

COMPARATIVE COST ANALYSIS OF MEAT PROTEIN AND
ENERGY PRODUCTION IN ABEOKUTA, NIGERIA.

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Target Audience: Nutritionist, policy makers, non governmental organization

ABSTRACT

This study was carried out primarily to analyse the relative cost of producing protein and energy from meat sources and thereby determine the least cost source of animal protein from the most common meat products in southwestern Nigeria. The paper also attempted to compare the cost implication of satisfying the monthly protein and energy needs of an average consumer in the study area from meat and plant sources. The major finding of the study was that beef is currently the cheapest source of animal protein, while pork is the cheapest source of meat-energy in Abeokuta. When the cost of producing protein and energy from animal sources was compared with selected staple food crop sources, it was found that beans is a far more cheaper source of protein than beef. All the four food-crop items (rice, cowpeas, gari and yam) were found to be cheaper sources of energy compacted with pork. If the average consumer in the study area (with an average monthly income of about (N800) was to satisfy his monthly protein needs from beef he will require as much as N875 whereas he will need only N280 to satisfy his total protein needs from the less qualitative least cost plant protein source which is cowpea. The study thus concluded that the cost of producing protein and energy from energy sources is still too high in the study area to make meat products an attractive and affordable source of protein to the average consumer. The study recommended the encouragement of backyard animal farming and the relaxation of the protection presently given to local livestock feed producers as short term measures. As a longer term measure it was suggested that local research should be intensified in the direction of making large scale livestock farming a reality in the Nigeria livestock sector.

Key words: Cost analysis, animal/plant protein sources, energy sources

DESCRIPTION OF PROBLEM.

Meat is any part of farm animal or game that is fit for consumption. It is a major source of animal protein in Ogun State of Nigeria and indeed in most parts of Nigeria. Nigeria is blessed with a wide variety of domesticated animals, most common among which are beef, mutton, chevron, poultry meat, rabbit meat, and pork. Other less common ones are bush-meat and snail meat (1, 2). Researches have over the years extensively shown that all the above named sources of animal protein possess adequate potentials for extensive small scale production in Nigeria, thereby bringing about a quickened amelioration of the animal protein deficiency problem in the diet of Nigerians.

However, inspite of the high level of natural endowment in animal protein production resources, animal protein intake per caput in various parts of the country has been found to be as low as 14 to 30 percent of the standard requirement of 35 grams per day (3, 4, 5), or 1.05kg per month. The major reason for the low level of meat consumption was found to be related to the high cost of meat products in the study areas (6). This perhaps resulted in the shift from meat consumption to other less expensive animal/non-meat protein sources such as fish and less qualitative plant protein sources such as legumes.

In Nigeria, the per capita daily calorie supply as a proportion of the minimum amount needed by the consumer averaged 75.6% between 1970 and 1979; 76.42% between 1980 and 1989 (7); and 91.62% between 1990 and 1994 (8). The enormosity of our food problems is thus made obvious in that it is impossible for per capita nutrient intake to be adequate when its overall supply is inadequate. In a study conducted in Ibadan (a major town in south western Nigeria), it was found that average adult male and female are able to satisfy only 66% and 74% of the required minimum calorie intake respectively (4). Animal products have been reported to contribute only 25.6% of total calorie intake of the average consumer in Ibadan in Nigeria (4). The figures showed some location bias as further investigations showed that animal products contributed about 3.48% and 1.2% to the total calorie intake of urban and rural dwellers respectively. All these show that energy deficit also constitute a serious nutritional problem among Nigerian consumers.

The major objectives of this study were to investigate, which animal products provide the cheapest source of animal protein in Abeokuta, Ogun State. Which animal product provides the cheapest source of energy relative to others in the area?

How well does the cheapest source of animal protein compare with the cheapest source of plant protein?

How well does the cheapest animal source of energy compare with the cheapest plant source of energy?

How economical would it be for consumers in the study area to source their protein and energy needs solely from animal products as compared with plant products?

The study therefore set out to comparatively analyse the unit cost of protein and energy production from selected domesticated animals. It also compared the cost of producing the calorific energy requirement of an average individual from meat and plant sources.

MATERIALS AND METHODS

The study was carried out in Abeokuta agricultural zone of Ogun State in south western, Nigeria. Personally administered interview schedules were used to collect relevant information on the production processes, input quantities, product output, input/output coefficients and input and product

prices, through a field survey which was carried out in the last quarter of 1997. A total of 120 livestock farmers were consulted at the rate of twenty farmers for each of the six animals product under consideration namely; cattle, sheep, goat, rabbit, poultry and pigs. Farm management/production data were not collected for the cattle enterprises because of the difficulty of getting such information from the pastoral Fulani herdsmen who are the major supplier of beef in the study area, through the survey approach. The farm gate price per kilogram of beef was therefore used as a proxy for estimated production cost of one kilogram of beef. Analysis of other five livestock enterprises were carried out through the use of classical analysis technique. That is fixed costs, variable costs, total costs, total revenue, and net income were estimated for each enterprise. The technique was used to estimate the unit cost of meat production from each of the meat sources under consideration. Calorie and protein conversation ratios were adapted (9) and used to convert meat production from kilogram to protein and energy units. Protein was measured in grams and energy was measured in kilocalories.

The unit cost of protein and energy production from the six meat sources were estimated through the following Equation

$$Z_j = [C_j / W_j \times R_j] / P_j \quad (j = 1, 2 \dots\dots\dots, 6) \quad (1)$$

$$Y_j = [C_j / W_j \times R_j] / E_j \quad (j = 1, 2 \dots\dots\dots, 6) \quad (2)$$

Where:

Z_j is the unit cost of producing 1 kilogram of protein through the production of animal j

Y_j is the unit cost of producing 1 kilogram of energy through the production of animal j

C_j is the cost of producing an average live animal j

W_j is the average weight of the live animal j

R_j is the carcass ratio (weight of carcass in kilogram/live weight in kilogram) for the animal j

P_j is the amount of protein, which was contained in 1 kilogram of carcass of animal j measured in kilograms.

E_j is the amount of energy that was contained in 1 kilogram of carcass of animal j measured in kilocalories.

The total costs of production per kilogram of crop items: rice, beans, garri and yam, were computed from a survey of 120 food crop farmers in the study area (10).

RESULTS AND DISCUSSION

The results of analysis are presented in Tables 1- 4. Table 1 reveals that beef production is the least cost way of producing one kilogram of protein from meat sources, while pork production is the least cost way of producing one kilocalorie of energy from meat sources. One kilogram of beef protein will cost N486 to produce. This is followed by pork (N561), mutton (N705),

chevron (N829), chicken (N933), and rabbit meat (N1761) in that order.

Table 1: Estimation of Cost of Producing One Kilogram of Animal Protein From Various Animal Sources (In Naira and at 1997 prices)

	Mutton	Chevron	Chicken	Pork	Rabbit	Beef
Unit cost of meat production from meat source (#kg)	98	117	112	55	206	107
Protein content of 0.220	0.139	0.141	0.120	0.098	0	1 1 7
1 kilogram of meat from meat source (kg/kg)						
Unit of cost of protein production from meat source (#kg)	705	830	933	561	1760	486
Cost of satisfying the animal protein requirement (1.05kg) for an individual consumer in a month at 35gms/day (#/caput/month)	740	871	980	589	1849	511
Cost of satisfying the total protein requirement (1.800kg) for an individual consumer in a month at 60 gms/day (#/caput/month)	1269	1492	1680	1010	3169	875

Source: field data, 1997

Further analysis revealed that it will take N511, N589, N740, N871, N980, N1849 to produce 1.05kg of protein (which is the FAO recommended monthly per caput animal protein requirement) from beef, pork, mutton, chevron, chicken and rabbit meat respectively. It follows that an individual will need a minimum of these amounts to satisfy his monthly animal protein needs from each of the meat products respectively.

Furthermore, Table 1 revealed that it will take N875, N1010, N1269, N1492, N1680, N3169 to produce 1.80kg of protein (which is the FAO recommended monthly per caput total protein requirement) from beef, pork, mutton, chevron, chicken and rabbit meat respectively. Thus if the average consumer is to satisfy his monthly protein needs from meat sources alone, he will require at least N875 worth of beef.

Table 2: Estimation of Cost of Producing One kilocalorie of Energy from various Animal Sources. (In Naira and at 1997 prices)

	Mutton	Chevron	Chicken	Pork	Rabbit	Beef
Unit cost of meat production from meat source (#/kg)	98	117	112	55	206	107
Energy content of 1 kilogram of meat from meat source (kcal/kg)	1180	1190	1290	3760	1230	1720
Unit cost of energy production from meat source (#/kcal)	0.083	0.098	0.087	0.015	0.167	0.062
Cost of satisfying the energy requirement (75000kcal) for an individual consumer in a month(#/caput/month) from meat	6225	7350	6525	1125	12525	4650

Source: field data, 1997

The study also revealed as expected that cowpea is a far more economical source of producing plant protein than any of the other selected staple food crops (rice, yam, cassava, cowpea) in the study area.

In addition, 1 gram of protein produced from cowpea (the major plant protein source in southwestern Nigeria) is far less expensive when compared with least expensive animal protein source (which is beef). According to Table 3, only 280 is needed monthly by the average consumer in the study area to satisfy the standard minimum protein intake needs (60gms/caput/day or 1.08 kg/caput/month) if he expends it on cowpea.

When the result of this analysis are considered against the background of ₦800 which is the estimated per capita income among households in the study area (11), it shows that meat protein may be too expensive as a source of animal protein for the average consumer. This may probably account for more than 80% of the total protein intake of the average consumer (3).

Table 3: Estimation of Cost of Producing One kilogram of Plant Protein from Selected Food Crop Sources (In Naira and at 1997 prices).

	Rice	Gari	Beans	Yam
Unit cost of production of food crop (#/kg)	46	12	36	14
Protein content of 1 kilogram of food crop (kg)	0.07	0.01	0.231	0.019
Unit cost of Protein production from food crop source (#/kg)	651	1200	156	737
Cost of satisfying the total protein requirement (1.800kg) for an individual consumer in a month that 60gms per day (#/caput/month)	1172	2160	280	1327

Source: field data, 1997

The analysis of cost of energy production from the six types of meat revealed that pork was the least cost source of energy followed by beef, mutton, chicken, chevron and rabbit meat in that order. Table 2 shows that N0.015, N0.062, N0.083, N0.087, N0.098 and N0.167 are needed to produce one kilocalorie of energy from pork, beef, mutton, chicken, chevron and rabbit meat. The implication is that an individual consumer will need at least N1225 worth of pork, N4650 worth of beef, N6225 worth of mutton, N6525 worth of chicken, N7350 worth of chevron and N12525 worth of rabbit meat in order to meet his monthly calorific energy need, if he was to depend only on meat sources. This is very expensive for the average consumer with per capita monthly income of N800.

In contrast, the plant sources of energy were found to be much cheaper than the animal sources. Table 4 shows that all the four selected plant sources can provide energy at lower cost than pork, which is the most cost efficient meat source of energy in the area.

Table 4: Estimation of Cost of Producing One kilocalorie from selected Crop Sources (In Naira and at 1997 prices).

	Rice	Gari	Beans	Yam
Unit cost of production of food crop (#/kg)	46	12	36	14
Energy content of 1 kilogram of food crop (kcal/Kg)	3640	3510	3420	1190
Unit cost of energy production from food crop source (#/kg)	0.013	0.003	0.011	0.012
Cost of satisfying the total energy requirement (75000kcal) for an individual consumer in a month at 2500kcal/day (#/caput/month)	975	225	825	900

Source: field data, 1997

CONCLUSION AND RECOMMENDATIONS

The study concludes as follows:

1. **The cost of producing 1 kilogram of meat protein from animal product is at least 212% higher than from cowpea (the least cost animal protein source).**
2. **The cost of producing one kilocalorie of energy from meat product is at least 400% higher than from gari (the least cost plant source of energy)**
3. **Meat protein production is still very expensive in southwestern Nigeria relative to the income of the average consumer. The monthly wage of the average consumer in the study area is just about 91% of the amount of money that will be needed to satisfy his minimum protein intake needs in a month. That is, if all his incomes were to go into meat consumption, he will still not be able to satisfy his protein needs!**
4. **The implication of the findings of this study is that there is need for a drastic reduction in the cost of production of meat products in Nigeria. There are a number of ways in which this can be achieved:**

- i. **Increase in Scale of Production:** The principle of economies of scale pretends that increases in scale of production within a certain range of output will result in declining unit cost of production. It was empirically established that there is an evidence that scale economies is a feature of the poultry-egg industry in the area (12), even though the effect could have been more substantial if the range of poultry farm sizes considered had been higher. That is if poultry farm sizes are increased well above the 1800 -birds mark. This measure is, however, a longer term measure for addressing the high unit cost problem identified in this study, because of the capital-intensive nature of most animal production enterprises coupled with the low resource base of most of the farmers.
- ii. **Reduction in the cost of major inputs:** This recommendation could pass for a shorter term solution to the problem of high unit cost of animal protein production. This should particularly be in the area of feeds and labour input. Previous studies (12, 13, 14) have shown that the feed and labour cost are the most important costs in small-scale animal production as we have in the study area. The present situation in which a largely inefficient local feed production industry is being highly protected by government policies from international competition should be reviewed. More funding should be effectively channeled to the development of lower cost locally and internationally sourced feed inputs. To reduce labour cost, government policy should encourage the use of family labour which has little or no opportunity cost (especially in the days of massive unemployment). This can be achieved if small scale and backyard animal farming is widely encouraged in the rural and peri-urban areas

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