**AGRICULTURAL MANAGEMENT,
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Small farmer participation in export production: The case of Kenya

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Small farmer participation in export production: The case of Kenya

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November 2003

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, 2008

Preface

In January of 2003, the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) and the Eastern and Central Africa Programme for Agricultural Policy Analysis (ECAPAPA), in conjunction with the Food and Agriculture Organization of the United Nations (FAO), commissioned research studies on small farmer participation in export production in four countries: Uganda, Ethiopia, Kenya and Tanzania. The four African countries selected for the case studies belong to a group of countries for which agricultural trade is particularly important and their economies are highly dependent on agricultural exports.

The country case studies aimed at providing information for improving producer capacity to respond to market changes, provide policy guidelines for institutional support to small farmer export production and understand small farmer responses to market incentives for export production and corresponding support needs. This entailed assessing the potential of improving small farmer production of export crop (traditional and non-traditional crops) and examining farmer and institutional constraints critical to farmers' participation in export crop production.

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Acknowledgements

The studies on small farmer participation in export crop production in four African countries were initiated by Angelika Schückler (2005), Farm Management Economist, Agricultural Management, Marketing and Finance (AGSF) Service of the Food and Agriculture Organization of the United Nations (FAO). Gratitude is owed to Angelika and to her dedication to all that she did. This series of web documents on small farmer participation in export crop production is dedicated to her memory.

Thanks go to Doyle Baker, Chief, AGSF, FAO, for his support in the development of the studies and for enabling the studies to be published and to John Dixon, Senior officer, AGSF, FAO, who provided advice and support for the studies. Thanks also go to Martin Hilmi, for editing and for following the publication process.

Acronyms

ACP	Africa Caribbean and the Pacific
AFC	Agricultural Finance Corporation
AOA	Agreement on Agriculture
ASALs	Arid and Semi-Arid Lands
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
CAN	Calcium Ammonium Nitrate fertilizer
CBOK	Coffee Board of Kenya
CIP	International Potato Centre
COMESA	Common Market for East and Southern Africa
CL	Coastal Lowlands
DAP	Diammonium Phosphate Nitrate fertilizer
ECS	Export Compensation Scheme
ECAPAPA	Eastern and Central Africa Programme for Agricultural Policy Analysis
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FPEAK	Fresh Producers Exporters' Association of Kenya
GAP	Good Agricultural Practices
GATT	General Agreement on Tariffs and Trade
GMR	Guaranteed Minimum Return
Ha	Hectare
HCDA	Horticultural Crops Development Authority
ICRAF	International Council for Research in Agroforestry
ILRI	International Livestock Research Institute
IMF	International Monetary Fund
KARI	Kenya Agricultural Research Institute
KEFRI	Kenya Forestry Research Institute
KEPHIS	Kenya Plant Health Inspectorate Services
KETRI	Kenya Trypanosomiasis Research Institute
KFA	Kenya Farmers' Association
KFC	Kenya Flower Council
KGGCU	Kenya Grain Growers Cooperative Union
Ksh	Kenyan Shilling
L	Lowland zones
LH	Lower Highland zones
LM	Lower Midland zones
MOARD	Ministry of Agriculture and Rural Development
MPND	Ministry of Planning and National Development

MRL	Minimum Residual Level
Mt	Mount
NCPB	National Cereals and Produce Board
NGO	Non-Governmental Organization
NPK	Nitrogen Phosphorus Potassium fertilizer
SACCO	rural Savings and Credit Cooperative
SAP	Structural Adjustment Programme
SCS	Seasonal Credit Scheme
TA	Tropical Alpine zones
VAT	Value Added Tax
UH	Upper Highland zones
UM	Upper Midland zones
WB	World Bank
WTO	World Trade Organization

1. Introduction

Background

Policies affecting agricultural development and in particular agricultural exports in developing countries have undergone two major changes in the 1980s and 1990s. Initially during the 1980s, the structural adjustment programme (SAP) of the World Bank (WB) and International Monetary fund (IMF) focused on stimulating an increase in foreign exchange earnings through the reduction in structural constraints in developing countries. These included policy reforms in monetary, fiscal, trade and domestic marketing policies. The measures included devaluation of the currency to create incentives for reallocation of resources towards international trade and/or tradable commodities, removal of export taxes on agricultural commodities, domestic market liberalization and reduction of the government's role in production and marketing of agricultural commodities.

During the 1990s the policy reforms on trade were enhanced with the conclusion of the Uruguay Round of the general agreement on tariffs and trade (GATT) negotiations which culminated with the establishment of the new World Trade Organization (WTO) and subsequent signing of the agreements by member countries in 1995. For agriculture, the negotiations led to the establishment of the agreement on agriculture (AOA), which for the first time introduced a written set of rules that emphasized liberalization in international agricultural trade. The main elements of the AOA were to improve market access, reduce domestic support and export subsidies.

The commitments to implement the AOA measures by developed countries have increased opportunities for developing countries to export. Gains resulting from the Uruguay Round will not be shared equally by all countries and within countries, and not by all producers. The main challenges for increasing competitiveness are improving quality of agricultural products for export, lower costs, develop trade and marketing strategies and to diversify production to take advantage of market opportunities. For developing countries, it remains to be seen whether they will capture the opportunities and within countries, which segments of the farming community will gain and lose. Other concerns are:

- What kind of services and regulatory functions governments still need to provide in order to enable smallholders in particular to participate and benefit?
- How can the entrepreneurial capacity of producers and exporters be enhanced in order to compete in international markets?
- How are the opportunities and risks perceived by farmers and support institutions?

The purpose of this study in Kenya was to contribute towards answering these questions with a focus on smallholders. This study analyses the potential of increasing small farmers' participation in the production of traditional export crops in existing farming systems and their profitability.

Currently, the small farm culture in Africa is more oriented towards subsistence farming than commercial farming. This orientation will have to change if diversification into non-traditional crops is to succeed. A commercial approach to non-traditional agriculture will have to be adopted not only by farmers, but also among all agencies and institutions involved.

2. Methodology

In this study both secondary and primary data were used, but secondary data forms the bulk of the analysis in this study. The data was collected from existing published and unpublished records in the Ministry of Agriculture and Rural Development (MOARD), and from the Central Bureau of Statistics of the Ministry of Planning and National Development (MPND). Other existing literature was also used to supplement the data collected. Primary data was collected from 34 farmers in the Kiambu district of Kenya using a structured questionnaire, which was specifically developed for the study. The area where the primary data was collected from, the KIambu district, lies about 50 Kilometers Northeast of Nairobi, the capital city of Kenya. The Kiambu district lies in the high potential areas of the country and a wide range of agricultural activities are practiced in this area. The district has a well-developed road network, when compared to most other parts of the country, its close location to the capital city also provides a ready market outlet for food and agricultural products and is only a few hours travel by road to the international airport, this providing a quick outlet for agricultural exports, particularly horticulture to international markets. The data generated therefore provides a case study of the nature of small-scale farming practices, constraints faced and farmers' participation in export marketing.

3. Structure of the agricultural sector

Kenya has a total land area of 56.9 million hectares (ha). The land is classified broadly into three categories: high potential, medium potential and low potential based mainly on the rainfall received. The high potential areas receive an annual average rainfall of 857 mm or more and cover about 13 percent of the total land area. The medium potential areas receive an annual average rainfall of 735 to 857 mm and cover about 7 percent of the total land area. Low potential areas receive an annual average rainfall of 612 mm or less and cover about 80 percent of the total land area. The high and medium potential areas, which comprise 20 percent of the total land, are the areas suitable for arable rain-fed agriculture. These areas are dominated by crop and dairy farming with cropland and grazing land each occupying 31 percent and 30 percent, respectively. The low potential areas, which are commonly referred to as arid and semi-arid lands (ASALs), are dominated by nomadic pastoralism, which utilizes about 50 percent of the land , ranching and other livestock keeping occupies about 31 percent of the area and the rest is used for agriculture, including irrigated agriculture.

Table 1: Categories of agricultural land in Kenya ('000 ha)

Region	High Potential	Medium Potential	Low Potential	Other Land	Total Area
Central	909	15	41	353	1 318
Coast	373	796	5 663	1 472	8 304
Eastern	503	2 189	11 453	1 431	15 576
Nairobi	16	-	38	14	68
North Eastern	-	-	12 690	-	12 690
Nyanza	1 218	34	-	-	1 252
Rift Valley	3 025	123	12 230	1 515	16 883
Western	741	-	-	82	823
Total	6 785	3 157	42 105	4 867	56 914

Source: GoK, Statistical Abstracts. 1998

3.1 Agro-ecological zones and farming systems

Kenya has various agro-ecological zones suitable for production of both tropical and temperate crops and livestock. Agro-ecological zones are mainly defined by relevant agro-climatic factors and differentiated by soil patterns. The main zones are:

- Tropical Alpine zones (TA)
- Upper Highland zones (UH)
- Lower Highland zones (LH)
- Upper Midland zones (UM)
- Lower Midland zones (LM)
- Lowland zones (L)
- Coastal Lowlands zones(CL)

Tropical Alpine zones (TA)

These zones have an annual mean temperature of 2-10 ^{0}C. They are mainly found in mountainous areas such as Mount (Mt) Kenya, Mt Elgon, and the Aberdares. These areas are covered by national parks and forest reserves.

Upper Highland zones (UH)

These zones are divided into sub-zones depending on humidity levels. The annual mean temperatures in these zones ranges between 10-15 ^{0}C. These zones are suitable for forestry, sheep, dairy production and ranching in drier areas. The crops grown include pyrethrum, wheat, barley, vegetables, beans, peas, rapeseed, potatoes, maize and fruits such as pears and plums. The zones are found in parts of Kiambu, Bungoma, Kericho, Uasin Gishu, Nakuru, and Nyandarua.

Lower Highland zones (LH)

These zones have annual mean temperatures of 15-18 ^{0}C and are found in various parts of the country, especially in Kisii, Nyamira, Gucha, Rachuonyo, Bungoma, Nandi, Kericho, Uasin Gishu, Pokot, Baringo, Samburu, Nakuru, Narok, Kajiado, Nyandarua, Nyeri, Meru, and Machakos districts. The zones are suitable for production of tea, maize, vegetables, beans, passion fruits, potatoes, pyrethrum, wheat, barley, dairy and sheep. However, ranching and nomadism are practiced in the drier parts of the zone.

Upper Midland zones (UM)

These zones are found in most parts of the country especially Western, Nyanza, Central, Eastern, and Rift Valley provinces, parts of Northeastern and Taita Taveta in the Coast province. The annual mean temperatures range between 18-21 ^{0}C. The main crops grown are coffee, tea, vegetables, millet, maize, sorghum, potatoes, sunflower, soybeans, macadamia nuts, passion, paw paws, bananas, guavas, wheat, barley, pigeon peas, citrus, pineapples, yams and dairy. In the drier parts, ranching and nomadic activities are undertaken.

Lower Midland zones (LM)

These zones are also predominant in the country especially, Western, Nyanza, Central, Eastern, Rift Valley provinces, and Taita Taveta in the Coast province. These zones' annual mean temperatures range between 21-24 ^{0}C. The zones are suitable for production of cotton, millet, green grams, cassava, beans, sugarcane, pineapples, sisal, citrus, mangoes, sorghum, pigeon peas, groundnuts, Soybeans, vegetables, rice, and tobacco. However, ranching and nomadic activities are carried out in drier areas.

Lowland zones (L)

These zones have an annual mean temperature of more than 24 ^{0}C and are found in the coastal districts such as Kwale, Kilifi, Mombasa and Tana River. The main activities include production of crops such as millet, green grams, cowpeas, dwarf sunflower, castor, sisal, livestock and millet. In drier areas, ranching and nomadism are practiced.

Coastal Lowlands (CL)

These zones have an annual mean temperature of more than 24 ^{0} C and are found in lower parts of the coast province. They are suitable for the production of sugar, coconut, cassava, cashew nut, millet, livestock, and ranching and nomadic activities.

3.2 Agricultural production

Farming in Kenya is dominated by the primary production of a few commodities, namely; cereals (maize, wheat and rice), traditional food crops (pulses, roots and tubers, millet and sorghum), industrial crops (sugar, pyrethrum, cotton, tobacco and sisal), export crops (tea, coffee and horticulture), and livestock products (milk and meat). The importance of each subsector based on area is shown in Table 2. Livestock production covers the largest area covering about two thirds of Kenya's arable land. Among crops, food crops cover the largest area followed by traditional export crops, horticulture and industrial crops. However, in terms of marketed production, export crops dominate contributing about 59 percent of the gross value of total marketed production, followed by livestock at about 28 percent, industrial crops at 9 percent and food crops at about 4 percent.

Table 2: Agricultural commodities in Kenya, classification and area 1980-2000

Commodity	Commodity category	Area (000 ha) 1980-1989	Area (000 ha) 1990-1995	Area (000 ha) 2000
Maize	Food	1 300	1 400	1 500
Wheat	Food	140	150	150
Rice	Food	8	7	9
Sorghum/ millet	Food	110	134	142
Pulses	Food	525	620	750
Roots and tubers	Food	120	150	231
Tea	Export	84	106	120
Coffee	Export	140	155	167
Horticulture Fruits Vegetables Herbs and spices Cut flowers	Export and domestic	 95 81 2 1	 136 97 1 2	 136 88 1 2
Sugar	Industrial	100	110	120
Cotton	Industrial	70	65	38
Pyrethrum	Industrial	15	18	27
Sisal	Industrial	50	35	26
Tobacco	Industrial/export	5	7	13
Other	Industrial	15	20	32
Dairy cattle ('000' heads)	Livestock	1 300	800	500
Beef cattle ('000' heads)	Livestock	9 900	12 500	11 800
Poultry ('000' heads)	Livestock	6 000	8 000	15 000
Other ('000')	Livestock	5 000	7 000	9 000

Source: Kenya Statistical Abstracts (various) and National Development Plan 2002-2008

3.3 The role of small farmers

Small-scale farmers are those with land size of less than 20 ha. There are about 3 million smallholder farms of which 80 percent have less than 2 ha, with women providing the bulk of the labour and heading about a third of the households. Small-scale farms account for over 75 percent of the total agricultural production and their share of marketed produce has been increasing since 1980. The proportional contributions in the 1990s are shown in Table 3. The increasing contribution from the small farm sector suggests that it is becoming more important in the quantities of the total marketed production. In addition, small farmers account for the production of about 70 percent of maize, 65 percent of coffee, 50 percent of tea, 80 percent of milk, 70 percent of beef and other meat and the production of all pyrethrum, cotton and most of the other food crops (Argwings-Kodhek *et al*, 1998). They generally practice a mixed crop-livestock production system.

Table 3: Annual production of large and small farms and percentage share of gross marketed produce from small farms

Year	Large farms (Ksh million)	Small farms (Ksh million)	Total (Ksh million)	% share of small farms
1980	3 376	3 690	7 066	52.2
1981	3 572	4 166	7 738	53.8
1982	4 334	4 644	8 978	51.7
1983	5 426	5 920	11 108	51.2
1984	7 724	8 051	15 775	51.0
1985	6 918	8 186	15 051	54.2
1986	10 311	8 456	18 766	45.1
1987	8 641	7 713	16 354	47.2
1988	10 008	8 907	18 915	47.1
1989	10 166	9 898	20 064	49.3
1990	9 951	12 346	22 297	55.4
1991	13 394	10 838	24 234	44.7
1992	9 924	16 433	26 440	62.3
1993	15 491	27 731	43 222	64.2
1994	17 679	34 547	52 360	66.2
1995	19 229	41 621	60 850	68.4
1996	20 294	44 752	65 046	68.8
1997	21 468	49 666	71 134	69.8
1998	25 576	59 226	84 802	69.8
1999	22 103	51 209	73 312	69.9
2000	23 633	55 143	78 776	70.0

Source: Republic of Kenya (statistical Abstracts, various years)

Smallholder farming dominates Kenya's agriculture. The subsector dominates in the contribution to export earnings (see Table 4). Except for sisal and cut flowers, smallholders now dominate all the other commodities. Smallholders have overtaken large estates, which up to 1995 dominated tea production. Although the large producers still dominate production and export of cut flowers, smallholders are increasingly becoming important and because of the contractual arrangements with large growers, it is expected that smallholders will in the future dominate the subsector.

Table 4: Smallholder share in export earnings

	Coffee				Tea				Pyrethrum	
	Smallholder		Estate		Smallholder		Estate		Smallholder share is about 90%	
Year	Qt in tonnes	Value in Mil Ksh	Qt in tonnes	Value in Mil Ksh	Qt in tonnes	Value in Mil Ksh	Qt in tonnes	Value in Mil Ksh	Qt in tonnes	Value in Mil Ksh
1980	45 659.5	1 233.3	34 406.5	929.3	28 274.4	438.5	61 618.6	721.6	285.0	180.6
1981	55 812.2	1 417.8	30 295.8	769.6	29 725.2	481.1	61 215.8	740.9	149.0	119.4
1982	61 018.9	1 747.3	39 949.1	1 144.0	32 749.2	632.3	65 283.8	919.5	215.0	192.5
1983	55 535.5	1 966.0	34 908.5	1 235.8	42 837.5	1 050.6	76 900.5	1 417.8	221.0	178.3
1984	56 125.2	2 358.7	40 776.8	1 713.7	41 377.1	1 719.3	74 794.9	2 070.2	250.0	193.6
1985	73 343.1	3 232.0	31 324.9	1 380.4	61 150.3	1 859.0	85 943.7	1 974.1	210.0	190.3
1986	75 923.6	4 663.8	50 562.4	3 105.9	55 356.8	1 642.7	87 960.2	1 813.1	257.0	229.6
1987	65 093.4	2 533.9	34 873.6	1 357.5	66 550.8	1 613.3	89 254.2	1 654.0	193.0	192.5
1988	59 414.9	3 201.7	31 347.1	1 689.2	71 356.8	1 913.1	92 673.2	1 792.1	332.0	230.1
1989	65 289.5	2 729.6	32 210.5	1 346.7	90 871.1	3 028.1	89 728.9	2 409.8	206.0	333.8
1990	76 533.7	2 957.6	37 842.3	1 462.4	94 648.8	3 510.6	102 437.2	2 779.5	216.0	418.6
1991	44 409.6	2 306.7	39 694.4	2 061.8	97 217.5	4 226.7	106 371.5	3 405.9	291.0	644.8
1992	44 082.8	2 328.0	34 061.2	1 798.8	88 395.4	5 042.4	99 746.6	4 455.8	241.0	731.4
1993	48 883.8	6 107.2	39 405.2	4 923.0	100 396.2	9 951.3	110 771.8	8 721.9	185.0	992.1
1994	45 726.3	7 499.6	33 889.7	5 558.3	99 467.4	9 599.2	109 955.6	7 282.1	244.0	1 566.6
1995	51 899.9	8 470.3	36 594.1	5 972.3	134 951.5	10 222.0	109 573.5	7 767.4	262.0	1 327.4
1996	55 381.0	7 793.6	61 350.0	8 633.6	136 830.0	12 719.9	120 332.0	9 984.7	282.0	1 599.2
1997	42 296.0	10 175.3	27 770.0	6 680.7	116 679.1	14 177.7	104 042.9	9 948.2	216.0	1 371.0
1998	30 105.5	7 515.0	21 472.5	5 360.0	157 040.3	19 685.4	137 114.7	13 285.2	114.0	715.8
1999	44 194.3	7 395.4	27 386.7	4 582.9	149 543.9	20 454.6	99 164.1	12 610.5	548.0	656.3
2000	40 958.6	5 512.7	46 023.4	6 194.4	133 660.2	21 617.8	102 625.8	13 477.5	165.0	703.8

Source: Various Statistical Abstracts; MOA

4. Trends in agricultural production, exports and imports

4.1 Agricultural production

Agricultural production shows mixed trends for various commodities (see Figure 1 and Figure 2). Most commodities, particularly food commodities and industrial crops have shown a decline in production, while some like tea and tobacco (cash crops in general) show a general increase in trend. The worst decline has occurred for maize, rice, milk, cotton, sisal and coffee. The mixed trend in production is attributed to a number of factors that include area expansion or contraction, yield changes because of climatic factors, technological changes, and prices. Further, although some commodities like tea show a general increased trend in production, this is attributed to an increase in ha rather than an increase in productivity. In all cases, productivity for all the commodities is low, but while it is in fact true that climatic factors such as drought are important in explaining Kenya's agricultural performance, the major culprits are policy related.

Figure 1 : Domestic production of food crops, 1980-2000 (000 tonnes)

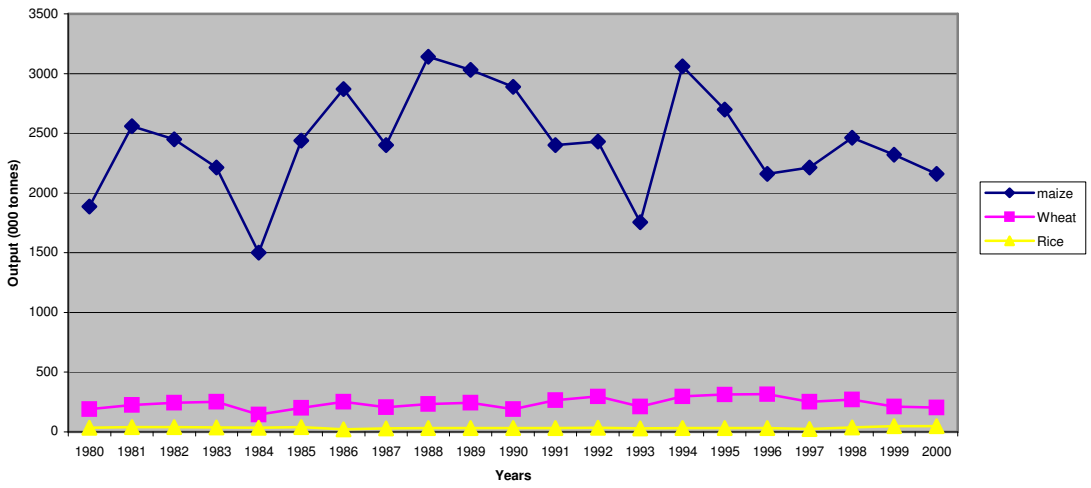
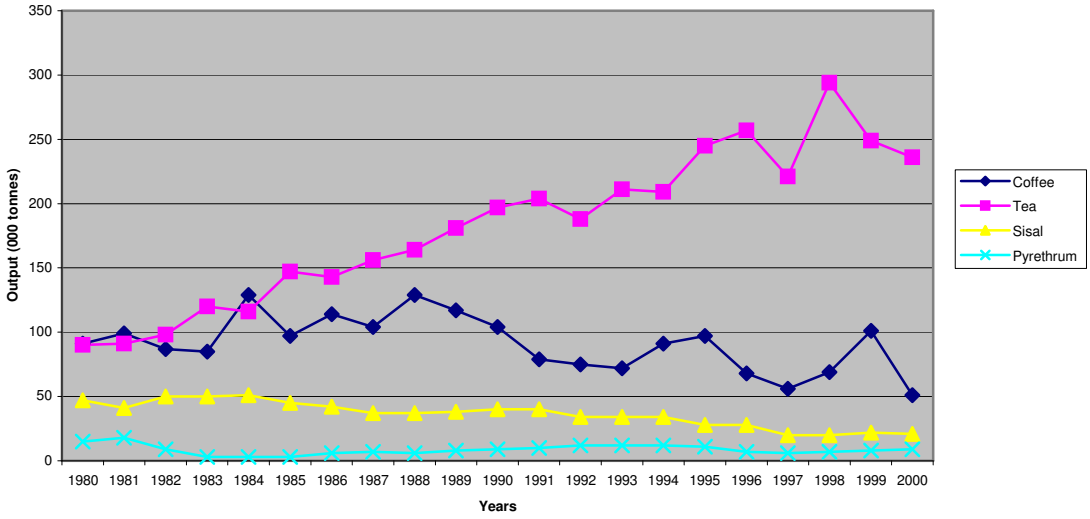


Figure 2 : Domestic production of industrial crops, 1980-2000 (000 tonnes)



4.2 Agricultural exports

Kenya's trade in exports is dominated by agricultural products (see Table 5). Agricultural trade in food and beverages continues to dominate. Kenyan agricultural exports constituted an average 53 percent of total exports over the period between 1980 to 2000. Agricultural exports can be classified as traditional and non-traditional exports. Traditional exports are those, which account for more than 3 percent of total exports in the base year 1980 (Blackhurst and Lyakurwa)[1]. The traditional exports include industrial supplies, coffee, tea and crude vegetable materials. The non-traditional exports include most of the horticultural products, including flowers.

Tea, coffee, pyrethrum, and horticultural products dominate agricultural exports (see Table 6). Coffee dominated the export value until 1988 when it was overtaken by tea. Fresh horticultural crops also overtook coffee in 1999 to become the second most important agricultural export for Kenya .

[1] Markets and market access for African exports: past, present and future. Framework paper presented at the African Economic Research Consortium Workshop on Africa and World Trading System held at Novotel Hotel, Accra, Ghana, on October 24-25. Cited by Mwega (2000)

Table 5: Composition of Kenyan exports in broad categories (in percentages)

Year	Food and Beverages	Industrial Supplies	Fuel and Lubricants	Machinery and Capital Equipment	Transport Equipment	Consumer Goods
1980	43.6	18.4	33.3	0.5	0.3	3.8
1981	45.6	18.1	31.9	0.4	0.4	3.6
1982	51.0	17.4	27.4	0.3	0.2	3.6
1983	56.9	18.7	19.7	0.4	0.2	3.1
1984	61.9	15.0	18.8	0.3	0.1	3.8
1985	62.8	16.3	16.1	0.3	0.2	4.3
1986	67.5	15.3	11.2	0.5	0.3	5.2
1987	60.0	19.5	13.4	0.6	0.6	5.9
1988	59.5	21.2	12.9	0.6	0.6	5.2
1989	59.8	22.0	11.4	0.7	0.4	5.7
1990	60.4	19.9	12.2	0.6	0.2	6.7
1991	53.3	20.9	17.4	0.7	0.3	7.4
1992	54.4	21.8	14.4	0.8	0.5	8.1
1993	54.8	24.2	9.8	0.7	0.8	9.8
1994	51.5	29.4	6.5	0.9	1.1	13.6
1995	51.1	26.9	5.3	1.4	0.5	14.9
1996	52.9	26.1	6.6	0.9	0.5	13.1
1997	53.7	22.4	9.0	0.6	0.4	13.9
1998	57.4	18.3	9.1	0.9	0.6	13.7
1999	55.9	17.9	8.2	1.3	0.9	15.9
2000	56.3	19.1	8.6	0.5	0.5	15.1

Source: Kenya, Economic Survey (1998)

The good performance of the non-traditional exports is attributed to the removal of restrictive trade policies by importing countries, particularly, Europe under the African Caribbean Pacific (ACP)-European Union (EU) Lome Agreement. The good performance from 1992 to 1996 similarly overlaps with trade liberalization and is explained by the removal of bureaucratic bottlenecks and availability of foreign exchange (Kenya, 1996).

Table 6: Value of agricultural exports (Ksh. million)

Year	Maize	Coffee	Tea	Sisal	Cotton	Pyrethrum	Fresh Horticultural Produce
1980	0.08	2 162.58	1 160.06	176.94	52.10	180.56	228.00
1981	1.36	2 187.40	1 222.08	175.12	32.74	119.44	252.00
1982	6.54	2 891.28	1 551.86	216.90	na	192.46	272.00
1983	243.16	3 201.74	2 468.42	241.82	17.28	178.32	350.00
1984	118.54	4 072.46	3 789.56	251.38	2.96	193.64	415.80
1985	24.82	4 612.46	3 833.14	288.58	39.50	190.30	469.20
1986	293.26	7 769.72	3 455.78	218.86	10.96	229.58	630.40
1987	389.18	3 891.38	3 267.32	197.68	1.00	192.46	na
1988	433.36	4 890.94	3 705.26	238.44	0.02	230.06	na
1989	311.32	4 076.26	5 437.98	324.50	na	333.84	1 440.05
1990	413.34	4 419.92	6 290.10	378.82	na	418.60	1 432.00
1991	96.08	4 368.56	7 632.60	353.30	na	644.78	1 692.00
1992	15.14	4 126.78	9 498.16	348.78	na	731.38	2 516.00
1993	6.08	11 030.20	18 673.18	725.62	na	992.14	4 672.00
1994	16.98	13 057.94	16 881.38	662.40	na	1 566.60	4 936.00
1995	1 810.72	14 442.64	17 989.46	588.28	76.84	1 327.38	6 400.00
1996	2 000.28	16 427.20	22 704.56	814.26	na	1 599.20	7 700.00
1997	55.58	16 856.04	24 125.90	723.08	6.46	1 371.04	9 000.00
1998	129.68	12 875.04	32 970.66	688.76	2.60	715.78	9 990.00
1999	357.24	11 978.28	33 065.08	637.50	4.50	656.30	14 200.00
2000	33.50	11 707.10	35 095.30	603.30	39.00	703.78	13 900.00

**na=data not available*

Source: Economic Surveys & Statistical Abstracts (various); HCDA; MOALD.

4.3 Agricultural imports

Kenya is currently a net importer of the main food crops; maize, wheat, rice, and sugar (see Table 7). The deficits increase more during the drought periods and therefore the high levels of imports during this period. Imports of most of the food products have had a negative impact on local production, this caused by the imports that are relatively cheap and the consequent market price does not cover the high costs of domestic production. Preferential treatment offered to member states through the Common Market for Eastern and Southern Africa (COMESA) agreements make it easier for products from the region to compete with domestic production of food commodities.

Table 7: Quantity of agricultural imports (tonnes)

Year	Maize	Wheat	Rice	Tea	Tobacco	Sugar
1980	323 873	48 462	1 239	6 244	328	1 751
1981	77 394	49 239	4 573	10 070	444	1 756
1982	89 056	139 326	11 880	8 261	281	2 216
1983	na*	81 946	44 768	9 351	3	2 402
1984	405 443	149 906	507	7 524	15	1 503
1985	125 454	143 793	562	16 752	17	3 912
1986	700	115 281	61 745	19 662	na	126 209
1987	na	217 857	39 129	16 910	7	49 100
1988	na	75 578	10 000	15 649	130	8 749
1989	na	123 535	30 006	1 216	6 644	44 696
1990	na	322 632	27 983	74	na	20 903
1991	na	242 612	61 163	434	2 784	1
1992	414 929	100 808	58 920	74	na	2
1993	12 874	314 410	37 150	1	1 157	216
1994	650 387	353 076	93 519	648	3 003	1
1995	11 965	249 134	28 177	1 281	2 159	37 738
1996	6 759	486 917	39 159	53	410	36 723
1997	1 101 105	388 138	62 435	345	599	9 923
1998	368 761	478 865	62 893	139	66	109 375
1999	73 520	578 543	53 358	218	50	55 573
2000	409 416	636 045	105 803	196	4 660	91 608

** n.a=. data not available*
Source: Statistical Abstracts.

5. Policies and strategies for export production and import substitution

Various agricultural policies and strategies have been developed for Kenya since independence in 1963. The first document to spell out these policies was the Sessional Paper No. 10 of 1965 on *African socialism and its application to planning in Kenya*; its aim was to achieve high rates of growth in the Kenyan economy. The Paper emphasized import substitution as the main strategy for industrial development and increased agricultural production. In order to achieve food security, food self-sufficiency was emphasized. These strategies yielded positive results with growth rates for the economy averaging over five percent between 1966 and 1972, this as a result of heavy government involvement in industrial/agricultural promotion and direct investment.

This policy direction was implemented until the early 1980s when it became clear that these policies were not financially sustainable. This led to the preparation of the Sessional Paper No. 1 of 1986 on the *Economic recovery for renewed growth* that laid the foundation for policy reforms towards restructuring and liberalization of various sectors in Kenya. The impetus to the implementation of the policy was enhanced by the SAP of the WB. The emphasis on import substitution was dropped and instead the focus was on value adding for exports. It was argued that inward-oriented economic policies such as import substitution, food self-sufficiency and protectionism that support them, were the main causes of inefficiencies and non-competitiveness of the economic sectors. The new outward looking strategies that focused on competitiveness were further emphasized in Sessional Paper No. 1 of 1994 on *Recovery and sustainable development to the year 2010* and Sessional Paper No. 2 of 1996 on *Industrial transformation to the year 2020*. The Sessional Paper No. 3 of 1999 on *National poverty eradication* and the *Poverty eradication plan* also laid emphasis on the importance of improving productivity, both in the agricultural and industrial sectors.

Over the years, the government formulated general agricultural support policies as well as commodity specific strategies/policies. Some of the commodity specific strategies focused on export crops mainly (tea, coffee, and horticultural crops). The strategies were aimed at addressing constraints faced in these subsectors to help ensure competitiveness and increase export earnings. The major strategies used included support to research and extension, and marketing.

Agricultural research

Agricultural research is dominated by the Kenya Agricultural Research Institute (KARI), a parastatal, which was established by an act of parliament in 1979 to undertake research in the agricultural sciences. The KARI took the lead in developing new technologies for crops as well as new varieties. The traditional export crops (tea and coffee) had specific research centres, this however was not the case for horticultural crops, where KARI was the major player. Kenya's agricultural research system was considered to be strong, however, the lack of progress made in increasing total factor productivity in agriculture suggested that the research system was operating below its potential or technology transfer mechanisms were weak. This may be related to weaknesses in priority setting, financing, management, interagency linkages (Nyangito and Karugia, 2002), and further financial imbalances plagued the research efforts.

Agricultural extension

The link between agricultural research and extension remains weak in Kenya (Kariuki, 2001). One reason for this has been the budgetary limitation while the high degree of agro-ecological variability limits the extent of generalization in technology recommendations. The MOARD has been the main player in directing extension services before and after independence in 1963. In remote areas of Western Kenya, staff to farmer ratio of 1:1200 is very common compared to high potential areas of Central Kenya with staff ratio of 1: 500 (MOARD, 1997). However, over time other players have come into the scene such as private companies (mainly commodity specific). Large private companies also offer extension services to small farmers. Good examples can be found in the horticultural industry (mainly flowers, fruits and vegetables), where large firms contract farmers to grow crops for the export market, while private firms also provide extension services and inputs to farmers. However, analysis of the MOARD extension services for which small farmers depend, reveals a declining trend in efficiency and effectiveness (Kosura, 2001). Whereas this can be partly blamed on declining budgetary allocations to the sector, most of the blame can be directed at a lack of clear objectives, failure to identify the role of beneficiaries and poorly defined organizational and institutional structures.

Subsidies on outputs and inputs

Kenya does not currently subsidize any of its agricultural goods exports. The Export Compensation Scheme (ECS), under which compensation for duties paid on imported inputs was granted on the basis of export performance, phased out in 1993. However, several incentive schemes (e.g. tax holidays, remission and refunds of import duties, accelerated depreciation and investment allowance) are in place to encourage investments. The large horticultural export subsector has been a beneficiary, import duties are not charged on all inputs imported for use in the agricultural sector, while the machinery, equipment and chemicals for health care, education, and agricultural products are generally zero-rated for the Value Added Tax (VAT) refund purpose.

Marketing promotion and assistance

Several agencies contribute to the promotion of agricultural exports. The Horticultural Crops Development Authority (HCDA) coordinates the horticultural industry. Its main roles are to advise the government on national strategies and policies, and farmers on production and marketing of horticultural crops. The HDCA collects, collates, analyses and disseminates information and statistics on horticulture and promotes horticultural produce in local and export markets and monitors imports and exports of the crops. Several agricultural marketing boards, such as the Coffee Board and the Tea Board, which regulate production, and marketing of exports of these commodities may be seen as export cartels, but they have a mandate for supporting development of the industries through research, marketing of the products and promotion.

6. Costs of production for selected crops

The costs of production for various crops in Kenya vary from region to region, as the level of management varies. The data shown in Table 8, however is an average calculated for the whole country. It is aimed at indicating the profitability of producing various crops on a general basis.

The gross margins are highest for all crops for management level III because of the high intensity in use of inputs, while the low use of inputs in level I is also responsible for the low gross margins realized. Among crops shown in Table 8, vegetables generate the highest gross margin, which can be as high as Kenyan Shilling (Ksh)321 832 for snow peas. Coffee, tea and fruit crops are second to vegetables in gross margin generation, while food crops, particularly maize, generate the lowest gross margins at about Ksh57 412 per ha. Thus, in general, traditional export and non-traditional export crops generate higher incomes for farmers than food crops. It is important to note however, that most small-scale farmers realize gross margins associated with level I and therefore there is scope for improving their incomes, if they improve crop management levels.

Table 8. Average cost of production and gross margin per hectare for selected crops in Kenya

Crop Type	Level of Production for Small and Medium Farms					
	I Low Management		II Medium Management		III High Management	
	Cost	Gross margin	Cost	Gross margin	Cost	Gross margin
Maize	15 890	10 140	25 560	21 000	36 388	57 412
Rice (Sindano)	45 600	74 400	55 200	109 800	64 000	146 000
Rice (Basmati)	41 400	46 600	49 620	60 380	57 000	79 400
Irish Potatoes	54 000	53 250	70 910	143 090	105 600	354 000
Tea	39 300	135 700	80 400	279 600	100 400	336 800
Coffee	43 070	56 905	79 940	219 985	118 000	281 900
French beans	50 378.4	88 077.6	59 522.4	134 323.2	72 424.8	176 803.2
Snow peas	92 973.6	128 563.2	101 548.8	193 838.4	121 248.0	321 832.8
Onion	36 273.6	56 030.4	44 740.8	93 722.4	53 964.0	130 651.2
Avocados	64 612.8	83 887.2	96 926.4	152 308.8	129 232.8	203 076.0
Passion fruits	32 860.8	26 308.8	49 478.4	37 663.2	65 628.0	51 602.4

Source: MOA 2003 - Gross Margin Analysis for various districts

7. Potential and international competitiveness of non-traditional exports

The horticultural crops comprising vegetables, fruits and flowers are the non-traditional export crops in Kenya. The crops have become a major source of foreign exchange earnings but exports only account for four percent of total production. In addition they are an important source of employment; the industry employs about two million people directly and another estimated 0.5 million indirectly.

Production of fruits and vegetables

The most important export vegetables are French beans, beans, snow peas, and Asian vegetables (okra, baby corn, karella or bitter gourd, eggplant, chilies, and capsicums or peppers). Important fruit exports include avocados, mangos, passion fruit, and strawberries. Fruit and vegetable growers are grouped into small, medium and larger growers. The HCDA estimates that 70 percent of vegetables production and 40 percent of fruit production for export is from small-scale producers.

A major issue in the production of fruits and vegetables is the use of chemicals for the control of pests and diseases, which attack the crops at any stage of production and post-harvest handling. Many disease causing micro-organisms and pests are favoured by the tropical environmental conditions in Kenya. Chemicals are usually the most effective means of controlling pests and disease, which leads to higher yields, but unfortunately the chemicals are a threat to human health (workers and consumers). As a result, safe use of chemicals focusing on the protection of workers involved in spraying chemicals and the control of chemical residues to protect consumers, are a major concern. The use of the right chemicals, frequency of application and dosage applied for effective disease and pest control, are critical requirements in the production of fruits and vegetables, while at the same time avoiding harm to workers and with minimum residual levels that can be acceptable to consumers.

Flower production

Flower growing is the leading horticulture export from Kenya. The flower industry has three types of growers namely; large growers, medium and small-scale growers. Presently, there are some 5 000 farmers or enterprises growing cut flowers for commercial purposes. However, export production is concentrated on only a few (about 75) large or medium-scale flower operations. The twenty-five largest producers account for nearly 75 percent of total exports.

Flower production on large farms is a highly sophisticated investment with facilities and quality assurance systems to meet supermarket requirements. Some of the flowers are annual crops that can be grown in open fields with relatively limited inputs (e.g. statice and alstrormeria); others require much more controlled growing conditions, more purchased inputs (especially agro-chemicals) and more intensive filed management (e.g. roses and chrysanthemum). Such flowers are grown in high investment structures which require special production systems such as production in green houses, drip irrigation, high fertilization, safe use of chemicals and computer controlled-venting care. However in all cases, export markets require flowers to be produced according to Good Agricultural Practices (GAP), which require that the use of chemicals should not pose measurable hazards to health of the consumer, farm workers and the environment.

Consequently flower growers are forced to observe production of flowers using environmentally sound practices.

The costs of flower production in Kenya are shown in Table 9. The table shows that the costs of production of various flowers varies greatly. The costs of flowers such as roses and carnations that are grown in high investments structures and require special attention are high as opposed to flowers such as carhamus grown under field conditions.

Table 9: Variable costs for cut flower production (US$/Season)

Cost item/crop	Roses	Statice	Carnation (Spray)	Bupleurum	Solidago	Carthamus
Land preparation	1 400	160	160	160	160	160
Planting Material*	53 250	702	43 860	1 600	20 880	526
Irrigation	500	1 053	1 580	526	1 053	526
Fertilizers	5 300	702	5 260	702	1 750	440
Pesticides	6 000	1 750	10 530	526	1 750	526
Labor	14 275	4 210	15 790	3 509	7 900	2 175
Electricity	-	-	-	-	1 750	-
Packaging material	3 500	9 650	7 020	1,842	5 260	2 403
Transportation	4000	1 750	10 530	526	1 750	526
Total	100 825	199 77	94 730	9 391	42 253	7 282

* Includes royalty where applicable.
Source. Thoen et al. (2000)

Below the large growers are several dozen medium to small-scale commercial growers, each with between five and twenty ha under production. The growers collectively account for some 10-15 percent of Kenya's total exports. In some cases, the growers export directly, but since competition has intensified many have shifted to supplying other firms (large growers) rather than shouldering the risks and transaction costs associated with exporting.

Challenges facing small-scale farmers in production of non-traditional crops

In general, smallholders face challenges in the production and marketing of horticulture products for export market. They lack credit, inputs and technical capabilities and suffer from logistical constraints such as transport, haulage and cold storage facilities. Sometimes, the growers organize themselves into groups to try and overcome the constraints they face, while some grow horticultural crops on contract for large growers. The large growers provide finance and technical support in production and grading of the contracted flowers. Both the HCDA, the Kenya Flower Council (KFC) and the Fresh Producers Exporters' Association of Kenya (FPEAK) support the smallholders through provision of inputs, training in crop management, pesticide application and quality control. Nevertheless the requirements of the European market (product consistency, quality control, and compliance with health and safety requirements) pose real problems for exporters wishing to source from smallholders.

Production and marketing of horticultural crops for the export market is vertically integrated for large growers. The produce is harvested and put in pre-cooling houses for chilling, cleaning, sorting, grading and packaging. At the airport, after inspection by the Kenya Plant Health Inspectorate Services (KEPHIS) officers, produce is ready for export. Other growers transport chilled produce to cold stores at the Airport where they are cleaned, sorted, graded and packed for export after inspection by KEPHIS officers. Transportation from the farm to the airport is in all cases done using refrigerated vehicles; this is a must for flowers.

The major export markets for fresh fruits and vegetables are Western Europe and the Middle East. The United Kingdom is the largest export market in Europe; France, Germany, the Netherlands, and Belgium are also significant markets. The marketing system for fresh fruits and vegetables for export are dominated by licensed exporters, there are over 200 licensed fresh produce exporters in Kenya. However, only 50 are consistently operational, while the other 150 exporters exploit favourable short-term market conditions, entering and exiting the industry sporadically during the October – April peak season. Among these 50 active export firms, four large firms dominate the export market. Exporters obtain produce from a variety of different types of producers using several types of transactions, namely, exporter grower-channels and exporter-agent/broker channels.

For flowers, several large firms have formed linkages with freight firms, importers and agents in Europe and most supply both the Dutch auctions and European supermarkets. These growers provide range and volume required to fulfill their sales programme. The international market for cut flowers is concentrated in the high-income countries of Northern America, Europe and Asia; Europe being the largest market for Kenyan flowers.

A major concern in the horticultural industry in regard to export markets is ability to meet the minimum residual levels (MRLs) requirements for chemicals used and undertake pest risk analysis. Attaining the MRLs requires good knowledge and ability to test before the produce is harvested for export. Most of the recommended chemicals and safety use guidelines are quite expensive to use and implement. Furthermore, costs have to be incurred in employing qualified agronomists to advise on use of pesticides and inspection of the levels of MRLs of the produce before harvest. Pest risk analysis requires that the country develops a catalogue of pests that are important in horticulture and a system of control for the pests. The failure for Kenya to have a pest risk analysis that covers a longer period is responsible for the restriction of Kenyan fresh produce of some horticultural produce to countries such as the United States , Japan and South Africa. Most growers consider this requirement to be too strict, since growers do not know about the restricted pests.

8. Support to the small farm sector

Since independence, policies have been put in place with the aim of promoting smallholder farming. Support has thus been given in terms of the provision of extension services, formation of cooperatives, statutory boards and farmer associations to enhance access to inputs and market, and formation of the Agricultural Finance Corporation (AFC) for access to credit. In the 1960s, the government used to provide Guaranteed Minimum Returns (GMRs) to maize farmers through the AFC in collaboration with the National Cereals and Produce Board. This provided incentive to farmers who increased the level of production, being assured of some income in case of weather calamities. Furthermore, the price controls ensured that farmers from the onset of cultivation were assured of some minimum price and access to market. The government also promoted formation of some farmer associations such as the Kenya Farmers' Association (KFA) that provided inputs to farmers at competitive prices.

However, poor governance in most of the marketing statutory boards and cooperatives reduced the expected benefit to farmers thereby leading to a near collapse of some industries such as dairy and cotton. Also affected were coffee, sugar, pyrethrum, cashew nuts and beef. Poor governance, political interference and the risk in agricultural production resulted in failure of the AFC and the Cooperative Bank to effectively provide credit facilities to smallholders.

9. Potential and constraints in export production

Smallholders are increasingly gaining entry into production for export markets. Currently, they supply the bulk of export crops like coffee, tea, pyrethrum, bixa and vegetables. They are already quickly gaining entry into export of flowers and fruits. The main constraints facing smallholder production for export include:

i) *Over reliance on rain-fed production in the face of erratic weather conditions*. Water for irrigation is a limiting factor in the expansion of horticultural production especially in the ASALs.

ii) *Disease and pest infestations* increase the costs of production and also limit expansion of produce for the export market.

iii) *High cost of farm inputs* such as seeds, fertilizer, pesticides, animal feeds and drugs increase the costs of production.

iv) *Inadequate credit availability* especially to smallholder farmers; the problem being made worse by the high interest rates on borrowing.

v) *Poor management of cooperative societies*, which are a major market outlet for farmers, have hampered access to export markets.

vi) *Inadequate supply of high quality seed and seedlings*, especially for horticultural crops limits productivity.

vii) *Low level of research and development***.** The level of research in some commodities such as the horticultural crops has remained low for many years, thus making farmers depend on imported varieties, some of which are not true to type. Moreover, the farmers, exporters, and private individuals use the imported material without information on the adaptability and performance of the varieties under local conditions.

viii) *Lack of pre-cooling facilities for smallholders*. This is especially crucial for the export produce, which requires pre-cooling before shipment to maintain quality and lengthening the shelf-life. Currently, only a few big exporters/producers have cooling facilities, while the market requirement is that all produce be pre-cooled before shipment to market outlets.

ix) *Severe limitation of air freight capacity out of Nairobi*. The low capacity is caused by lack of adequate southbound airfreight cargo destined to Nairobi, high cost of jet fuel in Kenya and high cost of landing fees and services at Jomo Kenyatta International Airport.

x) *Poorly developed marketing channels and infrastructure*.

xi) *Problems in meeting the standards required in international markets* such as meeting the EU's MRLs and pest risk analysis for the produce, this leading to the rejection of the exported produce.

10. Farm management information

Farm management information for crops varies from commodity to commodity and also from region to region. The information presented here gives a general picture for the typical areas where the crops are grown.

10.1 Food crops

The main food crop in Kenya is maize. The crop is mainly produced on a small-scale basis with most farmers producing for subsistence. However, it is also produced for sale to meet household financial needs, although such households purchase maize a short while later. Maize yields have been dropping over the years and farmers are now forced to use various yield improving inputs such as fertilizer and certified seeds, if they have to get satisfactory yields. The main requirements for growing one acre of maize are:

Inputs

- 25 kg Certified seeds
- 50 kg of Fertilizer DAP
- 50 kg of Fertilizer CAN
- 1 kg Agrochemical – Dipterex
- 2 kg Actellic

Labour

- Planting
- Weeding two times
- Top dressing of fertilizer
- Cutting and stocking
- Dehusking
- Shelling

Credit

Credit facilities are not easily available to small-scale farmers. They mainly rely on friends/relatives and the informal rural micro-finance systems for credit facilities. Large scale maize farmers on the other hand have had good access to some credit schemes. The major scheme that was used for many years (1942 to 1978) was the GMR that provided both credit and insurance to maize production. The scheme was replaced by a Seasonal Credit Scheme (SCS) in 1980, which however was unsuccessful and collapsed in the late 1990s. In recent months, the government has made initiatives to revive the scheme.

Input and output Markets

Until 1993, when maize marketing was fully liberalized, principally the NCPB dominated maize purchases at a price set by the government handled maize marketing. Farmers therefore had a guaranteed minimum price and would strive to sell at least at the price offered by the parastatal. However, after liberalization, there is no guaranteed buyer of last resort and NCPB is not obliged to buy from farmers and it can buy at whatever price it deems fit in the market.

Before liberalization of the industry, input supply was dominated by the KFA that distributed crop inputs at very competitive prices. Quality of the produce was also guaranteed. The KFA was changed into the Kenya Grain Growers Cooperative Union (KGGCU), which unfortunately was poorly managed leading to inefficiencies in input marketing. With liberalization, many actors are involved in inputs marketing, but the marketing system is still not competitive enough and the costs of inputs are high. In some cases the quality of inputs is also compromised to the disadvantage of farmers.

10.2 Horticultural crops

The cost of production of various fruit and vegetable crops varies greatly among different farm categories as shown for selected exports of vegetables and fruits in Table 8. The costs of production are highest for large farms (level III), which use higher levels of inputs (chemicals and fertilizers) and better management practices. The major cost elements are labour, which takes about 25-33 percent of total costs, irrigation averages about 16 percent of total costs (but is not incurred for rain-fed agriculture), and chemicals (fertilizers and pesticides), which account for 24 to 53 percent of the total costs. The cost components vary from crop to crop, but the costs of chemicals usually forms the largest cost component (about 30 percent), because of the need to protect vegetables and fruits against diseases and pests. A few examples are given here:

(i) French Beans

Inputs per ha

- Seeds 25 kgs per ha
- 50 Kg TSP
- 250 kg CAN
- Fungicides Ridomil

Labour @ Ksh. 100 per man-day

- Planting
- Weeding
- Spraying

Credit

There is no organized source of credit for producers of French beans. However, some farmers access input credit through exporters who contract them to produce the beans. Some rural SACCOs and informal group lending institutions also provide credit to farmers.

Input and output market

Farmers mainly buy the inputs from local agro-chemical stores. However, some exporters enter contractual agreements with farmers and provide them with the necessary inputs. These are later recovered from the sales of the beans. Numerous exporters who collect the produce from collection centres in the districts undertake marketing of French beans. More than 20 such companies operate in the eastern province, especially around Mt. Kenya. They provide farmers with special cartons in which farmers pack the produce for transportation to Nairobi, where actual grading and packaging for export are done. Some brokers or middlemen operate in various strategic areas to collect produce from farmers and deliver to exporters. However, farmers complain that these middlemen exploit them by offering very low prices. The HCDA has put up seven cold storage facilities in the main production areas and the Jomo Kenyatta International

Airport to assist small-scale farmers and it also provides refrigerated trucks to transport the produce at a fee.

(ii) Mangoes

Mangoes for commercial production are produced through grafting. The main varieties are: Vandyke, Tommy Alkins, Kent, and Haden. Production involves digging holes size 2 ft x 2 ft x 2 ft at a spacing of 9 x 9 m. Mix 1 debe decomposed manure and 10g of TSP with topsoil in the hole. Top-dress with 200g CAN at the onset of rains in each season. Flower inducement requires a spray with 2-3 kg/ha of potassium nitrate when the plants are almost flowering.

Inputs

- Top dressing CAN
- TSP
- Ridomil
- Manure
- Potassium nitrate

Labour

- Weeding/manure application
- Pruning
- Harvesting/grading

Input and output markets

Private and public tree nurseries are taking part in the production of planting materials. Some women groups also actively taking part in seedling production on a commercial basis. Inputs such as fertilizer and agro-chemicals are purchased mainly from local agro-chemical stores. Some exporters collect the produce from the farms, while others rely on brokers for collection of the produce. There is however a big local market for mangoes, both for consumption and processing. The increasing demand for fruit juice is likely to result in higher demand for these products.

(iii) Arabicum cut-flower for export (1 ha)

Inputs

- Seeds
- Manuring
- Basal soil treatment
- Fertilizer and chemicals
- Mulching materials
- Packaging materials
- Freight charges

Labour

- Land preparation
- 720 man days
- Security

Credit facilities

Flower production is an expensive enterprise that most farmers cannot invest in unless they have access to credit facilities. Its production is however less risky and a number of financers are willing too provide credit facilities for their production. Even commercial banks provide credit facilities for flower production. The main problem is the high interest rate on loans and the lack of collateral for small-scale farmers.

Input and output markets

Flower farming is still dominated by large-scale farmers who have direct access to export markets for their produce. They thus produce with a target market in mind. Some pre-package the flowers in accordance with the specifications of the target supermarket in Europe. Small-scale farmers sell to exporters or their agents who collect the same from either the farms of designated collection centres. The bulk of the flowers are sold at the auction market in Amsterdam. The KFC and the FPEAK play a leading role in ensuring that farmers and exporters follow the agreed upon work ethics and that they meet the stipulated quality standards. This is done through the implementation of a Code of Conduct.

10.3 Coffee

The higher performance Ruiru 11 coffee variety is currently being promoted in various parts of the country. It requires spacing of 2x2 m and 1 ha supports 2 500 trees.

Inputs

- Seedlings
- Manure
- CAN fertilizer
- NPK (17:17:17)
- Chemicals – (Sumithion)

Labour

- Spraying
- Hole digging
- Land preparation
- Planting
- Fertilizer and manure application
- Weeding
- Pruning and handling
- Harvesting and transport

Input and output marketing

Marketing of coffee is managed by cooperative societies, which also provide farmers with inputs. The cooperative societies also receive the proceedings from the sales and make payments to farmers. However, the payments are usually not made on delivery by farmers to the society but after some time, usually more than three months later. Before liberalization it was mandatory for small farmers to sell all their coffee through cooperative societies and the Coffee Board of Kenya (CBOK), but changes have been made in the legislation to allow other players into coffee marketing and farmers can sell to other marketing agents.

Credit facilities

Most of the credit available to small-scale farmers is in the form of inputs from cooperative societies. These loans are recovered from the sale of the coffee through the cooperative society. Low world market prices coupled with poor management of the cooperative societies have resulted in very low producer prices, thereby discouraging farmers from coffee production.

11. Institutional requirements for farmers

The various institutions involved in provision of services to small farmers are presented here. The focus is on research, extension, farmer organization, credit and marketing information.

11.1 Research

Agricultural development can only be sustainably attained if there is effective research in various areas. These include plant and animal breeding for yield, pest/disease/disease tolerance, etc. There should also be, for example, the development of appropriate technologies for production, harvesting, processing, storage, and even marketing.

Research is mainly undertaken by government-supported organizations such as KARI, the Kenya Forestry Research Institute (KEFRI), the Kenya Trypanosomiasis Research Institute (KETRI) etc. There are also a number of public supported organizations such as the Coffee Research Foundation, Tea Research Foundation, and the Sugar Research Foundation. Kenya is also resident to many international research institutes such as the International Livestock Research Institute (ILRI), the International Centre for Research for Agroforestry Research (ICRAF), the International Potato Centre (CIP) etc. The national universities namely; Nairobi, Jomo Kenyatta and Egerton also undertake research on various areas in agriculture.

11.2 Extension

Farmers require access to information on research breakthroughs, marketing and proper crop and animal husbandry. The government is the main provider of extension services to farmers. Some non-governmental organizations (NGOs) and church organizations also provide extension services while the private sector particularly large horticultural export growers also provide extension to farmers through contract farming.

11.3 Research, extension, farmer linkages

Effective adoption of research breakthroughs requires close linkages between research and extension. The MOARD has a research-extension liaison division which links research and extension in delivery of research findings to farmers.

11.4 Farmer organizations

Smallholder farmers dominate agricultural activities, which necessitates a mechanism to assist them in access to inputs or market their produce in an organized manner. These functions were for many years undertaken and are being undertaken by cooperative societies. Most of the important cash crops had farmers' organizations that helped in marketing the produce and provision of inputs to farmers. However, in recent years, the cooperatives have faced managerial problems and this has affected the efficiency with which they provide services to farmers. With no organized marketing systems for farmers, access to inputs or output marketing can be expensive and this raises the costs of production.

The need for farmers' organizations in input and output marketing is important to allow farmers to enjoy economies of scale, thus the need for the formation of farmer groups to exploit this opportunity. This can be in the form of cooperative societies or farmer groups, to bulk purchase

or even directly import inputs and avail the same to farmers at competitive prices. The same organizations can add value to farmers' produce, transport in bulk thus reducing the overall cost of marketing to the farmer. Some farmers' organizations have been organized in the form of women groups that address various problems facing members, including access to credit and marketing of produce. More often, they work together with some NGOs, government departments and development partners.

11.5 Credit

Small farmers face serious problems with respect to access to credit. This is because formal banks are usually reluctant to lend to risky agricultural ventures. Moreover, the commercial banks are usually not willing to take land as collateral. This is partly because it is difficult to dispose off the land in case of default. Small farmers are also not keen to give land as collateral because of fear of losing it in case of default. During 1960s and 1970s, farmers had access to credit and insurance through the GMR lending programme implemented through the AFC. The AFC provided credit to farmers to produce maize and wheat under this programme, whereby in case of crop failure arising from natural calamities such as drought, farmers were guaranteed some minimum returns, payable through the AFC. Loans were also extended for general farm investments. The scheme faced problems in the 1990s, but the government is looking into modalities of reviving the programme.

Cooperatives have also played an important role in credit provision especially through the rural Savings and Credit Cooperatives (SACCOs). Furthermore, private micro-financial institutions have also been started in various parts of the country for rural banking and credit provision. The micro finance institutions are increasingly becoming important as they offer packages that are suitable to the needs of small borrowers.

11.6 Marketing information and facilities

Market information is an important service to farmers. Most large exporters of horticultural produce have ready access to information for export markets through the Internet. Information flows from supermarket chains in the major markets in Europe and elsewhere and are also readily accessible to large horticultural producers. At the local level, the MOARD through radio and local newspapers provides wholesale prices especially for food commodities. This however does not reach all farmers and traders. Some farmers therefore rely on information from other farmers and extension staff.

A major problem also faced by farmers is post-harvest losses. Farmers lack appropriate storage facilities and the usage of pesticides to reduce the impact of storage pests has been on the increase. Mostly local authorities provide marketing facilities, while storage facilities at farm level and market level are a responsibility left to farmers and traders, respectively. Some perishable agricultural products such as cut flowers and other horticultural crops require refrigerated trucks and cold storage facilities to increase the shelf-life and reduce post-harvest losses. These are expensive facilities that are mainly owned by large-scale farmers and exporters. However, the HCDA has developed seven cold storage facilities for horticultural crops in strategic parts of the country to assist small-scale farmers store products for the market. They also have refrigerated trucks to ferry the products to the airport for export.

12. Farm survey results

Farm level analysis was undertaken using data collected from 34 farmers who were purposely but systematically selected from four divisions in the Kiambu district of Kenya. This section presents the results from the survey.

12.1 Farmer characteristics

The characteristics of the sampled farmers are shown in Table 10. Most of the farmers (79.4 percent) were over 40 years old. The level of education for most farmers (38.2 percent) was over 9 years, which was beyond primary level of education. About 58.8 percent of the farmers owned the land, while 32.4 percent used family land for agricultural activities. Land renting and leasing is also practiced in the area. Most farmers (69.6 percent) had annual income of over US$400, meaning that the majority of farmers in this area had an income which was higher than Kenya's per capita income, estimated at US$340. The majority of farmers (about 82.4 percent) in this region were full time farmers and about 47.1 percent of the farmers practiced commercial farming. Most of the farmers (67.6 percent) also operated one plot.

Table 10: Farmer characteristics in the Kiambu district, Kenya

Attribute	Number	Percentage
Gender		
Male	20	58.8
Female	14	41.2
Age		
25 to 40 years	7	20.6
40 to 55	13	38.2
Over 55	14	41.2
Education		
1 to 8 year	10	29.4
Over 9 years	13	38.2
Technical training	4	11.8
Agriculture training	7	20.6
Land Tenure		
Own land	20	58.8
Rented	2	5.9
Leased	2	2.9
Family land	11	32.4
Income level/year		
Less US$400	10	29.4
US$401 to 800	13	38.2
Over US$800	11	32.4

Source: Survey data

12.2 Farming practices

The average farm size ranges from 0.5 to 20 acres, indicating that this area is typically occupied by small-scale farmers (see Table 11). The majority of sampled farmers grow vegetables (70 percent), cut flowers (56 percent) and maize (50 percent). A few farmers grow dry beans (35 percent), tea (14 percent), spices (8 percent) and pyrethrum (6percent). Other crops grown include millets and fruits. Tea, which is a traditional export crop in Kenya, dominates with an average area of 5.4 acres per farmer. This is followed by non-traditional export crops, cut flowers and vegetables with a mean area of 1.5 and 1.1 acres, respectively. The food crops (maize) have an average area of 1.2 acres. Farmers in this area grow both traditional export crops and non-traditional export crops and a wide range of industrial crops for cash, while they also grow food crops, mainly maize and millets. Thus, farmers in this area have diversified agricultural activities.

Table 11: Crops grown in the Kiambu district, Kenya

Crop	Proportion of farmers growing (%)	Minimum area (acres)	Mean area (acres)	Maximum area (acre)
Tea	14	.75	5.4	15.0
Vegetables	70	0.13	1.1	10.0
Cut flowers	56	0.13	1.5	14.0
Maize	50	.25	1.2	3.0
Dry beans	35	0.25	0.83	3
Spices	8	0.25	0.25	0.25
Pyrethrum	6	0.25	0.5	0.75

Source: Survey data

Although farmers grow a wide range of crops, they tend to give a priority to selected crops. The most preferred crops in the area are cut flowers and vegetables, which are most preferred by 38.2 percent and 32.4 percent of the farmers respectively. A major determinant on the choice to grow the crop is how easy it is to market or trade the crops as reported by about 85.3 percent of the farmers. Crops are also selected on the basis of their use for home consumption.

Apart from growing crops, the farmers in the area keep livestock. The main types of livestock kept are cattle (64.7 percent of the farmers); poultry (20.6 percent of farmers) and sheep and pigs by 3 percent of the farmers. The livestock are kept to provide products for home consumption, as well as for sale.

12.3 Input use

Farmers use purchased inputs in producing their crops and other commercial farming practices (see Table 12). About 97.1 percent of the framers use fertilizers. The widely used fertilizer is diammonium phosphate (DAP) followed by calcium ammonium nitrate (CAN) and compound fertilizers. Most farmers (79.4 percent) use improved seed varieties, while only 20.6 percent use local varieties. The level of use of insecticides, fungicides, herbicides and tractors is however low as shown in Table 12.

Table 12: Commercial farming practices in the Kiambu district

Attribute	Number of farmers	Percentage
Use of fertilizer	33	97.1
Use of insecticides	25	73.5
Use of fungicides	15	44.1
Use of herbicides	9	26.5
Use of tractor	4	11.8
Use of improved seed	27	79.4
Keeping records	16	47.1

Source: Survey results

The main sources of inputs are local stockists where all the farmers reported to purchase inputs from. Only about 29.4 percent of the farmers reported encountering problems in accessing inputs when required. The major problem was related to transport costs.

Most farmers, about 64.7 percent, use hired labour regularly and about 67.6 percent of the farmers reported that availability of hired labour is a constraint in farming. The main problems with hired labour are cost for 39.1 percent of the farmers, and unavailability and seasonal fluctuations for 30.4 percent of the farmers.

About 47.1 percent of the farmers keep records on the farming business. The main reasons why most farmers do not keep farm records are lack of knowledge,(64.7 percent) and are unaware of the benefits, (35.3 percent).

Institutional issues

The major concerns with respect to institutional set up for farming are credit availability, agricultural education and extension, and marketing of products.

12.4 Credit

Only about 29.4 percent of the farmers reported to have used credit. The sources of credit are mainly farmer cooperative societies, where only 23.5 percent of the farmers had sourced credit, about 2.9 percent of the farmers sourced credit from commercial banks and 2.9 percent from NGOs. Among the framers who had accessed credit, about 18 percent were dissatisfied with the credit received. In general, farmers were dissatisfied with credit access because of its high interest rates and repayment schedules.

12.5 Agricultural extension and education

The major organizations that provide extension services to farmers in the area are the MOARD, the Kenya Tea Development Authority and the Pyrethrum Board of Kenya. The type of information from these organizations is mainly on training on improved farming methods, product information and pest disease control. Market information was only mentioned by 2.9 percent of the framers. About 82.4 percent of the framers had had some training in farming and all of them indicated that such training was useful. For farmers who have had no training in farming, about 11.8 percent were aware of the training.

12.6 Export marketing

About 88.2 percent of the farmers were involved in growing crops for the export market, mainly flowers, vegetables and spices. They indicated that export marketing is very important for income generation (76.5 percent of the farmers) and job creation for only 11 percent of the farmers. About 91.2 percent of the farmers believe that exporting non-traditional crops (flowers, vegetables and spices) offers them an opportunity for earning a reasonable standard of living. The major determinant of prices they sell their products for is the information from the MOARD and buying agents. Only 8.8 percent of the farmers indicated that they use cost information as part of setting producer prices. The farmers (82.4 percent) indicated that producer associations should play a leading role in the export of non-traditional crops. About 94.1 percent of the farmers appreciate the need for maintaining standards required by non-traditional crops.

12.7 Agricultural development

The major needs by farmers to improve agricultural development are access to credit (44.1 percent), farmer training (26.5 percent), support to farmer organizations (11.8 percent), better transportation (5.9 percent), market information (5.9 percent) and provision of production inputs (5.9 percent). About 73.5 percent of the farmers also indicated that the government should take the lead in agricultural diversification. A major factor that farmers believe can improve agricultural production is better access to markets (41.2 percent of the farmers), better producer prices and capital or credit for production for about 29.4 and 26.5 percent of the farmers, respectively.

13. Conclusions

This study had three main objectives namely; providing information for improving producer capacity to respond to market changes, to provide policy guidelines for institutional support for diversification into export production, and to understand small farmer response to market incentives for export production and corresponding support needs.

Kenya's land has a potential to produce a diversity of agricultural commodities. These range from food crops, industrial crops, export crops and livestock products. Livestock production covers the largest area estimated at about two thirds of Kenya's arable land, however livestock products are mainly used within the country with very little exports. This is mainly because of constraints related to domestic disease control measures, which do not make it possible for the products to meet international standards. Among crops, food crops cover the largest area followed by traditional export crops (coffee, tea and sisal), horticulture and then industrial crops. The major export crops from Kenya are tea, horticulture and coffee. Horticulture crops comprising of fruits, vegetables and flowers are the non-traditional crops.

Small-scale farmers account for over 75 percent of the total agricultural production and their contribution towards marketed production has been on the increase. Within the export sector, small farmers account for about 65 percent of coffee production, 50 percent for tea and 45 percent of horticultural crops. Agricultural production has shown mixed trends with most commodities particularly food crops and industrial crops showing a decline in production and so is the case for coffee among export crops, while tea and horticulture production has been on the increase. The changes in production are attributed to area expansion or contraction, climatic factors, technological changes and prices. Policy changes, particularly poor sequencing and implementation of policy reforms have also affected performance of the sector.

Kenya's exports are dominated by agricultural products, which account for about 53 percent of the total exports. Among agricultural exports, the leading commodities are tea, horticulture, coffee and pyrethrum. The non-traditional crops (horticulture) exports have shown a good performance in recent years, caused by the removal of restrictive trade policies in export markets particularly in the EU markets under the ACP preferential trade arrangements. Food commodities (maize, wheat and rice) dominate agricultural imports to Kenya. Most of these are imported from developed countries.

Smallholders face challenges in the production and marketing of agricultural commodities for export markets. They lack credit, inputs and technical capabilities and suffer from logistical constraints such as transport, haulage and cold storage facilities. Sometimes, the growers organize themselves into groups to try and overcome the constraints they face, while some grow crops on contract for large growers. The large growers provide finance and technical support in production and grading of the contracted horticultural produce.

The government has over the years formulated policies that aim at promoting smallholder farming. Before policy reforms started in the 1980s, support was given in terms of provision of extension services, formation of cooperatives, statutory boards and farmer associations to enhance access to inputs and market, and through the AFC. These provided incentives to farmers who increased the level of production. However, poor governance in most of the marketing statutory boards and cooperatives reduced the expected benefit to farmers, thereby leading to the near collapse of some industries such as dairy and cotton.

Small farmers face many constraints in production for commodities for the export market which include, reliance on rain-fed agriculture which is unreliable, high costs of production, low technology availability and use, access to credit, marketing and storage facilities and low capacity to meet standards required in international markets. Institutional guidelines required to relax these constraints include:

Agricultural research: Agricultural research development, which includes plant and animal research, should focus on the development of appropriate technologies for production, harvesting, processing, storage, and marketing. Institutions (public, private and international) involved in research should be strengthened to develop and disseminate appropriate technologies that are required by farmers.

Extension: Farmers require access to information on research breakthroughs, marketing and appropriate crop and animal husbandry. The government is the main provider of extension services to farmers. Some NGOs and church organizations also provide extension services while the private sector particularly large horticultural export growers also provide extension to farmers through contract farming. These institutions should enhance their efforts to support small farmers. Close linkages between research and extension are also required to ensure effective adoption of technologies.

Farmers' organizations: Smallholder farmers dominate agricultural activities, which necessitates a mechanism to assist many producers in accessing inputs or market their produce in an organized manner. The organizations allow farmers to enjoy economies of scale. Such organizations can be in the form of cooperative societies or farmer groups, to bulk purchase or even directly import inputs and avail the same to farmers at competitive prices. The same organizations can also be used to add value to farmers' produce, which can increase the farmers' income.

Credit: Small farmers face serious problems with respect to access to credit. This is because commercial banks are usually reluctant to lend to the risky agricultural ventures. Moreover, the commercial banks are usually not willing to take land as collateral. Institutions involved in credit provision, which includes public government organizations, commercial banks, cooperative societies, and microfinance institutions should increase the support to small farmers. Cooperatives in particular can play an important role in credit provision, especially through the SACCOs. Furthermore, microfinance institutions are increasingly becoming important as they offer packages that are suitable to the needs of small borrowers.

Market information and facilities: Market information is a major consideration in export marketing. However, this is a major constraint for small farmers. Systems such as public support to market information centres are important for farmers. Linkages between small and large farmers in marketing of export produce will also improve information flows to small farmers. A major problem also faced by farmers is post-harvest losses. Therefore there is the need for the development of appropriate storage facilities for farmers and the provision of information on the use of chemicals to reduce the impact of post-harvest losses. Some perishable agricultural products such as cut flowers and other horticultural crops require refrigerated trucks and cold storage facilities to increase the shelf-life and reduce post-harvest losses. These are expensive facilities and public support may be required in this area.

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