

# Animal feed industry in Sudan, current status, problems and prospects

## Abstract

In spite of the great potential of livestock and Sudan's self-sufficiency in meat and other livestock products many constraints on production were recognized, the most important of them is the seasonality of animal feeds and lack of processing of feeds and export of by-products. About 90% of livestock are raised in traditional pastoral systems, mainly in the western states of Kordofan and Darfur. Rangelands occupy an area of 110million hectares. Sudan also produces about 18.6million tonnes of crop residues. Green fodder cultivation, however, is less than 126,000 ha. Rangelands provide about 86% of feed for livestock, crop residues and agricultural byproducts 10%, and irrigated forage and concentrates 4%. Drought and war have depleted most of these feed resources, therefore, improved animal feed and feeding practices can play in the long-term alleviation of rural poverty and their specific benefits to the rural poor such as increased livestock productivity, household food security and income, beside peacemaking in the Sudan.

Because of the growing demand for animal feed, new technologies and techniques need to be continuously developed and transferred in order to avoid environmental deterioration or increases in the prices of food products. Research and technology generation seeking ways to overcome food insecurity and poverty are therefore essential for agricultural and rural development. Animal feed industry is one of these solutions suggested to alleviate this problem.

The objective of this study is to highlight the animal feed industry sector in Sudan, to evaluate the current status, and to what extent it may contributes to solve the problem of shortage and seasonality of feed in Sudan.

**Keywords:** animal feed, industry

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Izeldin A Babiker

University of Zalingei, Department of Animal Production, Sudan

**Correspondence:** Izeldin A Babiker, Department of Animal Production, Faculty of Agriculture, University of Zalingei, P.O. Box 6, Sudan, Tel +96 656 614 8391-+96 656 560 6691, 96614030030(3454), Fax 9661 404 4265, Email izeldinbabiker959@gmail.com

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**Abbreviations:** ARC, agricultural research council; KSC, kenana sugar company; SCB, sugarcane bagasse; SCM, sugarcane molasses; SCT, sugarcane tops; SMAAI, state ministry of agriculture, animal resources and irrigation

## Animal feed industry

According to the FAO,<sup>2</sup> there are three definitions for animal feed industry, one of them is "commercial operations producing feed for sale", the second is "integrated operations where large producers in particularly produce their own feedstuff" and the third definition is "the cooperative operations where farmers jointly own the feed mill or production plant that produce the feed they use". On the other hand Cheeke<sup>3</sup> used the term "animal feed manufacturing" rather than animal feed industry and defined it as the process of converting ingredients raw materials "feedstuffs". Into balanced diets that are then sold to producers of livestock and other animals. In many countries the term "feed compounding" and compound feeds were used.

Manufactured feeds are produced in feed mill that have equipments to process feedstuff e.g. "grinding and extruding" for mixing in the desired proportion and for mixing the ingredients to produce the finished product,<sup>3</sup> often the mixed feed is pelleted or it may be marketed as a meal type (mash feed).

Modern feed mills are largely computer controlled. The process begins with the company nutritionist who computer formulate diets, using recognized requirements figures e.g. (NRC or ARC) and tables

of feed composition and current prices of ingredient. Many diets are least cost formulas, in which the ingredients are selected to meet the prescribed nutrients requirements figures at the lowest cost. There may be factors such as palatability and physical texture that reduce animal performance.<sup>4</sup> FAO<sup>1</sup> reported that ten countries produce more than 60% of the world's total industrial feed. Manufactured feeds for poultry are the greatest portion of tonnage, next is swine followed by cattle feeds which are mainly concentrate for dairy cows.

Ensminger et al.<sup>5</sup> defined animal feed industry as the operations necessary to achieve the maximum potential nutritional value of feedstuffs, i.e. changing ingredients in such a manner as to maximize their natural value and the net returns from their use. The same author also tend to use term "feed processing" as a synonymous to feed industry which may be physical and/or chemical. Similarly, Church et al.<sup>6</sup> described animal feed industry as "methods which might involve mechanical, chemical and/or thermal methods or combination of all these methods to alter the physical form or particle size, to prevent spoilage, to isolate specific parts of the seed or plant, to improve palatability, or to inactivate toxins or anti-nutritional factors of one type or another.

## Materials and methods

Field survey and visit were done to investigate the current status of animal feed factories in Sudan, 37 animal feed factories in different locations, were visited and only 16 of them were shown in Table 1, this is due to lack of firm documentation.

**Table 1** Animal feed factories in Khartoum State

Factory	Production (ton/year)	Capacity (ton/year)	(%)
Coral	7488	14976	50
Arab Company Animal Feed Unit	12000	36000	33
African Poultry Company	14400	14400	100
Gad	4300	4300	100
Abuhalima	63	120	52.2
Tarafa Feed	192	384	50.5
Gaith for Animal Feeds	500	3500	14
University of Khartoum Farm	150	300	50
Elshaheed	4000	4000	100
Anaam	24	31.104	77.1
Elgandool	90	150	60
Elmarkazi (Central Animal Feed Factory)	15000	25000	60
Grabis I	1868	1868	100
Elbadri	144	144	100
National Company (Watania)	1200	360	33
Kenana Animal Feed*	75000	*	*
<b>Total</b>	<b>292.386</b>	<b>176.655</b>	

**Source:** Ministry of Agriculture Animal Resources and Irrigation, Khartoum State<sup>7</sup>.

\*Personal communication

## Animal feed industry in Sudan

The manufacturing of animal feed in Sudan was initiated in the early 1960's and it's becoming increasingly important since natural pastures in Sudan suffered significantly from drought, desertification, fires, and overgrazing. This industry is basically located in the capital town "Khartoum" with some factories in Gezira, Kassala and Gedarif States. Twenty seven animal feed factories and mixers were found in Khartoum State, only 19 out of them is working.<sup>7</sup> The total production of the manufactured feed is 176.665tons (which estimated of 60% of the designed capacity of these factories). Recently Kenana Sugar Company (KSC), established a modern animal feed factory in 2004 at the White Nile State to produce 75.000tons, but the actual production up to 2007 is 10.5tons/hr. Kenana animal feed factory is designed to make use of the agro-industrial byproduct of sugar refining, mainly sugarcane bagasse (SCB), sugarcane molasses (SCM) and sugarcane tops (SCT).

Animal feed industry is one of the major animal feed resources in Sudan, it mainly provides the poultry industry with manufactured feed and or minerals and vitamins, but of low contribution in livestock feeding, because cattle and sheep are primarily grazing species. Animal feed industry in Sudan could not be developed in the absence of the figures and tables of feed compositions prescribed by the nutritionists to determine the nutrients requirements of the Sudanese local animals,

unless prescribing the nutrients requirements of our local animals species and feed prices, formulation of balanced rations and diets will be based on the published recommendations for the temperate feeds and breeds, which obviously leads to erroneous estimates and predictions of production when applied to the local types and breeds. The reason for this is the fact that, our local animals nutrients requirements (for optimum production) and nutrients allowance (gives margin of safety) were different from those prescribed by the National Research Council (NRC) and/or the Agricultural Research Council (ARC) for the temperate breeds or other recognized requirements. To guide livestock producers in selecting properly balanced rations for their livestock, scientists in Sudan should prepare feeding standards (tables which indicate the quantities of nutrients to be fed to various classes of livestock for different physiological functions like, growth, maintenance, lactation, egg production and wool production). The recommendations must provide a sufficient margin of safety to cover the usual variations in the composition of feeds and the differences in the individual animals to be fed.

Other factors also have a great role in animal feed industry. These are, Irregular and expensive power supply, high production cost (reaches 10% as reported by Abuswar & Darag,<sup>8</sup> seasonality and high cost of the raw materials (feed stuffs), scarcity of well trained workers and technicians, absence of the effective role of agricultural and veterinary extension among the producers, unavailability of the rules and regulations that organize this type of industry in the Sudan, and unavailability of the standards, feed safety measurements and quality control of the animal feeds. It could be concluded that, such problems should be solved to aid in developing animal feed industry in Sudan.

## Acknowledgements

None.

## Conflict of interest

Author declares that there is no conflict of interest.

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