
***FORECAST ESTIMATES OF PROTEIN FOR ANIMALS
IN SOUTH AFRICA***

BY WILLEM DE JAGER

Submitted in partial fulfilment of the requirements for the degree

MASTER OF SCIENCE IN AGRICULTURAL ECONOMICS

In the

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DECLARATION

I, Willem de Jager, hereby declare that this dissertation submitted by me for the degree of Master of Science (M.Sc. Agric) in the Department of Agricultural Economics, Faculty of Natural and Agricultural Sciences, at the University of the Free State, is my own independent work and has not been submitted by me to any other university.

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Forecast estimates of protein for animals in South Africa

by

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Abstract

Across the globe, the world population is rising at a drastic rate, higher income opportunities in urban areas attract more people to cities, and coupled therewith is the higher income that these people have at their disposal. Higher income streams increase the demand for protein-rich and high-value foods. Furthermore, humans are faced with the huge challenge of producing the same amount of food that was produced in the last 8 000 years, but only in the next 40 years.

South Africa is currently experiencing the same challenges and there is an important drive to supply the human demand for animal-source protein and to reach self-sufficiency in protein supply. Critical linkages exist between the human demand for animal-source protein, the number of animals to be slaughtered to supply this demand, and the animal feeds required to feed the animals. South Africa requires a decision support tool to aid decision making, to provide accurate and relevant results, and to measure self-sufficiency in protein supply.

Various researchers have examined these linkages globally and in South Africa. In this study, dynamic data generated by the BFAP model is integrated into the APR model. Thereafter, the APR_OPT model is able to determine least-cost animal feeds to satisfy the nutrient requirements of all animal categories. This study aims to quantify, manage, and forecast the linkages between these industries. The specific objectives are to replicate and update the APR model, to generate and forecast baseline results for the period 2015 to 2024 with integrated BFAP data, and to simulate shocks on the specific linkages using an external shock analysis on the supply and demand side of the APR_OPT model.

Three external shocks are simulated in the study. Firstly, the effect of the introduction of a new raw material into the animal feed industry. Secondly, the effect of increased imports of animal-source

protein is simulated. Thirdly, the shock of the 2015/2016 drought on the specific linkages, animal feed cost, and demand for imports of raw materials.

Animal feed consumption is expected to increase with an average of 2.54% annually to 14.63 million tonnes by 2024. Total protein usage for animal feeds is expected to increase from 1.98 million tonnes in 2015 to 2.806 million tonnes by 2024, with a 4.63% average increase per year. South Africa's self-sufficiency in protein supply for animal feeds is expected to increase from 60% in 2015 to 79% by 2024.

Sorghum distillers dried grains with solubles (S-DDGS) are fully absorbed into the animal feed industry at 100% of the yellow maize price. The biggest consumer of S-DDGS is dairy cattle. The implementation of the African Growth and Opportunity Act (AGOA) is expected to decrease the demand for broiler feed, as well as the demand for imported raw materials. The 2015/2016 drought caused an average 52% increase in animal feed costs across all rations. Total imports of raw materials for animal usage are expected to increase from 573 525 tonnes in a normal 2016 year to 2.78 million tonnes in the drought shock year.

The APR_OPT model poses, in this study, a huge variety of beneficial abilities that are able to aid decision making and quantify the linkages between the industries.