

PRESENT SITUATION OF COMPOUNDED FEEDS IN KENYA AND
PERSPECTIVES FOR BETTER USE OF LOCAL FEED RESOURCES

by

A.N. Said and P.N. Mbugua

1. INTRODUCTION

Production of compound feeds in a country depends on a number of factors. Some of them are:

- (i) livestock population composition and the systems of production;
- (ii) availability of feed ingredients;
- (iii) availability and capacity of feed mills;
- (iv) availability of technology to compound the feed; and
- (v) demand for animal products.

Emphasis will be put on use of raw materials produced locally. Equally important prerequisites are the pricing policies on raw materials, compound feeds and animal products, marketing channels and the efficiency of quality control of compound feeds.

Most beef cattle in Kenya are raised under extensive ranching and pastoralism which do not hardly use compound feeds to any extent. A small fraction of beef herds were raised in the better grassland where supplementing with concentrates during the dry season has been shown to improve growth rates (Thomas and Mbugua, 1982). Economic returns, however, mitigate against the use of compound feeds in this sector. Efforts to expand beef production under feedlot failed on economic grounds.

In 1980 the estimated beef production was 140 000 tons while the demand was 135 000 tons (Kenya, Ministry of Livestock Development, 1982). By 1990 the demand for beef is estimated to rise to 200 000 tons. To meet this demand structural changes in systems of production have to occur. Amongst the strategies will be to produce more beef in intensive systems increasing the competition for compound feeds with dairy cattle, pigs and poultry (see Table 1).

Sheep and goats are raised in systems very similar to those of extensive beef production. The demand for compound feeds for the small stock is therefore minimal.

The change in land policy after independence in 1963 has meant that dairy production has changed from large systems involving lay farming to small scale involving intensive fodder production often rearing 2-3 dairy cattle. Such a system may have to rely on supplementary feeding to maintain milk production, high so long as there are economic incentives. The trend in dairy production referred to is shown in Figure 1.

Pig production has not shown such great changes. There have however been some large increases in poultry population in the country.

The greatest demand for compound feeds in Kenya is in dairy, pig and poultry enterprises.

2. The feed industry in Kenya

Commercial agricultural production in Kenya dates only from the beginning of this century. When large scale farms were introduced into the highlands, the farmers grew maize, wheat and barley and raised beef and dairy cattle as well as pigs. Farmers used whole grains to supplement animals in the pastures. With cultivation of wheat, the flour milling industry developed. The cereal offalls were used for feeding cattle. Feed manufacturers started to produce "Cereal balancers" for pigs and dairy cattle. By 1967, the feed industry was well founded and various types of animal feeds were under production (Adlington, 1970). Now it is possible to obtain all types of livestock and pet feeds and the production of these is shown in Table 3.

The actual feed production, however, falls far below the installed capacity. This could be the real situation or it more probably is understated to evade taxation. Availability of feedstuffs, however, affects the actual feed production. Table 3 indicates 50% of the feed is for poultry. A drop in production was seen in the 1979/80 drought (Mbugua, 1984 and Table 3). In the 1983/84 drought, compound feed production came to a near standstill.

3. Availability of feed ingredients

Feed ingredients used in formulation of animal feeds are classified into four major categories:

- (i) energy sources
- (ii) protein sources

(iii) minerals and vitamins and

(iv) additives

The major ingredients that constrain feed compounding are the energy and protein sources. Table 4 shows the range and percentages of ingredients in poultry feeds.

3.1 Energy sources

The conventional energy sources are cereals and by-products such as wheat bran and maize germ meal. Maize is the most important energy source in the Kenyan feed industry but it is also a staple food. The competition between humans and livestock limits the amount of maize available to the livestock sector. In 1981 estimated human requirement for maize was 540 thousand MT while production was 571 thousand MT. The provender milling requirement of 37 thousand MT was therefore not met for that year. The prices of maize germ meal have increased recently because of higher demands for extraction of cooking oils.

Wheat production has been below requirements for human consumption. Almost all the barley produced in the country goes to the brewing industry. Sorghum and millets are rarely used in the feed industry (Maritim, 1983). Sources of energy therefore limit the expansion of the feed industry. Emphasis must, therefore, be placed on the need to identify alternative energy sources (Gomez, 1982).

3.2 Protein sources

The protein sources are oil cakes, fish meal, meat meal, blood meal and meat and bone meal. Extracted oil cakes such as seeds of cotton, sunflower and rape are produced. In large quantities in general oil cakes are about 30-40% protein but are deficient in methionine and this limits their use in poultry diets (Scott *et al.*, 1976). Groundnut seed cake is highly susceptible to mould growth (*Aspergillus flavus*) producing aflatoxins that limit its use. Cotton seed cake in diets of laying hens frequently causes difficulties because it reduces egg quality. As little as 0.001% of free gossypol in the diet will cause egg yolk discolouration (Scott *et al.*, 1976).

However, rape seed cake contains goitrogenic glucosides and also 3% tannic acid (Scott *et al.*, 1976). This undoubtedly limits its use to 15% of the diet.

Although there is an ample supply of oil cakes, their use in poultry feeds is limited and the country needs to import soyabean meal.

Animal protein sources are of higher biological value than plant proteins (Nesheim et al., 1976). Table 6 summarizes the local production of animal proteins. The current level of local production is low and Kenya has to import fish and soyabean meal. It is estimated that at least 4 thousand MT of fish meal are imported annually.

3.3 Vitamins and minerals

Minerals for mixes such as iron, copper, zinc etc. as well as all the vitamins are imported.

4. Use of local feed ingredients

There is under utilization of some potential feed ingredients available locally. As has been indicated sorghum and millet are in limited supply and not used in feed formulation.

Cassava is another local material that is not used because it is low in protein and entails the use of greater quantities of animal proteins.

Although large quantities of molasses are produced very little molasses is used in feed formulation even though Baustad (1974) has shown that up to 50% of maize can be replaced with molasses in pig rations.

In diets for laying hens caraphyll orange is used for yolk colouration. Any leguminous leaf meal (e.g. alfalfa) can be used in place of caraphyll orange. However little legume leaf meal is produced in the country and perhaps should be encouraged.

Research findings show that soyabean can be grown in Kenya (Thairu and Shakoor, 1985 and Njuguna, 1985). However, this legume is not produced in large quantities. Other feedstuffs that can be exploited are feather meal and poultry byproduct meal (Mbogua, 1984) and blood meal. Kayongo-Male (1984) estimates that 2.2 thousand MT of blood meal can be produced annually in the country but the current production is only 1% of the potential.

5. Constraints facing the feed industry

Availability of the raw materials given in Section 3 is not the only constraint facing the feed industry. Other constraints are:

- (i) pricing policy

- (ii) price increases of raw materials and
- (iii) availability of qualified personnel

5.1 Pricing policy

The raw materials and the compound feeds are controlled under the "general order system" while the animal products are controlled under "Specific order control" (Kenya Ministry of Livestock Development, 1983). This means that prices fixed for the animal products are at times so low that they discourage use of compound feeds. Beef is under price control while eggs and poultry meat are not. This then causes beef to be cheaper than poultry meat and limits the expansion of this industry.

5.2 Price increases of raw materials

In the last ten years, the prices of raw materials have increased at a rate to at least double the price of most ingredients which has reduced the use of compound feeds and indeed lowered levels of animal production. The high feed prices means that the animal products are expensive and often beyond the reach of the majority of the poor people in the country.

5.3 Quality control

The Kenya Standards (KBS) has specified standards for various types of animal feeds which are difficult to implement. The standards which are enforced are those of the finished products whereas no standards are set for raw materials. Since the feed formulators cannot carry out analysis for all raw materials, feed formulators tend to use the data collected in North America or Western Europe which is sometimes a dangerous practice.

5.4 Availability of qualified personnel

Each feed manufacturing concern should have a qualified animal nutritionist. Few of the provender millers have such personnel. The duties of a nutritionist should be on quality control so as to ensure that the right feed is produced.

6. Substitutes: Accent on perspectives for better use of local feed resources

The potential local feed resources that can be used in compounding feeds have been mentioned. It has been indicated that fish meal and soyabean meal are imported. There is need to

investigate the possibility of producing fish meal locally. It has been shown that soyabean can be grown in Kenya (Njuguna 1985). What is needed is to provide the necessary incentives to the farmers to grow this crop.

There are local feed resources that are grown in this country but are not widely used in animal feed compounding. Sorghum and millets are the most important. Production of these crops was 53 thousand MT in 1975 and rose to 146 thousand MT by 1980 (Maritim, 1983). More effort should be expended to increase the production of these grains.

Byproducts of the meat processing industry in particular blood, feather meal and poultry byproduct meal can form an important source of animal proteins. Most of the animals are slaughtered in small slaughterhouses scattered in the country. To enhance blood meal and poultry byproduct meal production, efficient methods of collecting and processing these materials must be identified.

The degree to which local feed resources will be used in compounding animal feeds will depend on the cooperation between the provender millers, researchers and policy makers. A step in this direction was taken in 1981 with the publication of the Feed Policy in Kenya (Kenya Government, 1981). In broad terms the National Food Policy emphasizes the need for increased food production. Indirectly this means greater uses of local resources.

7. Conclusions

There is a well organized small feed industry in Kenya. Most of the feed ingredients are locally produced. There is, however, need to produce the imported feed ingredients such as fish meal and soyabean meal locally. There is a high potential to utilize locally produced feed resources such as sorghum, millet and molasses. Pricing policies of raw materials, compound feeds and animal products as well as the availability of raw materials are the major constraints in livestock feed production. Livestock feed production must be intensified to meet the domestic demand for animal proteins. This, in turn will best be met by the expansion of the feed industry.

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Table 1: Estimated livestock population, 1978 ('000 head)

Type	Numbers
Cattle	10 247
Sheep	
Wool sheep	500
Hair sheep	6 000
Goats	
Dairy goats	2
Meat goats	8 500
Total	15 002
Poultry	
Indigenous	15 020
Exotic	1 760
	16 780
Pigs	70
Rabbits	34
Camels	607
Donkeys	135

Source: Kenya Ministry of Livestock Development (1982).

Table 2: Percentage ration compositions for beef feedlot

Feedstuff	Ration 4	Ration 5
Maize	37	52.8
Forage	50	33.9
Mum [*]	10.5	11.5
Cotton seed cake	2.7	2.7

Source: Were (1974) and Creek (1977)

^{*}MUM - Molasses Urea Minerals

Table 3: Livestock feed production, 1977-1982 ('000 tons)

Year	Cattle	Type of feed			Total
		Pigs	Poultry	Others [*]	
1977	43	22	63	8	136
1978	39	22	79	15	156
1979	35	16	65	14	130
1980	34	9	50	12	105
1981	47	12	64	6	129
1982	39	8	62	6	115

Source: Kenya, Ministry of Livestock Development (1983)

Table 4: Composition of poultry rations to meet feeding standards in Kenya

% feed ingredients	Type of feed				
	Chick mash	Grower mash	Layers mash	Broiler starter	Broiler follow-on
Maize	23	9	30	50	57
Pollard	25	10	10	14	4
Maize germ meal	21	30	25	-	-
Wheat bran	-	10	-	-	-
Fish meal	2.5	-	3	9	-
Meat and bone meal	2.1	-	4	6.9	8
Sunflower cake	6	8	4	-	6.9
Cotton seed cake	10	-	-	10	10
Rape seed cake	7.5	7.5	-	7.5	7.5
Bone meal	0.6	4	-	-	-
Limestone	1.2	1.2	5.0	1.2	1.0
Salt	0.5	0.5	0.5	0.5	0.5
Premix	0.5	0.5	0.5	1.0	0.5

Table 5: Production of animal proteins in Kenya (tons)

Factory	Feedstuff	Year				
		1975	1976	1977	1978	1979
KMC ²	Meat and bone meal	-	-	-	1 629	1 393
	Blood meal	73	131	-	38	54
	Meat meal	2 866	4 775	-	-	-
UBF ³	Meat and bone meal	-	-	397	678	459
	Blood meal	-	-	20	20	18

Source: Mbugua (1984)