ECONOMIC ANALYSIS OF GROUNDNUT PRODUCTION IN DAMBATTA LOCAL GOVERNMENT AREA OF KANO STATE

BY

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DECLARATION

I hereby declare that this thesis has been written by me and it is a record of my own research work. It has not been presented before in any previous application for a higher degree or reputable presentation elsewhere.

All borrowed ideas have been duly acknowledged by means of references and quotations marks.

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Date

The above declaration is affirmed.

CERTIFICATION

This dissertation entitled " ECONOMIC ANALYSIS OF GROUNDNUT PRODUCTION IN DAMBATTA LGA OF KANO STATE" BY Muhammed Abdu Yaro, meets the regulations governing the award of the degree of Master of Science in Agricultural Economics of Ahmadu Bello University, Zaria, and is approved for its contributions to scientific knowledge and literary presentation.

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To my Brother;
Alh. Sanusi Mohammed Yaro,
For Everything.

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ABSTRACT

This study was designed to *assess* the resource use efficiency and the profitability of groundnut production in Danbatta Local Government Area of Kano State. The specific objectives were to;

(i) determine socio-economic characteristics of the groundnut farmers in the study area

(ii) determine the input-output levels and the resource use efficiency in groundnut production in the study area,

(iii) determine the costs and returns in groundnut production in the area,

(iv) identify the major constraints to increased groundnut production in the study area.

To achieve the objectives, data were collected from 100 groundnut growers in the study area during the 1997 cropping season. The analytical framework chosen for the study were descriptive statistics, net farm income and the regression analysis.

The results showed that the farmers were making profit of N0.84 (not costing family labour) and N0.47 (costing family labour) on every Naira invested by the farmers respectively. Multiple regression analysis results showed that the inputs identified in groundnut production were significant at 5% level of significance in explaining 73.23% of the variation in the output. However the marginal value productivities (MVPs) of the inputs derived from the cobb-Douglas production function were more than enough to offset their costs, implying that the farmers were

underutilizing such inputs like fertilizer, and labour and hence, it was necessary for them to employ more of such inputs in their production process for better returns.

Labour was identified to be the most costly input in groundnut production among the farmers accounting for 47.20% of the total cost of production. However, 53.37% of this was unpaid family labour which constituted non-direct expense to the farmers. Most farmers (81.0%) were constrained by acute scarcity and costliness of input such as fertilizer.

The study recommended that government should monitor the pricing and quality of fertilizers to be supplied by the private enterpreneurs since the subsidy has been removed,. Extension activities should enlighten farmers on how to use available resources effecientiy. In the study area, government shou!d release some of the large expanse of land acquired for irrigation but left unused to the farmers at reasonable charges.

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Chapter 1

1.0 INTRODUCTION

The periods of benign environmental conditions of the 1930s and the world market opportunities of the 40s and 50s contributed in no small measure to developing groundnut into a very important export crop in the 60s and 70s for Nigeria. For long, most areas in the northern part of the country produced substantial quantities and thus made the crop to become one of the major cash crops of the region.

Groundnut (Arachis hypogea L.) has become very popular in the northern part, although the crop is not indigenous to this country. Hammon (1973), asserted that groundnut is a native of South America from where it was believed to have been brought to the east and west coasts of Africa by early Spanish and Portuguese explorers.

Nigeria was a very important country in groundnut production in the World market. Winter (1973) stressed that Nigeria was the world's largest exporter and the third largest producer. This crop was produced mainly in the upper part of northern Nigeria, entirely by small holders with predominantly one to two acres each at an average yield of 600 - 700 pounds of the shelled nuts per acre (Kriesei, 1968). Moreover, the population of the farmers that engaged in the production was more than one million all scattered within the region. The total land area under groundnut production has been estimated to be between 1.3 million and 1.6 million hectares with

an estimated total output of nearly one million metric tonnes of kernel annually (Harkness, et al. 1968). This had been less than half of the total land under cultivation of different crops produced during a typical cropping season (Kriesel, 1968).

With regards to groundnut production, Nigeria had been more or less maintaining its position of production in the world market up to 1973. Soon afterwards, production started declining drastically from 1.79 million metric tonnes in 1967 under an area of 1.4 million hectares and a yield of 128 Kg/ha to as little as 450,000 metric tonnes from an area of 600 thousands hectares and a yield of 750 Kg/ha in 1979. However, production has been improving in recent years with an estimated production of 1.2 million metric tonnes in 1994 as shown in Table 1.

The decline in production did not only affect the groundnut sub-sector but the whole of the agricultural sector. A case in point was the dramatic decline of the percentage contribution of agriculture to Gross Domestic Products which fell from 64.0% in 1960 to as low as 39.90% in 1992. In addition, GDP growth slumped from 23.3% in 1970 to only 3.80% in 1996. However, the above figures were signalling a serious decline of agricultural sector at a frightening rate.

Famoriỳo (1978) observed that agricultural sector can no longer meet the growing demand for its products in industrial and domestic sectors. The rate of growth in food production was lagging behind the population growth rate of 2.5 - 3.0 percent per annum. Moreso, agricultural export production also declined significantly. It provided more than 60 percent of the total export in 1960, but only 2.0 percent in

1980 (Hunt and D'silva, 1981).

However, the sudden decline of agricultural sector was attributed partly to the successful exploration and the subsequent exploitation of petroleum resources with its fast dominance on our export which led to mass exodus of farmers to big cities at the expense of farm productions. Nevertheless, this decline had been causing great concerns and government is currently exploring possible strategies for increasing production particularly through the development of relevant technologies to achieve rapid increase in agricultural production (Abalu and Harkness, 1978).

Furthermore, various governments have been introducing different programmes, policies and strategies since 1960s to date for boosting agricultural production in general. However, a recent effort was made in 1993 when the government launched the National Accelerated Industrial Crop Production Programme (NAICPP). The Groundnut Rehabilitation Programme is an important component of the NAICPP. The sum of ₦24.5 million was earnmarked per year with main focus on production of quality seeds, timely inputs distribution and extension services. The Government of Nigeria had sought the assistance of World Bank, IFAD and recently F.A.O. in carrying out various aspects of its N.A.I.C.P.P. and particularly the groundnut component (F.A.O., 1996).

All the afore mentioned programmes, policies and strategies have the noble objectives of arresting the broad and specific agricultural declines by uplifting production from its present position to a higher level for sufficient internal and external food requirements.

Table 1: Production, Area Planted and Yield of Groundnut in Nigeria, 1961 - 1994 Seasons

YEAR (000 tones)	PRODUCTION (000ha)	AREA PLANTED (Kg/ha)	YIELD (Kg/ha)
1961	1150	N.A	N.A
1963	1515	N.A	N.A
1965	1253	1150	0109
1967	1792	1400	0128
1969	1375	1214	0115
1971	1660	1846	0900
1973	1350	2032	0665
1975	0548	1596	0305
1977	0459	0684	0671
1979	0450	0600	0750
1981	0570	0600	0850
1987	0612	0877	0682
1990	0680F	0800F	0650
1991	1219	1146	1166
1992	1150	1000	1150
1993	1170*	1000F	1170
1994	1200F	1048F	1145

Source: F.A.O. Production year Book: Food and Agricultural Organization of United Nations, various years.

2. Falusi, A.O. and Williams, L.B. :Nigerian Fertilizer Sector: Present situation and Future Prospects IFDC, 1981.

Key: N.A. NOT AVAILABLE, F = FAO Estimates, * = Unofficial figure.

Table 2: Production and Area Planted of Groundnut in Kano state 1982 - 1996.

YEAR	PRODUCTION (000 TONES)	AREA PLANTED (000 ha)
1982	224	485
1983	372	657
1984	207	245
1985	118	334
1986	158	542
1987	350	941
1988	229	610
1989	249	694
1990	117	759
1991	190	256
1992	59	45
1993	188	286
1994	908	1081
1995	272	489
1996	402	346

Source: Kano State Agricultural and Rural Development Authority, (KNARDA) Kano.

TABLE 3: Share of Agriculture in Nigerian Gross Domestic Product (G.D.P) for Some Selected Years

YEAR	TOTAL GDP	AGRIC GDP	GROWTH IN GDP	CONTRIBUTION OF AGRIC IN PERCENTAGE
1960*	5275. 8	2915. 5	-	64. 0
1965*	6675. 7	3240. 5	0. 6	55. 4
1970**	8902. 1	3511. 0	23. 3	44. 6
1989**	83.46	26.07	7.33	31.26
1990**	90.36	27.21	8.27	30.10
1991**	94.54	28.43	4.61	30.08
1992**	98.42	29.43	4.12	29.90
1994**	101.04	31.04	3.02	30.72
1996**	106.87	33.31	3.80	31.17

* GDP at 1973/1974 cost (₦ million)
** GDP at 1984 constant factor cost (₦Billion)

Source: Federal Office of Statistics, Lagos
Annual Report and Statement of Account for Year Ended 31/12/92: Central Bank of Nigeria, Lagos.

Table 4: Groundnut Oil Trade and Production Performance of African Groundnut Council (AGC) 1961-65 and 1986 - 88

	COUNTRY	PRODUCTION RATE (%)	YIELD GROWTH RATE (%)	SHARE OF THE WORLD			
				PRODUCTION (%)		EXPORT (%)	
				1961-65	1986-88	1961-65	1986-88
1.	GAMBIA	-0.72	-0.19	1	1	2	2
2.	MALI	-2.21	0.05	1	0	2	2
3.	NIGER	-7.03	2.56	1	0	4	0
4.	NIGERIA	-5.47	0.36	12	3	26	0
5.	SENEGAL	-1.14	-0.20	6	4	23	14
6.	SUDAN	2.02	-1.71	2	2	5	3

NB: Groundnut Exports in oil Equivalent

Source: Ousman Bediane and Sambout Kinteh: Trade Pessimism and Regionalism in African countries: The case of Groundnut Exports from FAO production year book, Rome, various.

1.1 Importance of Groundnut to Nigeria's Economy

Over the years, groundnut has played an important role in the economy of Nigeria and particularly in the economy of Kano State where a significant proportion of country's groundnut was produced (Abalu and Marton, 1978). Groundnut had constituted about twenty percent of the total value of Nigerian produce exported to United Kingdom, Germany, Netherlands and Japan (Kriesei, 1968). The importance of this crop does not lie alone in its role as a foreign exchange earner, but

also in its role as a source of protein in the country's nutritional requirements as well as a source of supplementary feed for a growing livestock industry (Abalu, 1978).

It has been estimated that about 58.91 grams of crude protein are available per head per day in Nigeria, and groundnut contributes five percent (5%) of this amount (Olayide, et al. 1972). Mijindadi (1978) observed that groundnut was also known to contribute to the balanced ration formulation for livestock. Experiments at Samaru for example, showed that heifers and steers fed on 7.12 kg/matter per day, had average daily live weight gain of 1.19 kg.

The crop of groundnut also serves as a very cheap source of raw material for food and feed industries. Mayhew and Penny(1988) observed that the numerous uses of groundnut should encourage its cultivation. The green haulms may be fed to animals and the kernel could be crushed as feed. Nuts may be cooked and eaten in variety of ways and it is very important in food industry. It is also good as a rotational crop as it helps in nitrogen fixation in the soil.

Groundnuts are used chiefly for the extraction of oil for culinary and domestic purposes and the residue is used as a cake for feed stuffs. Groundnut is important in treating malnutrition in young children (Mayhew and Penny, 1988).

1.2 The Problem Statement

The decline in agricultural production especially that of groundnut from the late 1960s to recent years is posing a great concern not only to the government but also to the teeming general population of this country. Hunt and D' silva (1981) observed that export crops of Nigeria have virtually disappeared from the world market, while simultaneously the supply of domestically produced food has apparently stagnated. Moreover, Nigeria was the largest exporter of groundnut among the member countries of African Groundnut Council, with a share of 26.0 percent of the World export in 1961 - 1965.

On the other hand and at the same period competitors from Asia and South America were able to boost their export by nearly 400 percent by raising their combined shares from slightly 10 percent in 1961 - 1965 to 50 percent in 1986 - 1988 of the World production of groundnut for exports, (Bediane and Kinteh, 1994). Therefore, it will be right to assume that high food imports or apparently low exports of produce signal agricultural collapse. Therefore, agricultural sector can no longer serve the role it was formally serving in the Nigeria's real sector in particular and in the economy as a whole.

By and large, various reasons have been put forward on the problem of decline of groundnut production from 1967 to 1977. These were; bad weather condition from about 1969, outbreak of rosette virus in 1975, low statutory groundnut prices and inadequate marketing arrangements; scarcity of labour and cash to pay for high

cost of labour; Availability of economically more attractive crops and ventures other than groundnut and groundnut production; scarcity of inputs such as fertilizers and improved seeds, inadequate extension services for farmers and smuggling of groundnut across Nigeria's borders, (Nigerian Groundnut Board, 1978).

It is against the above background of the persistent production problem and some few new developments like improved groundnut varieties that are high yielding and rosette resistant, abolishing of commodity marketing boards and the ever increasing high cost of input resources, that it now becomes useful and timely to re-examine problems of allocation and the productivity of scarce resources employed by the farmers in facing more new challenges in their production enterprise. This problem alone with all others being absent could be a constraining factor in the efficient and increased groundnut production in the country. This study also examined the cost and returns as well as the socio-economic factors militating against groundnut production.

1.2.1 The Objectives

The broad objective was to conduct an economic analysis of groundnut production in the study area while the specific objectives were to:

(i) determine socio-economic characteristics of the groundnut farmers in the study area,

(ii) determine the input-output levels and the resource use efficiency in groundnut production in the study area.

(iii) determine the costs and returns in groundnut production in the area.

(iv) identify the major constraints to increased groundnut production in the study area.

1.2.2 Justification of the Study

It is far from any reasonable doubt that among the pre-requisites for developing an economy is an increased agricultural productivity. This is particularly true of the developing countries where majority of the population live in the rural areas and engage in primary agricultural production. Hence, Awoyemi (1981) observed that Nigeria is envisaged to be a typically peasant agriculture with small farmers accounting for 95% of the total population and therefore, agriculture remains the most important source of income and employment to the citizens of this country.

Nevertheless, agricultural production recorded an average real growth of under 4.0 percent in the Structural Adjustment Programme (S.A.P) years compared with a minimum of real growth of 5.0 percent targeted for the sector (Ukpeng, 1993). Groundnut subsector has not been an exception in this negative trend as productions have been declining since late 1960 to recent years (Table 1.0).

Referring to the issues presented above, it has become imperative for groundnut farmers to increase the efficiency of their resource use so as to minimize cost of production in order to be able to produce more groundnut. Olayide et al., (1974) stressed that one of the strategies for increasing agricultural productivity is a combination of measures designed to increase the level of farm resources as well as

making efficient use of the resources already committed to the farm sector. Hence, this study is relevant as such issues were examined. Moreso, it has also been suggested that for a meaningful, successful and sustained macro and micro economic farm policies, a knowledge of the efficiency with which the resources are used, the difference in productivity of these resources in different areas and how all these are related to farm size is required (Olayide et al., 1974).

From the foregoing discussion, the study is justified and timely as some states like Kano are making efforts to revitalize groundnut production by establishing a rehabilitation unit in their Ministries of Agriculture. Therefore, a study in economic analysis of groundnuts in the study area will be of great help to policy makers, administrators, and farmers alike for their allocation of meagre resources and evaluation of impact of measures that will be taken to revamp groundnut production in the country.

1.2.3 Hypotheses

1. There was no efficiency in the use of the following resources;

(a) Land (b) Seeds (c) Fertilizer (d) Labour and (e) Pesticides.

2. The total cost of production of groundnut was greater than the total revenue realisable in the study area.

Chapter 2

LITERATURE REVIEW

2.1 Theory of Production

The production process involves the transformation of inputs into outputs, hence what is put into the production comes out either as a product or in form of waste. The product is that part of the output that is valuable to the producer while that which has no value to him is the waste or waste product. But as long as the production generates sufficient profit from the valuable part of output the investor is satisfied with the investment (Olukosi and Ogunbile, 1989).

Inputs in agricultural production are classified into labour, land, capital and management. These inputs are usually coordinated by the producing unit whose ultimate objectives or goals may be profit maximization, cost minimization, output, maximization of security or combination of all or any of these motives (Olayide and Heady, 1982).

The relationship between one or more variable inputs when other inputs are kept constnt to the total products is the main concern of a classical production function of economic theory.

The estimation of the input output relationship involves the specification of a production function which depicts the factor - product relationship (West and Dillon, 1968). It is assumed that production function consists of three stages; increasing

returns to inputs (i.e positive), increasing with decreasing return and decreasing returns that are negative.

The purpose of the production function model in this study was to determine the variability in output. The greater the extent to which these factors were able to explain the variability in output, the greater the influence which these factors considered had on the production of groundnut.

2.2 Resource Productivity and Efficiency

Resource productivity is defined in terms of individual resource inputs or in terms of combination of them e.g labour productivity is defined as the ratio of total output of labour inputs (Olayide 1972). Moreso, it implies committing minimum possible set of inputs to obtain maximum possible output as a maximum productivity. Using the above approach, optimal productivity of resources implies efficient utilization of resources in the production process. Hence, productivity and efficiency are snynonmous in this context.

Olayide and Heady (1982) submitted that agricultural productivity may be defined as an index of the ratio of the value of farm output to the value of total inputs used in farm production, Therefore, an increase in the productivity of resources employed in farm production could suggest an advancement, on the part of the economy and standard of living in general.

It is important to note that the term productivity and efficiency are used

interchangeably in the policy context to imply an increase in output from given input or a reduction of quantity of input, required to generate a given level of output (Hill and Ray, 1987).

There has been two concerns: first is that more efficient agriculture could reduce the amount of food which is imported or release resources which could be used for development in other sector of the economy and second is that greater productivity would enable the income of farmers to be higher (Rae, 1977).

2.2.1 The Concept of Efficiency and its Measurement

The concept of efficiency today means different things to different people in different circumstances. As Lau and Yotopoulus (1971) put it, "economic efficiency is an elusive concept in which the economists, engineers and policy makers all have a great "stakes".

To the economist, the economic efficiency of a firm or industry can be broken down into two separate components; Price efficiency and technical efficiency. Price efficiency measures a firm's success in choosing an optimal set of inputs, while technical efficiency is a method of production which minimises physical usage of inputs according to some specific rules, (Farel, 1957). However, once the adjective 'economic' is dropped, efficiency becomes a rather nebulous concept meaning only success in achieving planned objectives.

Adeniyi (1988) observed that a discussion of resource allocation efficiency generally starts with assumption regarding the motive of producers. The classical

assumption is the motive of profit maximization which is an ideal framework against which various forms of efficiency or production can be adequately measured and tested.

Three forms of efficiency are identifiable; technical efficiency is a ratio of total output to total inputs, for a perfectly efficient firm, this ratio is unity. The larger the amount of the input per unit of output, the smaller the size of this ratio. Price efficiency is defined by the tangency of the line to the isoquant. This tangency indicates that a minimum possible amount of each input is being used to produce a unit of output at the given level of price, overall efficiency is the product of technical and price efficiency. This measure of efficiency assume that a standard, efficient production function exists which could be set up as a yardstick for measuring individual firm's performance. But it is better to compare the individual firm's performance with the most efficient performance actually achieved than setting up an ideal theoritical function.

Olayide (1972) identified other analytical techniques for estimating resources' productivity and efficiency. One of such techniques consists of simply computing input output-ratio, for example labour productivity can be measured in terms of the ratio of total output to the total labour inputs. Indices of production can be constructed by multiplying this ratio by 100. In terms of aggregate output framework, resource productivity in crop production for example, can be measured as an index of total output of crops to the index of total inputs used in crop production. Its limitation is

that of ignoring the quantity and quality of inputs used and results obtained are not available to a statistical test of reliability.

2.2.2 Review of the Resource Productivity Studies in Agriculture.

Studies on Groundnut Production

Abalu and Harkness (1978), conducted a study on an economic analysis of groundnut production in northern Nigeria using traditional versus improved groundnut production practices using sampled number of farmers, the area planted ranged from 0.15 - 1.29 hactare for improved technology and 0.14 - 1.15 ha for traditional one. Their yields varied from 390 - 287 kg/ha for improved technology and from 142 - 213 kg/ha for Traditional method.

They also found out that hired labour used on family farms was quite high in study area. Seventy three percent of the total labour used by farmers adopting improved method was hired while 87% for farmers using indigenous practices. This contrasts sharply with Norman's (1972) study carried out in 1967, where only 18% of the total labour used on family farms was hired, while Hays and Raheja (1977) found up to 56% of total labour input employed on improved cowpea fields in the area was hired. In this analysis, hired and family labour were assumed to be near perfect substitutes.

However, the gross yield of 870 kg/ha for traditional and 1229 kg/ha for improved and a value of ₦261.00 per hactare for traditional and ₦368.70/ha for

improved. Net Return per hactare for the traditional technology was ₦9.28 and N1.91.34 for improved practice. Therefore, Net Return per hactare for the Traditional technology was 45% less than that of the improved one, and Net return per Man-hour was 83%, while Net return per kilogramme was 64%. Therefore, the improved method of production appears to be superior to the traditional one, whichever of the three methods of Net returns was applied.

The study was carried out at Hunkuyi village in Kaduna State.

Other Resource Productivity Studies in Agriculture

Ogunfowora et. al. (1975) distinguished two broad categories of resource productivity studies; first category focussed attention on resource use efficiency in industrial enterprises such as wheat maize, rice, cotton, groundnut, poultry etc. Producing unit is to coordinate and utilize resources or factors of production in such a manner that together they yield the highest Net returns (Sani, 1969). This category of studies provide quantitative estimates which would be used as a basis for effective and efficient allocation of resources at the farm level. While second category of resource productivity study is between enterprises groups such as crop versus livestock enterprise or export versus food crop enterprises. This category of studies provide macro-level resource allocation decision on these group of enterprise. They do not, however, indicate the magnitude and the direction of needed adjustment within a particular enterprise group.

One of the most frequently cited early studies in Northern Nigeria is Norman's study of Zaria villages. In this pioneer work of input - output study in Zaria area, Norman (1972) observed that most farms used all inputs with exception of hired labour in an optimally efficient manner. He pointed out that, hired labour was at that time, not efficiently used because it was not particularly successful in mitigating the effect of peak demand period for labour. The study indicated that the seasonal nature of farm work results in labour shortages at peak period of labour demand. The result of the study also indicates that the number of family members was important in determining farm size, but land quantity was found to be most important contribution to farm productivity. In general, Norman concluded that, under the existing technological and socio-economic conditions in the study area, farmers used their resources in a manner consistent with the goal of profit maximization.

In another similar development, a study was conducted in Funtua Agricultural Development Project area (F.A.D.P) by Ukpabio (1978). He compared the productivity differentials between small and large farmers using both cobb-Douglas production function and gross margin analysis. He found that, while small farmers were more efficient in the production of traditional food crops, large farmers were more efficient in the production of cash crops. He also obtained an increasing return to scale in the production of most of crops grown by both small and large farmers, However, Ekele (1980) in a follow up study of the same area, (F.A.D.P), to determine the economic efficiency of resource use by different farm sizes, observed that while there

exist some differences in the level of resource use amongst different classes of farms, there was no significant differences between small and large farm in terms of the relative economic efficiency.

Moreso, Yotopoulous (1973), had shown that irrespective of the nature of returns to scale, difference in factor use intensities and output exist between different sizes of farms.

2.2.3 Factors Affecting Yield, Production Efficiency and Farm Income

More recently, a number of studies have shown that production in developing countries is generally efficient, given the state of technology within which it is organised (Schultz, 1964; Hopper, 1965; Massel, 1967: Nowshiryani, 1971; Tax, 1963 and Venkaredy. 1967).

The usual interpretation of the production function is that although individual farms attempt to maximize profits, they are not uniformly successful in doing so due to differences in their managerial abilities Marschack and Andres, (1944); Nerlove, (1965).

Sahota (1968) confirmed that resources available to farmers in India had by and large been efficiently allocated. He maintained that it will be difficult to depend the often advanced assertion that Indian farmers were tradition ridden and not rational or that marginal product of labour was zero and or that marginal product of any kind of capital was high. Disequilibruim may exist here and there, for example, taking the

coefficients at their face values, the MVP of fertilizer may seem to be considerably above cost. This input is however not entirely within the capacity of the individual farmers to supply. There may be a supply constraint on fertilizer.

Thus a rapid and mass development of agriculture can be achieved only by breaking through the state of the arts and introducing modern technology in a package consisting of new inputs, agricultural education, special skills, land techniques, and competent guidance in farm planning (Venkraddy, 1967).

In his study of farm families in Epirus, Greece, Yotopoulous (1968) also concluded that the farmers were poor but efficient. The implication of the result was that poverty in Epirus was not due to the misallocation of the existing agricultural resources. Mere reshuffling of factors of production could be expected to contribute significantly to economic development. Poverty was more likely to be due to low stock of factors of production. He concluded that by increasing quantities of complimentary factors of production (equipment, improved seeds, knowledge etc) one may expect that the production possibility curve will obtain higher levels of marginal productivity for all factors.

In the literature, there seems to be no agreement as to which group of farmers (small or large) are technically more efficient. Yotopoulous et al. (1970) observed that small farms were more efficient at one set of factor prices ratios and the large farms were at another set of factor prices ratios. If they faced different price ratios because of market conditions, it could have been possible for different factor intensities to exist side by side. The results of the production function analysis were therefore inconclusive in discussing questions of economic efficiency when the underlying production analysis was different for the two groups of farms. This seems to be in line with what Sen

(1966) had observed when he studied the behaviour of two groups farms in India, capitalist (large farms) and peasant (small farms). The findings of his studies showed that there were significant differences in factor intensities and input-output ratios between different sizes of farms.

Using the production function to estimate the yield with respect to resource use efficiency and adoption of improved practices, the findings of the study showed that farms in irrigated areas produced higher yields and consequently higher farm incomes. This was in agreement with what had been obtained in India by Abraham and Raheja (1967). A possible explanation was greater efficiency in the use of operating capital on irrigated farms.

The findings of Liao et al. (1968) also indicated that adoption index of improved practices was positively significant in the three areas during the wet season. However, during the dry season, the regression coefficients of adoption were positively significant only in the irrigated areas. This implied that adoption of improved practices brought a higher yield of rice only when irrigation water was sufficient.

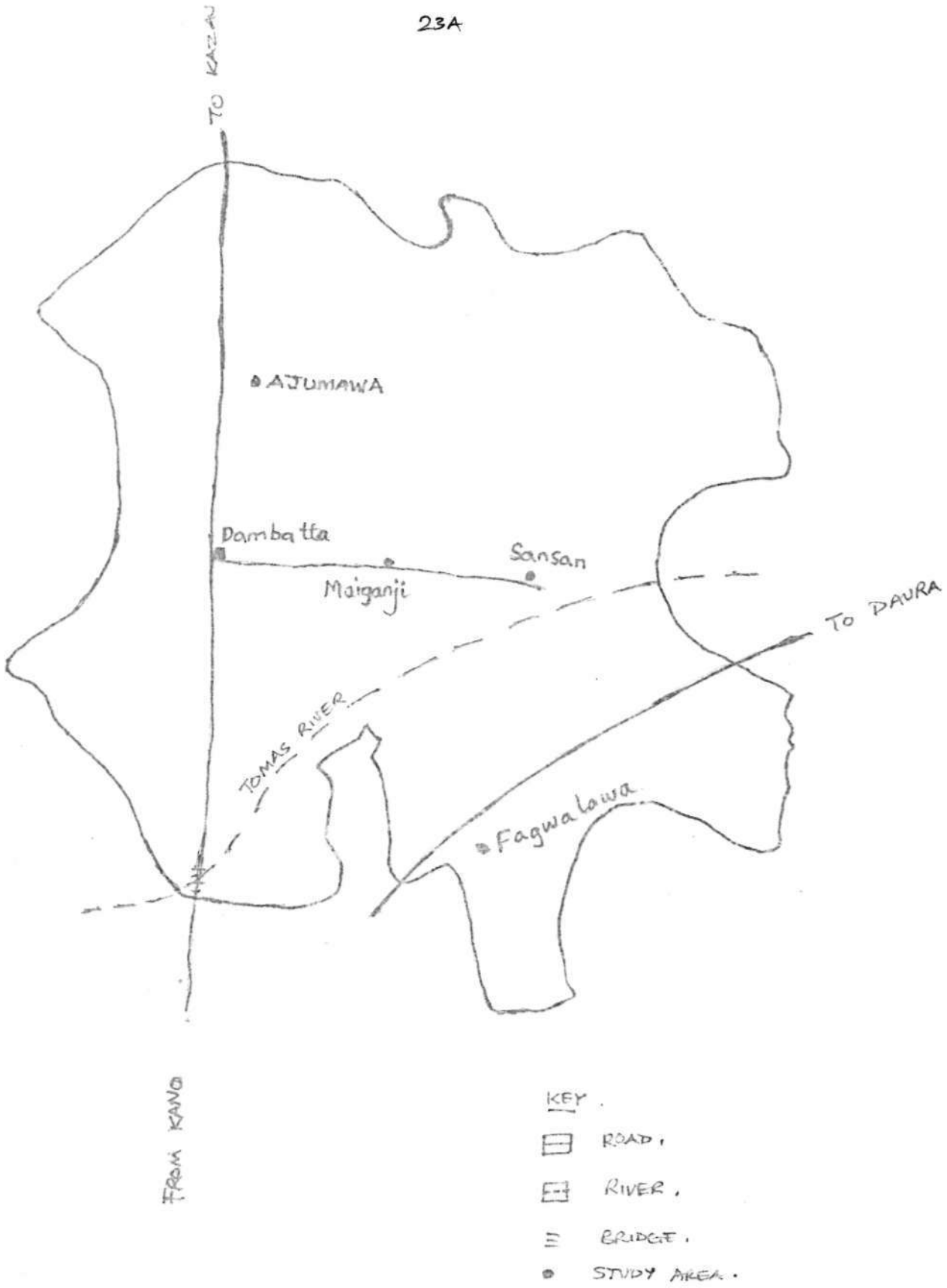
The equality of MVP of the resource and its MFC was used as a criterion to measure the efficiency of resource use. It was found that the MVP of operating capital was greater than the MFC. The difference was found to be statistically significant. This indicated that operating capital could still increase groundnut production. However, the opportunity was very limited because of capital limitation. This further suggests the need for improved infrastructure, technology or institututional factors as means of achieving higher rice productivity.

In a study on the comparative economic analysis of the use of hand tractors and carabao (water buffalo) in land preparation in Laguna Province in Phillipines,

Deamampo (1967) observed that on all weeding dates, the amount of weeds in a carabao ploughed plot was higher than that from tractor - operated plot. Ploughing with a carabao removed 43% of the weed population while the use of tractor removed 75%. It was observed that if equivalent amounts of work were performed, there appeared to be no difference in yield resulting from the use of tractor over yield resulting from the use of carabao, provided weeding was properly and timely done. However, there were indications that it was cheaper to use carabao for ploughing and the harrowing, it was still more economical to use the hand tractor than the carabao.

Cost comparisons of maintaining a carabao versus those of maintaining a tractor were not made. Maintenance costs for carabaoes which include cost of feeds and caring for them were difficult to estimate since they were feeding mainly on grasses found around the farmer's house, and younger members of the family took turns in caring for them and no such costs were recorded.

Analysis of cost per hactare tended to show that on the average the use of hand tractors greatly depended on the area served. There was a need for bigger farm sizes in order to lower production costs and it proved economical only if used in an optimum number of hactares.



MAP OF DAMBATTA L.G.A. SHOWING THE STUDY AREAS.

Chapter 3

3.0 Methodology

3.1 The Study Area.

Kano State lies within the sudan vegetational zone except its southern border where guinea savanna vegetation predominates. The Kano emirate, Dambatta inclusive is generally undulating slope to the north east with a physically uniform appearance. The state has an ardous climate with relative wide and rapid changes in temperature and humidity. Humidity at times rises up to 100.0 percent in a daily maximum and minimum temperature of 91.6F (33.1°C) and 60F (15.85°C) respectively.

Rainfall varies considerably from year to year ranging from 635.00 - 889 mm and is concentrated from June to September and rains are preceded by violent dust from storms followed by tornadoes mainly during the month of May and the close of the rains is September or early October.

Dambatta local government area's headquarter is located in Dambatta town just about 40km north east of Kano metropolis and according to census of 1991, it has a population of 242, 681 and an expansion rate of 6.2 percent per annum. It has a land mass area of 305.51 km^2 and the population mostly are small scale farmers. In addition, they rear livestock, goats, sheep and poultry.

However, even with the disappearance of the famous groundnut pyramids of Kano, the crop is still serving as one of the major cash crop in Dambatta local government area. The crop is grown solely or mixed with other food crops like millet,

sogharm and cowpea. Moreover, villages that are located close to the nearby Tomas Irrigational Project engage in production of rice, pepper, onions, tomatoes and wheat.

The study area is populated mainly by Hausa-Fulanis and more than 95 percent are Muslims by religion.

3.2 Sampling Procedure

Random cluster sampling without replacement where each groundnut farmer has equal chance of being selected was employed. A total of five major villages were purposively covered by the study with Dambatta serving as the centre. Other villages were Sansan, Maiganji, Ajumawa and Fagwalawa. These villages are very important production centres and contribute significantly to the total population of the local government area.

However, according to the local government's official estimates, about 500 farmers engaged in sole groundnut production from the earlier mentioned villages though majority were mixed farmers but sole groundnut croppers were specifically considered. Therefore, twenty sole groundnut farmers were randomly selected from each of the villages making a total of 100 respondents and thus, the sampling percentage was 20% of the total estimate of the groundnut growers in the area.

The grounds for selection of the villages were; (i) importance in groundnut production and accessibility by road for easy administration of questionnaires as the researcher did not live in the study area. (ii) The villages were a fair representation of

production and population across the study area as two villages were from the northern part and the other two were from the southern part with Dambatta serving as the cente.

3.2.1 Data Collection

Primary data were sourced by means of structured questionnaires from the farmers, while secondary data were collected from L.G.A. Headquarter; Kano State Agricultural and Rural Development Authority (KNARDA), and the State Ministry of Agriculture.

Some of the data collected were:

1. Farm size - Farmers were asked their actual or estimated sizes of their farms in acres then later converted into hactares.
2. Seeds: Source, price and quantity of seeds information were collected.
3. Type of fertilizer - The cost, type and quantity and their sources were collected from the farmers.
4. Tractor/oxen - Number of oxen used or tractor used for the farm operations, their duration per operation and cost were collected.
5. Labour: Types of farm labour whether family, hired or communal were determined from the farmers. The class of workers as determined by sex, age, work performed and the time spent per operation were detailed.

Other general background information were also obtained from the respondents like age, marital status, educational qualification, sex, output, land preparation, types of pesticides applied and the sales of the produce after harvest.

3.2.2 Analytical Framework

There are several analytical tools that can be employed in production studies and the choice of a particular one depends essentially on the available data. The analytical facilities available and the use to which the results are intended. For convenience and relevance below are the tools that were employed in order to achieve the already stated objectives of the study:

(i) Descriptive statistics was employed to achieve objectives1 and 4.

(ii) Regression Analysis was used to achieve objective 2.

(iii) Net Farm Income was employed to achieve objective 3.

The Net Farm Income

This is one of the oldest and simplest tool of analysis in farm production and management studies. Basically, it is an operation leading to the estimation of total costs and revenue for the production period (Olayemi and Oni, 1971, Oluwole, 1970; Osifo, 1970). The aim of a farm's net Income is to compare how profitable different kinds of enterprise combination can be (Olukosi and Erhabor, 1988).

The Model

The net farm income general model is presented in equation (1) below and was used in the profitability or cost and returns analysis in the study.

$$NY = TR - (TVC + TFC) \ldots\ldots\ldots\ldots (1)$$

where:

NY = Net Farm Income

TR = Total Returns to groundnut production in Naira

TVC = Total variable cost in Naira

TFC = Total Fixed cost in Naira

Depreciation

Depreciation on working and fixed assets were determined by the straight line method. A loss in values of a capital asset over time due to age, obsolence, wear and tear, is referred to as depreciation. It is therefore a function of time and use, and it involves promoting the original costs of an assets over its useful life. Depreciation (D) by this method is the difference between the purchase value (Price) (P) and the salvage value (S) divided by the number of years of life of the asset (n). It is given by

$$D = \frac{P - S}{n}$$

certain variables called the independent explanatory variables or regressors on the other variable called the dependent variable or regressant.

In this study a multiple regression model was applied to provide the numerical values for the influence of the explanatory variables on the dependent variable (output of groundnut) in 1997, in the study area. The explanatory variables were farm size, seed, fertilizer, labour and pesticides.

The Cobb - Douglas Production Function(unrestricted).

This is also called the power function and takes the following form:

$$Y = a X_1^{b1} X_2^{b2} X_3^{b3} X_4^{b4} X_5^{b5} e.....$$

$$\text{Log } Y = \text{Log } a + b_1 \text{ Log } x_1 + b_2 \text{ Log } x_2 + b_3 \text{ Log } x_3 + b_4 \text{ Log } x_4 + b_5 \text{ Log } x_5 + e$$

where Y = Output of Groundnut in kilogrammes (Kg)

X_1 = Farm size in hactares (ha)

X_2 = Quantity of seeds (kg)

X_3 = Quantity of fertilizer in kilogramme (Kg)

X^4 = Total labour used in (Man-days)

X_5 = Pesticides applied in litres (l)

e = error term

a = constant term

$b_1 - b_5$ = regression coefficients and elasticities of production of factors $X_1 - X_5$ respectively.

a = constant term

$b_1 - b_5$ = regression coefficients and elasticities of production of factors $X_1 - X_5$ respectively.

The values of the coefficients $b_1 - b_5$ are direct measures of elasticities of response to inputs $X_1 - X_5$ in the production process. Where there is a diminishing return to factors, the sum of the values of the coefficients will be less than one where there is increasing returns, the sum of the values will be greater than one; while a constant return to factors is indicated when the sum of the values is unity.

The ease of estimation and its ability to show elasticities of response to factors and nature of returns to scale are some of the merits of using cobb-Douglas production function. Nevertheless, the assumption of zero output at zero levels of input and constant elasticities of production at all levels of inputs are counted as the demerit. Other important demerit is the inability of the function to show both diminishing and increasing returns to factors in a single response curve.

3.2.8 Information Expected from the Production Function

1. The coefficient b_i's are known parameters and their estimator b_i obtained from the functions will give an insight into the direction and magnitude of change when the input is changed by one unit. The level of output which when the inputs specified are not added to one, give rise to the following situations:-

$b_i = 1$ indicates constant returns to scale

$b_i > 1$ indicates increasing returns to scale

$b_i < 1$ indicates decreasing returns to scale.

2. The coefficient of multiple determination (R^2) was obtained as a measure of goodness of fit. It is the percentage of the total variation in the dependent variable (Y) explained by the variation in the independent variables ($x_1 - x_5$). The equation with the higher R^2 value explains the variation better and will be regarded as a better fit (Heady and Dillon, 1972).

3. Regression coefficient for the various inputs used were tested using the t-test to determine the inputs to which output was highly responsive. Only those variables (represented by the b-coefficients) whose computed values were significant at 5% level of significance were taken to have significantly influenced variation in output.

4. The marginal value productivity of each resource will provide an insight into the efficiency of resource use when compared with their respective prices. The marginal value productivity of input X_1 is the addition to the total value of production resulting from utilization of the last unit of x_1. If $MVPx_1 = P x_1$ then X_1 is being efficiently utilized. A positive MVP may imply that output could be

increased by using more of a given resource. However, The magnitude of MVP must be compared with the factor cost in order to determine its usefulness. The difference between the MVP and factor costs indicates the scope of resource adjustment necessary to attain economic optimum.

3.2.3 Defination and Measurement of Variables

i) Farm Size: - This was denoted by x_1 and showed its influence on the yield of groundnut. Farm size was measured in hactares.

ii) Quantity of seeds - This was represented by x_2 and was measured in mudus but later converted into kilogrames and was included because of its influence on groundnut yield.

iii) Quantity of fertilizer - Denoted by x_3 and was measured in kilogrames and was included because of the variation of quantities used by the farmers, and thus to determine the extent to which its variation can influence total groundnut output.

iv) Labour:- This was represented as X_4 and was measured in man-days. Data on labour provided by family and hired labour used. Labour was divided into male, female, and adults, and since work rates differ according to different categories, weights were assigned to different categories of labour input. Olukosi (1986) categorised farm labour based on age, and sex, hence was measured in man equivalents as follows:

Age	Sex	Man-Equivalent	Work unit
0 - 6	Male and Female	0.00	Man days
7 - 14	"	0.5	"
15 - 64	Female	0.75	"
15 - 64	Male	1.00	"

These were measured in Man-days and multiplied by the prevailing wage rate. Labour input was relevant in order to determine whether it was over or under utilised in farm operations.

v) Pesticides Applied:- This was denoted by X_5 and was measured in litres (l). It was included in the model to examine to what extent variations in the volume of pesticides applied affected the total output of groundnut.

vi) Output: refers to the quantity of groundnut produced in kilogrammes from the various sample farms.

Total Revenue or Gross Returns:- refers to the value in Naira of groundnut sold.

Chapter 4

4.0 RESULT AND DISCUSSION

4.1 Socio-economic Characteristics of Farmers and their Production Activities

The efficiency of production of groundnut and some farmer's decisions with regards to marketing are a function of some various factors at a particular point in time. The socio-economic characteristics, resource employment, conditions and government policies are some of the factors that shape the decision making process of the farmers. With special reference to some of these factors, this sub-section will report the findings of this study.

Table 4.1 Age Distribution of the Respondents, 1997

Age	Mean Age	%	% Cum.Freq
20-29	24.5	13.0	13.0
30-39	34.5	27.0	40.0
40-49	44.5	31.0	71.0
50-59	54.5	24.0	95.0
60-69	64.5	5.0	100.0
		100	

No of Respondents = 100
Mean ($\bar{x}$) = 41, Standard Deviation (S) = 9.75
Source: Field Survey, 1997.

Table 4.1 shows that 31.0% of the respondents were within the range of 40-49 years, while 24.0% and 5.0% fell within the range of 50-59 years and over over 60 years respectively. The cumulative frequency shows 71.0% were within the active age of below 50 years. The distribution mean of age shows that the average age of all the respondents was 41 years. However, the standard deviation was approximately 10.0

Table 4.2: Educational Levels of Respondents, 1997

Educational Level	%
Koranic School	61.0
Primary School	12.0
Secondary School	10.0
Tertiary	
a) Polytechnic	7.0
b) A.T.C.	6.0
c) University	3.0
	100

No of Respondents = 100
Standard deviation (SD) = 1.2
Source: Field survey, 1997

Table 4.3: Family Size of Groundnut Growers, 1997

Family Size	%
1 - 5	71.0
6 - 10	24.0
11 - 15	2.0
16 - 20	1.0
21 - 25	2.0
	100

No of Respondents = 100

Mean ($\bar{X}$) = 5

Source: Field survey, 1997.

Table 4.2 shows the educational level of the respondents where majority of the respondents 63.0% interviewed had no formal education but were educated only in Koranic school, while 12.0% attended Primary school, 10.0% attended secondary education. However, 7.0% passed through Polytechnics, while 5.0% got Advanced Teachers College (A.T.C.) certificates and only 3.0% graduated from University. It is noteworthy that there were two types of education in the area of study; the religious (koranic) and the western formal education. However, both allowed for literacy in their own particular ways.

Table 4.3 shows that 71.0% of the respondents fell within the range of 1-5 member per household, 24.0%, 2.0%, 1.0% and 2.0% fell within the range of 6-10,

11-15, 16-20 and 20-25 members per household respectively. Family size determines the amount of workforce possessed by a particular family. It is important to note that family size used in this study refers to the number of adults from the age of 15 years in the family that engaged in groundnut production.

Table 4.4: Farm Size of the Respondents in Hactares

Size (ha)	%
0.4 - 2.0	51.0
3.0 - 4.0	36.0
5.0 - 6.0	5.0
7.5 15.0	8.0
	100

No of respondents = 100

Mean ($\bar{X}$) = 1.5

Note: 2.47 acres = 1.0ha
1.0 acre = 0.41 ha

Source: Field survey, 1997.

Table 4.5: Age and Farm Size of the Respondents

Age (years)	Farm size (ha)	%
20 - 29	0.4 - 2.0	43.0
30 - 39	3.0 - 4.0	31.0
40 - 49	5.0 - 6.0	12.0
50 100	7.5 15.0	14.0
		100.0

No of Respondents = 100
Source: Field survey, 1997.

Farm size of the respondents was presented in Table 4.4 and it shows that majority (51.0%) of the farmers had 0.4 - 2 ha, while 24.0% fell within the range of 3-4ha and 8.0% had over 6.0ha of farm size. It was observed that the farm sizes were small probably due to continuous fragmentation

Table 4.5 shows that 43.0% of the groundnut growers were within 20-29 years range and have farm size ranging from 0.4-2ha, while farmers with over 50 years of age have larger farm size of over 6.0 ha and constituted 14.0% of the respondents. This analysis shows that older farmers had larger farm sizes which also corresponds with the fact that, these group of farmers had higher number of family members that could be used on the farm as work force (Table 4.3).

The significance between the age and farm size of the respondents was tested using chi square (x^2). The calculated x^2 value of (107.31) was higher than the table x^2 - value at 7 degree of freedom and 1% level of significance and at 5% L.O.S (13.87). Moreover, the difference between the observed and the expected value is statistically significant.

Table 4.6: Experience of Groundnut Growers

Year	%
1 - 5	26.0
6 - 10	29.0
11 - 15	19.0
16 - 20	15.0
Over 20	11.0
	100

No of Respondents = 100
Source: Field survey, 1997.

Table 4.7: Experience and Level of Output of Groundnut

Experience in Yrs	Output in Kg	%
1 - 5	300	42.0
6 - 10	580	30.0
11 - 15	700	18.0
16 - 20	1000	7.0
Over 20	1160	3.0
		100

No of Respondents = 100
Source: Field Survey, 1997.

Table 4.6 shows that 29.0% of the respondents accounted for the 6-10 years category, 19.0% were of 11 - 15 years of experience while only 11.0% constituted farmers with over 21-60 years of experience. It can be observed logically from the analysis that experience increases with old age of the farmers.

The experience and level of the output of the groundnut growers was presented on Table 4.7. It shows that 42.0% with 1-5 years of experience had 300kg of output, while 30.0% fell within the range of 6-10 years and produced 580 kg and only 3.0% of the respondents were of 21-60 years of experience produced 1160-2500kg of groundnut. It can be observed that experience is one of the factors that enhances output level because farmers acquire more skill of production over time, and were most likely to own bigger sizes of land.

The significance between experience and output level was tested using chi-square (x^2) and the calculated chi-square value (17.67) was higher than the tabled chi-square value at 5 degrees of freedom and 1% level of significance and 5% L.O.S. (10.11). Therefore, the difference between the observed and the expected values were statistically significant. This analysis shows that the farmers with higher experience level were more likely to have higher level of output all other things being equal.

Table 4.8: Sources of Income of the Respondents

Source	%
Faming	61.0
Trading	19.0
Civil service	18.0
Others	2.0
	100.0

Source: Field survey, 1997.

Table 4.9: Land Tenure System in the Study Area

Tenure System	%
Inheritance	88.0
Lease from Govt	9.0
Lease from Private	3.0
	100

Source: Field survey, 1997.

Table 4.8 shows that 60.0% of the farmers were full-time farmers and had no other source of income apart from farming. Moreover, 20.0% of the respondents combined farming with buying and selling of goods as their other sources of incomed. Civil servants accounted for 18.0% though they combine with farming, while only

2.0% were sourcing income from other sources of income like tailouring and commercial driving.

Table 4.9 shows that 88.0% of the respondents acquired their land through inheritance, while 9.0% acquired theirs through the Tomas Irrigational Project that was nearby though leasing. However 3.0% leased their land through private individuals who have more than enough land for cultivation or were not willing to cultivate the land during a particular cropping season.

Table 4.10:Educational Level, and Adoption of Modern Methods of Production

		Adoption of Modern Methods of Production		
Education level	Respondents	Fertilizers No. Of Resp.	Tractor No. Of Rsp.	Other modern inputs
Koranic School	61	51	6	Nil
Primary School	12	8	3	Nil
Sec. School	10	10	4	1
Tertiary:				
Polytechnic	7	7	4	2
A.T.C.	6	6	3	1
University	3	3	2	2
Total	100	85	22	4

Source: Field survey, 1997.

The educational level and adoption of modern methods of production was presented in Table 4.10. It shows that 51 and 6 respondents out of 61 koranic educated respondents used fertilizers and tractor hire service respectively, while none

of the farmers used other modern methods. The most widely accepted modern input was fertilizer as majority of all the categories of respondents used it. Those that did not use it did so only out of frustration due to the scarcity and expensiveness of the commodity. All the tertiary level educated respondents used fertilizer and only 5 respondents out of 7 polytechnic educated farmers used tractor service and other modern inputs. From the table, all the 3 university graduates adopted fertilizers and tractor while only 1 respondent did not adopt other modern inputs of enhancing production.

From the analysis, it could be observed that the level of education highly influenced the rate of adoption of modern methods of production in the study area. Chi square (x^2) test also confirmed the above inference as the calculated value of (19.63) was higher than the table chi-value at 5 degree of freedom and 1% level of significance (15.58) and 5% L.O.S. (12.44).

It is noteworthy that fertilizer use, tractor service and other modern inputs were independent of each other. A farmer that adopted fertilizer for instance, had the same chance of adopting or not adopting tractor or other modern inputs if he had so wished and was capable financially. This explains the discrepancies between the total respondent's level of education and the total number of respondents' that adopted the three modern methods of production.

4.2 RESOURCE USE

4.2.1 Capital

Capital is considered as the total investment available for use in the farm operation. The various inputs used in groundnut production were; seeds, fertilizer, pesticides, building, machinery and labour.

Seeds

In a typical cropping season, majority of the farmers in the study area (89.0%) used previous year's reserve while those that did not have (10.0%) went to the market to purchase the required amount of seeds to supplement their little reserve or to purchase whole seeds needed for the planting operation. During the research, it was found out that farmers used different seed rates per hactare but most of the farmers used one seed per hole, thus rarely two seeds per hole and none was reported to have used more than two seeds per hole.

Fertilizer

The fertilizer procurement Division of Federal Ministry of Agriculture recommends 6 bags (300kg) of SSP (0:54:25) plus 1 bag 50kg of Murate of Potash in old furrows before splitting the ridges or side dressed at or shortly after planting of groundnut. In the study area, due to scarcity of the commodity, not all the farmers used the inorganic fertilizer and even those that applied it, did not follow the recommended rates, thus a significant number of the respondents supplemented the

little fertilizer they could afford with organic manure and some resorted to using only manure on their farms.

Table 4.11: Quantity of Fertilizer Applied by the Respondents

Type of Fertilizer	Average in Kg	%
S.S.P	112.50	49.85
N.P.K	92.00	40.54
Urea	22.05	9.61
Total	226.66	100.00

Source: Field survey, 1997.

Table 4.12: Sources and Price of Fertilizer Brands in the Study Area, 1996/97

Source	No of Resp.	Fert.Brand	Open market Price (₦)	Govt Price (₦)	Difference (₦)
Open market	81	S.S.P	850.00	120.00	+730.00
		N.P.K 15:15:15	1200.00	150.00	+1050.00
Govt. Deport	19	urea	1500.00	150.00	+1350.00

Source: Field survey, 1997.

Table 4.11 shows the average quantity of fertilizer used per farm in kg in the study area. A total of 226.55 kg of different brands of fertilizers were used. A total of 112.50kg of SSP which accounted for 49.85% was used while 92.0kg of NPK and 22.05Kg of Urea which represented 40.54% and 9.61% respectively.

As was pointed out earlier, scarcity and high prices of fertilizer at the most accessible point of sales (markets) had seriously constrained more production of groundnut during the cropping season of the study. Reports from the respondents had it that, the fertilizers were not on the market when they were needed most and government did not distribute it on time and even after distribution, only very scanty was procured to the teeming farmers, hence most ended up purchasing it at the open market. Therefore, the farmers paid variety of prices per bag.

Table 4.12 shows what farmers (81.0%) paid very exorbitant for the different brands of fertilizer with differences ranging from ₦730-₦1350 when compared with those farmers (19.0%) that were so very lucky to have bought theirs subsidized from the Government's depots or mobile sales system devised by the state government in the study area. The government prices were ₦120 for SSP, ₦150 for NPK and Urea respectively. The two major problems of costliness and scarcity made the commodity unaffordable to the common farmer that the subsidies were targetted for and thus significant number resorted to using manure or nothing at all.

Pesticides, and Other Chemicals

The use of herbicides was not reported by any of the farmers but the use of pesticides was reported by only 2.0% of the respondents. According the latest field report, there had not been any serious case of pests outbreak that would have warranted pesticides as a serious meaningful part of production cost, nevertheless, if there were any minor invasion at the beginning of growth of the crop, the farmers normally relied on the first few rains to destroy the pests.

As for the herbicides, its costly rate and lack of awareness and understanding of its usege had affected its acceptability and thus had greatly affected its application by the farmers. The groundnut farmers felt more relaxed and sure of human labour for their weeding operations.

Dressing chemical was also used by small number of the farmers due to the non presence of serious pest to necessitate its use on the seeds.

Buildings

Farm buildings were not very common feature to almost all the farmers in the study area. They move along with their farm equipment in the morning to the farm and return home after a day's work on the farms with their farm implement. Nevertheless, farmers had store (`rumbu') at their various residences but scarcely at farm area.

Machinery

This is classified as a fixed capital asset and its contribution in the production process is quantified in terms of the services rendered by the machine over time rather than the consumption of its material form.

In this sub-section, the ownership of a functional machinery and the use of its services and the employment of machine to render services irrespective of ownership during a production process with the respect to the cropping period of 1997 was considered.

The farm related implement and machineries used during the cropping season were: Tractor, delivery truck, Hand plough, oxen-plough, hoes, and cutlasses. During the study, none of the farmers were found to own any tractor but some farmers (22.0%) used tractor hire service from government agencies and private owners (Table 4.10). In essence, all the respondents admitted using hoe at one point of farm operations by themselves or through contract labourers.

After a careful observation, it can be concluded that 13.0% of the farmers with bigger farms and those that attended tertiary institutes (12.0%) employed the services of tractors mostly for the harrowing and ridging operations. The use of oxen-plough was patronized by 27.0% of the groundnut growers for harrowing and ridging operations.

Labour

Human labour was the most predominant source of labour in the study area. Other forms of labour like machines and animals were found to be relegated to minor sources, yet there were used by some of the groundnut farmers.

The use of labour in the production of groundnut was closely linked to the use of labour for production of other crops intercropped together with groundnut. In the cases of mixed field labour can be quantified taking into cognisance the other mixed crops in the same field with groundnut. The use of family labour, hired labour were given more emphasis as communal labour was not common in the area per se. From

the observations, farmers carried out their production activities from land preparation to harvesting using either family or hired labour or combining the two in a given cropping season.

The family labour force involves the head of the household i.e the farmer together with his adult children and wives engaging themselves with different production activities of the farm; from land preparation till the groundnuts were finally bagged and stored in the store or brought to the point of sale. This type of labour was common in the area and constituted 64.0% of the total labour used in the study area.

The second form of labour in the area was the use of contractual labour force. This involves a contractual agreement between the farmer and the labourers. The area (farm) is normally shown to the labourers and operations to be carried out stated clearly. Then, the labourers will strike a deal with the farmer after carefully observing the nature of the area and the nature of the job to be carried out. If the farmer agrees, then he will give the labourers free hand to perform the job as fast as they could. Some labourers will demand a part payment to kick start their bodies for the job, while some prefer a whole payment after they have finished the job and the farmers was satisfied with the work performed. The determinants of the amount to be paid were; type of operation to be performed, such as ridging, weeding, soil type, its easy workability and the interpersonal relationships between the labourers and the farmers.

During the cropping season of the research, the total labour employed for all the different farm operations in groundnut production was 3,601 mandays, where 1 man

day equals to 5 man-hours. Family labour accounted for 2,211 man-days representing 61.40%, hired labour accounted for 1390 mandays, and represents 38.60%. A summary of the labour usage by the farmers for the various production activities is shown on Table 4.13.

From the Table, harvesting operation carried the highest percentage of 19.05% of the total labour input. Family labour of the respondents during harvesting constituted a major share with 12.30% while hired labour represented 6.75%. Weeding operation then followed with 17.87%, and family labour during weeding accounted for 11.23% and hired labour formed the remaining 6.64% of the total 643 man days and accounted for 14.30% of the total labour consumed. Threshing constitutes 11.25%, while planting, winnowing, bagging and transportation expended 9.92% and 9.50% respectively. Fertilizer/manure application consumed 7.36%, while seed dressing and pesticide application used only 0.33% and 0.17 respectively. These operations were not common as there was no serious pests outbreak and only very few farmers seed dressed in the study area.

Table 4.13: Summary of Labour Use by Groundnut Growers in Man-days.

Operation	Family	Hired	Total	%
1. Land Preparation	227	142	369	10.25
2. Ridging	291	224	515	14.30
3. Seed Dressing	12	-	12	0.33
4. Planting	269	89	358	9.92
5. Weeding	404	239	643	17.87
6. Fertilizer/Manure-Application	207	58	265	7.36
7. Pesticide Appl.	-	6	6	0.17
8. Harvesting	443	243	686	19.05
9. Threshing	216	189	405	11.25
10. Winnowing, Bagging and Transportation	142	200	242	9.50
Grand Total	2211	1390	3601	100.00

Note: 1 man day = 5 man-hours.
Total Area = 319.95ha
Source: Field survey, 1997

4.2.2 Production Practices

In this sub-section, groundnut production practices are examined. These were: land preparation, ridging, planting, weeding, fertilizer/manure application and havesting.

Land Preparation

The relevance and importance of a good preparation of land in groundnut production enhances the overall production activities to follow. Machine and Human powers were used to conduct the various production activities. All the farmers reported using human labour at one point or the other but some well enlightened and medium to large farmers reported using tractor service (Table 4.10).

Use of animals in form of Oxen-drawn plough accounted for 18.0% for harrowing and making of ridges only. Land preparation in form of clearing and burning of bushes began between the month of March and May depending on the farmers choice, hence some start even earlier. Harrowing and ridging began in May - June depending on the rainfall availability.

The average requirement for land preparation is shown in Table 4.15. The total amount of family/Hired labour consumption was 369 man-days per hactare which represents 10.25%. More family labour was utilized (6.31%) than hired labour which account for 3.94%.

Planting

After the preparation of the ridges, planting followed. It was done manually by all the farmers in the study area. Farmers sowed 1-2 seeds per hole on the already prepared ridges. Groundnut was mostly intercropped with other crops, so normally ridges of groundnut were planted after some ridges of sorghum or millet, hence they were intercropped together. Sometimes the farm was divided into two halves. Groundnut will be planted on the half while the other half will be planted with other crops. However, the study considered only those with sole groundnut farms.

Weeding

Weeding enhances proper growth of groundnut as unweeded field is more prone to competition of light, nutrients and moisture with the different weeds that will be found on the field. Weeding using herbicides either as pre or post emergence. However, the predominant form of weeding was manual using human labour as chemical weeding was not common probably due to its cost and the level of perception and adoption of the method was very low.

Human weeding accounted for 643 man-days (19.87%) of the total labour inputs of groundnut production, Table (4.13). Family weeding accounted for 11.23% and hired labour represents 6.64% respectively.

Fertilizer/Manure Application

Though fertilizer was too scarce and too expensive when they were available, farmers had really got used to applying it. Hence 68.0% used SSP and other minor combinations of other brands on their groundnut farms, while 32.0% used only manure as they could not afford inorganic fertilizer. Moreover, some proportion of those using fertilizers also combined it with some manure where enough fertilizer was not found.

Harvesting, Threshing and Winnowing

One of the most important activity in groundnut harvesting is the timing for digging and lifting the crop. Two methods of harvesting are manual and mechanical. Manual is digging with hoe; mechanical is by the use of bullock-drawn plough with mould boards removed or a specially designed blade which runs under the plants. This method needs care so as not to damage the pods in lifting. However, all the respondents reported using manual methods where hoes were used to lift the groundnut from the ground. Harvesting accounted for 686 man-days which represents 19.05% of the total labour input.

The uprooted plant was kept in heaps (`dunkule'). `Baga' or collecting and making smaller heaps into bigger ones followed. The next operation was the threshing or `Bugu', thus beating with the sticks and hoe-handle and it was then followed by `Rairaya' or sieving from the ground with hands. Threshing accounted for 405 man

days and constituted 11.25%. Winnowing (' Shika') was performed mostly by females and children either family or hired labour and consumed 342 man days with 9.50% of the total labour where hired labour took 200 man-days representing 5.56% while winnowing by the family consumed 3.94%, (Table 4.13). The last activity in harvesting was the bagging and its final transportation to points of sale or to the store.

Moreover, the groundnut haulms was normally transported home by the farmer if he needs it for his livestock or can be sold on the farm to the buyer who usually bears the cost of transportation.

4.2.3 Cropping System

The types of cropping systems were diverse in nature as farmers engaged in mono or sole cropping where a single crop was cultivated. The other type was the intercropping where more than one crop were grown in a given field. After careful observation in the area of study, the predominant system in practice were the mono and intercroping with the latter as the most common practice. Groundnut was mostly intercropped with other crops by majority of the farmers. The common groundnut mixtures in the area were groundnut/Sorghum, groundnut/millet, groundnut/millet/cowpea and groundnut/millet sorghum. The sole groundnut field were not predominant as most farmers did not want to take chances of growing only groundnut in case of any crop failure and partly they wanted to grow something for immediate consumption at home. Therefore, they always liked intercropping it with

other crops. However, for the purpose of the study, the research considered only sole groundnut growers.

4.2.4 Marketing of Produce

A good specialisation in production is highly enhanced by good marketing system, so that there can be exchange of goods and services among different peoples. Therefore, a mechanism whereby people can exchange what they can produced with what they can not produced is refered to as a marketing system. Specialisation in an economy depends on the exchange and the rate of exchange depends on the marketing system of the economy. As the marketing process becomes complex, more and more steps come between the producer and the consumer. Agencies or individuals appear whose only business is to facilitate the process. These agencies are middlemen or marketing intermediaries.

In the study area, there were rural markets which were held periodically mostly once in a week. The groundnut produce were brought by the farmers to the rural markets where the buyers participate actively in assembling the produce. The different channels through which the farmers sold their produce is shown in Table 4.14.

Table 4.14: Channels of marketing groundnut in Dambatta LGA., Kano state, Nigeria.

Channel	Respondents	%
Rural Market	61	61.0
Local Buyers	39	39.0
Cooperative Market	Nil	Nil
	100	100.0

Source: Field Survey, 1997.

Table 4.15: Average prices received by groundnut growers in the study area, 1997

Variety	Price(₦)/Tiya
Local variety * (`Bahaushiya')	25.00
Dakar variety * (Yar Dakar)	35.25
Local variety **	60.00
Dakar variety **	80.00

Source: Field Survey, 1997.
Note: * = Unshelled
** = Shelled
1 Tiya = 1.45kg for unshelled
1 Tiya = 2.34kg for shelled

Table 4.14 shows that 61.0% of the respondents sold their produce through the rural markets while 39.0% sold theirs through the local buyers who purchased the produce directly from the farmers by making contact with them at their various houses or farms. The farmer was saved the cost of transportation to the market as the buyer will bear the cost. The existence of cooperative union or market was not reported by any of the respondents in the study area.

It is important to note that a `Tiya' (bowl) was the standard unit of measure in all the rural markets of the study area. The commodity was packaged in 100kg and 50 kg bags and a standard bag contains 40 Tiya and each Tiya of unshelled groundnut weighed 1.45kg.

Table 4.15 shows that there were two types of varieties of groundnut predominant in the study area. Their average prices were computed by taking their various prices at the beginning, middle and at the end of the year. An inference drawn from the analysis was that prices were lower at the harvest (beginning period and highest at end before new cropping season sets in). The lower prices was explained by the abundant supply just after harvesting and the higher prices was explained by low supply towards the end of the cropping season.

The table shows that the local variety (Bahaushiya) sold at ₦60.00 per Tiya . The Dakar variety's price was ₦35.25 and ₦80.00 for the unshelled and shelled commodity respectively.

4.2.5 Production Function Analysis

4.2.6 Empirical Results from the Cobb-Douglas Function

Out of the four production function models tried i.e Linear, Quadratic, Semi-logarithmic, and Cobb-Douglas, only Cobb-Douglas function was selected as it was the only equation that gave the best fit. The results of the estimated Cobb-Douglas production function for the groundnut farmers is presented in Table 4.16.

The table revealed that the adjusted values of the coefficient of the multiple determination (R^2) was able to explain 73.23% of the variation in the production by the inputs. Moreover, a significant relationship existed between the inputs and outputs at 5% level of significance as the calculated F - ratio of (4.146) was greater than the Table value of (3.92)

Farm size, fertilizer and labour were observed to be statistically significant at 5% level of significance from the critical t-values of the regession coefficients presented in (Table 4.16). By implication, it means that, the higher the level of farm size, fertilizer and labour, the higher will be the returns from the output. The insignificance of seeds and pesticides implies that their increament into the production would have been uneconomical to the farmer. This might be attributed probably to the expensive nature of these pesticides and absence of any major pest invasion. As regards to seeds, no significant changes were observed when one or two seeds were used. Infact (89.0%) of the farmers sowed only one seed per hole in the study area.

Table 4.16: Regression coefficients from Cobb-Douglas Production Function

Variables	Regression Coefficients	Standard Error	t- values
Farm size (X_1)	0.3001	0.9681	0.310 *
Seeds (X_2)	0.2592	0.2094	1.238 ns
Fertilizer (X_3)	0.1315	0.6234	0.211 *
Labour(X_4)	0.6250	0.8003	0.781 *
Pesticides(X_5)	0.4513	0.2663	1.695 ns
Constant	2.5070		
Σbi	1.7290		
R^2	0.7230		
F-ratio	4.1463		

* = Significant at 5% L.O.S.
ns = Not significant.
Source: Computed from field survey data, 1997.

Table 4.17: Marginal Value Productivities(MVPs) from the Cobb-Douglas Function

Variable	$\bar{X}$	MVP	MFC	MVP/MFC
Farm Size	3.2	54.77	-	-
Fertilizer	76.50	11.25	10.53	1.07
Labour	18.79	680.10	35.00	19.43
$\bar{Y}$	584.10			

$\bar{X}$ = Mean values of inputs

$\bar{Y}$ = Mean values of output

Note: Ratio values of seeds and Pesticides were not determined since they were not significant in the production process.

Source: Calculations from field survey, 1977.

4.2.7. Marginal Value Productivities (MVPS) and Efficiency of Resource Use

The marginal value productivities of the factors were derived and compared with their respective prices in order to determine the efficiency of resource use of groundnut production in the study area.

Table 4.17: shows the ratio of MVP to MFC for fertilizer and labour to be 1.01 and 19.43 respectively. This implies that farmers will earn higher returns from their productions if they increase the use of fertilizer and labour, since the marginal contributions of these inputs to output were more than their opportunity costs.

However, there was no need to determine the efficiency of use of seeds and pesticides since they were not even significant in the production process (table 4.23). Moreover, it proved difficult to obtain the ratio value of land since majority of the farmers did not actually pay for the land and those that paid were negligible, hence the efficiency of land use could not be determined by the researcher.

4.2.8 Returns to Scale

The regression coefficients or the sum of elasticities indicates the nature of return to scale associated with a particular system. Therefore, the behaviour of the output when all the factors of production are changed simulteneously in the same proportion is referred to as return to scale.

Table 4.16, revealed that there was an increasing returns to scale ($\Sigma bi = 1.73$).

The economic implication of the scale relationship is that, if all the other inputs in the model were increased or decreased by 1%, then the output would increase or decrease by 1.73% as the case might be.

4.2.9. Costs and Returns Analysis

This sub-section focuses on the determination of costs and and returns associated with the use of the different inputs and outputs resources and the agricultural practices involved in the production of groundnut.

The assumption for the discussion of the costs and returns in the study area were:

1. Most of the inputs were taken to be bought at the prevailing market prices. This is because the subsidised inputs rarely got to the peasant farmers targeted. So in most cases, they ended up buying most of their needed input from the markets. For instance, only 19.0% of the farmers bought their fertilizers from the government sales, while 81.0% bought theirs from the market.
2. Family and Hired labour were the predominant workforce available to the farmers and the prevailing price of ₦35 per man-day was applied.
3. Farmers were assumed to own their pieces of land and zero opportunity cost was attached since there was no realistic value for land in the study area.

A total of 319.95ha were cultivated by the total respondents of 100 sole

groundnut growers. This gave an average of 3.2 ha of sole groundnut farm size.

All the respondents in the study area incurred a total cost of production of two hundred and forty four thousand six hundred and fifty one naira (₦244, 651.00) which gave an average of Seven hundred and sixty four naira and sixty three kobo (₦764.63) per hactare. The total cost was made up of both the fixed and variable costs components. The gross revenue realised was ₦359, 748.58 . The value of the various cost components are presented in Table 4.18.

The total fixed cost (TFC) of the production was ₦6598.00, an average of ₦19.87 per hactare, while the total variable cost (TVC) was ₦238,294.00 and an average of ₦744.76/ha. However, the fixed cost was obtained by depreciating cost of farm equipment such as hoes and cutlasses using the straight line method. The depreciation was computed on individual basis before summing up since the expected life span contribution of assest to production and the salvage value of the respondents differ. The fixed cost component was mainly made up of the depreciation values of the equipment. The depreciation schedule used for computation are shown in Table 4.20 and 4.21 for the individual farmers.

Table 4.18: Cost of Fixed and Variable Inputs

Item	Amount ₦	%
1. Fixed cost (Depreciation on farm-equipment)	6,598.00	2.61
2. Cost of Transportation	11,380.00	4.65
3. Cost of bags	9,510.00	3.89
4. Cost of Seeds	17,296.00	7.07
5. Fertilizer:		
a) SSP	52,520.00	21.63
b) NPK	10,980.00	4.49
c) Urea	5,520.00	2.26
d) Manure	15,176.00	6.20
6. Labour (Man-day)		
a) Family	61,634.00	25.19
b) Hired	53,871.00	22.01
TOTAL	244,651.00	100.00

Total revenue = ₦359,748.58
Total Area = 319.95ha.
Mean/ha = 764.65,

Source: Field survey, 1997.

Table 4.19: Average Cost Analysis per Hactare

ITEM	₦
Average fixed cost (AFC)	19.87
Average Variable cost (AVC)	744.76
Average Total cost (ATC)	764.63
Average Total cost (ATC) (Family Labour not costed)	592.02
Average Revenue (ATR)	1124.39

Source: Derived from table 4.18.

Table 4.20: Annual Depreciation Schedule for Hoes,

Year	Initial Value	Annual Depreciation	Remaining Value(₦)
1	300	45	255.00
2	300	45	210.00
3	300	45	165.00
4	300	45	120.00
5	300	45	75.00

Source: Field survey, 1997.

Table 4.21: Annual Depreciation Schedule for Cutlasses,

Year	Initial Value	Annual Depreciation Value(₦)	Remaining
1	175	23	152.00
2	175	23	129.00
3	175	23	106.00
4	175	23	83.00
5	175	23	60.00

Source: Field survey, 1997.

Note: The predominant farm implements in the study area were hoes and cutlasses and were assumed to be depreciating at 10% and 5% per year during the production process of groundnut respectively. The assets were expected to last for five years on the average and their purchase prices were ₦300 for hoe and ₦175 for cutlass and their salvage values were ₦75 and ₦60 respectively at the end of their useful period.

Table 4.22: Groundnut output/ha in Dambatta LGA, Kano State Nigeria, 1997.

Farm Size	Average Yield (kg/ha)	Respondents	%
0.5 - 2.0	300	49	44.00
3.0 - 4.0	1100	32	32.00
5.0 - 6.0	2056	11	11.00
7.5 15.0	2550	8	8.00
		100	100.00

Note: 1 acre = 0.41ha
2.47 acre = 1ha
1 bag = 58kg.
Source: Field survey, 1997.

Table 4.23: Returns per Hactare in Groundnut Production in Dambatta LGA, Kano State, Nigeria.

ITEM	AMOUNT (₦)
Gross Returns	1124.39
Net Farm Income (costing Family labour)	359.81
Net Farm Income (Not costing Family labour)	529.50
Average Rate of Return per naira invested (costing Family labour)	0.47
Average Rate of Return per naira invested (Not costing Family labour)	0.84

Gross Returns = ₦359,748.58
Total cost = ₦244,651.00
Source: CalculationField survey, 1997.

The average rate of output or returns by farm size group is shown in Table 4.22. The table shows that 49.0% produced an average of 0.3 tonnes/ha (300kg/ha) while 32.0% produced an average of 1.1 tonne/ha, 11.0% and 8.0% produced 2.0 tonnes/ha and 2.5 tonnes/ha respectively. Yields were observed to vary among the different farm size category.

Table 4.21 shows the various measures of returns to groundnut production. The gross returns per hactare was ₦1124.39. The net farm income costing family labour was ₦359.91 while Net Returns not costing family labour was ₦529.50 respectively.

Net farm income (Not costing family labour) represents returns to labour, management and capital inputs. However, Net farm income costing family labour represent returns to management and capital. Average rate of return to total investment not costing family labour was 84.0% while that of costing family labour was 47.0% respectively. This implies that on the average, a profit of ₦0.84 not costing family labour and profit of ₦0.47 costing family labour were realised on every Naira invested by the farmer in the study area.

Table 4.24: Constraints Militating Against Increased Groundnut Production

Constraint	%
Labour	22.00
Land	18.00
Fertilizers	53.00
Others	7.00

Source: Field survey, 1997.

The major constraints associated with production of groundnut is presented in Table 4.24 and it reveals that problem of fertilizer availability accounted for 53.00% of the farmers' constraints. The scarcity of fertilizer coupled with its costly rate forced farmers to revert to the use of manure as a substitute. However, this shortage of fertilizers led to application of the commodity at far below the recommended rate and late application on the farms, thus affecting total output of the crop.

Labour was also found to be another significant constraint at certain times during the production period. This normally occured during weeding, harvesting and other related operation periods, when most of the farmers may have to supplement family labour with hired labour, thus demand was more than the supply of labour and that normally increased labour cost higher than other periods. Moreso, labour constrained production for 22.00% of the farmers in the study area.

In addition to the above constraints, the findings showed that there was inadequacy of land which ultimately affected more hectarage to be devoted to sole

groundnut production . Farmers complained they were afraid of growing groundnut as a sole crop due to the uncertainties of the failures associated with sole cropping, because in event of such failures, they would loose everything from that piece of land that particular year. Farmers always preffered mixing with other crops like millet, sorghum, cowpea on the same field. However, farmers with enough capital resources ventured into sole groundnut production.

Chapter 5

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of the findings

Chapter one contains the introduction which reviews the trends of agricultural sector of Nigeria in general. It lays a special emphasis on groundnut production and its economic importance to the nation. The research problem justification, objectives, and hypotheses of the study were also presented in this chapter.

Chapter two was the literature review. It contains review of related research work comprising aspect of production theory, resource productivity, efficiency and its measurements, factors affecting efficiency.

Chapter three on methodology contains the study area, selection of the study districts, sampling procedure and sample size. Others include data collection, measurement of input output data and the analytical framework.

Chapter Four contains a thorough discussion and analysis of the results and findings. These include the socio-economic characteristics of the respondents in relation to their production activities.

The major findings of the study were as follows:

About 31% of the respondents were between 40 and 49 years where the mean age was 41 years. Those farmers within the 20-29 years category accounted for 43.0% and had farm size of 0.4 - 2ha.

Majority of the respondents attended only Koranic school, 11.0% attended secondary school while only 18.0% attended tertiary institutions. Families with 1-5 members were the majority, 71.0%. However, 51.0% had 0.4 - 2ha of farm size and only 4.0% had over 6ha. Those farmers with 6-10 years of experience constituted 29.0% and had 580 kg of output. Moreover, only 11.0% had over 20 years of experience in groundnut production.

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Most of the respondents were full time farmers while 40.0% engaged in other activities other than farming. Farmers that attended tertiary institutions (18.0%) adopted modern methods of production more than others. Seeds from the previous years were used by 89.0% of the respondents, 11.0% bought seeds from the market to supplement theirs from previous year. No tenant operators were reported and thus 88.0% inherited their farms. Variety of fertilizers were bought, but 49.85% bought SSP and only 9.61% bought Urea in the open market price at ₦800 for SSP and NPK ₦120 and ₦1500 for Urea. The government prices were ₦120 for SSP and ₦150 for NPK and Urea respectively.

Tractor hire service was patronised by 25.0% while 27% of the respondents used oxen drawn ploughs. A scanty 2.0% of the farmers used pesticides herbicides usage was not reported. The main source of labour in the study area was the human labour both family and hired labour. No communal labour was reported. Labour consumed a total of 3601 man-days and family labour accounted for 61.41% of the total labour. Harvesting accounted for 19.05% of the total labour input while the

least (0.17%) was taken by pesticides application.

The cropping system was diverse in nature. The presence of mono or sole cropping and mixed cropping were conspicuous in the area. Groundnut was normaly mixed with sorghum, millet, or cowpea or any two of the crops above but sole growers were sampled during the survey. No cooperative union was reported, so farmers sold their produce to local buyers (39.0%) or rural markets (61.0%). The average price per 'tiya' was ₦25 for the local variety (Bahaushiya') and ₦35 for `Dakar' variety.

Regression analysis result showed the R^2 value to be 0.723, hence 72.30% of the variation in production was explained. Farm size, fertilizer and labour were statistically significant at 5% level of significance. The sum of elasticity of production of $\sum bi = 1.72$ implies that if all other inputs in the model were increase by 1%, then the output will increase by 1.72%. The MVP to MFC ratios of fertilizer and labour were 1.07 and 19.43 respectively. This implies that increase of these inputs will increase output. Pesticides and seeds efficiency ratios were not computed because they were not significant in the production process. 476595

The farmers cultivated a total area of 319.95ha, an average of 3.2ha. The total cost of production by all the farmers was (₦244,651.00) an average of total cost of ₦764.63 per hactare. The total cost was made up of total variable cost and total fixed cost. The average fixed cost per hactare was ₦19.87 while the average total variable cost was ₦744.76 per hactare. The fixed cost was derived from the depreciation of the farm equipment. The equipment were hoes and cutlasses depreciated at 10% and

5% respectively.

The expected returns per hactare were 300kg for 0.5-2ha which was accounted for by 49.0% of the respondents, and 8.0% produced an average of 2550Kg/ha. However, returns were calculated based on the average of 1.95 tonnes/1ha. The average return per hactare was ₦1124.34. The net farm income costing family labour was ₦359.81 and had an average rate of return of ₦ 0.49, while net farm income not costing family labour was ₦ 529.50 and an average rate of return of ₦0.84.

During the period of study, some of the factors found militating against increased groundnut production in the study area were, labour, input acquisition especially fertilizer and inadequate land.

5.2 Conclusion

On the basis of the findings of the study, certain important conclusions could be drawn. The result of costs and returns analysis showed that production of groundnut could be profitable despite some of the constraints before the farmers. A similar result was found in an earlier study in Hunkuyi village of Kaduna State by Abalu and Harkness (1978).

The results of the multiple regression analysis revealed that the inputs were able to explain the variations in the groundnut output significantly. It also showed that inputs such as farm size, fertilizer and labour were significant. The marginal value productivities (MVPs) when compared with the marginal factor cost (MFC) of the

inputs showed that some input were underutilized and their increased utilization could possibly increase output. It can be concluded that the shortage and costliness of these inputs at certain points in time contributed immensely in their underutilization by the farmers, and consequently, affected their total groundnut output.

5.3 Recommendations

With reference to the findings, the following recommendation can be made:

1. Since the government has finally withdrawn its subsidy on fertilizer, then it should monitor the pricing and quality of the commodity to be supplied by the private enterpreneurs. Government should also see to it that the various companies are issued with proper authorization to import or where possible to manufacture these fertilizers locally to avoid undue monopoly by some elements.
2. More enlightenment campaigns should be mounted on the use of improved inputs that are high yielding, more effective and be made affordable and available.
3. Extension activities should be strenghtened to enlighten farmers on how to attain optimum - efficiency from their available resources.
4. The state government acquired some large expanse of land for irrigation in the study area. However, not all the land is being cultivated for the targeted purpose presently. Therefore, arrangement could be reached whereby interested farmers could be allocated more land to grow groundnut in return of a reasonable land charges from the government.

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APPENDIX I

Net farm Income

$$NY = TR - (TVC + TFC)$$

Return Per Investment.

$$\frac{N\ Y}{A\ T.C}$$

Marginal value products

$$MVP_X = \frac{b_1 \bar{Y}}{\bar{X}} . P_X$$

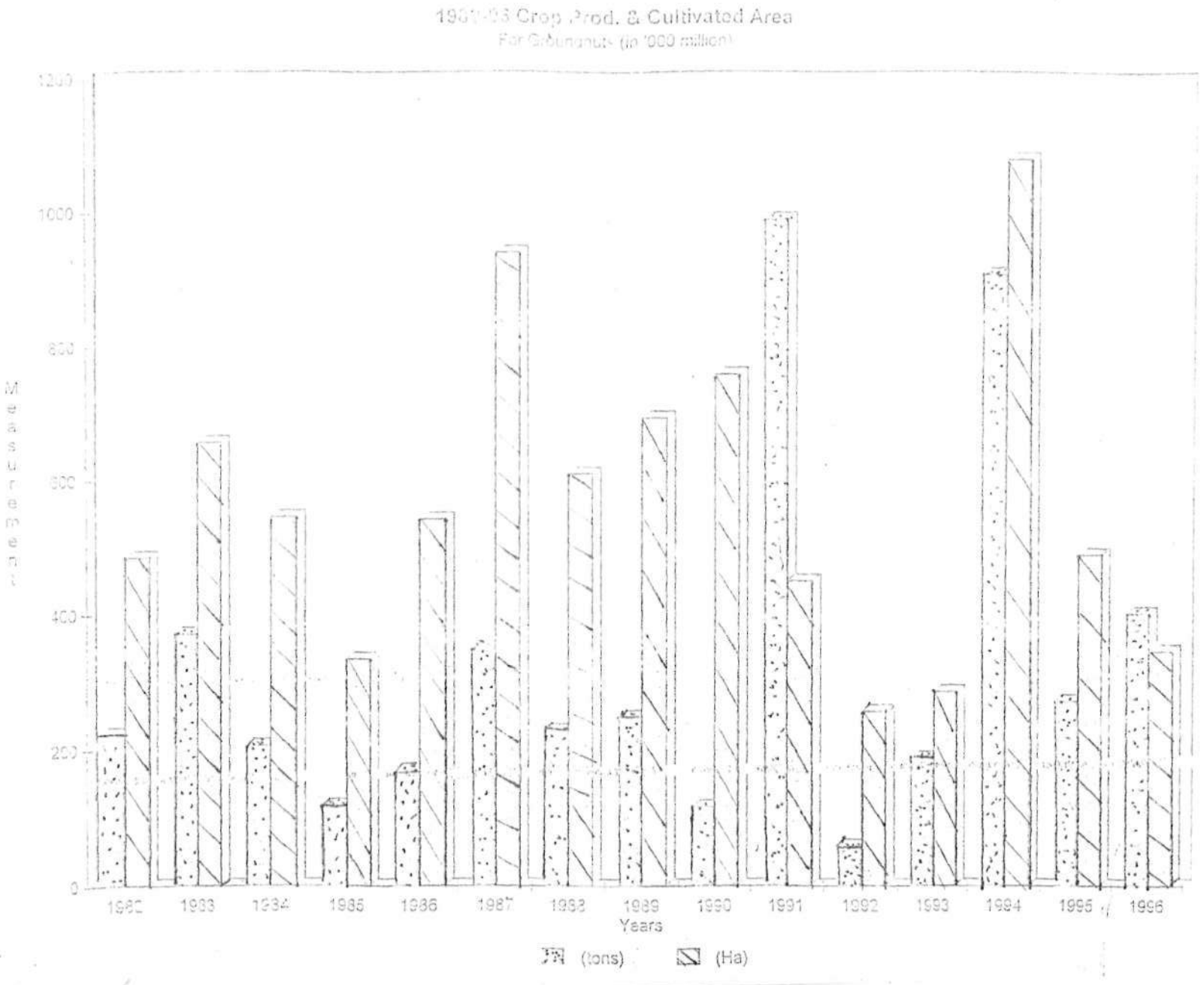
b_1 = Regression Coefficient

$\bar{Y}$ = Average Output

$\bar{X}$ = Average input

P_x = Price/Marginal factor cost.

APPENDIX II


1200
1000
800
600
400
200
0
Measurement
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
Years
(tons)
(Ha)

APPENDIX III

DEPARTMENT OF AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY
Faculty of Agriculture/Institute for Agricultural Research
Ahmadu Bello University, Zaria.

Economic Analysis of Groundnut production in Danbatta Local Government Area of Kano State: (M.Sc. Agric. Econs Thesis)

FARMERS' QUESTIONNAIRE
SECTION A: BACKGROUND INFORMATION (Tick where appropriate)

1. Sex: Male ( ) Female ( )

2. Level of Education

   a) Not been to school..... .....

   b) Primary.....c) Secondary

   c) Tertiary: (University, Polytechnique, College of Educ)

   e) Others specify..... .....

3. Village of Informant..... 476595

Family Composition

4. Are you married..... Yes ( ) No ( )

   If above is yes, then,

5. Give the number in your family aged between 10 and above

   Male No..... Female No.....

SECTION B: PRODUCTION INFORMATION

6. How long have you been growing groundnut?..... years

7. Do you grow groundnut as a sole crop (single crop)?

Yes ( ) No ( )

Give reason for answer above..... . . . . .

8. How many groundnut sole field do you have?..... . . . . .

Sole field No..... . . . . .

9. Give their correct or estimated sizes

Field I..... Field II..... Field III.....

Do you grow groundnut in a mixture with other crops?

Yes ( ) No ( )

If yes, what is the correct or estimated sizes of your

mixed crop field?..... . . . . .

Field I..... Field II.....Field III.....

List the crops you mix with groundnut

a).....(b).....(c).....(d).....

When do you start preparing your land for groundnut

cultivation? Give the month..... . . . . .

How did you get your land (a) inherited,

(b) Lease from Govt, (c) Lease from Private.

Which of the following methods of cultivation do you use?

Hand cultivation (using Hoes and cutlasses)

Using tractor(s)

Both methods

How many of this equipment do you have?

Hoes.....(b) Tractor.....(c) Oxen-drawn plough....

Cutlasse..... (e) Others specify..... .....

16. How much did each cost you?

a) Hoe..... (b) Tractor.....(c) Oxen-drawn plough....

d) Cutlass.....(e) Others..... .....

17. When did you buy them?

a) Hoe..... (b) Tractor.....(c) Oxen-drawn plough....

d) Cutlass.....(e) Others.....

18. Estimate how long each will last

a) Hoe..... (b) Tractor.....(c) Oxen-drawn plough....

d) Cutlass,.....(e) Others.....

19. What is/are your source of income?

a) Farming only, b) Trading c) Civil service d) Others.

20. When do you apply fertilizer?

Before germination ( ) 1-2 weeks after germination ( )

21. How many times do you apply fertilizer?

a) Once ( ) b) 2 times ( ) c) 3 times ( )

22. How long does it take you to apply fertilizer to a field?

State the estimated time..... .....

23. Do you apply herbicides? Yes ( ) No ( )

24. Do you apply pesticides? Yes ( ) No ( )

25. How many bags of 50kg or 100kg of groundnut did you harvest from your sole groundnut field during the 1995/96 season.

a) 50kg.....b) 100kg.....c) No. of Tiya.....

d) Others..... .....

26. How many bags did you harvest from mixed field?

a) 50kg.....b) 100kg.....c) No. of Tiya.....

d) Others..... .....

27. How long did it take you to harvest a unit of your harvest? i,e.

a) 50kg.,.....b) 100kg.....c) No. of Tiya.....

d) Others..... .....

28. What method of harvest do you use?

a) By uprooting with hand

b) Using machine

c) Other specify..... .....

SECTION C: INPUT USE: LABOUR

29. How many of the people aged 15 years and above in your family work on the groundnut farm or on its cultivation.

specify their ages

30. Fill the table below for family labour used on your sole or mixed groundnut field. (Fill as appropriate)

Mixed ( ) Sole ( )

Form of Operation	Male: Days and the average per day worked		Female: No of Days and Average hours per day worked		Children aged (10-15 years		Total Number of Days and Hours	
s	DAY	HOUR	DAY	HOUR	DAY	HOUR	DAY	HOUR
1. Land Clearing								
2. Ridging								
3. Seed Dressing								
4. Planting								
5. Weeding								
6. Fertilizer appl								
7. Pesticide appl								
8. Herbicide appl								
9. Harvesting								

Operation	Male: Days/Hour		Female: Day/hours		Children: Day/Hour		Total No of Day/Hour		Total cost (N)
	DAY	HOUR	DAY	HOUR	DAY	HOUR	Day	Hour	
1. Land Clearing 2. Ridging 3. Seed Dressing 4. Planting 5. Weeding 6. Fertilizer appl 7. Pesticide appl 8. Herbicide appl 9. Harvesting									

34. Fill the table below for the source, quantity and cost per Unit of the following inputs.

INPUT	Source	Quantity	Cost/Unit	Total Cost (N)
Fertilizers a) S.S.P. b) N.P.K c) Urea d) Others..... Seeds Herbicides Pesticides Dressing Chemical Bags Others..... ..				

SECTION D: MARKETING OF THE PRODUCT

35. When do you sell your groundnut?
    a) Before harvesting ( )
    b) After Harvesting ( )

36. Do you process or sell as shelled groundnut?
    a) Processed b) Sell as shelled groundnut
    c) Processed some.

37. Which of the following factors determine when you sell?
    a) High price
    b) Immediate Cash needs
    c) Lack of storage facilities
    d) Others specify..... .....

38. Do you belong to any marketing Union such as marketing co-operative? Yes ( ) No ( )

39. If no, why?..... .....

40. If yes, do you sell your harvested groundnut through the Union? Yes ( ) No ( )

41. If no, how do you sell your groundnut?
    a) Sell in the open market
    b) Sell to government
    c) Sell to industrial buying agents
    d) Sell to local buyers or traders.

42. How did you sell your groundnut in 1995/96 session
    a) Sold in Tiya
    b) Sold in 50kg bags
    c) Others..... .....

43. What price did you collect per unit of your sell above
    a) N..... per Tiya b).....per 50kg bag c)N....per others

44. 1) Begining of season....2) middle..... 3) Ending.....

45. What mode of transportations did you use in carrying your groundnut to the market?
    a) Motor vehicles such as pick ups
    b) Motor cycles
    c) Bicycles
    d) Donkeys
    e) Others specify..... .....

46. What was your total cost of transportation?

    N.....

47. Which of the following is/are your major constrants in groundnut production?
    a) Land Acquisition (b) Labour (c) Input acquisition
    d) Marketing problem (e) Others specify..... .....

    Thank you.