

THE DETERMINANTS OF EXPORT PERFORMANCE OF THE KENYAN HORTICULTURAL INDUSTRY

BY

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DECLARATION.

This Research Paper is my original work and has not been presented for a Degree in any other University.

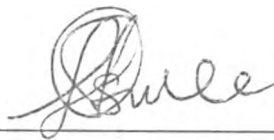


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This Research Paper has been submitted for examination with our approval as University of Nairobi supervisors.



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DEDICATION

To my late grandfather, Ibrahim M'Mugambi, who appreciated the value of education before most of his peers did and never hesitated to sell his cattle whenever school fees from other sources was not forthcoming.

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ABSTRACT.

Kenya's horticultural industry earns the country much foreign exchange and horticultural products are set to overtake coffee and tea as the country's leading agricultural export commodities. The industry, however, is beset by a number of constraints and challenges that may hinder the full realization of its potential. Literature on the industry identifies these as including limited air-cargo space; high cost of packaging; lack of proper handling, pre-cooling and cold storage facilities; high cost of production; strong competition from other horticultural producers; and seasonality of foreign demand.

Despite the identification of the factors that influence exports of horticultural products from Kenya by various researchers, no study has attempted an empirical analysis of their impact. In recognition of the strategic importance of this industry, particularly in its foreign exchange earning potential, and the limitations of the existing literature on the export performance of the industry, this study does this by specifying a semi-log-linear econometric model and estimates it using Ordinary Least Squares (OLS). This is aimed at identifying the statistically significant determinants of the export performance of Kenya's horticultural industry. Diagnostic tests have been carried out on the estimated model to verify the reliability of the estimated model.

Results of the empirical analysis indicate that foreign income, air-cargo space availability, the real exchange rate and the concessions under Lomé Conventions all positively influence the volume of horticultural exports from Kenya. However, the Lomé Conventions' variable was not statistically significant at the 5% level of significance.

As Kenya's policy makers have no way of influencing foreign incomes, policies aimed at increasing the volume of horticultural exports from the country should be those that increase the real exchange rate and air-cargo space availability. Due to data limitations a number of important variables such as packaging cost and quality; handling, pre-cooling, and cold storage facilities; processing ; and so on, were not incorporated in the model used in the study. For this reason, further work on horticultural exports should attempt to incorporate some of these variables.

CHAPTER ONE:

INTRODUCTION.

1.0. Background to the Study

The agricultural sector is the mainstay of Kenya's economy. The sector's contribution to GDP remains high although it has been declining over the years as development has occurred. For example, while the sector's contribution was 35.4% in 1965, it had fallen to 19.9% by 1990 (Table 1). This has occurred due to increasing importance of the manufacturing and services sectors as sources of national income. This has also been caused by declining growth in the agricultural sector. While the agricultural sector recorded an average annual growth rate of 4.9% over the 1965-80 period, this had fallen to 3.3% over the 1980-88 period (World Bank, 1990).

In addition the agricultural sector employs over 80% of the population, contributes to 64% of the country's export earnings (Republic of Kenya, 1991) and provides food for the populace and raw materials for the industrial sector. It also provides an important market for the services, manufactured goods and inputs produced in the country. According to the Sessional Paper No. 1 of 1986 on Economic Management for Renewed Growth, agriculture, being the backbone of the economy, is expected to be the key sector in meeting the challenges that beset the nation's development efforts. To achieve the targeted growth rate of 5.6% per annum for the whole economy, agriculture is targeted to grow at 5.3% p.a. between 1984 and the year 2000 (Republic of Kenya, 1986).

le 1: Sectoral Contribution to GDP in Kenya, 1965-1990.Selected Sectors (Percentages)

tor	1965	1975	1985	1988	1990
iculture*	35.4	29.6	30.5	29.5	28.9
ufacturing	10.7	13.4	12.8	13.0	13.2
lding & Construction	3.9	5.8	5.2	5.0	4.9
vices **	18.2	17.1	21.2	21.9	22.3

Includes forestry and fishing, both monetary and non-monetary

Includes 'Trade, Restaurants and Hotels', ' Finance, Insurance, al Estate and Business Services', and 'other services'.

Source: Republic of Kenya, Economic Survey, various issues.

The impact of agriculture is particularly significant on Kenya's external trade and this is important because external trade plays a major role in the country's economy. Immediately after independence Kenya intensified industrialization through the import-substitution strategy. Import-substitution was expected to follow a sequence of three stages: first, the establishment of consumer goods industries; second, intermediate goods industries and finally, capital goods industries (Nixson, 1982). Kenya's experience shows that this sequence has not materialized. Hence the country has found itself 'stuck' in the first stage of import-substitution industrialization, (Nixson, op. cit.) having only 'infant' industries in the first stage which depend wholly on captive domestic markets.

It was the failure of import-substitution industrialization strategy to proceed to the second and third stages and the collapse of the East African Community, which had hitherto provided a large

et for Kenya's manufactures, in 1977, that forced Kenya to
 ge focus to the alternative strategy of export-led
 ustrialization which entails producing for foreign markets. This
 supposed to provide new markets for the domestic industries and
 are inflows of foreign exchange. It is expected that wider
 ets coupled with competitive pressures will improve production
 lower unit costs. Export promotion enhances economic growth
 ough three factors: first, with export earnings there is
 reased capacity to import investment goods, second, there is
 reased demand for investment when new foreign markets are
 tured; and finally, there is increased savings that are generated
 the export industries. The increased export earnings ensure an
 flow of foreign exchange which is important for economic growth.

Kenya's export performance has not been very good, especially
 the 1980s. While in 1965, Exports of goods and non-factor
 rvices as percentage of GDP was 31%, the same had declined to 19%
 1988 (World Bank, 1990). Between 1965-80, the average annual
 wth rate of exports was 0.3% and over the period 1980-88, the
 hual growth rate had fallen to only 0.1% (World Bank, 1990). In
 ct, over the period 1980-88, the change in exports/GDP was -4.0%.
 gosin, 1991).

Table 2 shows the importance of various commodities in Kenya's
 ports over the years. From this table, it is clear that coffee
Coffea spp.) and tea (Carmelia sinensis) have dominated the Kenya
 port sector and indeed, this dominance has grown over the years.
 hile coffee and tea exports accounted for 42.8% of the total

Figure 2: Contribution (by value) to Total Merchandise

Exports, 1965-1990

	1965		1975		1985		1988		1990	
	Value	%	Value	%	Value	%	Value	%	Value	%
Commodity	K.Pd		K.Pd		K.Pd		K.Pd		K.Pd	
	'000		'000		'000		'000		'000	
Wheat, not roasted	14,096	29.9	35,204	16.6	230,623	29.4	244,547	26.7	220,996	18.4
Beans	6,085	12.9	22,932	10.7	191,657	24.4	185,263	20.2	314,505	26.1
Wheat, raw	747	1.6	1,282	0.6	1,975	0.3	1	0	0.6	0
Fruit and vegetables*	2,337	4.95	10,248	4.8	52,970	6.7	94,784	10.3	159,922	13.3
Petroleum Products										
By-products	4,670	9.9	58,552	27.2	127,421	16.2	119,797	13.1	140,241	11.6
Manufactured goods	5,432	11.5	39,978	18.6	103,360	13.2	136,015	14.8	-	-

* Includes cashew nuts, pineapples (tinned), beans, peas and lentils plus 'other'

Source: Republic of Kenya, Statistical Abstract, various issues and Economic

Survey (1991) for the 1990 figures

merchandise exports in 1965, the share fell to 34.1% in 1980 (due to the drought experienced in the country during 1979/80) and increased to 53.8% in 1985. Subsequently the share declined gradually and had reached 44.5% by 1990. This high dependence on beverage exports (coffee and tea) is worrisome given the depressed world commodity prices occasioned by global over-production; the collapse of International Commodity Agreements, particularly in the case of coffee; the low income elasticity of demand for these products relative to the demand for manufactured goods which causes a deterioration in the terms of trade, and the growers' increasing disenchantment over late payments for their crop deliveries.

Due to falling export prices of unprocessed (crude) industrial raw materials and increased domestic demand by local textile and leather industries for cotton (Gossypium spp.), wool, hides and skins, exports of these products have declined substantially. Late payments to cotton farmers have also discouraged them, leading to a decline in supply and consequently in the export surplus. Thus there were no net exports of cotton for the third year running in 1990, and Kenya is actually becoming a net importer of cotton (Republic of Kenya, 1991). The droughts that gripped the country in 1979/80 and 1984 affected the supply of hides and skins adversely.

The share of sisal (Agave sisalame) and pyrethrum (Chrysanthemum spp.) exports in total exports and the absolute levels of sisal and pyrethrum exports have declined sharply since early 1960s. In 1963, sisal and pyrethrum exports accounted for 17% and 6%, respectively, of total exports. By 1986, these products' shares had both declined to about 1% (Kenya Association of Manufacturers (K.A.M.), 1989).

Thus, despite the growth in the relative shares of fruits and vegetables, petroleum products and by-products, and manufactured goods in total merchandise exports in Kenya over the years, there has been limited diversification of the Kenyan export sector. The major export earners for Kenya remain coffee and tea. Due to this lack of diversification a deterioration in the terms of trade for these important products has adverse effects on the value of exports (Horman, 1981).

To achieve stability in export earnings in Kenya there is need for diversification of the agricultural export sub-sector. Such export diversification can be encouraged through increased production of horticultural crops which have shown the greatest promise in expanding the country's export base (Republic of Kenya, 1986). This is confirmed by the Sixth Development Plan (1989-93) which stresses the development of horticultural crops as alternative sources of foreign exchange earnings.

Horticultural exports¹ have grown at a phenomenal rate over the years. While fruits and vegetables exports accounted for only 5.0% of total merchandise exports in 1965, the share had risen to 13.3% by 1990 (Table 2). Horticultural exports from Kenya have grown both in volume and value from 1,476 tonnes worth Kenya Pounds 156,481 in 1968 to an impressive 188,800 tonnes worth Kenya Pounds 159.9 million by 1990 (Republic of Kenya, 1983), a phenomenal annual growth rate of 23.5% in volume and 35.2% in value. Horticultural exports are now Kenya's third largest source of foreign exchange among agricultural exports, behind coffee and tea.

Kenya's climate permits the production of a wide range of fruits and vegetables both for the domestic and export markets. The range of products has increased steadily. While in the early 1970s pineapples (Ananas comosus) were the dominant horticultural export, accounting for 32% of total horticultural exports by value (Republic of Kenya, 1983), their dominance has been challenged by other products so that their share in the value of total horticultural exports had fallen to only 0.7% by 1990 (Table 3).

Table 3: The Major Horticultural Exports From Kenya, 1990

Commodity	Percentage share in total vol. (Tonnes) of horticultural exports	Percentage share in total value of horticultural exports
Cut flowers	29.4	51.6
French beans	33.2	25.3
Mangoes	5.3	3.9
Avocadoes	6.7	3.0
Chillies	4.3	2.8
Okra	3.7	2.5
Karela	3.0	2.0
Strawberries	1.3	1.9
Other Asian vegetables	2.8	1.5
Passion fruits	0.9	0.8
Pineapples	1.6	0.7

Source: Calculated from HCDA Export Statistics for the year 1990

✓ The country, which had almost no cut flower ² exports as recently as 1974, was by 1989 the World's fourth largest exporter of cut flowers, the most popular of which are roses(Rosa Spp.), orchids(several genera including Cattleya, Cymbidium, Phalaenopsis, Vanda, and so on), and carnations (Dianthus caryophyllus) (World Bank, 1989). More than 50 varieties of cut flowers are now produced in Kenya and cut flowers are now Kenya's leading horticultural export item by value. For instance, in 1990 cut flowers constituted 29.4% by weight of the country's total horticultural exports and 51.6% of the total value (Table 3).

French beans (Phaseolus vulgaris) are the second largest horticultural export in terms of value. These accounted for only 8% of the total volume of Kenya's horticultural exports in the early 1970s, but their share had risen to 33.2% by 1990 (Table 3). By 1990, Kenya was exporting 16,000 tonnes of fresh French beans yearly and accounted for 40% of the world trade in this product (Republic of Kenya, 1991).

Besides this substantial foreign exchange contribution, horticultural exports are also very important in that they enable geographical diversification of the country's exports. Horticultural products from Kenya go to some 30 countries (World Bank, 1989), the largest single market being the UK, taking about 34.8% of the total in 1990 (Table 4). The other main importers of Kenyan horticultural produce are France, Holland, Germany, Italy and other European countries. However, Middle Eastern countries are also becoming an increasingly important export markets. This geographical diversification of Kenya's export destinations, which is facilitated

by horticultural exports, has obvious advantages for the country: it helps to reduce losses in total export earnings in the event of economic recession in some parts of the world, or of political differences with some trading partners, or political instability in some export markets.

Table 4: The Major Export Markets by Value for fresh Kenyan Horticultural Products, 1989 and 1990

Country	Percentage Market Share	
	1989	1990
United Kingdom	33.48	34.75
France	17.01	18.64
Holland	16.65	19.17
West Germany	12.60	11.82
Italy	6.28	0.39
Belgium	3.64	6.77
United Arab Emirates	3.33	-
Switzerland	2.05	1.87
Saudi Arabia	1.21	1.61
Djibouti	0.97	-
Other	2.78	4.98
TOTAL	100.00	100.00

Source: Calculated from HCDA Export Statistics.

Horticultural products provide an appropriate means for a more equitable distribution of income by providing employment to many job

seekers and a source of income to small scale farmers. Fruit and vegetable production in Kenya has been shifting from large farms to smallholder farms throughout the country and their production is fairly highly labour intensive (Government of Kenya, 1984). By 1988, horticultural production was based on an estimated 250,000 smallholders operating mixed farms with horticultural products as cash crops and a few large, export-oriented and vertically integrated specialized units (FAO/ADB, 1989). Jaffee (1986), notes that French beans (Phaseolus vulgaris) identify more with small scale farmers. Moreover, horticulture is an important source of job opportunities, as the production of most of the horticultural products is labour intensive. According to the Ministry of Agriculture, (Government of Kenya, 1979), horticultural products offer higher employment opportunities per unit area than most agricultural commodities. This conclusion was arrived at after a comparison of labour requirements by each agricultural commodity. Thus French beans require 3,285 man hours per hectare per year while hybrid maize (Zea mays) require 984; maize/beans (Phaseolus vulgaris) intercrop 1579; Irish potatoes (Solanum tuberosum) 1760; and milk production requires 380-482. It is obvious, therefore, that promotion of production of horticultural products for export will also offer higher employment opportunities. This is confirmed further by statistics on estimated labour requirements contained in a FAO/ADB (1989) report: labour-days per hectare: French beans, 400; chillies (Capsicum annuum), 378; coffee (Coffea spp), 269 (calculated using data from Cote d'Ivoire); cotton, 125 (ox-drawn cultivation); maize, 90; sugarcane (Saccharum officinarum) (smallholder), 45 (calculated for a ratoon crop).

International and domestic demand for horticultural products is high and growing. The growing domestic market alone absorbs 90% of the fruits and vegetables produced in Kenya (World Bank, 1989). A peculiarity of the Kenyan horticultural sub-sector is that the domestic and export markets operate quite separately from each other (FAO/ADB, 1989). Hardly any of the major crops used locally are exported. On the other hand, there is little or no domestic market for such crops as French beans, avocados (Persea americana), or some Asian vegetables. The unit value of Kenya's horticultural exports has grown more rapidly than the average for all exports. Between 1984 and 1988 it rose in current terms at an average of 4.6% per annum while the price index of all exports rose at an average of only 0.7% per annum (The Courier, 1991). The rapid rise in the price index for horticultural exports supports the view that their market is stable and reliable and that the demand for these products has been growing steadily relative to supply.

Given the inadequacy of foreign capital inflows and the need to continue servicing the country's debts, growth of exports is important if the economy is to realise the targeted growth rate of 5.6% p.a. by the year 2000 (Republic of Kenya, 1986). Horticultural exports provide an avenue through which Kenya could increase her export earnings; reduce instability in export earnings through the diversification of commodity exports and their destinations; generate more employment opportunities; and reduce inequality in regional income distribution.

1.1 Statement of the Problem.

Inspite of the fact that horticultural exports have grown as indicated, there are many problems which limit the maximum quantity that could be exported from the country. Domestically, these problems include limited air-cargo space; high cost of packaging (which according to HCDA records accounts for approximately 16.5% of the total cost of French bean production); lack of proper handling, pre-cooling and cold storage facilities both at the collection centres in the producing areas and at the airports; and high cost of production. Externally, the problems are those of strong competition from other producing countries (including other ACP members and other countries like Greece, Spain and Portugal which have joined the EEC in the 1980s) and the seasonality of foreign demand. There are horticultural success stories in Africa that could compete with Kenya's horticultural products in the export market. These include Lesotho in white asparagus (Asparagus officinalis), Swaziland in tomatoes (Lycopersicon esculentum), Ghana and Cote d'Ivoire in pineapples (Ananas comosus) (The Courier, op.cit.). Moreover, outside Africa cut flowers from Israel and Spain compete seriously with Kenya's produce.

These problems and challenges have, undoubtedly, prevented horticultural exports from realising their full potential. Although these constraints and challenges have been cited in many reports that have been compiled on Kenya's horticultural industry, no empirical study has been carried out to investigate the significance of these factors on horticultural export performance. This study is an attempt to fill the existing gap. It takes a departure from other studies on Kenya's horticultural sub-sector by empirically analysing the factors that influence the export performance of the sub-sector.

1.2 Objectives of the Study.

This study is concerned with what determines the export performance of the horticultural industry in Kenya. Specifically, the study will:

1. Specify a model that delineates the factors that influence the export performance of Kenya's horticultural industry;
2. estimate the model and assess the statistical significance of the explanatory variables;
3. Based on the above, offer proposals on how the performance of horticultural exports could be enhanced. These suggestions could form a basis for policy to improve the performance of this sub-sector.

1.3 Significance of the Study.

This study seeks to shed light on the quantitative relationships between the volume of horticultural exports and the variables that influence it. A model will be developed on these relationships and estimated.

Knowledge on how the export performance of horticultural products could be enhanced will enable the country to formulate appropriate policies to increase foreign exchange earnings and raise employment and incomes from this sector. Inferences drawn from the empirical analysis could form a basis for policy prescriptions.

1.4 Organization of the rest of the Study.

In setting off to accomplish what has been proposed in this chapter, the following brief outline will be adhered to. Chapter Two discusses, traces and analyses the nature and patterns of the Kenyan horticultural export industry in detail. The nature of the external market for Kenyan horticultural products is discussed. So is the the nature of the horticultural exporters and the arrangements necessary for successful export marketing.

In Chapter Three a review of existing literature on Kenyan horticultural marketing, particularly on export marketing, and on related issues is presented. The factors that have a bearing on the horticultural export performance are identified.

In Chapter Four the research methodology used is presented. Sources and nature of data used are also discussed in this chapter. Chapter Five deals with the analysis of the data. The regression results also are presented and interpreted in this chapter. Finally, Chapter Six contains summary and policy recommendations drawn from the results, suggestions for further research and the limitations of the study. Notes, References and Appendices follow this last chapter.

CHAPTER TWO:

KENYA'S HORTICULTURAL EXPORT SUB-SECTOR.

2.0 Introduction

This chapter describes the Kenyan horticultural export sub-sector in detail. It traces the historical development and growth of horticultural exports, identifying the dominant Kenyan horticultural export commodities and how they have shifted their relative importance over time, describes the major characteristics of the participants in the Kenyan horticultural trade and the competitive patterns within the sub-sector, and finally, discusses the organization of the export market.

2.1 Historical Development and Growth of Kenyan Horticultural Exports.

Throughout the period of colonial rule in Kenya (1895-1963), the production and trade in fresh and processed fruit and vegetables and cut flowers remained generally underdeveloped (Jaffee, 1992). This horticultural sub-sector was characterized by an absence of modern marketing facilities and nation-wide marketing organizations, official grades and standards for fresh produce and research and advisory services in the years prior to World War II. During this period a small volume of export trade in potatoes (Solanum tuberosum) and passion fruits (Passiflora edulis) was carried out

by private firms but the bulk of fruit and vegetable production in Kenya was of very low quality and the colony remained a net importer of fresh and processed fruit and vegetable products.

The period between the end of World War II and Kenyan Independence saw the development of the scientific, infrastructural, and institutional framework from which larger and more diversified export trade could be pursued. This effort did not bear fruit immediately because even at Independence such trade only amounted to U.K. pounds 1.2 million, or 3% of the country's total agricultural exports (Jaffee, 1992).

It was during this period that expatriate-owned private and cooperative enterprises pioneered trade in high-quality, air-freighted fresh fruit, vegetables, and cut flowers during the European winter 'off-season'. This trade, however, was constrained by the limited availability of air-cargo facilities out of Kenya and the limited investments in Kenya in irrigation facilities and marketing infrastructure (e.g. storage units and refrigerated trucks). The colonial government concentrated its investments in production and processing facilities for such export crops as coffee, tea, and pyrethrum, so that public investments in the horticultural sub-sector were minimal. Small-scale exports of processed fruit (notably canned pineapples) and vegetable products were also developed. The participating firms, however, experienced acute raw material supply problems and were not competitive due to the high costs of intermediate inputs. Indeed Kenya's continued exports of canned pineapples, which alone accounted for more than two-thirds of Kenya's total horticultural exports by the time of the

country's Independence, depended on government subsidies and protection for the participating firms (Swainson, 1980).

Much of the 1960s saw Kenya's horticultural exports grow moderately as processing companies continued to encounter raw material supply problems and fresh produce exporters faced continued international transport bottlenecks. By the early 1970s, however, the sub-sector appeared poised for major expansion as a result of several large-scale investments in production (e.g. irrigation) and processing infrastructure, favourable international market conditions, and an expansion in the availability of air-freight facilities (Jaffee, 1992). The Kenyan Government encouraged investments in processing facilities and in crop development by engaging in joint ventures with multinational corporations. This provided foreign partners with low cost access to land, with preferential and subsidized access to public services (e.g. roads, rail cargo, electricity), and with reduced financial risks. These efforts have borne fruit because since the early 1970s the horticultural export sub-sector has developed into an important component of the Kenyan economy, providing a major and growing source of foreign exchange earnings as well as substantial employment and farm income opportunities. During a period in which Kenya's exports of many of its traditional commodities have stagnated or declined (e.g. sisal (Agave sisalame), pyrethrum (Chrysanthemum spp.), cotton (Gossypium spp.), meat products), or fluctuated considerably from year to year (coffee (Coffea spp.), maize (Zea mays)), the aggregate volume and value of horticultural exports has increased substantially and almost continuously (Table 5 and Appendix I).

Table 5: The Expansion of Kenya's Horticultural Exports, 1973-1988

<u>Years</u>	<u>Volume('000 tons)</u>	<u>Value(KPds million)</u>
1973	27.4	3.6
1974	21.6	3.8
1975	34.4	8.4
1976	47.3	13.2
1977	67.8	18.8
1978	66.7	19.1
1979	66.3	21.2
1980	66.3	23.1
1981	69.6	27.2
1982	70.6	31.5
1983	83.0	43.3
1984	90.0	51.6
1985	87.1	57.3
1986	93.3	65.3
1987	93.4	81.9
1988	111.1	99.9
Average annual change, 1973-88	11.6%	28.0%

Source: Jaffee, 1992, pp. 8.

As Table 5 demonstrates, there has been double-digit annual growth in horticultural exports since 1973. In 1990 alone the horticultural export sub-sector earned Kenya a total of 159.9 million Kenyan Pounds and accounted for well over 22% of the value of total exports of agricultural commodities (Republic of Kenya, Economic Survey, 1991). If current trends continue, horticultural products may surpass both coffee and tea to become Kenya's leading commodity export sub-sector.

2.2. Kenya's Dominant Horticultural Export Commodities.

The expansion of Kenya's horticultural exports has been based on a wide range of individual commodities and provides the only significant case of agricultural export diversification in the country since World War II. While at independence exports of canned pineapples accounted for more than two-thirds of the total Kenyan horticultural exports, their dominant role was reversed in later years (Table 3). Cut flowers, French beans, mangoes, and avocados, in that order, are now the leading foreign exchange earners among the horticultural exports of Kenya.

In recent years, Kenya's horticultural trade has consisted of more than seventy-five different commodities/products (HCDA reports) from the following categories:

- (1) Canned fruit and vegetables (including canned pineapples and French beans),
- (2) Fruit and vegetable juices (including pineapple, passion fruit, orange, and tomato juices),
- (3) Fresh temperate, sub-tropical, and tropical fruits and vegetables (including French beans, chillies, okra, mango, avocado, strawberry, pineapple, passion fruit, and many others),
- (4) Cut flowers (including carnations, roses, astroemeria, chrysanthemums, statice, and others), and
- (5) Vegetable and flower seeds (both hybrid and generic).

The development of Kenya's horticultural trade has not been even across commodities (Jaffee, 1992). In the pineapple canning and cut flower industries, trade has expanded enormously, placing the

country among the five leading exporters World-wide. Significant expansions in trade and market shares have also been achieved for several fresh fruit and vegetables, especially French beans, strawberries, and a wide range of the so-called 'Asian' vegetables (e.g. chillies, okra, karela). However, for a range of other fresh and processed products, Kenya has either not maintained former levels of trade or has achieved only moderate trade increases, despite rapid expansion in West European and Middle Eastern import demands.

2.3 The Participants in Kenyan Horticultural Trade.

Up to the early 1970s export-oriented production was dominated by medium-to-large-scale farmers based in centralized locations, although a few individual projects involving government participation did attempt to organize raw material supplies from smallholder farmers (Jaffee, 1992). The diversification of trade over the past decade and the increased competition among exporters have encouraged a large number of smallholders, some located in relatively remote and undeveloped regions, to produce for the export market.

Despite direct government investments in certain production, processing and trading activities, and the introduction of regulations and positive support measures to increase the 'Kenyanization' of horticultural trade (including restrictive licensing arrangements, restricted access and targeted programmes for production and other credit, and laws restricting the hiring of non-Kenyans), this trade has remained largely controlled by foreign-owned companies or members of Kenya's Asian and European communities (Table 6).

Table 6: Shares of Kenya's Horticultural Export Trade by Firm-ownership, 1985-86 (percentages).

Firm ownership	fresh fruit + veges. ^a	cut flowers ^b	proce.fruit +vege. ^c	combined ^d
Foreign-owned				
(MNCs) ^e	0	58	91	54
Private-locally owned	97	38	9	43
of which:				
Kenyan Asian	81	0	7	30
Kenyan European	9	35	2	10
Kenyan African	7	3	0	3
Local cooperative	0	1	0	1
Kenyan parastatal	3	3	0	2
TOTAL	100	100	100	100

a. Export volumes for 1985

b. Export values for 1985/86 season

c. Export values for 1986

d. Estimated for the export value for 1986.

e. Includes joint ventures with majority foreign ownership and management control.

Source: Jaffee, 1992, pp. 11.

With the aim of 'Kenyanizing' the trade of fresh fruit and vegetables, the Government had restricted this trade only to companies having 50% or more local ownership. However, in 1988, Del Monte-owned Kenya Cannery was issued with a licence to export fresh

pineapples. Since the mid-1970s, the Government has also tried several measures to encourage Kenyan African participation in this trade. These have included:

- (1) Pressure on Asian-owned firms to take on African partners,
- (2) Government promotion of African-owned exporting firms in overseas trade fairs, and
- (3) Preferential access for African-owned firms to the air-freight facilities of Kenya Airways. The Home Exporters Association was started in 1986 following a presidential directive through the initiative of the HCDA to assist the upcoming indigenous African businessmen. Members of the association are guaranteed a minimum air-cargo space in Kenya Airways flights to Europe. These efforts have seen many Kenyan African-owned firms enter this trade, but the trade remains dominated by firms owned by Kenyan Asians, with firms owned or managed by Kenyan Africans accounting for a mere 10% share (Table 6).

Through the mid-1980s, the bulk of Kenya's cut flower exports were produced by foreign-owned companies or firms owned and managed by Kenyans of European origin. This is largely due to the lack of an official Kenyan system of floricultural research and extension and a lack of local knowledge regarding European floricultural product demand and marketing channels. The few African-owned floricultural production and trading operations are on very small scale. The limited government efforts to promote the Kenyanization of this industry have involved some direct investments by the Agricultural Development Corporation (ADC) in cut flower production and pressures on foreign companies to limit the size of their expatriate staff and provide training to Kenyans.

In contrast with fresh produce, Kenyan exports of processed fruit and vegetable products have been dominated by a few foreign-owned companies. Over the past two decades, one firm, a subsidiary of Del Monte, has accounted for 80% or more of such exports. The only other processing firms which have been oriented primarily to export markets have involved foreign companies, either in joint ventures with Kenyan parastatals or private companies or within the framework of management and marketing contracts with local firms. The Government has sought to increase 'Kenyan control' in this industry by entering into joint ventures with foreign partners.

The vast majority of locally-owned fruit and vegetable processing companies have focused on the domestic market, a strategy made profitable by strong tariff and non-tariff barriers on imports of competing products into the country. These firms exported to the East African market when the East African Community (EAC) was in existence. With the collapse of the EAC in 1977 and the political and/or economic crises in the neighbouring countries, such exports declined substantially. Most such local firms have not been cost- or quality-competitive in international markets.

Table 6 shows that in 1986 foreign-owned companies accounted for 54 percent of the value of Kenya's horticultural trade while firms owned by Kenyan Asians and Europeans accounted for 40 percent. Firms owned by Africans or having Africans in senior management positions accounted for just 6% of the trade. This has both positive and negative implications. On the positive side, without the technical skills and marketing expertise of foreign companies, Kenya's horticultural export trade (especially that of cut flowers

and processed fruit and vegetables) would have been considerably lower. A few foreign investments have had a demonstration effect, encouraging local entrepreneurs to make similar investments in production and post-harvest facilities. On the negative side, such an ownership pattern poses potential political problems as this sector is now one of the fastest growing components of the Kenyan economy and concerns about the distribution of benefits from this trade have grown (see, for example, Republic of Kenya, 1982 and 1985). The Government has experienced problems in the monitoring and regulation of the pricing and financial practices of firms which are trading with subsidiaries or associated firms overseas (Kaplinsky, 1979). This pattern of ownership has not helped in the provision of expertise to Kenyan Africans in the international marketing of Kenya's horticultural crops, expertise which could be potentially applied to other agro-industrial activities.

2.4. Competitive Patterns within the Kenyan Horticultural Export sub-sector.

In the early years (mid-1950s to mid-1960s) of Kenya's exports in fresh fruit and vegetables, trade was dominated by three firms which were also the leading domestic fresh produce wholesalers at the time (Jaffee, 1992). These firms competed against one another in procuring high-quality produce, obtaining allocations of air-freight space, and servicing local institutions and high-income residential areas. One of these firms, Kenya Horticultural Exporters Ltd. (KHE), acquired a dominant position in the trade by providing improved buying services (e.g. credit, input supply, seasonal planning, timely payment) to the major medium-to-large-scale

producers and by developing several effective marketing channels to distribute its produce in the United Kingdom. By the late 1960s, KHE accounted for more than half of Kenya's total fresh produce exports (Jaffee, 1992).

During the 1970s and afterwards, there occurred a large increase in the number of fresh produce exporters with some farmers integrating forward to engage in trade and with some firms entering the trade from other lines of business. In 1991, for instance, the HCDA either renewed or issued new licences to 145 fruit and vegetable exporters and 32 cut flower exporters. This tremendous increase in the number of exporters could be attributed in part to the Government's implementation of a very liberal licensing scheme.

Large scale entry into the export trade has undermined attempts to pre-plan the allocation of available air-freight space among exporters and has prevented the country from developing effective brand name promotion for its commodity lines. Competition in the procurement of crops has generated benefits for both smallholder and larger farmers through higher prices paid to farmers and the setting up of buying centres in new locations in order to diversify their supply sources. Some firms have sought to escape from this competition by integrating backward into farm production. Increased competition for the available air-freight space on commercial air carriers has led to last-minute off-loads of produce and an upward bidding of air-freight charges, especially during the peak export months of December to February. This has increased the risks faced by traders and provided an entry barrier for new small-scale exporters. There has also been increased competition in foreign

markets, with many firms sending the same products to the same markets, frequently using the same agents. This pattern has allowed foreign buyers and agents to play off one Kenyan exporter against another. At times some exporters also operate as wholesalers and retailers. The retailing operation is an important part of their business, assisting in disposing of produce which either cannot be exported (due to lack of air space, etc.) or is of inferior quality to meet the standards necessary for exports. The challenge faced by Kenya is to combine competition in the procurement of crops within the country with a more effective co-ordination of export sales operations to improve exporter bargaining power overseas.

2.5. Organization of the Export Market.

As pointed out in Chapter One, demand for Kenyan horticultural products is high and growing in Europe and the Middle East. Demand in these regions is rising steadily, attributed largely to population growth but also due to the fact that over time, these countries are opting to import produce from low-cost sources such as Kenya, where land, labour and other inputs remain relatively inexpensive. Demand in established but insignificant markets in Spain, Italy, Saudi Arabia, the United Arab Emirates, and the Seychelles is also surging, largely due to improved economic growth and the concomitant conspicuous consumption habits. Kenyan exporters are also eyeing the former Eastern European bloc, the majority of whose members have severe environmental problems, and are therefore likely to look beyond their borders for supply of horticultural produce.

To capture these markets, Kenyan exporters ought to have good contacts within them. The current organization of the market is such that all horticultural exporters from Kenya have clients (importers) in the importing countries. Most of the local exporters are introduced to their clients by the HCDA. Official documents of agreement are signed by the two parties, marking the start of trade. The exporters then strive to cultivate amicable trade relations with their clients, by working hard to meet foreign consumer wants and needs which include high quality produce, good packaging, reliable supply, and reasonable, competitive prices.

In the Kenyan horticultural industry, new markets have been explored in a number of ways, including some of the following:

(1) The HCDA sends exporters to various countries to learn the horticultural trade. This provides a chance for Kenyan exporters to meet foreign importers with whom they can trade.

(2) The HCDA participates in various international shows and trade fairs, from where they are able to advertise and promote Kenyan horticultural produce.

(3) The International Trade Centre (ITC) created by the General Agreement on Tariffs and Trade (GATT) and the UN acting through the United Nations Conference on Trade and Development (UNCTAD) plays a major role in trade promotion for developing countries. This institution gives information on available markets; works with developing countries to set up effective national trade promotion programmes for expanding their exports; and through it, market development services aimed at identifying new export opportunities, adapting products for sale abroad, and promoting these goods on the international market.

(4) COLEACP publications provide more information on markets. Comite de Liason Europe-Afrique-Caraibes-Pacifique (COLEACP) is an organization established in 1973 which assists the African, Caribbean, and Pacific (ACP) countries in the marketing of various commodities. The body, whose secretariat sits in Paris, brings together the ACP horticultural producers and the European importers. Their publications are made available to ACP member states. In Kenya, HCDA receives the publications concerned with the marketing of tropical fruits and off season vegetables into the EC market. The information contained in them is subsequently relayed to potential exporters.

The access of the Kenyan horticultural products into some markets is assured. As members of the EC and therefore signatories to the Lomé Conventions, the major European importers apply preferential duties and in most cases grant free entry to products imported from the ACP countries. To benefit from this scheme exporters must ensure that each of their shipments is accompanied by the appropriate European (EUR) 1 form.

2.6. The Role of the HCDA and the Horticultural Cooperative Union(HCU).

While horticultural trade in Kenya has been traditionally left to the private sector to develop, some trading is currently performed by the Horticultural Cooperative Union (HCU) and on a very limited scale by the HCDA through its grading and packing stations.

The HCU acts as a grower marketing organisation with the export operations being the strongest part of its activity. Over the years, there have been concerted efforts to support this union so that it could become an important marketing organization of the smallholders.

The HCDA was established by legislation in 1967 to assist farmers in the production, collection and marketing of horticultural produce. The specific role which the Authority is currently undertaking is :

- . Regulating the horticultural industry through licensing and application of rules,
- . Providing advisory services to the Government and the industry generally,
- . Providing market intelligence information to the industry for planning purposes. This information covers the local and export markets,
- . Organising the provision of vital inputs to the farmers, and assist in grading, storage, collection, transportation and ware-housing of produce destined for markets,
- . Monitoring prices and foreign exchange remittance into Kenya in collaboration with the Department of Customs and Excise and the Central Bank of Kenya,
- . Providing a specialized extension service to horticultural farmers, and
- . Undertaking marketing for small scale farmers.

* CHAPTER THREE:

LITERATURE REVIEW.

3.0 Introduction.

The horticultural industry has not been given the attention it deserves as an important sub-sector of the agricultural sector. In most countries, the industry has always been subsumed under Agriculture. There is thus little literature, especially of the empirical type, that specifically relates to the issue of horticultural export performance in Kenya.

In Kenya, horticulture for export is a relatively new industry, its full potential having been realised long after the country attained independence. Information available is therefore limited. Most of the work done is on the domestic market. The studies reviewed in this section may therefore not be specific on horticultural exports but are related in varying degrees to the current study.

3.1 Review of Theoretical and Empirical Literature.

Price is one major factor that determines domestic and export market performance of horticultural products as it influences the allocation of resources and rations available goods and services among consumers. Studying the structure, conduct and performance of

the transport of fruits and vegetables from Kenya, Ng'eno (1978) observed that the retail prices of fruits and vegetables in urban areas were beyond the reach of lower-paid workers. This reduces the total quantities of horticultural produce transacted in the domestic market. This study reached these conclusions, however, without an empirical evaluation of the impact of prices and other factors on marketing. In addition, the study did not give the export marketing of Kenya's horticultural products due recognition.

Abbot (1986) also underscores the role played by prices. He argues that prices established through the marketing system should provide the right signals to producers and consumers; they should transmit demands back to producers and supply conditions forward to consumers. This, he argues further, should be done with a minimum of lag, imperfection and distortion to facilitate production of the right quantities of the commodities demanded. This study is also merely exploratory, lacking proper empirical analysis.

Salasya (1989), using linear regression of total French bean exports on price and air-freight charges, showed that the coefficient for price was positive but insignificant at 5% level of significance. She inferred that price had little influence on the quantity of French beans exported. The coefficient for air-freight charges was negative and significant at 5% level. She concluded that besides air-freight charges, there were other factors, qualitative in nature, which also influenced Kenyan French bean exports. These included air-cargo space capacity; packaging; seed availability; and handling, pre-cooling and cold storage facilities. Salasya's study used a model with only two explanatory variables. The study was also limited in that it concerned itself with French bean exports only.

Balassa (1990) carried out an econometric investigation which showed that exports in general, and agricultural exports in particular, are responsive to prices in sub-saharan Africa: that is, they are highly responsive to changes in the real exchange rates. He showed, further, that within sub-saharan Africa, market-oriented countries generally gained and interventionist countries lost export market shares. This was attributed to the fact that the former group of countries maintained realistic exchange rates and did not bias the system of incentives against exports appreciably. According to the paper, Kenya and the Ivory Coast exemplify market-oriented, and Tanzania and Ghana interventionist countries in Sub-Saharan Africa. The paper made pair-wise comparisons between Kenya and Tanzania and between the Ivory Coast and Ghana, indicating the superiority of the market-oriented approach in promoting exports and agricultural production.

To obtain these results, Balassa used a model consisting of (foreign) export demand and (domestic) export supply equations. He hypothesized that foreign demand for a country's exports (X^F) was affected by changes in its international competitiveness as indicated by changes in the index of the real exchange rate, derived as the nominal exchange rate (R) adjusted for changes in the prices of traded goods in foreign countries (P^F_T) and in the domestic economy (P^D_T). He also introduced foreign incomes (Y^F) as another variable affecting exports and thus obtained the following equation.

$$X^F = f(R \cdot P^F_T / P^D_T ; Y^F) \quad (1)$$

He hypothesized further that the supply of a country's exports (X^D) will be affected by changes in the prices of traded relative to nontraded goods. This may be indicated by an index of relative prices in the domestic economy, derived as the ratio of domestic price indices for traded goods (P^D_T) and for nontraded goods (P^D_N). He also introduced a domestic capacity variable (C^D) and obtained equation (2):

$$X^D = g \left(P^D_T / P^D_N ; C^D \right) \quad (2)$$

Finally, he introduced equation (3) to represent the equilibrium condition:

$$X^D = X^F \quad (3)$$

He could not estimate this system of equations directly. He therefore estimated a reduced form equation (equation 4) in which he took the export-output ratio to be the dependent variable. This was necessary in view of the existence of intercorrelation between exports and domestic capacity.

$$X = h \left(R, P^F_T / P^D_T ; P^D_T / P^D_N ; C^D ; Y^F \right) \quad (4)$$

The index of relative prices in the domestic economy was found to be not statistically significant. Estimation was done by expressing all variables in terms of rates of change between successive years and combining time-series observations for the individual countries. The result indicated that a 1% change in the exchange rate is associated with a 0.8 - 1% change in the ratio of exports to output.

This study could be criticized for being very general, focusing on broad categories like agricultural exports and merchandise exports. Moreover, his equation (3) representing the equilibrium

condition may not hold in the case of Kenya's horticultural exports as the inadequacy of air-cargo space may constrain the supply of horticultural exports from Kenya so that they are less than foreign demand.

Ommeh (1984), trying to find out whether farmers respond to price changes in terms of carrying out husbandry operations and increasing production, found that remunerative prices both on the export and domestic market led to increased production. Ommeh's work was, however, restricted to the study of cashew nuts only. It did not attempt an assessment of the response to prices of other horticultural producers besides those of cashew nuts.

Transport costs is another important factor that determines the domestic and export market performance of any commodity. Ng'eno (1978, op. cit.) found that transport costs increased with the distance from the market and were higher the poorer the condition of the roads. He also found that transport costs influenced the supply of low-valued crops relatively more compared to high valued crops as the latter's high prices could absorb the high transport costs incurred over long distances and poor roads. As already noted, Ng'eno's study ignored horticultural export marketing.

Foreign incomes, that is, the incomes of the countries that constitute the export market for any commodity, play a significant role in determining export performance of a country's produce by increasing effective demand for the exports. Balassa (1990 op.cit.) found the level of statistical significance of the foreign income

variable to be very low; reaching 5% level only in the case of merchandise exports in the 1965-73 period. This result may be explained by the high share in sub-saharan exports of foods, the exportation of which responds little to income changes in the developed countries. In addition, coffee exports, accounting for a large proportion of the exports of several sub-saharan African countries, were determined by quotas under the International Coffee Agreement, which bore little relationship to changes in incomes in the developed countries. This result demonstrates the weakness of assessing the response to changes in foreign incomes of agricultural exports as a whole and supports the case for disaggregation of this into separate categories such as horticultural exports, coffee exports, tea exports, and so on. It would be interesting to find out if exports of horticultural products, like those of coffee, have low income elasticity of demand in developed countries.

Packaging is an important factor in the marketing, particularly of perishable produce like horticultural products as it determines how attractive the product appears to consumers and also its safety during transportation. Ngone (1975), studying the role of grading and packaging stations in the development of horticultural marketing, noted that the packaging stations face severe competition from private traders and that the development of annual horticultural crops was constrained by inadequate packaging facilities, among other factors. Ngone, however, did not analyse the impact of packaging quality empirically. This study, too, had bias in favour of domestic marketing.

Packaging plays an important role in the horticultural export industry, taking approximately 16% of the total cost (HCDA, 1986). packages are designed to protect the quality of a product and to facilitate its timely and efficient movement. Packaging is thus a productive resource which sometimes effects product differentiation which Kenya can use to increase product demand and consequently raise its market share. Good packaging minimizes losses thereby increasing the volume of sales.

Sharpley (1985) pointed out that appropriate packaging and efficient modes of transportation increase the volume of sales and reduce wastage. She avered that improving the quality of packaging reduces product spoilage particularly in the horticultural industry and can be a means of expanding the volume of horticultural exports. Her conclusions were, however, not based on empirical analysis.

8 Duggal (1982) had reached similar conclusions. He studied the prospects of export marketing for Kenyan products in the Middle East by analysing past trends and projecting them into the future. He underscored the need for the Government to explore new and better incentives for increasing exports steadily. According to yearly HCDA export statistics, the Middle East is a growing market for Kenyan horticultural exports, especially mangoes. Duggal merely mentioned the need for the Government to explore new and better incentives for increasing exports without studying some of the possible incentives and their likely impacts on horticultural exports.

On the same issue, Jaffee (1986,op.cit.) found that the potential for expanding Kenyan horticultural exports exists. He stressed the need to penetrate new markets, noting that for a long time Kenya has relied on only a few markets overseas for her produce. He also found that Kenyan exports of fresh horticultural produce display a strong seasonal character, reflecting primarily European domestic production of certain vegetables and flowers but also seasonality of domestic production. Agreeing with this, an FAO/ADB report points out that the production and marketing of cut flowers, avocados and mangoes show substantial seasonalities. In the case of mangoes, nearly 60% of total exports are carried out from October to March; in the case of avocados, more than 80% of the total are exported between May and August. Trade in cut flowers is also highly seasonal with nearly 70% of the total shipped between November and February. On the other hand, the seasonality of export of pineapples and the main vegetables is very limited. The report thus concludes that although seasonal variations of exports exist, total exports during the year remain remarkably constant in total weight. The fact that Kenya has varied agro-ecological zones, and given the existing potential for irrigation, means that Kenya could take advantage of the off-season production period in European countries.

Jaffee, whose work also suffers the limitation of being merely exploratory, also notes that the horticultural industry has the potential to expand and diversify Kenya's exports (both commodity-wise and geographically). This potential, however, is limited by serious competition for the international horticultural market by other producers, both within and without Africa. Bale (1986), for

instance, notes that on the first of January 1981, Greece became the tenth country to join the European Community (EC), followed by Spain and Portugal in 1986. Concern has centred on the so-called Mediterranean, or "Southern", products, mainly fruits, vegetables, wine and olive oil, in which climatic conditions and proximity to the EC market give Greece, Portugal, and Spain a comparative advantage vis-a-vis other producers of these commodities. Thus in an enlarged EC the protective umbrella of the EC's Common Agricultural Policy (CAP) might induce significant excess supplies of these products from the new members and affect the producers of competing products within the EC adversely.

Outside the EC, concern regarding Mediterranean agricultural products is of a different nature. The EC as a block accounted, in 1986, for 55% of world fruit and 60% of world vegetable imports. It is therefore the single largest importer of fresh fruits and vegetables in the non-Communist world. Bale argues that although the EC is an important producer of fruits and vegetables (and even exports some), its horticultural production is not expanding, and its demand for horticultural imports largely reflects seasonal variations in production. During the off-season (approximately October-May), demand for fresh fruits and vegetables is large and growing.

Existing supplier countries that are not candidates for admission to the EC are concerned about losing a significant amount of their market as a result of enlarged EC membership. For example, it was expected that the entry of Greece, Portugal and Spain into the EC would stimulate their fruit and vegetable production and

cause a decline in horticultural prices in international markets. The new member states may expand their market shares at the expense of other countries, mainly those in the Mediterranean basin. Bale's study is weak in that it ignores competition for the EC market among supplier countries that are not candidates for admission to the EC.

A report by FAO/ADB, under their Co-operative Programme, agrees that in the European import market Kenya faces increased competition from other developing countries as well as expansion of production within the EC due to the introduction of new techniques of production. The report points out that the country has lost some of its share in the import market, partially due to price competition and quality problems related to lack of cooling facilities, poor handling and poor packaging. It argues further that price and quality competitiveness are to a limited extent adversely affected by government regulations. The Government of Kenya would therefore be expected to abolish certain levies and taxation on inputs required by the export-oriented horticultural industry which limit its competitiveness in the world market. This relates in particular to taxes on aviation fuel, and to import levies on paper and other inputs required by the packaging material industry and destined for the horticultural export industry.

Concessions under the Lomé conventions played an important role in increasing the volume of non-traditional exports from Kenya and other African, Caribbean and Pacific (ACP) members into the EC. Since Lomé I was signed in 1975, the share of non-traditional commodities in Kenya's exports to the EC grew three times as fast as total exports between 1976 and 1987 (The Courier, 1991). As a

result their share (by value) of total exports rose from 10% in 1976 to 23% in 1987 (The Courier, op. cit.). The EEC-ACP Co-operation Treaty was signed in 1975. In the years following this, three other Agreements (Lomé Conventions II to IV) have been signed between these two groups of countries, covering a wide range of trade and other aspects of economic co-operation. Under the Lomé Conventions, Kenya and other ACP states are granted tariff and non-tariff preferences for a number of industrial exports to the EC market.

Tropical agricultural commodities and raw materials from ACP countries are granted special and more favourable treatment under the Common Agricultural Policy (CAP) of the EC. The Lomé Conventions also operate an Export Earnings Stabilization scheme (STABEX) for shortfalls caused by fluctuations in volumes and prices of agricultural commodities due to reasons beyond these countries' control (Ikiara, 1988).

Growth in the domestic demand for any exported commodity would, ceteris paribus, be expected to reduce the amount available for export. However, according to the FAO/ADB report (under their Co-operative Programme), this is not necessarily the case for the Kenyan horticultural export sub-sector. According to this report, production for the domestic market is fully met by the local farmers and production for the export markets is clearly differentiated from production for the domestic market, with very little of the produce forming part of the local diet exported and many of the crops grown for export markets generally not consumed locally. Demand in the domestic market is concentrated on such crops as local beans, onions, tomatoes, carrots and cabbages. Bananas, citrus fruits and

mangoes are the major fruits consumed locally. The export market concentrates on French beans, Asian vegetables, avocados, pineapples, and, to a lesser extent, mangoes.

Jaffee (1992) sought to answer the question whether the liberalization of African markets necessarily increases competition in a private market. He empirically investigated the organization and development of a dynamic African export-oriented sector- Kenya's horticultural exports_ in which the private sector has long had a dominant role. He highlighted the sector's impressive pattern of growth over the past two decades and examined the (ownership) characteristics of participating private firms, the competitive pattern among those firms, and the institutional means by which they procure raw materials for processing and export. He found that despite the Kenya Government's direct investments in processing and trading activities and its application of regulations and targeted support measures to strengthen the role of Kenyan Africans in the horticultural trade, most of this trade remains controlled by foreign-owned companies or members of Kenya's small Asian and European communities. He concluded that even with market liberalization, the technical characteristics of many crops, their production, and their processing may lead to centralized procurement and marketing arrangements. In horticulture (also true for a wide range of other exportable crops and agro-industries in developing countries, including sugar, tea, oilseeds, dairy and tobacco), where scale economies, quality heterogeneity, commodity and raw material perishability, lengthy production cycles, and so on, are common features, open market arrangements may be rendered hazardous for both producers, processors and traders, and may limit, depending

upon the market size, the number of scale efficient processing plants to only one or very few. Thus, market liberalization may simply involve a shift from centralized public control to some form of centralized private control.

Jaffee opines that various forms of centralized private control may indeed be preferable to centralized public control, but that the country's experience with horticultural exports suggests that when an African country such as Kenya privatizes agricultural processing and (export) marketing, the government must find a better way to monitor and control dominant firms, to get companies to involve smallholder farmers in raw material procurement operations, and to improve the farmers' bargaining position with centralized contracting firms.

Jaffee concerned himself only with the issue of market liberalization and failed to investigate the influence of other important factors on Kenya's horticultural industry.

3.2 Overview of the Literature.

From the literature reviewed, the factors that have been identified as influencing the export performance of horticultural products include prices, air-freight charges, transport costs, packaging costs and quality, foreign incomes, real exchange rates, domestic production capacities, seasonality of foreign demands, competition from other producers, and the concessions under the Lomé Conventions. Moreover, annual reports from the Horticultural Crops Development Authority (HCDA) cite such other factors as

inadequate air-cargo space availability, lack of proper handling and pre-cooling facilities at the collection centres and airports, and poor quality seeds.

Except for Salasya(1989) none of the other studies reviewed has attempted empirical analysis of these factors. Salasya analysed the impacts of only two of the factors - price and air-freight charges. This study will attempt a more comprehensive empirical investigation into the factors that determine the export performance of Kenya's horticultural industry .

CHAPTER FOUR:

RESEARCH METHODOLOGY AND DATA.

4.0. Introduction

This chapter explains the methodology used in the study. It starts by presenting the theoretical framework which forms the basis of this study. Hypotheses to be tested are stated and the econometric model used is explained and specified. The chapter closes with a section on the estimation technique which has been applied and another on the nature and sources of data.

4.1 Theoretical Framework.

Models that have sought to investigate the effects of price incentives and other relevant variables on the export performance of various commodities have generally consisted of (foreign) export demand and (domestic) export supply equations (see, for example, Balassa, 1990 and Moran, 1988). This study is concerned with the determinants of the export performance of the Kenyan horticultural industry.

The present study investigates the effect of some of the quantifiable factors identified in the literature on the export performance of the horticultural industry. Thus, the export performance, represented by the annual volume of horticultural exports from Kenya, X^s_D , is assumed to depend on:

- (i) the export price of horticultural products, P^E_H ,
- (ii) the real exchange rate, R ,
- (iii) the air-freight charges for airlifting horticultural produce, A^C ,
- (iv) foreign incomes, Y^F ,
- (v) the available air-cargo space, A^S ,
- (vi) concessions under Lomé Conventions, L ,
- (vii) competition from other horticultural producers especially those that have joined the EEC, CO , and
- (viii) the quality of packaging, P^Q

Domestic capacity is another important determinant of export performance but in the Kenyan case this is not the case since the annual domestic production capacity exceeds the annual volume of horticultural exports substantially. As pointed earlier, about 90% of the annual horticultural produce is consumed domestically. Thus it can be assumed that what really affects the export performance are factors besides domestic production capacity. Moreover, it is the case that more horticultural produce is annually available for export than what is actually exported. In the literature review, it was pointed out that the domestic and export markets are distinct and separate, with little of what is consumed locally being exported and hardly any of the major export crops being consumed locally. It can be expected therefore that domestic demand will hardly exert any influence on the export performance of the horticultural sub-sector.

Seasonality of foreign demand is another important determinant of the export performance but it was not possible to use it in this model. This is because the model uses annual data.

Since the export price and the real exchange rate are highly correlated, this study uses the real exchange rate variable and leaves out the price of horticultural exports. The same applies to the two variables: air-freight charges and available air-cargo space. As the air-freight rates rise, so does the available air-cargo space. Due to lack of data on the former, it has been left out and instead available air-cargo space has been used. Moreover, the official air-freight rates for fresh horticultural commodities being transported to various European and Middle Eastern destinations have always been set by the Kenyan Government and have not been fluctuating freely. Due to the excess demand for freight space during the peak export months, some exporters offer side-payments or other inducements to the air carriers to guarantee freight space (Jaffee, 1992).

Packaging quality and costs are important determinants of export performance of horticultural produce. Unfortunately, data on any of these two variables was not available. It has not been possible to find a proxy for either of them. They are thus left out of the model.

Thus the model for the export performance of the Kenyan horticultural industry can be expressed implicitly as:

$$X^S_D = f (R ; Y^F ; A^S ; L ; CO).$$

It is hypothesized that X^S_D depends on:

(i) Real Exchange Rate, R

Ceteris Paribus, devaluation of the Kenyan Shilling will increase the demand of Kenyan horticultural exports. It will do this by making the horticultural produce relatively cheaper overseas and thus increasing the quantity demanded. Moreover, devaluation will ensure that local exporters get more Kenyan Shillings per unit of foreign currency earned from horticultural exports thus providing incentives for increased exports.

It is thus hypothesized that $\delta X^S_D / \delta R > 0$

(ii) Foreign Incomes, Y^F

As foreign incomes increase, so does the foreign demand for Kenya's horticultural exports. This means that horticultural exports like cut flowers have income elastic demands (i.e. they are normal goods). The increased foreign demand induces an increase in the quantity of horticultural exports.

i.e $\delta X^S_D / \delta Y^F > 0$

(iii) Availability of Air-cargo Space, A^S

Since inadequate air-cargo space has been cited as the major constraint on the volume of horticultural produce that can be exported from Kenya, it is hypothesized that an increase in the air-cargo space capacity would, ceteris paribus, increase total horticultural exports from the country.

Thus $\delta X^S_D / \delta A^S > 0$

(iv) Concessions Under Lomé Conventions, L

Following the signing of Lomé I-IV Conventions between 1975 and 1989, the ACP member countries were allowed preferential access of their manufactured and tropical crop exports into the EC market. It is thus hypothesized that the Lomé Conventions have led to an increase in horticultural exports from Kenya.

i.e. $\delta X^s_D / \delta L > 0$, where L is a dummy variable defined thus:

L = 1 for each of the years from 1976 to 1990 inclusive, or

0 for each of the years from 1970 to 1975 inclusive

(v) Competition from other Horticultural producers, CO.

Following the admission of Greece (1981), Spain and Portugal (both in 1986) into the EC, it was expected that this would hurt the export of horticultural produce into the community from non-members. Having comparative advantage (due to good climatic conditions and close proximity to the EC) in the production of Mediterranean or "Southern" products, mainly fruits, vegetables, wine and olive oil, it was expected that the entry of these three countries into the EC would stimulate their fruit and vegetable production and thus reduce the volume of imports of such products from the EC. It is therefore hypothesized that after 1981, the horticultural exports from Kenya suffered a decline since the EC is the major market for them.

i.e. $\delta X^s_D / \delta CO < 0$, where CO is a dummy variable defined thus:

CO = 1 for each of the years from 1981 to 1989 inclusive, or

0 for each of the years from 1970 to 1980 inclusive

4.2. Model Specification

The studies that have been done to assess the relative impact of various factors on export performance have tended to use either a multiplicative model (see Moran, 1988), or one where the variables are expressed in terms of growth rates (see Balassa, 1990, op. cit.). The present study adopts the former approach as it directly yields short-run elasticities of export performance with respect to the explanatory variables.

The multiplicative model takes the following form ³:

$$X^S_{Dt} = b_0 R^{b1}_t \cdot Y^{fb2}_t \cdot A^{sb3}_t \cdot e^{b4 L_t + b5 CO_t + \mu_t}$$

where:

X^S_{Dt} = the annual volume of horticultural exports in tonnes. This is obtained from HCDA export statistics.

R_t = the real exchange rate in KShs / US \$.

Y^F_t = the foreign income, captured by GNP per Capita of U.K., Germany, France, Italy, and the Netherlands, in U.S. Dollars. It is obtained from various issues of The World Bank Atlas.

A^S_t = the air-cargo space capacity measured by the annual air-cargo ('000 tonnes) destined to Kenya from the U.K., Continental Europe and the Middle East (including Egypt). This is used to capture air-cargo space availability as it is assumed that this south-bound cargo traffic provides north-bound legs that could be used to airlift Kenya's horticultural produce.

L_t = a dummy variable to capture the influence of the Lomé Conventions.

CO_t = a dummy variable to capture the effect of external competition.

μ_t = stochastic disturbance term.

e = the natural number

t = time period, in years.

This model can be linearised by taking logarithms as follows:

$$\ln X_{Dt}^S = \ln b_0 + b_1 \ln R_t + b_2 \ln Y_t^F + b_3 \ln A_t^S + b_4 L_t + b_5 CO_t + \mu_t$$

The stochastic error term, μ_t , captures all the other explanatory variables which may have been omitted from the model, such as seasonality of demand, quality of packaging, processing, and so on.

4.3. Estimation Technique

The simple model specified in section 4.2. has been estimated using Ordinary Least Squares (OLS). This technique has been applied to annual time-series data covering the period 1970-1989. Any problems such as autocorrelation, heteroscedasticity, model instability and multicollinearity have been investigated as appropriate.

4.4. Data Type and Sources

Secondary data contained in Statistical Abstracts, Economic Surveys, HCDA export statistics, World Development Reports, World Bank Atlases, and other sources have been used.

Export performance is defined as the total annual volume (in tonnes) of fresh horticultural exports, the data for which are obtained from HCDA annual export statistics. The foreign incomes are given by the average per capita income of the major importers of Kenyan horticultural products, i.e. the U.K., France, Holland,

Germany and Italy. GNP per capita (in U.S. Dollars) for each of these countries was obtained from various issues of the World Bank Atlas.

According to HCDA reports, the inadequacy of cargo space which is one of the main constraints facing the horticultural export industry is caused largely by the inadequate south-bound air-cargo space. This leads to the air charters demanding very high air-freight rates. The HCDA has been calling for the introduction of an incentive scheme that would attract importers of spare parts, pharmaceuticals and other goods currently being imported by sea to use air freight. This would facilitate the generation of south-bound cargo in quantities that can generate the required air-cargo space for horticultural exports from Kenya.

Due to lack of data on air-cargo space capacity, this study uses annual cargo (in tonnes) destined to Kenya from the United Kingdom, Continental Europe and the Middle East (including Egypt) as a proxy for cargo space availability. These three regions are chosen as they constitute the largest markets for Kenyan horticultural produce. These data are obtained from Statistical Abstracts.

Real exchange rates are calculated from the data on nominal exchange rate, domestic inflation, and foreign inflation, and are obtained from issues of the International Financial Statistics, as follows:

$$\text{Real exchange rate} = \text{nominal exchange rate} \times \frac{\text{domestic inflation}}{\text{foreign inflation}}.$$

The complete data set used in this study is shown in Appendix II.

CHAPTER FIVE:

REGRESSION AND CORRELATION ANALYSES RESULTS.

5.0. Introduction.

In this chapter results of the regression and correlation analyses are analysed. The micro-TSP computer program was used to estimate the model and PC-GIVE to conduct diagnostic tests. The elasticities of the export performance of the Kenyan horticultural industry with respect to real exchange rates, foreign incomes, and the availability of air-cargo space are discussed. The impact of the Lomé Conventions on the export performance of the horticultural sub-sector is also assessed. The chapter closes with a discussion on the policy implications of the results.

5.1.0. Regression Analysis: Elasticities of Export Performance.

Regression analysis is concerned with the study of the dependence of one variable (the dependent variable) on one or more other variables (the explanatory variables). A regression equation is considered satisfactory if, after estimation, it meets some laid down empirical criteria. First and foremost, the signs of the estimated coefficients should be in accordance with theoretical or prior expectations. Second, the variables expected from theory to be important in their influence on the dependent variable should be statistically significant at the desired level of significance. Finally, the explanatory power of the model should be satisfactory.

Regression trials of the model showed that the coefficient obtained for the dummy variable used to capture external competition had an unexpected sign and was also not statistically significant. It was subsequently dropped. The results obtained after running the regression are summarised in Table 7 :

Table 7: Results of the regression analysis.

<u>variable</u>	<u>coefficient</u>	<u>standard error</u>	<u>T-stat.</u>	<u>2 tail sig.</u>
CONSTANT	-16.2940	2.0756	-7.8510	0.000
LN R_t	0.6064	0.1694	3.5796*	0.003
LN A_t^S	0.6189	0.2730	2.2667*	0.039
LN Y_t^F	1.3110	0.3900	3.3616*	0.004
L_t	0.2407	0.3155	0.7630	0.457

Degrees of freedom = 16

$R^2 = 0.9685$

adjusted R-squared = 0.9601

S.E. of regression = 0.2937

Durbin-Watson stat. = 1.84

F-stat. = 115.33

Sum of squared residuals = 1.294.

* statistically significant at the 5% level of significance.

Therefore the estimated equation is :

$$\ln X_{Dt}^S = -16.29 + 0.61 \ln R_t + 1.31 \ln Y_t^F + 0.62 \ln A_t^S + 0.24 L_t .$$

The estimates of the parameters of the variables provide information about the effect of a given explanatory variable on the export performance of the Kenyan horticultural industry. The coefficients are short-run elasticities of the volume of

horticultural exports with respect to the various variables, except for the Lomé Conventions variable. The coefficients estimated for all the explanatory variables have the expected signs and all except the Lomé Conventions one are statistically significant at the 95% confidence level. The adjusted- R^2 also has a high value indicating that the four explanatory variables included in the model explain a high percentage of the total variation in the volume of horticultural exports.

5.1.1. Foreign income elasticity of export performance.

According to the regression results, a 10 percent increase in foreign incomes would increase the volume of horticultural exports from Kenya by 13.1 percent. Of all the explanatory variables included in the model used in the study, foreign incomes variable has the greatest relative impact on the export performance of Kenya's horticultural sub-sector as can be discerned from the magnitudes of the estimated coefficients. The estimated coefficient is statistically significant at the 5 percent level of significance.

This finding is not in agreement with that of Balassa (1990) who found that foreign income has no statistically significant influence on African agricultural exports. The fact that foreign income elasticity of horticultural export performance is greater than unity, 1.31, indicates that Kenya's horticultural exports are normal goods abroad. Thus, as long as there is exportable surplus of horticultural products from Kenya, the overseas demand for them could be expected to increase as foreign incomes increase.

5.1.2. The elasticity of export performance with respect to the real exchange rate.

The results indicate that an increase in the real exchange rate (that is, devaluation) would enhance the export performance of the Kenyan horticultural industry. Specifically, a 10 percent devaluation would increase the volume of Kenya's horticultural exports by 6.1 percent. Devaluation of the Kenyan Shilling against the World's currencies would enhance the export performance of Kenya's horticultural industry by making her horticultural exports relatively cheaper to foreigners thereby increasing the foreign demand for them. The results of this study are consistent with Balassa's (1990) who found an increase in the real exchange rate to have a positive and statistically significant effect on both merchandise and agricultural exports. Indeed, his submission that Tanzania suffered 10 percent and 19 percent average decreases in the market share of her traditional agricultural exports over the periods 1974-78 and 1979-81, respectively, while Kenya experienced 24 percent and 19 percent increases respectively, over the two periods, due to the former and not the latter country letting her exchange rate become seriously overvalued, is supported by this study's findings. The results are therefore consistent with the observation that African countries which let their exchange rate become seriously overvalued have experienced considerable declines in their export market shares.

5.1.3. The elasticity of export performance with respect to the availability of air-cargo space .

The study confirms the claim, common in the literature on the Kenyan horticultural export sub-sector, that the limited availability of air-cargo space constitutes the most significant constraint facing the horticultural industry in Kenya. The study finds that if air-cargo space capacity were increased by 10 percent, the annual volume of horticultural exports from Kenya would increase by 6.2 percent. This estimated coefficient is statistically significant at the 5 percent level of significance.

5.1.4. The impact of the Lomé Conventions on Kenya's horticultural industry's export performance.

In conformity with prior expectations, the advent of the Lomé conventions influenced the export performance of Kenya's horticultural industry positively. However, the estimated coefficient was not statistically significant at the 5% level of significance. This may be because these conventions give more preferential treatment to manufactured exports than agricultural exports.

According to Gujarati (1988: 461), the coefficients of dummies in a semi-logarithmic function have to be interpreted differently from the other variables because such dummy variables are not continuous but dichotomous. In such a case, he argues, one can obtain the relative change in the dependent variable even for the dummy variable by the device suggested by Robert Halvoresn and Raymond Palmquist. This merely involves taking the antilog of the estimated dummy coefficient (to base e) and subtracting 1 from it.

In the regression equation, the coefficient that was obtained for the dummy variable was 0.2407. The antilog (to base e) of this coefficient is equal to 1.272. Thus the relative change in the volume of horticultural exports per unit change is $1.272 - 1 = 0.272$ or 27.2%.

In general, the results show that the real exchange rate, the availability of air-cargo space, the level of foreign income, and the concessions under Lomé Conventions have a positive effect on the export performance of the Kenyan horticultural industry. An increase in any one, or more, of these factors (or the advent of the Lomé Convention) enhances the industry's export performance.

5.1.5. The explanatory power of the model.

The statistic R^2 measures the goodness of fit and thus summarizes the explanatory power of the model. It measures the proportion of the total variation in the dependent variable that could be attributed to the explanatory variables included in the model. This statistic takes on values ranging between zero and unity and the closer it is to unity, the higher the explanatory power of the model.

The adjusted- R^2 is R^2 adjusted for the degrees of freedom. As Henri Theil (quoted in Gujarati, 1988: 183) notes:

"....it is good practice to use adjusted- R^2 rather than the R^2 because R^2 tends to give an overly optimistic picture of the fit of the regression, particularly when the number of explanatory variables is not very small compared with the number of observations."

According to the adjusted- R^2 obtained for the estimated model, the four explanatory variables fitted in the model explain 96% of the total variation in the volume of horticultural exports. This is confirmed further by the joint test of significance. The joint test shows that the explanatory variables jointly explain the export performance of the Kenyan horticultural industry adequately. This is clearly evident from the value that the F-stat. takes. The F test is a measure of the overall significance of the estimated regression.

In conducting the F-test, the null hypothesis that the joint effect is zero is tested against the alternative hypothesis that it is not. If the value of the F statistic reported from the regression is greater than the critical F value, then the null hypothesis can be rejected.

Since the calculated F stat., 150.33, is greater than the F-critical value, $F(4, 16)_{0.05} = 3.01$, the null hypothesis is rejected and the conclusion drawn that the joint effect of all the explanatory variables on export performance is statistically significant at the 5% level of significance.

Other indicators of the confidence with which the estimated coefficients could be interpreted include the sum of squared residuals and the standard error of regression. These should be as low as possible - the closer to zero the better. Low values of standard error of regression and the sum of the squared residuals indicate that the coefficients of the explanatory variables are unbiased and efficient, indicating, further, that specification error, if present at all, is minimal.

Both the standard error of regression (0.29) and the sum of squared residuals (1.29) obtained from the estimation of the model are reasonably low. This indicates that the specification error, if any, is minimal.

5.1.6. Testing for autocorrelation.

Autocorrelation exists when the disturbance terms are not serially independent due either to incorrect specification of the form of the relationship between the variables or measurement error in the "explained" variable.

Application of the Ordinary Least-Squares to a model in which the disturbances are autocorrelated will render the t and F tests invalid and will lead to inefficient predictions, that is, predictions with needlessly large sampling variances.

It is therefore important to diagnose the presence of the autocorrelation problem in the regression. The Durbin-Watson (DW) test is a small - sample test that is used to find out whether positive or negative autocorrelation exists in a regression model. This basically involves testing the null hypothesis of zero autocorrelation against the alternative hypothesis of first - order autocorrelation.

According to Pearce(1983:126) a DW value of around 2 usually indicates that there is no autocorrelation. The DW test conducted using the available degrees of freedom showed that a DW value less than 0.685 or greater than 3.315 indicates positive and negative

autocorrelation, respectively. Values between 0.685-1.567 and between 2.433-3.315 indicates the presence of autocorrelation which is, however, not serious. DW values falling between 1.567-2.433 indicate no autocorrelation. The DW value obtained from our regression, 1.84, falls in the latter category, indicating that autocorrelation does not exist. The absence of autocorrelation increases the confidence with which these results could be accepted.

5.1.7. Testing for the structural stability of the model.

A very important indicator of the quality of a functional specification is the stability of the parameters over various data sets. It is important to test for the stability of a model because it is only when stability is ensured that valid policy conclusions could be drawn and accurate predictions made. The Chow forecasting test may be applied to test for the stability of a model. The PC-GIVE computer program was used to carry out the test.

All the Chow test (see Johnson, 1984:507) does is testing the null hypothesis that there is no difference in the coefficients obtained from the estimation of relationships over two data samples of, say, n_1 and n_2 sizes.

The model used in this study is stable. This is so because $F^* = 3.46$ and $F_{0.05}(9,6) = 4.10$ where F^* is the observed F ratio and $F_{0.05}(9,6)$ is the critical F ratio. Thus since $F^* < F_{0.05}$ we cannot reject the null hypothesis and it can be concluded that the function is stable. Any policy conclusions and predictions drawn from the model are therefore valid.

5.1.8. Testing for the normality of the error term, μ .

The random variable μ is assumed to have a normal distribution, that is, μ is normally distributed around zero mean and constant (finite) variance (Koutsoyiannis, 1977:196). If some important variable is omitted due to mis-specification, or in order to avoid some other econometric implications (for example multicollinearity), the values of μ may not show the required normal distribution.

The assumption of normality is necessary for conducting the statistical tests of significance of the parameter estimates and for constructing confidence levels (Koutsoyiannis, op.cit., 197). If the assumption is violated, the parameter estimates are still unbiased and best, but we cannot assess their statistical reliability by the classical tests of significance (t, F, and so on) because the latter are based on normal distributions. Moreover, testing for normality also tests for mis-specification of the model.

The test for normality is basically a chi-square one in which the null hypothesis that the random variable μ is normally distributed is tested against the alternative hypothesis that it is not. If the observed chi-square value is greater than its critical value, the null hypothesis is rejected.

In the present study, the observed chi-square value is: $\chi^2_{(2)} = 1.52$. The critical value, with 2 degrees of freedom = 5.99. Therefore, since $1.52 < 5.99$, we cannot reject the null hypothesis. It can be concluded that the error term μ is normally distributed. This indicates that the tests of significance carried out are valid and any mis-specification of the model is ruled out.

5.1.9. Testing for heteroscedasticity.

Heteroscedasticity is said to occur when the variances of μ_i are variable as in the cases where with learning errors of behaviour become smaller over time or where as data collecting techniques improve, the variance decreases.

The application of OLS without allowing for heteroscedasticity will yield a sample variance that is a biased estimator of the population variance and as a result the conventionally computed confidence intervals and the conventionally employed t and F tests can no longer be relied upon. Conclusions drawn and inferences made from the usual testing procedures when heteroscedasticity is a problem may be misleading.

It is evident that heteroscedasticity is potentially a serious problem and the researcher needs to know whether it is present in a given situation. In the present study, the PC-GIVE programme was used to test for ARCH(Autoregressive conditional heteroscedasticity) and the results indicated its absence. The F calculated value, $F(1,13) = 0.68$ is less than the F-critical value, $F(1,13) = 4.67$. Thus the null hypothesis that the problem of autoregressive conditional heteroscedasticity is absent cannot be rejected.

5.1.10. The Regressor Specification Test (RESET F-TEST).

The RESET F-TEST is used to assess the appropriateness of the specification of the model applied. In the event that the model is mis-specified, the estimation results cannot be valid. The test is carried out in the PC-GIVE program. The null hypothesis that the

model is well specified cannot be rejected as the observed F^* ratio is less than the critical ratio. $F^* (1,14) = 5.22$. The critical ratio, $F_{0.01} (1,14) = 8.86$. Therefore, the model is well specified and the estimated parameters are valid and reliable.

5.1.11. Correlation analysis.

The primary objective in correlation analysis is to measure the strength or degree of linear association between two variables. A simple correlation coefficient (r) measures this strength of association, that is, the extent to which two variables are linearly related, whether through direct causation, indirect causation or statistical chance. The coefficient can take on values between plus and minus unity. A negative r indicates a negative relationship while a positive r indicates a positive one. The closer the coefficient is to plus or minus unity, the greater the strength of the relationship (Pearce, 1983:85).

The correlation analysis conducted yielded the correlation coefficients contained in Table 8:

Table 8: The correlation matrix.

<u>Variables</u>	<u>LNx</u>	<u>LNr</u>	<u>LNy</u>	<u>LNa</u>	<u>L</u>
LNx	1.00				
LNr	0.76	1.00			
LNy	0.94	0.62	1.00		
LNa	0.94	0.61	0.94	1.00	
L	0.82	0.56	0.84	0.89	1.00

The correlation matrix presented in Table 9 confirms the regression results by indicating the existence of a high degree of positive correlation between the export performance of the Kenyan horticultural industry and all the explanatory variables (see the first column of table 9). However, the simple (or zero-order) correlations are not very good indicators of the influence that each explanatory variable has on the dependent variable as the effect of the other regressors is not held constant. Nevertheless, they serve to confirm the results obtained from the regression analysis.

5.2.0. Conclusions on the Empirical Analysis.

From the foregoing analysis, it can be inferred that the most important determinants of the export performance of the Kenyan horticultural industry are the real exchange rate, the availability of air-cargo space and the level of foreign incomes.

The empirical results show that foreign income has the largest impact on the volume of horticultural exports from Kenya relative to the other variables. However, since Kenya's policy makers have no way of influencing foreign incomes, the policy usefulness of this finding is limited. Notwithstanding this, however, it can be expected that with economic growth and per capita GNP increases in Europe and the rest of the world the foreign demand for Kenyan horticultural exports will rise.

Policy conclusions can also be drawn from the other variables for which the estimated coefficients are statistically significant at the 5% level of significance. Since the coefficient estimated for the Lomé Conventions' variable was found not to be statistically significant at the 5 percent level of significance, it is only from the real exchange rate and air-cargo space capacity variables that policy recommendations could be made. As indicated by the regression results, any policies that increase real exchange rate and air-cargo space availability would enhance the export performance of Kenya's horticultural industry. Recommendations on how these two could be increased are presented in Chapter 6.

CHAPTER SIX:

SUMMARY AND RECOMMENDATIONS.

6.0. Introduction

This last chapter begins with a summary of the whole study. It summarises the objectives and importance of the study, the nature and source of the data used, the nature of the model and the estimation technique used in its estimation, and the major findings and policy implications of the study. The major limitations of the study are also indicated. The chapter ends with a presentation of the recommendations arising out of the study's findings.

6.1. Summary of the Study.

The horticultural industry has become an important sub-sector of Kenya's economy in that it earns the country substantial foreign exchange, creates employment in the rural areas, provides food for the country's population, and so on. In recognition of the sub-sector's potential, this study set out to identify the main factors that influence the sub-sector's export performance and assess their quantitative impacts. It was hoped that this would facilitate the formulation of policies intended to enhance export performance.

The study used data from secondary sources such as the HCDA's annual export statistics, various issues of the World Bank Atlas, the International Financial Statistics, Economic Surveys and Statistical Abstracts. Two dummies were used for variables that

could not take continuous values- namely the Lomé conventions and external competition variables. Time-series data were used for the period 1970-1989.

A semi-log-linear model was specified and estimated to determine which of the factors identified in the literature on horticultural exports in Kenya were statistically significant determinants of the export performance of the Kenyan horticultural industry. The Ordinary Least Squares (OLS) estimation technique was applied on the model. A number of diagnostic tests were carried out on the model using the PC-GIVE program to detect the possible presence of autocorrelation, instability of the model, heteroscedasticity, violation of the normality assumption, and model mis-specification. The model performed satisfactorily in all these tests, indicating the reliability of the results obtained.

Results of the regression analysis indicate that real exchange rate, air-cargo space availability, foreign income, and the concessions under the Lomé Conventions were all important factors explaining the export performance of Kenya's horticultural industry. Of these factors, foreign incomes had the largest relative impact, followed by air-cargo space capacity, real exchange rate, and Lomé Conventions in that order.

The study has shown that increasing the real exchange rate and air-cargo space availability would have stimulatory effects on the volume of horticultural exports from Kenya.

6.2. Limitations of the Study.

The current study has a number of limitations. First is the lack of adequate data. This is explained partly by the fact that in the period before the 1980s, horticulture was not recognised as an important sub-sector of agriculture in official statistical publications. It was due to lack of data that annual exports of fresh fruits, vegetables and flowers were used to represent total horticultural exports. This may, to some extent, be unrepresentative of the actual situation since processed horticultural exports have been growing in importance over the years.

Second is the use of a proxy to capture the availability of air-cargo space. The proxy used may not have completely captured the cargo space availability variable.

Exclusion of other important explanatory variables such as packaging quality, handling and pre-cooling services, seasonality of foreign demand, processing, and so on, may be other sources of the model's weaknesses. However, these have been assumed to have been captured by the error term.

6.3. Policy Recommendations.

On the basis of the results of this study, a number of recommendations could be made which should, given the very favourable conditions in Kenya for the production of a large variety of fruits, vegetables and flowers, facilitate rapid expansion of the horticultural industry and consequently contribute significantly towards the achievement of the social and economic objectives of the

Government such as increasing employment opportunities, increasing foreign exchange earnings and the diversification of the agricultural sector. Such recommendations include:

(1) Devaluation of the Kenyan Shilling against the World currencies would make the country's horticultural exports cheaper relative to those from other countries and thereby increase the foreign demand for them. Therefore policies that allow gradual depreciation of the Kenyan Shilling would give a boost to the export performance of the country's horticultural industry.

(2) Concerted efforts by the Government and the HCDA to increase the availability of air-cargo space could play a significant role in improving the export performance of Kenya's horticultural sub-sector. This it could achieve by increasing the volume of horticultural exports from the country.

6.4. Suggestions for Further Work.

There are a number of issues on horticultural exports which the current study could not address but that later studies could take up. First, it may be important to find appropriate proxies or other means of modelling the explanatory variables such as packaging quality and cost, handling and pre-cooling services, seasonality of foreign demand, processing and so on, which have been omitted in this study. This would indicate their relative significance in the sub-sector's export performance.

Second, an empirical investigation of the impact of air-freight rates, jet fuel prices, the guaranteed minimum air-cargo space allocation scheme, sea shipment, the refurbishment programme on the country's airports, and inducive pricing and quality structure on the availability of air-cargo space, could be carried out. This would enable policy makers to formulate those policies that could increase air-cargo space capacity. Literature on this issue has proposed ways of increasing the availability of air-cargo space. These have included:

(1) Relaxation of Government control on air-freight charges on horticultural products destined for overseas markets. This would encourage more airlines to pass through Kenya and thus provide cargo space on which Kenyan horticultural exports could find their way to foreign markets. Thailand relaxed government regulations that required airlines to charge a lower freight rate for horticultural products and this increased air-cargo space availability for her horticultural exports substantially (Zelenka, 1975).

(2) Lowering of jet fuel prices: jet fuel prices in Nairobi have been cited as among the highest in Africa. This has tended to discourage some airlines from flying through the city and this has, unfortunately, meant less availability of air-cargo space. The lowering of these prices could reverse the situation: more airlines would ply through Nairobi and Mombasa. This measure would avail more air space for Kenyan grown produce and ensure prompt delivery of the same to markets in Europe and elsewhere.

(3) Enhancement of Government efforts that have been aimed at supporting and promoting small indigenous horticultural exporters. The guaranteed minimum air-cargo space allocation in Kenya Airways flights that has extended to the members of the Home Exporters Association since its creation in 1986, if continued, and the minimum weekly space allocation made, could increase the availability of air-cargo space substantially.

(4) Shift to sea shipment of some of the horticultural products which are not easily perishable, through the Suez Canal. Since 1988, with the assistance of the UNDP/FAO, some sea-trial shipments have been carried out with less perishable products like pineapples, mangoes, bananas, limes, passion fruits and avocados. This alternative mode should be utilised more vigorously so as to leave air-cargo space for the easily perishable and high value products like cut flowers and high-value fruits and vegetables like asparagus, strawberries, and so on, where the higher freight rates could be absorbed.

(5) Refurbishment of the airports: the programme of refurbishment that has been started in Jomo Kenyatta International and Mombasa airports, if continued, would serve as an inducement for more airlines to ply through Kenya.

(6) Inducive pricing and quality structure: according to a "Status of the Horticultural Industry" report by the Managing Director of the HCDA (Kenya National Farmers Union, KNFU, Farmer's Voice, march 1990), it has been found that if the pricing structure and quality are inducive enough to divert Middle East buyers from suppliers in

India, Pakistan, Turkey, Europe, New Zealand and Australia, Kenyan vegetables and fruits can be exported by sea to the Middle East. These proposals need to be assessed empirically through further research in this field.

NOTES.

1. Horticultural Exports here refer to three categories of Kenyan Produce which are exported under the general category, 'Horticultural Products'. These are:

(i) Fruits - Pineapples (Ananas comosus), Mangoes (Mangifera indica), Avocadoes (Persea americana), Strawberries (Fragaria spp.), Passion fruits (Passiflora edulis), Melon (Cucumis melo), Paw paw (Carica papaya), Limes/Lemons (Citrus aurantifolia / Citrus limona), other miscellaneous fruits;

(ii) Vegetables - French beans (Phaseolus vulgaris), bobby beans (Phaseolus vulgaris), capsicums (Capsicum annuum), okra (Hibiscus esculentus), aubergines (Solanum melongena), karela (Momordica charantia), mooli (Raphanus sativus), dudhi (Lagenaria siceraria), chillies (Capsicum annuum), turia (Luffa acutangula), tinda (Citrullus vulgaris) and other Asian vegetables, courgettes (Cucurbita pepo), tomatoes (Lycopersicon esculentum), leeks (Allium porrum), carrots (Daucus carota), miscellaneous vegetables and roots;

(iii) Cut flowers - Carnations (Dianthus caryophyllus), alstroemeria (Astroemeria aurantica), molucella (Molucella laevis), roses (Rosa spp.), ornithogalum (Ornithogalum thyrsoides), gypsophila (Gypsophilla paniculata), larkspur (Consolida ambigua), asper, statice (Limonium spp.), liatris (Liatris spp.), anthuriums (Anthurium spp.), orchids (several genera including Cattleya, Cymbidium, Phalaenopsis, Dendrobium, Vanda, Ascocenda, and Paphiopedilum.)

2. See note No. 1, (iii).

3. The Variables L and CO do not enter the Model Multiplicatively since they are represented by dummy variables. Logarithms of zero are not defined.

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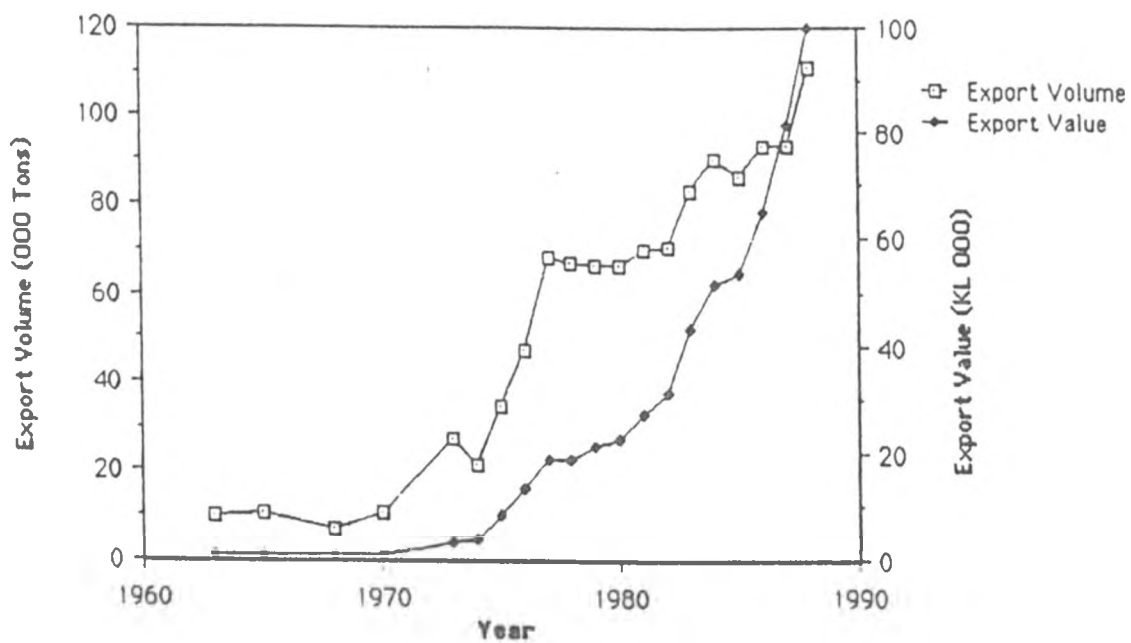
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APPENDIX 1

Graph 1: Growth of Kenyan Horticultural Exports



APPENDIX II: THE COMPLETE DATA SET.

YEAR	X_D^S	R	Y^P	A^S	L	CO
1970	2974.018	2.535	3255.4	3254.0	0.00	1.00
1971	4822.789	4.601	3403.7	3854.1	0.00	1.00
1972	7840.428	7.143	3552.0	5225.5	0.00	1.00
1973	10157.553	6.682	4192.0	5054.1	0.00	1.00
1974	11330.304	8.459	4672.0	7062.1	0.00	1.00
1975	13115.700	10.619	4992.0	5718.2	0.00	1.00
1976	14718.497	10.161	5440.0	14762.8	1.00	1.00
1977	19054.963	10.797	6092.0	11629.7	1.00	1.00
1978	21007.232	13.402	7026.0	12880.8	1.00	1.00
1979	21376.858	4.780	8696.0	33342.7	1.00	1.00
1980	22286.040	6.484	10238.0	14701.9	1.00	1.00
1981	23958.273	7.695	10700.0	22209.0	1.00	0.00
1982	24596.981	18.264	10314.0	24348.6	1.00	0.00
1983	28850.005	12.219	9484.0	27971.9	1.00	0.00
1984	31135.383	10.672	9106.0	32771.7	1.00	0.00
1985	29969.122	21.097	8916.0	30786.1	1.00	0.00
1986	36211.007	9.005	10048.0	34053.1	1.00	0.00
1987	36525.729	9.317	11964.0	32205.8	1.00	0.00
1988	59119.212	11.201	15046.0	43570.3	1.00	0.00
1989	49503.519	12.056	16838.0	40846.1	1.00	0.00

Where,

X_D^S = the annual volume of fresh horticultural exports, in tonnes, from the HCDA export statistics.

R = the real exchange rate, in KShs / US \$

Y^F = foreign incomes, captured by GNP per capita, in dollars, of U.K., Germany, France, Italy, Netherlands, obtained from various issues of the World Bank Atlas.

A^S = annual cargo ('000 tonnes') destined to Kenya from U.K., Continental Europe and Middle East (including Egypt). This is used to capture the availability of air-cargo space as it is assumed that this south-bound cargo traffic provides north-bound legs to airlift Kenya's horticultural produce.

L = dummy to capture the influence of the Lomé Conventions, the first one having been signed in 1975.

CO = dummy to capture the effect of external competition.