AN ANALYSIS OF RICE MARKETING IN KENYA:
A CASE STUDY OF KANO PLAINS.

BY

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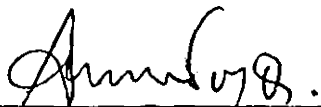requirements for the Degree of Master of Arts in
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ABSTRACT

Most of the cereals including Rice are
marketed through the National Cereals and Produce
Board (NCPB). The existence of a parallel market
for rice has resulted into excessively high margins
to traders with a likelihood of exploiting farmers
who sell in these markets. This case study aimed at
investigating the constraints to supply of rice from
a marketing point of view. The approach taken to
study the supply was by considering the response of
marketed output of paddy. Paddy can be withheld at
farm level as a process of choice or due to lack of
marketing outlet. The timing of sales by the producers
was also considered. These phenomena have implications
on short run shortages and losses to the farmers. The
producer price uncertainty to the farmer gives a certain
probability of farmers exploitation. Withholding of
supplies therefore involves benefits and costs to
different economic units.

The study utilized statistical and econometric
tools to investigate some hypotheses. This study found
out that farmers adopted different marketing strategies.

(iii)

Traders likewise adopted a certain pattern of trade.
Existence of withholding of supplies at farm level
was noted especially for farmers far removed from
the markets indicating that both choice behaviour
and marketing problems are contraints to the market
supply. The significant factor explaining the
variation in marketed output across farm households
was the total farm production of paddy. Family size
was found not having positive correlation with
quantities withheld. Producer price variation across
farms and from the government's gazzeted floor price
gave evidence that farmers were being exploited at
varying degrees. Trading margins were high in the
first marketing stage.

These findings were used to draw policies in two
areas. Policies that increase quantity of paddy
supplied and those which improves the marketing efficiency
were suggested.

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CHAPTER 1

1. INTRODUCTION

1.1 Background Information

1.1.1 Rice Growing Systems

Rice can be grown under different systems. Within the upland rise category dryland rise is grown naturally in freely drained soils, where the water table is kept below the rice roots. Rainfall methods are used in the cultivation of this dryland rice. Hydromorphic rice grown in saturated water level also belongs to the uplands rice group. Within the lowland rice, there is the swamp rice grown in water logged area, flat shaped valleys and along the coastal regions. Another type of lowland rice is the irrigated paddy[1].

In Kenya rice growing occurs under different conditions at a few paces. Lowland rice is cultivated along the coastal regions in the swamps and valley bottoms. Around the lake Victoria region in Nyanza province rice is cultivated using rainfed methods in swampy areas like the Kano plains, South Nyanza, Kisii and Siaya districts.

1.1.2 The structure of Domestic Production

Rice production is concentrated in the national irrigation Board schemes (N.I.B.) at Mwea, Ahero, West Kano and Bunyala schemes. About 8,200 hectares are currently under irrigated rice production which amounts to about 90% of the total domestic production. Other small scale irrigation schemes grow rice along the Tana river, and around lake Victoria. The only statistics on rice production cover the N.I.B schemes. Production of rice outside N.I.B schemes is not recorded. The available statistics on marketed production are these from the National Cereals and Produce Board (N.C.P.B), whose major suppliers are the N.I.B schemes. Consequently it is difficult to establish the trend of rice production by the small scale individual farmers who trade their rice in the parallel markets.

In the N.I.B schemes, rice production is organized and controlled by the Board. Farmers do not have much choice in production pattern and the Board supplies most farm inputs except labour. Other irrigation services are as well provided to the farmers. Deductions are made from each tenant's income from paddy in order to recoups the costs of such inputs and services. The production decision of non N.I.B farmers are largely

free. The farmers organise their own purchase of farm
inputs. Thus two structures in rice production occur .

1.1.3 Some Aspects of Rice Production in the Kano Plains

Rice cultivation in Kano plains has a long history.
It has occured as a traditional type of farming in
addition to other food crops like maize, sorghum,
mimillet e.tc. Rice has been grown here since the
1930's when it was probably introduced by the colonialists.
The local Community embarked on its cultivation in the
1950's. By 1970 production of rice had expanded into
most of the suitable areas as it gained popularity in
the area as a source of cash income. Other cash crops
grown include cotton, sugar and sunflower[2].

Despite local people's efforts to increase the
production of rice, the Kenya Government has improved
rice production in this area though an institutional
approach. The earlier establishment of the Ahero and
West Kano irrigation schemes has led to an increased
rice production in this area. The continued response
to increased production has now moved away from
concentrating on the N.I.B. schemes to small scale rice

producers. A small holder Rice Rehabilitation
programme (SRRP) and small scale irrigation
Development programme (SSIDP) have been established
to give technical support. Agricultural extension
activities through training and visit (T & V) has also
looked into the crop husbandry aspects of these small
scale farms[3].

Production response of the people to such
technical incentives has been good. Generally the
marketing and prices of crops has influenced resource
allocation pattern[4].

Despite such response, some constraints to
increased production (supply) of rice still occur,
especially those related to water control, local water
shortages, poor crop husbandry, poor and mixed seed
varities, pests and diseases, and generally those
related to input supply and marketing of produce[5].

1.1.4 The Agricultural Marketing Structure

Kenyas Agricultural marketing system is highly
centralized. There is a large number of marketing
Boards and Cooperatives which have been established to

to handle farm produce. The parastatals like National
Cereals and Produce Board (N.C.P.B) and the National
Irrigation Board (N.I.B), were established by the Acts
of Parliament to perform specific functions in the
production and marketing of some scheduled crops like
maize, wheat, rice and pulses. As we know the Government
has intervened with marketing programmes and policies
which have positively or negatively affected the
efficiency in commodity marketing.

The government however expects that with the
existence of the agricultural marketing boards, the
major policy goals for agricultural marketing can be
achieved. Farmer's supply decisions are often
influenced by a series of economic factors like, the
level and stability of prices and the terms of payments.
A secure outlet for farm produce ensures quick returns
to the farmer. Whenever the supply of any commodity
is not balanced across deficit and surplus areas,
prolonged shortages and high price differentials tend
to occur.

Despite, the existence of these parastatals some
commodities like fruits, vegetables and some portion of

of the scheduled crops are being traded in the private
markets. Farmers must sometimes find ways and means of
disposing off their produce (surpluses).

The N.C..P.B was granted a monopoly in the handling
of grains maize, wheat, rice, pulses etc. Despite its
existence some small holder produce of maize, rice and
pulses are traded in the parallel markets.

. In the rice industry two marketing systems occur.
The N.C.P.B handles both domestic supplies, mainly
from N.I.B schemes and the imported quantities. A
greater proportion of this is sold to wholesalers and
institutions, as small amounts are retailed by the Board.
There are also parallel markets where farmers sell their
produce to. These rice farmers engage in marketing
activities including processing, wholesaling and retailing.

Kenya's rice consumption is high among the high
income groups and among its producers. Despite low
price and income elasticity of its demand, increased
populations espècially in the urban areas accompanied
by increases in income per capita implies that the
demand for rice will be increasing. Table 1 indicates
an increasing rate of consumption of rice. A rather low

growth rate in production of about 2.7% annum has been achieved from 1970 to 1984. Increasing amounts of imports of rice will therefore be called for, yet import policy on rice states clearly that domestic demand can only be met through imports on concessional terms.

Table 1 figures on imports of rice are not so reliable for an analysis of trend. Wide fluctuations which exists on imports can be explained from the changes in import policies in relation to the country's availability of foreign excahnge in different years, the level of concessions, which depends on world market conditions and finally the food aid inflows during years of drought.

Table 1.   Total Marketed Production, Imports and

Consumption   of Rice = 1970-1984

Year	Production (Paddy)[*] 1000 Tonnes	Rice Equivalent[a] 1000 Tonnes	Imports (Rice) 1000 Tones	Consumption 1000 Tones
1970	25,730	18,011	1,149	19,160
1971	27,443	19,210	10,203	29,413
1972	31,749	20,224	2,150	24,374
1973	34,943	24,460	23	24,483
1974	33,563	23,494	1,502	24,996
1975	31,558	22,090	4	22,094
1976	36,946	25,862	10,001	35,863
1977	43,640	30,548	24	30,572
1978	38,485	26,939	111	27,050
1979	34,912	24,438	241	24,679
1980	37,475	26,232	1,239	27,471
1981	39,944	27,960	4,939	32,899
1982	38,600	27,020	11,080	38,900
1983	33,600	23,520	44,768	68,288
1984	36,400	25,480	96,188	121,668

Source: Statistical Abstract: Central Bureau of Statistic

(Kenya).   Various issues.

Note (a).   Rice equivalent calculated using a conversion ra

of 70%.

* Paddy is the unhulled Rice.

1.1.5 The N.C.P.B and Rice Marketing in Kano Plains

The N.C.P.B is the major handler of the rice produced from the N.I.B. schemes, West Kano and Ahero. It has also been handling some rice produced from the small scale schemes in this area. The bulk of the produce from these non-N.I.B. schemes have been handled by the KIBOS millers limited (Kisumu District). In the past few years, after 1970, farmers have undertaken both production and marketing activities. They have been using hand-pounding methods to process the paddy and could sell the pounded rice to consumers. In the recent years after 1983 rice milling machines were introduced in the area. Currently the share of paddy which is handled by the private millers (other than KIBOS) is sizeable[6].

The farmer's response to sell to the N.C.P.B has therefore changed. In the past N.C.P.B organized transport or used a few agents to purchase paddy from these non-N.I.B. farmers. Such agents enjoyed high margins as they could pay farmers low prices and sell to the N.C.P.B. at high prices. The problem of high margins to the agents (low produces price) and the delays in payments whenever N.C.P.B purchased from farmers caused farmers to change to a different marketing system. Today most producers sell to local middlemen or can transport the paddy for milling at the market centres. After the milling, rice is sold to the consumers and to the licenced millers. In this manner the agents who enjoyed high trade margins have been eliminat

1.1.6 Some Policy Issues

The optimum agricultural marketing policy is
that which maintains an increased supply of food and
raw-materials to meet demand at reasonable prices.
Farmers should, as well, receive a reasonable return
that more than covers their costs of production. In
Kenya the need for food self-sufficiency has been
emphasized, however the country is far from reaching
a self-sufficiency level in rice.[7] While the
government controls both producer's and retail price
of rice, a parallel market exists in the urban and
rural areas. In these markets, the prices deviates
from the officially gazetted prices.

Table 2 shows that producer's and retail
prices for paddy and rice respectively. These prices
have annually been adjusted for the changes in the
costs of production and marketing. Sometimes prices
get increased as an incentive to increased production.

Table 3 indicates price trend for paddy and
rice in the parallel markets. Increases in the market
producer prices of paddy has been minimal on average
than the annual increases shown in Table 2. The

Table 2:   Producer and Retail Prices (Gazzetted)

1980/81 - 1984/85

Year	Producer Price Shs./kg. (Paddy)		Retail Prices Shs./Kg.	
	Grade I	Grade II	Grade I	Grade II
1980/81	1.60	1.20	4.70	3.05
1981/82	2.70	2.00	5.50	4.60
1982/63	2.80	2.35	6.75	5.60
1983/84	3.25	2.70	7.75	6.35
1984/85	4.15	2.75	8.80	6.55

Source: Statistical Abstracts (Kenya) :   various issues.

Statistical digests (Kenya)   :   various issues.

Annual Agricultural Reports (MALD): Various issues

market producer prices have been lower than the floor

price in all years. Retail market prices have been

higher than the official retial price. This implies

that high margins are being realized by traders in the

parallel markets and producers have sometimes been

exploited.

Table 3: Average Market Prices Paddy/Rice 1980/81 -
1984/85

| Year | Producer price Shs./Kg. | Retail Prices Shs./Kg. | |
		Grade I	Grade II
1980/81	1.504	5.72	4.76
1981/82	1.50	7.56	6.00
1982/83	1.50	8.17	6.73
1983/84	1.78	6.35	7.55
1984/85	1.78	7.20	8.50

Source: Central Bureau of Statistics
Statistical Digests (Kenya) Various issues
Statistical Abstract (Kenya) Various issues.

Table 4 indicates that trade margins have been
higher in the parallel markets than in the official
market. In 1984/85 margins to trades in the parallel
market almost doubled the official marketing margins.

TABLE 4:   Price Margins 1980/81 - 1984-85

Year	Gazetted Prices [a] Kshs/kg		Market Prices [b] Shs/kg	
	Grade I	Grade II	Grade I	Grade II
1980/81	3.10	1.85	4.216	3.286
1981/82	2.80	2.60	6.06	4.50
1982/83	3.95	3.25	6.67	5.23
1983/84	4.50	3.65	4.57	5.77
1984/85	4.70	3.80	5.42	6.72

Note (a) Official retail price less producer price

(b) Average Market retail price less average market producer price.

(c) Table 4 calculated using Table 2 and Table 4

Table 5   indicates the existence of differences between prices in the two markets. The retail market price deviations have been higher from the official price than the producer prices, especially for Grade II rice.

Table 5: Price Deviations (official and Market prices)
1980/81 - 1984/85

Year	Retail Prices[a] Shs./Kg.		Producer prices[b] Shs./K	
	Grade I	Grade II	Grade I	Grade II
1980/81	1.02	1.71	0.096	-0.304
1981/82	2.06	1.40	1.20	0.50
1982/83	1.42	1.13	1.80	0.85
1983/84	0.80	1.20	1.47	0.92
1984/85	-1.65	1.95	2.37	0.97

Note(a)   Average market retail price less official retail
price

(b)   Official producer price less average market
producer price.

Table 5 figures are calculated using table 2 and table
3.

The behaviour of both farmers and traders   occurs
as a process of choice. Their activities occur in an
environment where alternatives   exist. They however,
face certain institutional and economic constraints which
limit their willingness to undertake different activities.

An important question, is the extent to which rice small
holder farmers have access to the N.C.P.B. marketing
services. Farmers may be willing to supply rice to N.C.P.B
if they can benefit from such a marketing system.

The current government policy on irrigation[8]
encourages small-holder irrigated rice growing in the
high potential areas. Such efforts aimed at increasing
the supply of rice would require an efficient market to
cope up with the increased marketing needs.

1.2   The Research Problem

This study concentrates on post harvest activities
performed by different economic agents for rice which is
produced outside the N.I.B schemes. An analysis of any
market structure without considering farmer's and traders'
marketing (supply) behaviour gives inadequate information.

Both imported and domestically produced rice from
the N.I.B schemes is mainly handled by the N.C.P.B. A
small proportion of tenants produce of between 10-12 bags
of 75 kgs of paddy are retained for household consumption[9].
In the N.I.B. schemes tenants do not have any choice

concerning the modes (channels) of disposing paddy, and on the quantities to market. Marketing of the produce from these schemes is organized by the scheme management. On prices, farmers do receive the annually gazetted producer prices fixed by the ministry of Agriculture (MOA) through annual price reviews.

For the non-N.I.B farmers, information on quantities sold and retained by farm households on average is limited. The Food and Nutrition Planning Unit (F.N.P.U) report which covered mostly the tenant farmers in the Kano plains revealed that about 10% of the farmers produce (10-12 bags) is annually retained by them for household consumption. Non N.I.B farmers however, make their own choices concerning the quantities to sell after a crop harvest, the modes to sell through, and when to sell the paddy. Although the producers and consumer's prices are gazetted by the government annually these exists a parallel market in which the operating prices diverges from the official ones (Table 5). Information about prices received and on the price information structure for the case of non-N.I.B farmers is quite limited, yet such information can be useful for pricing policy analysis. High trading margins to middlemen due to low prices paid to farmers indicates some innefficiency in this marketing system.

Generally, information concerning the structure, conduct and performance of rice marketing is lacking among small scale schemes in the Kano plains. There is a need to examine the institutions (agents) involved in this marketing systems. Certain factors can explain the behaviour of these actors, who inturn determines the structure of the market.

The objective of the farmer as based on optimization hypothesis implies that certain social, geographical and economic factors influence the allocation of total rice harvested. This allocation decision is then followed by other decisions on the timing and on the modes of supply. Studies on the supply and marketing of food crops have tended to concentrate on marketing aspects like produce prices, transport and distribution, storage e.tc without investigating the factors that leads to the observable system. These factors can only be examined by considering the behaviour of agents and farmers with respect to their social geogra phical and economic environment.

In this connection, certain research questions can be asked;

(a)   How and after what periods does the produce reach a final consumer? Are there bottlenecks to

increased flow from the farms to the consumers?

(b) What kind of distances do farmers/traders have to travel and what are the effects of these distances on the marketing process? When farmers are subjected to a lack of a ready market exchange of the good can occur at unreasonable prices.

(c) What factors are likely to be causing withholding of marketable output, and what are the implications of this?

(d) Do farmers, or traders have adequate market information on prices, measurements etc. What are the chances that either farmers or consumers can get exploited through malpractises in the marketing system?

(e) What is the nature of the interaction between N.C.P.B and the parallel market and what are the producers attitude towards these two systems?

This study will therefore examine the adequacy and performance of the marketing system based on the above research questions.

1.3 Objectives of the Study

Broadly, this study shall examine the nature and
the performance of rice marketing by the non - NIB scheme
farmers. Specifically, the following objectives shall
be considered;

(i)   To describe and analyze the structure, conduct
        and performance of rice marketing system. In
        its structure marketing organization, sites,
        modes, controls and regulations shall be studied.
        Analysis of market conduct shall include issues
        concerning price formation and information,
        competition degrees, and the ᴉ .
        market response to the changing environmental and
        economic conditions. Market performance is
        however concerned with the efficiency in the
        operation of the system in terms of marketing
        costs, analysis of margins and allocative efficiency.

(ii)   To determine the factors that explain the
        variation in quantities of rice marketed by farm
        households, The relative effects of these
        factors shall be examined.

(ii)   To determine the nature of retail price
        formation for rice.

(iv)   Objectives (i), (ii) and (iii) shall be used
        to provide information that can be useful
        for policy guidance.

1.4 The Hypotheses

     Some hypotheses have been formulated in this
section to explain the behaviour of the traders and
farmers in relation to the market structure.

Hypothesis 1

     That the distance from a trader's home to the
markets (mills) affects the choice of transport mode
between motor vehicles, donkeys, bicycles and head loads.

Hypothesis 2

     That the location of a farmer with respect to
the markets influences the choice of whether to engage
in rice trading or not. Farmers residing near the
markets are often attracted to join trading activities.

Hypothesis 3

     That the choice by a farmer to sell paddy in
bulk at once or not is dependant on whether the farmer

is one who at least engages in some rice trading or not. Pure rice farmers are most likely to be selling their produce at home.

Hypothesis 4

That withholding of supplies of paddy to the nearest markets can, despite other factors be explained by the distances of the farms from the markets.

Hypothesis 5

That the average quantity that a trader handles in the market depends on the marketing strategy adopted. Traders have the choice of whether to purchase paddy, process it and then sell rice or deal with rice only, or both.

Hypothesis 6

That there is lack of the knowledge of the annually gazetted prices for paddy and rice in the study area. The imperfection in the market price information differs across the markets and schemes.

1.5 Justification of the study

Rice has increasingly become an important
component of household's food basket especially in the
urban areas. In the past, studies have concentrated on
maize, wheat, while few studies exist on rice. Those that
exist tend to concentrate on scientific and sociological
issues. This study shall therefore be significant in
terms of providing an economic study on marketing.

Rice in the Kano plains is a source of both food
and cash income. To rice farmers marketed output plays
an important role as a source of household's income.
Given that the majority of people here derive their
livelihood from from this crop, farmers should be ensured
reasonable returns. Marketed output from national point
of view reduces imbalances in the deficit areas. Any
policy that increases the supply of rice should take into
account the nature of the marketing flows. Usually for
the foodcrops, it is the aggregate of farm surpluses that
constitutes domestic supplies.

Data on the supply and information on marketing
of rice produced outside N.I.B schemes is not available,
and this study seeks to generate this information.

The household in the rice economy is both a producer and a consumer of this product. Theoretically, the subject of household behaviour has attracted alot of attention in modern economic analysis. A distinction between food crop production and supply is important since factors influencing production are not always the same factors affecting marketed quantities. This study will therefore be helpful in testing and validating some earlier theories on household's production and consumption behaviour. Improved marketing performance helps the achievement of optimum resource allocation. Information on performance, which can be generated by this study will be useful in the formulation of policies to increase resource use efficiency.

1.6 Organisation of the Text

In this chapter 1, background information on rice production and marketing are discussed. This is followed by a definition of the research problem. Chapter 2 concerns with the review of literature on agricultural commodity marketing. Chapter 3 emerges from chapter with specification of the models that were estimated. Chapter 4 discusses the research methodology. Data types, and the collection procedure is included here. Chapter 5 presents the analysis of data and the tests of hypothesis.

Chapter 6 gives a summary of the regression results from the estimated models. Finally a summary of the whole study and some policy implications are presented in chapter 7.

FOOT NOTES

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2. Ministry of Agriculture, The Provincial irrigation
    Unit, Nyanza Province Report. "Tasks, Activities
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6. Most of the farmers sell to local middlemen who
    transport the paddy to the mills for processing.
    Licensed millers then purchases from these
    middlemen and sell to other districts.

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CHAPTER   2

2.   LITERATURE REVIEW

The literature review in this chapter focuses
on both the theoretical and empirical literature on
agricultural commodities marketing and supply in the
first and second parts respectively. The third part
will consist of a survey of relevant literature on
food crops supply and marketing with respect to Kenya.
The fourth part is a diagnosis of the methodologies
which have been used in past studies and their
relevance to the present study. The last part of
this chapter will finally examine some limitations
in the past studies and also discusses how this study
hopes to fill some gaps in the past studies.

2.1 The Theory and Practice of Marketing

According to Bartel (1968) , a definition which
is consistent with the general theory of marketing
has been given as;

"the process whereby society, to supply its
consumption needs evolves distributive systems
composed of participants who, interacting

under constraints, technical, economic and
ethical - Creates the transactions or flows
which resolve market seperations and result
in exchange and consumption"[1]

It is important to note that the 'general theory
of marketing' is distinct from the 'theory of the
markets'. The former consists of a certain set of
theories which includes even the latter. Within the
Umbrella of the 'general theory of marketing' the
contained theories can be outlined as follows;

The first, is the 'theory of the social
initiative' which considers the society as being the
undertaker of all activities. Here it becomes
necessary to consider the social aspects of people
first before one can interprete the marketing process
and the institutions involved.

The second type, the 'theory of economic
separations', popularly known as the 'theory of
markets' is concerned with a situation where families,
groups, nations organise themselves as producers or
consumers with a view to be economically satisfied.
The separations may be spatial, temporal and

informational. It is here that the price theory in economics becomes fundamental.

The third set, the 'theory of market roles, expectations and interactions', is concerned with the (several) participants in the field including financier s, government's, communities', manager's and employee's roles in marketing activities and so on. In this case participants do interact and exhibit different behaviours. The fourth theory is that which deals with the 'Flows and Systems', and this theory addresses itself to the complex channels and interactions in the process of marketing.

The theory of human behaviour is the fifth set. This is a phenomenon which is also studied in many disciplines including sociology, anthropology and physychology. Human behaviour is often influenced by a set of political, economic and social factors in the form of rules and controls.

The sixth theory deals with 'Social Change'. This is often a subject of interest in Sociology but it does receive some attention in marketing as well.

Any system can become dynamic with changes in the environment, ideologies and ethics.

Finally the theory of 'social control' which has received wide application is that which deals with the evaluation and regulates marketing performance according to certain set standard goals or policies[2].

According to the umbrella of general theory of marketing, any study in the field of marketing must stem from one, some and/or from all the above sub-theories. Economic theory emphasizes on the theory of markets and theory of behaviour, while economic policy emphasizes on the theory of social control, addressing the studies of marketing institutions (cooperatives and statutory boards) and general state marketing policy.

In practise, marketing studies tend to concentrate on the flows, channels of distribution and transport. Commercial marketing studies however, analyse wholesaling, retailing pricing and competition, purchasing and processing, sales promotion and market information.

2.2 General Theoretical and Empirical Leterature on Foodcrop Supply and Marketing

In this section a survey of general literature on food crop supply and marketing will be undertaken. Focus will be made on literature dealing with marketing of subsistence food crops. Som e empirical literature   exist on the price and output response of market supply (surplus) of subsistence crops. The distinction between total output response and marketed output response is very important for these responses are not always similar.

The theoretical economics of Marketable surpluses has been put forward by many authors. The Classical theoretical model is that put forward by Krishna, (1962) Behrman (1966) and Toquero (1975) where models are based on the basic statement that output of a subsistence crop is either consumed by an household or sold in the market, thus;

$$Q = C + M,$$

where Q is the total output of a subsistence crop, C is quantity of the crop consumed by the household and M is the quantity sold in the market.

The household producing a subsistence crop
will therefore face the problem of allocation of Q
between C and M as the households will behave to
maximize economic welfare or Utility. Several factors
can influence the allocation mechanism as observed
by the authors mentioned above. These are prices of
the other related commodities, the commodity as a
source of income and the price of the commodity itself.

Empirical works by Behrman (1966, 1968),
Krishna (1962) have shown that price elasticity of
marketable surplus of a subsistence crop   rangesfrom
negative values to positive values. They noted that
what can bring such a difference arises from how
prices and incomes are treated in a model, and also
depends on the room for adjustment of the commodity
price.

Khan <u>et. al</u>   (1970) reported that;

"... there is a mixed character of the
marketable surplus function in terms of its
response to farmer's income and price. This is
because   only half of aggregate marketable
surplus is truly a commercial surplus. The

other half is a distress surplus necessitated
by cash obligations of the farmer. Higher
prices then reduces this distress surplus and
lower prices increase it"3

His results were that food output and rent payments
by farmers explained the variation in marketable
surpluses.

Mohammad (1970) observed for the case of
Pakistan that total quantity produced and family
size explained much of the variation in marketable
surplus of food grains. Attempt to analyse the
effects of land-tenure did not give significant results.
He recommended improvement in yields and reduction of
family size as a measure for increasing size of
marketable surplus for the country.

Toquero et. al. (1975) found out for the case
of rice in Phillipines that Quantity produced more
than proportionately explained variation in marketable
surplus. Family size had a negative effect on
marketable surpluses.

Strauss (1984) studied marketed surpluses of
agricultural households in Sierra Leone. A set of

commodities was considered, foods, non-food and
labour. In his model he considered the effect of
price and production technology changes. A utility
maximization model formed the theoretical basis for
the study. Commodities like rice had output elasticities
of less than 0.2, but price elasticity was found to be
less than 1 except for lowexpenditure households.
These results do not however deviate from those obtained
by Krishna (1962).

2.3   Empirical Literature on Foodcrop Supply and
Marketing in Kenya

A survey of literature on crop studies in Kenya
reveals existence of many studies on supply response
than on the marketing issues. The growing demand for
food crops and the need to increase farm incomes have
spurred off many crop supply studies in the past years.
This is done with a view to establish the constraints
to increased supply and the correct policies on
incentives for greater output.

Clayton and Ogwel (1973) in their study of
Nyeri district used a linear programming model and
found out that prices were important instruments for

increased crop supply. Normative supply functions, through sensitivity analysis were shown to be positively related to price changes for various crops.

Maitha (1974) studied the Kenya Wheat and Maize response of large scale farms. Producers were found to be responsive to the price changes. Nerlovian and Fisher's distributed lag models were tried and they fitted well with kenyan data. Time series data was used in the estimation of the equations.

Heyer (1976) observed that the marketing of Maize, Meat, and dairy were the best documented, yet agricultural marketing activities involves a whole chain of commodities. She recognized that;

"... the value of a reliable, well developed, low cost food distribution system in a country like kenya is often under estimated."[4]

She described an efficient market as that which performs it's functions at low cost and develops taking into account new services, while simultaneously responding to the increasing needs.

Schmidt and Mbugua (1976) recognized that
research on marketing was limited. They suggested the
need to embark on studies to improve operational
efficiency of marketing system, both its distributive
and allocative efficiency.

Ru igu(1982) observed the problem of excessive
market controls in food marketing for milk and maize.
The other problems are those of illegal trade and
high marketing costs. Such problems have been observed
by other as well (Heyer, Schmidt, etc.).

Smith and McAthur (1979) emphasized that the
upward pressure on prices and existence of the evasion
of price controls suggested inefficiency in the marketing
system. Annual price reviews for a wide range of crops
was recommended with a view to consider cost structures
on a regional basis for the crops.

Aldington's (1979) study on the performance of
marketing in agriculture considered a framework for
evaluating commodity marketing efficiency. Technical
efficiency measure based on storage and transport costs
per unit, together with overhead costs was found as a

useful approach, but generally performance can be
evaluated on the basis of allocative efficiency of
farmers. Incomes from crop sales are normally used
for farm capital formation. Analysis of margins to
middlemen and retailers was suggested another useful
technique.

Schmidt (1979) recognized that small holders do
play an important role in marketing e.g. about 70%
of maize production by the smallholders gets handled
in the informal markets with only about 20% going to
the N.C.P.B. (National Cereals and Produce Board).
He observed low price efficiency, price instabilities
and illegal trade. Relaxation of controls was
recommended.

Casley and Merchant's (1979) study on small
holder marketing showed that 30% of smallholders were
involved in marketing activities and that for the
subsistence crops (foodstuffs) like maize, soghum etc.
about 10% of total produce was being sold out.

2.4 An Over View of the Methodologies

The survey on both theoretical and empirical literature on crops supply and marketing studies shows the various models in use and area of their application. There is a wide application of partial adjustment models using time series data (Nerlove: 1956, Maitha: 1974 ; Krishna: 1962). This method is advantageous in the analysis of responses to changes in economic factors like prices, changes in technology, institutional and weather changes. Such models in addition reveals the speed of adjustments (response). Both output (supply) and sales response can be studied using this approach. Any effort aimed at using this approach can be fruitless unless time series data on farmers supply (sales) of rice can be available over a long period of time.

The neo-classical production function can be manipulated to give expressions for a supply function. This approach is more relevant in issues related to production aspects, in a technical sense but does not allow an analysis of the effects of certain market factors. It assumes existence of efficient production frontier for all producers. Both time series and

cross-section data can be used. Using the related dual concept the profit function, expressions for the supply function can be given using derivative properties[5]. While this approach is more advantageous in the study of supply, its use in analyzing farm supply response (marketed output) gets prohibited by lack of data on inputs used and their cost structures. More so, its assumption of profit maximization as the only farmer's objective is unrealistic.

With the use of a linear programming model, normative supply functions can be shown. While a maintained hypothesis of profits (returns or sales) maximization can be assumed, the relative effects of social and economic factors cannot be easily captured. It becomes useful in the area of marketing, for an analysis of optimal marketing strategy i.e. marketing planning by farmers, a subject which is out de the scope of this paper.

2.5   Limitations of Past Studies

Some studies on the supply response, especially for food crops in Kenya, have failed to make a distinctions between output produced and marketed output thus

assuming a pure commercial farm entreprise. This distinction is important, as it adds to the understanding of households behaviour as a production and consumption unit. Krishna[6] and Behrman[7] established in their case studies that total output response to price changes was positive, while the marketed surplus response was negative to price changes. Results of farm supply response can vary widely depending on how the producer's and retail prices are perceived by farmers. The level of farm income and the weights households put to a commodity consumption can also be significant factors.

The role of certain factors like distances to the markets, marketing costs, risk attitudes , family size, and land tenure have rather been neglected in the crop supply studies for kenyan case.

This study, which shall use cross section data of the marketed supply of rice will consider price and output factors and in addition shall consider the effects of certain socio-economic factors in influencing the post harvest supply. Farmers preferences and risk altitudes are important in explaining their marketing behaviour. The producer's behaviour may occur such that post harvest crop supply can lag due to withholding

of the produce. This generally affects the total
quantity marketed. The problem of the short-run
shortages can be addressed to from such an avenue.

In this study a regression model will be used
to analyse the effects of both economic and non-economic
factors in terms of explaining the variation in quantities
of rice marketed by farmers in this area. A study of
farmers and traders characteristics in relation to the
marketing process will be undertaken using statistical
techniques to analyse some existing relationships and
behaviour. A consideration of the marketing environment
as explained by its structure, conduct and performance
will provide a basis of analysis for which the marketing
environment can go affecting the supply (market output)
of rice from individual small scale rice farms.

In the next chapter regression models on
price and marketed output determinants are specified.

Foot Notes

1.   Bartel, "The general Theory of Marketing",
            Journal of Marketing Vol. 32, January
            1968, pp 32.

2.   A detailed discussion about the general Theory
            of marketing was presented by Bartel.
            Ibid. pp 32.

3.   Khan, R, et. al, "Marketable Surplus Function.
            A study of the Behaviour of West
            Pakistan Farmers", Pakistan Institute
            of Development Economics, 1970, vol. 13,
            No. 3, pp 270-293.

4.   Heyer, J, "The marketing system" in Agricultural
            Development in Kenya. An economic
            Assessment, Heyer J, Maitha, J.K. and Senga,
            W.M. (eds), Oxford University Press,
            Nairobi, 1976, pp 320.

5.   Yotopoulos,   A and Lau, L.J, "Profit, supply and
            Factor Demand Functions", American
            Journal of Agricultural Economics, 1970,
            Vol. 52, No. 1 pp 51-60.

6.   Krishna, R. "Farm supply Response in India -
        Pakistan. A case study of Punjab
        Region", Economic Journal, 1963, Vol.
        73 No. 291, pp 477-87.

7.   Behrman, J.R., Supply Response in Underdeveloped
        Agriculture: A case study of four
        major annual crops in Thailand, Amsterdam,
        1968, pp. 9

CHAPTER   3

3.   THE MODELS: SPECIFICATION AND ESTIMATION

In this chapter, we specify two models to explain
the behaviour of market prices and marketed output of
paddy. While the producer's and consumer's prices for
paddy and rice are fixed by the government, parallel
markets occur. The market prices for paddy and rice
deviates highly from the official floor prices. (Table
5). Existence of many producers indicates that
producer's prices are exogenous to an individual farmer.

3.1 Determinants of Retail Price Variation

The prices at which consumers buy rice vary
widely across the traders. Despite the existence of
many traders a model was specified to explain the
variation in the retail price of rice.

The model to be estimated takes the following
expression;

$$RP = f(PP, TC, AQ, E, D_1, D_2, D_3), \text{ ------------------} \qquad (1)$$

Where the variables in the model are defined as follows;

RP = Retail price for rice in Shs/2 kg "Cowboy tin").

PP = Purchasing price of paddy (shs/bag).

TC = Total marketing costs in shs/Bag.

AQ = Average quantity handled by a trader.

E = Experience of the trader in number of years.

D_1 is a dummy variable for which

$$D_1 = \begin{cases} 1 & \text{if it is a market Day} \\ 0 & \text{otherwise.} \end{cases}$$

D_2 is a dummy variable for which

$$D_2 = \begin{cases} 1 & \text{if trader grows rice.} \\ 0 & \text{otherwise.} \end{cases}$$

D_3 is a dummy variable for which

$$D_3 = \begin{cases} 1 & \text{if the trader knows government retail price} \\ 0 & \text{otherwise.} \end{cases}$$

In this model the relationships which occur between the dependant variable RP, and other exogenous variables are defined below.

(a)   That there is a positive relationship between Retail price and the purchasing price of

paddy (PP). If a trader buys paddy at a relatively high price, there will be a tendency to charge a high retail price to cover the cost price of paddy.

(b)   That traders are usually willing to take to the market large quantities if they expect to sell at a high price. This relationship is based on price expectation hypothesis and the normal law of supply.

(c)   We expect that there exist a positive relationship between RP and TC. Whenever total marketing costs are high, a trader will sell rise at a relatively high price, if we assume that traders are profit motivated, such that they consider the marketing costs in the pricing mechanism.

(d)   We expect that a trader experience in the business leads to a learning process whereby the motive will be to increase the rate of stock-turn to make high profits than selling at a high price with a very low stock-turn. Thus retail price and Experinece are inversely correlated.

(e) On a market Day (D_1 = 1) we expect that the supply of rice in the market will increase, thus depressing the price, hence on a particular known market Day we expect the prices to be falling for the trader. The increase in the number of buyers may/may not lead to a price increase.

(f) We expect a negative relationship between PP and (D_2 = 1). When a trader grows rice, he may be selling his own produce or both the produced and purchased paddy. Such traders may suffer from some illusion and sell at a low price.

(g) Finally, we expect that if traders have got the knowledge of the government price, then they will relate their prices with the official price. Their pricing mechanism is then guided by presence of such information It is however difficult to determine the direction of the causality in the relationship.

3.2 The Determinants of Marketed Output

The purpose of this model is to analyse the factors which influence the variation in the quantity of marketed output of farm households. In the area of study, farm households are not always self sufficient in rice and most families grow it as a cash crop. Despite their consumption needs, farmers end up selling out some quantities of paddy (rice).

Both theoretical and empirical literature on the response of marketed surpluses of crops is wide. Basically the models in use have been specified using the definition that marketed surpluses of a good(i) is the difference between farm output and household consumption, thus

$$MS_i = Q_i - QD_i \quad \text{for} \quad i = 1, 2, \ldots, N \quad \ldots$$

where MS_i is the marketable surpluses of good i

Q_i is the household's farm output of good i

QD_i is the household's consumption of the
good i

This kind of formulation has been used by several authors like Krishna: 1962, Berhman: 1968, and Straus: 1984.

A similar approach is used in this case to define what we mean by marketed output, assuming that at least each household retain some paddy for household consumption. In a semi-subsistence economy, a household is assumed to be deriving satisfaction from both rice retained and that which is sold out. An indirect ulility is derived from rice sold in terms of other goods which the household can obtain in a situation where the commodity is the sole or major source of household's income.

In the specification of marketed output function, the following assumptions are made;

(a)   That every household growing rice   sell at least some quantities of paddy (rice) and consume a certain portion.

(b)   That farmers exhibit an optimization behaviour whereby meeting both household's food demands and the profit motive are the set of objectives to be satisfied.

(c)   The role of retail prices for rice and households income, on quantity demanded by households is assumed to be negligible. Such a low

Price and income elasticity of demand is a temporary phenomenon. Producers who are both consumers of rice start responding to the retail price of rice and their income level whenever all the retained rice has been used.

In this model, we define marketed output as,

$$QM_i = Q_i - QD_i \text{ for } i=1,2, \ldots, N \text{ ---------(2)}$$

Let also the households consumption of rice be expressed as $QD_i = QD(F_i, Z_i)$ for $i=1,2, \ldots, N$ -------- (3) where, F_i is the family size, measured as the number of people permanently residing within the family,

Z_i is the households total availability of other cereals. A proxy used for this variable is the sum of produced grains maize and sorghum, plus stock of paddy the farmer has at the time of selling currently produced paddy. (in bags).

Thus from the demand side of the model, $QM_i = Q_i - QD(F_i, Z_i)$, we can define another variable QS_i as the quantity of paddy supplied to the market. Now using the assumption of profit maximization hypothesis we expect the market supply to respond positively to producer price (PP_i), hence

$$QS_i = QS(PP_i) \text{ for } i= 1, 2, \ldots, N.$$

But for every household quantity marketed is equal to the
quantity supplied to the market ($QM_i = QS_i$). In this
model we have the basic identity that;

$$Q_i(L, \lambda) = QM(PP) + QD(F_i, Z_i) \text{ for } i = 1, 2, .., N \qquad ($$

Rewriting $QM(PP_i) = Q(L_i \lambda_i) - QD(F_i, Z_i)$ .... (

L_i and λ_i are vectors for hectares, planted with
rice and other inputs respectively.

For every farm household, we have a new variable
to be called yield where $Y = (^{Q/}L)$ if the λ component
is ignored for simplicity purposes. From the identity
equation (6)   we get equations of the following
nature;

(a) $QM = f(Q, PP, F, Z)$ ---------------- (6)

(b) $QM = g(Y, PP, F, Z)$ --------------- (7)

(c) $QM/_Q = h(Q, PP_i, F, Z)$ ------------- (8)

Certainly other qualitative variables are used to
capture farmer's attitude towards retaining or marketing
paddy. These are defined as below.

(i)   Farm practises: whether a farmer operates as
       an owner occupier or not can influence the
       level of marketed output. Renters may be willing

to sell more to enable them pay for the land use and other inputs. A *dummy variable is defined as*

$$D_1 = \begin{cases} 1 & \text{if farmer is tenant (renter)} \\ 0 & \text{otherwise.} \end{cases}$$

(ii) The existence of pressing cash needs for payments of school fees, debts etc is an important factor being considered by farmers when it so happens +that rice production is the major source of income. A dummy variable D_2 is defined to capture the effect of this, where

$$D_2 = \begin{cases} 1 & \text{if there exists pressing cash needs at the time of selling paddy.} \\ 0 & \text{otherwise.} \end{cases}$$

Output sold will increase if a farmer has high level financial obligations. In this model we expect the following relationships to occur between Marketed output and other exogenous variables.

(a) We expect that quantities of paddy produced (Q) or the Yield (Y) of paddy per farm influences marketed output. With increases in output or yield of paddy, marketed quantities increase.

(b) According to the Law of Supply, when prices increase quantity supplied increases.

(c) Large families will tend to retain more rice to meet household's consumption needs, hence with increase in the family size marketed quantities of paddy declines for a household.

(d) Availability of other cereals which are substitutes for rice positively affects quantities of paddy marketed. With increase in production of other grains quanlities of paddy sold increases. Farm households prefer consuming other grains like maize and sorghum and sell more rice.

3.3 The estimated Equations

The method of ordinary least squares technique was used in the estimation of the regression equations. Cross section data was used. Linear and non-linear functional forms were tried in order to get functional

forms with the best fit. The following equations were estimated.

(i) <u>Determinants of Retail Price for Rice</u>

(a) $RP = \beta_0 + \beta_1 PP + \beta_2 TC + \beta_3 AQ + \beta_4 E_i + \beta_5 D_1 + \beta_6 D_2 + \beta_7 D_3 + \varepsilon$ ..... (9

(b) $\ln RP \simeq \beta_0 + \beta_1 \ln PP + \beta_2 \ln TC + \beta_3 \ln AQ + \beta_4 \ln E + \beta_5 D_1 + \beta_6 D_2 + \beta_7 D_3$

$$+ \varepsilon \qquad \ldots\ldots\ldots\ldots (1$$

(ii) <u>Determinants of Marketed output of Paddy</u>

(a) $QM = \beta_0 + \beta_1 Q + \beta_2 PP + \beta_3 F + \beta_4 Z + \beta_5 D_1 + \beta_6 D_2 + \varepsilon$ .... (1

(b) $QM = \beta_0 + \beta_1 Y + \beta_2 PP + \beta_3 F + \beta_4 Z + \beta_5 D_1 + \beta_6 D_2 + \varepsilon$ .... (1

(c) $\ln QM = \beta_0 + \beta_1 \ln Q + \beta_2 \ln PP + \beta_3 \ln F + \beta_4 \ln Z + \beta_5 D_1 + \beta_6 D_2 + \varepsilon$ ..... (1

(d) $\ln QM = \beta_0 + \beta_1 \ln Y + \beta_2 \ln PP + \beta_3 \ln F + \beta_4 \ln Z + \beta_5 D_1 + \beta_6 D_2 + \varepsilon$ ....

ε is the random error term.

In the next chapter, data collection methodology is discussed.

CHAPTER 4.

4.   RESEARCH METHODOLOGY

In this chapter the research methodology
is discussed under two major sections. The first
section is based on the study area, the target
population, sampling design, data collection strategy
and data type. The second section is a discussion
of the methodology of data analysis.

4.1   DATA COLLECTION METHODOLOGY.

4.1.1 The Study Area

The study area is the Kano Plains in Kisumu
District. Rice cultivation is an important activity
given suitable climatic and ecological conditions in
the area. Rice is also grown in other districts of
Nyanza Province namely, South Nyanza, Siaya and Kisii.[1]

The Kano plains lie in between the Sugar belt
in the slopes of Nandi Hills, Lake Victoria and
Nyakach Hills. This is a flat area generally 1180 metres
above sea level and is traversed by rivers Nyando,
Awach and Oroba. Some of these rivers end up in Swamps.
This area is often subjected to seasonal flooding
especially during the rainy season. Apart from the
swamps other areas remain dry after the long rains.

The area is served with a road network, where
the tarmac road from Kisumu to Kisii and Kericho passes.
An all weather road connects Ahero (at the centre of
the plain) with the Sugar Belt (Miwani). Other dry
weather roads serve the rest of other areas.

Economically, the major activities which people
engage in are crop and animal production, with a small
proportion of the population being engaged in commercial
activities. Major farm activities include growing crops
like maize, rice, sorghum, sugarcane and cotton. Some
households keep livestock as well.

Two N I B schemes, Ahero and West Kano are
situated in this area. Apart from rice growing in
the N.I.B. schemes other small scale rice growing
schemes include Kore, Awach Kano, Alungo, Wasare, Nyachoda,
Nyakach, Oyani, Masune Chiga, Nyatini and Obange.
Farmers in the non -- N I B schemes, whether owner occupier
or renters, are organized by the Provincial Irrigation
Unit (PIU) which closely works with them in the rehabilita-
tion and development of the schemes.

Farmers in this area are now being encouraged
to grow rice through a technical support programme
on the construction of irrigation and drainage canals.
This would raise productively the available water and
land resources.

The choice of this study area was based on the
following factors:-

(i)   Kano plains lead other areas (Districts)
      Nyanza Province in terms of hectares planted
      with rice in virtually all the years. This
      area so far also offers the greatest potentials
      in Nyanza for increased production of irrigated
      rice.[2]

(ii) The two NIB schemes, Ahero and West Kano are
      situated in the area. The performance of
      these schemes can have both production and
      marketing impact on the smallholder schemes
      in terms of diffusion of technology and
      information.

(iii)   The new Government irrigation policy[3]

emphasizes small scale irrigation schemes.

Such efforts are promoted through the

support of the Provincial Irrigation Unit

(PIU). Research efforts both on irrigated

and upland rice are being undertaken at

Ahero by the NIB and at KIBOs by the Ministry of

Agriculture (MOA) respectively to increase

the production of rice. The increases in rice

production would require an improved marketing

system.

4.1.2   The Target Population

Non-NIB rice farmers was the target population

for this study. Farmers who had harvested rice in

the late months of 1986 and early 1987 were selected

for the study. Since the study concentrates on

marketing issues, the choice of those farmers was

justified. It was advantageous to find that the

PIU had in 1986 carried out a census of rice farmers

outside NIB schemes, thus providing a sampling

frame.

4.1.3   Sampling Design

To derive a sampling strategy to enable efficiency in the data collection, a sampling frame was first considered.   The non-NIB schemes are clustered in the three West, North - East and South-East Kano Locations.   These farms extend into North Nyakach.   A list of 11 schemes was considered.   From this list a random sample of 3 schemes was selected including Wasare, Nyatini and Alungo.   These schemes had a farmer's population of 240, 140 and 90 respectively.   The PIU had isolated the farms into 11 schemes to allow institutional programmes.   Currently some schemes are adjacent.   There were no apriori reasons to suggest that significant differences existed across the schemes on production and marketing to warrant completely random sampling.   For statistical reasons it was justified to give each scheme an equal chance of being selected for the study.   The choice of the schemes was prompted by the following factors;

(i)   The rice schemes are clustered over a wide area.   If a single sampling frame was used there could arise possibilities of the researcher being made to trace farmers over long distances one after the other at different schemes.   This could be costly and a time

consuming exercise. To go over this
problem, clustered random sampling
procedure was preferred to the simple
random sampling.In a complete random
sampling, it could be necessary to prepare
a list of total rice farmer population of
2545 regist-red by the PIU, from which to
draw a random sample of 76 farmers.

(ii) By considering the total farmer popu-
lations in each scheme it was found that some
schemes had a population of less than 76 farmers.
This means that no single scheme could be chosen
at random for the study unless a repeated samplin
procedure was used. To capture the added
advantage of comparative analysis the sample size
was distributed in the three schemes on the
basis of the weights 0.5, 0.3 and 0.2 for Wasare,
Nyatini and Alungo schemes respectively.

A sample size of 38 farmers was randomly selected
from Wasare, 23 from Nyatini and 15 from Alungo.
This design could then give a fairly representative
sample. At the schemes level, a list of farmers in

each scheme was used to select the required
sample size randomly. At the end of the survey
after the field work was over, in the data
analysis stage, 5 questionnaires were found to be
unfit for analysis due to poor response from the
farmers. A total sample of 71 farmers was available
for analysis, where Wasare, Nyatini and Alungo
schemes had sub-sample sizes of 35, 21 and 15
respectively.

Another set of data was obtained from paddy (r
traders. Much of the rice traded in this area is
produced from the Non-NIB farms. NIB schemes rice
finds it's way to Kisumu town for milling and is
later sold outside the district through the NCPB.
Given the difficulty of designing a sampling frame
for the traders, a census rather than a sampling
technique was adopted. Most of these traders were
not registered anywhere. The census was done at
different markets centres where rice mills are
situated like Ahero Katito, Ombeyi and Rabuor.
The census was conducted based on availability of
traders at the centres within a period of one week.
All those traders found could be interviewed. A
total of 56 traders were interviewed at Ahero,
Katito, Oubeyi and Rabuor markets with sizes of

25, 16, 8 and 7 respectively.

4.1.4 Data Collection Strategy

In order to obtain the necessary information
questionnaires were constructed. Two types of
structured questionnaires were used to interview
farmers and traders. The collection of the data
was undertaken by the researcher with the help of
two research assistants. To interview the farmers
it was necessary to locate the farmer either on
the farm or at home. With the help of PIU staff
in charge of the selected schemes appointments
were made with the already selected farmers at
least a day before the date of interview and thus
could be met on their farms.

In some cases it was not possible to find
some farmers on their farms. At the time of
conducting the interviews, some farmers were not
participating in farming activities. Since farmer's
homes are not far removed from the farms, with the
help of chairmen of farm group's committees these
farmers were traced at their homes. The interviews
were conducted during the months of February and
March 1987.

The farmers were very co-operative during the interviews. Their response to the questionnaires was good. Some problems were however faced at the field. Traders were most of the times reluctant to give the required information and some of them completely refused to be interviewed and could not agree that they were traders.

It was sometimes difficult to reach some farms in the schemes, far removed from the roads, however we made sure they got interviewed. Transport problem seemed to have caused some delay in completing the fieldwork in time as was expected.

4.1.5   Data Type

Two data sets were generated for this study from primary sources. Information was obtained on the following areas;

(a) Farmer's and trader's socio-economic characteristics such as age, family size, years of occupation, sources of income, credit acquisition, financial obligations, land and labour resources.

(b) Information about production and
    marketing costs for paddy e.g transport
    costs, milling costs, storage e.t.c.

(c) Communication and transport types

(d) Geographical factors like distances of
    the farms/homes to the nearest markets
    and roads

(e) Producer's and retail prices for paddy and
    rice respectively

(f) Farm production of other grains like maize,
    sorghum and other cash crops like sugar
    cane and cotton. Farmer's stock positions
    for the grains at different times of the
    year was considered.

(g) Farm size and land tenure.

4.2 DATA ANALYSIS AND HYPOTHESIS TESTING PROCEDURE

The data obtained from a fieldwork survey
was analyzed using statistical methods. Cross-
tabulations were used to summarize the major
characteristics of farmers and traders and how
they relate to the structure of the marketing
process. These cross-tabulations were then used
to construct contingency tables.

These contingency tables were mainly used in
the test of hypotheses.Both statistical and
econometric methods were utilized. The statistical
tests used included the Chi's square test, in analyzin(
the existence of dependence between some variables.
The same test was used to analyze the existence
of differences among farmers and traders in the
three schemes and the four market centres. Test for
differences between the means of the sub-samples
was relied on in some cases for comparative purposes
across the schemes and the markets using the
t-test.

The models in chapter 3 on marketed quantities of paddy and on the determinants of price variation were estimated using OLS technique, where cross-sectional data was fitted into a computer programme.

The regression results were finally used to analyze the effects of some variables and make conclusions about the hypotheses nested in such models.

The next chapter presents data analysis and the results of the hypotheses testing.

FOOTNOTES

1. Ministry of Agriculture, "Annual Provincial Reports" for various years indicates that Kano plains leads in hectares planted with rice in all the years in Nyanza province.

2. Ministry of Agriculture, `Provincial Irrigation Unit Report. "Tasks, Activities and Organization," 1986.

3. Republic of Kenya, "Economic Management for Renewed Growth Sessional Paper No. 1 of 1986, Government Printer, Nairobi, 1986, pp. 83.

CHAPTER 5

5.   DATA ANALYSIS AND RESULTS

        This study has mainly relied on primary data

to analyse the nature of rice marketing, price

determinants and the supply of marketed output. The

study considered 71 farmers and 56 traders.

5.1   Farm Production of Paddy

        An average farmers produced about 13.8 bags of

paddy. Output however varied significantly with a

standard deviation of 14.98 bags in that season.

Table 6.   Means and Standard Deviations on Farm Size,
                Production, and Yields of Paddy

| | Name of scheme | | | Entire |
	Wasare	Nyatini	Alungo	Sample
Farm Size in hectares	2.44 (3.8)[1]	1.63 (0.87)	2.66 (1.98)	2.24 (2.89)
Production in Bags	15.4 (17.3)	9.04 (6.68)	19.2 (18.3)	13.8 (14.98)
Yield in Bags/hectare	7.9 (6.6)	6.58 (5.42)	7.42 (2.9)	7.4 (5.87)

1 Figures in brackets are standard deviations.

Table 6 was used to test whether or not
these existed differences between the means
of the schemes. Using the t-test[1] there existed no
significant differences between these means. For
the entire sample rice farms averaged 2.24 hectares
with a standard deviation of 2.89 hectares. Farm
size was high at Alungo scheme, with Nyatini scheme
having the least sizes. Variation in farm sizes was
high at Wasare scheme. The average yield of paddy
was 7.4 bags/hectare. Variation in yield was relative
higher at Wasare scheme.

5.2   Marketed Output of Paddy

On average out of the production of 13.8 bags
per farm, farmers were selling about 10.2 bags.
Thus about 26% of farm produce got retained.
Farmers at Alungo scheme marketed more paddy than
other schemes because they had a higher output.

Table 7.   Marketed output of Paddy, and Availability
of other grains (Means and standard deviatj

| | Name of Scheme | | | Entire |
	Wasare	Nyatini	Alungo	Sample
Marketed output of Paddy in Bags	11.01 (12.95)[1]	7.11 (6.31)	15.4 (17.6)	10.2 (11.8)
Availability of Other Cereals in total (Bags)	4.089 (4.52)	2.76 (2.85)	1.5 (1.8)	3.347 (3.85)

1 Figures in brackets are standard deviations

The production of other cereals (maize and sorghum) was high at Wasare but very low at Alungo scheme. Table 7 indicates that there was some relationship between availability of other grains and the marketed output of paddy. Farmers at Alungo scheme who were producing less of other grains were selling more of their paddy.

5.3 Producer Prices of Paddy

On average farmers received Kshs 312.5 per bag, however farmers at Nyatini scheme were being paid higher prices on average (Kshs. 320.4). Prices paid to farmers at other schemes averaged Kshs 311.3 and Kshs 310. for Wasare and Alungo schemes respectively. Nyatini scheme situated near Ahero Market faced a higher demand for its paddy than other schemes, given that there exists more middlemen at Ahero market. Variation in farm prices was also higher at the same scheme.

5.4 Harvesting of Paddy

Paddy is harvested by hand using sickles and knives. But men and women provide the required labour. Harvesting is a labour intensive exercise, because here mechanical harvestors are not used. Attempts to introduce mechanical harvestors by the KIBOS millers Ltd failed.

The government realized that machines were replacing
the local labour which can do the same work. In
countries, where it is costly to use labour due to
its scarcity relative to capital, mechanical harvestors
are used e.g. Japan. Since most of the farms are small
(2.24 hectares on average) family and hired labour
is used. Apart from the farm sizes, use of machines
can be difficult as rice matures at different times
given that rice planting spreads over many days in a
particular farm and generally harvesting occurs in
isolated manner.

5.5   Threshing

Threshing is important after the cutting of rice
plants. Men and women provide threshing labour using
their hands. Paddy is gathered through a repeated
shattering. Because it is costly to transport paddy
home before threshing, this activity is done at
the farm. There are some losses which occur at this
stage. It was observed that some paddy could scatter
away and sometimes it was difficult to remove all the
paddy from the rice plant.

5.6   Drying

Harvested paddy contains some moisture. The
moisture content must be reduced through certain

methods to allow storage of the crop without

losses after damage. Usually it takes one to two

weeks of drying in open sun at home. Again there

were losses during drying for instance when birds and

and goats were not kept away, a substantial amount

could be eaten away. Drying is therefore necessary

to prevent rice from getting mould. In other countries

mechanical drying at controlled temperatures is

prefered.

5.7   Storage of Paddy (Rice)

Storage for paddy is needed before it can be

sold out for milling. Special storage facilities

were not available but farmers could store paddy in

their houses. This was only possible for farmers

with spacious houses. Farmers who produce many

bags sometimes face storage problem. Storage costs

include losses due to handling, and pest damage. Some

farmers reported on the lack of adequate storage

capacity for their paddy.

Much of the storage is now being provided

by the millers who allow traders to store paddy or

milled rice at no cost, while awaiting transportation

to other districts or for sale in the local markets.

Table 8. Transport Modes by Markets

Name of Market	No. of traders using vehicles	No. of traders using bicycles	No. of traders using donkeys	No. of traders using head loads	Others	Total
Ahero	10 (47.6) [1]	0 (0)	10 (52.6)	0 (o)	5(45.4)	25
Katito	5 (23.8)	1 (50)	7 (36.8)	3(100)	0(o)	16
Ombeyi	3 (14.3)	1 (50)	1 (5.3)	0 (o)	3(27.3)	8
Rabuor	3 14.3	0 (0)	1 (5.3)	0 (0)	3(27.3)	7
Total	21 (37.5)	2 (3.6)	19 (33.9)	3(5.4)	11(19.6)	56 (100)

1 Figures in brackets are percentages.

From Table 8 37.5% of traders prefer use of vehicles while another 33.9% were using donkeys to transport paddy. Despite other means like bicycles, head loads, and the mixed types (others), the two modes, vehicles and donkeys dominate. Local traders in this area live with the farmers and some of these traders grow rice. When purchasing paddy traders sources of supply are the farms near to their homes. Paddy gets transported to the four markets from different sources. Traders conveniently transport paddy to the nearest market centres (mills).

Everyday, traders can collect the rice from the mills and if any rice remains they can store with the millers. Such a move by the millers has been with a view to provide incentives for traders and farmers to avoid withholding paddy (rice) at their homes. Storage at the mills makes it easy for licenced millers to collect rice for transportation to other districts. Millers do not incur storage costs given the high demand for rice.

5.8   Transportation of Paddy

Transport is an integral activity in the marketin process between production and consumption. Paddy is transported from farms to homes and from the homes to the markets for milling. The means of transport have included motor vehicles, bicycles, donkeys and head loads. Farmers who reside near the schemes pay an average between Ksh 5 to Ksh 10 per bag using donkeys. Over long distances transport costs can increase to Ksh 20 per bag.

Table 9. <u>Distance to Markets (Mills) and the Traders choice of</u> <u>Transportation Modes</u>

Distance in miles	No of traders using vehicles	No. of traders using bicycles	No. of traders using donkeys	No. of traders using head-loads	No. of traders using others	Total
less than 1	5 (23.8)	2 (100)	7 (36.8)	1 (0.3)	6 (54.5)	21 (37.5)
1.1-2	5 (23.8)	0 (0)	6 (31.7)	1 (0.3)	0 (0)	12 (21.4)
2.1-3	2 (9.5)	0 (0)	2 (10.5)	0 (0)	3 (27.3)	7 (12.5)
3.1-4	2 (9.5)	0 (0)	2 10.5	0 (0)	1 (9.1)	5 (8.9)
4.1-5	1 (4.8)	0 (0)	2 (10.5)	0 0	0 (0)	3 (5.4)
5 + above	6 (28.6)	0 (0)	0 (0)	1 (0.3)	1 (9.1)	8 (14.3)
Total	21 (37.5)	2 (3.6)	19 (33.9)	3 (5.4)	11 (19.6)	56 (100)

1   Figures in brackets are percentages.

From Table 9, 37.5% of the traders reside less than 1 mile from the market with 36.8% of them using donkeys. About 14.3% of the traders reside more than 5 miles from the markets. These traders are not significantly disadvantaged in terms of transport costs.

<u>Hypothesis 1.</u>

That the distance from a traders home to the market (mill) affects the choice of a transport mode between motor vehicles, donkeys, bicycles and headloads. The pattern of choice of the modes was hypothesized as different across the markets.

To test this hypothesis Tables 8 and 9 were used. From the contingency table calculated using table 8 a chi square test was used.[2] The chi square value (x^2 = 14.9, d.f = 20) was less than critical value for chi square at 0.05 level of significance, hence we reject the hypothesis that choice of transportation mode is dependent on distances from the markets. The effect of distances on the choice could only be accepted at 0.1 level of significance. The calculated chi square value from table 9 (x^2 = 19.3, d.f = 12) indicates that the pattern of choice was homogenous across the traders in the different markets. The calculated chi square va   was less than critical chi-square at 0.05 level of significance.

5.9   Processing (Milling) of Paddy

Once paddy has been harvested it consists of husks which must be removed before it can be declared fit for human consumption. Hand pounding methods can be used to remove the husks. Before the introduction of private mills in the area farmers could use hand pounding methods. This process is labour intensive hence farmers could hire labour which was paid in kind or some money. Farmers realized this was expensive

such that after 1983 when the mills were introduced, they stopped hand pounding. A few farmers can however handpound some little paddy for home consumption.

In the four major market centres of Ahero, Katito, Rabuor and Ombeyi there are rice mills. These mills are conveniently located to serve all the rice schemes in the area. Much of the paddy they mill is produced by non- NIB farmers. Some small proportion of NIB rice finds its way into these mills.[3] This is the proportion which farmers (tenants) in NIB retain for household consumption needs.

Table 10.   Market Mills, costs and out-turn

Market	No of Millers	Average no of Mills/ Miller	Milling costs (Ksh/Kg)		out-turn (in %)
			Mixed	Graded	
Ahero	3	3	0.50	0.6	60-75
Katito	2	2	0.50	-	50.70
Ombeyi	1	3	0.50	-	50.75
Rabuor	1	3	0.50	-	50.75

From Table 11, milling costs and out-turn are shown to be varying across the millers. This variation is dependant on the type of machines in use. Milling out-turn ranges from 50-75%. The millers were found having an

average out-turn of 66% while the old "Reru' women
group mill (1983) at Katito had low out-turn of 50%.
It should be noted that average milling yields depends
on the type of machines in use and the moisture content
of the paddy.

With respect to the milling capacity, existing mills
can cope with current production. Millers reported they
sometimes work less than expected capacity in the off
season in the months of April and May. No records on
milling capacities were available hence no exact figures
can be given on capacity utilization.

5.10   Standardization and Grading

In marketing weights and measures are important.
Correct and standardized measures ensures efficiency in
the marketing process, otherwise certain malpractises can
occur. Either the producers or the consumers can lose.
Grading and measurements have certain advantages in the
marketing process;

>   "... brings higher returns as producers can
>   determine the quality and the value of the
>   produce, thus encouraging production of
>   better quality rice and marketing. It
>   permits significant price quotation and
>   market information"[4].

With grading easier purchases can occur as there will be no need in examining a lot whenever purchases are to be made. In the formal markets, paddy and rice are traded upon using weights. Prices are quoted on a per kilogramme basis. This eliminates malpractises in the marketing system and can permit diffusion of market price information.

All traders interviewed were using "2kg CowBoy tins" as a basis for measuring rice while others use small dishes. It was noted that the size of the containers differ after some adjustments have been made to them, such that the measures were not uniform. Attempt to weigh some samples of '2 kg CowBoy tins" full of rice showed that the weights were between 2.36 and 2.57 kilogrammes. The weight of rice in a container therefore depends on the quality of the rice i.e. its moisture content. The differences in weights indicate that even if prices paid for rice in tins are uniform, people can receive rice with different qualities. The same problem was observed with the farmers as they could sell paddy using bags of paddy weighing between 75 kgs and 110 kgs. The NIB bag of paddy is usually 70kgs.

Table 11.   Traders and the Measurements by Markets

Market	No of traders too strict to measures	No of traders not too strict to measures	Total
Ahero	11 (35.5)[1]	14 (56)	25
Katito	10 (32.3)	6 (24)	16
Ombeyi	5 (16.1)	3 (12)	8
Rabuor	5 (16.1)	2 (8)	7
Total	31 (100)	25 (100)	56

1   Figures in brackets are percentages.

The Table 11 above indicates that 53.3% of the traders were too strict to the measurements they use. While in the traditional sense buyers can receive some more on top of purchased   quantities, it is the degree to which such an activity occurs that matters.   The net result of the practise can be a loss to the trader if more quantities are given out by such practises. In all the markets there existed the two types of behaviour, but the proportions of the two groups differed.

5.11   The Market Structure

Analysis of the market structure covers a wide area. In formal economic theory it is the industrial organizations and the relationships between the sellers themselves, the buyers themselves and between the buyers and the sellers. Mostly the characteristics emphasized are those on seller concentrations, their numbers and distribution in the market. The number of buyers and their distribution forms another side of the market structure model. In markets the degree of product differentiation and the conditions of entry can also be examined.[5]

No information exists on the number of sellers and on the number of buyers. The sellers of the product (paddy), are the farmers who are quite many, but their numbers change from season to season. The buyers of the final product (rice) are as well many.

In the intermediary between the producers and the consumers are other organizations which constitute the market structure. These include the local private middlemen, the licenced millers, and registered agents. Other productive services are offered by these intermediaries in terms of transportation, bagging and handling, milling and grading.

There exists many producers, giving rise to a competitive market structure, if the number of buyers are also considered. There were however few middlemen compared to the farmers. In the area there was only one registered rice dealer, the KIBOS ltd, which can purchase paddy from the farms, mill it and sell to other agents and consumers. Mostly, local middlemen handle a greater proportion of the Non-NIB produced rice. They purchase paddy, transport, mill and sell to other agents and consumers. The number of mills are quite few.

Rice trading does not occur in the retail shops like that of other items. Trade usually occur around the mills where the women can spread the

the rice and wait for the buyers. On market
days, usually once per week for every market
centre, the traders mostly sell from the
market place.

Rice trading occur throughout the year.
During certain months, a smaller volume flows
in these markets. Some months after the harvest
the quantity of paddy milled falls, as farmers just
release the with held quantities.

The market structure is important for the
analysis of price formation. While there exists
variation in the producer price of paddy across
farms, usually the selling price is exogenous,
as no single farmer can influence the price.
Total market supply is therefore important in
explaining price trends for paddy. The same market
forces of supply and demand operate for the
formation of the retail price of rice.

5.12   Market Controls and Regulations

This system has evolved in a free
market environment where there are no barriers
to entry except for flows outside the district
where agents must obtain a licence. The only
kind of regulations which exists is the local
government cess collections. Traders on daily
basis can pay between Shs. 2, and shs 20
depending on the amount of rice a trader has at
the time of paying the charge.

Some malpractises existed as traders
tended to hide some of their rice in stores to
avoid paying high market fees. The system of
daily collection based on quantity was seen
to have a loophole. Traders did not raise
any complaints about the rates, but questioned
the frequency of the collection of the cess.
On certain days some traders may not sell any
quantity. Since it is difficult to ascertain
whether a trader had sold or not there can be
no justification for exempting one if she
insists not to have sold any account.

Table 12 below shows that 83.9% of the
traders interviewed were paying the market dues.
About 65.9% of these ones always paid the cess.
The rest could only pay occasionally. Considering
local government cess collections there was a fair
performance as about only 3.5% of the traders
avoided payments always. Traders were asked on the
amount they pay and on the regularity of the
payments.

Table 12. Payments of Cess to Local Government by
Traders

Traders Payments	No. of traders for always	No. of traders for occasinally	Total
Avoiding	2 (6.1)[1]	7 (30.4)	9(16.1)
Paying	31 (93.9)	16 (69.6)	47(83.9)
Total	33 (100)	23 (100)	56 (100)

1   Figures in brackets are percentages.

5.13   Trading Organizations

The survey of the traders across the markets
had the result that there is no formal rice marketing
Co-operative. Some of the traders operated on the
basis of women groups. Some operated on the basis of

partners. Majority of the traders did not

belong to any Co operation.

Table 13. <u>Traders Organizations by Markets</u>

Market	No. of traders operating as individuals	No. of traders in some form of co-operation	Total
Ahero	23 (46)[1]	2 (33.3)	25
Katito	14 (28)	2 (33.3)	16
Ombeyi	6 (12)	2 (33.3)	8
Rabuor	7 (14)	0 (0)	7
Total	50 (100)	6 (100)	56

1   Figures in brackets are percentages.

From Table 12 about 89% of the traders were

operating on individual basis. The rest of the

traders belonged to some co-operations either

women groups or operated as partners. The pattern

of majority of traders operating as individuals was

similar in all the markets. Forms of Co-operation

can influence the quantity of rice that is handled

by a trading unit. Because most of the traders

handled small quantities they did not seek for

licences from the government to enable them
transport large quantities of rice outside
the district.

5.14 Types of Traders and Quantity of Rice Handled

Mainly two types of traders exist. There
were farmers, who apart from growing rice, engaged
in rice trading as they could undertake transpo-
rtation and milling of paddy in order to sell rice.
The other type was pure rice traders, who purchases
paddy, incur transport and milling costs, and sell
rice.

Generally, all these traders were handling
small quantities on average, and there were few
who happened to be growing rice.

Table 14.   Type of trader and Quantities handled

Average Quantity (Bags)	No. of people trader/farmer	No. of people trader only	Total
Less than 1	6 (54.5) [1]	35 (77.8)	41 (73.2)
1.1 - 3	3 (27.3)	3 (6.7)	6 (10.7)
3.1 - 5	1 (9.1)	5 (11.1)	6 (10.7)
5.1 - 7	O (O)	1 2.2	1 (1.8)
7.1 - 9	1 (9.1)	O (O)	1 (1.8)
9.1 + above	O (O)	1 (2.2)	1 (1.8)
Total	11 (100)	45 (100)	56 (100)

From Table 14, 19.6% of the traders were rice
growers while the remaining majority were pure rice
traders. About 73% of the traders were handling
less than 1 bag of rice in the markets on average.
Quite a small percentage (1.8%) of the traders
handled more than 9 bags. Trader/Farmers had a
tendency of dealing in small quantities. About 55%
of them handled less than 1 bag perhaps because
they mainly sell own produced rice. There however
occured no significant differences between the two
types of traders.

5.15   Distances from the Markets and type of Traders

In the area, the markets are distributed in a
manner that the farms are not far removed from the
markets. Some rice growers happened to be residing
near the markets. When farmers are located near
to the markets, they can have a tendency to engage
in trading activities to supplement their sources
of income. If they consider other factors like the
marketing costs and retail price for rice they can
decide whether to engage in trade or just sell
paddy if they are satisfied with the purchasing

price offered. Table 15 indicates that about

21% of the farmers engaged in rice trading.

Table 15. Distribution of Farmer/Traders and Distances
from the nearest Markets

Distance in Miles	No. of farmers engaged in trade		No. of farmers not trading		Total	
Less than 1	3	(20)[1]	13	(23.2)	16	(22.5)
1.1 - 2	0	(0)	5	(89)	5	(7.1)
2.1 - 3	1	(6.7)	4	.(7.1)	5	(7.1)
3.1 - 4	11	(73.3)	29	(51.8)	40	(56.3)
4.1 - 5	0	(0)	3	(5.4)	3	(4.2)
5.1+above	0	(0)	2	(3.6)	2	(2.8)
Total	15	(100)	56	(100)	71	(100)

1   Figures in Brackets are Percentages.

From Table 15, none out of the 5 farmers

residing more than 4 miles from the market engaged in

rice trading. Majority of the farmers (56.3%) reside

between 3 and 4 miles from the markets.

Hypothesis 2.

That the location of a farmer with respect to

the markets influences the choice of whether to engage

in rice trading or not. Farmers residing near the

markets are often attracted to join trading activities.

To test this hypothesis Table 15 was
used to construct a contigency tables. A chi-
square test was used to test the dependence
between choice of trading or not and the distances
from the markets. The calculated chi-square value
($x^2 = 4$, df = 5) was less than the critical chi-square
value at 0.05 level of significance. We therefore
reject the hypothesis. Given that there was no
significant differences in farm location from the
markets the choice of engaging in trade or not can
be explained by other factors, but not the distances
from the markets.

5.16   The Marketing Channels and Strategies

Rice is mainly traded at Ahero, Katito, Ombeyi
and Rabuor markets. Trade occurs at the mill sides
everyday. Much of the rice produced is handled by
local middlemen but the KIBOS millers Ltd. handle
some amounts especially from the farmers at Alungo
scheme. Alungo scheme is nearer to KIBOS than other
schemes considered in the study. A survey of the
markets indicated that much rice is being traded
upon at Ahero, than other markets. Such an estimate
was based on the number of mills at each market centre.

Changing social and economic environment
can lead to an evaluation of a marketing system.
Precisely, the following types of marketing channels
were observed;

(i) Producers were selling paddy to middlemen
who transports, and process the paddy. These
middlemen then sold to the licenced millers and
consumers. Licenced millers can transport
many bags of rice to other districts. A greater
volume of rice flows through this system.

(ii) There are producers who have chosen to
sell their paddy either in bulk or not. Some
of these farmers undertake milling and sell
rice to the licenced millers for transportation
to other districts and also sell to consumers.

(iii) The third system is that for which traders
purchase rice from other agents at the mills
and sell it to consumers and other agents. Thes
traders usually on average handle very small
quantities of rice in the markets than other
traders.

Figure 1 shows the distribution channels for paddy (rice) from the farm gate (home) to the final consumer. The three systems (i), (ii), and (iii) are represented by the flows A,B and C respectively.

Figure 1. Market Flows (Channels) for Paddy and Rice
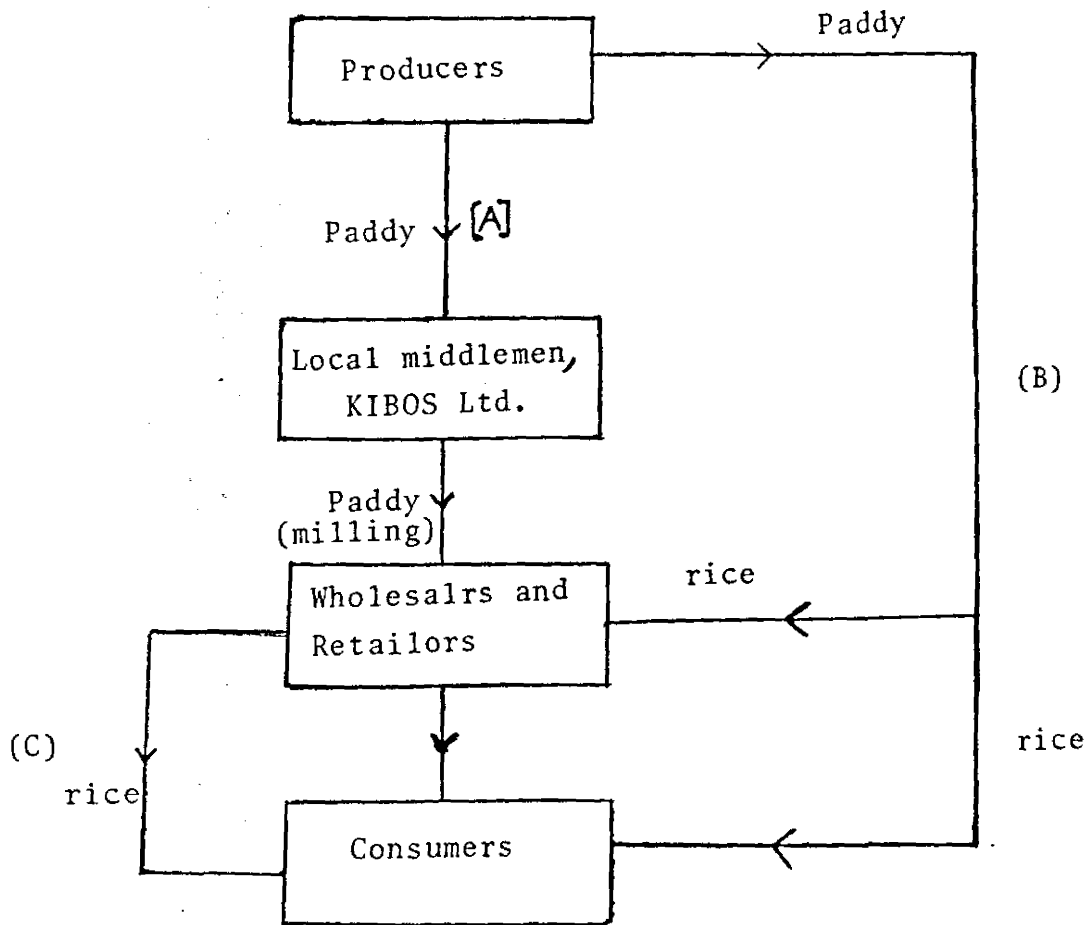
In the analysis of marketing strategies
the modes for rice distribution were considered.
These modes can be defined using certain characte-
ristics, for both farmers and traders.

(i) Whether paddy is sold in bulk or not
by the farmers, the duration for total
disposal and the place of sale.

(ii) The timing of the sale and place i.e
whether paddy is sold immediately after
harvest or not, and whether sold at farm
or market.

(iii) Whether traders consider purchasing
paddy only, rice only or both.

Paddy is either sold in bulk at once or in
small quantities at different times. Some farmers
could have upto five rounds to clear the sales. For
these rounds some of the farmers received different
prices, in an increasing manner, but the price
variation was between shs. 10 to shs. 30 per bag.

Table 16. Type of Farmer and Marketing Strategy

Type of farmer	No. of farmers selling bulk in bags at once	No. of farmers selling in bulk in bags at different times.	Total	
Farmer only	37 (92.5)[1]	19 (61.3)	56 (78.9)	
Farmer/ trader	3 (7.5)	12 (38.7)	15 (21.1)	
Total	40 (100)	31 (100)	71 (100)	

1   Figures in brackets are percentages.

From Table 16, 56.3% of the farmers sold paddy in bulk (in bags) at once after the harvests, but the rest sold in bags, at different times. About 93% of those farmers not trading sold their paddy in one round.

Concerning the point of sale for paddy, one can consider the distances from the farm to the markets, and the costs of delivery of paddy from the farm to the markets. Given that there was no wide variation on distances from the markets, transport costs did not significantly vary.

Majority of farmers resides less than 4 miles
from the markets.

Table 17. <u>Distance from Markets and Point of Sale</u>

Distances in Miles	No. of farmers selling at farm gate.		No. of farmers selling in the market.		Total	
less than 1	9	(17.6)[1]	7	(35)	16	(22.5)
1.1 - 2	5	(9.8)	0	(0)	5	(7.1)
2.1 - 3	4	(7.8)	1	(5)	5	(7.1)
3.1 - 4	29	(56.9)	11	(55)	40	(56.3)
4.1 - 5	3	(5.9)	0	(0)	3	(4.2)
5.1 + above	1	(2)	1	(5)	2	(2.8)
Total	51	(100)	20	(100)	71	(100)

1 Figures in brackets are percentages.

From Table 17, 71.8% of farmers sold paddy at
farm gate. From this table there is no clear relation-
ship between distance and the point of sale, as farmers
residing more than 5 miles also sold at the markets.

Hypothesis 3.

That the choice by a farmer to sell paddy in
bulk at once or not is dependant on whether the farmer
is one who at least engages in some rice trading or not.
Pure rice farmers are most likely to be selling their

produce at once.

To test this hypothesis a contingency
table constructed from Table 16 was used. The
calculated chi-square value (X^2 = 10.28, d.f = 1)
was greater than the critical chi-square value
at 0.05 level of significance. Therefore, we do
not reject the hypothesis that the type of a farmer
has some influence in sales decision making. Farmers
whose interest are in exploiting gains from different
prices offered sold their paddy at different times.

On the timing of sales, farmers exhibited
two behavioural patterns. There were those who sold
immediately after harvest (within 2 weeks) while some
took long to sell their paddy (more than one
month). Several factors can be put forward to explain
why farmers withhold supplies. One important
explanation is that based on the expectations hypothesis,
whereby gains from higher prices are timed. Marketing
problems like lack of markets or rigidities like distance
of farms from the markets can as well explain the
phenomenon.

Table 18 below indicates that only 42.3% of
the farmers sold their paddy immediately after drying
(within 2 weeks), hence majority of them withhold
their supplies. Over 50% of farmers who sold
immediately reside less than 3 miles from the markets.
Purchasers of paddy can find it less costly to buy from
farmers near the markets first before they go over
long distances to search for more paddy.

Table 18. Distances from the Markets and Timing of
Sales

Distance in miles	No. of farmers who sold immediately		
less than 1	12	(40)[1]	
1.1 - 2	3	(10)	
2.1 - 3	1	(3.3)	
3.1 - 4	9	(30)	
4.1 - 5	3	(10)	
5.1 + above	2	(6.7)	
Total	30	(100)	41 (100)

1   Figures in brackets are percentages.

Hypothesis 4.

That withholding of supplies of paddy to the
markets can, despite other factors, be explained by
the distances of the farms from the markets.

To test this hypothesis Table 18 was used
to construct a contingency table which was applied
in the test of de pendence between the two variables.
In the chi-square test, the calculated value
(x^2 = 26.23, d.f = 5) was found greater than the critical
chi-square value at 0.05 level of significance. We
do not then reject the hypothesis that farm locations are
critical in the timely flow of produce to the markets.

Traders, as well can withhold (hoard) supplies
to the markets, after the purchase. Given that some of
the rice traders were found to be growing rice, a
situation may occur whereby they aggravate the problem
of short falls in the market supply in relation to
demand. The amount not released to the markets by
traders in total is critical in influencing the market
price.

The third strategy adopted by traders was that
of whether to deal with paddy first, rice only or both.

Traders were purchasing paddy from the farmers
or traded on their own produce. Some traders
handled rice only. Those traders who handled
paddy were likely to be handling more rice in
the markets on average than those who could on
a daily basis buy rice in these markets and
retail it out.

Table 19. Marketing Strategies and average quantities of rice handled

Average Quantities (Bags)	No. of traders handling paddy		No. of traders handling rice only		No. of traders purchasing both		Total	
Less than 2	15	(55.6)[1]	18	(94.7)	10	(100)	43	(76.8)
2.1 - 5	8	(29.6)	0	(0)	0	(0)	8	(14.3)
5.1 - 7	3	(11.1)	0	(0)	0	(0)	3	(5.3)
7.1 - 9	1	(3.7)	0	(0)	0	(0)	1	(1.8)
9.1 + above	0	(0)	1	(5.3)	0	(0)	1	(1.8)
Total	27	(100)	19	(100)	10	(100)	56	(100)

1 Figures in brackets are expected frequencies.

Table 19 indicates that 48.2% of the traders
could purchase paddy or sell their own produce and 33.9%
of the trader handled rice only. The rest 17.9%
handled both purchased paddy and could as well buy
milled rice, before selling to consumers and other
agents. About 76.8% of the traders handled less than
2 bags on average. From the above table, traders who

handle such quantities are mainly those who deal in rice and not paddy.

Hypothesis 5

That the average quantity that a trader handles in the market is dependent on the marketing strategy adopted.

To test this hypothesis, Table 19 was used to construct a contingency table. A chi-square test for dependence between variables was utilized. The calculated chi-square value x^2 = 18.46, d.f = 8) was greater than the critical chi-square value at 0.025 level of significance. We do not reject the hypothesis that the marketing stragegy a trader adopts influences the quantities of rice handled on average.

5.17   Farmers Preference for types of middlemen

At the time of conducting the study, majority of the farmers were selling paddy to local traders and not to the Kibos millers ltd. as before. The N C P B could purchase paddy from the farmers, but this stopped. Most of the farmers had at least been exposed to one if not all the types of agents mentioned.

Farmers preference for different types of
agents was investigated across the schemes. Table 20
below gives farmers preference for agents at different
schemes.

Table 20 Farmers Preference for Types of Agents

Scheme	No. of farmers for local middlemen	No. of farmers for N.C.P.B or KIBOs	Total
Wasare	18 (42.9)[1]	17 (58.6)	35
Alungo	6 (14.2)	9 (31)	15
Nyatini	18 (42.9)	3 (10.4)	21
Total	42 (100)	29 (100)	71

1 Figures in Brackets are percentages.

Table 20 shows that 59.2% of the farmers prefered
selling paddy to local middlemen. Farmers at Nyatini
scheme, near Ahero market mostly prefered local
middlemen. This can be explained by the ready market
offered by the many middlemen at Ahero market. Over
half of the farmers at Alungo scheme prefered N C P B
or KIBOs Ltd. Alungo scheme is near to KIBOS millers
Ltd. At Wasare scheme both types of middlemen were
prefered.

The choice behaviour of farmers towards
marketing agents depends on the characteristics
(attributes) of the agents and on how each
individual farmer perceives the characteristics.
Farmers gave different reasons for their
preferences.

Table 21.   Farmer's Reasons For Preference of the
Agents

Preference	Payments of Cash	Easy outlet and bulk purchase	High/ official price
Local traders	31 (100)[1]	2 (11.8)	6 (42.9)
NCPB	0 (0)	15 (88.2)	
Total	31 (100)	17 (100)	14 (100)

1   Figures in brackets are percentages.

From Table 21, 43.7% of the farmers prefered local
traders because they pay cash. About 21% of farmers gave
the reason that they prefer NCPB because it purchases in
bulk and provides a promising outlet. While over 50%
of the farmers prefered to sell to local middlemen,
some of the farmers reported they would prefer NCPB if
there were no serious delays in payments by the Board.

5.18   Farmers, Traders and the Knowledge of Government
        Control Price for Paddy and Rice.

The government announces both producer's
and retail price for paddy and rice annually. This
announcement is made to farmers in advance before
crop planting begins. In the study area, however,
prices are set by market forces, such that the
market prices can either be below or above the
officially gazetted prices. The official prices
act as floor prices, so that farmers can more
than cover their costs of production, and to
cover trader's marketing costs. It is therefore
important that the farmers and traders are aware
of these floor prices.

Table 22. The Knowledge of Government retail Price
for Rice in the Markets

Markets	No. of traders who Knew	No. of traders who did not know	Total
Ahero	7 (77.8) [1]	18 (38.3)	25
Katito	1 (11.1)	15 (31.9)	16
Ombeyi	0 (0)	8 (17.0)	8
Rabuor	1 (11.1)	6 (12.8)	7
Total	9 (100)	47 (100)	56

1   Figures in brackets are percentages.

Table 22 indicates that 83.9% of the traders were not aware of the retail price for rice per kilogramme. In every market over 50% of the traders did not know of the existence of such prices.

Farmers as well did not have perfect knowledge of the producer price floors regulated by the government on annual basis. The survey of farmers across the schemes indicated that most of them did not know that the government fixes a floor price for paddy.

Table 23. The Knowledge of Producer Price floor for Paddy in the schemes

Schemes	No. of Farmers who Knew	No. of farmers who did not know
Wasare	12 (66.7)[1]	23 (43.4)
Alungo	4 (22.2)	11 (20.8)
Nyatini	2 (11.1)	19 (35.8)
Total	18 (100)	

1 Figures in brackets are percentages.

Over 50% of farmers in every scheme did not know of the producer price floors guaranteed to the farmers every year. Table 23 indicates that 74.6% of the farmers did not have the knowledge. This

high proportion implies that there was the chance
that farmers were paid a price less than the price
floor. Farmers who were selling at a price of
shs. 280/bag (Over 100 kg), sold below the floor
price of shs 2.90/kg paid to the NIB tenants.

Hypothesis 6.

That there is lack of the knowldege of the
annually gazetted prices for paddy and rice in the
area. The imperfection in the market price
information differs across the markets and schemes.

To test this hypothesis Tables 22 and 23
were used. Well over 50% of farmers and traders
lacked the government guaranteed prices, hence we
do not reject the 50% proportion hypothesis for
lack of price knowledge. Tables 22 and 23 were used
to construct contingency tables. A chi-square test
was applied to test for homogeneity of price
information across the markets and schemes The
calculated chi-square value from the table 22
(x^2 = 5.58, d.f. = 3) was less than critical chi-square
value at 0.05 level of significance. The calculated
chi-square value from Table 23 (x^2 = 4.21, d.f = 2)
was also less than critical chi-square value at 0.05
level of significance. We therefore reject the
hypothesis that the pattern of price information
is different across markets and schemes.

This result was surprising as for a scheme like Nyatini, which lies on the roadside from Ahero irrigation scheme a large proportion (about 90%) of farmers had not received information on gazzetted producer price for paddy. Farmers in these two schemes are expected to interact in terms of diffusion of technology and information.

5.19   Analysis of Trade Margins

In the analysis of the trader's margins, estimation was done on a per unit basis. The purchasing price of paddy on average was shs. 312/bag. The bags often weighed about 100 kg thus the unit purchasing price for paddy was shs 3.10. Transport costs were shs. 0.2/kg (excluding bagging and handling). Milling costs were on average shs 0.5/kg. The tables 24 (a), 24 (b) below gives a summary of the trading margins, to the two types of traders. Traders who purchase rice only, do not incur transport and milling costs.

Table 24 (a) Margins to Traders Who Purchase Paddy

	Selling price of rice (Shs. 15/2 kg 'Cow Boy' tin),	Shs/kg	6.50
Less	Purchasing price of paddy	Shs/kg	3.10
	Transport cost for paddy	Shs/kg	0.20
	Milling Cost	Shs/kg	0.50
	Margins to traders	Shs/Kg	2.70

Table 24 (b): Margins to Traders who Purchase Rice Only

	Selling price of rice Shs 15/2kg 'CowBoy tin'	(Shs/kg)	6.50
Less	purchasing price of rice Shs 13/ 2kg 'Cow Boy tin'	(Shs/kg)	5.50
	Margins to traders	Shs/Kg	1.00

Data was not available for the analysis of marketing margins at other stages in the marketing process outside this study area. The above results on margins can be compared with the margins at the official prices. The common brands of rice were sold at Shs. 7.00/Kg while paddy price was shs 2.90/kg. Thus total trade margins before 1987 price review was about shs. 4.10/kg. This margin is catered for in transport, handling, storage, and other costs. At the first stage in the marketing of rice where no substantial costs are involved the margin of Shs 2.70/kg was high.

If deductions for marketing costs are made from total official rice trading margin of Shs 4.10/kg, the commission to the traders is less than Shs 2.70/kg, which traders in this area get. Traders who handle rice only were even satisfied with the average margin of Shs 1.00/kg of rice.

FOOTNOTES

1. The formulae for the test of differences between the means of two samples was based on the hypothesis that

$$H_o : \mu_1 - \mu_2 = 0$$

$$H_1 : \mu_1 - \mu_2 \neq 0.$$

The test statistic $t = \dfrac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\left[\dfrac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2 - 2}\right]\left[\dfrac{n_1+n_2}{n_1 n_2}\right]}}$

with $d.f = n_1 + n_2 - 2.$

n_i = Sample size.

S_i = Sample standard deviation.

2. For test of dependence or homogeneity the chi-square is obtained from the formula;

$$X^2 = \sum_{i=1}^{n} \frac{(f_o^i - f_e^i)^2}{f_e^i}$$

and $d.f = (r-1)(c-1)$

f_o^i - observed frequency for cell i

f_e^i - expected frequency for cell i

r - number of rows

c - number of Columns.

n - number of cells

3. Information obtained from millers through personal discussions

4. Abbott J.C., et al, _Rice Marketing_, FAO
   Marketing Guide, Rome, 1972,
   pp 79.

5. Miller J.C; (ed), _Marketing and Economic
   Development;_ Readings in Agribusiness
   Research, University of Nebraska Press,
   Lincoln, 1967, pp 346-7.

CHAPTER 6

6. REGRESSION RESULTS

6.1 Determinants of Retail Price Variation

A sub-sample of 31 traders was used in the estimation of equations (9) and (10) in chapter 3. All the 56 cases could not be used due to the problem of missing variables. Only those traders who at least purchased paddy were considered. It was also difficult to find a price variable for traders who sold their own produce.

The data fitted well with the simple linear functional form (equation (9) in chapter 3). This equation was expressed as:

$$RP = \beta_0 + \beta_1 PP + \beta_2 TC + \beta_3 AQ + \beta_4 E + \beta_5 D_1 + \beta_6 D_2 + \beta_7 D_3 + \varepsilon.$$

The summary of the regression results for this equation are presented in Table 25.

Table 25. Regression Results on Determinants of
Retail Price variation.

Variable	Regression Coefficient	t. values
Purchasing price (PP)	0.0102	2.113
Average Quantity (AQ)	0.2543	4.309
Marketing Costs (TC)	-0.0142	-0.972
Experience (E)	-0.0439	-1.359
Market Day (D_1)	-0.0807	-0.254
Farmer/Trader (D_2)	0.3205	0.9
Knowledge of official Price (D_3)	-0.558	-1.311
Constant	12.4896	

$$R^2 = 0.56$$

$$S.E.E. = 0.71$$

$$F = 4.1$$

Using the F. test, the whole regression model was statistically significant. According to the value of R^2, about 56% of the variation in retail price could be explained by the variables included in the model. All the variables expressed in the model had some influence on the retail price of rice. The variables which had

statistically significant coefficients at 0.05 level
of significance were, purchasing price of paddy and
average quantities. These variables also had the
expected signs. This result indicates that if the price
at which paddy gets sold is high, then a trader sells
rice at a relatively high price. Also, the results
indicates that traders were willing to supply more rice
with expectations of selling at high prices.

The coefficients of the remaining variables were
statistically insignificant at 0.05 level of significance.
The variable, experience was found negatively related
to retail price, indicating that with increase in the
number of years in rice trading, there occurs some
tendency to charge relatively low price, perhaps to
increase the rate of stock-turn. The market day dummy
variable had a negative relationship with retail prices,
indicating that the change in supply tended to be
grater than the change in demand on a market day, thus
depressing the retail price. The dummy variable on
the knowledge of official retail price was negatively
related to the retail price. This implies that this
knowledge can influence a trader's bargaining power.
In these markets some traders hedged their prices on
the official prices and could accept a low   price.

The dummy variable on whether a trader was selling own
produced rice or not had a positive relationship with
price. This sign was unexpected, thus rejecting the
hypothesis that such traders suffered some illusion in
terms of selling at a relatively lower price. The
proportion of own produced paddy sold was perhaps small.
The variable on marketing costs had negative coefficient.
No conclusive statement can be given for the negative
relationship between marketing costs and retail price.
Over all most of these variables were statistically
insignificant.

On a stepwise regression, the purchasing price of
paddy, average quantities, and the dummy for the
knowledge of official retail rice price were statistically
significant at 0.001.

These results are presented in Table 26.

Table 26. Summary of Results of a stepwise Regression
on Determinants of Retail Price Variation.

Variable	Regression Coefficient	F-ratio d.f(1,27)
Purchasing Price (PP)	0.0105	5.744
Average Quantities (AQ)	0.2174	15.984
Knowledge of official price (D_3)	-0.7549	-3.979
Constant	11.5303	

R^2 = 0.48

S.E.E. = 0.71

F ratio = 8.265.

6.2 Determinants of Marketed output of Paddy by Farm Households.

Equations (11) to (12) in chapter 3 were
estimated. All the 71 cases were not used in estimating
these models. It was difficult to find producer price
variable for 6 farmers who were not selling paddy.
These were the farmers who undertake milling and sell
rice.

The 65 cases fitted well with the simple linear functional form (equation 11). Equation (11) was specified as;

$$QM = \beta_0 + \beta_1 Q + \beta_2 PP + \beta_3 F + \beta_4 Z + \beta_5 D_1 + \beta_6 D_2 + \varepsilon$$

The regression results for this equation are presented in Table 27.

Table 27. <u>Summary of Regression Results on Determinants of Marketed output of Paddy</u>

Variable :	Regression Coefficient	t-values
Quantity of paddy produced (Q)	0.7551	21.701
Producer price (PP)	0.0080	0.559
Family size (F)	0.0722	0.395
Availability of other cereals (Z)	-0.0868	-0.657
Land tenure (D_1)	1.0297	1.037
Existence of high financial obligations (D_2)	-0.0365	-0.032
Constant	-3.5032	

$$R^2 = 0.904$$
$$S.E.E. = 3.879$$
$$F = 90.583$$

From Table 27, total farm production of paddy was the only statistically significant variable at 0.01 level of significance. This implies that with increases in total production, marketed quantities correspondingly increase. This result was similar to the results obtained earlier (Krishna: 1962 , Berhman: 1968, Mohammed: 1970, Khan: 1970).

The producer price of paddy had a positive correlation with the marketed quantities. The coefficient of this variable was statistically insignificant at 0.05 level of significance. This result was surprising as unlike this study, marketed output of subsistence have been shown to be responsive to the producer price changes.

The Family size variable taken to be the number of persons residing permanently within a household had a positive correlation with marketed quantities. This was another surprising result as in other studies family size negatively affects the marketed quantities of a subsistence crop. The possible explanation for this relationship is that in this area, rice is not an important foodcrop. Households with large families tend to have great demand for foodcrops like maize

and sorghum. Most of the households here were found not self-sufficient in grains like maize and sorghum, thus they sell rice mainly to obtain cash for purchase of maize and sorghum. The coefficient for this variable was however statistically insignificant at 0.05 level of significance.

The dummy variable on land tenure did not give a statistically significant coefficient at 0.05 level of significance. Tenants (renters) were however found to be selling more paddy than owner-occupiers. Another dummy variable on households financial obligations had a statistical insignificant coefficient and had unexpected sign. This poor result might have arisen due to the difficulty of distinction between families who had some pressing cash needs, and those which did not have. Usually in peasant farming, most farmers have unsatisfied financial obligations.

The variable on availability of other grains at the time of selling paddy also had a statistically insignificant coefficient. The unexpected negative correlation between this variable and marketed output can be explained by the behaviour of farmers in subsistance farming. Given that this area is often subject to

floods and drought when the harvest of maize and sorghum is poor, more rice is sold to allow purchase of other grains. With little availability of other grains more paddy get sold.

Using the value of R^2, all the variables included in the model explained about 90% of the variation in marketed quantities. In a stepwise regression, at 0.001 level of tolerance, the only significant variable was quantity of paddy produced.

6.3 Elasticities of Marketed output of Paddy

Price and output elasticities of marketed quantities of paddy were estimated using the means of output and producer prices for the entire sample and for the sub-samples. The elasticities are summarized on Table 28.

Table 28.   Partial Elasticities of Marketed output of

Paddy

Name of scheme	Output elasticity	Price elasticity
Wasare	0.105	0.251
Nyatini	0.096	0.401
Alungo	0.094	0.179
Entire sample	0.102	0.27

Output elasticity of marketed output was higher at Wasare scheme than in the others. The elasticity with respect to output was less than unity. This indicates that if output increased by 1%, marketed output increases by less than 1%. The price elasticities were statistically insignificant and farmers response to producer price changes was found to be very low. (less than Unity).

In order to increase the quantity of paddy marketed in a crop season, output should be increased by a greater proportion.

The next chapter is a summary and conclusion of the whole study and goes to suggest certain areas for further research.

CHAPTER 7

7. SUMMARY, POLICY IMPLICATIONS AND AREAS FOR
    FURTHER RESEARCH

7.1 Summary

The aim of this study was to examine the nature
and performance of rice marketing for the case of
small-scale producers in the non-NIB schemes. The
interest was in describing and analyzing the structure,
conduct and performance of the marketing system.
The ultimate aim was to relate the market structure
with the response of marketed output of paddy.
Imperfections in the market system which results into
withholding of supplies and paddy price instabilities
were to be investigated. This study also aimed at
providing information on how to increase the supply
of marketed output of paddy and generally improve the
marketing system.

This study was conducted in Kano plains where
farmer's and trader's marketing behaviour was the
scope of the study. In the analysis of the market
structure, conduct and performance, statistical and
econometric methods were utilized. Hypotheses were
tested using statistical tests, while in the
estimation of the econometric models, linear and
non-linear functional forms were tried using ordinary

least squares (OLS) estimation technique. Cross sectional data obtained from the field by way of questionnaires was used. In the hypotheses testing, tests of dependance between variables and test for homogeneity was done using the chi-square (x^2) test statistic. In the test for differences between the means of the samples students' t-test was used. A multi-stage random sampling strategy was adopted, where the sampling frame first consisted of the list of 11 small-holder schemes under PIU and in the second stage, from the selected 3 schemes a list of farmers for each scheme was used to draw samples of farmers. A census of traders was conducted at the markets during the survey. Other information was obtained from interviews with the PIU officials and the rice millers.

Rice is sold in the open mill sides at the markets everyday, thus the market for rice is not periodic. There are many producers and buyers of paddy leading to a competitive market structure. The transport system is fairly adequate for most times of the year, and traders have a choice for transport modes between headloads, donkeys, bicycles and motor vehicles. Distances between the farms and the markets were found not to be significant in influencing the

choice of the modes. Farms are not far removed from the market centres. Less variation in the distances between farms and the markets means that transport costs did not significantly vary.

There exists three marketing strategies in the area, being adopted by the traders. There are traders who mills own produced and purchased paddy and sell rice. Secondly, there are those traders who handle rice only, as they do not incur any costs in transporting and milling paddy. The third group consists of traders who can buy both paddy and rice. Traders who adopted the first strategy mentioned above realized high trade margins than those traders who only handled rice. The level of margins to traders who adopt the mixed strategy depends on whether the mix is optimal or sub-optimal. No attempt was made at programming the marketing strategies in order to derive an optimal strategy for a trader.

Some farmers undertake marketing activites on their own right. The location of a farmer with respect to the markets was found not a significant factor in explaining the choice of whether to engage in rice trading or not, hence other reasons can explain this behaviour. Most of the traders deal on an individual basis. There was no formal rice marketing co-operative Thus the traders on average handle very few quantities

(2 bags). Traders who adopted the marketing strategy
of dealing in rice only handled the least quantities
and there was a significant relationship between the
quantities handled on average and the marketing
strategy which traders adopt.

Paddy is purchased by traders either at the
markets or at the farms (home). Purchases of paddy
occur throughout the year after the harvests. Farmers
do not have a consistently uniform crop calender hence
harvesting spreads from the month of July to December,
with a few harvests after December.No significant
relationship was found to exist between distances
from the markets and the point of sale of paddy by
the farmers. Some farmers could wait for middlemen
to purchase the paddy at home. Perhaps this decision
process would require determining the probability
that a farmer will receive a trader within a certain
specified period of time.

Some farmers were found to be withholding paddy
at home and supplies could be withheld for more than
two months. Apart from the known reason that farmers
can speculate on the higher prices in the future,

distances of homes (farms) from the markets was
found significant in explaining withholding of
supplies by the farmers. Farmers who are willing to
sell   their paddy immediately after harvests are
disadvantaged as they receive the traders after a
long period. However, in most cases with-holding of
farm supplies results from adecision process of
whether to sell immediately or not.

Sometimes farmers decide to sell their paddy
in bulk at once or in small quantities at different
times. A significant relationship was found to exist
between the choice of whether to sell in bulk at
once or not, and the type of trader i.e. whether the
farmer indulges in trading activities.

Prices in this market are mainly set by the
forces of supply.and demand. There did not exist
significant price differences on average, across the
markets that results into arbitrage. Producer's and
consumer's prices however differ significantly from
the officially controlled floor price for paddy and
retail price for rice. It was difficult to analyse
the magnitude of the problem of seasonal price
fluctuations due to lack of information on supplies
and prices on a seasonal basis. Farmers however,

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kg. Other types of traders were getting
kg. After deducting the marketing costs
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ders in official market is less than
kg which is received by traders in the
iarket. Margins to the traders in the local
iarkets are therefore high and hence in terms
:iency the marketing costs were found to be

high in the first marketing stage after paddy is milled.

Farmers preference for different types of marketing agents differed across the schemes. This can explain the effect of accessibility (proximity) to the markets on the choice of a marketing channel between the local traders, NCPB and Kibos Millers Ltd. (Kisumu). Farmers prefered to sell to local dealers owing to the reason that they pay cash with collection of paddy. Farmers who prefered NCPB were those who recognisedthe advantages offered by this system in terms of bulk purchases, official prices and standardized measurements. There was strong evidence that if farmers are free to choose a marketing channel, they will consider the attributes of the various channels.

From the regression models, the factor which determines the quantity of paddy marketed was total production of paddy. Other factors tested, did not give significant results. The factors which were found to be explaining variation in the retail price of rice were the purchasing price of paddy, average quantities handled, and the traders knowledge of official retail price for rice.

In this paper the creteria suggested for evaluating the performance of the market is based on consideration of efficiency and the margins. Precisely, we consider the probability of farmers being exploited due to some inefficiencies in the system, and the extent to which farm supplies are withheld.

There was evidence that some farmers were receiving prices below the recommended producer's price floor. Some farmers lacked the knowledge of such prices. Farmers sometimes offered paddy at relatively low prices whenever social relationship between the parties was considered. Lack of standardized measurements for paddy gave some middlemen an opportunity to exploit the farmers.

Evidence of withholding of supplies had also been shown. Prolonged withholding can lead to regional and seasonal shortages and price instability. The marketing costs in total was found to be high at the first stage in the marketing process. All these factors mentioned above supports the view that the marketing system is inefficient. Even though the system is termed inefficient, some improvement had

occurred. Farmers reported that the rate of exploitation by middlemen was high until after 1983, when a new marketing system emerged. Now there exists many traders unlike few agents of NCPB and Kibos Millers who enjoyed high margins.

7.2 Policy Implications

In this case study there are mainly two policy intervention areas;

(i) Policy on increasing the quantities of paddy supplied to the market (marketed output) and

(ii) Policies that generally improve the efficiency of the existing marketing system.

Policies that can increase the production especially on yields should be encouraged as they consequently lead to an increase in the marketed output of paddy. On the other hand timely flow of the commodity from the farms is important. A market system whereby farmers can sell their produce when desired is therefore called for, especially for farmers far removed from the markets. Losses due to handling and pests, which farmers incur whenever they fail to get a buyer can be reduced. Quantities of

paddy withheld for long periods after harvest should find a way of being released to avoid temporary shortages elsewhere and price instabilities..

Efforts at increasing the quality of rice produced by non-NIB farmers should be enhanced. At the time of survey farmers were not allowed to sell to NCPB. This happens because paddy produced by these farmers is usually considered below the required quality standard in terms of moisture content and the out-turn. With education and extension services to the farmers on drying and handling, these farmers can as well sell their paddy to NCPB as there was evidence that some farmers prefer NCPB to other agents. Moreover NCPB can act as a buyer of last resort.

Market information about producer's prices and the retail prices are usually passed to farmers and the general buyers. Common media of transmitting the information has been the radio and press. To the non-NIB farmers these media is ineffective. In addition to these media, other information outlets should be encouraged like the use of agricultural extension officers. With increased market information

to farmers chances of exploiting farmers by the traders can be reduced. Farmer's bargaining position can also be strengthened.

While the government annually anounces price increases on agricultural commodities as a production incentive,   smallholder production of rice cannot respond to price changes as expected, if farmers do not know of the existence of annual price announcements.

While there can be more than adequate rice in the area, shortages may occur in other areas, especially outside the district. Some traders can transport small quantities (less than 1 bag) to other districts. This cannot cope up with the demand for the commodity elsewhere. Instead of having only one licenced dealer transporting rice to other districts, more dealers should be encouraged. The existence of such a competitive structure can reduce monopsonistic effects like determination of the purchasing price by the only buyer.

Usually it is costly to collect all the necessary market information, and costs involved can

outweigh the benefits. To improve on the knowledge of the market, millers should be encouraged to keep records on quantities of paddy handled at different times of the year as this can be used to determine the quantities of paddy supplied in aggregate in relation to time and prices. Market information services can as well be extended into the village markets, especially on prices of rice on a seasonal basis.

7.3 Limitations of the Study and Areas for Further Research.

Cross-sectional and time series data can be used to analyse framer's marketing behaviour. The effect of seasonal price changes on supply of paddy could not be analyzed due to the limitation of data. Farmer's behaviour towards future markets could as well not be investigated using cross-section data.

On the structure of the market, two major systems of supply of paddy were observed. Farmers can undertake marketing on their own right or wait for the traders to buy their paddy. Since this occurs as a process of choice, explanation of the factors underlying such choices can be investigated using discrete choice models.

Traders were found to be adopting different strategies in marketing. There existed those who first purchase paddy, undertake transport and milling and finally sell rice. There were also those who could buy rice only and retail it out. Some traders however adopted a mixed strategy. Through programming models, the most efficient strategy to a trader or a farmer can be normatively shown, and consequently the study of implications of such choices can follow.

This study only considered the Kano plains non-NIB rice producers. To generalize on the marketing of rice produced outside NIB more case studies should be done, and research should extend into the areas mentioned above.

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APPENDIX I

QUESTIONNAIRE I:

ANALYSIS OF MARKETING OF RICE PRODUCED BY NON - N.I.B. FARMERS

1. District. ....Division.........Location.........

   Sublocation................

   Name of Interviewer.......................Date...........

   Respondent...

   Sex: Male/Female   Age...........

2. Farm Holdings:

   a. What is the total area of your land?...........hectares.

   b. How many hectares of the following crops did you plant

CROP	(a) This year (season)	(b) Last year (season)
Rice		
Maize		
Sorghum		
Others		

   c. Do you own all the land that you plant with rice? No/Ye

   d. How many hectares did you plant through leasing? ....

   hectares.

   e. How many hectares did you lease out?..........hectares

   f. Why did you decide to lease out some land to others?

   ....

   ....

g. If you leased, for how long have you operated the farm on this basis? ....

3. a. In your family, what is the

    i. number of children not attending school?.......

    ii. number of children in Prmary school? ....

    iii. number of children in secondary school?........

    iv. number of people having completed school?......

  b. How many of these members of the family do not reside permanently here in the family? Children...........

    adults..........

4. a. What is your main occupation? ....

  b. What other activities do you engage in?.............

    ....

5. What are your main sources of income?...................

  ....

  Which one is the most important source?..................

  ....

6. a. Did you ever obtain credit from some source during the last crop season? No/Yes

SOURCE	AMOUNT (KSHS)
Co-operative	
A.F.C.	
Commercial Bank	
Others	

b.What amounts are still outstanding?.............

7. Which major expenditures during the last harvesting of rice did you meet with your income?

TYPE	AMOUNT (KSHS)
Payments for school fees	
Payments for debts	
Purchase of farm inputs	
Others	

8. Farm Production

What quantities of the following crops did you produce (harvest)?

CROPS	TIME OF HARVEST	QUANTITIES
Rice		
Maize		
Sorghum		
Others		

9. a. At harvest time, what quantities of the following crops did you maintain?

CROPS	AMOUNT STOCKED
Rice	
Maize	
Sorghum	

b. How does the fluctuation in the quantities produced of rice affect the quantities which you retain?

    ....

    ....

    ....

10. Marketing

    a. What quantity of rice did you sell this season? ....

    b. When did you sell it?.....................

    c. How long did you take before selling out some quantities?.................................

    ....

    d. How then did you allocate the total rice (paddy) produced?

	QUANTITY
Retained for household consumption	
Payments in kind and gifts	
Seeds	
Rice sold out	
Others	

    e. whom have you been selling rice to?

      .. people known/related
      .. agents not related to farmer
      .. others

f. How did you sell? (through which channels)

        ..   through Co-operatives always/not always
        ..   to middlemen (agents) at the farm/market
            (always/not always)
        ..   consumers (always/not always)
        .   others

g. In what form did you sell the rice/paddy?........

   ....

h. Did you undertake any of the activities listed
    below

    i.   Processing
       What costs did you incur? (Amount)..........
       (for specified units of measurement)

   ii.   Storing
       What costs per unit?.......................
       Were these facilities adequate or not Yes/No

 iii.   What is the hulling out-turn? (Out of paddy
       being processed what quantity of rice do you
       usually obtain).

   iv.   Is the produce usually bought at the farm?

       Yes/No

       How did you transport rice to the market?

    i.   head loads

   ii.   using vehicles (matatus, lorries, buses)

 iii.   using bicycles

   iv.   using animals (donkeys)

j. Which ones of the above means do you own?...........
    ....

k. What is the distance of the farm from the

    a. nearest market .... km

    b. nearest mills............. km

l. Approximately how many shillings do you pay for
    transporting rice using any of the above means?

Modes	Charges/Unit (Kshs.)
Head	
Ox/donkey	
Vehicles (matatus, lorry/ buses	
Others	

m. Do these charges vary with time of the year
    (season) Yes/No

    What has been the trend? highest cost ....
    lowest cost.......... ever paid this crop season)

    What about other years?.............

a. At what price did you sell the rice (paddy)?

Type	Price/Unit	Time (Month)	Farm Gate	Market
Rice or Paddy				

b. Do you sell your rice in bulk (at once) Yes/No

What was the price?.................

c. If you do not sell in bulk, but in small quantities
at different times of the year, then which quantities
did you sell when and at what price?

Type	Rounds (month) after harvest (weeks)	Quantity	Price Per Unit	Farm Gate	Market

12. a. What major problems do you face after harvesting of
rice?

b. When did you experience lastly a crop failure? Year.

What were the causes?............................

....

c. Have you ever experienced any of the following problems?

i. Losses due to floods Yes/No Quantity...........

ii. Losses due to theft Yes/No Quantity...........

iii. Damages due to pest Yes/No Quantity...........

d. How do you try to cope up with each of these

problems specified above........................

....

13. a. Why did you decide to sell some of your produced

rice?

i.   To receive income to enable me meet other
     expenditures (specify)
ii. The price was favourably high
iii. Other (specify)

14. a. When did you start growing rice?................

Why did you start growing it?...................

i.   conditions have been suitable for its
      cultivation

ii.   in order to obtain income

iii. to provide (supplement) as a source of food

iv.   Other (specify).............................

b. Suppose the total quantity of rice produced
    increased, what would you do with it?

a. Sell all of it

b. Sell more than I used to sell

c. Consume more quantities than before

d. Sell the same amount

15. Do you know of the existence of officially
    gazetted producer prices paid by the National
    Irrigation Board to tenants? Yes/No

    How did you receive the information?..................

    Why did you sell at a price either

    i.   lower than the price gazetted?
    ii. higher than the price gazetted?

16. Suppose you were free to sell to either National
    Cereals and Produce Board (NCPB) depots, or to
    private millers, which ones would you prefer?.........

    ....

    Why?...

17. In your opinion, did you sell more than/less than that
    quantity you planned to sell? No/Yes Specify:........

    Why?...

    What quantity did you plan to sell out of your total
    production?

    ....

APPENDIX II

QUESTIONNAIRE II:

ANALYSIS OF RICE TRADERS

1.   District...............Division.........Location.........

Sublocation..............Name of Market..................

Name of Interviewer.................Respondent...........

Place of residence..................Date................

2.   a.   What is the distance of your place of residence
            (home) to the market?........................

      b.   Do you operate as an individual or on a cooperative
            basis?

      c.   When did you start trading in rice? Year...........
            With what motivations?

            i.   lack of other employment opportunities

           ii.   trading more profitable

          iii.   because I grow rice and need to sell some out

           iv.   Other...................................

      d.   Which other activities do you engage in?..........

            ....

      e.   What is your major source of income?.............

3.   a.   When do you usually purchase the rice?

            i.   immediately after harvest

           ii.   later

      b.   From which sources do you purchase rice?

            i.   farmers at farm gate
           ii.   farmers at market place (where)................
          iii.   other agents (where)... ....
           iv.   millers (where) ....

4.　a. How do you transport rice from the point of
purchase to the market?.....................

b. What costs do you incur in any of the modes you can
use?
....

Mode	Cost/Unit (charge) for specified distances
Head load	
Ox/donkeys	
Vehicles (matatu, buses, lorries)	
Others	

c.　Is your means of transport adequate/inadequate (always/
not always)?

d.　Which ones of the transport means do you own?..........

....

5.　a.　In what form do you buy the rice?......................

Do you undertake any processing?　Yes/No

Which ones?..

What costs do you incur per unit?......................

b.　How do you measure the rice when selling?..............

Do you undertake any grading?.........................

6.　a.　On average what volumes do you handle in the market?.....

b.　Are purchases made in bulk?　Yes/No

c.　What is the capacity of your storage facilities?........

7. Which problems do you face in the process of marketing of rice?

    .. pest damage
    .. losses due to handling
    .. losses in processing (low out-turn)
    .. theft
    .. others

8. a. At what price/unit did you purchase the paddy?......
    or rice?.....................

   b. How did you arrive at this price?

     a. bargaining
     b. the ruling price in the market was paid
     c. other terms (specify)

9. a. To whom do you sell?................................

    What is your selling price?..........................

   b. Do you know of the existence of regulated retail price for rice? No/Yes

    Why do you sell at a price below or above this official price?

     a. no alternative prices
     b. the product is not of very good quality as NCPB rice
     c. customers are known and prices are negotiable
     d. other (specify)

10. What are your common units of measurement?..........

Are you strict to the measurements when selling?

No/Yes

Explain:

11. a. What is your feeling about the purchasing price paid to farmers? (low, fair, high)

    What about the selling price? (low, fair, high)

12. Do you keep (hold some stocks of rice in your
    stores? No/Yes
    For What?.......
    During which periods?.............................

    Approximately what volumes?.........................

    Why do you keep rice ?   ....

    .. get expected future prices

    .. for consumption security

    .. other (specify)

13. a. What controls and regulations do you face for the
        rice that you trade upon?

          i.   taxation (how much)
         ii.   licencing (how much)
        iii.   other administrative controls

    b. How do you cope with these regulations?

          i.   abide by them (always/occasionally)
         ii.   avoid (always/occasionally)