Investigation into the future viability of the current soybean Breeding and Technology Levy system

Report by the Bureau for Food and Agricultural Policy (BFAP)

Commissioned by
SACTA and SANSOR

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Report outline

- Background
- International systems
- Description of SA system
- Role-players' views on current SA system
- Context to provide insights to next levy round
- Conclusion and recommendations

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Background

- Historically, seed companies have struggled to earn a return on investment in research and development in self-pollinating commodities like soybeans. Especially in countries where farm-saved seed is allowed, seed sales volumes are not sustained once introduced as farmers retain seed for replanting and payment for novel traits are difficultly enforced.
- Soybean yield trends in South Africa have lagged that of the larger international producers, partly due to the fact that seed companies have been hesitant to release new soybean varieties and advanced traits in South Africa, as 'farmer privilege' allows for farmers to replant seed produced on their own holdings and soybean seed companies are unable to collect the required return on innovation. This situation limits productivity and competitiveness in the local soybean sector and also has knock-on effects in the vegetable oil and livestock sectors.
- In an industry effort to address this situation, the statutory Breeding and Technology Levy system that is managed by the South African Cultivar and Technology Agency (SACTA) for wheat, barley and oats, was extended to also include soybeans, and the first levy collections took place during the 2019/20 grain marketing season.
- Under the Marketing of Agricultural Products Act (Act 47 of 1996) an industry can apply for a statutory levy as long as the levy amount is less than 5% of a specific commodity price (at the time of application), administration fees are not more than 10% of the total levy amount and 20% must be allocated towards transformation.
- The soybean levy was set at 1.2% of the previous two years' average SAFEX price at time of application, of which about 5% share is allocated towards administration and collection services, and 20% to development/transformation. 16.67% of the remaining 75% is allocated to the (currently only) genetically modified (GM) herbicide tolerance trait owner, and the remainder, pro rata their market share, to the owners of the germplasm (the seed). The levy is collected at the first point of sale or delivery and SACTA allocates the funds based on each company's estimated market share.
- The first two seasons' levy collection has been quite successful and based on feedback from some seed companies the levy has had its intended impact, in that companies have released new seed germplasm into the market and plan to introduce additional varieties and GM traits in the near future. Herein however also lies the conundrum: While there are a number of companies selling soybean seed, there is only one GM herbicide tolerance event and this event belongs to only one company. It is thus easy to allocate the 16.67% technology share to that company. In the current production season new GM technology (conferring herbicide tolerance and insect resistance) has been released. As this technology belongs to the same company with the current GM event, it remains simple to allocate the technology share to the same company. However, it is quite likely that a number of seed companies would consider releasing new soybean varieties with new GM event combinations in the near future. It it is not clear if the current levy system would be able to effectively distinguish between varieties and traits and if seed and technology innovators would be fairly compensated for their higher value novel products. In addition, most seed companies in South Africa are either multinational companies or have a collaborative relationship with foreign companies and it is vital that South Africa's approach to creating an enabling environment and protecting companies' intellectual property are in line with international standards and practices.
- In light of the above, SACTA, SANSOR and GrainSA have approached BFAP to investigate the future viability of the current soybean Breeding and Technology Levy system, in order to inform the next levy round application.

International royalty collection systems

- The main mission of the seed industry is to generate income through the development of new, distinct, uniform and stable plant varieties whose seeds maintain genetic purity and intrinsic quality, thus improving features such as productivity, maturity, regional adaptation, disease and insect resistance, and tolerance to diverse weather patterns (ISF, 2016). The development of novel plant propagation material requires years of research and efforts by a multi-disciplinary team of individuals, production infrastructure and processes and a substantial amount of funding.
- Intellectual property protection is applied in plant improvement to recoup the investments made during the development of new varieties and hybrids, benefiting the breeder of such varieties, and producers and society at large. Different forms of intellectual property protection are available for plant varieties and biotechnological inventions, but the most common is Plant Variety Protection (PVP), Plant Breeders' Rights (PBR) and Patents on novel genes, traits or processes. Most countries have based their PVP and PBR principals on the guidelines provided by the International Union for the Protection of New Varieties of Plants (UPOV) Convention and its subsequent revisions, while patents on, for example, genetic traits, are regulated by national and international intellectual property rights law.
- For cross-pollinating crops where the resulting crop is a product of two plants' genetic material, and where hybrid seed is used in intensive commercial production systems, recouping and earning a return on invested R&D funds tend to be relatively simple with farmers having to buy new seed every season. However, with self-pollinating crops like soybeans and wheat, genetic traits are transferred across generations and harvested grain can be used as seed, i.e. farm saved seed.
- The International Seed Federation and the principals of the UPOV Convention supports 'farmers' privilege' to retain and replant their own farm saved seed, and this is common practise in most countries. However, over the years this practise has led to a limited certified or commercial seed market and limited innovation in self-pollinating crops.
- Development in agricultural biotechnology and the increasing trend of combining the best performing reproductive germplasm with transgenic and genetically modified traits, also for self-pollinating crops, have necessitated some innovation in value or royalty capturing systems internationally.

"Up to 1995, existing commercial soybean plant varieties were derived exclusively from traditional plant breeding methods and, therefore, the only right available for their protection was the Plant Breeder's Rights provided in the UPOV Convention. From 1995 onwards, transgenic varieties were introduced and in many cases these varieties contained patented traits and technologies, …the complex situation of "coexistence of rights" originated. This scenario potentially becomes even more complex, since patent owners may be individuals, corporations, or consortiums of public and private institutions. The situation is yet further complicated by the fact that a biotechnological event may be protected by multiple patents and these may be owned by different entities. For example: when Ingo Potrykus completed the development of the "golden rice" at his university institute, he obtained a licensing agreement for 60 patents owned by 32 different public and private institutions. "

ISF, 2016

International royalty collection systems

A 2016 study by the International Seed Federation, reviewing royalty collection systems in 17 countries, found that:

- Internationally most soybean seed varieties are protected through plant breeders' rights derived from the UPOV Convention, but that due to the presence of patented GM traits or technologies, royalties can also be collected based on patent law.
- Royalty collection systems depend on existing legislation, the structure of the local seed business and prevailing farming practices in each country.
- Different countries have implemented different systems, with varying levels of success.
- ***No country has been able to develop and implement an ideal system.***
- An ideal functional system should amongst others:
  - Enable farmers to use or not use new technologies
  - Be as simple as possible
  - Introduce a minimum disruption of the usual commercial practices
  - Create general guidelines to be observed by all participants, based on a prior agreement
  - Allow each germplasm/biotechnological event combination to implement the terms and conditions on their own technologies agreed with third parties on an independent basis
  - Be effective, efficient, feasible and sustainable, and
  - Promote the use of certified seeds.

Table 1 summarises the royalty collection systems of Brazil, the USA and Argentina who make use of GM soybeans and produced more than 80% of the world's soybeans in 2020/21.

Country	System	Reality	Success
Brazil	Plant Varieties Protection Law and Industrial Property Law Royalties collected through seed sales and 2% technology fee collection at delivery of grain produced from declared farm saved seed, and higher penalty rate on undeclared deliveries.	Monsanto manages total royalty collection system themselves at a substantial cost. Considerable animosity between Monsanto (Bayer) and farmers	64% certified seed sales 2% royalty on GM traits (not for germplasm) on declare grain from farm saved seed
USA	Plant Patent Act, Plant Variety Protection Act – seed sold under technology agreements and enforced by legal system	Seed is purchased under contract limiting use of the seed for production of a single crop. Agreement provides a limited use license, allowing farmer to use the GM events, but there is no property transfer	System works well but at high cost and with numerous court cases
Argentina	Seed Law, PBR & Patent Law Royalties collected through certified seed and Extended Royalty System	Royalty collection on saved seed not legally enforced and limited to germplasm. Monsanto withdrew Intacta in 2016 due to inability to collect royalty on GM events	15% certified seed 14% extended royalty collection of farm saved seed in 2014 but increasing

South African soybean royalty collection system

- For many years the yield trends of self-pollinated crops in South Africa have lagged that of leading agricultural countries, largely due to the fact that seed companies have been hesitant to release new seed varieties and advanced traits in South Africa, as 'farmer privilege' prevented seed companies to collect the required return on innovation.
- Industry role-players have for quite some time acknowledged that there is a need for a fair and sustainable value capturing system to drive seed innovation in these value chains.

- Moving to a more deregulated agricultural industry, the implementation of the 1996 marketing of Agricultural products Act signalled abolishment of the agricultural marketing boards established in terms of the Marketing Act of 1968. Recognising the need for functions like information collection and dissemination, grading systems and research, that was performed and funded by the former commodity boards, Act 1996 provided for the application for and implementation of statutory levies, with the objectives:
  - To increase market access for all market participants
  - To promote the efficiency of the marketing of agricultural products
  - To optimise export earnings from agricultural products
  - To enhance the viability of the agricultural sector

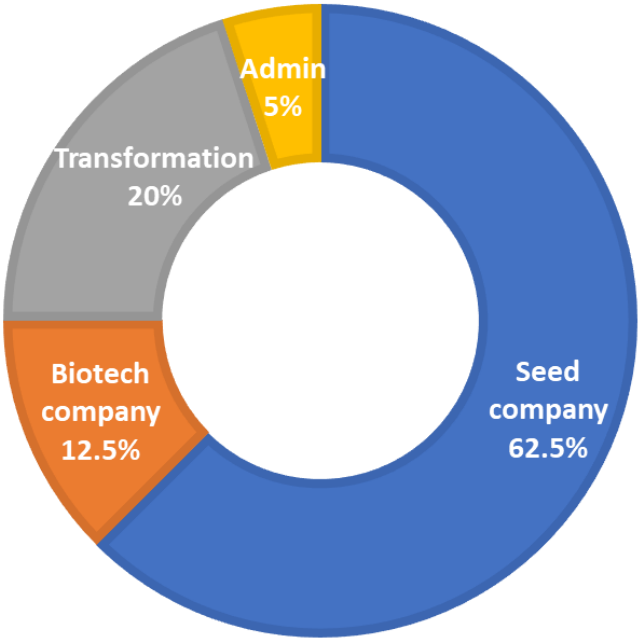
- Over the last 25 years 17 commodity organisations, trusts and forums have applied for statutory levies, mainly to perform generic support functions in their respective industries.

- Driven by industry, the South Africa Cultivar and Technology Agency (SACTA) was created in 2016 to collect and administer breeding levies for self-pollinated crops in South Africa.
- SACTA is not linked to a specific commodity and addresses only the need to advance breeding of self-pollinated grain and oil seeds by collecting (at first point of sale or delivery) and paying breeding and technology levies (royalty fees) to seed companies and plant breeder rights holders.
- Initially only wheat and barley levies were collected (from 2016) but oats were added in 2018 and soybeans in 2019. A breeding and technology levy on lupins was approved in 2021.

- As a statutory levy under the Marketing of Agricultural Products Act (1996), the levy:
  - Amount cannot be higher that 5% of the commodity price.
  - Administration fees cannot exceed 10% of nett income, and
  - 20% of the collected levy amount has to be spent on transformation.

- Following negotiations between producers (farmer organisations) and seed companies, it was agreed that the technology and breeding levy for soybeans would be set at 1.2% of the soybean price per ton, with 1% allocated towards germplasm owners with plant breeders rights and the 0.2% to the company/companies that own the biotech / genetically modified traits.

This means that after the 5% admin fee and the 20% mandatory transformation allocation have been deducted, 16.67% of the 75% is allocated to the biotechnology owner and the remaining 83,3% to the seed companies. In reality this means that of the total collected levy amount, the seed companies receive 62.5% and the biotech company (s) 12.5%.



At the R80/ton levy rate, this would mean that for each ton of soybeans delivered / sold in the commercial market:

- R50,00 went to the seed company
- R10,00 to the GM trait owner
- R16.0 to SACTA to be spent on transformation initiatives, and
- R4.00 towards administration of the royalty collection system.

Payments to seed companies are based on market share and is calculated based on:

- Seed sales (40% weight in calc)
- Producer declarations (30%), and
- Additional research that includes surveys and additional industry information (30%).

The architects of the current system argue that it is 'near-ideal' as it is:

- Supported by all core stakeholders
- Cost effective
- Fair, in that all growers pay the same levy per ton
- Risk is shared by growers and seed companies as the levy is based on the resulting harvest, and
- The royalty income is directly linked to the performance and popularity of a variety.

It is however not clear if the current levy system will be able to cope with additional GM technologies and if the royalty income will be enough for seed companies to invest in breeding and bring the best soybean seed technologies to South Africa.

The following points were raised, and information shared during interviews and discussions held with the main soybean seed and technology companies and farmer organisations in SA, between Oct and Dec 2021.

The levy opened the door to new varieties and GM technology

- To some extent farmers feel that they are now paying for seed technology that they have been using for more than 15 years, but recognise the fact that without an incentive for seed companies, the best new seed and technologies will not come to SA.
- Farmers supported and agreed to implementation of the levy but will not support a continuation of the levy if they do not see benefits.
- There is a perception that farmers have been paying for two years but have not benefitted from any new technologies yet.
- Some seed companies feel there is too much focus on the GM technologies (still to come) and not enough recognition of the fact that between 2016 and 2019 an additional 56 new soybean varieties were registered in SA, substantially increasing soybean seed variety options for farmers.
- With a proven functional royalty capturing system in place, seed companies are willing to bring more technology to SA, even though SA is a relatively small soybean producer where more than 80% of seed is farm saved seed.
- Without the levy, companies would not be investing in new varieties or considering bringing additional GM technologies to SA.
- Some seed companies are concerned that farmers feel that because they now pay the levy, they can do with the seed (harvested grain) what they want, and that illegal seed sharing, swopping and sales will increase.
- Some seed companies argue that the levy opened the door for them to bring the best new germplasm to South Africa, and now they need to work on decreasing the use of farm saved seed by releasing new, better performing seed varieties every season. A sustainable dependable royalty collection system (the levy) is fundamental in this system.

Technology pipeline

- The germplasm determines the yield potential while the GM events assist the seed germplasm to reach its potential.
- There are some excellent new varieties in the pipeline and some companies foresee that they will (individually) be able to release 4-6 new better performing and adapted varieties every year.
- A large international seed company estimates that SA's soybean yield can increase by 50% over then next 5 years with new seed germplasm, GM events and improved farm practises.
- A number of seed companies will be marketing their seed with Bayer's Intacta stacked herbicide tolerance (RRII) and insect resistance (Bt) traits in the near future, with first commercial seed multiplication taking place in the 2021/22 season and larger commercial plantings commencing in 2022/23.
- Corteva plan to launch their new varieties with Conkesta (Bt and glyphosate, glufosinate and 2.4 D resistance) in SA in 2025 for seed multiplication and larger release in 2026.
- A larger selection of new varieties with stacked and individual GM traits will become available to suite farmers' production conditions, practices and refugia requirements.
- Possibly further in the future is Arcadia Biosciences and Bioceres Crop Solutions' HB4 drought tolerant soybean that has recently been approved for production in the USA, Brazil, Argentina, Paraguay and Canada.

Market share estimate

- There is recognition that the market share estimate is less than perfect, with smaller companies seemingly more concerned than larger companies.
- Seed companies have learnt that they need to make an effort to assist farmers to make more accurate variety declarations.
- Some companies feel that seed sales should be a more important indicator of market share, as farmer declarations are inaccurate, easily manipulated and result in the allocation of levy income to seed companies who are no longer active in the market or do not do any seed R&D.
- There does exists potentially more accurate market share estimate / variety identification methods or tools, and SANSOR and SACTA are actively assessing the viability (practical implementation, effectiveness and affordability) of these tools for future use.
- New GM technologies and companies will complicate the division of the technology share, but this division can be negotiated, and should not threaten the stability and longevity of the levy.
- Perhaps transformation funding can be utilised to appoint more people to better monitor seed use, refugia management and grain deliveries to improve market share estimate accuracy and technology sustainability.

Transformation fee

- Initially the plan was that companies would manage their own transformational allocation, but following the first wheat levy year and some issues with companies' transformation plans, the NAMC requested that SACTA administer the 20% transformation allocation on behalf of the seed companies.
- Companies do not have control over these funds and are also not benefitting from the transformation spend through BEE points or recognition.
- Most companies see the transformation fee as a cost they are willing to bare to have the statutory levy in place, but would like to have more control over the funds and / or receive BEE recognition for their transformation spend.
- Can transformation funding be used to support Government seed and technology regulatory services, as this is a major stumbling block.

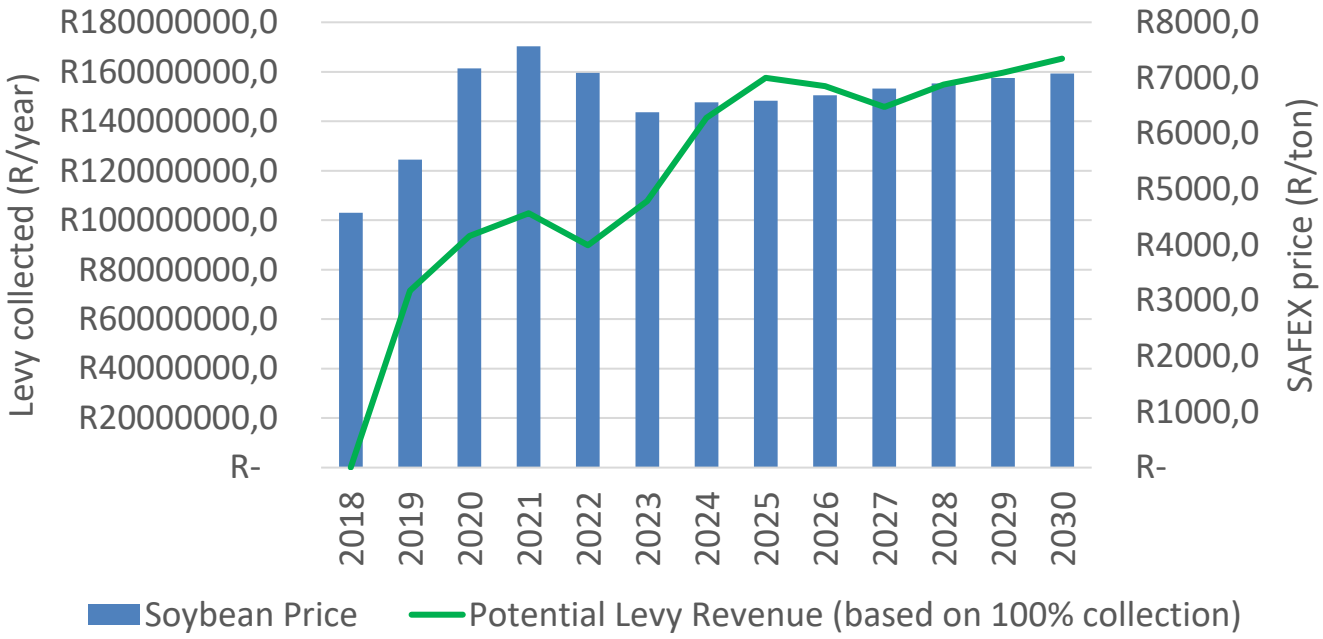
Alternative (additional) royalty collections systems

- Some seed companies feel that farmers who buy new seed should receive a type of credit note for a certain tonnage that will then exempt them from paying the levy. In this way the seed company can charge more for seed, directly recoup the royalty fee and not 'loose out' on the 20% transformation and 5% admin fee.
- This approach is in line with the system in Brazil, but will complicate the existing system, will likely require a central structure to monitor credit notes and deliveries at silos, and will decrease the amount available for transformation – which can be interpreted as not being in line with the spirit the levy was negotiated in.
- The current levy system does not prevent seed companies to innovate in their offering to farmers, and should be seen , as it was intended, as a breeding and technology levy and not as a total seed and technology value capture system.

Context to provide insights to next levy round

The figure below presents a view of the historic and projected SAFEX price with the total value of actual and potential levy collected. For the graph, it is assumed that the levy will be collected on 94% of the total projected soybean harvest, at a levy rate of 1.2%.

The historic levy collection was calculated with the levels as specified by SACTA (March 2019 to 29 February 2020: R65; 1 March 2020 to 28 February 2021: R80). The same formula was used to calculate the future levy collection, given the projected price and volumes. The future SAFEX price and production volumes are projected with the BFAP partial equilibrium model.



The sensitivity analysis illustrates the revenue pool (total levy collected per year) for seed companies given the change in the SAFEX price and the statutory levy level collection percentage. It uses the production volumes of the production season 2021/22.

It is clear that a potential revenue loss or gain for seed and technology companies is strongly linked to change in the soybean SAFEX price. At the current projected (2021/22) SAFEX price of R7500, each 0.25% of collected levy contributes R 34 000 revenue to the levy pool of income (assuming 94% collection on production volumes). While each R500 increase in SAFEX price at the current levy level (1.2%), adds R11 000.

SOYBEANS SENSITIVITY ANALYSIS (LEVY COLLECTION PER YEAR: 2021/22)

SAFEX price	Levy %					
	0.50%	1.00%	**1.20%**	1.50%	1.75%	2.00%
4,000	R 36,061,220	R 72,122,440	**R 86,546,928**	R 108,183,660	R 126,214,270	R 144,244,880
4,500	R 40,568,873	R 81,137,745	**R 97,365,294**	R 121,706,618	R 141,991,054	R 162,275,490
5,000	R 45,076,525	R 90,153,050	**R 108,183,660**	R 135,229,575	R 157,767,838	R 180,306,100
5,500	R 49,584,178	R 99,168,355	**R 119,002,026**	R 148,752,533	R 173,544,621	R 198,336,710
6,000	R 54,091,830	R 108,183,660	**R 129,820,392**	R 162,275,490	R 189,321,405	R 216,367,320
6,500	R 58,599,483	R 117,198,965	**R 140,638,758**	R 175,798,448	R 205,098,189	R 234,397,930
7,000	R 63,107,135	R 126,214,270	**R 151,457,124**	R 189,321,405	R 220,874,973	R 252,428,540
7,500	**R 67,614,788**	**R 135,229,575**	**R 162,275,490**	**R 202,844,363**	**R 236,651,756**	**R 270,459,150**
8,000	R 72,122,440	R 144,244,880	**R 173,093,856**	R 216,367,320	R 252,428,540	R 288,489,760
8,500	R 76,630,093	R 153,260,185	**R 183,912,222**	R 229,890,278	R 268,205,324	R 306,520,370
9,000	R 81,137,745	R 162,275,490	**R 194,730,588**	R 243,413,235	R 283,982,108	R 324,550,980

The sensitivity analysis below illustrates the effect that a change in production volumes and the levy percentage will have on the total levy revenue collected.

The sensitivity analysis assumes that the SAFEX price is constant at the current level projected for the 2021/22 production season.

Production volumes have a substantial impact on the total levy amount collected. At the current levy level of 1.2%, each 100 000 tons harvested, can contribute R9 million to the levy revenue.

If South Africa's total soybean production volumes increase to 2.2 million tons (as is projected by BFAP baseline), and assuming that the SAFEX price stays at current levels, the levy revenue will be R199.8 million (at a 1.2% levy collection level).

SOYBEANS SENSITIVITY ANALYSIS (LEVY COLLECTION PER YEAR: 2021)

Production volume	Levy % 0.50%	1.00%	**1.20%**	1.50%	1.75%	2.00%
1,500,000	R 56,765,495	R 113,530,990	**R 136,237,188**	R 170,296,485	R 198,679,232	R 227,061,980
1,600,000	R 60,549,861	R 121,099,723	**R 145,319,667**	R 181,649,584	R 211,924,515	R 242,199,445
1,700,000	R 64,334,228	R 128,668,455	**R 154,402,146**	R 193,002,683	R 225,169,797	R 257,336,911
1,800,000	R 68,118,594	R 136,237,188	**R 163,484,626**	R 204,355,782	R 238,415,079	R 272,474,376
1,900,000	**R 71,902,960**	**R 143,805,921**	**R 172,567,105**	**R 215,708,881**	**R 251,660,361**	**R 287,611,841**
2,000,000	R 75,687,327	R 151,374,653	**R 181,649,584**	R 227,061,980	R 264,905,643	R 302,749,307
2,100,000	R 79,471,693	R 158,943,386	**R 190,732,063**	R 238,415,079	R 278,150,925	R 317,886,772
2,200,000	R 83,256,059	R 166,512,119	**R 199,814,542**	R 249,768,178	R 291,396,208	R 333,024,237
2,300,000	R 87,040,426	R 174,080,851	**R 208,897,022**	R 261,121,277	R 304,641,490	R 348,161,703
2,400,000	R 90,824,792	R 181,649,584	**R 217,979,501**	R 272,474,376	R 317,886,772	R 363,299,168
2,500,000	R 94,609,158	R 189,218,317	**R 227,061,980**	R 283,827,475	R 331,132,054	R 378,436,633

The trade-off between the SAFEX price and soybean volumes produced is illustrated in the sensitivity analysis. It illustrates the required levy level (%) that will ensure that seed companies collect the same revenue at different production volumes and SAFEX price levels. The analysis assumes that the average levy amount of 2020/21 and 2021/22 should be collected.

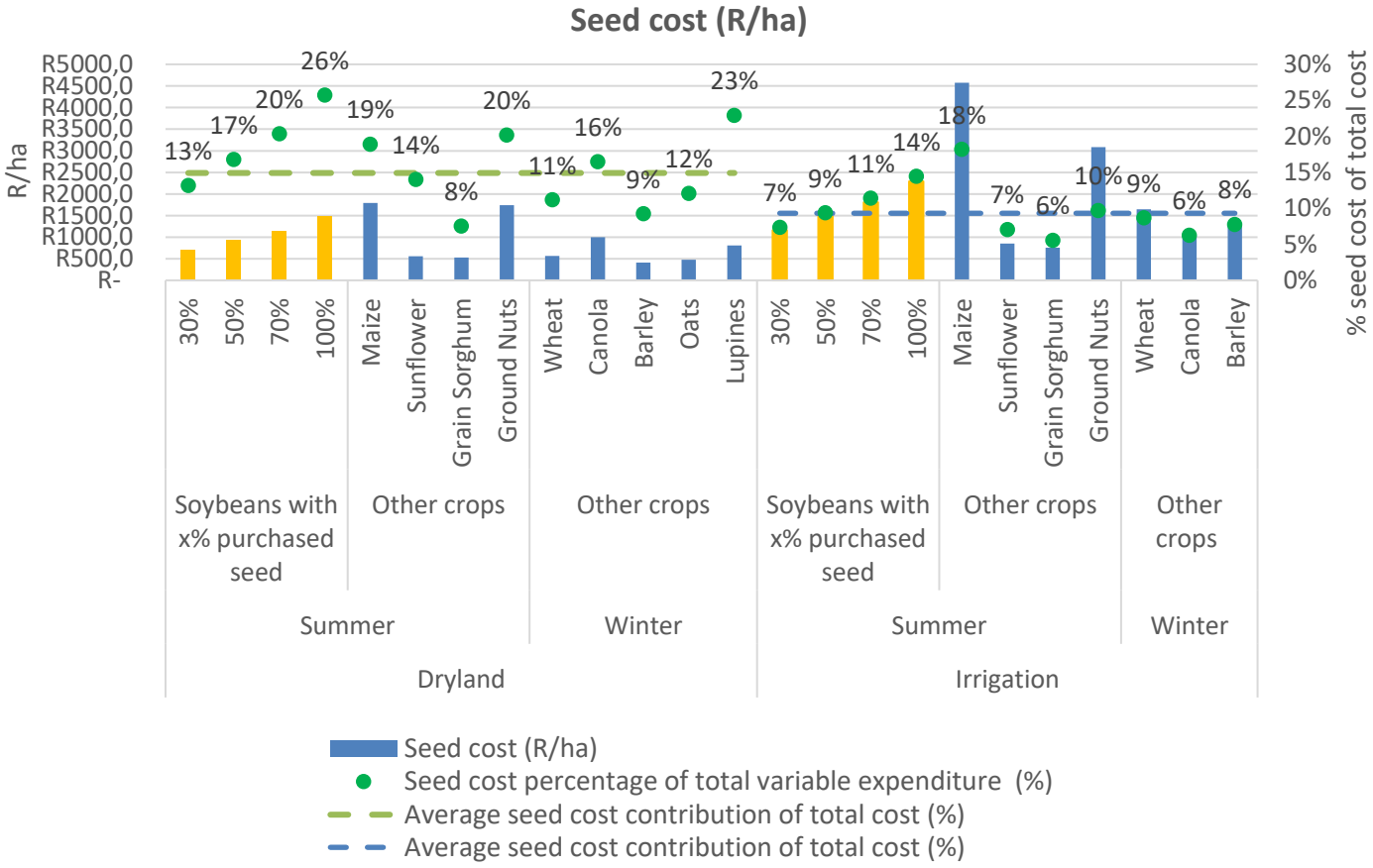
SOYBEANS SENSITIVITY ANALYSIS (LEVY COLLECTION PER YEAR: 2020/21 - 2021/22)

Production volume (tons)	SAFEX price (R/ton) R 4,000	R 5,000	R 6,000	R 7,000	R 8,000	R 9,000
1,500,000	1.64%	1.31%	1.09%	0.94%	0.82%	0.73%
1,600,000	1.53%	1.23%	1.02%	0.88%	0.77%	0.68%
1,700,000	1.44%	1.16%	0.96%	0.83%	0.72%	0.64%
1,800,000	1.36%	1.09%	0.91%	0.78%	0.68%	0.61%
1,900,000	1.29%	1.03%	0.86%	0.74%	0.65%	0.57%
2,000,000	1.23%	0.98%	0.82%	0.70%	0.61%	0.55%
2,100,000	1.17%	0.94%	0.78%	0.67%	0.58%	0.52%
2,200,000	1.12%	0.89%	0.74%	0.64%	0.56%	0.50%
2,300,000	1.07%	0.85%	0.71%	0.61%	0.53%	0.47%
2,400,000	1.02%	0.82%	0.68%	0.58%	0.51%	0.45%
2,500,000	0.98%	0.79%	0.65%	0.56%	0.49%	0.44%

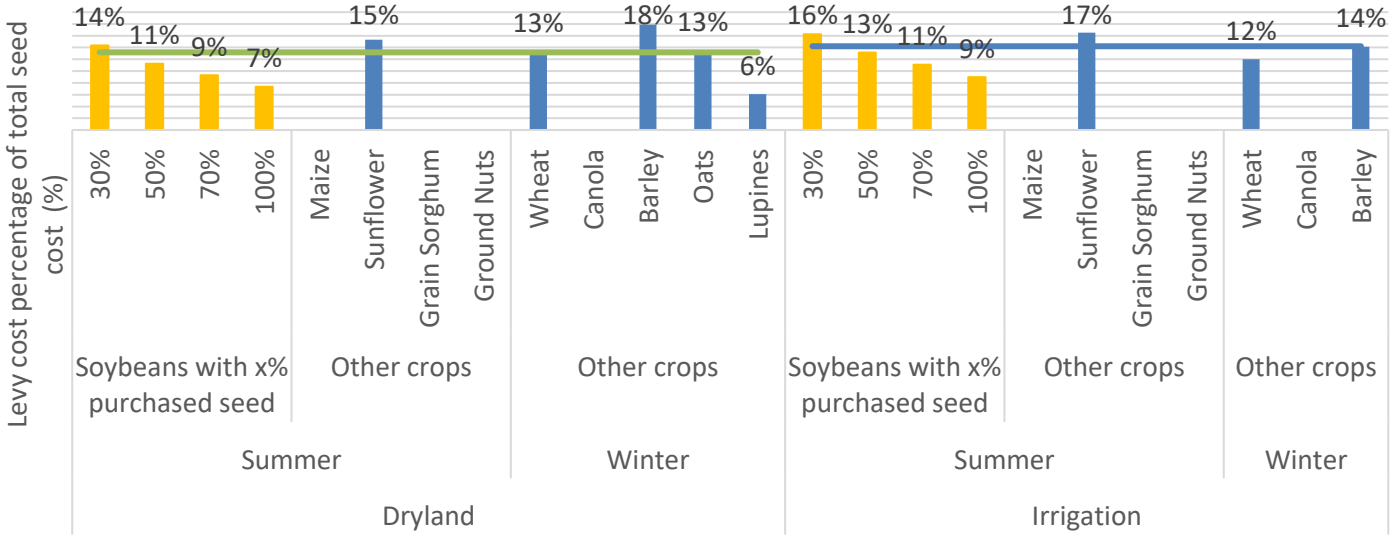
Analysis for context to future levy view

The figures below illustrate the typical seed cost per hectare (bars) and the percentage that seed cost contributes to the total variable expenditure (dots) for different commodities produced on dryland and under irrigation. For soybeans, the seed cost per hectare is illustrated at different purchased and farm-saved rations and taking the current levy level into consideration.

The seed cost per hectare for soybeans is higher than most other crops, except for maize and groundnuts. Under irrigation, the seed cost contribution to the total direct cost expenditure for soybean production (with 50% purchased seed share), is equal to the crop average. If the share of purchased seed increases, the seed cost contribution exceeds the average.



The figure above includes the seed breeding and technology levy cost per hectare at an average assumed yield. The figure below illustrates the share that a levy (if applicable) contributes to the total seed cost. If soybean producers procure 100% of their seed, then the levy contributes 7% and 9% to the total cost of seed per hectare under dryland and irrigation. While, if 50% of seed is procured, 11% and 13% of the total seed cost is attributed to levies. Levies on average contribute about 1.59% to the total variable expenditure cost to produce the indicated crops. For the other crops, it was assumed that 100% of seed is purchased.



The effect that the statutory levy, as well as the SAFEX price, has on the farmer gross margin per hectare is illustrated in the sensitivity analysis below.

On dryland production, a R500 change in SAFEX price at the current levy level of 1.2%, will result in R1 000 less profit per hectare for the farmer. While at the current SAFEX price of R7 500, a 0.25% change in the level of the levy, will reduce the farmer gross margin by R39.

Under irrigation, a R500 change in SAFEX price at the current levy level of 1.2%, will result in almost R2 000 less profit for the farmer. While at the current SAFEX price of R7 500, a 0.25% change in the level of the levy, will reduce the farmer gross margin by R74. The larger difference under irrigation is due to a higher yield.

SOYBEANS SENSITIVITY ANALYSIS (GROSS MARGIN PER HECTARE): AVERAGE DRYLAND 2021/22

GROSS MARGIN PER HECTARE

SAFEX price	Levy % 0.00%	0.50%	1.00%	**1.20%**	1.50%	1.75%	2.00%
R 4,000	R 1,759	R 1,718	R 1,676	**R 1,660**	R 1,635	R 1,615	R 1,594
R 4,500	R 2,787	R 2,741	R 2,695	**R 2,676**	R 2,648	R 2,625	R 2,602
R 5,000	R 3,816	R 3,764	R 3,713	**R 3,692**	R 3,662	R 3,636	R 3,610
R 5,500	R 4,844	R 4,788	R 4,731	**R 4,709**	R 4,675	R 4,646	R 4,618
R 6,000	R 5,873	R 5,811	R 5,750	**R 5,725**	R 5,688	R 5,657	R 5,626
R 6,500	R 6,902	R 6,835	R 6,768	**R 6,741**	R 6,701	R 6,668	R 6,634
R 7,000	R 7,930	R 7,858	R 7,786	**R 7,757**	R 7,714	R 7,678	R 7,642
R 7,500	**R 8,959**	**R 8,882**	**R 8,804**	**R 8,774**	**R 8,727**	**R 8,689**	**R 8,650**
R 8,000	R 9,987	R 9,905	R 9,823	**R 9,790**	R 9,740	R 9,699	R 9,658
R 8,500	R 11,016	R 10,928	R 10,841	**R 10,806**	R 10,754	R 10,710	R 10,666
R 9,000	R 12,044	R 11,952	R 11,859	**R 11,822**	R 11,767	R 11,720	R 11,674

SOYBEANS SENSITIVITY ANALYSIS (GROSS MARGIN PER HECTARE): AVERAGE IRRIGATION 2021/22

GROSS MARGIN PER HECTARE

SAFEX price	Levy % 0.00%	0.50%	1.00%	**1.20%**	1.50%	1.75%	2.00%
R 4,000	-R 567	-R 646	-R 725	**-R 757**	-R 804	-R 844	-R 883
R 4,500	R 1,408	R 1,319	R 1,230	**R 1,194**	R 1,141	R 1,097	R 1,052
R 5,000	R 3,383	R 3,284	R 3,185	**R 3,146**	R 3,086	R 3,037	R 2,988
R 5,500	R 5,358	R 5,249	R 5,140	**R 5,097**	R 5,032	R 4,977	R 4,923
R 6,000	R 7,333	R 7,214	R 7,096	**R 7,048**	R 6,977	R 6,918	R 6,859
R 6,500	R 9,308	R 9,179	R 9,051	**R 8,999**	R 8,922	R 8,858	R 8,794
R 7,000	R 11,283	R 11,144	R 11,006	**R 10,951**	R 10,868	R 10,799	R 10,730
R 7,500	**R 13,258**	**R 13,109**	**R 12,961**	**R 12,902**	**R 12,813**	**R 12,739**	**R 12,665**
R 8,000	R 15,233	R 15,075	R 14,917	**R 14,853**	R 14,759	R 14,680	R 14,601
R 8,500	R 17,208	R 17,040	R 16,872	**R 16,805**	R 16,704	R 16,620	R 16,536
R 9,000	R 19,183	R 19,005	R 18,827	**R 18,756**	R 18,649	R 18,560	R 18,472

The sensitivity analysis of the effect that the statutory levy and the percentage purchased (vs farm-saved) seed has on the farmer gross margin per hectare, is illustrated below.

As the percentage purchased seed and levy contribution increase, the gross margin per hectare decreases. Increasing the soybean levy by 0.25%, will result in a R37 gross margin difference on dryland, and R71 on irrigation. While increasing the percentage purchased seed by 10%, reduces the gross margin by R111 on dryland, and R161 under irrigation. The seed companies gain the same amount of revenue for every percentage seed sold instead of being re-used.

SOYBEANS SENSITIVITY ANALYSIS (GROSS MARGIN PER HECTARE): AVERAGE DRYLAND 2021/22														
GROSS MARGIN PER HECTARE														
Purchased seed share	Levy %													
	0.00%		0.50%		1.00%		**1.20%**		1.50%		1.75%		2.00%	
0%	R	8,801	R	8,727	R	8,653	R	**8,624**	R	8,580	R	8,543	R	8,506
10%	R	8,689	R	8,616	R	8,542	R	**8,513**	R	8,469	R	8,432	R	8,395
20%	R	8,578	R	8,504	R	8,431	R	**8,401**	R	8,357	R	8,320	R	8,284
30%	R	8,467	R	8,393	R	8,319	R	**8,290**	R	8,246	R	8,209	R	8,172
40%	R	8,355	R	8,282	R	8,208	R	**8,179**	R	8,135	R	8,098	R	8,061
50%	R	8,244	R	8,170	R	8,097	R	**8,067**	R	8,023	R	7,986	R	7,950
60%	R	8,133	R	8,059	R	7,985	R	**7,956**	R	7,912	R	7,875	R	7,838
70%	R	8,021	R	7,948	R	7,874	R	**7,845**	R	7,801	R	7,764	R	7,727
80%	R	7,910	R	7,836	R	7,763	R	**7,733**	R	7,689	R	7,652	R	7,616
90%	R	7,799	R	7,725	R	7,651	R	**7,622**	R	7,578	R	7,541	R	7,504
100%	R	7,687	R	7,614	R	7,540	R	**7,511**	R	7,467	R	7,430	R	7,393

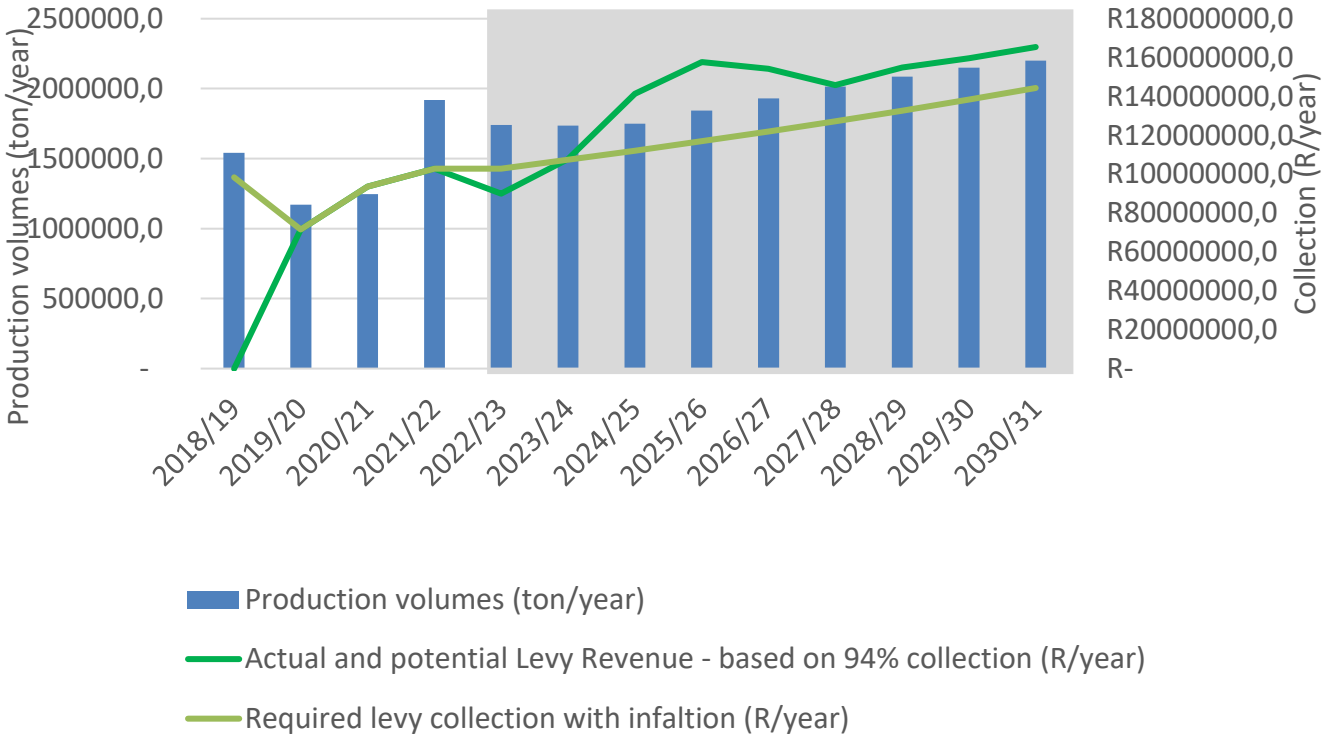
SOYBEANS SENSITIVITY ANALYSIS (GROSS MARGIN PER HECTARE): AVERAGE IRRIGATION 2021/22														
GROSS MARGIN PER HECTARE														
Purchased seed share	Levy %													
	0.00%		0.50%		1.00%		**1.20%**		1.50%		1.75%		2.00%	
0%	R	13,012	R	12,871	R	12,730	R	**12,673**	R	12,588	R	12,518	R	12,447
10%	R	12,851	R	12,710	R	12,569	R	**12,512**	R	12,427	R	12,357	R	12,286
20%	R	12,690	R	12,549	R	12,408	R	**12,351**	R	12,266	R	12,196	R	12,125
30%	R	12,529	R	12,388	R	12,247	R	**12,190**	R	12,105	R	12,035	R	11,964
40%	R	12,368	R	12,227	R	12,086	R	**12,029**	R	11,944	R	11,874	R	11,803
50%	R	12,207	R	12,066	R	11,925	R	**11,868**	R	11,783	R	11,713	R	11,642
60%	R	12,046	R	11,905	R	11,764	R	**11,707**	R	11,622	R	11,552	R	11,481
70%	R	11,885	R	11,744	R	11,603	R	**11,546**	R	11,461	R	11,391	R	11,320
80%	R	11,724	R	11,583	R	11,442	R	**11,385**	R	11,300	R	11,230	R	11,159
90%	R	11,563	R	11,422	R	11,280	R	**11,224**	R	11,139	R	11,069	R	10,998
100%	R	11,402	R	11,261	R	11,119	R	**11,063**	R	10,978	R	10,908	R	10,837

Levy percentage sweet spot?

- Calculating a 'sweetspot' where the seed and technology levy is at the right percentage to be considered acceptable and fair by farmers and seed and technology companies, is difficult and perhaps impossible.

- Not knowing seed and technology companies' disaggregated investment costs or required return on investment and uncertainty about possible increases or decreases in the use of farm saved seed, complicates calculations and as was shown in the sensitivity analyses, the levy revenue level will be substantially influenced by soybean prices and production volumes.

- The figure below illustrates the projected soybean production volumes *BFAP Baseline), as well as the 'required' levy collection and potential levy collection per year. The required levy collection is calculated by assuming that the levy level be at the same level as the average that was obtained for 2020/21 and 2021/22, adjusted with inflation. The projected actual and potential levy collected illustrates how much levy was collected historically and how much will potentially be collected in the future, given the 1.2% levy and the projected price and production volumes. Given the current projections, the 1.2% should largely be sufficient to provide the seed and technology companies with an amount that is at least in line with expectations when the 1.2% was agreed.



Conclusion and new application recommendations

- The seed and technology levy is the reason why local and international seed and technology companies are investing and introducing new improved soybean products in South Africa.
- Numerous new soybean varieties have entered the market over the last 4-5 years, and there are more varieties and GM events on the way.
- The performance of these new varieties needs to be assessed, compared and clearly communicated to farmers.
- There is recognition and an expectation that the levy percentage will likely increase slightly in future, largely to the benefit of the technology companies, as novel technologies realise benefits for farmers, but this can only be done once farmers have seen benefits.
- Additional GM events and companies will complicate the seed technology share division, but companies feel this issue can be discussed and 'internally' negotiated, it should not impact on the longevity of the levy and collection system.
- Longer term certainty about the continuation of the levy is vital for stability and to provide confidence to especially international seed companies that they will be able to recoup at least a share of their invested value.
- Leading seed companies aim to decrease the use of farm saved seed through offering new seed varieties every year and innovative marketing.
- It is likely that a second seed technology company will only enter the market in the 2025/26 production season.

Recommendations for new application

Based on the study findings, is recommended that the next seed and technology soybean levy application:

- Is for 3 years (March 2023 to Feb 2026) – to provide the necessary certainty and instil confidence in the system.
- That the levy percentage is kept at 1.2% for stability and for farmers to recognise farm level benefits before any possible adjustments are made.

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