CAPITAL RESOURCE USE IN FARMING:AN APPRAISAL OF RURAL WOMEN IN NIGER STATE, NIGERIAN

BY

OMER, RIHAB ABDUL- RAZIG

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DECLARATION

The author hereby declares that the whole of the work now submitted for the Master of Science Degree (Economics) of Ahmadu Bello University, Zaria is the result of her research, except where references are made to published literature and duly acknowledged. It has not been part of any presentation for any other certificate.

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OMER, R. A.

_____

DATE

The above Declaration is confirmed.

_____

DR. (MRS) P. S. AKU,
CHAIRPERSON,
SUPERVISORY COMMITTEE.

_____

DATE

CERTIFICATION

This Thesis entitled, "CAPITAL RESOURCE USE IN FARMING: AN APPAISAL OF RURAL WOMEN IN NIGER STATE, NIGERIA" by RIHAB OMER, meets the regulations governing the degree of Master of Science of Ahmadu Bello University, Zaria and is approved for its contribution to Scientific knowledge and literary presentation.

DR. (MRS) P. S. AKU, CHAIRPERSON SUPERVISORY COMMITTEE	DATE
PROF. J. S. ODAMA, MEMBER SUPERVISORY COMMITTEE	DATE
DR. (MRS) P. S. AKU, HEAD OF DEPARTMENT	DATE
DEAN, POST GRADUATE SCHOOL	30/5/97 DATE
EXTERNAL EXAMINER	DATE

DEDICATION

This work is dedicated to the memory of my father. To my passionate Mother Bothiena Ahmad. To my sisters and brothers and my close friends Amina and Hussain.

ACKNOWLEDGEMENT

My thanks and praise go to Almighty Allah, the Beneficient, the Merciful.

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ABSTRACT

The study investigated the use of capital in farming by women in selected villages of Niger State. The research tested the following hypothesis that:

The capital resource being used by Niger State Rural women does not contribute to productivity.

Descriptive statistics and multiple regression was used to analyse the data.

The results of the study indicate that Kagara women have capital but they are not used efficiently. Kuta results lent support to the issue of low capital use by women in the village. In Gunna, the regression results indicated that the production technique is labour-intensive. Tegina has similar result with Gunna.

The marginal productivity (MP) of resources differ greatly among the four villages. MP differences are attributed to differences in resource use. It is observed that the limited capacity of land is most importantly influenced by factors such as limited working capital, rudimentary technology and low productivity of labour rather than land shortage.

The MP of labour is found to be negative in some selected villages. This proves a clear case of excessive use of labour in the agriculture of the study area. It is more of excessive use because labour is surplus in Nigeria. The MP of capital was positive in two villages but negative in two. It's negativeness in these villages could be attributed to the short supply of capital. This finding highlights the need for increased use of

capital resource.

The conclusion to be drawn from these results is that the labour productivity in agriculture in the study area calls for a reduction in heavy chores by increasing use of capital in order to boost its productivity. Implicit in this result is the need to increase women's access to capital resource.

It is suggested that government should design and implement policies that support women and increase women's access to capital and appropriate technology. All these need money and women must have credit to purchase them.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Carver (1924) states that "rural economy is that branch of the science of statesmanship which deals with agriculture, other rural enterprises and rural life as factors in a nation's building". This definition covers essentially the whole scope of the elements of rural economics with which this study is concerned. The striking feature of this definition is that it places agriculture in the center of economic life of rural communities. This indicates that no country, much more a developing one, can afford to keep permanently out of the development process about 50% of its population (Brown, 1979).

In the modern era, African women continue to play an important role in the development process, especially in the rural sector. The available data and current studies show that women today appear to play active roles both as decision makers and participants in most rural development (Abell 1962 and Olayiwola 1977).

According to Howard (1988), women working on small farms are believed to produce about 90 percent of the food consumed locally. Furthermore, it has been established that in most African countries, more than 80 percent of those who earn their living as farmers are women, while about 25 percent of all African farm households are partially owned and controlled by women (Howard, 1988). It is, therefore, indisputable that women participate in almost all facets of farm activities alongside the men.

Several studies (Ogungbile et al, 1991 ; Olayiwola and Voh, 1982; Patel and Anthonio, 1973) have revealed that women participate in virtually all forms of farm activities in Nigeria. According to the

Federal Office of Statistics (1984), about 84 percent of Nigerian rural women are engaged in crop production while 4 percent take part in fishing. Ijere (1991) estimates that between 60 - 80 percent of all agricultural labour is provided by rural women. The foregoing clearly shows the importance of women in Nigerian agriculture.

However Successful agricultural policies require a knowledge of aggregate, farm level resource availability and the differences in the productivities of these resources in different areas. Such information reveals the possibilities of increased agricultural production by indicating the direction of adjustment in resource use and allocation.

Niger State is one of the states of the Federation that depends mainly on agriculture in the employment of its citizens and the majority of the inhabitants are small farmers depending almost solely on agriculture for livelihood. Inspite of this fact, the situation generally remains that there exists a wide gap between the demand for, and availability of agricultural output. The plight of peasant farmers is that they are constrained in a vicious cycle of low productivity, low income and low capital resource which deprives them of adequate share in economic growth. Therefore, to enhance the productive potential of peasant farmers, there is the need for provision of requisite resources, especially capital which Ogunfowora et al. (1972) has identified as one of the factors militating against rapid agricultural modernization in Kwara State. The Niger State Government has made several attempts to assist in this area by channelling credit to the small farms in the local government area through public agricultural credit programmes.

1.2 Statement of the Problem

The main thrust of the agricultural development policy of Nigeria is the attainment of self-sufficiency in food and fibre production. In recent times, the high demand for food and galloping food prices have revealed the inadequacy of the agricultural sector to provide food in sufficient quantities to feed the growing population in Nigeria.

Famoriyo (1987), observes that there is a serious underdevelopment in Nigeria's rural sector with respect to infrastructures such as water supply, transportation, electrification, etc.

Therefore, giving inadequate attention to rural development by Nigeria and insufficient investment in food production through reliance on low-yielding technology, coupled with an increasing attention and expenditure on the urban sector, the nation is drifting gradually towards increasing underdevelopment. Government expenditure on water supply, roads, irrigation, education, health, provision of farm implements and industries have been heavily concentrated in the urban areas (Abalu, 1988). Less than 25 percent of government total expenditure is allocated for the development of the rural farming communities. Also, inspite of its potentials in form of labour force supply, utility and its contribution to the gross domestic product, only 15 - 18% of estimated private and public sector expenditure is usually earmarked for the rural farming sector (Hassan 1992), thus encouraging a vicious web of low productivity, low income and low investment. This self-perpetuating web inhibits the participation of the farming sector in development activities, thus depriving them of an equitable share of the benefits of economic progress necessary for the cycle to be broken. The farmers must be helped to realize their productive potential through the provision of requisite productive

resources, especially capital which has been identified as one of the factors militating against rapid agricultural modernization in Nigeria (Ogunfowora et al, 1972). Accordingly, any macro and micro-economic strategy aimed at breaking the cycle must be designed to increase agricultural productivity and stimulate capital investment through the provision of cheap and readily available credit facilities. A prerequisite for the formulation of an operational credit programme and strategy for stimulation of capital resource is an understanding of the quantum and structure and the productivity of capital resource in peasant agriculture.

This study therefore, intends to examine the pattern of capital use in peasant agriculture. The choice of Niger State, particularly Kagara Local Government, stems from the fact that from national statistics, Niger State contributes a reasonable percentage to agricultural output in Nigeria, and most of all, the percentage of women participation in agriculture within the State is about 60 percent of the population (Federal Office of Statistics, 1984).

As a contribution to knowledge in the area of peasant farming, this micro-economic study seeks to evaluate the pattern of capital use by Kagara women in food crop production in Niger State. This study is particularly important, as there has been no previous study of this nature on the Kagara agricultural zone of Niger State.

1.3 Objectives of the Study

A study of this nature has never been conducted in the area before. It is on the basis of this assumption that this study is undertaken in order to achieve the following objectives:

i. To investigate the pattern of capital use by rural women in food crop production and to evaluate the efficiency with which they employ such capital resources for optimum production.

ii. To indicate the relative quantities of various types of capital used by rural women.

iii. To examine the relationship between capital and other factors of production in agricultural development, with the aim of assessing the differences in the productivities of these resources.

iv. To make policy recommendations and suggest ways of encouraging women farmers to make investment in agriculture.

1.4 JUSTIFICATION OF THE STUDY

Successful macro and micro-economic farm policies require a knowledge of aggregate farm level resource availability and the differences in the productivities of these resources in different areas. Such knowledge could indicate the possibilities of increasing agricultural production by indicating the direction in resource use and allocation.

Most of the works in this area are usually based on whole factors of production (Land, Labour, Capital and Management) or mostly based on two factors (land and labour) rather than the individual factors of production in the crops production. This micro-economic study therefore, as a contribution toward the provision of such information was designed to evaluate the efficiency with which the Niger women use their resources (especially capital) in crop production activities. In addition, this study is aimed at increasing our knowledge of rural economic performance. It is the cherished wish of the research that the findings

would make a positive contribution to the existing literature on the rural sector in Niger State and would augment and facilitate further future research work in this direction.

1.5 Hypothesis

The research hypothesis is derived directly from the research objectives. It is as follows:

i. That the capital resource use by Niger State Rural Women does not contribute to productivity.

1.6 Organisation of the Study

The research work is made up of five chapters.

Chapter One introduces the conventions of a project of this kind. These include the introduction, statement of the problem, objectives of study and the organisation of the work.

Chapter Two reviews the relevant literature.

Chapter three presents theoretical framework, statistical and econometric model and study design.

Chapter four presents the analysis of the data, the results of the findings and the interpretation of results.

Chapter five contains summary, conclusion and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

In recent years, considerable interest has been shown in the economic development of the rural areas in all countries of the world.

Carver (1924), argued that agricultural development itself can be considered as a process whereby rational and effective use is made of resources so as to increase the welfare of farmers in particular and the nation in general.

The principal features of Nigerian agriculture are its low level of technology and fragmentation of land-holdings. The chief tools are hoes, cutlasses, axes and knives. Experiences and analysis have shown that introduction to heavy machinery and the rationalization of cultivation through consolidated farm holdings would increase output. Therefore, to increase peasant productivity will involve incentive investment on farm resources (Famoriyo, 1987).

2.1 The Role of Capital in Development

Traditionally, development has meant the capacity of a national economy whose initial economic condition has been static for a long time, to generate and sustain an annual increase in its gross national product sufficiently large to more than cope with the national increases in population. The process of economic development has therefore come to be seen as a planned alteration of the structure and employment in such a way that the share of agriculture declines, whereas those of the manufacturing and service industries increase (Abalu, 1988).

However, so much has been written in recent years in development problems of underdeveloped countries of the world that there can be no single

generally applicable definition of "economic development". (Thirlwall, 1989). However, for the purpose of this study, we define economic development as a process of sustained economic growth which is achieved over a period of time in an economy with a large and complex administrative structure, a high rate of capital use, well-trained manpower and a high level of technology. Economic development does require a major transformation of the economy which includes changes in structures, attitudes and institutions as well as the reduction of inequality, eradication of absolute poverty and a substantial decline in the position of the agricultural sector. Agricultural development itself can be considered as a process whereby national and more effective use is made of resources so as to increase the physical production and the productivity of agriculture in order to increase the welfare of farmers in particular and the nation in general.

According to Rostow (1960), the transition from underdevelopment to development can be described in terms of five distinct stages through which all countries must pass. He considered that these stages of economic growth were essentially a theory of development in which the right quantity of saving, capital investment and foreign aid were all that was necessary to enable less developed countries proceed along the path of economic growth which historically had been followed by the more developed countries. Rostow further explained that countries which saved 15 to 20 percent of their GNP could grow faster than those which saved less. The core issue in economic growth to him, therefore is a matter of increasing savings and investment.

According to Gadsby (1965), capital occupies a position so dominant in economic theory of production that it is natural to assume that development hinges only on capital resource. However, he does suggest that differences in capital

resources, more than any other factor, distinguish the agriculture of developing countries from that of the economically advanced countries.

It must be mentioned that there is a school of though which states that the role of capital in economic development is over-stressed. Todaro (1994), claims that, "most economists would probably agree that it is the human resources of a nation, not its capital or its natural resources that ultimately determine the character and pace of economic and social development".

However, the importance attached to capital resource as a means of accelerating economic development is evident in economic planning of developing countries

2.2 Capital in Developing Countries

One of the most assertive statements on the role of capital in developing countries was made by Nurkse (1963), when he described the vicious circle of poverty. He argued that, "it is the small purchasing power, resulting from the low level of income that leads to the low inducement to invest. The low income is due to low productivity, which again is a result of the small capital used in production, which in turn is caused by the low inducement". In other words, Nurkse is of the opinion that there is a low capacity to save resulting from low level of income which is, in turn, a reflection of low productivity and, in turn, is due to lack of capital which is the result of small capacity to save. He further asserts that poverty in itself is perpetuated in developing countries due to this reason.

Although Nurkse himself suggests that the vicious circle of poverty could be broken by embarking on massive investment, he acknowledges the fact that capital alone will not achieve much without other complementary factors such as

natural resources, social attitudes, political conditions and historical accident. The significance of the above statements for the developing countries is that the conditions of poverty are intense for insufficient supply of capital. In the case of Nigeria for instance, Ogunfowora (1975), indicated four main areas of need. First, the adoption of modern technology in farming inevitably involves an increasing need for capital which most farmers are unable to meet because they lack adequate financial resources to implement improved practices. Secondly, most of the farmers produce at low productivity levels and in consequence, are unable to save, therefore, capital resource is low. Thirdly, the necessity to borrow arises from the seasonal nature of farm income (that is, income which comes in once a year and only at harvest period) which is very irregular and creates a demand for short or medium term credit to provide capital for the purpose of purchasing farm inputs. Fourthly, it is asserted that the supply of credit is necessary because it may strengthen the farmers position in disposing of their crops instead of having the time scale determined by an urgent need for cash.

There is shortage of capital available for farming families in developing areas because the income derived from farming results in a low capacity to save money for investment.

Many research studies have demonstrated the potential role of increased level of capital on agricultural Production. Norman (1970) and Ogunfowora (1972), have both shown that when capital is combined with improved technology, a greater opportunity exists for increased output and higher net income. Campbell (1958) argued that access to capital, either owned or borrowed, is an essential prerequisite for sustained expansion in production, whether on the farm or industry.

The importance of the agricultural sector in Nigeria is not in doubt, although estimates of its size differ. A world Bank study (1981), indicates that in Nigeria as well as in most countries of Africa, Asia and Latin America, nearly 80 percent of the total population can be described as rural inhabitants with agriculture providing employment and means of livelihood for as much as 75 to 80 percent of the population. Also, Ijere (1992), wrote, "The Nigerian agricultural sector has the largest sector of the labour force out of a population of 115 million".

Olayide (1976) and Lele (1981) have shown that the small scale resource-poor farmers and their families produce over 90 percent of the staple food requirements of the total population.

Chavandavarker (1970), has emphasized that one of the basic problem facing the developing countries like Nigeria, especially among rural women is the scarcity of domestic capital relative to the size of investment required to achieve a higher and self-sustained rate of growth of national and per capita income.

To Norman, investment in traditional agriculture tends to be low for two main reasons; first, the supply of funds for investment is small, since savings from the farmers' low incomes are minimal, credit from institutional sources has been almost non-existent and credit from local money lenders is costly. Second, the returns from investment are low, partly because many forms of capital goods can be formed directly from labour, e.g. land improvements, land tools, etc. And partly because low level of technology greatly reduces the productivity of capital goods, e.g, investment in fertilizer without better seeds or management, compared to the returns in a technologically advanced agriculture. The result of the poor investment means the level of technology remains low and few inputs are purchased.

A high proportion of work in the rural areas, and particularly on the farm, depends on the women. While men concern themselves with clearing new land for planting, growing and harvesting of tree, crops, hunting, and where necessary, defence, women tend to plant, weed and harvest food crops, (Janelid, 1971).

In more recent years, studies have tended to focus on the changing role of women in relation to development. These have examined the extent of integration of women into national development schemes.

2.3 Definition of Capital and Capital Goods

The terms capital and capital goods are frequently used interchangeably. According to Famoriyo (1979), capital is anything that increases productive power and secondly as anything that serves as means of creating investment. Nwosu and Ogunfowora (1977), defined capital as all those man-produced goods (as different from natural resources) which are used in the process of producing other goods. Items such as tools, machinery, buildings, livestock, fertilizer and chemicals, which are consumed, not for their own sake, but to produce other goods, constitute what is regarded as capital.

Schumpeter (1949), defined capital as, "nothing but a lever by which the entrepreneur subjects to his control of concrete goods which he needs, nothing but a means of directing factors of production to new uses or of dictating a new direction of production", thus, leading to the opportunity for increased output and higher income.

Raymond Firth (1949), opined that capital has three functional aspects. These include: production assets, purchasing power and funds for investment. Capital represents a stock of goods and services which can be used in further production, as distinguished from goods and services produced for consumption.

In agriculture, capital includes such items as simple tools, machinery, livestock, fertilizer, seeds and chemicals. The valuable improvements that farmers make on their farms can be considered as capital. These include land clearing, draining, terracing, fencing, irrigation and the planting of tree, in addition to any farm building used in production. Furthermore, it includes farm inputs, marketing and the processing of farm products.

In modern farming as in other businesses, the key to satisfactory money incomes is a proper combination of productive assets such as land, capital, available labour and managerial ability. The amount of capital a farmer controls, the terms and conditions under which he has access of loans undermines, to a large extent, the level of his income.

However, because of the heterogenous nature of capital resources, the capital of business is usually defined in terms of money which may be defined as the sum total of money available for investment.

In this study, an attempt is made to distinguish between the two terms. Capital is defined to include capital goods. Capital includes both money available for investment and the amount already invested. The former is also termed liquid capital (e.g. cash and bank money) while the latter is designated as fixed capital (e.g. investment in land equipment, livestock). The transferable farm resources, land and capital goods, are often referred to as farm capital.

As shown above, in peasant agriculture, it is probably more appropriate to talk of capital goods instead of discussing the more inclusive term "capital" for at least two reasons. First money available for farm operations is not different from money available for other household uses. It is therefore difficult to isolate and discuss liquid capital from capital. Secondly, much of the capital used in

production is created in the production process and retained by the farm family for further production. Thus, the bulk of what can be classified as farm capital in peasant production is in the form of goods.

Farm capital goods may therefore be defined as those real assets, other than land, which are employed in the production of farm produce. Farm capital goods include farm tools (hoes, knives, etc) and equipment, farm buildings, barns, storage facilities, fertilizer and chemicals, seeds, cuttings and livestock. (Nwosu et al, 1977).

According to McQeen (1973), the two main inputs of traditional agriculture are labour and land while the amount of capital and the proportion of income invested are very low. Mellor has, however, quite rightly emphasized that saving and investment are a function of two main factors: the attitude toward saving, investment and consumption, i.e., the position of the supply schedule for saving and the management. Consequently, capital formation in traditional agriculture tends to be low not necessarily because the capacity for saving is low, but because the returns to investment tend to be low.

2.4 Classification of Farm Capital Goods

Norman (1970), in this economic survey of three Zaria Villages, classified capital as being made up of:

(a) Money for investment, and,

(b) the amount of money already invested in land, equipment, chemical, etc. He went further to classify capital as:

(a) durable capital which lasts from two or more years as a result entails the computation of depreciation allowances and provides flow type services (e.g. land, tools, etc.).

(b) non-durable capital which can contribute to production only once (e.g. fertilizer, seeds, etc.).

Cash expenditure in connection with farming operations are considered only as means of obtaining the services of inputs.

2.5 Capital Goods Inventory

Researchers interested in the development process agree that capital inputs are necessary to stimulate agricultural output. The study by Norman underlined the importance of an increased capital base as a key factor in the increased productivity at the farm level. Hence it is correct to attribute an expansion in output to high investment.

He also observed that, a high rate of capital use usually accompanies rapid growth in productivity and income if producers are provided with complimentary factors of production in the form of technical knowledge and other relevant agricultural inputs. (Ogunfowora, 1972).

According to Nwosu and Ogunfowora (1977), "farm capital goods inventory was taken twice during the production season, that is at the beginning and at the end".

One of the most difficult problems of compiling any type of inventory is placing a realistic value on the farm assets. This is particularly true of durable capital goods that last for several years because the new construction or purchase price is not a realistic measure of valuing such items with the help of a depreciation scheme. Non-durable assets are usually valued according to their cost of purchase net selling price (i.e. market price minus the cost of marketing).

2.6 Imputed Expenditure in Capital Goods

Ogunfowora (1975), found that for durable farm capital goods such as hoes, knives, etc., which are used for many production seasons, it becomes difficult to determine what quantities of such capital goods have been used up in one particular production season. The value of such durable capital goods used per production season have to be imputed using some established methods.

In the case of non-durable capital goods, it should be easy to measure and record the quantities of such inputs used in a production process. But in peasant agriculture where quantities of inputs are usually not measured and where farm records are totally absent, the determination of the quantities of all capital goods used becomes a matter of imputation, hence the heading "imputed expenditure on capital goods".

For durable goods, imputed expenditure is determined in the form of annual depreciation as already mentioned. The total imputed expenditure on durable capital goods is calculated as the summation of the depreciation rates of the capital goods. For non-durable capital such as seeds, cuttings, etc., since the farmer in most cases does not actually purchase these items, heavy reliance is placed on the farmer to estimate the value of the quantities of these inputs used. For other non-durable capital goods used, they are able to supply their purchase price and the proportions used of the information supplied by the farmer, the values of the quantities of such inputs used are determined.

CHAPTER THREE

THEORETICAL FRAMEWORK AND STUDY DESIGN

3.1 The Theoretical Framework

Various techniques exist for productivity studies. Their application depends on the choice of the investigator whose latitude is normally constrained by the nature of the available data, resources and facilities available and the use with which the results are to be put.

However, the simplest method of measuring resource productivity is in terms of individual input-output ratios. For example, capital resource (durable and non-durable) productivity can be measured in terms of the ratio of the total output to the total inputs of capital resource. Indices of productivity can be conducted by multiplying this ratio by 100. In terms of aggregate output-input 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 (olayide, 1972).

In this study, we have concentrated on the use of descriptive statistics and production function.

3.2 Methodology

3.2.1 Descriptive Statistics Method

Descriptive statistics such as mean, and measures of variation such as variance, and deviation were used in analysing some of the data.

A t - statistics(1) was used to show the significance of the stated hypothesis in chapter one above.

3.2.2 Statistical Techniques

Econometric techniques are used to estimate the resource use efficiency in peasant farming. In resource use efficiency, the economic progress of the multitude of peasant farmers is strongly tied to increased productivity.

Creating fair producer prices, increased productivity should lead to higher incomes and a probably higher investment level. Thus, increased farm productivity becomes a crucial factor if peasant farmers are to be extricated from the economic stagnation which characterizes their situation.

It has been a subject of focus, that to achieve increased productivity, what is required is a combination of measure aimed at increasing the level of farm resources as well as improving the efficiency with which resources already committed to the farm sector are being used. This framework forms the basis for the analysis in this work, which seeks to certify the extent to which the available farm capital resources in the study area are being efficiently utilized. In this study, we adopted the Ordinary Least Square (O.L.S.) Method whose regression parameter estimated are Best Linear and Unbiased (B.L.U.).

The Production Function

The production function is a mathematical way of describing the relationship between the production of given output and factors used in the production process. (Heady, 1966).

A number of functional forms such as quadratic, linear, spillman, square root, power variants of these are possible in production function studies, but functions estimated from farm samples ordinarily have been power and linear forms because of the relative ease of computation and the smaller degrees of freedom involved in estimating the parameters (Heady, 1966).

Also, Heady (1966), suggested that quadratic and other functional forms, if they are fitted to farm samples, generally lead to a loss of many degrees of freedom and often result in too many regression coefficients which are not often significant in probability sense.

Given the level of technology and prices of both input and output, the marginal productivity (MP), is the yardstick for judging the efficiency of resource use. A given resource is optimally allocated or used when the MP is equal to its acquisition price. (Ogunfowora et al, 1974).

In traditional agriculture, however, the prime motive for production is to attain self-sufficiency in food production as well as ensure family survival.

The main aim of marginal productivity is to determine whether efforts to bring about large incomes should be directed towards changing the farm system or improving the efficiency of production of the present combination of farms. The marginal productivity (MP) of individual resources provide a framework for policy decisions on resource adjustment. Positive MP implies that output could be raised by using more of given resource. (Ogunfowora, 1974).

The Model

In order to assess capital resource in peasant farming, a Cobb-Douglas Production function was used and there are five sets of model specifications, (Kagara, Kuta, Gunna, Tegina, and all villages). This is, in an attempt to show the effect of inputs on output yield.

The Cobb-Douglas Production function was fitted with the full complement of four independent variables as follows:

$$Y = bo X_1^{b_1} X_2^{b_2} X_3^{b_3} X_4^{b_4} \qquad (1)$$

Taking logarithms of equation (1) reduces it to a linear equation (2), thus:

$$\text{Log}Y = Log b_0 + b_1 \text{Log}X_1 + b_2 \text{Log}X_2 + b_3 \text{Log}X_3 + b_4 \text{Log}X_4 \quad (2)$$

where

Y = Aggregate value of crop output (₦)

X_1 = Land (hectares)

X_2 = Labour (man hours)

X_3 = Cost of non-durable capital (e.g. seeds, chemicals, etc.) ₦.

X_4 = Cost of durable capital inputs (e.g. tractor hire, depreciation on tools, implements, barns and store houses) ₦.

The b's are the regression coefficients in the equations. In equation (2), they are also the elasticities of production for the regression equation and represent the percentage increase in the output of Y for each 1- percent increase in the input of respective resources. Diminishing returns hold true if the exponent for any one resource is less than unity, implying that the productivity of that resource declines as more of it is used while holding the others constant at some specified level (Ike, 1983).

The output from individual crops in all the women's fields was first obtained in physical units. The physical units were then weighted by the average prices paid for individual products and then aggregated to obtain the total value of crop output.

The explanatory variables are those quantifiable input (factors) which influence output in the study area. Land was measured in hectares.

The farm size for any woman is the addition of all the hectares of crop fields cultivated. Labour was provided by members and non-members of the farm family in man-hours. Seeds were obtained from the quantity saved out of the previous harvest. The quantity used was weighted by the average ruling price in the area. Fertilizer and other chemicals are sparingly used while mechanical and other technologies are casually used by the farmers.

3.3 Description of Study Area

The survey was conducted in four villages, namely Kagara, Kuta, Gunna and Tegina in Niger State.

Niger State is one of the thirty States in Nigeria, and located in the Northern part of the country. It shares boarders with Kebbi, Sokoto, Kaduna, F.C.T., Kogi and Kwara States. The State has 14 local government areas in which four of the surveyed villages were situated.

The population of the State is 2,482,367 according to the 1991 population census provisional results (CBN Statistical Bulletin 1994). Female population from the same source stands at 1,191,647. representing about 48% of the total population, suggesting that women constitute a significant force that needs to be integrated into the mainstream of the development process.

The inhabitants in the four villages are mainly Kamukus and Hausas by tribe. Most of the people are Muslims.

The land is generally undulating gently rolling hills, often less than 50 feet below the general surface. The flow of water varies considerably between seasons and from year to year.

During the dry season, the rivers become a series of disconnected pools, flooding during the wet season, and generally uncontrollable for a period of six to

seven months.

The climate in the four villages and their surroundings is that of Sudan Savannah in nature with surplus rainfall between March and September. It is thus, a fact that rainfall contributes significantly to large crop yield in the area.

Agriculture contributes significantly to the economy of the area. For example, over 70 percent of the working population in Kagara L.G.A. are engaged in agriculture while about 80 percent of the total land area is under cultivation. Other occupations include civil service and craft which are mainly pottery, goldsmithing and dyeing.

Social amenities are relatively few. A high level of illiteracy is common among the dwellers, because most of the young girls and boys in the rural villages are frequently used by their parents to help on the farms rather than go to school.

3.4 Description of Data Sources

The various data on the relevant variables used for this study are both from primary and secondary sources.

The primary source of the data were obtained from cross-sectional survey of 80 randomly selected rural women from each of the four villages. From each village, 20 women were randomly selected.

A random sample is a sample unsystematically chosen. That is to say, the sample was chosen without a defiite method. It was drawn from a population of rural women in the study area so that each member of the population has an equal chance of representation.

A combination of farm and home visiting were used to collect information from the women in order to obtain data on their farm activities. Such information included costs of labour and capital inputs and prices of various products.

The secondary sources include CBN publications, journals, etc.

3.5 Limitations of the Study

Most empirical works have certain limitations. This study is no exception. First, there are many unquantifiable variables affecting the production process in traditional agriculture (e.g. managerial ability and other socio-economic factors. However, the choice of three factors (land, labour and capital) may give rise to some statistical problems. Such as, multi-collinearity, non-significance of some explanatory variables, low coefficient of multiple determination.

Second, the measurement of variables presented a formidable task since the farmers are predominantly illiterate and their memory can fail.

FOOTNOTES

The t-value for any one variable was obtained using the formula:

$$t = \frac{\hat{\beta}_i}{s\hat{\beta}_i}$$

where

t = calculated t - value

$\hat{\beta}_i$ = Least squares estimator of β_i

$$s\hat{\beta}_i = \frac{s}{\sqrt{ss_{xxi}}}$$

where

s = Sample standard deviation

ss_{xx} = Sum of squares of the distances between x measurements and their mean.

CHAPTER FOUR

ANALYSIS OF THE RESULTS

4.1 Personal Characteristics

Data on personal characteristics of respondents were confined to age, education and other occupation(s). The aim of investigating these personal particulars was to ascertain if they bear any significant relation to the capital investment.

4.1.1 Age

The majority of the respondents (31.25%) were in the category of 30 - 39 years (Table 1), followed by those in the age category of 40 - 49 years (28.75%). Only, 11.25% of the women interviewed were between the ages of 20 - 29 years. None of the respondents was below 20 years because the sample chosen did not include them and only 1.25% of the women interviewed were about the age of 60 years.

Table 4.1: Distribution of Respondents Age (%)

AGE	KAGARA	KUTA	GUNNA	TEGINA
10 - 19	-	-	-	-
20 - 24	10	-	15	10
25 - 29	25	5	25	10
30 - 39	30	45	30	30
40 - 49	30	35	25	45
50 - 59	-	15	5	5
60 and above	5	-	-	-
Total	100	100	100	100

Source: Computed from Respondents to the Questionnaires, 1996.

Most of those who pursued three or more occupations was in the young and middle age groups (20 - 24, 25 - 29, 30 - 39 years). Those in the late middle age and old category (40 - 49, 50 - 59 years) pursued two occupations, while the very old respondents (60 years and above) mostly pursued a single occupation. The findings showed an inverse relationship between the ages of rural women and the number of occupations they pursued. On the other hand, the findings showed an inverse relationship between the ages of rural women and capital used. The interaction of age, occupation and capital in this way would be on the economic performance of the respondents for this reason, that the young and middle aged women are likely to have more than one occupation which can allow them to save small amount of money that can be used for investment in the farming process.

4.1.2 Literacy Rate

Among the women interviewed in the four villages, Kuta had the highest illiteracy of 70 percent as is shown in Table 2. This was followed by Gunna village with 66.4 percent, Tegina had 53 percent, while Kagara had the lowest, 38 percent.

Table 4.2: Distribution of Respondents by Educational Category (%)

Educational Category	Kagara n = 20	Kuta n = 20	Gunna n = 20	Tegina n = 20
Illiterate	37	70	66.7	50
Koranic	30	23.3	23.3	65
Western (Primary 6)	33.3	6.7	10	6.6

Source: Computed from Respondents to the Questionnaires, 1996.

High level of illiteracy was noted among these women probably because young girls in rural villages are frequently used by their mothers for hawking and the importance of getting western education is not quite appreciated by mothers who never went to school themselves.

Furthermore, in rural communities where educational facilities are limited, women generally do not have the opportunity to go to school.

The type of education and the level of literacy of the respondents studied had a close relationship with capital use in the study villages. The vast majority who did not have any formal education were involved only in traditional skills. The smaller number of rural women who had some formal education adopted a modern technique of farming.

4.1.3 Other Occupation

Majority of the women in the villages surveyed were farmers and most of them depended on farming for their subsistence. But also some of them combined farming with other occupations such as small trading (Table 4.3).

Farming combined with trading was found among occupation for 45% of the women in Kagara, 25% in Gunna, 20% in Tegina and 10% in Kuta. This was followed by women who combine farming and craft. About 20% women found in Kagara and Gunna. Tegina and Kuta claimed 15% and 10% women respectively. Also, about 5% of the respondents in Kagara only combined civil employment with farming.

Going by the above findings, it is logical to argue that it is possible that the farmers can raise additional capital to finance their farming activities from the other occupations.

Table 4.3 Occupations of Rural Women in the Four Villages.

Name of Village	Farming	Craft (Res. in %)	Small Trading (Res. in %)	Civil Servant (Res. in %)
Kagara	30	20	45	5
Kuta	80	10	10	0
Gunna	55	20	25	0
Tegina	65	15	20	0

Source: Computed from Respondents to the Questionnaire, 1996.

4.2 Major Crops Grown in the Villages

Table 44, shows the major crops grown in the four villages. The three major crops for Kagara and Gunna were guinea corn, groundnut and maize. Important crops for Kuta were groundnut, guinea corn and maize. For Tegina, the two major crops were guinea corn and maize, followed by rice and groundnut. Maize and yams were the least important crops grown in Kuta and Gunna. The less important crops grown in Kagara were rice and yams. The fable shows that in Kagara and Tegina, almost all women also grow millet and yams, while almost all women in Kuta and Gunna grow rice and millet, while all the women in the four villages grow beans.

Table 4.4 Major Crops in the Four Villages (%)

Crops	Kagara % of Respondents	Kuta % of Responden t	Kagara % of Responden t	Kag ra % of Respondent
Guinea Corn	95	65	85	90
Groundnut	95	100	95	70
Rice	50	40	45	75
Millet	30	40	55	30
Maize	65	65	60	80
Yams	45	60	65	55
Beans	35	55	50	45

Source: Computed from the Respondents to the Questionnaires, 1996

4.3 Capital Resource Availability and Use

4.3.1 Value of Farm Capital Goods by Rural Women

The average value of capital goods available to women in all the villages between 1984-1994 is about N103.35[1] per rural woman. This is shown in Table 4.5. Considering the fact of the predominance of hand tools and grain stores constructed cheaply from the local materials in peasant agriculture, the N103.35 seems high. This was observed to be from the data obtained for other years from the farmer by estimation[2]. Further as the table indicated, farm buildings, tools and farm implements account for 84% of the total value of the capital goods.

This means that seeds, cuttings and fertilizers account for only about 16% of the value of capital goods. It was gathered from the respondents that the farmers obtained their seeds and cuttings from the last harvest. However, the total average values for fertilizer which formed the major component of the non-durable capital is about N12.47 per rural woman for each season, which is an indicative of low non-durable capital investment and characteristic of peasant agriculture. This confirms to Norman (1972) and Ogunfowora (1974) findings.

Table 4.5: Average Value of Capital Goods Per Rural Woman (N) (00) (1984 - 1994)

Village	Durable			Non-Durable		Total (N) (00)
	Farm Buildings (N)	Tools & Equipment (N)	Total Durable (N)	Fertilizer (N)	Total Non-Durable (N)	
Kagara	2.52	95.65	98.17	9.10	9.10	107.27
Kuta	4.17	85.16	89.33	16.04	16.04	105.36
Gunna	4.27	87.26	91.53	13.76	13.76	105.29
Tegina	3.74	80.75	84.49	10.99	10.99	95.48
Average	3.67	87.21	90.88	12.47	12.47	103.35
Percent of total value of capital goods	3.551%	84.38 3%	87.934 %	12.06 6%	12.06 6%	

Source: Computed from the Respondents to the Questionnaires, 1996.

* See Footnote 1.

4.3.2 Imputed Expenditure on Capital Goods per Rural Woman

Imputed expenditure on capital goods per rural woman is N34.03 per woman (Table 4.6) between 1984 - 1994[3]. The major contributor to this amount is imputed expenditure on tools and other planting implement which claim about 52 percent of the total imputed expenditure. Other contributors to imputed expenditure in capital goods are depreciation on building, N16.10 or 48% per rural woman.

However, the imputed expenditure in durable capital goods shown in (Table 4.6) greatly outweigh the imputed expenditure on non-durable capital goods. This is indicative of low capital investment especially in the direction of labour-saving equipment and storage facilities.

Table 4.6: Average Imputed Expenditure on Capital Goods by Rural Women (₦) (1984 - 1994)

Village	Durable			Non-Durable		Total
	Depreciation of Buildings 1	Depreciation of Tools 2	Total 3	Cost of Seeds 4	Total 5	3+5
Kagara	10.46	20.13	30.69	0.10	0.10	30.69
Kuta	18.41	13.61	32.19	0.17	0.17	32.19
Gumma	19.36	17.62	37.23	0.25	0.25	37.23
Tegina	16.54	19.31	35.99	0.15	0.15	35.99
Average	16.19	17.67	34.03	0.17	0.17	34.03
Percent of total	47.575%	51.925%	99.5%	0.5%	0.5%	100%

Source: Computed from the Respondents to the Questionnaires, 1996.

* See Footnote 1

* The quantities of seeds were used as weights in calculating the average cost of seeds per hectare.

4.3.3 Cash Expenses

The ability of peasant farmers to meet the cash expenses, for general operations is very limited considering the low incomes of these farmers (Ogunfowora et al, 1972). Thus, any attempt at agricultural extension and structural transformation should include the possibility of making funds available to the farmers at the right time and at low interest rate.

As Table (4.7) indicates, the most expensive item is payment for marketing costs which claims about 69 percent of the total cash expenses. The significant contribution of marketing costs is an indication of high cost of transportation. About 54 percent of the respondents indicated that they travel over six kilometres to convey their products to the market. Fifty-six percent of the respondents used motor vehicles to carry their products to the market and that most of the roads

linking the farms and product markets were untarred, motorable only during the dry seasons. This explains why transportation cost has been high.

Expenditure on the fertilizer comes next. It constituted about 16.5% of the total cash expenses. Most of the women interviewed indicated that they obtained their fertilizer and chemicals from the black market and they did not receive any assistance from the Ministry of Agriculture. Storage costs claimed about 14% of the total cash expenses.

Even at an average cash expenditure of about N27.98 per season per rural woman, the, farm incomes are so low that most women cannot readily afford this sum of money during the growing season.

Table 4.7 Average Farm Expenses (N/Rural Woman by Village 1984 - 1994)

Village :	Cost of Transporting Fertilizer	Marketing Costs	Storage Costs	Total
Kagara	3.83	13.74	2.67	20.24
Kuta	4.53	15.44	3.83	23.80
Genu	5.25	25.09	5.38	35.16
Tegina	4.94	23.10	4.68	32.72
Average	4.64	19.34	4.00	27.98
Percent Contribution	16.583%	69.121 %	14.296%	100%

Source: Computed from the Respondents to the Questionnaires, 1996.

4.4 Test of Hypothesis

The null hypothesis tested in this section states that the capital resources used did not contribute to productivity of rural women in Niger State. The null hypothesis tested

Table 4.8 Regression coefficient showing the significance or non significance of Capital Resources for Rural women in the four Villages

Villages	Constant	REGRESSION COEFFICIENTS				Sum	R^2	$\bar{R}^2$	F-Value
		X_1	X_2	X_3	X_4				
Kagara	1.92 (0.33)	0.112 (0.22)	0.152 (0.43)	0.096 (0.16)	0.581 (1.39)	0.941	0.15	0.00	0.677
Kuta	2.00 (6.42)	0.107 (3.84)	0.482 (31.25)	0.138 (4.44)	0.174 (4.08)	0.901	0.99	0.987	35.84++
Gunna	1.99 (4.34)	0.105 (2.68)	0.544 (27.26)	0.121 (3.81)	0.119 (2.96)	0.889	0.982	0.977	20.64++

Tegina	1.44 (2.59)	0.169 (4.72)	0.498 (22.32)	0.117 (2.34)	0.192 (5.81)	**0.976**	0.974	0.967	14.26++
All Villages together	1.02 (-0.21)	0.283 (0.9 **9)**	0.546 (3.06)	0.0646 (1.14)	0.363 (1.48)	1.2566	0.513	0.383	3.953+

( ) =t - **ratio**
\+ = signicant at 1% signicant level
++ =highly signicant at 1% signicant
Source : Computed from Respondants to **the Questionnaires,** 1996

here used a student t-statistics. The concern here is with the variables X3 and X4 (ie non-durable capital and durable capital respectively).

Therefore, the null hypothesis is symbolised thus:

$$Ho: X3,X4 = 0$$

against the alternative hypothesis:

$Ha: X3,X4 > 0$

The sample size is less than thirty, so a student 't' is used to test the hypothesis. The rejection region for the test is +/- the t - value for $\alpha/2$.

4.4.1. Empirical Results

Kagara Village

Table 4.9 Variables X_3, X_4 with their regression Coefficient and t-ratios

Kagara Variables	b-coefficients	t-ratios
X_3	0.096	0.16
X_4	0.581	1.39

Sources: Extracted from regression equations in table 4.8

As can be seen in table (4.9) above, the calculated t-value for variable X_3 is 0.16. With $\alpha = 0.05$, the rejection region for the null hypothesis test is +/- t-value for 0.025 with 18 degrees of freedom (df) given in the t-distribution table which comes to be 2.049. Thus the rejection region for the hypothesis that X_3 does not contribute to productivity is $t > 2.049$ or $t < -2.049$.

The observed t-value falls outside the rejection region. Therefore the null hypothesis is accepted and conclude that X_3 does not make contribution to

productivity in Kagara farm industry. The durable capital (X_4) has the value 1.39 as the t-ratio for its b-coefficient, in table (4.8) The tabular t-value with 18 degrees of freedom (df) and with $\alpha = 0.05$ is 2.049. The calculated t- statistic falls outside the *rejection region. We accept the null hypothesis and conclude that* X_4 does not make contribution to total productivity in Kagara.

Kuta Village

Similar test (hypothesis) was carried out in Kuta Village to find out if X_4, X_3 do not contribute to Kuta village farm productivity. Table (4.10) below shows the t-value and variables used

Table 4.10 Variables X_3, X_4 with their regression Coefficients and t-ratios

Kuta Variables	b-coefficients	t-ratios
X_3	0.138	4.44
X_4	0.174	4.08

Source: *Extracted from regression equation in table 4.8*

The calculated t-value for Kuta Village for X_3 -variable is 4.44. The rejection region for one hypothesis that variable X_3 in Kuta Village does not contribute to productivity is $t > 2.049$ or $t < -2.049$, for $\alpha = 0.05$ and 18 degrees of freedom. The observed t-value 4.44 falls within the rejection region. The null hypothesis is *rejected and concluded that* X_3 *does make positive contribution to productivity* in Kuta.

In table (4.10) above, it can be seen that the calculated t-value for variable X_4 is 4.08. In a similar analysis, it was found that the calculated t-value of 4.08 was greater than the tabular one of 2.049, which falls within the rejection region. So we

reject the null hypothesis and conclude that variable X_4 has contributed to productivity in Kuta.

Gunna Village

Table (4.11) below shows the values used to test the null hypothesis set up above in Gunna, using = 0.05

Table 4.11 Variables X_3, X_4 with their regression Coefficient and t-ratios

Gunna Variables	b-coefficients	t-ratio
X_3	0.121	3.81
X_4	0.119	2.96

Source: Extracted from regression equations in tables 4.8.

The calculated t-value of 3.81 was found to be greater than the tabular one of 2.049. The rejection region was fixed at $t > 2.049$ or $t < -2.049$ at $\alpha = 0.05$ with 18 degrees of freedom. The calculated t-value of 3.81 fell on the rejection region. So, the null hypothesis was rejected and the alternative accepted and it was concluded that the X_3 contributed to productivity in Gunna.

As for variable X_4 the calculated t-value was 2.96, while the tabulated t-value was found to be 2.049 at 18 degrees of freedom and with $\alpha = 0.05$. The calculated t-value of 2.96 was greater than the tabulated t-value of 2.049. So we reject the null hypothesis and accept the alternative and concluded that X_4 contributed to farm productivity in Gunna.

Tegina Village

Use results in the table that follows to test the null hypothesis:

Table 4.12 Variables X_3, X_4 with their regression Coefficient and t-ratios

Tegina Variables	b-coefficients	t-ratios
X_3	0.117	2.34
X_4	0.192	5.811

Source: extracted from regression equations in table 4.8

Test the hypothesis using $\alpha = 0.05$

The elements of the test remain the same as above. Again the calculated student 't' is 2.34 for variable X_3 and with 18 degree of freedom, the tabulated t-value is still 2.049. The rejection region of the hypothesis is $t > 2.049$ or $t < -2.049$. Since t - calculated is greater than t - tabulated, we rejected the null hypothesis and accepted the alternative with the conclusion that X_3 variable contributed to farm productivity in Tegina.

We also tested the null hypothesis that X_4 variable did not contribute to productivity in Tegina. The values used are stated in table 4.12 above. While the calculated student 't' was found to be 5.811, the critical t-value with 18 degree of freedom (df) was 2.049 at $\alpha = 0.05$. The observed t-value = 5.81 is greater than the tabular t-value. We reject the null hypothesis and accept the alternative hypothesis and concluded that X_4 variable contributed to output production in Tegina.

Combined Results of Hypothesis Test of All Villages

All the data of the four selected villages were combined into a single entity, a

regression analysis was done on them and the values required for the null hypothesis testing were extracted and presented in the table that follows:

Table 4.13 Variables X_3, X_4 with their regression Coefficient and t-ratios

All Villages combined Variables	b-coefficients	t-ratios
X_3	0.0646	1.14
X_4	0.363	1.48

Sources: Extracted from regression equations in table 4.8

In Table 4.13 above, it can be seen that the calculated t-value for non-durable. capital, X_3 is 1.14. A tabulated t-value of 2.00 was obtained by using $\alpha = 0.05$ with 78 degrees of freedom. The rejection region was set at $t > 2.00$ or $t < -2.00$. Since t- calculated is2.00, we accept the null hypothesis that X_3 variable does not contribute to farm productivity in all villages.

Again, a student 't' of 1.48 is obtained for variable X_4 in table 4.13. Using $\alpha = 0.05$ with 78 degrees of freedom, the tabulated t-value given in the t- distribution table is 2.00. Thus, the rejection region is $t > 2.00$ or $t < -2.00$. The observed t-value of 1.48 falls below the rejection region, indicating that the null hypothesis is accepted and conclude that X_4 contributed to farm productivity.

The results of the hypothesis testing revealed a mixed result. In Kagara, the null hypothesis was accepted and it was concluded that X_3 and X_4 made no significant contribution to productivity. The hypothesis tests in Kuta, Guma and Tegina yielded the opposite results. The null hypothesis was rejected in these three villages. It was concluded that X_3 and X_4 contributed to productivity in the three villages. The results of the combined analysis of all villages was also interesting in the sense that the null hypothesis was accepted and it was concluded X_3 that X_4

contributed nothing significant to productivity in all the villages combined.

These mixed results prove that the amount of capital available to rural women in Niger state is too small to make any meaningful contribution to productivity. This goes to show that opportunities exist in the study area to increase productivity by moderate injection of capital particularly the non-durable type which will complement land and labour in order to raise their level of production. The conditions of these women farmers would be much improved if they have access to more capital resources.

4.5. The Production Function Results

The estimated production function for selected villages and combined villages result are presented in table 4.8. The Cobb-Douglas production function was linearized by taking the logarithms of the model and then fitted it into the data for each village first and all the villages combined. The objective of this analysis was to establish relationship between dependent and independent variables, find the differences between the villages in the use of productive resources and the relative importance of capital resources used in farm production in the study area.

Kagara:

The coefficient of determination (R^2) indicates the goodness of fit of the regression line to the observations. Its value must be between zero and one. A value of one indicates a perfect fit and a value of zero shows that there is no linear relationship between the regression variables.

In the Kagara results $R^2 = 0.15$. The adjusted R^2 was zero, indicating that there is no linear relationship between dependent and independent variable whatsoever. The Kagara R^2 shows a poor fit for the data.

All the regression coefficients for Kagara are positively linked to output (y). The

positive contribution to total output by variables X_1, X_2, X_3, and X_4, satisfy the a prior expectation of the rise in productivity of resources and also suggest a direct relationship variable between dependent and independent variables.

Durable capital (X_4) indicates a higher productivity than any other resources in Kagara village. Its coefficient is 0.581, which means that durable capital contributes about 58% to total production in Kagara village. Resources such as land, labour and non-durable capital contributed less to total production in the said village.

Kagara results indicated that the farming technique is capital intensive as adjudged by its capital coefficient ($X_4 = 0.581$). The result of the resources ($X_1 = 0.112$; $X_2 = 0.152$; and $X_3 = 0.096$) made minimal contribution to output of farm industry in Kagara.

If t–ratio's are greater than two, regression coefficients are referred to as being significantly different from zero or significant at 5 or 10 percent level of probability. In table 4.8, the t- ratios are in parenthesis. The t-ratios in Kagara equation are all less than two. This is an indication that no significant relationship exists between the dependent and independent variable.

The sum of four coefficient s is 0.941. Clearly, the sum of coefficients is less than one and indicates a decreasing returns to scale in Kagara farm industry.

Kuta

Kuta results are presented in table 4.8, from this table, it could be seen that the $R^2 = 0.99$, which means that 99% of variation in dependent variable was explained by explanatory variables. A high R^2 value indicates a good fit and a high degree of explanatory power of the model.

All coefficients in the Kuta regression model are positive, signifying positive

contribution to total output. This is consistent with the hypothesis of a direct relationship between dependent and explanatory variable. For instance, a positive labour coefficient (X_2) may mean that an increase of 1% in labour use would lead to a positive increase of 1% in total output.

The labour coefficient is larger ($X_2 = 0.482$) in Kuta village. This implies that the production technique is labour intensive in the village. Durable capital ($X_4 = 0.174$) made the next large contribution to output. This is closely followed by non-durable capital ($X_3 = 0.138$). The resource that least contributes to output in Kuta is land ($X_1 = 0.107$).

The t-ratio values for the slope coefficients in Kuta model are above two in absolute terms. This indicates that the model could be relied upon to establish valid results.

The sum of the coefficients for the four resources is 0.901. This is less than unity and indicates that the village farming industry is operating at decreasing returns to scale.

Kuta results lend support to the issue of low capital utilization by women in the village farming system.

Gunna Village

The Gunna village model in table 4.8 indicates that the labour coefficient is 0.544. This is greater than all the other three coefficients put together. This shows that labour contributes 54% to total production in Gunna farm industry. The remaining variables (X_1, X_3, and X_4) contribute 0.105; 0.121 and 0.119, respectively.

Judging from the labour coefficient, Gunna is operating a labour-intensive farm production process. Non-durable capitals is the next best contributor to output production.

T-ratio in Gunna village equation are greater than two, indicating that a strong relationship exists between dependent and explanatory variables and that regression coefficients are significantly different from zero.

The sum of regression coefficients add up to 0.889, signifying a decreasing returns to scale for farm industry in Gunna.

Tegina Village

In this village, labour coefficient is 0.498, durable capital coefficient is 0.192, land coefficient is 0.169 and non-durable capital coefficient is 0.117. The farm industry in Tegina is definitely labour-intensive as reflected by the high labour coefficient of 0.498. The labour coefficient indicates that labour is contributing 49.8% to total output. Durable and non-durable capital and land contribute 19.2%; 16.9% and 11.7% respectively to total output.

The coefficient of determination R^2 for Tegina is 0.974 which states that 97% of the dependent variable is explained by explanatory variable included in the model. With such a high value of coefficient of determination, the regression equation can be said to fit the data well.

T-ratios for each coefficient in Tegina regression model are greater than two. As mentioned previously, if a t-ratio that is greater than two, the regression coefficient is said to be significantly different from zero and indicates a strong relationship between dependent and independent variable.

The sum of the coefficients in the regression model is 0.976. This indicates that Tegina farm industry is operating under decreasing returns.

All Villages

A production function analysis was performed for all the villages combined. In all villages, regression coefficients indicated positive signs. The labour coefficient

was greater than all the other coefficients. Therefore, farm industry technique in all villages was termed labour- intensive as was indicated by $X_2 = 0.546$. This implied that 54.6% of total production in all villages was attributable to labour alone over the study period. Variables such as (X_4, X_3, and X_1) contributed 36.3%; 28.3% and 6.46% respectively. Only the t-ratio for labour coefficient was greater than 2 and significantly greater than zero. The t-ratio for X_1, X_3 and X_4 variables were less than two and not significant.

The R^2 of 0.513 measured the goodness of fit of the model to the data. That is to say 51% of variation of dependent variable is explained by independent variable. This suggests a good fit to the data.

The sum of the regression coefficients for all villages is 1.257. Clearly, this is more than one whole and indicates that all villages' farm industry operate at inerasing returns to scale.

The contribution of capital to total output production in all the village is low, and signifies the limited use to capital in farm industry production in the study area. Therefore, efforts should be made to increase capital per labour in order to make it more productive. There should be efficient utilization of farm capital resource also so that farm productivity will be enhanced, as a means of breaking the vicious circle of poverty.

4.6 Regression Parameters

Table 4.13 presents regression parameters derived from the production function model used to analyse the data in the selected villages in the study area.

Table 4.14 Regression coefficients and Efficiency Parameters

Villages	Land X_1	Labour X_2	non-durable capital X_3	Durable capital X_4	Efficiency Parameters bo
Kagara	0.112	0.152	0.096	0.581	1.92
Kuta	0.107	0.483	0.138	0.174	2.00
Gunna	0.105	0.544	0.121	0.119	1.99
Tegina	0.169	0.498	0.117	0.192	1.44

Source : Extracted from computer print-out, 1996.

The results in table 4.14 indicate that labour parameter ($X_2 = 0.544$), is greater in Gunna than in all the other villages, Tegina has the next high parameter, ($X_2 = 0.498$)

This is closely followed by Kuta with $X_2 = 0.482$ and next is Kagara with the least labour parameter of $X_2 = 0.152$. Durable capital parameter $X_4 = o.581$ is the highest in the selected villages. The rest of the parameters graduate from small to smallest in this order : Tegina, 0.192, Kuta, 0.174 and Gunna 0.119, respectively. The capital parameters are positive indicating that capital is making some contribution to total production. Those parameters that are small could be explained to the meagreness in the use of capital in the study area.

Land parameters in all the villages were small and ranged from 0.102 to 0.169. They were all positive and suggest that land made small contribution to total production in all the villages. Non-durable capital parameters can be seen in table 4.14. They range in value from 0.096 to 0.138, indicating that non-durable capital also made some positive contribution to production in all the four villages.

All the parameter estimates in table 4.14 are positive which is an indication that the resources used in the analysis have the potential for raising rural women's productivity level in Niger state.

As was mentioned previously, the parameter for durable capital was the highest in the study area. This suggests that a worker using more capital in the study area will obviously be more productive. It must be pointed out here that the mere physical provision of these capital goods need not result in a larger output unless economic incentives are created for the farmers to make full use of them. With their acute material poverty.

The labour parameter was the next high value among the selected villages except Kagara; indicating a clear case of effective utilization of labour in the study area. Both family and hired labour are available. With heavy over crowding on land, the obvious thing to do is to invest as little as possible in labour-saving mechanized farming. This calls for investment in low cost farm tools which would boost labour productivity and result in higher output. In line with the preceding argument, the intensification of the use of non-durable capital such as fertilizer and improved seed varieties will go along way to raise farm production. To this end, women's participation in credit programmes is a "sine qua non" for raising agricultural productivity levels in the areas.

The positive land parameter simply suggest that the expansion in production has been the result of bringing more land under cultivation. There is communal land-ownership in the study area. Women have rights to use land only as long as they are wives, sisters, daughters or mothers. The moment a women ceases to be any of these, she looses her rights to use the land, no meaningful development can occur on any piece of land that is not yours. This explains why the land parameters are low throughout the villages under investigation.

Efficiency parameter plays a role in determining resource productivity [appendix]. Consequently, it can serve as a good measure of the overall efficiency in the selected villages. If the overall efficiency parameter (bo) rises, resource productivity's also increase. Equations in the appendix point to that direction.

The efficiency parameters (bo) in table 4.13 are positive and greater than unity.

This is an indication that farm productivity is rising in all the selected villages.

This finding highlights the need to formulate policies that will harness such potentials through sustainable production and resource management practices. Equally important is the provision of resources supply facility which enables

women to purchase needed resources at reasonable prices and at an accessible production outlet. The problem of women's inaccessibility to productive resources is clearly established in the study area. This remains a serious matter of inequity in the pursuit of economic development.

The study suggests very strongly the need for more direct support for the productive role of women, notably by improving their direct access to productive resources.

4.7 Marginal Productivity of Resources

The marginal productivities of resources used in the selected villages under investigation are presented in table 4.15 below :

Table 4.15 : Marginal Productivities of Resources for the four villages

Villages	MPx_1	MPx_2	MPx_3	MPx_4
Kagara	-0.1086	-1.1549	4.6923	-0.2496
Kuta	0.0058	!.2074	-0.0248	-0.3430
Gunna	-0.0192	-0.1982	-0.0533	-0.1116
Tegina	0.3027	-0.485	0.2956	0.2729
All Villages combined	1.3148	0.7295	1.3281	1.2214

Source :Calculated as indicated in the Appendix.

As shown in table (4.15), the marginal productivity of land as obtained from the equations calculated in appendix is -0.0192 in Gunna and 0.3027 in Tegina. These marginal productivity figures explain the additional contribution each input makes to growth of output in each village. Negative Mps' simply mean that resources are subtracting from total output while positive MP's symbolize addition to total output. In Kagara and Gunna, land is subtracting from total production while it is adding to total production in Kuta and Tegina. Labour, on the other hand, contributed positively to output in Kuta (1.2074) than in the rest of the villages. Labour MP's in Kagara, Gunna and Tegina were -1.1549, -1.1982

and 0.485 respectively. Negative MP's signify diminishing returns to input. This agrees with economic theory which suggests that MP's of resources in subsistence agriculture are very low or may even be negative because of poverty and population pressure on land. Nevertheless, the subsistence farmer enjoys a share of the product from the family farm which may be equal to her average product and much higher than her marginal product. Consequently, output can only increase by introducing changes in agricultural techniques supplemented by a variety of measures ranging from credit, fertilizers, improved seed varieties, improved technology and extensive services.

The MP of non-durable capital was found to be 4.6923 in Kagara, -0.0248 in Kuta, -0.0533 in Gunna and 0.2956 in Tegina. The non-durable capital MP for Kagara and Tegina are positive, indicating positive contribution to productivity. Results of this nature point us to where we need improvement, Kuta and Gunna MP's are negative, pointing to the fact that capital is a limiting factor in Improved productivity in the study area.

Durable capital was also limiting because three of the selected villages had negative MP's. These are Kagara, -0.2496; Kuta, -0.3430; and Gunna, -0.1116, it was only in Tegina that durable capital made a positive contribution of 0.2729 to farm productivity. Tegina is on the main road. It is a growing village and has more access to improved farm inputs therefore, the MP of capital is positive.

The data for all the villages were combined and analysed as one. The results of the marginal productivities of the combined resources became positive as presented below.

$MPx_1 = 1.3148$; $MPx_2 = 0.7295$; $MPx_3 = 1.3281$; and $MPx_4 = 1.2214$

The improved results seem to suggest the pulling of resources together for more effective results. This agrees with the current discussion in development economics of helping the small farmers form co-operatives so as to benefit more from improved resources. This also agrees with the economic theory of allowing all resources to be variable in the long run so that output may expand. In the sense used here, individual villages have not changed the amount of resources but have combined them to make them larger. MPx_1, MPx_2, MPx_3 and MPx_4 are above unity in this combined analysis. But the MPx_2 is less than unity, meaning that labour causes total product to increase but not by as much as the other three

resources. With the improvement of the results because of the analysis of the combined resources, it is suggested that efforts should be stepped up to encourage the formation of women's co-operative in the state.

The yardstick for measuring resource productivity is their marginal productivities. In the preceding analysis we have considered the marginal productivities of resources used in the study area. The results revealed that land MP's in Kagara and Gunna were negative. Economic theory explains that overcrowding on land could result in negative returns. This explains why the labour MP's in all but one village are all negative, revealing excessive use labour on the cultivated land. These findings point to the fact that women' work in agriculture should form part of a more comprehensive labour policy.

Specifically, women should be assisted through training to increase their productivity. To this end, it is suggested that substantive economic reforms at the national level, backed by strong political will, are required to end discrimination against women whose problems have remained largely unarticulated.

FOOTNOTES

1. This figure for 1996 is obtained from the questionnaires filled by the villagers, for other years it was estimated from the farmers by discussing with them as to what was the value of capital input in those years. This figure is then compared with cost of these items as presented in the commodity price magazine. We then picked the most appropriate. See the commodity price magazines, all editions between 1984 to 1996.

2. Estimation here means obtaining the figure by interviewing the farmers about how many tools or farm implements used that year and then multiply the figure by the cost in that year. See also commodity price magazine, 1984 to 1996.

3. See commodity magazine, all editions, 1984 - 1994.

4. $$F=\frac{R^2/R}{(1-R^2)/[n-(R-1)]}=\frac{Mean\ Square\ (Model)}{Mean\ Square\ (Error)}$$

where

n = Sample size

R = number of terms in the model

Rejection region: $F > F_2$, with R numerator degrees of freedom and [n - (R+1)] denominator degrees of freedom.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND POLICY IMPLICATION

5.1 Summary of Main Findings

This thesis has examined the issue of capital use in farming for rural women in Niger State as a case study. In this section, summary of the main conclusions of the chapters is presented.

Capital use in farming among women of Niger State has been studied with respect to personal characteristics such as education and age. Using descriptive statistics the capital resource in the study area is found to have an inverse relationship with the ages of rural women. That the young and middle women have more than one occupation which can allow them to save and invest this money in the farm process. The level of education of rural women shows low literacy rates. Formal education was acquired by a very small proportion of the sampled women, while Qura'nic education was the most common type which was attained by over three-quarters of the rural women studied. Educational standard of the sampled rural women had a close relationship with the nature of capital use in farming in the study villages. The large majority who did not acquire any formal education acquired only traditional skills learned informally. In general, it has been observed that farming activity was combined with various other non-farming occupations.

An inventory of capital goods reveals that the value of farm capital goods held per rural woman in the four villages is about N103.35. Farm buildings and fertilizer together, account for only 15 percent of this, while tools and equipment account for 84 percent. Moreover, the imputed expenditure on capital goods by the rural women was only N34.03. The situation is indicative of low capital

investment especially in the direction of labour-saving durable equipment and improved storage facilities.

This thesis, tested a null hypothesis which stated that capital resource use does not contribute to productivity of rural women in Niger State. The hypothesis was tested using the t-statistics, The results of the tests were mixed. The null hypothesis, in Kagara and all selected villages combined, were accepted and it was concluded that X_3 and X_4 made no significant contribution to productivity. But they made a significant contribution to productivity in Kuta and Gunna and Tegina. These mixed results suggest that rural women in Niger State use small amount of capital which makes minimal contribution to productivity. This goes to prove that opportunities exists to improved productivity by injecting more capital in the study area.

The productivity function results showed that all the regression coefficients for Kagara are positively linked to output (Y). Durable capital coefficient (X_3) proved to be greater than any other coefficient in all the selected villages, indicating that X_4 was contributing more to total output than any variable in the regression equation. Kagara results indicate that farming technique is capital intensive as adjudged by its capital coefficient.

The regression coefficient in Kuta were all positive and the labour coefficient was larger. This means that production technique in Kuta was labour-intensive, Kuta results lend support to our conclusion on null hypothesis results that there is low capital utilization in rural Niger State by women.

In Gunna village the labour coefficient was greater than all the three others put together. Judging from the larger labour coefficient, it was concluded that Gunna's technique of production was labour-intensive.

Tegina's labour regression coefficient was also larger than those of the other variables. The farm industry in Tegina operates a labour-intensive technique as reflected by its higher labour coefficient.

The results of all villages combined was greater, and showed that labour coefficient was also greater, indicating a labour intensive technique. The fact that all but one village results operated labour-intensive techniques, signifies the limited use of capital in the study area in farm industry by women.

In the Cobb-Douglas production function, parameter "b_o" is a symbol for efficiency and it is one of the factors that determines resources productivity.

Table 4.13 shows that all efficiency parameter estimates are positive and suggest that all the resources used in production process have the potential of raising productivity levels in the study area.

The study considered the marginal productivities of resources used in the selected villages of Niger state. The results indicate poor performance of these resources to output growth. The MP for non-durable capital was positive in Kagara and Tegina, indicating positive but small and limited contribution to productivity in the study area. Durable capital was negative everywhere else, indicating that it is a limiting factor to improving productivity in the study area.

Marginal productivity of labour was low and negative in some villages. The low and negative MPs suggest poverty and population pressure on land in the study area. Negative productivity is a sign that output is diminishing as more inputs are used. The only way to change the situation is to change the techniques of production. This is why the study suggests supplementing the existing techniques with a variety of measures ranging from credit, fertilizers, improved seed varieties, improved technology and extension services.

5.2 Conclusions and Policy Implications

Implicit in the results is the need for increased use in both durable and non-durable capital inputs. With respect to durable capital inputs, the situation would imply replacing the traditional hoe, knife, etc., for more efficient equipment. In this regard, the use of some form of mechanization and of more sophisticated storage facilities are suggested.

With respect to non-durable capital inputs, the new input should be in the form of proven biological inputs such as high yielding seeds and planting materials. There is also the need to stimulate the rural women's interest in the use of fertilizer and chemicals.

At this juncture, it will be pertinent to make some suggestions which might help make women perform a more productive role in rural development:

(a) Modern mechanized technique as used in the developed countries is beyond the reach of rural women. An acceptable mechanization policy should encourage the adoption of simple intermediate hand-moved or animal drawn farm implements like ploughs, harrows and planters. The use of such simple implements should alleviate the drudgery which the use of the traditional hoe and knife endangers and lead to better tillage and increase in farm size.

(b) The adoption of the new inputs suggested above may never materialize if the women should rely solely on their low incomes for investible funds. There is, therefore, the need to establish sources of easy access to credit facilities. These should, in most cases, be in kind and channelled through co-operative organizations.

(c) Women should, by right, have access to available resources for

self-improvement and the improvement of society. In this connection, they should be given the opportunity for both formal and non-formal education.

(d) Since a very large proportion of small-scale cultivators in the rural areas are women, special attention should be given to them. There is, therefore, the need for rural women to obtain training in agricultural production through cooperative societies and should have access to extension services.

(e) They should be encouraged into co-operative societies, in order that they might benefit from government programmes for Co-operatives.

(f) They should also be encouraged to go into rural crafts and women oriented community programmes such as those organised by the family support programmes of government.

BIBLIOGRAPHY

ABALU, G.O (1988): "Rural Development Research in Nigeria: The Usefulness of the Useless". A contributory note to the seminar held by Department of Agricultural Economics and Rural Sociology, Ahmadu Bello University, Zaria on June 10th, 1988.

ABELL, H.C. (1962): "Socio-Economic Survey of Peasant Agriculture in Northern Nigeria". F.A.O., Rome.

BROWN, C.K. (1979): "Towards an Effective Participation in Integrated Rural Development with Emphasis on the Grass-roots". Paper presented at staff seminar organised by the Pan African Institute for Development, Kaduna, 11-12 September. (Being reproduced at C.S.E.R. Reprint Paper No. 6).

CAMPBELL, B.J. et al, (1966): Experimental and a case "experiment design for research". Rand McMally, Chicago.

CARVER, T.U. : Elements of Rural Economics. Boston State University Press, U.S.A. (1924).

CHANDAVARKAR, A.G. (1970): "Interest Rate Policies in Developing Countries". Finance and Development, Vol. 7, No 6, May, 1970.

COMMODITY PRICES, National Agricultural Extension and Research Liaison Services. Federal Ministry of Science and Technology, A.B.U Zaria, Nigeria. 1984 - 1994 all Vol.

FAMORIYO, S. (1979): "Improved Agric. Credit in Nigeria". Inviertal Jahres Beriche Problems der Entwichklyus lander Non 78: Dec (1979).

____: (1987) "Integrated Rural Development as a Framework for Women's Participation in Development". Paper presented at the Conference on Integrated Rural Development and Women in Development, Benin City, Benin, Nigeria, September 22-26, 1987.

____:(1979): "Rural Development Revisited". Contributory Note to the Seminar on Rural Development held by the Department of Political Science,

Ahmadu Bello University, Zaria on November 6, 1979.

FEDERAL OFFICE OF STATISTICS, LAGOS (1986): National Integrated Survey of Households. Household Survey. April, 1984 - March, 1985, Lagos, Nigeria.

FIRTH, R.: "Capital, Saving and Credit in Peasant Societies: A View point", from Economic Anthropology, quoted from Capital Saving and Credit in Peasant Societies. Ed Firth and Yemay, B.S. London, George Allen and Unwin, 1949.

GADSBY, D.: "Capital and Credit in Change in Agriculture in Twenty-Six Developing Nations, 1948 - 1963". United States Development of Agriculture, Foreign Agricultural Economics Report, No. 24, November 1965.

HASSAN, R. (1992): Nigerian Womanhood. Olabola Graphic Press, Kaduna, Nigeria.

HEADY, E. et al. (1960): Agricultural Production Function. Iowa State University Press, Ames Iowa, U.S.A.

HOWARD, T. (1988): "The African Farmer". African Farmer No. 1. A Hunger Project Publication, New York.

IJERE, M.O. (1991): Women in Nigerian Economy. Acona Ventures Ltd., Enugu, Nigeria.

____:(1992): Leading Issues in Rural Development. Acona Ventures Ltd., Enugu, Nigeria.

IKE, D.N. (1983): "Estimating Agricultural Production Function for some Farm Families in Western Nigeria". Paper No. 7, Department of Agricultural Economics and Extension, University of Ibadan, Nigeria, 1983.

JANELID, I. (1971): "The Socio-Economic Role of Farm Women in Agricultural and National Development in West Africa:, F.A.O.

LELE, U. (1981): "Rural Africa: Modernization, Equity and Long-term Development". Science Vol. 221(6) 547-53.

OGUNFOWORA, O. et al (1972): "Derived Resource Product Supply and Farm Policy in the North Central State of Nigeria", Unpublished Ph.D Thesis, Ames, I.S.U., 1972.

____: et al: Resource Productivity in Traditional Agriculture: A Case Study of Four Agricultural Divisions in Kwara State, Nigeria, Rural Development Paper No. 16, Department of Agricultural Economics and Extension, University of Ibadan, Nigeria, 1975.

OGUNGBILE, A.O.; J.O. OLUKOSI AND B. AHMED (1991): "Women's Participation in Agricultural Production in Northern Nigeria". Women in Nigeria Economy. M.O. Iyere Ed., Acona Publishers, Enugu.

OLAYIDE, S.O.: "Agricultural Productivity and Increased Food Production under Economic Development in Nigeria". Proceedings of the 1972 Annual Conference of Nigerian Economic Society, 1972.

____:(1976): "Structure of the Nigerian Economy". Economic Survey of Nigeria (1960 - 1975). Aromolaran Publishers, Ibadan, Nigeria.

OLAYIWOLE, C.B. (1977): "The Contribution of Women to Economic Development". Paper presented at the Workshop on Rural Development at the at the village level in the Sahara Environment of Nigeria, Zaria, May 19-23.

____ AND J.P. VOH (1982): Local Leaders and Change Agents' Perception of Women's Roles in Agricultural Activities. Paper presented at the 2nd Annual Women in Nigeria Conference held at Ahmadu Bello University, Zaria.

MC'QUEEN, M. (1973): The Economics of Development. 'Problems and Policies'. Redwood Press Ltd., London.

NORMAN, D.W.: "An Economic Study of Three Villages in Zaria Province: Input-Output Relationships". Samaru Miscellaneous Paper 33, Ahmadu Bello University, Zaria, 1970.

____: "Methodology and Problems of Farm Management Investigations: Experiences from Northern Nigeria". African Rural Employment Paper

No. 8, Michigan State University, U.S.A., 1973.

____: "Technical Change and the Small Farmer in Hausaland, Northern Nigeria". Paper presented at the African Rural Economy on African Rural Economy Programme. Paper No. 21, 1979.

NURKSE, R: Problems of Capital Formation in Developed Area. Oxford University Press, New York (1963).

NWOSU, E. et al: "Capital investment in farming: An appraisal of household in Kwara State, Nigeria." Economic and Social Studies. Vol. 19, No. 3, Nov., 1977.

PATEL, A.C. AND GB.C. ANTHONIO (1973): "Farmers' Wives in Agricultural Development: The Nigerian Case Mimeograph. Department of Agricultural Economics and Extension, University of Ibadan.

ROSTOWO, W.W.: The Stage of Economic Growth. Cambridge, 1960.

SCHUMPETER (1949): The Theory of Economic Development. Translated by Opie, P. (Cambridge Mass.) Harvard University Press.

THIRLWALL, A.P. (1989): Growth and Development. 'With Special Reference to Developing Economies. Macmillan, Hong Kong.

TODARO, M.P.: Economics for Developing World. Longman, 1994.

WORLD BANK (1981): "Accelerated Development in Sub-Sahara Africa: Agenda for Action". The World Bank, Washington D.C.

APPENDIX

Marginal Production of factors

1 **Kagara**

$$Y = b_0 X_1^{b1} X_2^{b2} X_3^{b3} X_4^{b4}$$

$$MPx_1 = Y/X_1 = (b_0 X_1^{b1} X_2^{b2} X_3^{b3} X_4^{b4})/X_1$$

$$MPx_1 = b_0 (X_1^{b1-1} X_2^{b2} X_3^{b3} X_4^{b4})$$

$= 1.92 (1219.7^{0.112-1} 4368^{0.152} 1251.5^{0.096} 1430.5^{0.581})$

$= 1.92 (1219.7^{0.888} 4368^{0.152} 1251.5^{0.096} 1430.5^{0.581})$

$= 1.92 (-0.888 \log 1219 + 0.152 \log 4368 = 0.096 \log 1252.5 + 0.581 \log 1430.5)$

$= 1.92 (-2.7406 + 0.5533 + 0.2974 + 1.8333)$

$= 1.92 (-0.05665) = -0.1086$

$MPx_2 = Y/X = (b_0 X_1^{b1} - X_2^{b2} - X_3^{b3} - X_4^{b4})/X_2$

$MPx_2 = b_0 (X_1^{b1} X_2^{b2} X_3^{b3} X_4^{b4})$

$= 1.92 (1219.7^{0.112} 4368^{0.152-1} 1251.5^{0.096} 1430.5^{0.581})$

$= 1.92 (1219.7^{0.112} 4368^{0.848} 1251.5^{0.096} 1430.5^{0.581})$

$= 1.92 (-0.112 \log 1219.7 + 0.848 \log 4368 = 0.096 \log 1252.5 + 0.581 \log 1481)$

$= 1.92 (- 0.6015)$

$= - 1.1549$

$MPx_3 = Y/X = (b_0 X_1^{b1} - X_2^{b2} - X_3^{b3} - X_4^{b4})/X_3$

$MPx_3 = b_0 (X_1^{b1} X_2^{b2} X_3^{b3-1} X_4^{b4})$

$= 1.92 (1219.7^{0.112} 4368^{0.152-1} 1251.5^{0.096-1} 1430.5^{0.581})$

$= 1.92 (0.112 \log 1219.7 + 0.152 \log 4368 - 0.096 \log 1252.5 + 0.581 \log 1430.5)$

$= 1.92 (0.3457 + 0.5533 - 0.2974 + 1.8423)$

$= 1.92 (2.4439)$

$= 4.6923$

$MPx_4 = MPx_3 = Y/X = (b_0 X_1^{b1} - X_2^{b2} - X_3^{b3} - X_4^{b4})/X_4$

$MPx_4 = b_0 (X_1^{b1} X_2^{b2} X_3^{b3} X_4^{b4-1})$

$= 1.92 (1219.7^{0.112} 4368^{0.152} 1251.5^{0.096} 1430.5^{-0.581-1})$

$= 1.92 (1219.7^{0.112} 4368^{0.152} 1251.5^{0.096} 1430.5^{-0.419})$

$= 1.92 (0.112 \log 1219.7 + 0.152 \log 4368 + 0.096 \log 1252.5 - 0.419 \log 1430.5)$

$= 1.92 (0.3457 + 0.5533 - 0.2974 + 1.3221)$

$= 1.92\ (-0.1248)$

$= -0.2496$

Kuta

$Y = b_0\ X_1^{b1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4}$

$MPx_1 = Y/X_1 = (b_0\ X_1^{b1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4})/X_1$

$MPx_1 = b_0\ (X_1^{b1-1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4})$

$= 2.00\ (1195^{0.107-1},\ 4767^{0.482} \cdot 1221.5^{0.132} \cdot 1762^{0.174})$

$= 2.00\ (1195^{-0.893} \cdot 4767^{0.482} \cdot 1221.5^{0.132} \cdot 1762^{0.174})$

$=2.00\ (-0.893\text{Log}1195 + 0.482\text{Log}4767 + 0.132\text{Log}\ 1221.5 + 0.174\text{Log}1762)$

$=2.00\ (-2.7481 + 1.7729 + 0.4075 + 0.5648)$

$=2(-0.0028)$

$= -\ 0.0058$

$MPx_2 = Y/X = (b_0\ X_1^{b1} - X_2^{b2} - X_3^{b3} - X_4^{b4})/X_2$

$MPx_2 = b_0\ (X_1^{b1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4})$

$= 2.00\ (1195^{0.107},\ 4767^{0.482-1} \cdot 1221.5^{0.132} \cdot 1762^{0.174})$

$= 2\ (0.107\text{Log}1195 - 0.518\text{Log}4767 + 0.132\text{Log}\ 1221.5 + 0.174\text{Log}\ 1762)$

$= 2(0.3293-1.09053 + 0.04075 + 0.5648)$

$= 2(-0.6037)$

$= 1.2074$

$MPx_3 = Y/X = (b_0\ X_1^{b1} - X_2^{b2} - X_3^{b3} - X_4^{b4})/X_3$

$MPx_3 = b_0\ (X_1^{b1}\ X_2^{b2}\ X_3^{b3-1}\ X_4^{b4})$

$= 2.00\ (1195^{0.107},\ 4767^{0.482} \cdot 1221.5^{0.132-1} \cdot 1762^{0.174})$

$= 2\ (0.107\text{Log}1195 + 0.482\text{Log}4767 - 0.868\text{Log}\ 1221.5 + 0.174\text{Log}\ 1762)$

$= 2(0.3293+1.7729 - 2.6794 + 0.5648)$

$= 2\ (-0.0124)$

$= -0.0248$

$MPx_4 = MPx_4 = Y/X = (b_0\ X_1^{b1} - X_2^{b2} - X_3^{b3} - X_4^{b4})/X_4$

$MPx_4 = b_0\ (X_1^{b1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4-1})$

$= 2.00\ (1195^{0.107},\ 4767^{0.482} \cdot 1221.5^{0.132} \cdot 1762^{0.174-1})$

$= 2\ (0.107\text{Log}1195 + 0.482\text{Log}4767 + 0.132\text{Log}\ 1221.5 - 0.826\text{Log}\ 1762)$

$=2\ (0.3293 + 1.7729 + 0.4075 - 2.6812)$

$= 2\ (2.5097 - 2.6812)$

$= 2\ (0.1715)$

$= -0.343$

Gunna

$Y = b_0\ X_1^{b1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4}$

$MPx_1 = Y/X_1 = (b_0\ X_1^{b1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4})/X_1$

$MPx_1 = b_0\ (X_1^{b1-1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4})$

$= 1.99\ (1145.5^{0.105-1},\ 4482^{0.544}\ .\ 1191.7^{0.121}\ .\ 1275^{0.119})$

$= 1.99\ (1145.5^{-0895},\ 4482^{0.544}\ .\ 1191.7^{0.121}\ .\ 1275^{0.119})$

$= 1.99$ (-0.895Log1145.5 + 0.544Log4482 + 0.121Log 1191.7 + 0.119Log 1275)

$=1.99$ (0-2.7378 + 1.986 + 0.3722 + 0.3695)

$= 1.99$ (-0.0096)

$= -0.0192$

$MPx_2 = Y/X = (b_0\ X_1^{b1} - X_2^{b2} - X_3^{b3} - X_4^{b4})/X_2$

$MPx_2 = b_0\ (X_1^{b1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4})$

$= 1.99\ (1145.5^{0.105},\ 4482^{0.544-1}\ .\ 1191.7^{0.121}\ .\ 1275^{0.119})$

$= 1.99\ (1145.5^{-0895},\ 4482^{-0456}\ .\ 1191.7^{0.121}\ .\ 1275^{0.119})$

$= 1.99$ (0.105Log1145.5 - 0.456Log4482 + 0.121Log 1191.7 + 0.119Log 1275)

$=1.99$ (0.32119-1.6650 + 0.3722 + 0.3695)

$=1.99$ (-0.6211)

$=-1.1982$

$MPx_3 = Y/X = (b_0\ X_1^{b1} - X_2^{b2} - X_3^{b3} - X_4^{b4})/X_3$

$MPx_3 = b_0\ (X_1^{b1}\ X_2^{b2}\ X_3^{b3-1}\ X_4^{b4})$

$= 1.99\ (1145.5^{0.105},\ 4482^{0.544}\ .\ 1191.7^{0.121-1}\ .\ 1275^{0.119})$

$= 1.99\ (1145.5^{-0895},\ 4482^{0.544}\ .\ 1191.7^{-0879}\ .\ 1275^{0.119})$

$= 1.99$ (0.105Log1145.5 + 0.544Log4482 - 0.879Log 1191.7 + 0.119Log 1275)

$=1.99$ (0.32119 + 1.9864 - 2.7039 + 0.3695)

$=1.99$ (0-0.268)

$= -0.00533$

$MPx_4 = MPx_4 = Y/X = (b_0\ X_1^{b1} - X_2^{b2} - X_3^{b3} - X_4^{b4})/X_4$

$MPx_4 = b_0\ (X_1^{b1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4-1})$

$= 1.99\ (1145.5^{0.105},\ 4482^{0.544}\ .\ 1191.7^{0.121}\ .\ 1275^{0.119-1})$

$= 1.99\ (1145.5^{0.105},\ 4482^{0.544}\ .\ 1191.7^{-0879}\ .\ 1275^{0.881})$

$= 1.99$ (0.105Log1145.5 + 0.544Log4482 + 0.121Log 1191.7 - 0.881Log 1275)

$= 1.99$ (0.105Log1145.5 +1.986 + 0.3722-2.7359)

$= 1.99\ (0.105\text{Log}1145.5 + 1.986 + 0.3722 - 2.7359)$

$= 1.99\ (-0.05611)$

$= -0.1116$

Tegina

$Y = b_0\ X_1^{b1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4}$

$MPx_1 = Y/X_1 = (b_0\ X_1^{b1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4})/X_1$

$MPx_1 = b_0\ (X_1^{b1-1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4})$

$= 1.44\ (1167^{0.169-1},\ 4125^{0.498} \cdot 1180.7^{0.117} \cdot 1275^{0.192})$

$= 1.44\ (1167^{-0.831},\ 4125^{0.498} \cdot 1180.2^{0.117} \cdot 1224^{0.194})$

$= 1.44(-0.883\text{Log}1167 + 0.498\text{Log}4125 + 0.17\text{Log}1180.2 + 0.194\text{Log}1224)$

$= 1.44(-2.5486 + 1.8005 + 0.3594 + 0.5990)$

$= 1.44(0.2102)$

$= 0.3027$

$MPx_2 = Y/X = (b_0\ X_1^{b1} - X_2^{b2} - X_3^{b3} - X_4^{b4})/X_2$

$MPx_2 = b_0\ (X_1^{b1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4})$

$= 1.44\ (1167^{0.169},\ 4125^{0.498-1} \cdot 1180.7^{0.117} \cdot 1275^{0.192})$

$= 1.44\ (1167^{0.169},\ 4125^{-0.502} \cdot 1180.2^{0.117} \cdot 1224^{0.194})$

$= 1.44(0.169\text{Log}1167 - 0.502\text{Log}4125 + 0.17\text{Log}1180.2 + 0.192\text{Log}1224)$

$= 1.44(0.5183 - 1.8149 + 0.3594 + 0.5990)$

$= 1.44(-0.3373)$

$= -0.485$

$MPx_3 = Y/X = (b_0\ X_1^{b1} - X_2^{b2} - X_3^{b3} - X_4^{b4})/X_3$

$MPx_3 = b_0\ (X_1^{b1}\ X_2^{b2}\ X_3^{b3-1}\ X_4^{b4})$

$= 1.44\ (1167^{0.169},\ 4125^{0.498} \cdot 1180.7^{0.117-1} \cdot 1275^{0.192})$

$= 1.44\ (1167^{0.169},\ 4125^{0.498} \cdot 1180.2^{-0.883} \cdot 1224^{0.194})$

$= 1.44(0.169\text{Log}1167 + 0.498\text{Log}4125 - 0.883\text{Log}1180.2 + 0.192\text{Log}1224)$

$= 1.44(0.5183 + 1.8005 - 2.7125 + 0.599)$

$= 1.44\ (0.2053)$

$= 0.2956$

$MPx_4 = MPx_4 = Y/X = (b_0\ X_1^{b1} - X_2^{b2} - X_3^{b3} - X_4^{b4})/X_4$

$MPx_4 = b_0\ (X_1^{b1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4-1})$

$= 1.44\ (1167^{0.169},\ 4125^{0.498} \cdot 1180.7^{0.117} \cdot 1275^{0.192-1})$

$= 1.44\ (1167^{0.169},\ 4125^{0.498}\ .\ 1180.2^{0.117}\ .\ 1224^{-0.806})$

=1.44(0.169Log1167+0.498Log4125+0.117Log1180.2-0.806Log1224)

=1.44(05183+1.8005+0.3594-2.4887)

1.44(0.1895)

=0.2729

All Villages together

$Y = b_0\ X_1^{b1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4}$

$MPx_1 = Y/X_1 = (b_0\ X_1^{b1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4})/X_1$

$MPx_1 = b_0\ (X_1^{b1-1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4})$

$= 1.02\ (4726^{0.283-1},\ 17789^{0.546}.\ 4606^{0.0646}\ .5860^{0.363})$

$= 1.02\ (4726^{-0.717},\ 17789^{0.546}.\ 4606^{0.0646}\ .5860^{0.363})$

=1.02(-0.717Log4746 0.54Log17789+0.0646Log 4606+0.363Log5860)

=1.02(1.2890)

=1.3148

$MPx_2 = Y/X = (b_0\ X_1^{b1}\ -\ X_2^{b2}\ -\ X_3^{b3}\ -\ X_4^{b4})/X_2$

$MPx_2 = b_0\ (X_1^{b1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4})$

$= 1.02\ (4726^{0.283},\ 17789^{0.546-1}.\ 4606^{0.0646}\ .5860^{0.363})$

$= 1.02\ (4726^{0.283},\ 17789^{-0.454}.\ 4606^{0.0646}\ .5860^{0.363})$

=1.02(+0.283-Log4746-0.454Log17789+0.0646Log 4606+0.363Log5860)

=1.02(1.0404-1.9295+0.23+1.3677)

=1.02(0.7152)

=0.7295

$MPx_3 = Y/X = (b_0\ X_1^{b1}\ -\ X_2^{b2}\ -\ X_3^{b3}\ -\ X_4^{b4})/X_3$

$MPx_3 = b_0\ (X_1^{b1}\ X_2^{b2}\ X_3^{b3-1}\ X_4^{b4})$

$= 1.02\ (4726^{0.283},\ 17789^{0.546}.\ 4606^{0.0646-1}\ .5860^{0.363})$

$= 1.02\ (4726^{0.283},\ 17789^{0.546}.\ 4606^{0.0646}\ .5860^{0.363})$

=1.02(+0.283-Log4746+0.546Log17789-0.93546Log 4606+0.363Log5860)

=1.02(1.0404+2.3206-3.4266+1.3677)

=1.02(1.3021)

=1.3281

$MPx_4 = MPx_4 = Y/X = (b_0\ X_1^{b1}\ -\ X_2^{b2}\ -\ X_3^{b3}\ -\ X_4^{b4})/X_4$

$MPx_4 = b_0\ (X_1^{b1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4-1})$

$= 1.02\ (4726^{0.283},\ 17789^{0.546}.\ 4606^{0.0646}\ .5860^{0.363-1})$

$= 1.02\ (4726^{0.283},\ 17789^{0.546}.\ 4606^{0.0646}\ .5860^{-0.637})$

$=1.02(+0.283\text{-}Log4746+0.546Log17789+0.2366Log\ 4606\text{-}0.637Log5860)$

$=1.02(1.0404+2.3206+0.2366\text{-}2.4001)$

$1.02(1.1975)$

$=1.2214$