ECONOMIC ANALYSIS OF COFFEE CO-OPERATIVE SOCIETIES. A CASE STUDY OF CENTRAL PROVINCE IN KENYA

BY

MUTURI L.K

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DECLARATION

I, Lydia K. Muturi declare this Thesis is my original work and has not been presented for a degree in any other University

Signed _____ 15/8/94

L.K. Muturi

I declare that this thesis has been submitted for examination with my approval as the University Supervisor

Signed _____ 23/8/94

Dr. H.O. Nyangito

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Abstract

The coffee industry is an important sub-sector in agriculture. However, despite its importance, the industry has been facing a lot of problems especially in the marketing of coffee by the co-operatives. The co-operative sub-sector of the coffee industry has been blamed for inefficiencies in internal coffee marketing. Neither have the various aspects of this inefficiency been identified nor are factors underlying it clear. This study focused on analysing the factors that affect the efficiency of coffee marketing by the co-operative societies. The objectives of this study were:

1. To describe the cost structure of coffee co-operative societies in the area of study and establish the optimal level of operation.
2. To establish whether the costs recovered by the societies are economically justified.
3. To determine factors responsible for costs variation and whether there is scope for improving efficiency of the coffee co-operative societies and the factories.

To achieve the first objective, regression analysis was used while correlation analysis was used to assess whether the marketing costs were significantly different from the marketing margins. The study also evaluated whether the societies were efficient in handling of farmers' payment by analysing the ratio of clean coffee to cherry coffee. To evaluate whether there is scope for improving efficiency through improvement of technical efficiency, the study used

descriptive analysis of accounting data. In this approach, the factories were categorized into four groups according to size. The groups were then analysed whether they differed in their ability to keep unit cost down or whether the differences in levels of various cost items were due to chance fluctuations.

Two hypotheses based on the objectives were advanced. It was hypothesized that, the co-operative societies do not operate at minimum cost and that the deductions (marketing margins) made by the co-operative societies are not significantly different from the marketing costs.

To achieve the above objectives, relevant data were collected and analysed using Statistical Package for Social Sciences (SPSS). The data were collected from sampled societies in Central province, Kenya Planters Co-operative Union (KPCU) and Ministry of Co-operative Development (MOCD). The study found out that:

1. Most co-operative societies operate at levels lower than the optimum and consequently incur very high costs. The optimum level of cherry intake was found to be about 7.5 thousand tonnes at a cost of Kshs 751.73 per tonne of cherry processed. The societies have therefore not managed to reduce per unit marketing cost as they are meant to do.
2. The co-operative societies make higher deductions than can be justified by the estimated marketing costs. The mean marketing margin was Kshs 1.85 which was significantly higher than the mean

marketing cost which was Kshs 1.21 per kilogram of cherry processed.

3. The co-operative societies are inefficient in the handling of the farmers' payments as shown by the analysis of cherry: clean coffee ratio. The ratio as calculated in this study (6.74) was significantly less than that recorded by the societies (6.79). This showed that farmers were losing about 0.05 Kilograms of cherry per every tonne of clean coffee.
4. There is scope for improving the efficiency of co-operative societies through improvement of technical efficiency by expansion of volume of cherry handled.

It is concluded that the overall performance of the co-operative societies is unsatisfactory and that there is need to make improvements in area of providing marketing services so that marketing margins are not in excess of marketing costs. Reduction of processing costs in societies with high cost due to low cherry volumes can be done by amalgamation of the small and uneconomical societies.

CHAPTER 1

INTRODUCTION

Kenya's economy largely depends on agriculture. Coffee is one of the most important commodities of Kenya's agriculture. The coffee subsector plays a major role in the economy as a foreign exchange earner and in creation of employment in both the rural and urban areas. As of 1986, coffee was Kenya's top foreign exchange earner. By 1988, about 70 per cent of the national labour force was employed in the agricultural sector, out of which a third was absorbed by the coffee industry (Kenya,1988). However, the industry has since been overtaken by tourism and tea as a foreign exchange earner (Kenya,1990).

Kenya's coffee production grew steadily from a meagre 12 000 tonnes in 1931 to a level of about 130 000 tonnes in 1988 (CBK annual reports). The phenomenal growth was facilitated by a combination of factors, mainly expansion of acreage and increase in yield per unit area. The trend in world coffee prices was also on average, favourable to the growth of the coffee industry.

The favourable trend in prices had been facilitated by the price support mechanism of the International Coffee Agreement (ICA). The price support mechanism was, however withdrawn on 4th July 1989, when the economic provisions of the ICA were suspended (ICO,1990). The suspension happened at a time of a

global glut in coffee supply, thereby forcing the coffee prices into a plunge. By 1990, real prices had fallen by 54 per cent (CBK,1991)

The sharp decline in global coffee prices has had quite adverse effects on the Kenyan coffee industry to the extent that the sales realization is below production costs. For example, the 1990/91 price of clean coffee was about Kshs 2500 per tonne while the cost of production per tonne of clean coffee was about Kshs 2600 (Table 1.1).

In 1986, the Government of Kenya set forth goals for the agricultural sector in its fifth Development Plan. These goals were based on an intensification of major food crops production, increased research and expansion in area and yields of high value crops such as tea and coffee. According to the plan, coffee production was to triple by the year 2000. To achieve such a dramatic increase, area expansion was projected at 83 per cent, and yields on existing area would as much as double due to conversion from the traditional variety to Ruiru 11 (Kenya, 1986). The sixth development plan also planned for increase in coffee area (Kenya,1989). Such projections appear unrealistic in light of Kenya's coffee poor performance during the last few years. This poor performance of the industry although mainly due to the poor world coffee prices, internal organizational and marketing related problems are also to blame.

Table 1.1

Average cost of coffee production and prices per tonne of clean coffee

Year	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91
Cost Ksh/tonne	1255	1069	1632	1640	2133	1877	2204	2543	2635
Price Ksh/ton	1748	1813	3110	2716	1706	2282	1603	1927	1454

Source: CBS annual reports

The price of Kenya coffee fluctuates with the international market and bears no relationship to the cost of coffee production (Table 1.1). While there is little the Government can do about the prices, a lot can be done to solve the internal problems. It is with this in mind that the Kenya Government commissioned a study in 1986 to look into the problems affecting the coffee industry. The study identified a major problem in the handling and processing of the coffee by the co-operative societies.

The co-operatives are the vehicles through which farmers market their coffee, receive their payments and inputs. The responsibility of the farmer often ends after delivery of the coffee to the factory. The burden of the responsibility remains with the society factory. As far as the coffee activity is concerned, the societies are expected to do the following:

i) receive cherry and mbuni from the members

ii) process the cherry at the factory

iii) send the parchment and the mbuni (dry processed coffee) to Kenya Planters Co-operative Union (KPCU)

iv) receive the coffee revenue after the coffee has

been sold by the marketing institution

v) deduct operational expenses from gross sales, and

vi) pay the farmers their net revenue without unnecessary delay.

The co-operatives make deductions on the farmers' proceeds to cover the costs incurred in performing these functions. These deductions made on the farmers proceeds have been said to be unreasonably high (World Bank, 1987). This results in low payouts to farmers in relation to sale proceeds realised by Coffee Board of Kenya (CBK) auctions. Consequently, farmers have scaled down investments in the husbandry of the coffee crop (Crandall, 1993).

Following the findings of the World Bank study in 1987, a coffee improvement project was implemented whose main objective was to raise farmers income in the smallholder and small estate (estates below 20ha) coffee subsectors, through improvements in the quality and quantity of the coffee produced . This project came to be known as the Second Coffee Improvement Project (SCIP II)[1].

One of the components of SCIP is an Improved Payment System (IPS) for smallholder. The objective of this component is to improve on timeliness and regularity of cash payments to the smallholder. This objective will partly be achieved by

[1]Kenya's first smallholder coffee improvement project, financed by commonwealth Development Corporation (CDC) and International Development Association (IDA) ran from 1979-87.

ensuring that charges by the intermediate marketing institutions, i.e. co-operative societies, unions, and Kenya Planters Co-operative Union (KPCU) on the farmers incomes are regulated and determined to be reasonable.

The focus of this study is to analyse the charges made by the co-operative societies to cover their costs.

1.1 Background Information on the Coffee Industry

Coffee in Kenya is grown both in smallholder and estate farms. The smallholders are organized into co-operative societies which process and market the coffee on their behalf. The smallscale sector accounts for about 76 per cent of the national coffee hectarage but produces about 62 per cent of the national output (Table 1.2).

Both the co-operative societies and the plantations (estates) sell their processed coffee (parchment) to the KPCU. The KPCU is jointly owned by co-operatives and estates. It is the only organization owning coffee mills in Kenya.

The KPCU occupies a very strategic and key position in the coffee industry. Its basic functions include:

i) Ensuring that coffee farmers obtain the necessary farm inputs on time and close to their local centres.

Table 1.2

National coffee output by sectors in the years 1981/82 to 1990/91 in tonnes

Sector	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	10yrs total
Co-op total	52531	52469	74683	64579	68384	67907	84358	78339	69482	51411	664343
Estate total	34392	32981	54258	28922	45542	36381	44649	38649	34356	35160	385290
National total	86923	85450	128941	93501	113926	104288	129007	116988	103838	86571	1049633

Source: CBK annual Reports 1982-91

ii) Provision of short term advances to farmers to enable them meet the cost of harvested and unharvested coffee. CBK supplements this advances with a premilling payment to the farmers.

iii) Provision of advisory services on better crop husbandry practices through the KPCU advisory services.

iv) Provision of storage facilities for parchment at Kisumu, Bungoma, Nanyuki, Meru, and Dandora. Parchment is stored at these points before bulk delivery to Ghala House in Nairobi.

v) Provision of processing services i.e. milling of parchment, hulling of mbuni and grading.

The KPCU then passes over the milled, hulled and graded coffee beans (clean coffee) to the CBK. The CBK is a government statutory board entrusted with the responsibility of controlling coffee farming and the marketing of all clean coffee in Kenya. CBK licences all coffee planting, provides

field services to planters and finances research on coffee through the Coffee Research Foundation (CRF).

The CBK authorises payment to producers because all processed coffee is delivered to the board for auction in the international market. This is of particular importance as sometimes, the board experiences cash flow problems. It is then forced to borrow cash from local financiers or abroad to pay the producers for coffee delivered but as yet unsold. The board cash flow position is further strained by the prac ice of pre-financing coffee production. It avails producers a pre-milling payment to enable them meet some of the costs of producing coffee.

All the coffee produced, including that held as stocks, is paid for at the market prices. Producers receive the international price fetched at the Nairobi auction less taxes, levies, marketing and handling charges made by the CBK, KPCU, co-operative Unions and societies. The payments are made according to the quality of coffee delivered and before 1993, the payments were made on a "pool" year basis i.e. between 1st of October and 30th september.

In general, the pool operation consists of pooling all funds received from the coffee sales during the year. Producers are paid an average price per unit for the year rather than that received for a given lot of coffee at the time of sale. The coffee producers receive advances and payments for their

produce from the CBK in the following basic modes:

a) Parchment advance: This credit is provided by the CBK and the KPCU. This advance has in many instances, and for most co-operative societies, not reached the farmers because the funds are utilized in meeting the operating costs of the co-operative unions and societies (World Bank, 1991). The interest charged on this credit is 1.5 per cent above the current bank's rate.

b) Delivery Payments: This is an interest free advance made by CBK through the KPCU to be refunded from proceeds of subsequent payments. This payment is made after parchment coffee has been delivered to KPCU stores. It is meant to assist farmers to finance on-going operations.

c) Milling Payments: These payments are made following milling of parchment coffee. They are released by CBK on a weekly basis following auction of the coffee. Most co-operatives release some payments to farmers after accumulation of the milling payments.

d) Interim Payments: These are individually small payments made during the coffee year (3-6 times), and are based on CBK's assessment of the rate and level of proceeds. It is after the first interim payment, that most co-operative societies make substantial payment to the farmers.

e) Final payment: This last payment reflects the balance of coffee proceeds of the coffee year including a quota

market valuation of stocks on hand. Normally payment is made to producers within one to four months after the close of the coffee year (September 30th).

As for the deductions made by the marketing institutions, CBK enforces a presumptive income tax at a rate of 5 per cent and a 1 per cent county council cess. This is for maintenance and construction of roads to the coffee producing area. To finance its general operations, CBK takes a 2 per cent levy from auction proceeds [illegible] as its marketing expenses which can total upto 5-6 per cent. In total, CBK can deduct upto 14 percent from the gross coffee sales.

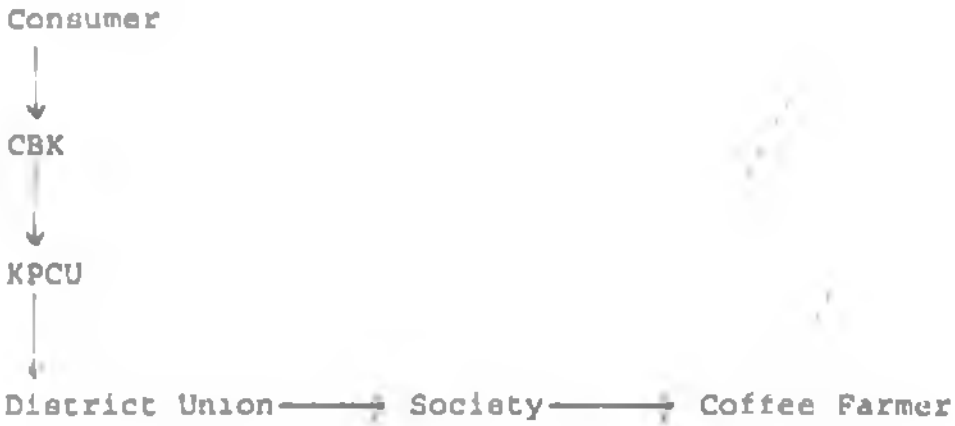
The KPCU receives directly from the CBK all payments due to the growers net of all deductions. KPCU then deducts its service and other miscellaneous charges before disbursing the funds to the co-operative societies. It deducts a milling charge at a rate of Kshs 1400 per tonne, agency commission at a rate of 1 per cent of gross payments due to the farmers from CBK and interest charges earned on credit loaned out to farmers. KPCU also deducts miscellaneous charges which include a penal charge on co-operatives for errors made in the handling of deliveries of coffee. The KPCU costs vary depending on the parchment quality and the deductions average around 4 percent.

The KPCU then passes over the money to the co-operative union's banking section (where the union exists, otherwise payment is made directly to the society) which then credits the

farmer's accounts on the basis of information provided by the society. The Co-operative Bank of Kenya makes nominal charges for its cash transfer services. Unions on the other hand normally deduct a premium for their services which include banking, book-keeping and in some cases the salaries of staff seconded to societies.

Each society has a number of factories which may differ in their processing costs. Payment for each factory is calculated separately by each society.

The major deductions are made at the societies level and the magnitude of this depends on the efficiency of the society. The speed with which these payments are made leaves much to be desired. There is a considerable time lag between payments to farmers. It takes a minimum of 6 months before farmers get paid, sometimes, it can span upto a year (World Bank,1991). By the time the farmer receives this money, the actual cash received is very low due to loans and credit borrowed from the societies. The above payment flow through the marketing intermediaries can be summarized in a flow diagram as follows:



The shown flow diagram constitutes the coffee marketing channel. According to Stern and El-asary (1988), a marketing channel relates to the way the marketing process is organized. At each channel level, a cost is incurred. This study is concerned with the costs incurred at the society level of the marketing channel. The study examined whether the costs of the various operations are reasonable or are in excess.

The above review of the coffee industry would not be complete without a mention of several policy reforms which have been made in the industry. These policy reforms were aimed at solving the problem of delayed payments. At the end of 1992, the Government mandated that the coffee auctions be conducted solely in US dollars. Foreign exchange retention accounts were instituted allowing farmers to keep upto 50 percent of their export sales in foreign currency. This percentage has since been raised to 100 per cent. The intent of these policies was to allow farmers to benefit from the free market exchange rates. Also introduced was an alternative payment system which

is the 'out of pool' payment system. This system gives farmers or their co-operative societies the opportunity to receive coffee sales immediately, instead of waiting for the interim and final payments that come with the pool system. One view of this new system is that farmers who were unable to bear the increased working capital that arose from the delayed payments will be attracted by the speedier payment system. The immediate link between sale and payment, and quality and payment, will provide farmers with the needed incentives to grow good quality coffee.

1.3 Problem Statement and Justification.

The co-operative societies play a big role in the marketing of coffee. However, in the recent past, the co-operative sector has been facing a lot of problems and the societies have been blamed for inefficiency in internal marketing of coffee. However, neither have the various aspects of this inefficiency been identified nor are the factors underlying it clear.

The co-operative societies provide their marketing services at a cost which is then recovered from the farmers proceeds. These deductions seems to vary overtime and from one society to another. Analysis of unit cost (per kilogram of cherry) and other charges deducted by co-operative societies show wide variations between individual societies and coffee

growing districts (World Bank, 1991). Wide variations also occur within the same societies over the years. Roe and Nyoro (1986) also indicated that variations in the payouts to farmers exist. The price range between society factories was from Ksh 1 to Kshs 6 per kilogram of cherry and that the co-operative farmer receives about 80 per cent of the CBK payout. The variation over time is also indicated by the International Coffee Organization (ICO, 1977) which showed that coffee smallholder in Kenya receive between 61-70 per cent of the world coffee price whilst estates receive between 90-93 per cent; the difference between these two margins is accounted for by the processing, marketing and administrative costs incurred by co-operative societies and unions on behalf of smallholder coffee farmers.

The government of Kenya limits the deductions levied against the farmer by the various coffee institutions. In an ultimatum released to the co-operatives by the Ministry of Co-operative Development (MOCD) in 1985, the co-operatives were allowed a commission of 10 per cent of gross sales to meet their operational costs. The ultimatum aimed for at least 85 per cent of CBK gross sales to be received by the farmers. But data from the MOCD show that coffee societies have been paying farmers as low as 50 per cent of the net income after statutory deductions. A study by the World Bank (1991), on a sample of 133 societies across the country indicated that about 29 per

cent of the societies deducted in excess of 30 per cent of the total payments due to the farmer. For the three years studied only about 7.5 per cent of the sampled societies achieved the desired level of deduction (according to the MOCD) of less than 10 per cent on the farmers proceeds. It seems that most societies are unable to operate within the set limit. In view of this, the MOCD has raised the societies commission to 20 per cent of the amount due to the farmer.

The level of payments made by the societies to the farmer and the divergencies observed necessitates a closer examination of the performance of the societies and their factories. i.e. examining the efficiency with which the co-operatives perform their functions. Furthermore, there is need for setting up an economic criteria to act as a guide when establishing coffee societies. Hyden (1973) noted that many of the societies in the country have been established primarily to meet local demands and the question of economic viability has only been secondary. This fact was also noted by Ambole (1971). He indicated that political struggles have accompanied the establishment of many coffee society factories.

One of the functions of co-operatives as economic organizations is to pool scarce resources so as to enable farmers expand scale of operation through exploiting economies of scale. The purpose of this study was to determine the scale of operation of the co-operative societies and establish the

optimal size of operation. The optimal level (level at which costs are at minimum) can act as a guide in establishment of new societies. The study also investigated whether the deductions made by the co-operatives are justified by the costs they incur. The factors responsible for the cost variations were also identified.

The study is important since it contributes to efforts being made towards the recovery of the coffee industry. From a one time high level of 85000 tonnes in 1987/88 period, smallholder coffee production has dropped to 51000 tonnes in 1990/91; a decline of 40 per cent. According to the World Bank Report (1987), the poor world prices have contributed to the poor performance of the industry and hence poor farmers' returns, but the major constrains that have led coffee to be neglected compared to other enterprises, are the late payments for the produce and the high processing and marketing costs. In order to encourage farmers to improve their crop husbandry and yields, improving the timeliness and level of income receipts is essential.

One way of improving payments to producers is to justify any deduction made on their proceeds. The premise that the co-operatives are here to stay should be accepted. Problems that are besetting them should therefore be looked into and solutions be identified so as to make them more efficient (low cost). Though individual societies have a unique character,

there are expected categories of services they are required to offer. Failure to offer these services efficiently will invariably have negative effects on the farmers' ability and willingness to adopt improved husbandry practices.

1.4 Objectives and Hypotheses of the Study

1.4.1. Objectives

The general objective of the study was to describe the operations of coffee co-operative societies and identify the problems facing them. The specific objectives were:

1. Describe the cost structure of the coffee co-operatives in the area of study and establish the optimal level of operation for the co-operative societies.
2. To establish whether the costs recovered by the co-operatives are economically justified.
3. To determine the factors responsible for costs variation and whether there is scope for improving efficiency of the co-operatives.

1.4.2. Hypotheses

Two hypotheses based on the objectives of the study will be tested:

1. The co-operative societies do not operate at minimal cost.

As economic organizations co-operative should in the long run operate at minimal cost. It is expected that farmers aim for economies of scale while establishing societies. The hypothesis will be tested by fitting a cost curve through cross-sectional data.

2. The deductions (marketing margins) made by the co-operative societies are not significantly different from estimated total marketing costs (the sum of processing storage and transportation costs).

The hypothesis will be tested by examining the significance of the correlation between marketing margins and marketing costs. This will be done by calculating the correlation coefficient between the marketing costs (C) i.e. the sum of processing, storage and transport; and the marketing margins (M).

CHAPTER 2

LITERATURE REVIEW

2.1 Co-operatives in Kenya

Co-operatives are defined as associations of persons who have voluntarily come together to achieve common economic goals through a democratically controlled organization with equal contribution to capital and equal sharing of risks and benefits accruing from the business of the organization (Ouma, 1980).

Theoretically, co-operatives as economic organizations have the following functions:-

a) they facilitate the increased participation of the small farmers in productive activities.

b) by pooling scarce resources, the small farmers expand scale of operations through exploiting the economies of scale.

c) they are useful agencies in the communication of innovations to the farm household.

d) they are supposed to modify inequalities by exploiting the leadership of the progressives.

e) integrate the small farmers into the monetary economy by breaking off traditional ties.

As social groups, co-operatives are supposed to:-

a) provide social security to members by the

collective sharing of benefits and risks.

b) promote collective orientation.

c) promote group identity ie. subordination of individual needs to group demands.

d) function as "trade unions" for collective bargaining.

e) be a source of psychological satisfaction through participation in group activities.

Anschel (1969) cited the following as the benefits of forming marketing co-operatives: Firstly, the co-operatives offer a potential for increasing incomes, secondly, co-operatives increase the bargaining power for its members, thirdly, the co-operatives lower the marketing costs hence create economics of scale. Lastly, the co-operatives will provide services which small scale farmers may not afford individually.

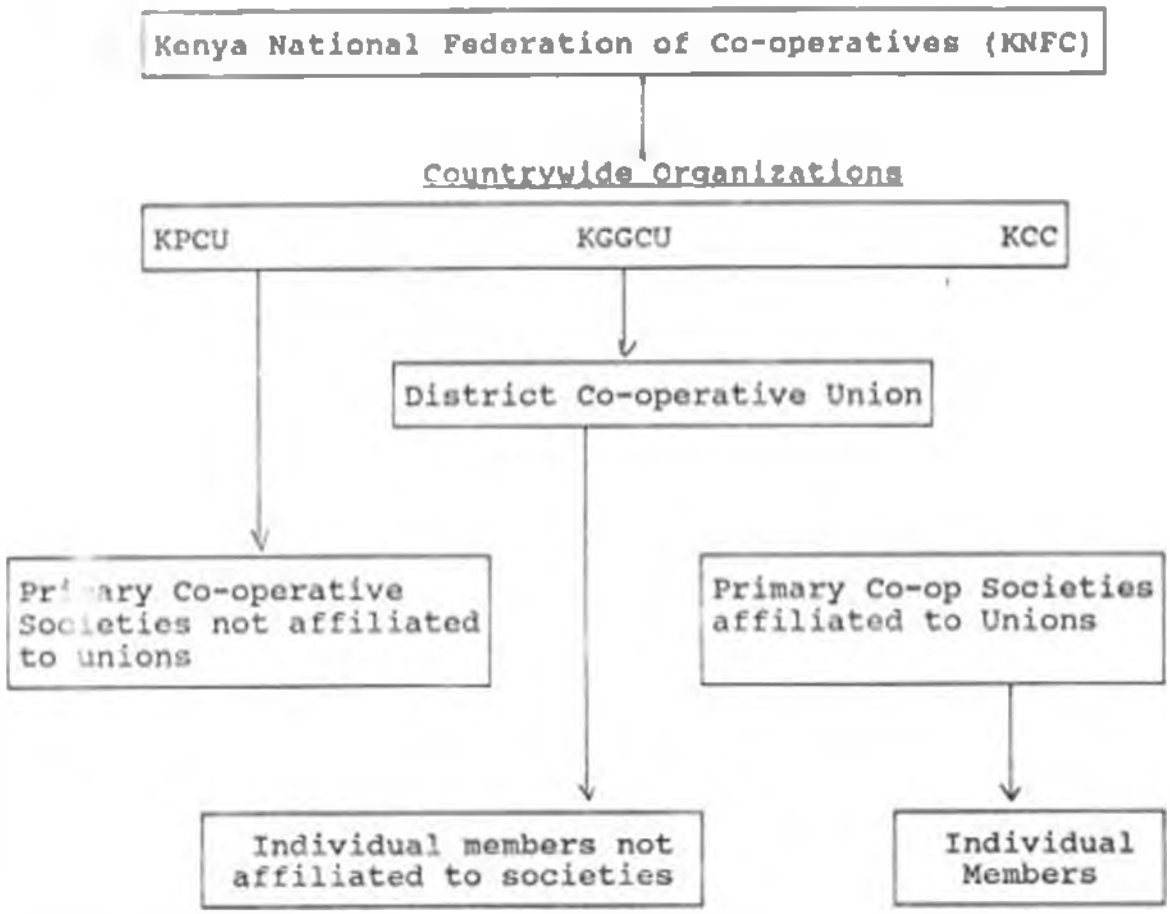
The government of Kenya views co-operatives as an important instrument for increasing smallholder participation in development and increasing access to inputs and services (World Bank, 1986). The co-operative movement has played and will continue to play a major role in the promotion of national development. Approximately, 2500 co-operatives are registered with the MOCD with a membership of more than two million and annual turnover of about Kshs six billion. There are 208 coffee co-operative societies. The co-operative

movement contributes nearly a half of Kenya's gross domestic product and affects directly and/or indirectly the livelihood of half of the country's total population. Most of the co-operatives in Kenya are mainly agricultural oriented and are a major institution in the smallholder sector of agriculture. The movement is a leading partner in the success of the sector.

In view of the crucial role the co-operatives play in the economy, their organization needs to be critically examined in order to determine its suitability to carry out the functions they have assigned themselves. The structure which a co-operative takes would be an explanation of the problems inherent in the movement.

The basic structural organization of co-operative movement in Kenya is made up of four successive layers (fig 1). It comprises of the primary societies as the bottom layer, followed by the district co-operative unions, then the countrywide co-operatives, and at the apex is the Kenya National Federation of Co-operatives (KNFC).

Primary co-operative societies are formed by individuals within a given village, sublocation or location. In the majority of cases, primary societies are single-purpose or single-product enterprises. These societies enable members to realize economies of scale, by for example, sharing the costs of transportation of the produce instead of meeting these



Key: KPCU - Kenya Planters Co-operative Union
KGGCU - Kenya Grain Growers Co-operative Union
KCC - Kenya Co-operative Creameries

Figure 1: The organization structure of the co-operative movement in Kenya (Agricultural commodities)

costs individually. In the case of coffee primary societies, they have one or more factories in a society where the produce is delivered then graded, weighed and recorded accordingly in the personal ledger of the individual members. Coffee processing is done in these factories, resulting in parchment coffee as the final product.

Primary co-operative societies in most parts of the country join together to form co-operative unions. The latter may be defined as a registered society whose membership is restricted to primary co-operative societies. This means that the individual members who have formed a primary society, which is a member of the union, are in fact the same members of the union indirectly or through their primary societies. There are exceptional cases whereby an individual coffee farmer may be authorized to join a co-operative union. This may be allowed in very special cases and only if there is economic justification to warrant this; e.g. a small coffee estate with its own processing factory.

Where a union exists, it is the focal point of co-operative activity. They aim at providing goods and services to members at costs far less than would otherwise be possible. Essential services such as banking, transportation, accounting, bulk procurement of stores and farm inputs are provided to primary societies by these unions with varying degrees of efficiency and occasionally at lower costs than individual societies or members would achieve. More than one union may exist in the same district but the Government encourages primary societies to affiliate to one union in every district. Government guidance and control is provided more effectively at the district level.

In the processing and marketing of some agricultural

commodities, the co-operative structure ends up at national level with countrywide co-operative organizations. Examples of these are the Kenya Co-operative Creameries (KCC), the Kenya Grain Growers Co-operative Union (KGGCU) and the Kenya Planters Co-operative Union (KPCU).

At the apex of the Co-operative movement is the giant Kenya National Federation of co-operatives (KNFC) to which the various types of co-operative organizations are affiliated. The membership comprises mainly of the primary societies, district co-operative unions, and the countrywide co-operative organizations. KNFC also acts as a bridge between co-operatives in Kenya and the International Co-operative Organizations. It also serves as the mouthpiece of the movement and also aims at improving the level of utilization of the total available co-operative resources.

Although from the look of its organizational structure, the movement ought to be autonomous, there is, however, the Government side. The MOCD has a duty to oversee, guide and direct the whole co-operative movement. This is carried out by the staff headed by the Commissioner for Co-operative Development (CCD).

The co-operative movement should ideally spring spontaneously from the people themselves and there should be no need for Government interference in its propagation. It is nevertheless true that government intervention is usually

essential if the co-operative movement is to get off the ground and develop along the desired lines. However, great care should be taken for such intervention can result in jeopardizing the co-operative movement and bringing into existence a mass of societies which are government-inspired and which may be resented by the very people they are supposed to serve.

In this study the operations of the coffee co-operatives are examined with a view of identifying the problems facing them. As has been noted earlier, one of the functions of co-operatives is to lower costs and hence create economies of scale. The level at which costs are at minimum, if known, can be used as a guide in the establishment of new societies. This study therefore examines the cost structure in an attempt to identify the optimal level of operation for the coffee co-operatives.

2.2 Marketing Efficiency

Economists point out that efficiency is a complex concept. The concept becomes even more complex when applied to a complex problem, such as the marketing of farm products. Lau and Yotopolous (1971), observe that "Economic efficiency is an elusive concept in which the economist, the engineer and the policy maker all have great stakes". The policy implications of economic efficiency permeate both the micro- and the macroeconomic level. The definition and dimension of efficiency

vary at different levels with the market economy and become increasingly complex as we move from the firm to an industry or groups of industries and finally to the total system. Not only is efficiency an elusive concept, but is also difficult to measure. French (1977) observes that "economists have yet to develop an integrated set of theories, concepts, methods and data that are necessary and sufficient for the construction of a workable frameworks for quantitative evaluation of the efficiency of marketing systems". This probably explains the great diversity in approaches to the study of efficiency.

The term efficiency can be distinguished into operational and price efficiency. The latter is concerned with profits or rather excess profits earned within a market or a marketing system. Operational or technical efficiency of a marketing system, is concerned with the costs involved in a marketing (Schmidt, 1979). If a marketing system performs its functions at higher costs than necessary, there is scope for increasing the operational efficiency. The present study looked at the performance of the co-operatives with respect to technical efficiency. The study also assessed whether there is scope for improving the efficiency of the co-operatives through technical efficiency.

2.3 Efficiency Studies

Published studies on efficiency of coffee co-operatives are scanty and most of the rest of this section reviews some studies that cover other areas of marketing. These studies are considered relevant, especially because they offer good examples of the various approaches to studies of marketing efficiency.

In his paper entitled "Some Considerations of Methods of Evaluating Market Systems for Agricultural Products", Schubert (1973) states that "determination of the gross trade margin, i.e. the difference between the average consumer price and the producer price, is generally the first step towards investigating technical and allocative efficiency." He continues to say, that the gross trade margin is then divided into component margins per trading function. These may include such functions as transportation, storage processing, e.t.c. Finally the component margins are resolved into costs and profits. This should then be followed by an assessment of whether marketing costs can be reduced. Bain (1968) says that the level of the marketing costs is dependent upon market organisation and the efficiency of the internal organization of the individual businesses, process and factor organizations. An improvement on technical efficiency then entails examining the marketing systems to assess whether marketing costs can be reduced by changes in the organization of the market or the

market organization themselves. Using the processing of maize at Jinja (Uganda) as an example, Schubert (1973) showed that processing costs of maize flour would be reduced through installation of larger roller mills. He concluded that the larger roller mills were more technically efficient than the smaller roller mills. As the capacity of the roller mills increased, the processing costs per tonne of maize decreased.

A similar approach was used by Schmidt (1979) and Karugia (1990). Schmidt studied the maize and beans marketing system in Kenya. The study analysed the functioning of the Kenyan domestic maize and beans marketing system with regard to interaction of the formal (controlled) and the informal (uncontrolled) subsystems. In assessing efficiency, Schmidt (1979) considered the costs incurred in performing the various marketing functions and investigated whether they are necessary or not, or whether they could be reduced. He found such costs as county council cess and bribes to police to be unnecessary. Since most of the unnecessary costs arose due to the controls in the market, he recommended that the controls in the market be done away with.

Karugia (1990) studied the beef retailing system in Nairobi. On the basis of selling practices, he identified two classes of butcheries which are the low class and the high class butcheries. He further subdivided the two classes into two subgroups; low-volume and high-volume sub-groups on the

basis of the level of sales. To assess the efficiency of the butcheries, cost data were subjected to descriptive analysis to obtain averages of unit costs of each cost component. Karugia concluded that the efficiency of the butcheries could be improved by increasing volume of sale. This study follows an approach similar to Schmidt (1979) and Karugia (1990) in assessing the efficiency of the co-operatives.

Other efforts to study marketing efficiency relevant to this study include, Ommeh (1984) and Westergaard (1969a, 1969b). Ommeh (1984) studied the cashew nut industry in Kenya. By using correlation analysis, she investigated the efficiency of the cashewnut marketing system. The analysis was carried out to establish the statistical significance of the relationship between the marketing margin and the marketing costs. The results of the analysis showed the relation to be statistically insignificant.

Ommeh (1984), used analysis of variance (ANOVA) to analyse the difference between the mean marketing margin and the marketing costs. The F-statistic was found to be significantly different from zero at the 0.05 level. She concluded that, the cashewnuts marketing system is inefficient, because an efficient marketing system should have marketing margins equal to marketing costs. This study follows an approach similar to Ommeh's as it evaluates the performance of the coffee co-operatives by analysing the marketing margins (deductions) and

the marketing costs.

Whitaker (1984) examined the percentage margins between the co-operative purchase price of agricultural inputs and the prices charged to the farmers. He showed that the district co-operative distribution systems operated within the range of 8-10 per cent on costs. However, he casted doubt on the justification of these margin levels. He suggested an in depth review of the operational costs involved. Westergaard (1969a) analysed the accounts of Mtwara Co-operative Union in Tanzania for the years 1965-1968. He compared the actual cost incurred with the deductions made by the co-operatives to cover the costs of rendering the marketing services. He found that the Union deductions more than covered the marketing costs so that the Union would have done with smaller deductions that it actually made. In his second Study Westergaard (1969b) analysed the marketing costs for 100 primary societies affiliated to Mtwara Co-operative Union. He observed that the marketing costs varied greatly between the societies and suggested that research should be carried out to look into the reasons why such great differences in unit costs between apparently similar societies should exist. He proposed a detailed cost analysis and comparison between different societies as a feasible approach to this kind of research.

From the above studies, it can be observed that it is important to keep on examining the operations of various

marketing systems so that areas in need of change can be identified and improvement made in the systems in order to make them more efficient. An economic study on efficiency of the coffee co-operatives societies would probably throw some light into the situation facing the co-operatives.

CHAPTER 3

METHODOLOGY

The Analytical Procedures

This section outlines the theoretical background of the analytical procedures used. The main tool and methods of analysis used in this study were descriptive statistics and regression analysis.

3.1 Scale of operation

From microeconomic theory, the economies of scale for a firm increase as the level of its throughput increases. Under these circumstances, costs are spread over large volumes of throughput resulting into decreasing average costs. Beyond the 'optimal', (the point at which costs are at minimum), diseconomies of scale outweigh the economies of increased size and average costs rise.

At the optimal level of throughput, the economies of scale are fully exploited, the average costs are at their minimum and the firm optimises its resource/throughput ratio.

The marketing co-operatives should in the long run, operate at the minimum point as one of their functions is to exploit economies of scale. The hypothesis to test whether the co-operatives exploit economies of scale was stated as:

The co-operative societies do not operate at minimal costs.

This hypothesis was tested by fitting a long run average cost curve on cross-sectional data from 42 societies in Central Province.

Many methodologies have been employed in analyzing the economies of scale. Garcia and Sonka (1984) classify these techniques into three broad groups: economic engineering, descriptive analyses and the statistical cost analysis. Each of these methodologies may appropriately be used for addressing questions of economies of scale. The choice of the most appropriate methodology, however, will depend upon the situation being analysed (Marvin et al. 1985). The statistical cost analysis method was chosen for this study because the data available were more suited to this method.

Ordinary least squares (OLS) regression was the analytical tool used in this analysis. Johnston (1960) says cross-section data is the most suitable for estimation of the long-run cost curve. However, several criticisms have been levelled on the cross-sectional method of cost-function estimation. From a consideration of literature, the most important criticism appears to be the regression fallacy bias (Walters, 1958; Jonhston, 1958, 1960). It is argued that the output produced and sold by each firm is usually a random variable and the variation of output about the mean value is not controlled by the firm. The firm will have to find the best way of producing this distribution of output. From literature, when firms are

classified by actual output, a kind of bias known as "regression fallacy" arises. Regression fallacy arises from treating a stochastic variable as exact. The fallacy produces a downward bias on the cost curve and is an important criticism of cross-sectional method of cost function estimation (Jonhston, 1958, 1960; Walter,1958). But Johnston, (1960) argues that it is unwarranted to set aside the results of cross-section studies solely because of a downward bias, whose relative importance has yet to be determined.

Furthermore, Walters argues that, if output is a random variable, the relevant cost curve for decision making purposes is the expected cost curve and not the cost curve generated by the random variations of output. Expected cost curves will be flatter than the original cost curves. He further states that, since accounting period usually includes many unit economic periods, the data actually available will generally approximate the expected cost and the expected output.

Bearing in mind the above arguments, this study estimated the long run average cost curve using cross-sectional data. The cost and the cherry throughput data was obtained from the co-operative societies' annual report and accounts for the year 1989/90. From a scatter diagram of average total cost against cherry intakes, a suitable cost function was derived.

3.2 Marketing efficiency

In studying marketing performance, the term that comes into play is efficiency. The efficiency of an organization system can be defined as the extent to which its targets or aims have been attained. For instance in measuring the efficiency of a profit-seeking firm, the results of the firm's operations with respect to its main economic aims; e.g profit maximization, are used as a measure of the efficiency of the enterprise.

For a co-operative firm, in as much it is not profit-seeking, its surplus cannot be considered a proper measure of its efficiency. Dulfer (1977),states that the efficiency of a co-operative should be judged principally by its services to members, i.e. its productivity. He continues to say that, there exists no general measure for efficiency of co-operatives, owing to their complex system of aims and objectives and that the situation must be handled in the single case.

In the case of coffee marketing co-operative society, the co-operative firm is entrusted by the farmers to market their product. The gross returns of the society are determined by the quantity sold on behalf of the farmers and the market prices, which in this case are also determined by government policies; e.g. county council cess and presumptive tax. The co-operative deducts the direct costs of marketing (processing, storage and transportation). The resulting difference, must

also cover the fixed costs of the co-operative firm. The emerging difference is the gross proceeds of the members which is Kenya shillings per kilogram of cherry. The preceding relationship can be expressed concisely through the following:

Turnover of Co-operative Society (quantities * prices) Minus Society direct costs Minus Fixed costs = Amount to be paid to the farmers.

For an efficient Co-operative society, the deductions made from the society's proceeds should be equal to the total cost of marketing (both variable and fixed costs)

In this study, the performance of the co-operative societies was examined by first analysing the correlation between marketing margins (deductions) and marketing costs. Secondly, an analysis on the ratio of clean coffee to cherry coffee is done so as to examine whether the societies are technically efficient in the handling of the farmers payment.

Thirdly, the study assessed whether there is scope for improving the efficiency of coffee marketing through improvement of technical efficiency of the co-operatives. This was done using a method that French (1977), calls "Descriptive Analysis of Accounting Data". The computational procedures involved in this approach involve obtaining the average costs records for a particular time period from a sample of plants. The sample plants are classified according to factors such as

size or locations, or some other operating practice. This study used size (volume of cherry intake) to classify the society factories. Averages of costs are computed for each grouping and for each cost component. The range in cost is also given. Variation in cost among the plants is explained in accordance with variation in class averages (such as volume).

3.2.1 Marketing Margins And Marketing Costs

The hypothesis on marketing efficiency was tested using the following procedures:

The hypothesis testing efficiency of the co-operative societies was stated as:

> The deduction made by the co-operative societies (M) are not significantly different from the estimated marketing costs (C).

This hypothesis was tested by analysing the extent to which marketing margin (M), differs from the estimated total marketing costs (the sum of processing, storage and transportation costs). The marketing costs of a firm are the expenditures it incurs in the marketing of a commodity or commodities. On the other hand, the marketing margin is the unit spread between the selling price of the commodity and the buying price of the original equivalent. In an efficient marketing system, marketing margin should not be significantly different from marketing cost.

A correlation coefficient between the average marketing margins (deductions) and marketing costs was calculated for the five years studied. The model used was as follows:-

$$r_{xy} = \frac{\sum x_i y_i}{\sum x_i \sum y_i}$$

Where r= simple correlation coefficient

X_i= Marketing costs for society i.

Y_i= Marketing margins for society i.

The mean marketing margins and the mean marketing cost were tested as to whether they were statistically significantly different at 5 per cent confidence level. The model of the test adopted from Steel and Torrie (1980) was specified as follows:

Step 1:

H_o: $\bar{M}-\bar{C}=0$ null hypothesis

H_a: $\bar{M}-\bar{C}=0$ alternative hypothesis

Where $\bar{M}-\bar{C}=d$

$\bar{M}$= Mean marketing margin for all the society factories

$\bar{C}$= Mean marketing cost for all the society factories

d= Difference between the means

Step II

To test whether there was any significance difference in the two means, the following formula was used:

$$t = \frac{(\bar{M} - \bar{C})}{S_p \sqrt{(\frac{1}{n_1}) + (\frac{1}{n_2})}}$$

Where:

t= Calculated t - value

$\bar{M}$= Mean marketing margin in the year .

$\bar{C}$= Mean marketing margin incurred by the society

factory.

S_p = Standard deviation of the differences

n_1 = Sample size from which marketing margins were calculated.

n_2 = Sample size from which marketing costs were calculated.

The theory behind using the above means is that two population means are commonly compared by analysing their differences. A reasonable point of estimate of this is the corresponding difference in sample means (Wonnacott, 1976).

Since co-operatives are not profit making, the deductions they make should just cover the cost they incur. If the calculated t value is significantly different from $t_{0.025}$ the null hypothesis is rejected in favour of the alternative. For example, if t is positive and significant, it means that the societies are making higher deductions than can be justified by the costs they are supposed to cover.

3.2.2. Analysis of cherry: Clean coffee ratio

Further analysis on co-operative efficiency was done by analysing the clean coffee: cherry coffee ratio. The theory behind this analysis is that a market for a particular product extends through successive forms of the product with a consistent structure of prices interrelated through processing costs - the cost of changing the product form (Bressler, 1970).

The changes in product form results from operations performed on a given basic product or raw material.

In a perfect market, the price of the basic product (P_r) is equal to the price of finished product (P_f) less processing costs (C).i.e.

$P_r = n(P_f - C)$. n is the conversion ratio between the raw material and the final product.

In the case of the coffee co-operative societies, the equality still holds even though they do not represent a perfect market. The price of cherry coffee offered to the farmers (P_r) is a ratio of the price of clean coffee received by the societies from KPCU (P_f) less the marketing costs (C); i.e. $P_r = n(P_f - C)$. P_r is in ksh per kilogram of cherry, while P_f is in ksh per kilogram of clean coffee.

The ratio of cherry weight to clean coffee is on average 7:1 but it differs from one society factory to another. The society calculates this ratio by dividing the quantities of cherry delivered by the farmers with the quantities of clean coffee recorded at KPCU. This ratio is used to convert the payment from clean coffee basis to cherry weight basis. The farmer is paid on cherry weight basis.

Mathematically,

$$n_q = \frac{\text{Cherry throughput}}{\text{clean coffee weight}}$$

This study calculated the above ratio and compared it with

that recorded by the societies in the cherry payment records. The two ratios were tested using t-test as to whether they were significantly different at 5 per cent level of significance.

The model of the test adopted from Steel and Torrie,(1980), for paired observations was specified as follows:-

Step 1:

$H_o: x_1 - x_2 = 0$ null hypothesis

$H_a: x_1 - x_2 \neq 0$ alternative hypothesis

$x_1 - x_2 = d$ where d = 0

and X_1 = the mean n_o as calculated in the study.

X_2 = the mean n_o as recorded by the societies.

d = difference between means

Step 2:

To test whether there was any significant difference in the two ratios, the following formula was used.

$$t = \frac{(X1 - X2)}{S_p \sqrt{(\frac{1}{n_1}) + (\frac{1}{n_2})}}$$

where S_p = the standard deviation of the differences.

t = calculated t - value

X1 and X2 as defined in step 1.

If t-calculated is significantly different from the critical $t_{0.025}$, then the null hypothesis is rejected in favour of the alternative. For instance, If t is negative and significantly different, it means that the calculated n_q is significantly lower than the recorded n_q. This implies that, the amount of clean coffee per kilogram of cherry is lower as calculated by the societies and indicates poor handling of the farmers' produce.

3.2.3. Variation in Cost and Scope for Improving Efficiency

To assess whether there is scope of improving coffee marketing through improvement of technical efficiency for the coffee co-operatives, "Descriptive Analysis of Accounting Data", the method used by French (1977) was used. In this analysis, the society factories were categorised into four groups according to annual average cherry throughput which determines the size of the factory. These groups were:

i) 0 - 150 tonnes per year

ii) 151- 350 tonnes ,, ,,

iii) 351 -800 tonnes ,, ,,

iv) > 800 tonnes ,, ,,

For each of the four groups, averages of unit costs were computed for each cost component. The ranges in unit costs were also given. Variations in unit costs were then explained in accordance with the variations in group averages i.e. volume of coffee handled. This was done by carrying out an ANOVA test and separation of the means of the cost components. The Duncan's Multiple Range Test (DMRT) was used to evaluate the means.

The procedure for applying DMRT involves the computation of a series of critical values that allow for the classification of the difference between two means as significant or non-significant. The computation of least significant ranges is as follows:-

$$R_p = q_{\alpha'} S_{\bar{y}}$$

$$\alpha' = 1-(1-\alpha)^{p-1}$$

Where $q_{\alpha'}$ = table value of the significant Studentized ranges at α per cent

α = Level of significance .

$S_{\bar{y}}$ = standard error of the mean difference

P = the total number of factory groups

R_p = Least significant ranges

The steps for computation of the DMRT values for comparing

all possible pairs of means is as follows:

a) Ranking all the group means in decreasing order.

b) Computation of the standard error of the mean difference S_y.

c) Computation of the (t- 1) values of the shortest significant ranges as R_p, for p= 2,3,....t, and t is the total number of groups.

d) Identification and grouping together of all group means that do not differ significantly from each other.

Computation of coefficients of variation for components of cost identified the factors responsible for the variations in total cost in the societies.

3.3. Data Collection and Sampling Framework

To achieve the objectives of this study, information on prices, quantities of coffee delivered to the society factories and marketing costs incurred were required. This necessitated use of secondary data. Primary data was also used to identify the problems faced by the co-operative societies. This section outlines the sampling framework and how the data were collected.

A register of all coffee societies in Central Province was obtained from KPCU. All the societies in the province were studied to analyse scale of operation of the societies. On the

other hand, 20 per cent of the co-operatives in the province were studied to analyse efficiency.

Central Province was chosen as the area of study because most of the smallscale coffee production is concentrated in areas East of the Rift-Valley, and mainly in Kenya's central region. The province accounts for about 56 per cent of total smallholder production.

The society records available in KPCU and Coffee Research Foundation revealed differences in the organization of co-operatives in the four districts of Central Province. For instance, in Nyeri district, the number of societies correspond to the number of administrative divisions while in Murang'a, they roughly follow the locational boundaries.

The non-uniformity of the population of societies necessitated stratified sampling. Stratification was done by districts. The sample size was about 20 per cent of active societies in each district, i.e. 5,2,2,and 1 in Murang'a, Kiambu, Kirinyaga and Nyeri respectively. All the 88 factories in the sampled societies were examined. The sample size was limited to 20 per cent because given the financial and time constraints it could not have been possible to study a larger number of society factories.

Secondary data were gathered by going through the monthly, annual reports and accounts of the co-operative societies. From these reports, the annual prices received by the farmer and the

societies for the produce and the breakdown of the processing costs were obtained. The quantities of cherry coffee delivered by the farmers were obtained from the monthly and annual entries of the societies, while the clean coffee quantities were obtained from both the society and the KPCU accounts. The reports also gave some insights into the problems facing the co-operative societies.

Primary data were gathered through questionnaires (Appendix I). From these questionnaires, information on operation of the co-operatives and the problems facing them were collected. Some of the primary data required in this study were obtained through informal interviews with the society managers and other staff of the co-operative societies and their factories.

3.4 Problems Experienced During Data Collection

Most officials of the co-operatives tend to regard coffee marketing as a sensitive area. This was compounded by the changes in coffee policy announced in 1992 by the government and whose effects were still being felt in the industry. The officials needed to be given time to go through the questionnaires before accepting to provide the information. Some officials were also reluctant to provide the information as they claimed that they had not benefited from answering other questionnaires directed to them previously.

Data contained in the accounts records were sometimes highly aggregated. Where more details were sought, some of the closed files from which they could be obtained were either missing or incomplete. Several institutions which deal with the co-operatives had to be visited in search of the missing information. This resulted in a lot of delays.

CHAPTER 4

RESULTS AND DISCUSSION

In this chapter, the results of the empirical analysis are presented and discussed. The chapter begins with a presentation of the problems that the coffee co-operative societies and their factories face in carrying out the marketing activities and which may influence their performance. The scale of operation of the societies is then examined. Efficiency is discussed by considering the technical component i.e. technical efficiency. Descriptive analysis of accounting data was utilized in assessing whether there is scope for improving efficiency in coffee marketing through improving technical efficiency of the co-operative societies.

4.1. **Analysis of the Problems of the Coffee Co-operatives and Their Effects on the Marketing Efficiency.**

The set of problems a firm faces in carrying out its marketing activities influences its marketing efficiency. This section identifies the major problems that the co-operative societies meet in coffee marketing.

4.1.1. Congestion.

This problem occurs in the primary processing of coffee particularly during the peak harvesting seasons. Congestion leads to quality deterioration of coffee and hence loss of

income to the farmers. This is because congestion causes delays of coffee in the fermentation tanks, soak tanks and in the skin and parchment drying tables.

Table 4.1 shows the responses given by the factory managers as to what causes the congestion problem. The constraint seems to vary with the agroecological zones (AEZ). This is expected given the fact that AEZ determine coffee production. Onchoke and Nyoro (1991), also noted that factories located in the Upper Middle zone 1 and 2 (UM1 and UM2) handled larger volumes of cherry than those in the lower ecozones and reckoned that these factories would also be the likely ones to suffer from congestion problems. From table 4 1, few fermentation and soak tanks, inadequate skin drying tables account for more than 60 per cent of the total constraints affecting quality processing in societies for all zones.

One of the strategies used by factory managers to solve the congestion and associated problems was to reduce the number of picking days per week and hence delivery of coffee to the societies. In this way, the managers hoped to handle and process a more steady flow of cherry. Although this may seem to handle the problem at the factory level, it leads to overripening of the beans in the farms; thus lowering the coffee quality. Other factories retained the parchment in the fermentation tanks for longer periods in cases where the drying tables were limiting and the soaks tanks were adequate. This is

TABLE 4.1: Responses to the main causes of congestion

Agroecozones Main constraint	Average % response UM1	UM2	UM3*	Average
Inadequate pulper machines	4	7	12	8
Labour shortages	10	12	4	11
Few fermentation and soak tanks	35	40	46	39
Inadequate skin and parchment drying tables	30	24	21	23
Frequent machinery breakdown	5	0	0	1
Inadequate conditioning bins	8	0	7	4
Bad weather	3	3	7	3
Inadequate water	0	3	4	3
Inadequate parchment stores	3	3	0	3

* UM_i = Upper Middle Zone i, i = 1,2,3.
Source: Author's Survey, 1993.

alright as long as the water is changed according to recommendations which require water to be changed every 16 to 24 hours. The best solution to this problem if recurrent in a factory is enlargement of the existing facilities or construction of another processing facility . However the latter solution should be considered only where the former has failed. This is because construction of new factories can create a problem of unutilized capacity.

4.1.2 Labour shortages.

Labour shortages were reported by 60 per cent of the sample factories. The extent to which the various operation are affected by the shortages differ. Table 4.2 shows how the

TABLE 4.2

Percent response on operations most affected by labour supply shortages and factors causing the shortage

AEZ	%response on Labour supply shortages	%response on operation most affected		
		Fermentation	Parchment drying	Skin drying
UM1	58	33	38	45
UM2	60	29	30	38
UM3	67	40	50	38
Average	60	53	60	55

Source: Author's Survey, 1993.

operations are affected. Parchment drying and parchment handling were shown to be the most affected with about 60 per cent of the managers responding positively. Skin drying followed with 55 per cent positive responses. These 3 operations need labour most and are also the ones which affect coffee quality most.

There are several categories of staff in a society. Table 4.3 shows the different categories and their remuneration. It can be deduced from the table that the society employees are poorly paid. This in comparison to estate workers doing the same kind of jobs. For instance, the equivalent of a factory manager in the estate, the factory foreman, earned about KSh 2350 in the same period, while the permanent manual workers earned on average KSh 1200. The poor remuneration can act as a disincentive thereby leading to poor performance. The casual

Table 4.3
Staff category and their remuneration for the year 1990/91

Job category	payment per month (Ksh)
Manager	1750
Asst/Manager	1500
Clerk	1000
Permanent Manuals	750
Casuals (per MD)	17.60

Source: Authors survey, 1993.

workers remuneration is also poor. The average wage rate per manday was about 30 per cent below the ongoing union rates which was about Ksh 30 in the coffee estate sector. This can explain why labour shortages in the co-operative sector are frequent since the casual labour wage rates are fixed for sometime and the society management does not have the authority to change the rates as demand arises.

In the past, societies made use of communal labour to try and solve the labour supply problems. However, Whitaker and Roe (1984), found use of communal labour to be unpopular among the farmers and this may have been the reason why it was found to be phased out when this study was carried out. It was noted that none of the societies in the sample used this kind of labour which is supplied by the society members (the farmers). This can be explained by the fact that, the communal labour usage occurred during the peak processing months when farmers labour is also required most in their farms for cherry harvesting and other farm operations (Onchoku & Nyoro, 1991).

4.1.3. Instability of Coffee Throughput.

The cherry throughput handled by the co-operative society is a random variable and the variation about the mean is not controlled by the firm. Factors which determine this throughput include

(i) the level of coffee production

(ii) Farmer's expectation regarding price of cherry coffee if they regard it as high, they will deliver cherry coffee instead of mbuni coffee.

(iii) Availability or shortages of harvesting labour at the farm level.

Figure 2 shows the fluctuations of coffee production in the societies over a period of ten years. The instability in coffee throughput have a number of effects on the operations of the society. The societies make yearly projection on cherry incomes and expenditure every year. However, this exercise is made difficult by the instabilities. Table 4.4 indicates that wide errors were made in the projection for the 10 societies studied. The figures are for 1988/89, a year that was considered to be normal in the coffee industry. The errors range from -11.7 to 52.5 per cent for the income and from -25.2 to 50.1 per cent for the expenditure.

The errors in the projections have an effect on forward planning. During each year, the societies also compute their net working capital requirements for crop financing. Using the

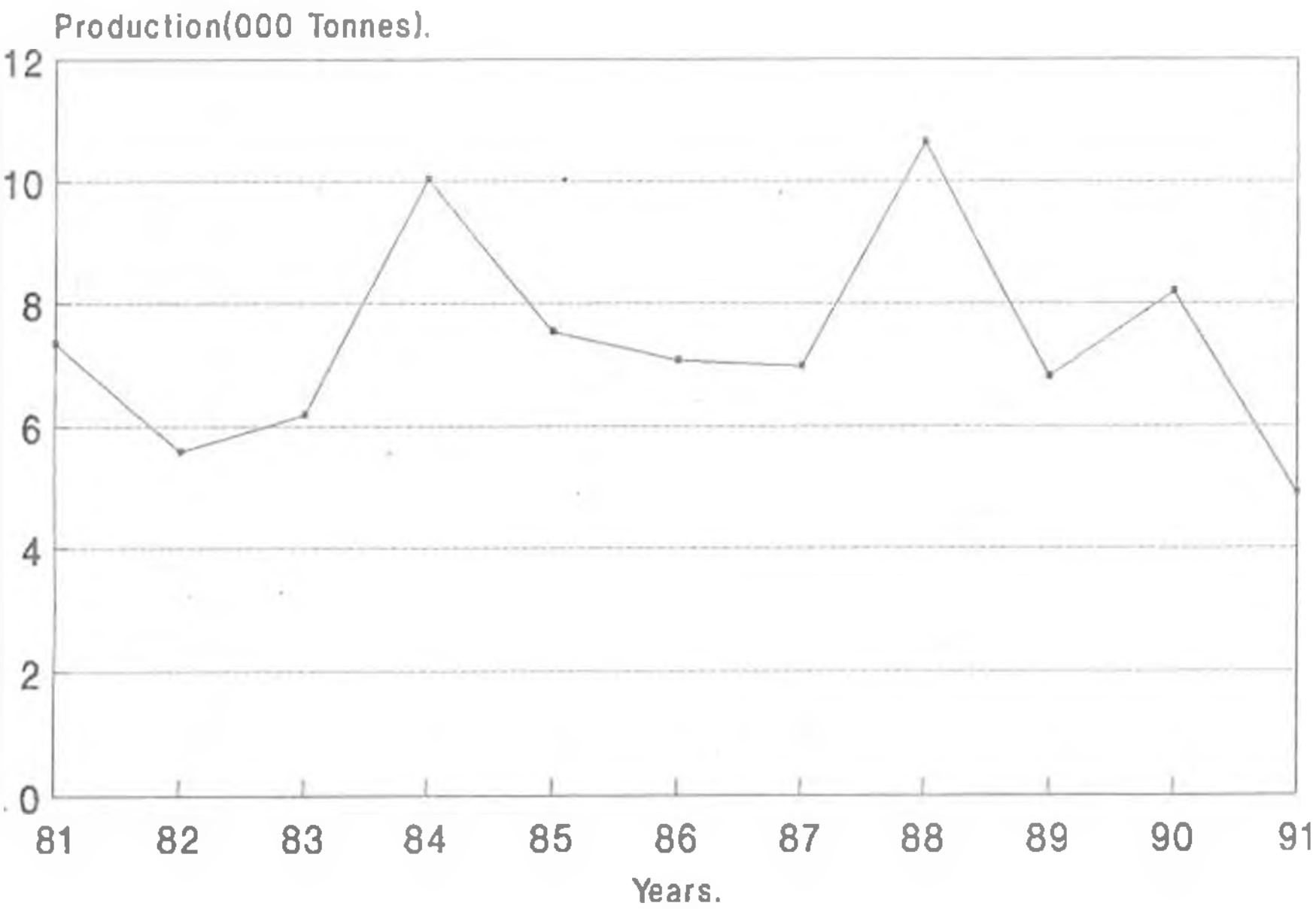


Figure 2: Fluctuations in coffee output between 1980/81 and 1990/91 for the ten Co-operative Societies

Table 4.4
Percent errors on projected incomes and expenditures for the ten co-operative societies in Central Province

INCOME(Ksh)			EXPENDITURE (Ksh)		
Projected	Actual	Error	Projected	Actual	Error
13732380	15343841	-11.7	12770810	13645477	-6.8
72682500	51914256	28.6	97460490	87461348	10.3
33889240	31201871	7.9	31248167	25739390	17.6
15401[illegible]0	11218061	27.	14419900	10205223	29.2
47719000	31435597	34.1	44292100	27517379	37.9
17791460	10417444	41.4	16989150	8471035.8	50.1
99185000	82325917	17.0	56812360	48075067	15.4
74596982	35469082	52.5	37340710	30405500	18.6
3382120	2938300	13.1	2469609	3092085	-25.2
18851740	8738153.6	19.5	10169167	5196895.8	49.7

Source: Author's survey, 1993.

same prices on the actual transactions, the percentage errors in the capital required were the same as those shown above for expenditure. Discussions with the co-operatives officials indicated that this was a common problem that often led to errors in borrowing from the commercial banks.

The results in Table 4.4 shows that there is a tendency by the co-operatives to budget for higher incomes and expenditures than to budget for lower ones. Normally, the societies should make less errors on expenditures than on incomes since the coffee prices are determined by the world market and the societies income is given. This may lead to farmers always getting less than the societies had originally planned for.

However, results indicate the errors on the expenditure are also high. The societies should device a method for projecting the crop in the field and market conditions to avoid inconveniences in planning.

4.2 Structure of Processing Costs

The main cost elements of processing within a society are as shown in Table 4.5. The table highlights the relative importance of these components. These costs were summarized from information available from the co-operative societies accounts. The co-operative operations can be divided into two; the factory operations and the society general operations.

Table 4.5

Main Processing cost elements shown as proportion of total cost

COST ITEM	PERCENTAGE OF TOTAL COST
Labour (i) Permanent Staff (ii) Casual Labour	29.00 25.14
Repair and Maintenance	18.78
Depreciation	6.52
Transport	7.67
Power	3
Processing material	8.5
Others	1.9

Source: Author's survey, 1991

Factory operations include expenditures on labour, processing materials, fuel, oil, electricity and water; repair and maintenance and the transport costs. These operations take

up 6 - 25 per cent of the gross cherry price (Table 4.6).

The society general operations include such items as education, committee allowances, legal fees, salaries and wages and other administrative expenses. This account generates little or no income and yet it is a major spender of society revenue. These expenses range from about 3.5 per cent in well managed societies to upto 23 per cent in the poorly managed ones. Another expense recovered by the society is the service at cost, a cost that is incurred to pay for services provided by the local Union if the society is an affiliate. The services include; book-keeping, education, management, banking and merchandise. This ranges from 0.5 percent to 5 per cent of the gross coffee price. The computation of this cost is on a flat rate basis, that is the union charges an equal amount to all societies irrespective of size. For instance, a society with one factory having 2400 members and another with 20 factories of 20926 members paid an equal amount of KSh 90000 in 1989/90. Furthermore, this amount is set constant for a number of years irrespective of the quantities of cherry marketed. This is unfair for the small societies for they end up contributing higher proportions to the running of the Unions. This fact has led some societies to break away from the Unions as was revealed by informal interviews with some society officials.

Table 4.6

Co-operative society expenses as proportion of gross cherry price and percent payout in 1990/91 for the ten societies studied

Cost components	Proportions of Gross Cherry price									
Repair & maintenance	3.99	1.09	1.69	1.44	2.01	5.16	0.56	1.32	0.27	0.49
Transport	0.46	0.56	0.38	0.62	0.61	1.77	0.71	0.98	0.56	0.91
Power	0.81	0.42	0.39	0.29	0.38	0.42	0.40	0.57	0.15	0.97
Processing Material	0.46	1.19	0.52	0.96	0.63	0.72	0.76	1.02	1.07	0.00
Labour	0.81	4.47	5.47	6.17	8.8	14.5	5.89	3.36	3.82	4.59
Total Factory Expenses	14.03	7.69	8.45	9.48	12.43	24.76	8.32	7.25	5.85	6.96
Society General Expense	10	3.5	8.6	8.9	16.6	10.1	4.7	22.7	7	8.4
Per cent Payout	53	86	69	68	40	44	68	57	79	78

Source: Author's Survey, 1993.

Although an individual society cannot control such costs as that incurred by the union, some costs are within its control. Among the cost components which a society can control, the labour cost contributes most to total cost. As far as the factory operations are concerned, the labour costs can take upto 10 per cent of the gross coffee price.

The study found out that the highest labour costs occurred in factories with lowest percent payouts, suggesting that inefficient staffing is a main course of poor payments. Factories in general operate three to four months in a year during the peak processing period and therefore do not require staff all year round. A perusal of the factories' Master rolls showed that there was a tendency to retain casual labour during the off-peak months. It was also noted that there was no incentive by the co-operative factories to reduce salary

expenses because they will always be paid before the farmer is paid. This means that the factory labour costs remain the same regardless of the amount of cherry pulped, and farmers are the ones who pay for this inefficiency.

The above phenomenon is in sharp contrast to a coffee estate. In estates, the primary goal is to stay in business which is only possible by earning revenues that exceed costs. They do this by cutting costs when possible or intensifying production. It is unfortunate the co-operative farmer has no control over unprofitable post-farm activities and he has to pay for the factory personnel inefficiencies.

Other costs which the society personnel can control include the processing material costs, repair and maintenance and the transport costs, expenditure on fuel, oil, electricity and water. The processing materials include; sisal tex, sisal twine and gunny bags. This takes about 1 per cent of the gross price. It was noted in the study that there was a tendency to overstock these materials which seemed to encourage misuse of those in circulation. This was especially so for gunny bags. Although large stocks are advantageous in times of high inflation, it is wise to purchase only the required amount if problems of loss and misuse are too frequent. Otherwise the factory personnel should be made more responsible.

The fuel, oil, electricity and water expenses are all put in one account. This meant that it was not possible to

determine which source of power is more efficient, diesel or electricity. However, most factory managers prefer electricity and reckon that it is cheaper and less wasteful. This supports feelings held by coffee engineers.

The repair and maintenance involves purchase of spares/materials and hire of services. The main items repaired or serviced are fermentation tanks, engines, pumps, moveable machinery, drying tables and buildings. For the affiliated societies, most of the items and services are usually procured through the local unions although they may also be hired. Some of the societies fall prey to unscrupulous mechanics who inflate the repair and servicing bills. This could be avoided if the societies had their own mechanics and if the machine operators were well trained on proper handling of the factory machinery and equipment. Procurement of the spares should also be through a strict tendering procedure to avoid exploitation by middlemen or even collusion with society committee.

Transport costs takes about 1 per cent of the gross coffee price. It largely depends on distance between the factory and the KPCU stores. However it was not possible to compute cost due to transport of parchment (transport cost per kilogram of coffee marketed) because this cost plus expenditure due to other jobs are lumped together. A society can either own a truck or hire transport. From the survey, hiring could be cheaper than owning as it was noted that most of the sampled

societies who owned trucks made losses on the vehicle activity in most of the years. However, for the societies which are able to raise the finance for purchasing a truck or pick-up, they should also use the vehicle for commercial purposes so as to raise extra income for the society. However, such movement should be highly controlled to avoid creating another source of loss for farmers' money.

4.3 Scale of operation

Average total costs were calculated from the societies accounts for the year 1988/90. From a scatter diagram of average total cost against cherry intake of all the societies in Central Province (shown in Fig 3) the most suitable cost function was:-

$$C_i = \beta_0 + \beta_1 Q_i + \beta_2 Q_i^2 + U_i$$

where C_i = average total costs for the society i in ksh/tonne.

Q_i = Level of cherry intake in tonnes for society i.

U_i = Disturbance term in society i.

The computed cost function was:_

$$\hat{C} = 1363 - 0.164 Q_i + 1.1 \times 10^{-5} Q_i^2$$

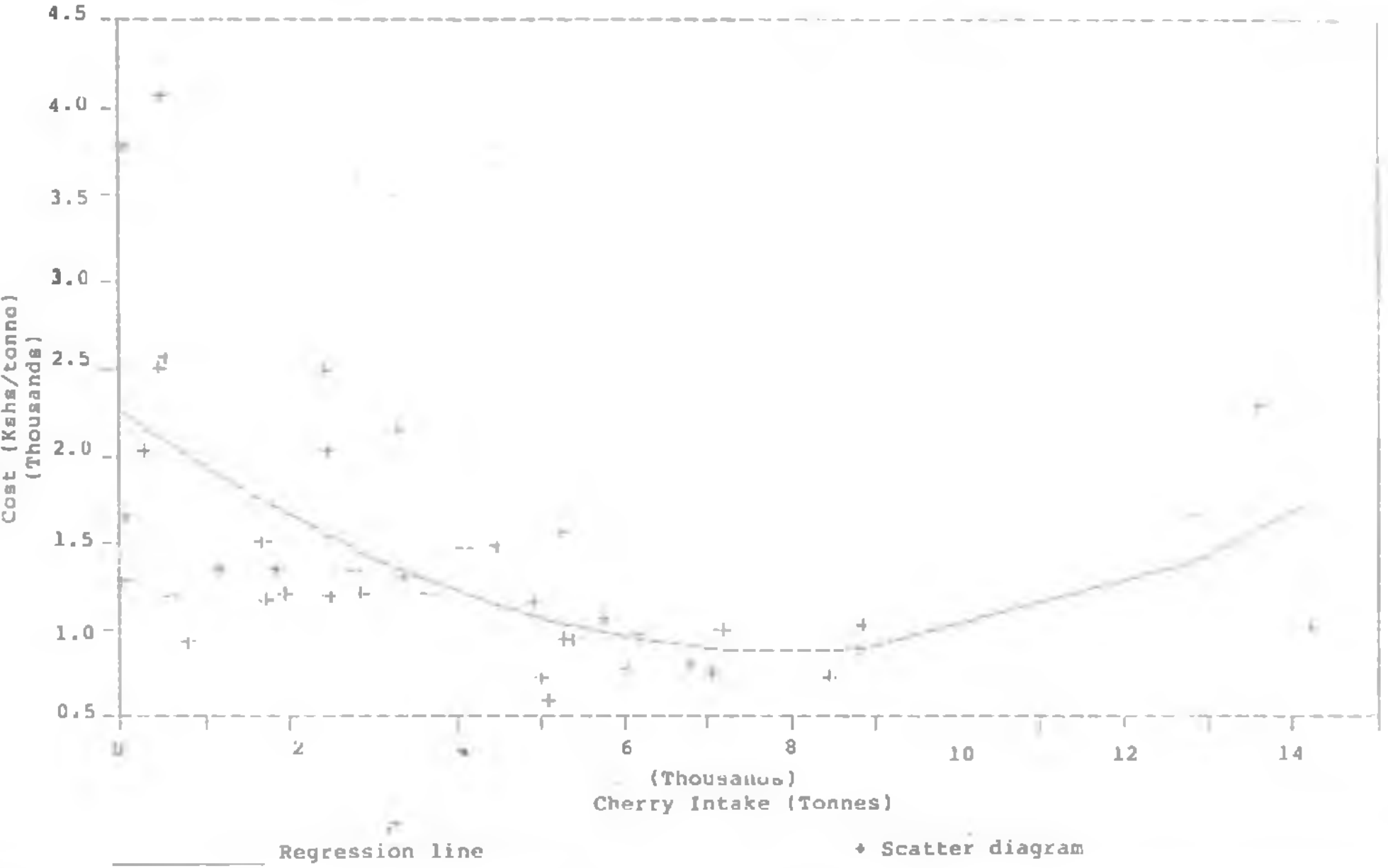


Figure 5 : Scatter diagram for unit cost of processing coffee against cherry intake for Societies in Central Province for the year 1989/90

SE = (389.4) (.0799) ($5.7*10^{-6}$)

T = (3.5) (-2.048) (1.942)

R^2 = 75%

adj R^2 = 52%

Df = 39

n =42

Mathematically, the optimal level of cherry intake is about 7.5 thousand tonnes. Average cost would then be Ksh 751.73/tonne at the current years prices.

The scatter diagram shown in figure 3 indicates that most societies are operating at less than the optimal level, i.e at the falling part of the curve. This shows that the co-operative should increase their scale of operation by either intensifying production at the farm level or by amalgamation of the small and uneconomical societies.

The produce handled by any society varies over the years and the variation about the mean is beyond its control. The society must therefore find the best way of handling this distribution of produce. In this study the societies were classified according to actual output. From consideration of literature, when firms are classified by the actual output, regression fallacy arises whose effect is to produce a downward bias on the cost curve (Johnston, 1958; 1960; Waller, 1958). But Johnson, (1960) argued that it is unwarranted to set aside the results of cross section studies solely because of a

possible downward bias, whose relative importance has yet to be determined.

As mentioned in chapter 3, section 3.1 if output is a random variable, the relevant cost curve for decision making purposes is the expected cost curve and not the cost curve generated by the random variations of output (Walters, 1958). Expected cost curves will be flatter than the original cost curves and since the accounting period usually includes many unit economic periods, the data actually available will generally approximate the expected cost and expected output. This point goes part of the way towards explaining why there is approximate linearity in the measured cost curve, that is, the low coefficient of Q^2; (β_2).

4.4 Marketing Efficiency

4.4.1 Marketing Margins and Marketing costs

The marketing efficiency of the co-operative societies was analysed by testing the statistical significance of the difference between marketing margins and marketing costs. In an efficient marketing system, marketing cost should equal marketing margin. The present study examined the marketing costs and margins for coffee co-operative societies and a test was carried out as to whether they were significantly different. The model given in section 3.2.1 was used.

The mean marketing costs incurred by the co-operative

societies over the period 1986/87 to 1990/91 were compared with the deductions the society made over the same period (Table 4.7). The results indicated that, 80 per cent of the studied societies had higher margins (deductions) than the estimated costs. Using the model which is discussed in chapter 3 section 3.2.1, it was found that on average, the societies have higher margins than costs as shown by the significantly higher mean marketing margin than the mean marketing costs of all the societies put together (Table 4.7). The overall mean marketing margin was Ksh 1.85 while the mean marketing cost was Ksh 1.21 per kilogram of cherry marketed.This implies that on average, the farmer lost 64 cents per kilogram of cherry delivered to the co-operatives. The results indicate that the societies are not efficient in the marketing of coffee. This implies low operational efficiency.

4.4.2 Analysis of clean coffee: cherry ratio

The analysis on the ratio between cherry coffee and clean coffee further indicated inconsistencies in calculation of farmers payment. A t-test on the difference between cherry: clean coffee ratio calculated using model described in section 3.2.2 and that obtained from the societies records showed a significant difference between the two ratios. Appendix III displays the five year average of two ratios for all the society factories in the study. The results calculated t-valve

Table 4.7

Comparison of mean marketing costs (Ksh/kg of cherry) incurred by the co operatives societies and the mean marketing margins (Ksh/kg of cherry) for the years 1986/87 - 90/91

Society	Mean Marketing Cost	Mean Margin	Calculated t-value	Critical t value	Degrees of freedom
1	1.46	1.98	1.99	1.96	64
2	0.98	0.83	0.38	3.78	4
3	1.33	1.78	2.85	2.09	19
4	0.89	1.31	2.56	2.09	19
5	0.94	1.62	8.14	2.05	29
6	1.01	1.54	2.44	2.06	24
7	1.5	1.99	1.24	2.14	14
8	1.67	2.12	4.58	1.96	144
9	0.95	1.54	2.07	2.00	59
10	0.84	1.44	2.38	2.05	38
Overall Mean	1.212	1.65	3.00	1.96	249

Source: Author's Survey, 1991

was -17.7 compared to a critical of 1.96 at 5 per cent with 88 degrees of freedom. This implies that the ratio as calculated in this study is less than that used by the societies to calculate farmers payments. This means that farmers receive less per kilogram or cherry than they would if the societies were efficient in the handling of the payments.

These results confirm fears expressed by some co-operative officials that there exists "air kilos" in societies. The so called "air kilos" are amounts which are alleged to be earned

by individuals who did not deliver coffee to the factories. From the findings of this study, the effect of these extra kilos is to increase the amount of cherry needed to make a kilogram of clean coffee. For instance, the mean of the recorded ratio is 6.79, that is 6.79 kilograms of cherry are needed to make a kilo of clean coffee. But the calculated ratio has a mean of 6.74. This means that, for every kilogram of clean coffee, 0.05 kilograms of cherry is "air kilo". If for instance a society had received 500 tonnes of cherry, about 3.7 (0.05*500/6.74) tonnes are "air kilos". This figure may not be noticeable if divided by the number of farmers in one society to show how much each farmer loses, but it is important since it represents earnings to a person who did not deserve and is a marketing loss as far as the farmer is concerned.

4.4.3. Variation in Cost and Scope For Improving Technical Efficiency

To answer the question of whether there is scope for improving efficiency of the co-operative societies through improvement in technical efficiency, descriptive analysis of accounting data was used. In this approach, averages of unit costs were computed for each cost component and for each group of factories. The range in unit costs for each group were also given (Table 4.8). Further, an analysis of variance (ANOVA) test was done to determine whether there were any statistically

significant differences between the different groups of factories in minimizing unit costs of the various cost items. The results of the Anova test are presented in Table 4.9.

The results of descriptive analysis of accounting data showed that, apart from processing material costs all the other cost components per kilogram of cherry processed differed significantly between the various factory groups. The mean unit cost for each factory group are presented in Table 4.8. The table also shows the range and the coefficients of variation for each cost component between the factory groups. The results of the Duncan Multiple Range Test (DMRT) are also given. The DMRT results are shown as A, B or AB, e.t.c. If two factory groups differ in their rating, then there is a significant difference between the groups and scope for improving technical efficiency through reduction in cost.

The Anova test (Table 4.9) indicated that the amount used on processing material per kilogram of cherry handled by the various factory groups did not differ significantly and that the differences can be attributed to chance fluctuations alone.

However, the means conceal a great deal of disparity between individual factories. When all the factories are considered together, rather than in groups, it is seen that the amount of unit cost on processing material ranged from .004 to .46 (Table 4.8.). What emerges from this is that there was great variation between the highest and the lowest amount of

unit processing material cost in use. Therefore, it can be concluded that, the ability to keep down processing material cost differs between individual factories. The differences in this ability, however, does not depend on the categorization adopted in this study. This situation is probably explained by an important exogenous or endogenous variable which may not have been captured in this study e.g. lack of information on

Table 4.8

Average Unit costs and their range for groups of factories in Central Province for 1989/90

Factory Group (Tonnes)	Statistic	Unit Labour Cost Ksh/MD	Unit Transport Cost Ksh/kg	Power Ksh/kg	Processing Material	Repair & Maintenance	Average Unit Cost
0-150	Mean	0.73	0.05	0.14	0.22	0.22	1.06
	Range	1.95-0.66	0.34-0.08	0.05-0.01	0.38-0.01	0.25-0.01	2.49-1.02
	Coefficient of variation	58.9	20	75	112.5	68.2	44.3
	DNRT	A	A	A	A	A	A
150-350	Mean	0.58	0.06	0.07	0.14	0.20	0.93
	Range	1.01-0.37	0.12-0.04	0.06-0.01	0.46-0.05	0.64-0.01	1.51-0.82
	CV	43	33.3	67	100	85	36.6
	DNRT	B	B	B	A	A	B
350-750	Mean	0.65	0.11	0.04	0.15	0.09	1.07
	Range	0.84-0.26	0.1-0.03	0.05-0.01	0.43-0.03	0.25-0.01	1.28-0.53
	CV	49.2	54.6	75	73.3	77.8	41.1
	DNRT	B	B	BC	A	A	BC
>750	Mean	0.34	0.04	0.02	0.04	0.05	0.64
	Range	0.54-0.16	0.07-0.01	0.05-0.01	0.28-0.004	0.34-0.03	1.01-0.21
	CV	29.4	50	50	87.5	71.4	40.6
	DNRT	C	B	C	A	A	C

Key: If two factory groups differ in their rating; A,B, then there is scope for improving technical efficiency.

Source: Author's Survey, 1993

Table 4.9

ANOVA test for differences between Central Province groups of factories in minimizing cost

Cost item	Source of Variation		df	Variance Ms	F-ratio
Unit Labour Cost	Between factory groups due to differences between means of factory groups	$SS_1 = 5.09$	3	$MS_1 = 1.70$	42.28**
	Residue due to differences between observations and factory group means	$SS_2 = 3.09$	77	$MS_2 = 0.04$	
	Total variation	$SS_T = 8.18$	80		
Unit Transport Costs	Between factory groups due to differences between means of factory groups	$SS_1 = 0.09$	3	$MS_1 = 0.03$	19.03**
	Residue due to differences between observations and factory group means	$SS_2 = 0.12$	77	$MS_2 = 0.002$	
	Total variation	$SS_T = 0.20$	80		
Unit Power Costs	Between factory groups due to differences between means of factory groups	$SS_1 = 0.005$	3	$MS_1 = 0.005$	5.49**
	Residue due to differences between observations and factory group means	$SS_2 = 0.021$	77	$MS_2 = 0.003$	
	Total variation	$SS_T = 0.025$	80		

Table 4.9 Contd...\

Cost Item	Source of Variation		df	Variance Ms	F-ratio
Unit processing material cost	Between factory groups due to differences between means of factory groups	SS_G = 0.07	3	MS_G = 0.02	1.45
	Residue due to differences between observations and factory group means	SS_R = 1.28	77	MS_R = 0.04	
	Total variation	SS_T = 1.35	80		
Unit Repair maintenance cost Costs	Between factory groups due to differences between means of factory groups	SS_G = 0.21	3	MS_G = 0.07	4.92**
	Residue due to differences between observations and factory group means	SS_R = 1.08	77	MS_R = 0.01	
	Total variation	SS_T = 1.29	80		
Average Unit Costs	Between factory groups due to differences between means of factory groups	SS_G = 8.68	3	MS_G = 2.89	41.02**
	Residue due to differences between observations and factory group means	SS_R = 5.43	77	MS_R = 0.07	
	Total variation	SS_T = 14.11	80		

Key : SS_G = Group sum of squares
SS_R = Error sum of squares
SS_T = Total sum of squares
MS_G = Group mean square
MS_R = Error mean square
df = Degrees of freedom

Source: Author's Survey, 1993

other sources of processing materials (most factories obtain their processing materials from their unions). The existence of such a variable may explain the high coefficients of variation shown in the table.

The results showed differences to exist in use of labour. The results indicate that the amount used on labour per kilogram of cherry handled by the various factory groups to differ significantly. The mean unit labour cost for each group are also shown in Table 4.8. When all the factories are considered together their labour unit cost ranged from Ksh 0.16 to 1.95 per tonne of cherry. The Anova test results indicate that the differences in unit labour cost cannot be attributed to chance fluctuations alone. It can be said that the factory groups do not incur the same amount of money on labour per unit of cherry handled. The results of Duncan's Multiple Range Test show that factories with low cherry throughput incur significantly higher unit labour costs than those with higher throughput. Therefore, from DMRT results it can be concluded that, increased volume of cherry reduces costs which implies that there is scope for improving technical efficiency.

Analysis of variance results also indicated that, the differences in unit cost on transport, repair and maintenance, and power costs between factory groups were not due to chance fluctuations and that the factory groups actually differ in their utilization of transport, repair and maintenance services

and power.

A similar analysis on the overall unit cost of processing also shows significant differences between factory groups. This implies that, factories incur different amounts of costs in processing. The results of DMRT also indicate that increasing volume of cherry throughput reduces overall unit cost of processing. It can, therefore, be concluded that there is scope for improving efficiency of the co-operatives societies through technical efficiency by increasing the volume of cherry per factory.

However, this improvement is subject to solving the problems of congestion. There seems to be a paradox in society factories. It was noted in section 4.1.1 that, congestion of coffee in the factories is a major problem in processing and at the same time, the analysis above indicates that technical efficiency can be improved through increase in cherry volumes. This can be explained by the fact that congestion problem is usually experienced during a very short period within the peak processing period in most factories. Solutions to this short lived problem would make it possible for expansion in cherry throughput in the existing factories.

4.5 Hypotheses Testing

The first section of this chapter presents the research findings and discusses the results in line with the objectives

posed in chapter one. Two hypotheses based on the objectives of the study were tested. The following section presents further evaluation and conclusions of the hypotheses tests.

Hypothesis 1: The co operative societies do not operate at minimal cost.

To test this hypothesis, the 1989/90 average total cost for each society was calculated and the cherry throughput for the same year was recorded from all the societies.

The quantity of cherry was regressed against corresponding average unit cost. The unit cost was found to be inversely related to the quantities at lower levels of throughput, but at higher levels the unit cost rose with output. Most co-operative societies were found to be operating at the declining part of the cost curve indicating that they do not operate at point of minimum cost.

The hypothesis the co-operatives do not operate at minimum cost was therefore accepted.

Hypothesis 2: The Deductions Made by the Co-operative Societies are not Different From Estimated Marketing Costs.

To test this hypothesis, the mean marketing costs incurred by the co-operatives were calculated. These costs were compared with the margin between the price received by the societies from KPCU, and the price offered farmers by the latter. The

mean marketing cost was found to be significantly less than the mean marketing margin or the deductions (Table 4.7). For example, in 1990/91, society 1 had incurred a mean cost of Ksh 1.46 to process a kilogram of cherry but it deducted a mean of Ksh 1.98 from the farmer's proceeds. This difference was found to be significant. Since the society received an average of Ksh 6.37 per kilogram of cherry, this difference represents 8.2 per cent of the gross cherry price i.e. the farmer lost an average of 8.2 per cent of the gross cherry price due to inefficiencies of the society.

The hypothesis that 'there is no difference in the marketing costs incurred by the societies and the deductions they make on the farmers proceeds' was rejected in favour of the alternative. The societies have low operational efficiency as reflected by their high marketing margins which do not compare favourably with the marketing costs.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This study analysed some aspects of coffee marketing by the co-operative Societies in Central Province in Kenya. The study undertook to evaluate the performance of the societies in the province. In studying marketing performance, the term that comes into play is efficiency. Efficiency has two aspects, the technical and the pricing aspect. Technical or operational efficiency of a marketing system is concerned with the costs involved in a marketing system while pricing efficiency is concerned with profits earned within a marketing system. In this study, the performance of the co-operative societies was analysed by analysing technical efficiency.

One of the objective of this study was to determine the scale of operation of the co-operative societies. This was done using regression analysis. The problems which the co-operativem face and which may limit their efficiency were also examined. In assessing the performance, the study evaluated the costs the co-operative societies incur in coffee marketing and the deductions they made from the farmers proceeds to recover this cost. Using t-statistics and correlation analysis, the difference between the mean marketing costs and the mean marketing margin was tested whether it was statistically

different from zero. The study also evaluated whether the societies were efficient in handling of the farmers' payment by analysing the ratio of clean coffee to cherry coffee.

To evaluate whether there is scope for improving efficiency through improvement of technical efficiency, the study used descriptive analysis of accounting data. In this approach, the factory groups which were categorized into four according to size were analysed whether they differed in their ability to keep unit costs down or whether the differences in levels of various cost items involved in processing were due to chance fluctuations.

Two hypotheses based on the objectives of the study were advanced and tested during the course of the study. The hypothesis relating to scale of operation was tested through examination of cross-sectional data on costs and cherry throughput. The hypothesis on the relationship between the marketing margin and marketing costs were examined using t-test and correlation analysis.

5.2 Summary of the Findings

This study analysed the marketing efficiency of the coffee co-operative societies. Problems that face the co-operatives and which may limit their efficiency were discussed. The cost structure and scale of operation for the societies were also examined.

The study found out that the main problems facing the co-operatives were; congestion of produce at the factories, labour shortages and instability of coffee incomes.

The congestion problem was shown to arise mainly due to inadequacy of fermentation and soak tanks, inadequate skin and parchment drying tables and labour shortages. Labour shortage is a recurrent problem in the co-operative factories during the peak processing period, and was shown to affect various operations differently. Parchment drying and handling were shown to be the most affected with 60 per cent of the managers responding positively. Skin drying followed with 55 per cent positive responses. It is unfortunate that these operations which are affected most are also those that affect coffee quality most.

The study also found that the instability in coffee throughput which leads to instability in incomes and expenditure is a hindrance in forward planning in co operatives. The incomes were shown to be less stable than the expenditure. Errors in the forecasts of incomes and expenditure were shown to be substantial for most societies. This in turn affected financial planning.

A regression analysis of average cost versus the annual coffee throughput indicated that the 'optimal' level of operation is about 7.5 thousand tonnes. At this level the societies would incur the lowest possible costs. However most

societies operated at less than this level. This means that there is room for lowering unit cost by expansion of cherry intakes. This can be done by intensification of coffee production at the farm level or through amalgamation of small societies. Diseconomies of scale were also shown to exist and a few societies operated at very high costs due to their large size. However it should be noted that this analysis held all other things constant and especially, it did not consider other benefits the farmers derive from the co operatives. Farmers may not mind slightly higher costs of operation as long as their other needs are met, for instance, provision of credit at the right time and in the right quantities.

As far as the performance of the co-operative societies is concerned, the study found out that, the societies have low operational efficiency as depicted by the high marketing margins compared to the estimated marketing costs. It was shown that, 80 per cent of the societies studied had higher mean marketing margins than the mean marketing costs. On average, the mean marketing margin was 1.85 while the mean marketing cost was 1.21. The calculated t-ratio of 2.00 showed that the difference between the two means was statistically significant at 5 per cent level of significance.

The co-operatives were found to be inefficient in the handling of the farmers payments. This was shown by analysing the ratio of clean coffee: cherry coffee. The ratio as obtained

from the societies records was compared with that calculated in this study. The difference between the two ratios was found to be statistically significantly different from zero at 5 per cent level of significance with the ratio calculated in the study being smaller. The fact that the t-value is significant shows that, the co-operatives incur marketing losses. The higher ratio recorded by the societies implies that, larger amounts of cherry are needed to make a unit of clean coffee implying lighter and hence poorer farmers' payments than would actually be the case. The existence of the extra kilos means that somebody receives revenue for coffee he had actually not delivered. This extra kilos is what is commonly referred to in the coffee industry as "air kilos". The performance of the co-operative societies can thus be said to be unsatisfactory.

The hypothesis that the deductions made by the co operative societies are not significantly different from the estimated marketing costs was thus rejected in favour of the alternative, implying that the co-operative societies are inefficient in the marketing of coffee.

The study also found out that apart from processing material costs, the four groups of society factories differed in their ability to lower unit cost of the various cost items. The results showed that the differences in unit labour cost, transport, repair and maintenance and power costs among the different groups were not due to chance fluctuations. The

results of DMRT showed unit cost of processing to decrease with increase in cherry throughput indicating that there is scope for improving technical efficiency of the co-operative factories.

5.3 Conclusions

From the results of empirical analysis, several conclusion concerning the co-operative societies in Central Province can be made. Conclusions regarding the technical efficiency were made with reference to the particular measures used. Generalized assertions for the whole co-operative system are made, but they must be interpreted with caution. This is because a system may be judged to be efficient when one measure is used and inefficient when a different measure is used (Waswa-Wangia, 1977).

The coffee co-operatives in their present status have not achieved one of their main objectives for which they were set for; that of lowering unit cost of marketing by taking advantage of economies of scale.

The results of regression analysis indicated that, there is scope for lowering marketing cost by expansion of cherry intake. The same is indicated by the results of descriptive analysis of accounting data. The results showed that, apart from processing material cost, unit cost on the other cost items (labour, transport, repair and maintenance and power)

varied significantly between the various factory groups. It is safe, therefore, to conclude that, there is scope for reducing these processing costs. Those factories whose unit costs were high could reduce them to levels that have been achieved by the more efficient ones. This was shown to be possible by expansion of cherry volumes handled. This can be done by intensification of coffee production at the farm level which is possible if farmers are given the incentives to do so, by for instance, the societies improving the handling of the farmers payments. If marketing costs could be significantly reduced in any way, it would be possible to pay the farmers higher price without affecting the final price to the consumers. This factor is the essence of improved marketing efficiency. Thus any improvement in marketing efficiency in the coffee industry should enable members of the co-operative society who depend on coffee to improve their income. An efficient method of minimizing the marketing cost in general and the transit losses would probably be to change the system of remuneration of the people working in the co operative societies who influence the costs associated with the marketing of coffee.

5.4 Recommendations

Based on the results of this study, the following recommendations are made and relevant implication derived:-

1] Proper accounting procedure should be maintained by the

co-operatives whereby each farmer's quantity of coffee marketed and the amount of money earned or spent are clearly spelt out. Such a system may allay the common mistrust among farmers about the 'mysterious deductions'. There is need for training in good record keeping especially at the society level to reduce incidence of loss of records as indicated in this study.

2) The overall performance of the coffee co-operatives appears to be inefficient judging by the significance of the difference of the means between the marketing margin and the marketing costs. There is need to make improvements in the area of providing marketing services, such as processing, transportation, storage facilities and timely payment of the produce delivered to the marketing institutions so that the discrepancy between marketing margins and marketing costs can be reduced. One way of improving marketing services would be to provide incentives to the societies' management by for instance paying more to the staff with lowest processing cost and high farmers' payout. This would require amendment of the co-operative Act.

3) The Act also need to be amended so that the co-operative societies can act as any private firm in searching for markets for its members' produce and employ qualified personnel to strengthen their management. This would be

with an aim of maximizing members returns. However, abrupt disruptions should be avoided as much as possible.

4) If recommendation 3 is fulfilled, the co-operatives should address themselves to storage of produce such that sales are made when prices are high.

5) During the course of the study, it became clear that, a number of problems beset the industry. Some of these problems or issues could compliment the findings of this study but were not captured and they require further study. These are:-

   i) Farmers response as to what they consider could be used as criteria for establishing co-operative societies; when to merge or split societies. The study showed that the societies were not taking full advantage of economies of scale, this might be due to few members or low production. Probably merging in such a case could be recommended. But the farmer's opinion should be considered.

   ii) The performance of other coffee institutions such as the co-operative Unions ,Coffee Board of Kenya and Kenya Planters' Co-operative Union as far as coffee marketing is concerned. A study needs to be carried out to assess whether these organizations are really necessary as they are currently, especially in this era of liberalization. Probably competition should be

introduced in the system so as to reduce the monopolistic tendencies of these organizations. These could reduce the high public expenditures associated with them.

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Appendix 1

CO-OPERATIVE FACTORY QUESTIONAIRE

To be completed for each factory

I 1. Name of Interviewer.....

2. Date of Interview.....

3. Designation of the person Interviewed .....

4. Factory..... Society .....

Membership.....

Union..... District .....

AEZ 1 2 2

II Information on factory throughout (1986/87 — 1990/91)

5. How many kg- of cherry were processed by the factory: for the years 1986/87-1990/91.

	1986/87	87/88	88/89	89/90	90/91
Grade 1					
Grade 2					
Total					
Mbuni					

6. For the same years, how many tonnes of parchment were delivered to KPCU? How many tonnes of clean coffee are these volumes equivalent to?

	1986/87	87/88	88/89	89/90	90/91
Parchment					
Clean coffee					
Clean coffee mbuni					

7. Over the same years, what has been the overall rate of payment per kg of cherry and mbuni to the factory.

	1986/87	87/88	88/98	89/90	90/91
Cherry					
Mbuni					

8. At what rate have the farmers been paid over the same period, per kg of cherry and per kg of mbuni.

	1986/87	87/88	88/89	89/90	90/91
Cherry					
Mbuni					

9. Classification of coffee

Class	1986/87	87/88	88/89	89/90	90/91
1-3					
4-6					
7-10					
Mbuni					

III

10. Information on the factory inventory.

How many of the following processing facilities/capacity are available? Are they sufficient for the factory throughput.

(i) Cherry hoppers
(ii) Pulper machine
(iii) Pulping disks per machine
(iv) Prograder
(v) Fermentation tanks
(vi) Soak tanks
(vii) Conditioning bins
(viii) Mechanical drier
(ix) Skin drying tables (area and number)

Length (m)	Width (m)	Area	Number

Length (m)	Width (m)	Area	Number

(xi) Parchment store (area and number

(xii) Water circulation system

IV Information on labour

10. How many of the following staff were permanently employed by the factory and what were their monthly salaries.

Staff category Factory Manager	Salary	1986/87	87/88	88/89	89/90	90/91
Asst. Manager						
Watchmen						
Clerks						
Foremen/ Nyaparas						
Machinery Mechanic*						
Carpenters'						
Masons*						
Permanent Manuals Others (Specify)						

NB

*If none, are they supplied by the society headquarter?
Yes..... No. .....

11 TOtal casual labour hired in the year and rate of payment/day.

	1986/87	87/88	88/89	89/90	90/91
Number					
Rate of Payment					

12. Do society members provide labours for the factory operations?

Yes..... No .....

If yes, how many days did they work in the following years.

	1986/87	87/88	88/89	89/90	90/91
Days Worked					

13. Do you use diesel in the factory? Yes..... No.....

If yes, how much was used and spent on it and lubricating oil- in the following years?

	1986/87	87/88	88/89	89/90	90/91
Litres					
Price					

14. Is main electricity available at the factory? Yes..... No.....

If yes, how much was spent on electricity?

1986/87 87/88 88/89 89/90 90/91

15. Other operating expenses.

	1986/87	87/88	88/89	89/90	90/91
Repair and Maintenance					
Transport Ins.					
Depreciation					

16. Which problems do you encounter in coffee processing?

To be completed in the Society's Office.

1. Society ..... Union .....
   District .....

2. Number of Factories in the Society? ..... Society Membership .....

3. How many of the following staff and what was their monthly salaries for the years 1986/87-91?

Staff Category		1986/87	87/88	88/89	89/90	90/91
Overall Society Manager	No Salary					
Factory Supervisory	No Salary					
Clerk	No Salary					
Messenger	No Salary					
Driver	No Salary					
Others (Specify)	No Salary					

4. How much have the following board members been paid as allowances.

	1986/87	87/88	88/89	89/90	90/91
Chairman					
Secretary					
Treasury					
Ordinary Member					
(State member number)					

5. Name the ways by which the society acquires its inputs? For instance, if affiliated in Union, is it the latter that does the purchasing or does the Society used middlemen?

6. What constitutes the Society general expenses?

Operation	E X P E N D I T U R E				
	1986/87	87/88	88/89	89/90	90/91

Appendix II. The average cherry : clean coffee ratios calculated in the study and that recorded in the societies for two years 1986/87-90/91

Society	Factory	Calculated (X^1)	Recorded (X^1)
Society 1	1	6.96	7.04
	2	6.94	6.94
	3	7.44	7.18
	4	7.14	7.12
	5	6.8	7.06
	6	7.04	7.08
	7	7.1	7.1
	8	6.88	6.88
	9	7.1	7.08
	10	6.96	6.98
	11	6.58	6.63
	12	6.94	7.02
Soc 2	13	8.2	6.84
Soc 3	14	6.76	6.76
	15	6.43	6.43
	16	6.68	6.68
	17	6.7	6.7
Soc 4	18	6.17	6.52
	19	6.23	6.48
	20	6.21	6.46
	21	6.17	6.5
Soc 5	22	7.28	7.24
	23	7.7	7.7
	24	6.12	7.38
	25	6.78	6.78
	26	7.3	7.47
	27	6.6	6.54
Soc 6	28	7.44	7.44
	29	6.5	6.76
	30	6.26	6.64
	31	6.58	6.54
	32	8.0	8.0
Soc 7	33	7.25	7.88
	34	8.3	8.76
	35	6.48	6.9
Soc 8	36	6.44	6.44
	37	6.36	6.7
	38	6.64	6.64
	39	6.66	6.66
	40	6.68	6.68
	41	6.72	6.72
	42	6.78	6.78
	43	6.98	6.98
	44	6.92	6.9
	45	6.88	6.88
	46	6.5	6.34
	47	6.58	6.58
	48	6.52	6.54
	49	[illegible]	6.9

Apped II Cont

Society	Factory	Calculated (X^1)	Recorded (X^2)
	50	6 6	6 58
	51	6 84	6 84
	52	6 76	6.74
	53	6 66	6 74
Soc 8	54	6 76	6 76
	55	7 12	7.08
	56	4 94	6 5
	57	6 88	6.88
	58	6.78	6 78
	59	6 76	6 54
	60	6 52	6.28
	61	6 83	6 94
	62	6 92	6 92
	63	6 78	6 82
	64	6 95	6 95
	65	5 8	5 8
	66	6 00	6 0
	67	6.66	6.65
	68	6 47	6 43
Soc 9	69	6 3	6.3
	70	6.5	6.5
	71	6 7	6 7
	72	6 52	6.42
	73	6 46	6 44
	74	7 12	6 08
	75	6 48	6 48
	76	6 64	6 64
	77	6 62	6 76
	78	6 36	6 36
	79	6.6	6.6
Soc 10	80	6 68	6 68
	81	6 4	6 38
	82	6 35	6 35
	83	6 6	6 58
	84	6 42	6 38
	85	7 66	7 66
	86	6 46	6.38
	87	6 82	6 82
	88	6.46	7.36

Mean Calculated Ration X^1 = 6 74 t = 17.7**
Mean Recorded Ration X^2 = 6.79

Source Athour's Survey. 1993