

Projected protein requirements for animal consumption in South Africa

Project 2022



Project for the Protein Research Foundation

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1. Introduction

The Protein Research Foundation (PRF) has as its main objective the replacement of imported protein with domestically produced protein. After many years of investigating numerous alternatives, the focus changed mainly to where the largest impact could be made, namely in the soybean and canola industries.

The expansion of the domestic oilcake supply serves as a valuable benchmark for the PRF to gauge the effectiveness of its endeavours in bolstering the industry through research initiatives, technological advancements, and technology dissemination. The targets that will need to be met in the future for the PRF to continue emulating the great progress that has been made thus far, requires projections of future oilcake demands and what will be required to obtain self-sufficiency, including when this goal is likely to be met.

To accurately measure this progress various models were developed and used over the years. A new model has been developed.

The model considers changes in per capita consumption of meat, milk and eggs as projected by BFAP as well as population growth, the quantity of meat, milk and eggs that are predicted to be imported and exported are also considered. Projected future prices of major raw materials are incorporated as well as the availability of raw materials, mainly those that are derived as by-products from various agricultural processing industries.

The genetic improvement of animals has a substantial impact on productivity, therefore changes in animal performance is an important factor that the model incorporates. The model calculates the quantity of feed required as well as raw material breakdown for these feeds.

There are several animals that are not producers of meat, milk and eggs that also consume a substantial amount of animal feed, including protein. The feed consumption of these animals, including the protein sources, also need to be accounted for.

The model has the ability of making use of least cost linear programming, considering transport costs of raw materials across various regions of the country to ultimately formulate the actual feed required by all animals in South Africa, the constraints of availability of domestic raw materials is also considered. The result is an accurate prediction of protein requirements and projection of protein requirements both domestically and imported.

The growth in the domestic availability of oilcake is a good measure which could be used by the PRF to ascertain if it were achieving its objectives. Measuring the impact of supporting the industry with research, new technology and technology transfer. The targets that will need to be met in the future for the PRF to continue to emulate the great progress that has been made requires projections of future oilcake demands and what will be required to obtain self-sufficiency. When this goal is projected to be met is also an important measure. The Animal Product Requirement (APR) model in collaboration with BFAP data is used to calculate these projections.

2. Results

2.1. Current scenario

Based on the current per capita consumption of animal products it is estimated (using the APR Model) that the requirement for animal feed in South Africa is as follows. The data for this analysis and report were based on the full Calander year of 2022:

Table 1: National animal feed production 2022

Feed Types	National feed consumption (ton)
Broiler	3 743 167
Cattle Beef	2 864 511
Cattle Dairy	2 546 373
Layer	1 279 836
Pigs	1 178 683
Pets	377 494
Sheep	278 810
Horses	130 493
Ostriches	92 415
Aquaculture	5 253
Various	10
Grand Total	12 497 046

The largest consumed oilcake is still soya oilcake followed by sunflower oilcake.

Table 2: Oilcake usage for 2022

Oilcake type	National consumption (ton)
Soya Oilcake	1 337 122
Sunflower Oilcake	369 602
Soya Full Fat	191 054
Canola Oilcake	92 560
Cotton Full Fat	71 018
Palm Kernel Meal	10 118
Total	2 071 475

Locally South Africa progressed significantly in substituting imported soya oilcake with local oilcake. Currently South Africa produced 88% of the total requirement in 2022, in 2005 this was only at a 12% level. The projection for 2025 is at 100% and will remain at 100% to 2031. However, the substitution is highly dependent on efficient infrastructure and logistics support, providing internal raw materials to coastal areas at competitive levels. In 2022 the crushing margins facilitated the increase in local consumption at the coastal feed mills. This was supported with the increase in local production with the largest exports of soybeans on record. The usage of the oilcake is also very sensitive in terms of prices and competition of raw

materials containing protein. For instance, an increase in Lucerne production or wet milling by-products directly affects the usage of oilcakes.

Table 3: Historical usages of soya oilcake (Local and imported soybeans processed in South Africa)

Year	Local soya oilcake (ton)	Total soya oilcake (ton)	Local %
2001	121 140	598 070	20
2002	141 520	616 593	23
2003	120 000	705 352	17
2004	119 280	616 596	19
2005	92 080	740 558	12
2006	210 000	849 678	25
2007	303 280	1 115 280	27
2008	253 200	1 261 791	20
2009	181 600	1 111 172	16
2010	251 840	1 083 640	23
2011	301 600	1 291 069	23
2012	347 760	1 271 341	27
2013	469 360	1 197 978	39
2014	565 280	1 232 687	46
2015	765 287	1 254 120	61
2016	768 800	1 218 001	63
2017	836 285	1 267 098	66
2018	766 795	1 150 521	66
2019	820 000	1 218 000	67
2020	849 700	1 213 700	70
2021	1 073 682	1 444 193	73
2022	1 299 760	1 483 363	88

In terms of total oilcake, the local share in consumption increases from 34% in 2005 to 90% in 2022. It is projected that the local share will increase to 100% in 2025 and 100% in 2031.

Table 4: Historical usages of Total oilcake (Local and imported oilcake)

Year	Local Oilcake (ton)	Total Oilcake (ton)	Local %
2001	454 192	1 021 862	44
2002	482 448	1 149 224	42
2003	472 312	1 210 396	39
2004	489 413	1 121 460	44
2005	416 736	1 212 593	34
2006	572 231	1 414 338	40
2007	608 370	1 635 525	37
2008	494 557	1 758 185	28
2009	565 181	1 664 927	34
2010	701 030	1 743 137	49
2011	624 912	1 857 391	34
2012	766 927	1 856 360	41
2013	760 321	1 877 671	40
2014	913 356	1 889 979	48
2015	1 197 604	1 914 330	63
2016	1 238 120	1 965 291	63
2017	1 300 865	1 798 372	72
2018	1 441 527	1 649 498	87
2019	1 434 660	1 875 738	76
2020	1 485 183	1 885 663	79
2021	1 643 916	2 069 697	79
2022	1 870 954	2 071 475	90

2.2. Growth in requirements for animal products

In order to calculate the consumption figures of the different species it is very important to determine the demand. The demand was calculated by means of using the following macro variables in combination with animal feed conversion ratios growth figures:

- Population growth
- Per Capita consumption growth
- Imported animal products
- Exported animal products

Table 5: Projections of feed and oilcake requirements for the years 2022, 2025 and 2031

	Feed (ton)	Oilcake (ton)	Soya Oilcake (ton)
2022	12 497 046	2 071 475	1 483 363
2025	12 853 437	2 181 794	1 557 531
2031	13 943 001	2 408 881	1 602 342

Soya oilcake remains the dominant protein source in South Africa, this dominance has increased over time and will continue to do so. The future consumption figures are highly influenced by the Feed Conversion Ratios, with the constant decrease in FCR it stabilises the future consumption. The exports of beef, sheep and the prospect of chicken export increases the consumption of feed and has a large impact on the end consumption figures for 2031, These export prospects still need to realise and are highly dependent on biosecurity measures within South Africa.

2.3. Local Soya Oilcake Production

The constant increase in local oilcake production from locally produced soybeans will make South Africa increasingly self-sufficient in protein requirements.

Table 6: Local vs imported soya oilcake

	Local Soya Oilcake	Local Soybean (soybeans)	Total Soya Oilcake	Local Soya (soybeans)	% Local
	(From local soybeans) ton	Production (required) ton	Requirements ton	Production (required) ton self-sufficiency	
2022	1 483 363	1 666 360	1 483 363	1 951 793	87
2025	1 557 531	2 049 382	1 557 531	2 049 382	100
2031	1 602 342	2 108 344	1 602 342	2 108 344	100

*Excluding full fat consumption

Total oilcake requirements in South Africa are estimated at 2 071 475 tons in 2022 versus a local production of 1 870 954 tons locally produced or 90% of requirements (Table 4). The soybean requirement of 1 951 793 tons is excluding the soya beans used for full fat soya and for human consumption. This production is needed to obtain 1 483 363 tons of soya oilcake.

Soya oilcake produced in South Africa in 2022 provided 87% of the country soya oilcake requirements (Table 6). It is forecast to increase to 100% in 2031. This forecast is based on margins and competitiveness within the industry. Forecasts indicate that enough soybean will be produced for local consumption. Logistics is still creating challenges to be competitive against imports and must be kept in consideration to reach projected levels. Most oilcake is produced inland and needs to be transported to the Western and Eastern Cape favourable crushing margins are required to subsidise transport to these regions and ensure local

consumption in the place of imports. To satisfy local demand in 2031, 2 108 344 tons of soybeans is needed.

According to the model feed requirements will increase to 13 943 001 tons in 2031 from 12 497 046 tons in 2022. Soya oilcake requirement will be 1 557 531 tons by the year 2025 and 1 602 342 by 2031 (Table 6).

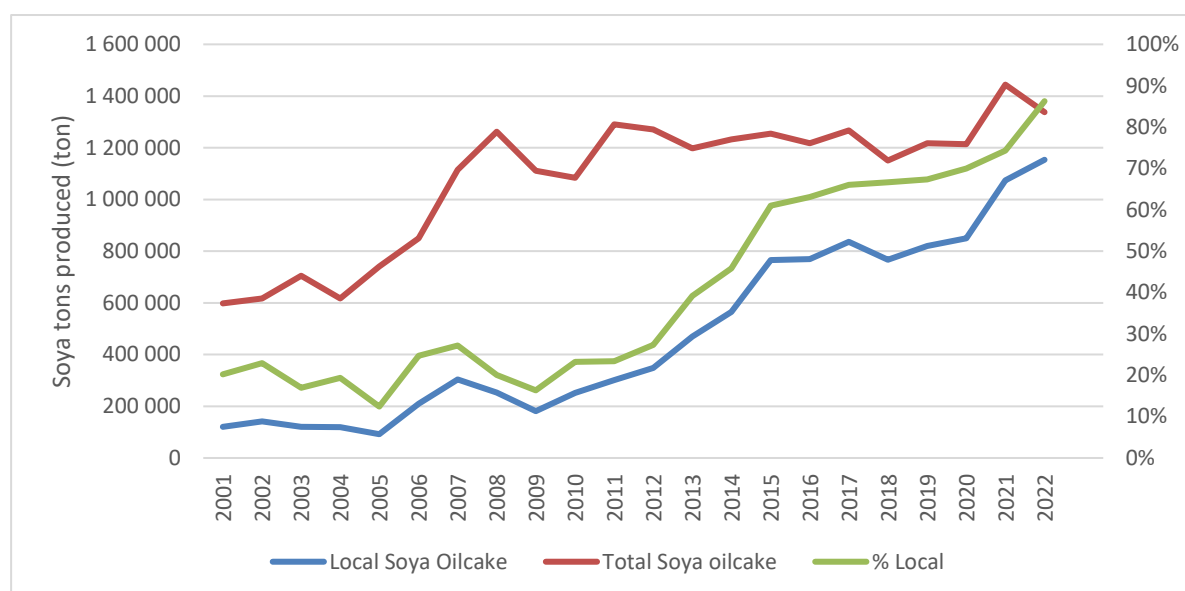


Figure 1: Growth in self-sufficiency of soya oilcake

Broiler and Layer diets play an enormous role within the industry particularly with reference to oilcake consumption. Growth and sustainability in the poultry industry will play a major role in oilcake requirements in the future within the future, it is encouraging this is part of the recent government masterplan. Implementation is slow and the impact of import replacement and export expansion not yet been experienced. The second most important role-player is the beef and sheep industry, to sustain growth and consumption of feed it is important that bio security is managed efficiently in South Africa. In addition to normal population growth the largest contributor to increases in animal feed consumption are the exports of animal products namely mutton, beef and chicken.

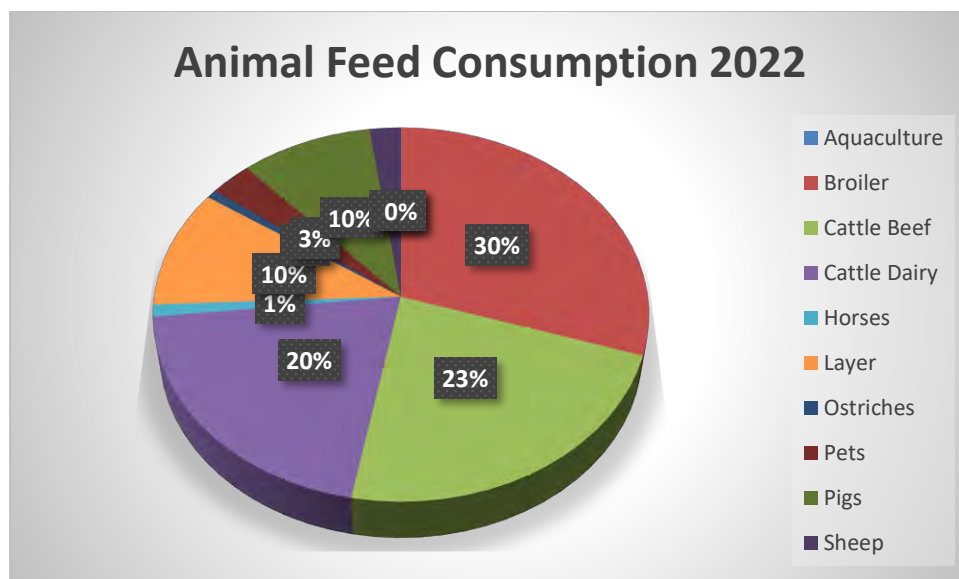


Figure 2: Specie feed consumption 2022

Table 7: National animal feed production 2025 and 2031

Feed Types	National feed consumption (ton)		
	2022	2025	2031
Aquaculture	5 253	5 657	6 560
Broiler	3 743 167	3 746 307	4 015 127
Cattle Beef	2 864 511	3 038 482	3 280 464
Cattle Dairy	2 546 373	2 644 922	2 859 105
Horses	130 493	137 099	158 993
Layer	1 279 836	1 313 829	1 412 940
Ostriches	92 415	101 887	136 539
Pets	377 494	396 604	459 939
Pigs	1 178 683	1 197 439	1 337 269
Sheep	278 810	271 201	276 053
Various	10	10	10
Grand Total	12 497 046	12 853 437	13 943 001

3. Conclusion

The prospects of feed for animal protein are looking promising in the future. However, it is highly depended on a few factors. With increasing efficiencies regarding Feed Conversion Ratios it is important to find additional demand. This additional demand is predominantly situated in exports of animal products. Currently this is the focus within the different masterplans submitted towards government and will play an important role in sustainability. However the outcome and positive outlook is yet to be seen.

Another factor that is very important is the prices and competition of raw material, in order to utilise these local consumption levels the raw material prices tend to be closer to export parity

levels. Which means that a lot of work will be needed to increase the feasibility of producing the raw material at these levels. Sensitivity is specific related to the price of protein sources, one of these ratios that is very sensitive is the maize to soyabean price ratio.

Given the production of raw materials the question prevails if there will be opportunities in the future for exports. Some of the commodities can be exported but there can even be opportunities to export processed product such as oilcake.

The protein raw material basket is very complex and any slight change in one raw material have effects on the utilisation of oilcake, specifically soya oilcake. If there is an increase in production or an import of a protein source it will have a direct impact on the consumption of soya oilcake. The crushing margins also have a direct impact on the self sufficiency factor, as it effected the competitiveness of inland oilcake vs imported coastal oilcake.

Lastly logistics and biosecurity will play a very important role in the future, if inland products cannot be delivered price competitive at coastal consumers, imports will continue. If the exports of animal products do not increase, there will be pressure on the utilisation in South Africa and have a direct impact on production.

If all of the above fall into place South Africa can be totally self-sufficient and there is some space for an increase in soyabean production without being to reliant on exports of beans.

Table 8: Self-sufficiency of total oilcake and oilcake

	2022	2025	2031
Total Oilcake	90%	96%	98%
Soya Oilcake	87%	100%	100%