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

BY
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Research Paper Submitted to the Department of Economics, University of Nairobi in partial fulfilment of the requirements for the Degree of Master of Arts in Economics.

MAY 1987.
This Research Paper is my Original Work and has not been presented for a degree in any other University.

Z.O. AMOS KICHE

This Research Paper has been submitted for examination with our approval as University Supervisors.

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Mr. L.M. Awiti
ACKNOWLEDGEMENT

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Without my sponsors, German Academic Exchange Programme (DAAD), I could not be able to take up this programme. I am therefore indebted to them.

I extend my appreciation to the Provincial Irrigation Unit Staff, of the Nyanza Province, for their assistance in data collection. To Mr. T.K. Opiyo, Mr. H. Ogindo and Mr. P. Momanyi, I say; thank you!

My sincere thanks go to my family for their sacrifice they made to enable me undertake this study. I am quite thankful to Anne and Michael.

Finally, I appreciate the skills of Margaret Karimi in the typing of this text.
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.
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 constraints 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 gazetted 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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1. INTRODUCTION

1.1 Background Information

1.1.1 Rice Growing Systems

Rice can be grown under different systems. Within the upland rice category dryland rice 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 occurred as a traditional type of farming in addition to other food crops like maize, sorghum, millet etc. 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 sunflower².

Despite local people's efforts to increase the production of rice, the Kenya Government has improved rice production in this area through 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.

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

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 varieties, pests and diseases, and generally those related to input supply and marketing of produce.

1.1.4 The Agricultural Marketing Structure

Kenya's 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 especially 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 exchange in different years, the level of concessions, which depends on world market conditions and finally the food aid inflows during years of drought.
<table>
<thead>
<tr>
<th>Year</th>
<th>Production (Paddy) *</th>
<th>Rice Equivalent (^{a})</th>
<th>Imports (Rice)</th>
<th>Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1000 Tonnes</td>
<td>1000 Tonnes</td>
<td>1000 Tones</td>
<td>1000 Tones</td>
</tr>
<tr>
<td>1970</td>
<td>25,730</td>
<td>18,011</td>
<td>1,149</td>
<td>19,160</td>
</tr>
<tr>
<td>1971</td>
<td>27,443</td>
<td>19,210</td>
<td>10,203</td>
<td>29,413</td>
</tr>
<tr>
<td>1972</td>
<td>31,749</td>
<td>20,224</td>
<td>2,150</td>
<td>24,374</td>
</tr>
<tr>
<td>1973</td>
<td>34,943</td>
<td>24,460</td>
<td>23</td>
<td>24,483</td>
</tr>
<tr>
<td>1974</td>
<td>33,563</td>
<td>23,494</td>
<td>1,502</td>
<td>24,996</td>
</tr>
<tr>
<td>1975</td>
<td>31,558</td>
<td>22,090</td>
<td>4</td>
<td>22,094</td>
</tr>
<tr>
<td>1976</td>
<td>36,946</td>
<td>25,862</td>
<td>10,001</td>
<td>35,863</td>
</tr>
<tr>
<td>1977</td>
<td>43,640</td>
<td>30,548</td>
<td>24</td>
<td>30,572</td>
</tr>
<tr>
<td>1978</td>
<td>38,485</td>
<td>26,939</td>
<td>111</td>
<td>27,050</td>
</tr>
<tr>
<td>1979</td>
<td>34,912</td>
<td>24,438</td>
<td>241</td>
<td>24,679</td>
</tr>
<tr>
<td>1980</td>
<td>37,475</td>
<td>26,232</td>
<td>1,239</td>
<td>27,471</td>
</tr>
<tr>
<td>1981</td>
<td>39,944</td>
<td>27,960</td>
<td>4,939</td>
<td>32,899</td>
</tr>
<tr>
<td>1982</td>
<td>38,600</td>
<td>27,020</td>
<td>11,080</td>
<td>38,900</td>
</tr>
<tr>
<td>1983</td>
<td>33,600</td>
<td>23,520</td>
<td>44,768</td>
<td>68,288</td>
</tr>
<tr>
<td>1984</td>
<td>36,400</td>
<td>25,480</td>
<td>96,188</td>
<td>121,668</td>
</tr>
</tbody>
</table>

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

Note (a). *Rice equivalent calculated using a conversion ratio 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.

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. 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

<table>
<thead>
<tr>
<th>Year</th>
<th>Producer Price Shs./kg. (Paddy)</th>
<th>Retail Prices Shs./Kg.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grade I</td>
<td>Grade II</td>
</tr>
<tr>
<td>1980/81</td>
<td>1.60</td>
<td>1.20</td>
</tr>
<tr>
<td>1981/82</td>
<td>2.70</td>
<td>2.00</td>
</tr>
<tr>
<td>1982/83</td>
<td>2.80</td>
<td>2.35</td>
</tr>
<tr>
<td>1983/84</td>
<td>3.25</td>
<td>2.70</td>
</tr>
<tr>
<td>1984/85</td>
<td>4.15</td>
<td>2.75</td>
</tr>
</tbody>
</table>

Source:  
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

<table>
<thead>
<tr>
<th>Year</th>
<th>Producer price Shs./Kg.</th>
<th>Retail Prices Shs./Kg.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Grade I</td>
</tr>
<tr>
<td>1980/81</td>
<td>1.504</td>
<td>5.72</td>
</tr>
<tr>
<td>1981/82</td>
<td>1.50</td>
<td>7.56</td>
</tr>
<tr>
<td>1982/83</td>
<td>1.50</td>
<td>8.17</td>
</tr>
<tr>
<td>1983/84</td>
<td>1.78</td>
<td>6.35</td>
</tr>
<tr>
<td>1984/85</td>
<td>1.78</td>
<td>7.20</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Year</th>
<th>Gazetted Prices (a) Kshs/kg</th>
<th>Market Prices (b) Shs/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grade I</td>
<td>Grade II</td>
</tr>
<tr>
<td>1980/81</td>
<td>3.10</td>
<td>1.85</td>
</tr>
<tr>
<td>1981/82</td>
<td>2.80</td>
<td>2.60</td>
</tr>
<tr>
<td>1982/83</td>
<td>3.95</td>
<td>3.25</td>
</tr>
<tr>
<td>1983/84</td>
<td>4.50</td>
<td>3.65</td>
</tr>
<tr>
<td>1984/85</td>
<td>4.70</td>
<td>3.80</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Retail Prices (a) Shs./Kg.</th>
<th>Producer prices (b) Shs./Kg.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grade I</td>
<td>Grade II</td>
</tr>
<tr>
<td>1980/81</td>
<td>1.02</td>
<td>1.71</td>
</tr>
<tr>
<td>1981/82</td>
<td>2.06</td>
<td>1.40</td>
</tr>
<tr>
<td>1982/83</td>
<td>1.42</td>
<td>1.13</td>
</tr>
<tr>
<td>1983/84</td>
<td>0.80</td>
<td>1.20</td>
</tr>
<tr>
<td>1984/85</td>
<td>-1.65</td>
<td>1.95</td>
</tr>
</tbody>
</table>

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 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. 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 inefficiency 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 in turn 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.t.c 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 geographical 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 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.
To determine the nature of retail price formation for rice.

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 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 a lot 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, 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


3. Ibid., pp 1-3.

4. Ibid., pp 1-3.

5. Ibid., Appendix 6.

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.


10. Ibid., pp. 7.
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 separations and result in exchange and consumption

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 interpret 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 psychology. 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.

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 Literature 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. Some 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 ranges from 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 et al (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 low expenditure 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 Ogwe1 (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."

She described an efficient market as that which performs its 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.

Rigui (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 Merchants (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 Overview 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. 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 outside 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 enterprise. This distinction is important, as it adds to the understanding of households behaviour as a production and consumption unit. Krishna and Behrman 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 attitudes 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


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


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;

\[
RP = f(PP, TC, AQ, E, D_1, D_2, D_3), \quad \text{------------------- (1)}
\]

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 Experience 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

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

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 utility 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,

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

Let also the households consumption of rice be expressed as

\[ QD_i = QD(F_i, Z_i) \quad \text{for } i=1,2, \ldots, N \quad \text{(3)} \]

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

\[ QS_i = QS(PP_i) \quad \text{for } i=1,2, \ldots, N. \]
But for every household quantity marketed is equal to the quantity supplied to the market \((Q_{Mi} = Q_{Si})\). In this model we have the basic identity that:

\[ Q_i(L, \lambda) = QM(PP) + QD(F_i, Z_i) \quad \text{for} \quad i = 1, 2, \ldots, N \quad \text{(6)} \]

Rewriting \(QM(PP_i) = Q(L_i \lambda_i) - QD(F_i, Z_i) \quad \text{........... (7)}\)

\(L_i\) and \(\lambda_i\) 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 \(Y = \frac{Q}{L}\) if the \(\lambda\) component is ignored for simplicity purposes. From the identity equation (6) we get equations of the following nature:

\[\begin{align*}
(a) & \quad QM = f(Q, PP, F, Z) \quad \text{----------------} \quad (6) \\
(b) & \quad QM = g(Y, PP, F, Z) \quad \text{----------------} \quad (7) \\
(c) & \quad QM/Q = h(Q, PP_i, F, Z) \quad \text{----------------} \quad (8)
\end{align*}\]

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 quantities 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) **Determinants of Retail Price for Rice**

(a) \[RP = \beta_0 + \beta_1 PP + \beta_2 TC + \beta_3 AQ + \beta_4 E_1 + \beta_5 D_1 + \beta_6 D_2 + \beta_7 D_3 + \varepsilon \quad \ldots \ldots \quad (9)\]

(b) \[\ln RP = \beta_0 + \beta_1 \ln PP + \beta_2 \ln TC + \beta_3 \ln AQ + \beta_4 \ln E + \beta_5 D_1 + \beta_6 D_2 + \beta_7 D_3 + \varepsilon \quad \ldots \ldots \quad (1)\]

(ii) **Determinants of Marketed output of Paddy**

(a) \[QM = \beta_1 Q + \beta_2 PP + \beta_3 F + \beta_4 Z + \beta_5 D_1 + \beta_6 D_2 + \varepsilon \quad \ldots \ldots \quad (1)\]

(b) \[QM = \beta_0 + \beta_1 Y + \beta_2 PP + \beta_3 F + \beta_4 Z + \beta_5 D_1 + \beta_6 D_2 + \varepsilon \quad \ldots \ldots \quad (1)\]

(c) \[\ln QM = \beta_0 + \beta_1 \ln Q + \beta_2 \ln PP + \beta_3 \ln F + \beta_4 \ln Z + \beta_5 D_1 + \beta_6 D_2 + \varepsilon \quad \ldots \ldots \quad (1)\]

(d) \[\ln QM = \beta_0 + \beta_1 \ln Y + \beta_2 \ln PP + \beta_3 \ln F + \beta_4 \ln Z + \beta_5 D_1 + \beta_6 D_2 + \varepsilon \quad \ldots \ldots \quad (1)\]

\[\varepsilon\] 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.

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 rehabilitation 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 registered by the PIU, from which to draw a random sample of 76 farmers.

(ii) By considering the total farmer populations 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 sampling 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 (rice) traders. Much of the rice traded in this area is produced from the Non-NIB farms. NIB schemes rice finds its 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, Ombeyi and Rabuor markets with sizes of
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.
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 analyzing 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 centers. 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.


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 farmer produced about 13.8 bags of paddy. Output, however, varied significantly with a standard deviation of 14.98 bags in that season.

<table>
<thead>
<tr>
<th>Name of scheme</th>
<th>Entire Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm Size in hectares</td>
<td></td>
</tr>
<tr>
<td>Wasare</td>
<td>2.44</td>
</tr>
<tr>
<td>Nyatini</td>
<td>(3.8)(^1)</td>
</tr>
<tr>
<td>Alungo</td>
<td></td>
</tr>
<tr>
<td>Production in Bags</td>
<td></td>
</tr>
<tr>
<td>Wasare</td>
<td>15.4</td>
</tr>
<tr>
<td>Nyatini</td>
<td>(17.3)</td>
</tr>
<tr>
<td>Alungo</td>
<td></td>
</tr>
<tr>
<td>Yield in Bags/hecate</td>
<td></td>
</tr>
<tr>
<td>Wasare</td>
<td>7.9</td>
</tr>
<tr>
<td>Nyatini</td>
<td>(6.6)</td>
</tr>
<tr>
<td>Alungo</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) 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>
<thead>
<tr>
<th>Name of Scheme</th>
<th>Entire Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wasare</td>
<td>Nyatini</td>
</tr>
<tr>
<td>Marketed output of Paddy in Bags</td>
<td>11.01</td>
</tr>
<tr>
<td></td>
<td>(12.95)</td>
</tr>
<tr>
<td>Availability of Other Cereals in total (Bags)</td>
<td>4.089</td>
</tr>
<tr>
<td></td>
<td>(4.52)</td>
</tr>
</tbody>
</table>

\(^1\) 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 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 preferred.

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.
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).

Table 8. Transport Modes by Markets

<table>
<thead>
<tr>
<th>Name of Market</th>
<th>No. of traders using vehicles</th>
<th>No. of traders using bicycles</th>
<th>No. of traders using donkeys</th>
<th>No. of traders using head loads</th>
<th>Others</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahero</td>
<td>10 (47.6)</td>
<td>0 (0)</td>
<td>10 (52.6)</td>
<td>0 (0)</td>
<td>5 (45.4)</td>
<td>25</td>
</tr>
<tr>
<td>Katito</td>
<td>5 (23.8)</td>
<td>1 (50)</td>
<td>7 (36.8)</td>
<td>3 (100)</td>
<td>0 (0)</td>
<td>16</td>
</tr>
<tr>
<td>Ombeyi</td>
<td>3 (14.3)</td>
<td>1 (50)</td>
<td>1 (5.3)</td>
<td>0 (0)</td>
<td>3 (27.3)</td>
<td>8</td>
</tr>
<tr>
<td>Rabuor</td>
<td>3 (14.3)</td>
<td>0 (0)</td>
<td>1 (5.3)</td>
<td>0 (0)</td>
<td>3 (27.3)</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>21 (37.5)</strong></td>
<td><strong>2 (3.6)</strong></td>
<td><strong>19 (33.9)</strong></td>
<td><strong>3 (5.4)</strong></td>
<td><strong>11 (19.6)</strong></td>
<td><strong>56 (100)</strong></td>
</tr>
</tbody>
</table>

1 Figures in brackets are percentages.
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 marketing 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.
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.

Hypothesis 1.

That the distance from a traders home to the market (mills) 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. The chi square value \(X^2 = 14.9, \text{ d.f} = 20\) 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 \(X^2 = 19.3, \text{ d.f} = 12\) indicates that the pattern of choice was homogenous across the traders in the different markets. The calculated chi square 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. This is the proportion which farmers (tenants) in NIB retain for household consumption needs.

Table 10. Market Mills, costs and out-turn

<table>
<thead>
<tr>
<th>Market</th>
<th>No of Millers</th>
<th>Average no of Mills/Miller</th>
<th>Milling costs (Ksh/Kg)</th>
<th>out-turn (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mixed</td>
<td>Graded</td>
</tr>
<tr>
<td>Ahero</td>
<td>3</td>
<td>3</td>
<td>0.50</td>
<td>0.6</td>
</tr>
<tr>
<td>Katito</td>
<td>2</td>
<td>2</td>
<td>0.50</td>
<td>-</td>
</tr>
<tr>
<td>Ombeyi</td>
<td>1</td>
<td>3</td>
<td>0.50</td>
<td>-</td>
</tr>
<tr>
<td>Rabuor</td>
<td>1</td>
<td>3</td>
<td>0.50</td>
<td>-</td>
</tr>
</tbody>
</table>

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 malpractices 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

<table>
<thead>
<tr>
<th>Market</th>
<th>No of traders too strict to measures</th>
<th>No of traders not too strict to measures</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahero</td>
<td>11 (35.5)¹</td>
<td>14 (56)</td>
<td>25</td>
</tr>
<tr>
<td>Katito</td>
<td>10 (32.3)</td>
<td>6 (24)</td>
<td>16</td>
</tr>
<tr>
<td>Ombeyi</td>
<td>5 (16.1)</td>
<td>3 (12)</td>
<td>8</td>
</tr>
<tr>
<td>Rabuor</td>
<td>5 (16.1)</td>
<td>2 (8)</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>31 (100)</strong></td>
<td><strong>25 (100)</strong></td>
<td><strong>56</strong></td>
</tr>
</tbody>
</table>

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 withheld 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

<table>
<thead>
<tr>
<th>Traders Payments</th>
<th>No. of traders for always</th>
<th>No. of traders for occasionally</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoiding</td>
<td>2 (6.1)</td>
<td>7 (30.4)</td>
<td>9 (16.1)</td>
</tr>
<tr>
<td>Paying</td>
<td>31 (93.9)</td>
<td>16 (69.6)</td>
<td>47 (83.9)</td>
</tr>
<tr>
<td>Total</td>
<td>33 (100)</td>
<td>23 (100)</td>
<td>56 (100)</td>
</tr>
</tbody>
</table>

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. Traders Organizations by Markets

<table>
<thead>
<tr>
<th>Market</th>
<th>No. of traders operating as individuals</th>
<th>No. of traders in some form of co-operation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahero</td>
<td>23 (46)</td>
<td>2 (33.3)</td>
<td>25</td>
</tr>
<tr>
<td>Katito</td>
<td>14 (28)</td>
<td>2 (33.3)</td>
<td>16</td>
</tr>
<tr>
<td>Onbeyi</td>
<td>6 (12)</td>
<td>2 (33.3)</td>
<td>8</td>
</tr>
<tr>
<td>Rabuor</td>
<td>7 (14)</td>
<td>0 (0)</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>50 (100)</td>
<td>6 (100)</td>
<td>56</td>
</tr>
</tbody>
</table>

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 transportation and milling of paddy in order to sell rice. The other type was pure rice traders, who purchased 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

<table>
<thead>
<tr>
<th>Average Quantity (Bags)</th>
<th>No. of people trader/farmer</th>
<th>No. of people trader only</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1.1</td>
<td>6 (54.5)</td>
<td>35 (77.8)</td>
<td>41 (73.2)</td>
</tr>
<tr>
<td>1.1 - 3</td>
<td>3 (27.3)</td>
<td>3 (6.7)</td>
<td>6 (10.7)</td>
</tr>
<tr>
<td>3.1 - 5</td>
<td>1 (9.1)</td>
<td>5 (11.1)</td>
<td>6 (10.7)</td>
</tr>
<tr>
<td>5.1 - 7</td>
<td>0 (0)</td>
<td>1 (2.2)</td>
<td>1 (1.8)</td>
</tr>
<tr>
<td>7.1 - 9</td>
<td>1 (9.1)</td>
<td>0 (0)</td>
<td>1 (1.8)</td>
</tr>
<tr>
<td>9.1 + above</td>
<td>0 (0)</td>
<td>1 (2.2)</td>
<td>1 (1.8)</td>
</tr>
<tr>
<td>Total</td>
<td>11 (100)</td>
<td>45 (100)</td>
<td>56 (100)</td>
</tr>
</tbody>
</table>

1. Figures in brackets are percentages.
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 occurred 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

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

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 contingency 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 \( (X^2 = 4, \text{df} = 5) \) 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. These 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 characteristics, 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

<table>
<thead>
<tr>
<th>Type of farmer</th>
<th>No. of farmers selling bulk in bags at once</th>
<th>No. of farmers selling in bulk in bags at different times</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmer only</td>
<td>37 (92.5)</td>
<td>19 (61.3)</td>
<td>56 (78.9)</td>
</tr>
<tr>
<td>Farmer/trader</td>
<td>3 ( 7.5)</td>
<td>12 (38.7)</td>
<td>15 (21.1)</td>
</tr>
<tr>
<td>Total</td>
<td>40 ( 100)</td>
<td>31 ( 100)</td>
<td>71 ( 100)</td>
</tr>
</tbody>
</table>

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. Distance from Markets and Point of Sale

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

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 relationship 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 \( (X^2 = 10.28, \text{d.f }= 1) \) 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

<table>
<thead>
<tr>
<th>Distance in miles</th>
<th>No. of farmers who sold immediately</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 1</td>
<td>12 (40)</td>
</tr>
<tr>
<td>1.1 - 2</td>
<td>3 (10)</td>
</tr>
<tr>
<td>2.1 - 3</td>
<td>1 (3.3)</td>
</tr>
<tr>
<td>3.1 - 4</td>
<td>9 (30)</td>
</tr>
<tr>
<td>4.1 - 5</td>
<td>3 (10)</td>
</tr>
<tr>
<td>5.1 + above</td>
<td>2 (6.7)</td>
</tr>
<tr>
<td>Total</td>
<td>30 (100)</td>
</tr>
</tbody>
</table>

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 dependence between the two variables. In the chi-square test, the calculated value \( (X^2 = 26.23, \text{d.f} = 5) \) 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

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

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 $\chi^2 = 18.46$, 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 strategy 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

<table>
<thead>
<tr>
<th>Scheme</th>
<th>No. of farmers for local middlemen</th>
<th>No. of farmers for N.C.P.B or KIBOs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wasare</td>
<td>18 (42.9)</td>
<td>17 (58.6)</td>
<td>35</td>
</tr>
<tr>
<td>Alungo</td>
<td>6 (14.2)</td>
<td>9 (31 )</td>
<td>15</td>
</tr>
<tr>
<td>Nyatini</td>
<td>18 (42.9)</td>
<td>3 (10.4)</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>42 (100 )</td>
<td>29 (100)</td>
<td>71</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Preference</th>
<th>Payments of Cash</th>
<th>Easy outlet and bulk purchase</th>
<th>High/official price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local traders</td>
<td>31 (100)</td>
<td>2 (11.8)</td>
<td>6 (42.9)</td>
</tr>
<tr>
<td>NCPB</td>
<td>0 (0)</td>
<td>15 (88.2)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>31 (100)</td>
<td>17 (100)</td>
<td>14 (100)</td>
</tr>
</tbody>
</table>

1 Figures in brackets are percentages.

From Table 21, 43.7% of the farmers preferred 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 preferred 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.
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

<table>
<thead>
<tr>
<th>Markets</th>
<th>No. of traders who Know</th>
<th>No. of traders who did not know</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahero</td>
<td>7 (77.8)¹</td>
<td>18 (38.3)</td>
<td>25</td>
</tr>
<tr>
<td>Katito</td>
<td>1 (11.1)</td>
<td>15 (31.9)</td>
<td>16</td>
</tr>
<tr>
<td>Ombeiyi</td>
<td>0 (0)</td>
<td>8 (17.0)</td>
<td>8</td>
</tr>
<tr>
<td>Rabuor</td>
<td>1 (11.1)</td>
<td>6 (12.8)</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>9 (100)</td>
<td>47 (100)</td>
<td>56</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Schemes</th>
<th>No. of Farmers who Knew</th>
<th>No. of farmers who did not know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wasare</td>
<td>12 (66.7)</td>
<td>23 (43.4)</td>
</tr>
<tr>
<td>Alungo</td>
<td>4 (22.2)</td>
<td>11 (20.8)</td>
</tr>
<tr>
<td>Nyatini</td>
<td>2 (11.1)</td>
<td>19 (35.8)</td>
</tr>
<tr>
<td>Total</td>
<td>18 (100)</td>
<td></td>
</tr>
</tbody>
</table>

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 knowledge 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 gazetted 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

<table>
<thead>
<tr>
<th>Description</th>
<th>Shs/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selling price of rice (Shs. 15/2 kg 'Cow Boy' tin),</td>
<td>6.50</td>
</tr>
<tr>
<td>Less Purchasing price of paddy</td>
<td>3.10</td>
</tr>
<tr>
<td>Transport cost for paddy</td>
<td>0.20</td>
</tr>
<tr>
<td>Milling Cost</td>
<td>0.50</td>
</tr>
<tr>
<td>Margins to traders</td>
<td>2.70</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Description</th>
<th>(Shs/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selling price of rice Shs 15/2kg 'CowBoy tin'</td>
<td>6.50</td>
</tr>
<tr>
<td>Less purchasing price of rice Shs 13/ 2kg 'Cow Boy tin'</td>
<td>5.50</td>
</tr>
<tr>
<td>Margins to traders</td>
<td>1.00</td>
</tr>
</tbody>
</table>

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

\[ H_0 : \mu_1 - \mu_2 = 0 \]

\[ H_1 : \mu_1 - \mu_2 \neq 0. \]

The test statistic

\[ t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1 + n_2 - 2}} \frac{1}{\sqrt{n_1 n_2}}} \]

with d.f = \( n_1 + n_2 - 2 \).

\( n_1 \) = 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.

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:

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

The summary of the regression results for this equation are presented in Table 25.
### Table 25. Regression Results on Determinants of Retail Price variation.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression Coefficient</th>
<th>t. values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchasing price (PP)</td>
<td>0.0102</td>
<td>2.113</td>
</tr>
<tr>
<td>Average Quantity (AQ)</td>
<td>0.2543</td>
<td>4.309</td>
</tr>
<tr>
<td>Marketing Costs (TC)</td>
<td>-0.0142</td>
<td>-0.972</td>
</tr>
<tr>
<td>Experience (E)</td>
<td>-0.0439</td>
<td>-1.359</td>
</tr>
<tr>
<td>Market Day (D₁)</td>
<td>-0.0807</td>
<td>-0.254</td>
</tr>
<tr>
<td>Farmer/Trader (D₂)</td>
<td>0.3205</td>
<td>0.9</td>
</tr>
<tr>
<td>Knowledge of official Price (D₃)</td>
<td>-0.558</td>
<td>-1.311</td>
</tr>
<tr>
<td>Constant</td>
<td>12.4896</td>
<td></td>
</tr>
</tbody>
</table>

\[ R^2 = 0.56 \]

\[ \text{S.E.E.} = 0.71 \]

\[ F = 4.1 \]

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 greater 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.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression Coefficient</th>
<th>F-ratio d.f(1,27)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchasing Price (PP)</td>
<td>0.0105</td>
<td>5.744</td>
</tr>
<tr>
<td>Average Quantities (AQ)</td>
<td>0.2174</td>
<td>15.984</td>
</tr>
<tr>
<td>Knowledge of official price (D3)</td>
<td>-0.7549</td>
<td>-3.979</td>
</tr>
<tr>
<td>Constant</td>
<td>11.5303</td>
<td></td>
</tr>
</tbody>
</table>

\[ R^2 = 0.48 \]
\[ S.E.E. = 0.71 \]
\[ F \text{ ratio} = 8.265. \]

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:

\[ QM = \beta_0 + \beta_1 Q + \beta_2 PP + \beta_3 F + \beta_4 Z + \beta_5 D_1 + \beta_6 D_2 + \epsilon \]

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

**Table 27. Summary of Regression Results on Determinants of Marketed output of Paddy**

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

\[ R^2 = 0.904 \]
\[ S.E.E. = 3.879 \]
\[ F = 90.583 \]
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 subsistence 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

<table>
<thead>
<tr>
<th>Name of scheme</th>
<th>Output elasticity</th>
<th>Price elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wasare</td>
<td>0.105</td>
<td>0.251</td>
</tr>
<tr>
<td>Nyatini</td>
<td>0.096</td>
<td>0.401</td>
</tr>
<tr>
<td>Alungo</td>
<td>0.094</td>
<td>0.179</td>
</tr>
<tr>
<td>Entire sample</td>
<td>0.102</td>
<td>0.27</td>
</tr>
</tbody>
</table>

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.
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 mill their 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 activities 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. Purchases of paddy occur throughout the year after the harvests. Farmers do not have a consistently uniform crop calendar 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 withholding of farm supplies results from a decision 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,
the existence of wide price fluctuations, the government announces the prices annually. It is estimated that 30% of the farmers and traders do not exist. This indicates the existence of such prices. This indicates the existence of farmer exploitation by the traders if they receive a paddy price below the floor price.

Analysis of the margins to the traders in the parallel market traders receive which are higher than the margins to the and wholesalers of rice in the formal. Before the 1987 Price review by the Ministry of Commerce total trade margins were about the common grade. This amount included transport, storage, handling and other costs. After considering the marketing costs in the parallel market were getting kg. Other types of traders were getting kg. After deducting the marketing costs official margin of shs. 4.40/kg, competitors traders in official market is less than kg which is received by traders in the market. Margins to the traders in the local markets are therefore high and hence in terms of efficiency 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 preferred to sell to local dealers owing to the reason that they pay cash with collection of paddy. Farmers who preferred NCPB were those who recognised the 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 criteria 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 announces 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 farmer'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.
BIBLIOGRAPHY


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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?

<table>
<thead>
<tr>
<th>CROP</th>
<th>(a) This year (season)</th>
<th>(b) Last year (season)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maize</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sorghum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   c. Do you own all the land that you plant with rice? No/Yes
   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 Primary 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
b. What amounts are still outstanding? 

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

<table>
<thead>
<tr>
<th>TYPE</th>
<th>AMOUNT (KSHS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payments for school fees</td>
<td></td>
</tr>
<tr>
<td>Payments for debts</td>
<td></td>
</tr>
<tr>
<td>Purchase of farm inputs</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
</tr>
</tbody>
</table>

8. Farm Production

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

<table>
<thead>
<tr>
<th>CROPS</th>
<th>AMOUNT STOCKED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td></td>
</tr>
<tr>
<td>Maize</td>
<td></td>
</tr>
<tr>
<td>Sorghum</td>
<td></td>
</tr>
</tbody>
</table>

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?

<table>
<thead>
<tr>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retained for household consumption</td>
</tr>
<tr>
<td>Payments in kind and gifts</td>
</tr>
<tr>
<td>Seeds</td>
</tr>
<tr>
<td>Rice sold out</td>
</tr>
<tr>
<td>Others</td>
</tr>
</tbody>
</table>

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?

<table>
<thead>
<tr>
<th>Modes</th>
<th>Charges/Unit (Kshs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td></td>
</tr>
<tr>
<td>Ox/donkey</td>
<td></td>
</tr>
<tr>
<td>Vehicles (matatus, lorry/</td>
<td></td>
</tr>
<tr>
<td>buses</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
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</tbody>
</table>

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)?
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?

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?

<table>
<thead>
<tr>
<th>Mode</th>
<th>Cost/Unit (charge) for specified distances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head load</td>
<td></td>
</tr>
<tr>
<td>Ox/donkeys</td>
<td></td>
</tr>
<tr>
<td>Vehicles (matatu, buses, lorries)</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
</tr>
</tbody>
</table>

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)