

Projected protein requirements for animal consumption in South Africa

Project 2019



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 soybeans and canola.

The growth in the domestic availability of oilcake is a good measure by which the PRF could ascertain if it was achieving its objectives, by way 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 thus requires projections of future oilcake demands and what will be required to obtain self-sufficiency, as well as 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 consume a substantial amount of animal feed including protein. The feed consumption of these animals including the protein materials also needs to be accounted for.

The model has the ability by making use of least cost linear programming considering transport costs of raw materials across various regions of the country to formulate the actual feeds required by all animals in South Africa given the constraints of which quantity of raw materials will be domestically available. 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 by which the PRF could ascertain if it was achieving its objectives, by way 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 thus requires projections of future oilcake demands and what will be required to obtain self-sufficiency, as well as when this goal is likely to be met. The 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:

Table 1: National animal feed production 2019

Feed Types	National feed consumption (ton)
Aquaculture	11 424
Broiler	3 125 196
Cattle Beef	2 754 272
Cattle Dairy	2 573 538
Horses	121 175
Layer	1 241 259
Ostriches	77 036
Pets	429 549
Pigs	1 051 796
Sheep	236 970
Various	10
Grand Total	11 622 225

In terms of oilcake the largest consumed oilcake is still soya oilcake followed by sunflower oilcake.

Table 2: Oilcake usage for 2019

Oilcake type	National consumption (ton)
Cotton Full Fat	78 686
Soya Full Fat	124 044
Canola Oilcake	53 930
Soya Oilcake	1 218 000
Sunflower Oilcake	358 085
Palm Kernel Meal	42 993
Total	1 875 738

On the local market, South Africa progressed in terms of substituting imported soya oilcake with local oilcake. Currently South Africa produced 67% of the total requirement in 2019, in 2009 this was only at a 16% level. The projection for 2022 is at 89% and will increase to 98% in 2028.

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

In terms of total oilcake the local share in consumption increase from 34% in 2009 to 76% in 2019. It is projected that the local share will increase to 84% in 2022 and 88% in 2028.

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

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 to the year 2022 and 2028

	Feed (ton)	Oilcake (ton)	Soya Oilcake (ton)
2019	11 622 225	1 875 738	1 218 000
2022	12 321 771	2 024 101	1 255 323
2028	13 426 384	2 160 266	1 298 528

As explained earlier soya oilcake remains the dominant protein source in South Africa, this dominance has increased over time and will continue to do so. Soya oilcake in 2010 made up 40% of oilcake requirements, this increased to 65% in 2019.

2.3. Local Soya Oilcake Production

The 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	Total Soya Oilcake	Local Soya	
	(From local soybeans) ton	Production (required) ton	Requirements ton	Production (required) ton self-sufficiency	% Local
2019	820 000	1 025 000	1 218 000	1 522 500	67
2022	929 788	1 162 235	1 255 323	1 569 154	74
2028	1 048 230	1 310 288	1 298 528	1 623 160	81

Oilcake requirements in South Africa are estimated at 1 875 738 tons in 2019 versus a local production of 1 434 660 tons locally produced or 76% of requirements (Table 4). The soybean requirement of 1,2 million tons is excluding the 124 000 ton fullfat soybeans and 30 000 ton for human consumption.

Soya oilcake produced in South Africa in 2019 provided 67% of the countries soya oilcake requirements (Table 6). It is forecasted to increase to 81% in 2028 which is due to mainly imports of oilcake at coastal regions. Logistics is still creating challenges to be competitive against imports.

According to the model feed requirements will increase to 13 426 384 tons in 2028 and 12 321 771 tons in 2022. Soya oilcake requirement will be 1 255 323 tons by the year 2022 and 1 298 528 by 2028 (Table 5).

Estimates indicate an 81% self-sufficiency by 2028 and a 74% by 2022 in terms of soybeans, this can be attributed to an increase in production of soybeans estimated by BFAP and a decrease in imported soybean oilcake. (Table 5).

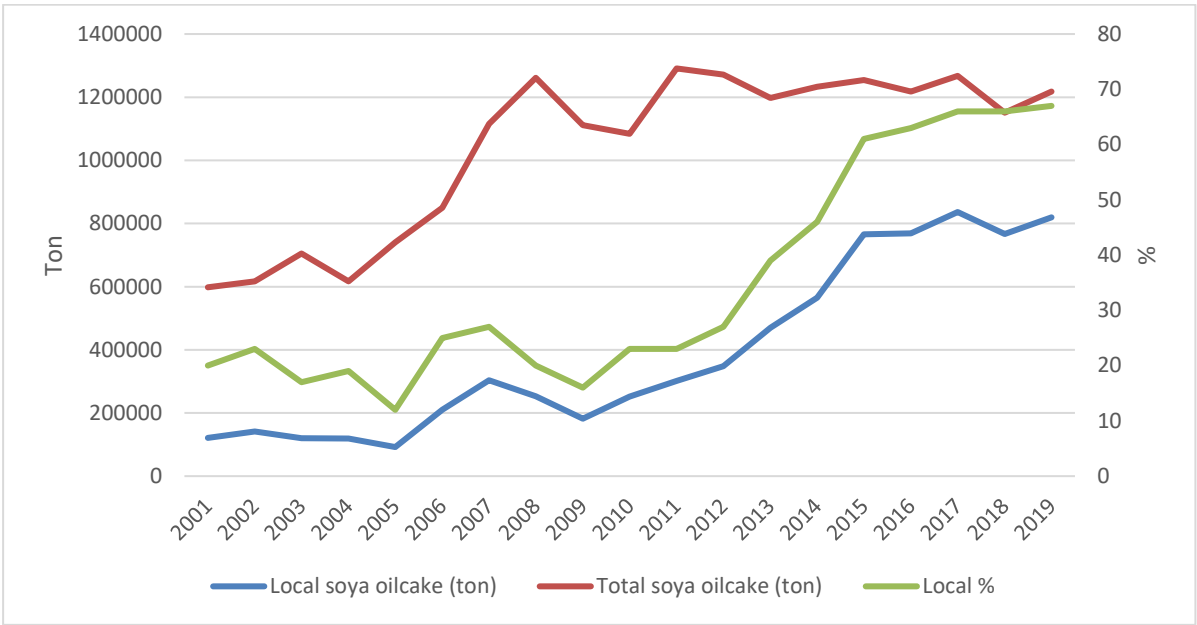


Figure 1: Growth in self-sufficiency in terms of soya oilcake

Broiler and Layer diets is playing an enormous role within the industry. Growth and sustainability in the poultry industry will play a major role in oilcake requirements within the future and it is good news to see that this is part of the recent masterplan submitted towards government. The second important roleplayer is the Beef and Sheep industry, in order to sustain growth and consumption of feed it is important that bio security be managed efficiently within South Africa. This is especially seen with the recent food and mouth breakouts in South Africa.

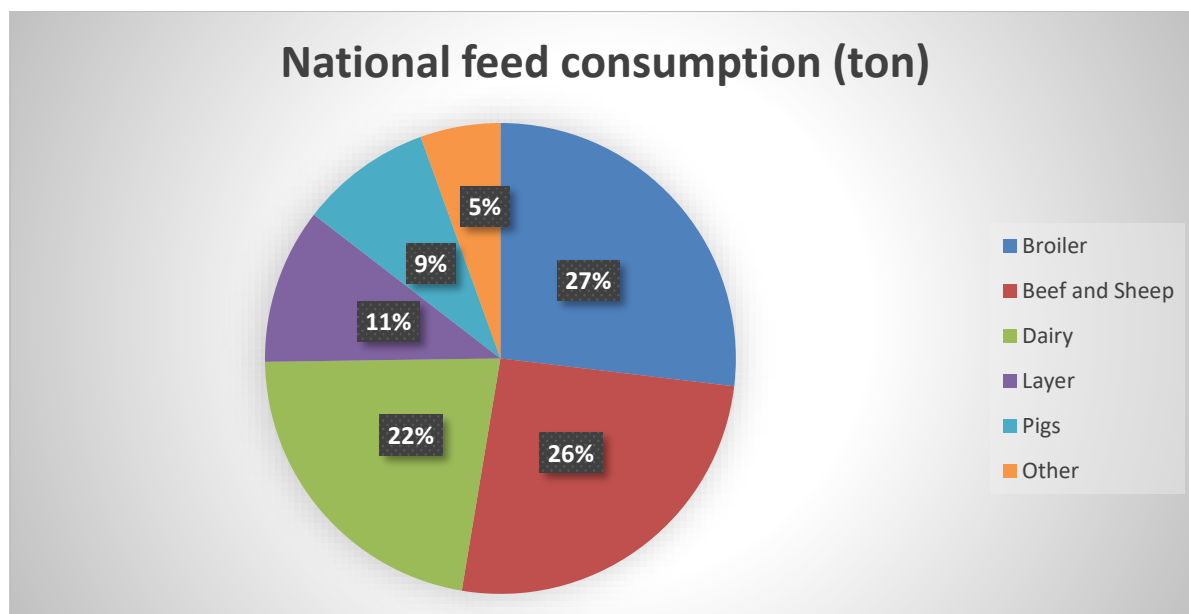


Figure 2: Specie feed consumption

Table 7: National animal feed production 2022 and 2028

Feed Type	National feed consumption 2022 (Ton)	National feed consumption 2028 (Ton)
Dairy	2 635 407	2 794 482
Beef & Sheep	3 205 596	3 565 587
Pigs	1 122 912	1 283 404
Layers	1 312 806	1 429 807
Broilers	3 347 253	3 637 052
Other	697 797	716 052
Total	12 321 771	13 426 384

Table 8: Oilcake usage projection 2022 and 2028

Oilcake	2022 Ton	2028 ton
Soya oilcake	1 255 323	1 298 528
Sunflower oilcake	432 231	484 565
Canola oilcake	62 885	76 318
Palm Kernel	49 018	49 018
Soya Full Fat	141 644	151 837
Cotton Full Fat	83 000	100 000
Total	2 024 101	2 160 266

3. Conclusion

Seasonality is playing an important role in terms of self-sufficiency and usage. Together with this the consumption of animal feed were also highly affected the past three season with factors such as bird flu and food and mouth disease which at the end limited exports of beef. The scenarios in this report is also based on the assumption that the poultry master plan would keep poultry imports stable. However if poultry imports keep increasing this will affect the usage of raw materials and national feed figures.

Looking at the forecast South Africa is progressing towards being self sufficient in terms of oilcakes, if one evaluates the summary within Table 9. However there is still a portion that will be imported and this is a function of infrastructure and coastal consumption.

Table 9: Self-sufficiency of total oilcake and oilcake

	2019	2022	2028
Total Oilcake	76%	84%	88%
Soya Oilcake	67%	74%	81%