reasons. As a result, a supply chain needs both centralised and distributed components. The industry's information technology solutions have traditionally been a patchwork of centralised components, some of which may cause compatibility issues or other challenges. The introduction of blockchain technology offers the possibility of solving some of these issues.

Blockchain acts as a ledger for recording transactions at their most basic level. It possesses two features that make it ideal for food supply chain management. Firstly, as already mentioned, it is decentralised. Instead of a single ledger recording transactions, the ledger is distributed over a network of nodes, each keeping a copy of the recorded transaction. This means that anyone with appropriate permissions can log into the ledger and view changes in real-time, regardless of where they occur.

Secondly, transactions on the blockchain cannot be hidden or manipulated. To be verified, everything entered in the ledger requires network consensus. It must be recorded in the same way on each ledger. As a result, deleting or altering items creates a record of when and by whom it was erased throughout the entire network.

This combination of a distributed methodology and 'always on' recordkeeping is what supply chain managers require to transform complexity into transparency. Transparency refers to the ability to identify an item in the supply chain and determine where it is, has gone, and will go next.

## Controlled visibility

Blockchain's unique qualities address the inherent blind spots in today's supply chains. The distributed approach of blockchain, for example, reduces the time delay between something happening in the supply chain and the system updating the state. Just think of the opportunity to unlock value-chain financing if inventory and financial information are updated in real time. Everyone with the appropriate permissions may see exactly where the unit of value is. As a result, comprehensive transparency into transactions between retailers, suppliers and financiers is possible for the first time.

> "In reality, blockchain can assist food supply chains, which are notoriously complicated, to become more transparent and traceable if appropriately used."

This improves co-ordination and streamlines interactions between parties, while the inability to tamper with information increases trust. For this reason, Walmart, the largest retail company globally, sent out a letter in 2020 urging their suppliers to track their products using blockchain. According to the statement, tracking down essential data from many sources is extremely time consuming as it uses the old paper-based technique

of gathering information used at many farms, packhouses and warehouses.

The concept of food traceability was tested within Walmart in 2016 when a team was asked to track down the origins of a bag of sliced mangoes. It took them six days, 18 hours and 26 minutes to complete the task. Even though all the data was available, getting to the information took time. Walmart can now monitor mangoes held in its United States stores within 2,2 seconds or, as they would refer to it, at the speed of thought!

## Opportunities for the grain industry?

The merging and mixing of grain at the storage and transportation stages presents a challenge for the use of blockchain. However, using the most recent advances in this technology, the grain industry can develop a strategy to resolve industry-wide issues such as inefficient processes based on manual data entry and paper records. Furthermore, limited traceability, fraud at all stages of the supply chain, large and small-scale corruption, payment delays, access to the commodity futures market, and a challenging financing cycle are some of the real issues that can be addressed.

> "Transparency refers to the ability to identify an item in the supply chain and determine where it is, has gone, and will go next."

The industry is advanced in the use and understanding of contracts. Blockchain technology, however, takes this concept a step further with the introduction of smart contracts. Smart contracts are agreements between parties that self-execute when the conditions of the agreement are met.

Integrating into business applications that feed commodities data from sensors and IoT devices into the blockchain, allows the platform to validate the terms and initiate contract execution. This implies that banks and contract holders get paid first, producers are paid faster and more readily than ever before, and the buyers obtain immediate marketable title to the commodity.

## A new way of working

Blockchain technology can provide a version of the truth in the agri-food system, allowing the production process to be trusted, traceable and transparent. While it does not solve farm data problems on its own, it can be a powerful catalyst for new ways of working, allowing for greater accountability and consensus, and providing a single view of the commodity's value in real-time for bankers, growers and traders.

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# Cyber attacks in the grain industry: Yes, it can happen to you

*By Prof Doug Jacobson, director: Center for Cybersecurity Innovation and Outreach, Iowa State University*

Most people affected by cyber attacks will wonder why they were a victim of the attack, often asking "Why me?" In many cases, the attack is not targeted at them specifically, but they fell victim to a cyber attack. Others ask why specific sectors or industries – including agriculture – have been targeted in recent months.

To help people understand, we need to explore the attacker's motivation. In most cases, it is simple – they want money.

## Money, money, money

If an attacker's goal is to make money, they will try to steal money or data, or they may hold users' systems for ransom.

Stealing money from an organisation typically involves interacting with staff through various scams. These scams typically use emails, phone calls or text messages to interact with the victim. The premise of the scam is often to convince someone to transfer money, purchase bogus materials or give up access to bank accounts.

## Data breaches

Stealing data is another tactic, and depending on the type of data, they may convert it into money by selling it or they might use it to gain a competitive advantage. Attackers target companies that possess customer data, because if they are successful, they can get thousands – if not millions – of records, which increases their potential payout. This is referred to as a data breach.

While data breaches and theft of money have targeted all sectors and businesses for years, we have seen a new attack that is becoming more common in the agricultural sector called ransomware. While the ultimate goal of ransomware is to obtain money, they attack more than just data to accomplish their goals.

Ransomware is software that encrypts all of the data on the infected computer systems and can make the computers unusable. Cyber criminals will then demand payment in cryptocurrency for the key to unlock systems.

An attacker will target systems and processes that will cause an organisation the most disruption. A typical processing/storage operation has three types of systems that can be targeted, each having a different impact on its ability to function, namely business/data systems, process systems and control systems.

## Access to business/data systems

The systems that support the organisation's business operations are often the systems most exposed to the internet, and are most likely to be targeted. A successful ransomware attack against the organisation's systems will disrupt its ability to interact with customers and process orders. The lastest versions of ransomware attacks also threaten to expose the data if an organisation does not pay. This

combines the threat of a data breach with the disruption of services.

## Access to process systems

Agricultural processors will have a series of systems that manage the data process. These systems are critical to the operation of the organisation. Depending on the nature of the process, this could cause a shutdown of operations. For example, an agricultural organisation may not be able to intake grain. This type of disruption could be more costly and have a long-term effect on the organisation.

There have been instances of process disruption in the United States. In some cases, the victim paid the ransom, because the cost of being unable to operate was greater than paying the ransom.

## Access to control systems

An attacker that gains access to systems dedicated to the control and operation of equipment could cause physical damage. The threat against the control systems from ransomware is not much different from the process systems – for instance, the organisation cannot process grain. The primary difference is that if the process systems are shut down, an organisation could potentially revert to a manual process.

The biggest threat to the organisation during an attack on the control system would be physical damage. And while these are rare, there have been several documented cases of attacks against power, water and pipelines that caused outages or physical damage. Most of these would be classified as terrorist attacks.

## How attackers carry out their plans

Ransomware is a subset of a larger category of software called malware. Malware is a program that must be loaded onto a computer and then executed on the computer. If an attacker uses malware as a means to attack, they must figure out how to either persuade users to download and execute the malware onto the computer, or persuade users to give up their login credentials so that attackers can download and execute the malware for them.

Attackers use social engineering to convince users to download the malware. In some cases, the attacker has chosen their victim and will create emails, and other social engineering tricks, that are customised based on information they have gathered on the victim. In other cases, attackers send phishing emails to an extensive list of users, hoping someone takes the bait and downloads the malware. Either way, the goal is to get the email recipient to download and run the malware.

In past years, attackers have moved away from attaching malware to an email and moved towards convincing people to go to a website that will persuade the user to either download the malware, or to trick them into giving up their username and password.

> The systems that support the organisation's business operations are often the systems most exposed to the internet, and are most likely to be targeted.

Therefore, malware can be placed on an organisation's computer, using an employee's username and password. There are many ways an attacker can obtain passwords, such as guessing the password based on the user's information that is pubically attainable.

Besides the deployment of ransomware, the attacker needs to receive money from the victim. Cryptocurrency has become the payment method of choice because it is untraceable. Before cryptocurrency, attackers resorted to using gift cards or other methods that may have limited the total dollar amount that could be transferred from the victim.

## Mitigation tactics and prevention

While we have seen an increase in successful attacks, there are several things an organisation can do to prevent attacks and be prepared if something happens. Consulting local cybersecurity experts is always an option, to help develop a plan and implement security measures.

**Multifactor authentication:** Enabling multifactor authentication on websites that have highly sensitive information, such as online banking, makes it nearly impossible for attackers to access an account. Attackers would need the correct username and password, as well as cell phone or email account information connected to the user's account.

**Segmentation:** Once ransomware gains momentum, it moves from computer to computer. In most organisations, all of the computers are interconnected with no additional protection to help separate them. At a minimum, the three types of systems – business, process and control – should be separated. Working from home makes it more challenging to provide separation. There are documented cases where remote access to the control systems was compromised, and attackers were able to take control of the system.

**Backups:** Backing up data is like insurance – it is something everyone needs but hopes to never have to use. The reason for backing up data to a secure storage point, such as the cloud, is to be able to recover the data later. While backups do not prevent attacks, it helps recovering from attacks.

The cloud provides off-site backup, so if equipment in an organisation is destroyed or unattainable, data that is backed up to the cloud is accessible. As ransomware has evolved, it will also try to encrypt back storage, so users and organisations must be sure to select a backup system with protection against ransomware.

**Planning:** Organisations must develop a plan on how to handle cyber attacks and who to contact in case of an incident. There are many examples of cyber security plans, and this is a good time to involve outside security experts.

**Practice:** Being prepared for a cyber event is critical to reducing the impact of a cyber security incident. Preparedness goes beyond having a well-trained cyber security workforce. It involves the entire organisation. Having a plan is also not enough. Organisations must practice their strategy. Holding tabletop exercises provides organisations the opportunity to practice and uncover weaknesses in their plans.

For more information, send an email to Prof Doug Jacobson dougj@iastate.edu.

# Prepare to comment on the Agricultural Product Standards Amendment Bill

*By Annelize Crosby, head: legal intelligence, Agbiz*

The *Agricultural Product Standards Amendment Bill* seeks to amend the *Agricultural Product Standards Act, 1990 (Act 119 of 1990).* The *Act* provides for control over the sale and export of certain agricultural products, control over the sale of certain imported agricultural products and control over other related products.

Various deficiencies in the *Act*, which necessitated the amendments, were identified. A key deficiency was identified in the definition of the management control system, which covered all management systems pertaining to inspection, auditing and production practices, and was found to have not been correctly captured to fully address what was intended.

## Purpose of the *Bill*

The *Bill* was introduced in parliament on 16 August 2021 and will be dealt with by the Portfolio Committee on Agriculture, Land Reform and Rural Development. An amendment *Bill* was also introduced in parliament in 2017, but then withdrawn by the minister in 2018. The portfolio committee is expected to call for written submissions on the *Bill* and host public hearings during the first half of 2022.

The main purpose of the *Bill* is to:

- Provide for the clear and effective application of management control.
- Provide for the auditing of a product for quality control.
- Make further provision for matters to be prescribed.

## Change in definitions

The definition of an 'assignee' will be amended to specifically provide that such an institution may not have a direct or indirect interest in the product concerned. The definition of 'audit' is inserted as well. Audit means a systematic and functionally independent examination of the management control system, in order to determine whether activities and related results comply with the claims associated with the product.

The definition of 'management control system' will be amended and it is proposed that it reads as follows: "means the manner or method of production which may be claimed through the use of a name, word, expression, reference, particulars or indication in any manner, either by itself or in conjunction with any other verbal, written, printed, illustrated or visual material, in respect of the sale or export of a product."

Exporters, farmers and sellers may benefit from guarantees that can accompany claims such as 'organic' and 'free range', among others, that may be authenticated. Consumers will also benefit from being protected against misleading claims and thereby getting value for their money. The quality of products offered for sale will also be enhanced. South Africa may have a strengthened food control system as a consequence of the anticipated proposed changes, which will serve as a good base for the facilitation of trade and market access.

The definition of 'sell' will also be amended to read: " 'sell' includes to offer, advertise, keep, expose, transmit, convey, deliver or prepare for sale, or to exchange or to dispose of to any person in any way for consideration or otherwise, and 'sold', 'selling' and 'sale' have a corresponding meaning." The phrase "or otherwise" that has been added indicates that even if no money has exchanged hands, an action can still be regarded as a sale.

## Clause 2 – Assignees

Clause 2 of the *Bill*, which will amend section 2 of the *Act*, provides that the minister may designate as an assignee, for the purpose of inspection of a commodity for quality control and auditing from a management control system, an entity, undertaking, body, institution, association or board who or which, as the case may be, has particular knowledge in respect of the management control systems related to that product.

This wording means that knowledge of the product will no longer be sufficient, but knowledge in respect of the management control systems of the product will be required. This definition should then be read with the definition of management control system.

## Clause 3 – Fees

Clause 3, which will amend section 3 of the *Act*, provides for a procedure in respect of the determination of fees by the assignee. Any fee shall be calculated on a cost-recovery basis and shall only come into effect if the assignee concerned has submitted a business plan. The budget must set out the powers and duties to be exercised and performed by the assignee and the expected costs associated therewith. This should be submitted to the executive officer for consideration.

The executive officer, within a specified period, has to invite written comment on the business plan and budget of such an assignee from interested parties or individuals who, in the opinion of the executive officer, are directly affected by the actions of that assignee. The executive officer, after consideration of the comments received, approves in writing the business plan and budget of the assignee for a specified period set out in such approval.

## Appeal against inspection services

The principal *Act* is also amended to allow for the inclusion of auditing or inspection,

grading and sampling for quality control. The cost of an inspection service will be reduced significantly if the *Act* allows auditing in cases where a full inspection service is not warranted.

> South Africa may have a strengthened food control system as a consequence of the anticipated proposed changes, which will serve as a good base for the facilitation of trade and market access.

Agbiz Grain opposed the introduction of inspection services in 2021 and argued that the sectors in the grain value chain are sufficiently self-regulated. None of the sectors required the introduction of inspection services by the Department of Land Reform and Rural Development (DALRRD) and there is no evidence of complaints or transgressions submitted that justifies the inspection of stakeholders.

The introduction of inspection services will likely lead to 13 000 inspections. Although it may be legally justified, it is not justifiable to add a layer of cost of approximately R74 million on the food value chain.

The Appeal Board that was appointed by the director-general of the DALRRD to rule on the implementation of the inspection services on grain and oilseeds announced that the procedure followed in promulgating the inspection service, as well as the determination of the inspection fee, was unlawful and not procedurally fair.

The board found that the fees cannot be rationally linked to the capabilities that need to be exercised or to the duties that need to be performed. The board further recommended that the director-general should consider additional regulations to facilitate appeals of this nature as the current arrangements are insufficient.

Agbiz Grain calls on affected stakeholders in the grain and oilseeds industry to submit their comments on the *Agricultural Product Standards Amendment Bill* as soon as the Portfolio Committee on Agriculture, Land Reform and Rural Development call for written submissions on the *Bill*. The public hearings will likely be hosted during the first half of 2022.

For more information, send an email to Annelize Crosby at annelize@agbiz.co.za.

# Structural stability criteria in grain handling

*By Pieter Fourie, Eko Design*

Grain handling poses challenges in various disciplines and cost-effective operations involving capacity optimisation, minimum product damages, safe storage and compliance with market demand. There are also legislative requirements ensuring that health and safety standards are met.

*Regulation Gazette 10113, Vol 584* of February 2014 states:

- Inspections of structures are carried out periodically by competent persons in order to render the structures safe for continued use.
- The inspections contemplated in the sentence above are carried out at least once every six months for the first two years and then yearly.
- The structure is maintained in such a manner that it remains safe for continued use.
- The records of inspection and maintenance are kept and made available on request to an inspector.

This presents the industry with challenges regarding what a structured inspection entails and what form records should take. The best way to approach the problem would be to establish the cause of structural failure. Experienced silo designers will take the relevant variables into consideration in the analysis process (*Figure 1*).

## Variables to consider

**Drainage:** Proper drainage ensures that reinforcement is not compromised by the ingress of water. Base plates and steel structure bolts subjected to ponding will corrode and weaken. Grain quality could be affected by water penetrating bins.

**Consolidation:** Understanding site geology is critical to identify potential problems that may occur, such as the presence of dolomite or collapsible sand and clay. During the investigation special attention must be paid to possible movement, which will manifest itself in cladding and cracking of structural elements.

**Figure 1: Variables to consider when establishing cause of structural failure.**


**Temperature variation:** Higher temperatures will expand steel silo walls, allowing grain to settle in the newly created space. When the temperature drops the silo wall will try to compress the grain, causing additional circumferential stresses in the thin shell. The common term for this action is ratcheting.

# *"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

**Dust explosion:** It is important to zone areas properly to ensure that the right equipment is used for specific zones. Insurance companies will demand management of this risk.

**Aeration:** Incorrect aeration design can lead to roof failure, which will cause gantry collapse. The balance between airflow in and out should be understood, together with the resistance that the grain mass will give.

**Operation:** The safe storage of grain at the right moisture content and temperature will ensure the free flow of product without the risk of bridging and subsequent collapse causing additional stresses. The new trend is to refrigerate grain to temperatures below 15°C, which eliminates the necessity for expensive fumigation. Spontaneous combustion in oilseeds is a risk that can be managed by proper aeration and seed conditioning via the combination of temperature and relative humidity.

**Maintenance:** This is always the area where costs are cut first if the bottom line is under pressure. This is to the detriment of assets and safety standards. The answer lies in a structured approach that prioritises action. This approach should clarify non-negotiable corrective actions and items that can be postponed to the following year's budget.

The first distinction to be made will be the identification of primary and secondary structural elements. Primary elements include the main frame that keeps the installation stable and safe, such as gantry supports, foundations, bins, etc. Cladding and paving are typical of secondary elements.

**Figure 2: Sequence of a typical storage facility.**

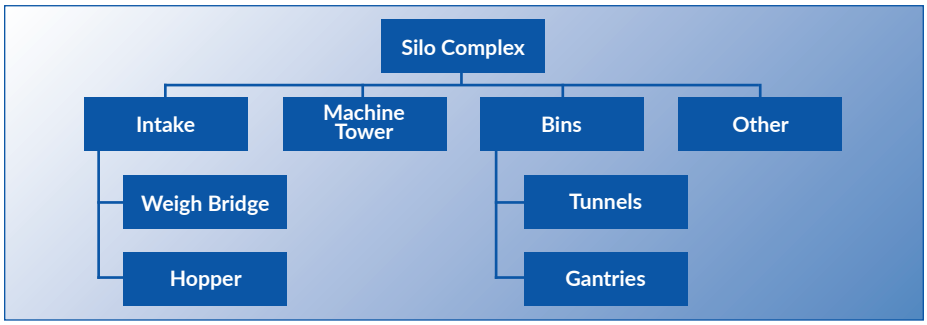


**Figure 3: Criteria for structural stability report.**


## Typical inspection procedure

The first step will be to group the complex into operational areas to analyse stability specifics applicable to that entity. *Figure 2* illustrates the sequence of a typical storage facility. Taking the hopper as an example, the criteria in *Figure 3* will apply. Operations will typically look at aspects such as the effect of increased loads on supporting beams and grids. On the maintenance side, the steel members will be checked for level of corrosion that will impact on thickness of webs and flanges, affecting the allowable safety factor. Other areas will be the integrity of the beam connections, cracks and wear and tear. This will be documented in an orderly manner. A good method of presentation is to classify it as green, yellow and red with an index classification as indicated in *Table 1*.

The red category requires immediate attention, while green can be placed on the three- to five-year budget. Each industry will have specific criteria. An example of this would be the corrosion of inner stiffeners in the older steel bins.

The improper mounting of dishes and other devices poses a safety hazard due to possible accidental falls from a height onto people or assets. Common areas of non-compliance are anchoring on safety rails, drilling of holes in the roof for cable entry, and not sealing the area properly, which causes corrosion of beams and reinforcement. Another area of concern is proper earthing. If a spark is transferred into the machine tower it may lead to a dust explosion.

One can conclude from all this that a standard operation procedure should be in place for each silo complex to ensure that regular inspections are carried out. This will assist in optimising the budget process for maintenance and ensure that the complex complies with legislation. The structured process set out here will simplify the investigation and will lead to good recordkeeping, which can be compared on an annual basis. It will result in a history of records for the complex.

**Table 1: Index classification for silo maintenance.**

| Category | Description | % Original strength | Action needed |
|---|---|---|---|
| 1 | New construction or excellent condition. | 100% | None |
| 2 | Slight service deterioration. Strength of members not affected. | 100% | None |
| 3 | Slight reduction in strength due to rust or minor spalling. | 95% to 100% | Repaint, patch or tighten bolts. |
| 4 | Some reduction in strength. Repair should be included in maintenance schedule. | 75% to 95% | |
| 5 | Severe deterioration with major reduction in strength. | 50% to 75% | Repair or replace members. |
| 6 | Member strength compromised. Not safe for operation. | < 50% | Replacement |

For enquiries, send an email to pieter.fourie@ekodesign.co.za or visit *www.ekodesign.co.za*.

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# A new era in commodity fumigation in South Africa

South Africa is a signatory member of the Montreal Protocol, an international treaty seeking to phase out the use of methyl bromide, among other chemicals, which have the potential to deplete the ozone layer. South Africa is now in the final year of phasing out methyl bromide for use in structural and commodity fumigation and the registration for these applications will be cancelled at the end of 2022.

A limited amount of methyl bromide will in future be allowed for critical use exemption (CUE), quarantine and pre-shipment (QPS) and international standards for phytosanitary measures (ISPM) purposes.

## A new era has begun

ProFume® fumigant was developed as an alternative to methyl bromide for treatment of food commodities and structures that process, store and transport these commodities. ProFume was first registered in 2003 in the European Union (EU), in 2004 in the United States (US), and in 2007 in Australia for post-harvest uses.

ProFume was introduced into the South African fumigation industry in 2019, for the control of a wide range of stored product and wood-destroying pests. Over the past two and a half years, ProFume has successfully been tested and more than 40 fumigation companies and fumigators started using it in the commodity, structural, QPS and ISPM fumigation markets.

## What is ProFume?

ProFume is a cylinderised, highly-penetrating, non-flammable, odourless and colourless inorganic gas fumigant, which penetrates enclosed spaces and commodities being treated to eliminate all life stages of stored product and wood-destroying pests.

It contains sulphuryl fluoride, which has a very high vaporising pressure – it penetrates dense substances such as flour up to ten times faster than methyl bromide. ProFume fumigation requires the use of powerful software, tools and techniques. It can only be purchased and used by qualified fumigators who completed additional stewardship training with the supplier and purchased the required ProFume equipment.

## Impact on food and human safety

Sulphuryl fluoride does not affect the characteristics, quality, taste, commercial value, or nutritional and baking qualities of food. The only residue left on commodities after fumigation is extremely low levels of fluoride, which is less than 2% of the average daily fluoride exposure for humans.

Established fluoride residue tolerances for food commodities have been set at 1 500g/m$^2$. The trained ProFume fumigator will be guided during fumigation by the ProFume software to ensure that these maximum tolerance levels are not exceeded.

## Impact on the environment

A consortium of multi-national research institutions and government organisations provide funding to the Advanced Global Atmospheric Gases Experiment (AGAGE). The AGAGE measures the atmospheric concentrations of more than 40 gases, including sulphuryl fluoride.


Sulphuryl fluoride was declared a non-ozone depleting substance by the United Nations Framework Convention on Climate Change (UNFCCC). They also declared that the global warming potential of sulphuryl fluoride is insignificant.

## Precision and flexible fumigation

ProFume fumigation makes use of a unique new concept called precision fumigation. ProFume Fumiguide software is used to plan and monitor the fumigation job. The software will analyse readings from the gas monitor during the job and make recommendations to the fumigator, to ensure the target pest is controlled and the commodity is never overexposed. On completion, the Fumiguide software will generate a detailed scientific report.

ProFume also makes use of a completely new feature called flexible fumigation. The fumigant does not have a standard label rate as with other pesticides and fumigants. Flexible fumigation tools allow for short-term exposure (as low as eight hours) or long-term fumigation (up to seven days). Short-term fumigation will require high rates of fumigant, but will save operational time. If there is no time restraint, long-term fumigation will require very low levels of fumigant.

**ProFume in South Africa**

Henchem, a specialist supplier of pesticides to the South African pest control industry, is the country's distributor of ProFume. Contact the Henchem national sales manager in your area for more information: 021 948 7366 (Western and Northern Cape); 081 496 4325 (Eastern Cape); 061 472 7435 (KwaZulu-Natal); 067 223 3760 (Gauteng, North West, Mpumalanga and Limpopo).

# Points to ponder

*With Jannie de Villiers*

# Ban hurry sickness from your life

I first came across the concept of 'hurry sickness' while reading John Ortberg's book, *The life you've always wanted*. I read it in 2000 while I was CEO of an organisation in the grain milling industry.

In it, the author explained how he battled getting a time slot to see his mentor. Eventually the time arrived and while shuffling everything in place to take a few crucial notes, he was blown out of the water by his mentor's response: "You must ruthlessly eliminate hurry from your life". The author jotted this down and looked up, poised for the next bit of insight: "There is nothing else".

This was enough to grab my attention. An analysis of my own behaviour at the time made me realise that I was a very sick person, trying to multitask all the time, doing everything faster and better. I'm an economist, after all. I was counting people in each line at the grocery store, along with the items in their baskets, to determine behind which till I should queue. I even kept a record of my progress.

In heavy traffic I memorised the number plates of my 'competitors' in other lanes to check whether I had chosen the best and fastest lane. I was also guilty of formulating answers to questions even before people finished their questions! Listening was not my strong suit – a symptom of hurry sickness.

I was quite comfortable having hurry sickness, but the next sentence by the author got me: "If you have hurry sickness, you don't have the capacity to love." That was true of my life at the time. Love and hurry are fundamentally incompatible.

## Slow down, take the time

There are three things I wish to challenge you with. Firstly, if you live at 140km/h, how do you expect to hear God's voice and His plan for your life? There are plenty of examples of great leaders in the Bible who were taken to the desert so that God could speak to them, and change their hearts and characters. Think of Moses, Joseph and David; men with a great spiritual legacy who spent a substantial amount of time in isolation to reform their characters. Once they were ready, God released them to commence with the dreams and plans He had for them.

> "Simply by taking the time to really listen and show interest, people will be encouraged. Leaders – this is how you can show your followers that you truly care."

It is hard to hear the Lord's will for your life, family, business or farm if you simply hurry past Him in the mornings, slowing down for five minutes only to give Him your 'prayer list' of things you want. Depth develops slowly.

## Listen more, say less

Secondly, I want to challenge you to listen more and to pay attention when doing so, as well as to see the people along your way every day. Hurried people give the impression that they are extremely busy and therefore very important – no time for small talk or to listen properly!

For instance, asking someone to give me the long version of their dreams and to tell me how they received their calling proved to be some of the best encouragement I've ever given another person. Simply by taking the time to really listen and show interest, people will be encouraged. Leaders – this is how you can show your followers that you truly care.

## Progress and solitude

Lastly, start practising slowness. God does not progress only by regression, but exponentially. The time you think you will lose by going slower will easily be caught up once you do those things He instructs you to do. As a leader or manager, you will learn that your relationships with others get the job done. Instructions and salaries cannot motivate as relationships can. Try it!

Solitude is almost like fasting; it is time spend without people to listen to God. When last did you set time aside to listen to what God had to say about the way you are living? Since my retirement, I have started to eat my breakfast cereal with a teaspoon, to re-learn how to eat slower and chew properly.

I am sold on a productive life, but if it does not allow time to love God and people, it will be meaningless and simply chasing after the wind.

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