

Improvement in Livestock Production: Nutrition and Feeds

By

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THE exact livestock population of this country is not known. Various figures have been given and all of them are quite different from one another, for example, figures for cattle range from 8.5 to 11.5

million, poultry from 45 to 81 million. (see appendix). Whatever the figures are, it is obvious that the average Nigerian eats less meat than the average European, American or even African (see Table 1),

TABLE I

Meat Consumption (Beef, Mutton, Poultry) Kg./Capita/Year

	1970	1985
Nigeria (3)	5.02 (1974)	5.7 (1980)
Europe (4)	187.2	213.2
N. America (4)	280.0	278
Africa (4)	10.0	12.5
World Total (4)	81.0	85.5

The figures in this table indicate what we already know — that we are consuming even less meat than an average African and that this trend will continue even after our gigantic 5-Year National Development Plan has been implemented. Our problems as animal scientists, are to find faster ways to increase the meat available to the public at a reasonable price. To my mind, some of the immediate problems are:

- i) provision of good quality feed at reasonable cost.
- ii) utilization of faster growing and more prolific livestock available in the country.
- iii) adequate planning with regards to staffing and financing of the projects.

FEEDING THE ANIMALS

Feeds account for about 60-80% of the cost of raising animals depending on species, breeds and environment. Basically, livestock feeds are composed of the following — grains and fats for energy, protein supplements for growth and maintenance, minerals, vitamins and additives.

Grains as Major Source of Energy

The backbone to livestock development is adequate and cheap supply of good quality grains. In the past five years, the demand on grains has caused the prices of the commodity to sky-rocket. Maize delivered to Lagos at a cost of between ₦50 and ₦60 in 1969 is presently priced at ₦100 to ₦130.

There is no indication that the demand is going to be less. Brown² points out that as income of people rises above certain level, consumption of carbohydrates increases, but as the income further increases, the consumption starts declining, levelling off at 70kg per person per year. At 70kg/person and a population of 80 million, this country requires 5.6 million metric tons of grains per year for direct human consumption alone.

According to the Federal Department of Agriculture projections, the total cereal supply for 1975 is 7.6 million tons. This leaves about 2 million tons of grains for livestock, manufacturing etc. At usage rate of 60%, the two million tons will produce only about 3.3 million tons of feed. This will feed 40 million layers, 80 million broilers and half a million porkers per year.

TABLE 2

Livestock Species	Feed Requirement (metric tons)	At 60% Grains (metric tons)	To give consumption Per Capita
Layers (5m.)	46,355	27,813	11 eggs
Layers (80m.)	3708,400	2225,040	183 eggs
Broilers (80m.)	800,000	480,000	1.85 eggs (kg)
Porkers (.5m.)	227,000	136,200	

The above exercise is done to show the great requirement of grains by livestock. Besides being available, the grains must be cheap. The plan mentions in several places,

that high cost of feed has resulted in high cost of livestock products. Table 3 gives prices of commodities in Nigeria, U.S.A. and United Kingdom.

TABLE 3

Commodity Prices

Products	Nigeria	U.K. ⁷	U.S.A. ⁴
	₦	₦	₦
Maize	120	76.30	68.45
Sorghum	120	75.00	
Wheat Offals	70	77.75	44.00
Groundnut Cake	100-105	104.15	76.40
Soyabean Meal	—	120.29	
Fish Meal	350		128.36(peruvian) 125.30(menhaden)

From this table, it is incredible that grains can be purchased at almost 50% less in U.K. and U.S.A. than in Nigeria and yet the grains purchased here have no guaranteed quality as to moisture content, protein and extraneous materials. In Nigeria, grains received during the harvest season may be as high as 20% in moisture. When dried and cleaned there may be a loss of 5-7% in moisture and 3% from chaff.

All these losses go to inflate the price picture as any feed miller can confirm.

Protein Supplements

Protein supplementation has been one of the many setbacks in the development of Nigerian livestock, the main reason being that of poor and inadequate utilization of protein sources available to the farmers and unrealistic high market price.

TABLE 4

<i>Protein Sources</i>	<i>Limiting Factor</i>
Groundnut Cake	Lysine
Fishmeal	Quality
Meat Scraps	Quality
Cotton Seed Meal	Lysine & Gossypol
Sesame Meal (48% Protein)	Lysine
Soyabean Meal	Methionine
Coconut Meal	Quality & Fibre
Palm Kernel Cake	Fibre
Petroleum Protein	Quality
Pulp Waste Protein	Quality

This table gives an indication of protein sources that are available or could be available in this country.

Groundnut Cake

The exact quantity available in the country is not known. At its peak, up to 250,000 metric tons could be available. However, since 1972 when the price shot up as a result of global protein crises, the crushers have preferred to export this product. Before a ban was imposed on exportation, feed manufacturers were finding it difficult to obtain supplies even at these high prices.

Fish Meal

The price of fish meal has risen from about ₦140.00 in 1970 to ₦700.00 in 1973/74 and presently it costs about ₦400.00. According to Federal Department of Fisheries, this country spends ₦3 million yearly on fish meal. Surprisingly, however, this same Department of Fisheries plans to spend only ₦.25 million to develop fish meal and fish protein concentrates during the plan period. Could this be a problem of incoordination within the Ministry of Agriculture? Or lack of adequate information on costs of fish meal processing projects? Whatever the answer, it betrays transparent lapses in the Plan!

Soyabean Meal

When fish meal prices went up in 1973/74, many developed countries substituted almost all the fishmeal in poultry and pig diets with the cheaper soyabean meal. Soyabean meal is about the only plant protein which is high in lysine. Although, it is deficient in methionine, this nutrient is cheap and the synthetic product can be used for supplementation. Soyabean meal is today the most used protein supplement all over the world. United States of America supplies most of world market although Brazil has increased its tonnage recently. In Nigeria, some soyabeans are grown mainly in the Benue river valley, although it has been proved that this plant will grow in most of the savannah areas. The few quantities that are produced are exported whole. To replace much of the expensive fishmeal and provide for expansion of livestock development increase soyabeans production is imperative in this country.

Sesame Meal (Beniseed)

This product is also grown in the Benue valley and most of it exported whole. As is seen in TABLE 4, its protein is high in methionine. Its production should be encouraged to compliment the soyabean protein.

Rendering Plants

Much of the abattoir by-products such as bloodmeal, meat meal, feather meal are wasted because of poor processing and storage techniques. This is a situation that should be remedied.

Protein from Petroleum and Wood Pulp Industries

Proteins of high quality can be produced from crude petroleum, gas and by-products of wood pulp industry. One would have expected the Federal Department of Livestock to start from this initial stage to plan for research into possibilities of using petroleum and pulp by-products to produce protein, especially as we have these industries. Although costs are high (about ₦200m for 100,000 tons per annum petroleum project) export possibilities should not be overlooked, especially now that ECOWAS has improved the possibilities to neighbouring countries.

Other By-Products

Rice bran, brewer's grains, molasses, groundnut shells, maize stalks, cocoa husks, maize cobs, locust beans are wasted and could be utilized for feeding livestock especially ruminant animals.

Feed Additives

Presently none of the feed additives are manufactured in Nigeria. Importation holds much problems mainly because over-zealous custom officials sometimes charge $33\frac{1}{3}\%$ duty (as chemicals) instead of the scheduled 10% (as feed supplement), or 5% as Agricultural raw material. The prevailing port congestion has also caused so much hardship that all the additives have to be airfreighted, thus adding to costs. You are all probably aware that vitamin premixes do not have more than 6 months dating. Any stuff that comes by surface shipment is most likely useless before it is cleared.

Feeding Standards

Having discussed the raw material availability, I wish to touch briefly on problems of feeds as it affects the various livestock (type) species.

Poultry

Poultry nutrition has made a lot of progress and this has resulted in high feed efficiency. However, in our case, there are standards still to be promulgated. These should include:

- i) Nutrient requirement of birds under our condition.
- ii) Standard analysis of raw local materials and the availability of their nutrients to poultry.
- (iii) Use of unconventional feeds such as non-protein nitrogen, sodium sulphate (to partially replace methionine) in poultry feeds.

Our experience over the last 12 years of commercial feed milling is that while overseas standards are fair, a local standard is still desirable. Both macro and micro-ingredients should be provided for in the standard, so as to ensure quality of raw materials and finished products.

Pigs

Again as in poultry, there is need for standard analysis of the various ingredients and establishment of nutrient requirements.

Other considerations include:

- i) Use of cassava and yams or their peels in feeding pigs.
- ii) Use of swill from institutions (schools, hotels, prisons, etc.) for pig feeding.
- iii) Development of early-weaning diet for pigs so that more than two litters could be possible in a year.

Cattle, Sheep and Goats

For these animals, the establishment of standard analysis of the various ingredients and nutrient requirements cannot be over-emphasized; so also are:

- i) development of calf starters and milk replacers;
- ii) development of protein/mineral blocks that can be used in the range for beef animals;
- iii) use of unconventional ingredients such as groundnut shell, brewers grains, cocoa husks, rice straw and maize cobs and
- iv) efficient utilization of molasses and other by-products of sugar industry for cattle feeding.

QUALITY CONTROL

It is impossible to keep to the quality

of raw materials if feed analysis cannot be performed readily and cheaply. For effective quality control, therefore, several Laboratories should be built and suitably equipped to enable them carry out nutrient analysis of raw materials, vitamins, drugs, etc. Alternatively, the existing Universities and Research Institutes should be equipped to perform these functions.

LIVESTOCK UTILITY AND LIMITATIONS

To hasten the availability of meat products in the country, it is necessary to utilize the fast-growing and more prolific animal species. This means the breeding and rearing of the better feed converting types. Table 5 shows trends in feed conversion efficiency of the different types of livestock.

TABLE 5
Trend in Feed Conversion Efficiency of Livestock⁸
(kg. feed/kg. liveweight or kg product)

Year	Pork	Beef	Milk	Sheep	Poultry	Eggs
1940	3.9	10.0	1.2	—	4.5	3.5
1970	3.3	7.5	0.7	8.0	2.2	3.0
1985	2.5	5.0	0.4	4.0	1.8	2.5

These figures indicate that the dairy animal is the best converter, while the beef cattle is the least. We also know that ruminants do not compete with humans for the limited available grains since they are able to utilize fodder and vegetation unacceptable to either man or other forms of livestock. On the other hand, the ruminants of most concern to us — cattle, take more years to reproduce. Moreover, all available figures indicate that the number of cattle is decreasing on per capita basis. The development of other livestock

will consequently relieve the pressure placed on our depleting cattle population. Table 6 gives comparative figures on reproductive performance of some livestock.

It clearly indicates that the quickest way of increasing meat sources is through poultry and pigs. There are, however, religious constraints for pork but these need not hinder development since there is a large population whose religion is not prejudicial to pork consumption. With poultry, there are many reasons why much

TABLE 6
Comparative Figures on Reproductive Performance

Livestock	Gestation Period	No. of Offspring/Year
Cattle	285 Days	0.75-1.0
Pigs	116 Days	16-24
Sheep	150 Days	1-3
Hen	Not applicable	150-210

more emphasis should be laid on its development. These are:

- Absence of religious bias;
- reproductive rate is rapid;
- it is quite adaptable to our warm climate;
- it is an excellent scavenger,
- it is convenient, that is, birds can be kept alive until wanted so that a source of fresh meat is assured;
- eggs, one of its products, are of high quality protein, especially for the young, beside having long shelf life; although may be difficult to transport if wrongly packed.

At this stage it is necessary to give examples of countries which, when faced with problems of increasing meat consumption, have taken steps to develop their poultry projects.

Iraq

This country of 10.4 million people

recently launched a 5-Year Plan of \$ 800.00 million (₦489 million) to increase poultry production. (Please note that this figure is higher than ours of ₦344 million for all the livestock programme). During this period, Iraq hopes to raise broiler production from 4.7 million birds to 98.6 million birds and increase egg production from 126 million to 3,200 million eggs per year by 1980 (by which time the projected population will be 11.5 million). Based on present and projected population growth, the per capita consumption is expected to grow from 121 to 278 for eggs and from 0.68 kg to 12.9 kg for broilers from 1975-1980 respectively.

Israel

Many of you are no doubt aware of this country's effort in promoting poultry industry, which has today made it the highest per capita consumer of poultry products. (see Table 7)

TABLE 7
Consumption Per Capita Poultry, Eggs and Meat

Country	Eggs	Broiler (kg)
U.S.A.	310	30
Czechoslovakia	290	8.5
Israel	350	50
China (Taiwan)	100	4.2
Turkey	50.6	2.3
Nigeria	10.0	0.85*

*The figure of 0.85 kg is based on 68 metric tons given by Third National Development Plan and a population of 80 million.

Pakistan

To increase the meat available, the Government is giving poultry farmers a five-year, tax-free period to enable them increase production. In addition, they are subsidising feeds for poultry farmers.

There are examples of other countries such as Kuwait, Greece, Russia who have taken dramatic steps to increase poultry production as the quickest and most economical way to adequately supply their people with necessary animal protein.

PLANNING

I have been talking mainly about the need to improve the animal production in this country. To achieve a reasonable per capita consumption and also to reduce the pressure on cattle, I have suggested that poultry and pigs production should be intensified since these are cheaper and convert more efficiently. This development, however, should not exclude cattle totally. I have given examples of other developing countries that were faced with similar problems and who have to first develop their poultry industry. Nigeria's target for 10 million commercial birds and 500,000 pigs by 1980 is, to my mind, quite inadequate.

I have also taken a brief look into the raw material problems. For an efficient livestock development, there is need for the various departments of agriculture to co-ordinate their activities especially in the production of grains and legumes which should be geared not only to satisfy human consumption but also livestock. Moreover, there should be more effort made to process and utilize the by-products of many industries for livestock feeds. These include the meals or cakes of oil seeds, bran and offals of grains, by-pro-

ducts of abattoirs and fishing industries. I have also enumerated the need for research in the use of unconventional feeding ingredients, establishment of feeding standards for our livestock and the need to develop starter diets or early weaning diets for piglets and calves.

To achieve these, we need real direction and cooperation among the various Government Livestock Departments. The Third National Development Plan has shown in some areas gross under-planning and probably insufficient practical knowledge of the real problems confronting livestock development in the country. Otherwise how can one explain huge amounts voted for small hatcheries of 10-100,000 capacities; the unrealistic and ridiculous figures — such as carcass value for poultry given as 2 kg. In one of the publications of the Federal Ministry of Agriculture, projections were based on figures of 250 eggs per hen per year (for commercial birds). But we all know that even in U.S. with their good management practices, they obtain an average of 213 eggs per hen per year and most countries are even below this figure. The "Poultry World" magazine recently reported that many poultry scientists in Nigeria have not seen a modern poultry set-up and are still using 1950's text books to advise farmers. How painful, but true. This, therefore, calls for improvement of education of livestock farmers in modern ways to increase their production and profit. After all that is what livestock business is all about.

Too much reliance in foreign experts, who have no basic and adequate knowledge of the Nigerian livestock environment does not make for proper planning. One is apt to question the recommendations of foreign experts, who, after a few weeks survey are able to project gigantic livestock plans involving millions of

Naira. Much has also been said of manpower shortage but I believe that the Nigerian problem is inadequate utilization of the available trained personnel.

In conclusion, allow me to quote from a publication of the University of California⁸ reporting on livestock projects in developing countries: "Livestock enterprises, whatever their nature, are long term projects. There are examples of the disastrous venture of hastily conceived, under-staffed and under-financed projects which contribute little to overall production". It is my sincere hope that the 5 Year National Development Plan is carried out successfully. But success does not come accidentally. It is always planned for. While the architects of the livestock plan deserve some praise, I earnestly suggest that their parameters are revised and updated. A bolder and more mature plan indicating:

WHAT IS TO BE ACHIEVED

BY WHOM

HOW

WHERE

AND WHEN

is called for. A total package incorporating the above will surely result in surpassing the objectives outlined in the Plan. It is the achievement of our chosen goals by which posterity will judge our performance, whether we belong to the public or private sector.

APPENDIX I

Livestock Population¹

Year	1961-'65	1971	1972	1973
Cattle (Millions)	10.8	11.2	11.1	10.9
Poultry (Millions)	65	82	81	81
Pigs (Thousands)	6.8	8.6	8.7	8.7
Sheep & Goat	—	—	—	—

APPENDIX II

Livestock Population²

Year	1963	1968	1972
Cattle (2)	10.859	11.500	11.405
Goats	21.2	23.3	23.5
Sheep	7.2	7.9	8.0
Pigs	0.68	0.80	0.88

APPENDIX III

Livestock Population³

Year	1975	1980
Cattle	8.5	9.26
Goats	22.0	24.30
Sheep	8.0	8.80
Poultry (small scale)	45.0	46.80
(commercial)	5.0	10.00
Pigs (small scale)	0.45	0.50
(commercial)	0.05	0.10

APPENDIX IV
Estimated Livestock Population, Production and Meat Supply 1974 and 1980

	Population (Million)		Off-take %		Carcass Wt. Kg.		Offal %		Meat '000		Offal Metric		Total Tons	
	1974	1980	1974	1980	1974	1980	1974	1980	1974	1980	1974	1980	1974	1980
Cattle	8.50	9.26	7.75	9	170	180	20	20	112.0	150.0	22.4	30.0		
Goats	22.00	24.30	30	30	13	13	20	20	85.8	94.8	17.8	19.0		
Sheep	8.00	8.80	25	25	10	10	20	20	20.0	22.0	4.0	4.4		
POULTRY--														
Small-scale	45.00	46.80	130	130	0.82	0.82	--	--	48.0	50.1	--	--		
Commercial	5.00	10.00	200	200	2.0	2.0	--	--	20.0	40.0	--	--		
PIGS --														
Small-Scale	0.45	0.50	75	75	30	30	4	4	10.1	11.3	0.4	0.5		
Commercial	0.05	0.10	150	150	45	45	4	4	3.4	6.8	0.1	0.3		
Nigerian Production	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	299.3	375.0	44.1	54.2	343.4	429.2
Imported Cattle	0.287	0.144	n.a.	n.a.	170	170	20	20	48.8	24.4	9.8	0.5	58.6	24.9
Total, Meat Supply	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	348.1	399.4	53.9	54.7	402.0	454.1

APPENDIX V

Capital Programme by Government (Livestock)

Government	Total Estimated Expenditure 1975-80	1975-76	1976-77	1977-78	1978-79	1979-80
Benue-Plateau — —	10,314,000	1,540,800	2,196,200	2,248,600	2,379,000	1,949,400
East-Central — —	15,227,487	1,874,105	2,694,145	3,147,695	3,430,248	4,081,291
Kano — — —	24,682,200	5,696,800	5,352,800	4,613,200	4,590,800	4,428,600
Kwara — — —	7,299,000	1,252,900	1,514,350	1,015,800	827,250	2,688,700
Lagos — — —	17,090,000	3,717,000	3,479,000	3,845,000	3,106,000	2,943,000
Mid-Western — —	8,383,460	1,537,117	1,747,913	1,714,309	1,639,083	1,745,038
North-Central — —	12,280,000	1,898,000	1,846,000	2,889,000	2,909,000	2,738,000
North-Eastern — —	20,800,464	3,869,888	4,224,975	4,234,689	4,088,756	4,382,156
North-Western — —	20,080,000	2,105,000	3,082,500	3,965,000	4,987,500	5,940,000
Rivers — — —	5,700,000	570,000	855,000	1,140,000	1,425,000	1,710,000
South-Eastern — —	10,747,800	5,039,075	2,166,053	1,705,556	1,046,348	690,768
Western — — —	18,365,149	2,114,523	3,058,908	3,604,310	4,191,564	5,395,544
Total: All State Governments — —	170,869,560	31,213,208	32,217,844	34,123,159	34,620,540	38,692,800
Federal — — —	₦173,176,631	28,169,684	30,507,947	33,917,488	40,121,220	40,460,292
Total: All Governments — —	₦344,046,191	59,384,892	62,725,791	68,040,647	74,741,769	79,153,092

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