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**USAID Kenya Business Development Services Program  
(Kenya BDS)**

**Contract No. 623-C-00-02-00105-00**

**Deloitte Touche Tohmatsu Emerging Markets, Ltd.**

**Kenya BDS Tree Fruits Sub-Sector  
BASELINE SURVEY REPORT**

**August 2003**



A USAID Funded Activity Managed by Deloitte Emerging Markets

**Deloitte  
Touche  
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## List of Acronyms

CBS	Central Bureau of Statistics
CDA	Coast Development Authority
FGD	Focus Group Discussion
GTL	Genetic Technologies Limited
GTZ	Germany Technical Cooperation
ICRAF	International Centre for Research in Agro-forestry
JKUAT	Jomo Kenyatta University of Agriculture and Technology
HCDA	Horticultural Crop Development Authority
KARI	Kenya Agricultural Research Institute
KEPHIS	
KHPHC	Kenya Horticultural Produce Handling Company
NALEP	National Agricultural and Livestock Extension Program
NGO	Non-governmental Organisation
MOARD	Ministry of Agriculture and Rural Development
MSE	Micro and Small-scale Enterprise

## Executive summary

This report provides important baseline information on smallholder growers of tree fruits (Mangos, Avocados, and Passion) in three provinces, namely: Coast, Eastern, and Central province. Of the 91 smallholder tree fruit growers interviewed, about a third (31.9%) were women. This number is very consistent with the number of female-headed households nationally.

The tree fruits sub-sector is one of three sub-sectors identified by the Kenya BDS (Business Development Services) program, a five-year micro- and small-scale Enterprise (MSE) initiative funded by USAID/Kenya expected to contribute to:

- Increased household incomes
- Growth of final sales in selected sub sectors
- Increased outreach and sustainability of BDS activities offered by multiple providers to large numbers of micro-enterprise clients
- A better skilled and more competitive MSEs sector

The baseline is part of Kenya BDS's strategies to track and monitor the impact of the program, and was specifically required to:

- establish the total number of MSEs currently accessing commercial business services;
- establish the total number of business service providers currently operating in Kenya in BDS program target areas; and
- identify and enumerate the total number of MSE producers linked with the commercial market.

In the context of Kenya BDS, an MSE refers to any smallholder farmer in the tree fruit sub sector, defined as any enterprise with between one to 50 employees. Secondly, business services refer to any of the following range of services purchased at non-subsidised cost:

- Product assembly and grading (market linkages)
- Financial brokering
- Quality control (extension services, post-harvest handling, etc)
- Research and development
- Material input supply
- Appropriate technology
- Market information; and
- Business skills training for smallholder farmers

Lastly, a business service provider is any entity that provides a business service commercially.

The survey was carried out in six districts of Muranga and Thika (in Central province), Embu and Meru South (in Eastern) and in Kwale and Kilifi (at the Coast). These are some of the districts leading in the production of Mangos, Avocados, and Passion fruits in the provinces.

A total of 91 MSEs were interviewed using an open-ended questionnaire. In addition to the individual interviews, four Focus Group Discussions were held with 43 MSEs at the districts. Key Informant interviews with Ministry of Agriculture staff were very instrumental in guiding the research team on sampling sites and mobilising MSEs for the FGDs.

Because there is no existing information on the number of MSEs growing tree fruits, both primary and secondary data have been used to estimate the total number of MSEs in the three provinces. The following questions were very instrumental in obtaining relevant information to address the survey objectives:

- Does the MSE obtain any external support or services in growing and taking care of the tree fruits?
- If so, from whom?
- Which of these external services did the MSE pay for, and what was the total cost?

The answers to these three questions were intended to help establish whether the market for business services exists in the production of the three tree fruits, namely: research and development, material input supply, and advisory services. And if so, who are the players.

The second set of questions were concerned about the distribution and marketing side of the sub sector, namely: product assembly and grading, processor financing, quality control, appropriate technology, market information, and business skills training for smallholder farmers:

- Are the MSEs producing more fruits than is consumed by their households?
- How does the MSEs' household sell the balance of fruits not consumed to the market?
- Do any of the MSEs have any supply contracts for the fruits produced?

The three questions were intended to establish the number of MSEs with direct links to the commercial markets, and hence provide the answers to the second baseline survey objective.

Lastly, the following third set of questions were intended to establish the number of commercial service providers presently involved in both the production and marketing of the tree fruits:

- Who currently provides any type of service to the MSEs, either in producing or growing the tree fruits?
- How many such commercially oriented business service providers exist in each of the survey districts?
- What specific services do they provide?

Because the typical smallholder grows tree fruits scattered and isolated throughout their holdings, getting an accurate estimate of the acreage under the fruits proved problematic except for the better endowed MSEs, who tended to be larger than the typical MSEs. Accordingly, a special effort was made to obtain more reliable estimate of the typical acreage under the three tree fruits from Ministry of Agriculture technical staff. This process was greatly assisted by existing literature.

From both the baseline survey and data provided by the Ministry of Agriculture experts, the typical tree fruit orchard (with trees mostly scattered throughout the farm holdings) is clustered around the following sizes:

- Passion fruit, 0.125 acres per orchard
- Avocado, 0.25 acre per orchard
- Mangoes, 0.25 acres per orchard

The total number of MSEs in Kenya BDS target provinces is thus computed by applying the typical orchard size to the total acreage under the different tree fruits. By applying the typical MSE acreage for each tree fruit to their acreage Table 3.1, the total number of MSEs in the tree fruits sub sector in Central, Eastern, and Coast provinces as at the end of 2002 was 198,004. Of this number, about a third (59,401 MSEs) belong to female-headed households. This survey did not find any statistically significant gender differences in access to business services or commercial markets.

SUMMARY OF FINDINGS	NUMBER	MSES BELONGING TO FEMALE-HEADED HOUSEHOLDS
Total MSEs in the tree fruits sub-sector	198,004	59,401
Total number of MSEs currently accessing commercial business services	75,642	22,693
Total number of business service providers currently operating in Kenya in BDS program target areas	598	N/A
Total number of MSE producers linked with the commercial market.	6,138	1,841

The survey has found that an estimated 75,642 MSEs have accessed commercial business services in the last three years, with only 38.2 per cent commercially purchased. About 6,138 MSEs are directly linked to the market. Of this number, about a third of the MSEs directly linked to the market belong to female-headed households.



# I. Introduction

The Kenya BDS (Business Development Services) is a five-year Micro- and Small-scale Enterprise (MSE) development programme funded by USAID and implemented on the ground by Deloitte and Touche Emerging Markets Division.

The programme aims to increase MSE's access to commercial business services in selected high growth sub sectors, such as the tree fruits sub sector, which is one of three sub sectors identified for support.

## 1.1 Survey objectives

The baseline survey is intended to provide baseline information on the tree fruit sub sector that USAID/Kenya, the funding organisation, can refer to after its interventions to measure the impact of its program. The survey was specifically intended to:

- Establish the total number of MSEs currently accessing commercial business services;
- Establish the total number of business service providers currently operating in Kenya in BDS program target areas; and
- Identify and enumerate the total number of MSE producers linked with the commercial market.

In the context of the USAID Kenya BDS, MSEs refer to smallholder farmers in the tree fruit sub sector, defined as any enterprise with between one to 50 employees.

Secondly, business services refer to any of the following range of any services purchased at non-subsidised cost:

- Product assembly and grading (market linkage)
- Financial brokering
- Quality control (extension services, post-harvest handling, etc)
- Research and development
- Material input supplier
- Appropriate technology
- Market information; and
- Business skills training for smallholder farmers

Lastly, a business service provider is any entity that provides a business service commercially. Business service providers are suppliers of any service that directly or indirectly supports the production and marketing and distribution of a particular product or groups of related products, in the case of this survey tree fruits.

The distinction between a commercial and non-commercial production of a tree fruit is based on whether the farmer is growing the trees with the intention of selling the fruits (beyond subsistence). This is likely reflected in the care and extent to which the farmer is ready to purchase business services to maximise his/her returns.

## 1.2 Sampling and survey sites

The survey was carried out in Central, Eastern, and Coast provinces of Kenya, the Kenya BDS program target areas where the tree fruits sub sector is most developed and commercialised.

The three provinces happen to be leading in the production of Mangoes, Avocados, and Passion fruits nationally (Table 1.1). In 2000, for example, the Central province produced the most Avocado fruits, accounting for 35 per cent of the total national output (or 18,090 metric tons), while Eastern province produced 29 per cent (or 15,232 metric tons). In the same year, the Coast province, which produced just one per cent of Avocados nationally, was the one that produced the most Mangoes in

the country, accounting for 39 per cent. Eastern province was second in the production of Mangoes in 2000, accounting for 32 per cent of the year's output; and also produced the most Passion fruits.

Table 1.1—Fresh fruits production by Region in 2000

Fruit	Central	Coast	Eastern	Western	Nyanza	R/Valley	N/Eastern	Total
Mangoes	5,999	43,845	35,546	5,598	14,579	5,553	1,488	112,608
Avocados	18,090	544	15,232	5,872	7,357	4,792	..	51,887
Passion	2,771	113	6,903	2,361	6,742	3,792	..	22,682

Source: Ministry of Agriculture and Rural Development, 2000 Horticulture Division Annual Report

Because the Kenya BDS program target area for the tree fruit sub sector is large, covering up to 24 districts (Table 1.2); it was necessary to adopt a two-stage sampling process to narrow down the possible survey sites to a manageable size. In this process, the first step in sampling was achieved by selecting a reasonable number of districts that could be studied over the time allowed, and areas that could also accurately reflect the production and marketing supply chain of the sub sector in the target areas.

The districts where the tree fruits are grown in large quantities nationally are the following:

- For Mangoes, the districts are: Kilifi, Kwale, Malindi, Machakos, and Lamu
- For Avocados, the districts are: Kiambu, Thika, Embu, Machakos, Maragua, Muranga, Nyeri, and Taita Taveta; and,
- For Passion fruits, the leading districts are: Thika, Nyeri, Kiambu, Muranga, Embu and Meru.

Table 1.2—Number of Districts in Kenya BDS targeted provinces

Central province	Eastern province	Coast province
Nyandarua	Meru Central	Kilifi
Nyeri	Meru South	Kwale
Thika	Meru North	Lamu
Kirinyaga	Mbeere	Malindi
Maragua	Embu	Tana River
Kiambu	Mwingi	Taita Taveta
Muranga	Isiolo	Mombasa
	Machakos	
	Makueni	
	Tharaka	
	Kitui	
	Moyale	
	Marsabit	

Source: Kenya Economic Survey 2002

Within each province, the sampling of a few but representative districts was facilitated by the knowledge that the production of these fruits is more established in some districts than in others, namely: Thika, Kiambu, and Muranga, in Central province. The other districts where the production of these tree fruits is relatively well established are Meru South and Embu districts, in Eastern province, and Kwale and Kilifi districts, in the Coast province.

Secondly, in sampling the districts for survey, the logic that the most number of commercial business service providers is likely to be found where the production of these tree fruits is most commercialised was taken into account. Other things being equal, the reverse of this logic is also true: that the production of the three tree fruits commercially is only possible where a market for them is relatively well established.

The third and last logic for the sampling adopted for the baseline survey is that the distribution and marketing supply chain of each of the three tree fruits is identical or nearly identical in

structure, relationships, and character. This, indeed, was found out to be the case in the March 2003 Market Assessment of Business Services for the tree fruits sub sector<sup>1</sup>.

Accordingly, the following districts were sampled for detailed study over a period of three days in each province:

- Thika and Muranga in Central province
- Meru South and Embu in Eastern province, and
- Kwale and Kilifi

These six districts account for a significant volume of the three tree fruits produced in the provinces.

Finally, within each of the districts selected, actual interviews were carried out at randomly selected administrative units known as locations based on the production and market intelligence provided by Ministry of Agriculture personnel. The specific sites in each province are described in the following paragraphs.

#### Central province

The total number of farm families in Central province was 743,795 in 2000. Unfortunately, no information exists on how many of these units grow the tree fruits, but Muranga and Maragua districts have the most hectares under Mango production in the province, while Thika leads followed by Maragua in Passion fruit. Thika also has the most hectares under Avocados. Hence, in Central province, the survey was carried out in Thika and Muranga districts, taking into account the distances and hectares under the tree fruits.

Table 1.3—Central Province tree fruits acreage (ha) and production (in metric tons) in 2000

District	Passion Fruit		Avocado		Mangoes	
	Ha	Tons	Ha	Tons	Ha	Tons
Nyandarua			..	..	..	..
Kirinyaga	16	96	217	705.3	136	594
Kiambu	18	185	133	2,660	7	140
Nyeri	28	336	95	760	40	400
Muranga	20	160	..	..	376	1,200
Thika	200	1,600	240	2,880	35	595
Maragua	88	394	..	..	120	3,190
<b>Total District Production</b>	<b>370</b>	<b>2,771</b>	<b>685</b>	<b>7,005.3</b>	<b>714</b>	<b>6,119</b>

Source: Survey data, July/August 2003

The main tree fruit growing areas in Muranga District are the following:

- Mangoes: in Kiharu Division, Gikindu Location
- Passion Fruits: in Mathioya Division, Gitugi Location
- Avocados: in Kahuro Division, Mugoini Location

Tree Fruit	Hectares	No. Trees
Local Mango	148	14,818
Grafted Mango	5	519
Local Avocado	96	9,609
Grafted Avocado	138	13,821
Local Passion	2.2	3,557
Grafted Passion	1.1	1,792
<b>Total</b>	<b>390.3</b>	<b>44,116</b>

The Kiharu Division has four locations with 18,948 households and a total population of 119,694 persons. According to the Division Home Economic Officer and Division Soil Conservation Officer, interviewed in the absence of the Divisional Agricultural Horticultural Officer, Kahuhia location produces the highest quantity of Mangoes, Avocado, and Passion fruits in the district. The typical number of trees and acreage under the

three tree fruits are summarized in the table below:

According to this survey, the tree fruit growing "MSEs tend to be concentrated in specific geographical locations that form incrementally large tree fruit growing locations (page 11)". The report also notes (in page 5) that farmer groups are generally homogenous with respect to their service acquisition".

In Thika District, Gatanga Division produces most of the three tree fruits in the district. Within the district, interviews were carried out in Thika Location (which produces most Avocados) and Gathamyanga where most Passion and Mango fruits are produced (Table 1.4).

Table 1.4—Production (tons) of Mangoes, Passion, and Avocado fruits in Thika District

Division	Passion Fruit	Avocado	Mangoes
Gatanga	1000	400	152
Kamwangi	280	480	184
Gatundu	160	240	100
Thika	30	100	280
Ruiru	16	50	90
Kakuzi	24	16	330
<b>Total District Production</b>	<b>1,510</b>	<b>1,296</b>	<b>1,196</b>

Source: Ministry of Agriculture Annual report

Thika district has a total of 117, 874 farm families, and an approximately 50 hectares of the land is used for growing Mangoes, 25 hectares for Avocados, and around three hectares for growing Passion tree fruits.

#### Eastern province

As at the end of 2002, about 4,668 hectares of land were under Mango tree fruit production in the Eastern province and 1,295 hectares under Avocados. The area under Passion fruit by the same date was 965 hectares.

Within the province, Embu and Meru South districts, which were sampled for the baseline survey, are leading in the production of the three tree fruits.

Embu district has five divisions and a total of 14 locations. The divisions are:

- Kyeni, with three locations
- Runyenjes, with three locations
- Nembuve, with three locations
- Central with two locations
- Manyatta, with three locations

The district produced about 1,397.4 metric tons of Mango fruits, 3,505 metric tons of Passion, and 2,090 metric tons of Avocado fruits in 2002. According to the information provided by the District Horticulture Officer, there has been a drop in the production of Mangoes, which is down by as much as 80 per cent.

Within the district, most of the Mangoes are produced in Karurumo location, whereas most Avocados and Passion fruits are produced in the Kyeni location. Because of time, however, the survey was carried out only in the Karurumo location, which also produces both Mangoes and Avocados in large quantities in the district. This partly explains why the 11 MSEs participating in the FGD at the Karurumo Primary School happened to be growing both of the two tree fruits.

The Meru South district has five divisions, 25 locations, and 76 sub-locations, and an estimated 1999 population of 205,252 persons.

Division	Population	No. of Households
Chuka	53,063	10,400
Igamba Ng'ombe	23,309	4,080
Magumoni	32,544	6,000
Muthambi	31,981	5,900
Mwimbi	64,355	12,060
<b>Total</b>	<b>205,252</b>	<b>38,440</b>

The total area under Avocado production in the location is 138 hectares, while Mangoes and Passion trees each occupy 265 and 128 hectares. In Meru South district, most of the Mangoes are produced in the lower, drier

zone (Igamba Ng'ombe location) while Passion trees are found mostly in the upper, relatively wet zone towards Mt. Kenya (Mugumoni). Avocados are found throughout the district but the total trees and area under the fruit is limited.

According to the District Horticultural Officer, about 147 hectares are under Mango tree fruits. The total Mango output in the district has dropped in the last three years, from 1,540 metric tons in 2001 to just 170 tons in 2002.

As earlier mentioned, the production of Avocado in the district is scattered in three of the four divisions, namely: Chuka, Mwimbi, and Magumoni Divisions. About 51 hectares of the land in the district is under avocado growing. The District has a high potential for avocado growing, however, because of declining and unpredictable marketing, the production of this tree fruit has also steadily declined since 1997.

It is in the production of Passion fruits where there has been an increase in output in the district, with the quantity increasing from 181.6 metric tons in 2001 to 220.2 metric tons in 2002.

### Coast province

In Kwale, the Key Informant interview was with the District Soil and Water Conservation Officer, who was the only Ministry of Agriculture Official then on duty. According to the information provided by the Officer, the district's population was 496,133 people in 1999.

Division	Population	Households
Matuga	72,377	14,425
Msambweni	211,814	43,622
Kubo (Shimba Hills)	48,769	8,620
Samburu	91,011	14,020
National Park	135	50
Total	496,133	92,594

It was not possible to get information on the total number of Mango, Avocado, and Passion trees in the district, or the farms growing them; however, the total acreage of land under Mango production in the district was reported as 2,874.4 hectares.

The production of Avocado in the district is very limited, and is hardly monitored by the Ministry. The variety of Mangoes grown in the district is largely the Apple and Ngoe type. For Passion, the main variety grown is the Yellow variety.

Kilifi district is one of the major producers of Mangoes in the Coast province. The district had a total population of 550,000 people and 63,862 farm families in 1999.

Division	Households
Bahari	7,410
Chonyi	16,234
Kikambala	7,700
Bamba	4,409
Ganze	425
Vitangeni	3,944
Kaloleni	2,000
Total	63,862

About 1,280 hectares of the land in the district is under the Mango tree fruit, with a yield of 10 metric tons per hectare. Passion tree fruits are also grown in the district, covering about 15 hectares of the land.

The production of Mango fruits in the district is highest in the Kikambala and Bahari Divisions, while Passion is produced on a larger scale in Chonyi division.

### 1.3 Data type and collection

#### Data type

Both secondary and primary data were collected to achieve the survey objectives (see Annex 2). About 89 MSEs were interviewed individually using an open-ended questionnaire, while 41 MSEs participated in Focus Group Discussions (FGDs) in Embu (11), Meru (four), Kwale (15), and Kilifi (11) districts.

The Key Informant and FGD discussions were particularly helpful in establishing the quality of existing services in the sub sector. The Key Informant interviews with District and Division-level Agricultural, Horticultural, and Crop Development Officers were particularly helpful in selecting survey sites and mobilising MSEs for FGDs. Indeed, much of the information on the involvement of the local populations in growing the tree fruits, total acreage under the three trees, and factors

influencing the production of the fruits such as service providers and also market for the fruits were obtained through these Key Informant interviews.

As earlier mentioned, the production, distribution, and marketing supply chain of the three tree fruits are remarkably similar, as is evident from the FGD notes (see Annex 1).

Table 1.5—Actual survey sites by District

District	MSEs	Mangoes	Avocado	Passion
Muranga	18	15	8	4
Thika	16	7	12	10
Embu	16	13	12	3
Meru South	8	7	7	1
Kilifi	14	14	0	2
Kwale	17	16	0	7
Total	89	72	39	27

Source: Survey data, July/August 2003

The answers to the survey objectives were generated by a series of key questions put to the respondent MSEs and Focus Groups. The first set of these questions comprised of the following:

- Does the MSE obtain any external support or services in growing and taking care of the tree fruits?
- If so, from whom?
- Which of these external services did the MSE pay for, and what was the total cost?

The answers to these three questions were intended to help establish whether the market for business services exists in the production of the three tree fruits, namely: research and development, material input supply, and advisory services. And if so, who are the players.

The second set of questions were concerned about the distribution and marketing side of the sub sector, namely: product assembly and grading, processor financing, quality control, appropriate technology, market information, and business skills training for smallholder farmers:

- Are the MSEs producing more fruits than is consumed by their households?
- How does the MSEs' household sell the balance of fruits not consumed to the market?
- Do any of the MSEs have any supply contracts for the fruits produced?

The three questions were intended to establish the number of MSEs with direct links to the commercial markets, and hence provide the answers to the second baseline survey objective.

Lastly, the following third set of questions were intended to establish the number of commercial service providers presently involved in both the production and marketing of the tree fruits:

- Who currently provide any type of service to the MSEs, either in producing or growing the tree fruits?
- How many such commercially oriented business service providers exist in each of the survey districts?
- What specific services do they provide?

#### Constraints and challenges

The biggest challenge during the entire 10 days of fieldwork was being able to identify survey sites where the productions of all the three tree fruits are well developed. In districts like Meru, where Mangoes were more common at one end of the district, while Passions were at the other opposite end, it was extremely difficult to carry out the survey on both sites because of lack of adequate time in the district of approximately a day and a half and the distances involved. In this district also, the MSEs that are seriously involved in the production of the tree fruits live elsewhere outside the district and few were on site at the time of the survey. Consequently, the district's sample is very limited.

As for the quality of information obtained, the size of the MSEs measured by number of trees and acreage was considered a critical source of information to confirm their status, since the Kenya BDS program is only targeting firms within this size category. However, while it was easy for the MSEs to readily and accurately report the number of tree fruits in their farm units, this was not the case with the acreage under the trees as these are generally planted individually in different spots around the homesteads or farm units. Yet this information was needed to develop stylised profiles of the MSE's sizes. The MSEs responding to this question accurately were the more organised, and better educated producers, hence the acreage are positively skewed.

Secondly, estimating the total production of each fruit per season proved difficult, as most farmers do not record their harvests; nor the quantity of the fruits wasted or consumed by the MSE's household. This information had been intended for use in estimating the proportion of the fruits produced that is offered by the MSEs to the market in each season, and especially to explore the famous argument that the markets for these fruits are poorly developed because of the low volumes produced.

The third and last major challenge was in getting reliable estimates of the time each MSE allocates to the tree fruits, a piece of information that was intended to explore the extent to which the production of these trees is truly commercialised. Unfortunately, majority of the MSEs interviewed were able to simply mention the activities involved in the production; such as planting, weeding, grafting, watering, application of chemicals, pruning, and harvesting, but were not able to quantify accurately the time spent by them in such activities.

These constraints and challenges have particularly forced the research team to use secondary data in estimating the number of MSEs based on reported acreage for each tree fruit.

## II. MSE's baseline Characteristics

### 2.1 Production of fruits at the individual MSE level

Notwithstanding the lack of a well-developed market for business services in the production of tree fruits, the average number of trees planted varies from 66.6 for Mangoes to 12 and 257 for Avocados and Passion fruits.

The average MSE Mango production is 6,757 Kilograms per season, while the average for Avocados and Passion are 1,507 and 1,274 Kilograms (Table 2.1). The actual output is much higher though, as the reported quantity is only what is sold per season, and excludes what is either consumed within the household or lost in the farm due to lack of markets for the fruits.

Table 2.1—Typical MSE unit production of tree fruits

	N	Minimum	Maximum	Mean	Std. Deviation
Number of trees	71	3	1000	66.6	139.3
Acreage of Mangos	37	0.25	15.0	2.1	2.8
Kgs of Mangos harvested	67	90	52,500	6,757	10,652
Number of Avocado trees	38	1.0	60	12	11.3
Acreage of Avocado	3	1.0	1.0	1.0	0.0
Kgs of Avocado harvest	32	70	7,500	1,507.2	1,761.0
Number of Passion trees	27	2	2,300	256	533.7
Acreage of Passion trees	10	0.15	2.5	.827	0.8
Kgs of Passion Harvested	22	40	7,200	1,274.1	2,025.2
Total number of trees	75	3	80,000	1,253	9,231
Total acreage of trees	29	0.5	15.0	2.2	3.1
Age of Mango	71	2	35	13.5	8.9
Age of Avocado	38	4	24	13.1	6.2
Age of Passion	23	1	16	3.3	3.5
Cost of service (Mango)	27	100	20,000	2,574	4,043.2
Cost of service (Avocado)	10	100	1,400	565.00	405.60
Cost of service (Passion)	7	250	5,000	2,064.30	2106.3
Kgs of Mangos consumed by household	62	3	20,000	2,714.3	3,689.4
Kgs of avocado consumed by household	26	200	3,000	903.5	703.8
No of commercial service providers known to the MSEs	62	1	5	2.0	1.0

Source: Survey data, July/August 2003

Generally, the quantity of Mangoes produced exceeds the consumption needs of the families. Of the MSEs producing Mangoes, only about a fifth (22.2%) sell less than 3,000 kilograms each of the fruit. However, much of the Avocado and Passion fruits produced is in small quantities; 43.6 per cent of MSEs with Avocado trees (per cent) sell less than 1,000 Kilograms of their output, while for Passion fruits it is 7.4 percent that sells at least 1,000 Kilograms.

### 2.2 Relative number of MSEs accessing business services

During the survey MSEs were asked if they have accessed any business services in support of their fruits production in the last six months of the year, and in the last three years. A follow up question asked them about the specific type of business services received, who supplied these services, and whether these services were purchased.

Generally, a total of 56 MSEs in the sample had received any business services in the last three years preceding the survey. However, only 38.2 per cent had actually paid for the services (Table 2.2). To the extent that the sample is representative of all the MSEs in the sub-sector, this information can be used to estimate the total number of MSEs currently accessing commercial business services in support of their fruit production.

Table 2.2—Proportion of MSEs accessing any business services

	MSEs receiving services	MSEs paying for services received
Period		
Last six months	48 (54%)	
Last three years	50 (56.2%)	
N	89	34 (38.2%)

Source: Survey data, July/August 2003

Some of these MSEs have purchased more than one business services. All in all, the MSEs purchasing services have done so more than once in the last three years. The most common service purchased by MSEs is the agrochemical from Stockists (mentioned 44.1% of the time), while about 38.2 per cent have purchased specialist services in propagating seedlings and grafting (Table 2.3).

Apart from the Ministry of Agriculture that is mentioned 43 per cent of the time as providing subsidized services to the MSEs in their production of the fruits, ordinary farmers were also providing informal services to each other as friends and neighbours (mentioned 25 per cent of the time). The other non-commercial service providers identified in the survey include:

- SIDA, which has an ongoing programme known as the National Agriculture and Livestock Extension Program (NALEP). Under this program, the Ministry is funded to provide extension services to farmers, and especially those growing passion fruits in selected focal points annually.
- ICRAF, which provides R&D Mango seedlings
- JKUAT University, which provides seedlings.
- The Horticultural Crop Development Authority (HCDA), which trains the Ministry of Agriculture staff on appropriate fruit husbandry so that they in return train farmers.

The most prominent business service providers mentioned in all the districts surveyed are:

- Individual farmers, who informally assist their colleagues by supplying seedling and informal training on different fruit variety, pests, and diseases control.
- Stockists of agrochemicals

KARI was repeatedly mentioned by the sample and in the FGDs as providing high quality seeds and seedlings for the trees in all the three provinces. GTL (Genetic Technologies Limited) was also mentioned as providing seeds and seedlings for Passion fruits but is reputedly expensive.

Table 2.3—Types of services accessed by MSEs

Services	Number (%) of MSEs purchasing services
Supply of agrochemical	15 (44.1)
Grafting/Supply of seedlings	13 (38.2)
Spacing	1 (2.9)
Technical advise	1 (2.9)
Spraying	4 (11.8)
MSEs purchasing services	34 (100)

Source: Survey data, July/August 2003

The annual cost of purchased business services range from an average of Kshs 565 for Avocados to Kshs 2,574 for Mangoes. Farmers generally spend more annually on agrochemical than on any other business service.

## 2.2 Relative number of MSEs with direct links to commercial markets

Because the MSE's produce more fruits than they can consume within their households, their links to commercial markets is important. During the survey the MSEs were asked about how they sell their excess fruits to the market. So far, just about three per cent of the MSEs responding to this inquiry have had any supply arrangements for their fruits (Table 2.4), a situation that has remained

essentially the same in the last three years. The few MSEs that have signed any supply contracts have dealt with local buyers like the Uchumi Supermarket chain and/or schools and rarely with fruit processors or the export market.

Table 2.4—MSEs with direct commercial links to the markets

Distribution and marketing	Number of times provider is mentioned	%
Local market	29	22.5
Road side	3	2.3
Hawkers/Groceries/Kiosks	9	7.0
Uchumi/local contracts	4	3.1
Total mentions	129 <sup>2</sup>	100

Source: Survey data, July/August 2003

The table above does not include any fruits sold through brokers since these agents pursue business goals that are in direct conflict with the goals of the Kenya BDS program.

### 2.3 Service providers

In order to establish the number of business service providers involved in the tree fruits sector, MSEs were asked whether they know of any in their area, location, or district. This same question was also put to the District and Divisional Agricultural staff and the MSEs participating in the FGDs. Among the providers mentioned in response to this inquiry are the Ministry of Agriculture, government marketing agencies such as the Horticultural Crop Development Authority, and MSEs' associations.

A lot of the information on service providers presented here is based on secondary sources, as the MSEs have only a limited knowledge of the supply chain. Brokers are excluded from the list (Table 2.5) because they represent a problem in the supply chain. Also excluded from the list is 3,050 Ministry of Agriculture staff, which is providing extremely valuable but informal or subsidised business services to the MSEs. The actual number of service providers is likely to be higher than is reflected in Table 2.5, as the discussion that follows indicates.

Table 2.5—Number of Service providers directly mentioned by different MSEs in the sampled districts

Providers	Number			Total	
	Coast	Eastern	Central		
Seedlings/tree nurseries (HCDA registered)		18	46	37	101
Agrochemical Stockists		140	220	120	480
Agrochemical manufacturing companies		5	5	5	5
Fruit processors		3	2	1	6
Extension/Agricultural consultants		2	2	2	6
Total		44	72	67	598

Source: Survey data, July/August 2003

#### Stockists

The total number of Agrochemical Stockists in the three provinces is based on Ministry of Agriculture Annual reports, which occasionally provide information about these providers. For example, in the 1999 Annual Ministry of Agriculture report for Malindi, the number of Stockists in the district was reported as eight. The same report indicated that the district had one dried fruits and juices Company (Ratif Farm). In Taita Taveta district alone, the number of Stockists reported (and even listed by name) was 32 according to the district's 2001 annual report. Furthermore, in a 5th March 2000 to 4th March 2001 Winrock KEPHIS/USAID Kenya report, the number of Stockists

<sup>2</sup> Brokers have been excluded from the table as their business goals are in direct conflict with the goals of the Kenya BDS program. Otherwise, the brokers were mentioned 65.1 per cent of the time.

operating in Machakos district alone over the period was reported to be 26, while in Kitui and Mwingi the number reported was 20. Nearly the same number of Stockists (19) was reported in the same source as operating in the Tharaka/Nithi district.

It would appear reasonable therefore to estimate the total number of Stockists in Eastern province at around 220, averaging about 20 Stockists per district<sup>3</sup>. In the Central province (with six districts), the total number is likely to be in excess of 120 and in the Coast province the number is also somewhere in the range of 140. These are generally very conservative estimates.

#### Agrochemical companies

The number of agrochemical companies operating in the three provinces area is five. The firms widely mentioned by MSEs include Murphy Chemicals, Twiga Chemicals, Bayer East Africa, and FarmChem. These firms provide subsidised extension services, but expect to gain financially by increasing the volume of agrochemical inputs they can supply to the agrochemical Stockists.

#### Seedlings and tree nurseries

There are up to 91 HCDA registered tree nurseries in the three provinces. Interviews with Ministry of Agriculture staff in the field indicate that the number of nurseries fluctuate a lot over time, making estimation very difficult. The estimates in Table 2.5 are hence based just on the list of nurseries published by the HCDA. The actual number on the ground could be higher as many of the operating nurseries are not registered or licensed. For instance, according to the 2001 annual Ministry of Agriculture report, Central province had 368 tree nurseries! This is almost four times the number published by HCDA in the three provinces all combined.

#### Fruit processors

The eighth edition Kenya Telephone Directory for 2000/2001 lists up to 17 fruit processors in the three provinces. Nine of these fruit processors are listed under Mombasa, two under Malindi, and one under Mtwapa. A test was carried out to confirm whether these companies are operational by calling their listed telephone numbers. After many attempts, four of the seven contacted had out-of-service lines, two had engaged lines, and one had a changed line message. It seems therefore that only a third of these companies might be actually operational.

In Central province, the only two fruit processors listed under the region are all based in Thika. One of these has since collapsed. Lastly, there are three fruit processors listed in the Directory under Eastern province. Two of these have since collapsed and are not counted among the service providers. The actual number on the ground is unlikely to be higher than this.

#### Extension services

Commercialised extension and agricultural consultancy services are rare. The number of firms providing extension listed in the eighth edition of the Kenya Telephone Directory is six, two each in every province. The actual number of providers is unlikely to be higher than this as the government is providing free but high-quality services on a relatively big scale.

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<sup>3</sup> Marsabit and Moyale Districts do not grow any tree fruits due to lack of rainfall, and are hence not included in the estimation of Stockists.

### III. The MSE numbers

This section presents the total baseline number of MSEs currently involved in the tree fruit sub sector, and is arranged around the three baseline objectives as follows:

- Total number of MSEs currently accessing commercial business services;
- Total number of business service providers currently operating in Kenya in BDS program target areas; and
- Total number of MSE producers linked with the commercial market.

The estimation approach adopted here is premised on the fact that none of the districts visited has information on the total number of MSEs involved in growing the tree fruits. Such information does not exist even at the national level. Hence, the baseline numbers reported here are based, first on the existing information on acreage of the fruits in the target provinces and, secondly, on primary and secondary data on the typical acreage of the fruits among the MSEs.

Generally, all the information obtained during the survey point out to very poorly developed markets for business services in the tree fruits sub sector. This is a widespread problem, which unfortunately can only be addressed effectively when the Kenya BDS program also intervenes in developing markets for the fruits.

#### 3.1 Estimation process

As earlier mentioned, the approach used in estimating the number of MSEs is based on dividing the total acreage under each of the crops by the typical MSEs holding under fruits. This approach seems valid because the typical tree fruit growing enterprise is the smallholder, the growers being targeted by the Kenya BDS (CTA Proceedings, 1993). Medium and large-scale orchards are very rare in the sub sector. From both the baseline survey and data provided by the Farm Management Unit of the Ministry of Agriculture, the typical tree fruit orchard (with trees mostly scattered throughout the farm holdings) is clustered around the following sizes<sup>4</sup>:

- Passion fruit, 0.125 acres per orchard
- Avocado, 0.25 acre per orchard
- Mangoes, 0.25 acres per orchard

These estimates take into account differences in tree husbandry practices, which are very closely related to the MSEs motivation in planting the trees. And acreage is a good basis for estimating the total number of MSEs, first because it considers both mature and new orchards that have just been established. Secondly, it is a generally more reliable indicator than output, as the trees once grown cannot be uprooted hurriedly.

To ensure that the typical acreage being used to estimate the number of MSEs is correct, care was taken to obtain expert opinion and experience from a random sample of six experienced Ministry of Agriculture staff based at the Kilimo House, the Ministry's head office.

The total number of MSEs in Kenya BDS target provinces is thus computed by applying the typical orchard size to the total acreage under the different tree fruits (Table 3.1).

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<sup>4</sup> Peter Dewees has documented similar stylised sizes in a case study of Muranga District. According to his study, the average size of a typical smallholder unit under scattered and isolated tree fruits cover is 0.2 of an acre. The percentage of total land area supporting scattered and isolated tree fruits ranged from 0.1 acres in the lower Maize zone to 0.6 acres in the lower Coffee/Maize zone. A typical Orchard was some 0.2 of an acre, but mostly ranging between 0.1 acres in the lower Tea/upper Coffee zone to an acre in the new settlement zone.

Table 3.1—Acreage and production of Tree fruits

Fruit/Province	Acreage (in Hectares)		Production (in metric tons)	
	2001	2002	2001	2002
<b>Mango</b>				
Central	543	650	4826	5224
Coast	8230	8240	45592	42946
Eastern	4655	4668	99059	91521
<b>Avocado</b>				
Central	1493	2031	21615	16540
Coast	80	82	640	650
Eastern	1295	1334	17030	17909
<b>Passion</b>				
Central	489	391	5783	4594
Coast	26	41	135	154
Eastern	1004	965	7618	7930

Source: Ministry of Agriculture 2002 Annual Report

The total number of MSEs in the three provinces is then estimated by applying the typical MSE acreage under each tree to their total acreage (Table 3.1). Hence, the estimated total number of MSEs as at the end of 2002 was 198,004 (Table 3.2). Of this number, 59,401 belong to female-headed households based on the national statistics that show that about a third of all households are female-headed<sup>5</sup>.

Table 3.2—Acreage and estimated MSEs as at end of year 2002

	Central	Eastern	Coast	Total
<b>Mangoes</b>				
Acreage (in acres)	1,625	11,670	20,600	
Conversion factor (0.25)				
Estimated MSEs	6,500	46,680	82,400	135,580
<b>Avocado</b>				
Acreage (in acres)	5,078	3,335	205	
Conversion factor (0.25)				
Estimated MSEs	20,312	13,340	820	34,472
<b>Passion</b>				
Acreage (in acres)	978	2,413	103	
Conversion factor (0.125)				
Estimated MSEs	7,824	19,304	824	27,952
<b>Total</b>				<b>198,004</b>

Source: Survey data, July/August 2003

#### 4.2 Total number of MSEs currently accessing commercial business services

The total number of MSEs currently accessing business services is finally estimated by applying the relative proportion of the sample to the overall total estimated number of MSEs in the three provinces. As earlier discussed, this sample was randomly selected from areas where the production of the fruits is relatively well developed. Secondly, as discussed in Section 1.2 on sampling, the production, distribution, and marketing supply chain for the three tree fruits is strikingly similar. Hence, the total number of MSEs accessing commercial business services of any kind before Kenya BDS's intervention is 75,642. Of the MSEs belonging to the female-headed households, about 22,693

<sup>5</sup> [www.worldbank.org/afr/findings/english/find55.htm](http://www.worldbank.org/afr/findings/english/find55.htm). 2003. *Reducing Poverty in Kenya*.

have accessed business development services of any kind. Indicative numbers of the total MSEs purchasing different kinds of business services are shown in Table 3.3.

Table 3.3—Estimated number of MSEs accessing different business services

	Number	% Of MSEs purchasing services
Services		
Supply of agrochemical	33,358	44.1
Grafting/supply of seedlings	28,895	38.2
Spraying	8,926	11.8
Technical advise (layout, care, etc)	4,463	5.9
Total	75,642	100

Source: Survey data, July/August 2003

### 3.3 Total number of MSE producers linked with the commercial market

Extending the estimation technique discussed above to establish the total number of MSEs with direct access to markets yields a figure of 6,138 MSEs based on the baseline sample. Very few of the MSEs have any direct access to the market, and are likely depend on local rather than export markets for their fruits (Table 3.4). of the MSEs belonging to female-headed households, about 1,841 have a direct link with the market.

Table 3.4—Estimated number of MSEs linked with the commercial market

Distribution and marketing	Total number of MSEs linked to provider	%
Brokers	128,901	65.1
Local market	44,551	22.5
Road side	4,554	2.3
Hawkers/Groceries/Kiosks	13,860	7.0
Uchumi/local contracts	6,138	3.1
Total mentions	198,004	100

Source: Survey data, July/August 2003

### 4.4 Total number of business service providers currently operating in Kenya in BDS program target areas

This baseline survey has 598 different service providers in the three provinces. Stockists of agrochemical inputs are the largest group among the service providers. The second largest group are the suppliers of seedlings and grafting materials. The service providers' inventory reveals that a wide range of the business services presently hardly exists, for instance:

- Financial brokering
- Appropriate technology
- Market information; and
- Business skills training for smallholder farmers

## IV. Annexes

### References

Actes CTA Proceedings, 1993. Production of ACP fresh fruits and vegetables for export to the EEC. Arnhem, Pays-Bas, Netherlands, Technical Centre for Agricultural and Rural Co-operation. December.

Kenya Government of, 2002. Kenya statistical Abstract. Nairobi, Government Printer.

Kenya Government of, various years. Ministry of Agriculture and Rural Development, various. Annual reports.

Kenya Telephone Directory, 2000/2001 Edition and Official inland edition.

Peter A. Dewees. Social and economic incentives for smallholder tree growers, a case study for Muranga District, Kenya. New York, Community Forestry Case Studies Services, Food and Agriculture Organisation (FAO), United Nations.

USAID Kenya Business Development Services Program, 2003a. "Market assessment of business services and the identification and selection of interventions for the tree fruit subsector", Contract No. 623 C-00-02-00105-00. March.

USAID Kenya Business Development Services Program (Kenya BDS), 2003b. Activity Status Report, Contract No. 623 C-00-02-00105-00. January.

USAID Kenya Business Development Services Program (Kenya BDS), 2003a. Activity Status Report, Contract No. 623 C-00-02-00105-00. February/March.

## Annex 1

### Schedule of visits and list of persons interviewed

#### Visits

<b>Dates</b>	<b>Place</b>	<b>District</b>	<b>Province</b>
24 July 2003	Kahuro Division	Muranga	Central
25 July 2003	Gikindu Location (Kiharu Division)	Muranga	Central
26 July 2003	Thika	Thika	Central
27 and 28 July 2003	Karurumo location, Kyeni Division	Embu	Eastern
29 July 2003	Thika and Muranga (call back)	Thika/Muranga	Central
1 and 2 August	Magumoni Division	Meru	Eastern
6 August	Travel to Mombasa		
7 August 2003	Matuga (Msambweni Division)	Kwale	Coast
8 August 2003	Bahari Division	Kilifi	Coast
9 August 2003	Travel back to Nairobi		

#### **Persons interviewed**

##### Embu District

G.M Njuguna, Horticultural Crop Development Officer  
Johnson Njagi Kathieri, Crops Officer Kyeni Division

##### Thika District

Daisy Kinyanjui, Divisional Crops Officer  
Mercy, District Agricultural and Horticultural Officer

##### Meru

Mrs. Mutungi, District Horticultural Officer

##### Kwale

Bakari Mwakunena, District Soil and Water Conservation Officer

##### Kilifi

Priscilla Munene, District Farm Management Officer  
Maina, Crops Officer

##### Muranga

Ann, District Horticultural Officer

##### Ministry of Agriculture Head Office/Kilimo House

Patrick Onchieku, Horticultural Officer

#### List of MSEs participating in FGDs

##### Kwale District

Mohamed Abdallah  
Chizi Charo  
Hamis Mohamed  
Mwanalima Ali  
Mwanamisis Abdallah  
Mejuma Chimetse  
Ali Chamaungu  
Juma Ngazi  
Mnagale Sombo  
Abdallah Mwamtsani  
Juma Raji  
Saidi Matsudzo  
Justine Mkono  
Niazado Mwakuneni

Mwanasah Salimu

Kilifi District

Mary Sasua  
Johnson Mwangome  
Christine Aliwazi  
Junoo Gichenga  
Badzo  
Maringa  
Monicah  
Everylyne Shizelu  
Sigi Charo  
Esther Karani  
Esther Jena  
Embu District

Annex 2

FGD and Key Informant proceedings

Key Informant Interviews

Key informant interviews were held with District and Divisional Agricultural and Horticulture officers to provide insight into production and overall market situation of the three tree fruits. This information proved extremely valuable in sampling the specific sites in the eight districts where the baseline survey was conducted.

Kahuro division in Murang'a district

Because the Division Agricultural Horticultural Officer was not available, it was the Division Home Economic Officer and Division Soil Conservation Officer interviewed as the Key Informant.

The Division has four locations with 18,948 households and a total population of 119,694 persons and Kahuhia location has the highest concentration of mango, avocado, and passion fruits. Statistics on the typical number of trees and acreage as presented in the table below:

TREE FRUIT	HECTARES	NO. TREES
Local Mango	148	14,818
Grafted Mango	5	519
Local Avocado	96	9,609
Grafted Avocado	138	13,821
Local Passion	2.2	3,557
Grafted Passion	1.1	1,792
Total	390.3	44,116

The divisional office has no available data on total number of farmers growing the three specific tree fruits. As shown by the above table the local types of mango and passion are the majority hence need to replace them with improved varieties resistant to disease and with high production yields.

### Service providers

The available service providers for the three tree fruits are:

- Ministry of Agriculture - providing Extension Services
- Horticultural Crop Development Authority (HCDA) - Train Ministry of Agriculture officers on fruit husbandry who then trained the farmers.
- KARI - collaborate with Ministry of Agriculture on research and development of fruit varieties as pests and disease control.
- Pharmaceutical stockists - stock and supply agro chemicals to farmers
- Brokers - provide market.

Farmer benefits from the above services for free except buying agro chemicals.

### Market linkages

It was reported that 99% of tree fruit (mango, avocado, and passion) farmers rely on brokers who come to purchase the fruits in the farms. The one per cent sells in the nearby towns.

### Thika District (2nd report)

In Thika District, interviews with the Deputy District Agricultural Officer revealed that the tree fruits do well in the district; this has 84 divisions, 20 locations, and 89 sub-locations. The population of the divisions is:

Division	No. of Households
Thika Municipality	15,890
Ruiru	12,330
Kakuzi	18,870
Gatenga	20,980
Gatundu	30,254
Kamwangi	19,550

The area under the three tree fruits and total production per fruit is as follows:

	MANGO		AVOCADO		PASSION	
	HECTARES	OUTPUT	HECTARES	OUTPUT	HECTARES	OUTPUT
Thika	28	280 tons	10	100 tons	3	30 tons
Ruiru	15	90 tons	5	50 tons	4	16 tons
Kakuzi	33	330 tons	2	16 tons	4	24 tons
Gatanga	19	152 tons	200	400 tons	100	1,000 tons
Gatundu	20	100 tons	16	240	32	160 tons
Kamwangi	23	184 tons	240	480 tons	35	280 tons
<b>Total</b>						

### Harvest seasons

- Mango - December to February
- Avocado - January to March
- Passion - Throughout the year especially those under irrigation.

### Service providers

- Ministry of Agriculture - extension Services
- KARI - Research and development of better tree varieties and training on pest and disease control.
- Brokers and fruit processing companions - provide markets
- Pharmaceutical firms - provide agro chemicals
- Private farmers with fruits nurseries - provide seedlings
- JKUAT University - provide seedlings.

### Linkage to Markets

- Farmers of mangoes 80% are linked both to local and export markets
- For avocado 40% are linked to both local and export market
- For passion almost all the produce are sold locally.

### Problems

The major problems are marketing and high cost of farm inputs. The most affected fruit by the market is the avocado whereby only 40% are sold while 60% go to waste. The district has a high potential for mango production but the prices at the local market are too low to support production of good quality fruits.

### Thika Division

Within Thika District, Thika Division was sampled for household interviews due to its proximity and availability of all the three fruits under study. The division has 15,890 farm families, and for the three fruits the following facts were established: The average production is 10 tons per hectare for avocado, 15 tons per hectare for mango and 10 tons per hectare for passion.

Avocado fruits are concentrated in Thika location, mango in Gatuanyaka and passions scattered in the two locations. Ministry of Agriculture provides the most needed extension services such as training on fruit nurseries, planting, application of fertilisers and chemicals, pruning, and grafting.

In Embu District Agricultural Office, the District Horticultural Officer was interviewed. Embu District has five divisions and 14 locations. The population of each division ascending to 2001 data is:

Division	Population
Kyeni	59,480
Runynjes	81,623
Nambile	68,228
Central	53,433
Manyatta	74,699

### Harvest seasons

- Mangoes: There are two varieties, one that matures between November and February and another between March and April
- Avocados: between May and July
- Passion matures in two main seasons, namely: from May to June and between December and February.

### Service Providers

The above various service providers which includes:

- Ministry of Agriculture - Extension services
- HCDA - Horticultural CAP Development Authority has a centre in Mwea and it is supposed to buy mango but only target farmers organised groups, therefore it has not assisted extra farmers.
- Companies such as - Everest - Buy passion fruits
- Makindu growers: Passion
- Bonga Tuu: also buys passions
- E. Africa growers: Mango
- Brokers - buys the three fruits for local and export market.
- Pharmaceutical companies (Buyer) - provide agro chemicals
- Farmers with private fruit nurseries -provide seedlings
- SIDA has an ongoing programme called National Agriculture and livestock extension program (NALEP), which provide extension services to farmers and especially on passion fruits.
- ICRAF - provide research and development of mango varieties
- KARI (Thika) - provide research and development of passion varieties

### Kyeni division, Embu district

Within Embu District, the Kyeni Division was sampled for household interviews and focus group discussion. Interview with the divisional Crop Officer established that the division has three locations and 10 Sublocations, and that the total population is 52,000 people with 9,260 farm families.

#### Harvest Seasons

- Mango: between December to February
- Passion: from June to July
- Avocado: from May to August.

Service providers include Ministry of Agriculture, providing extension services, pharmaceutical companies, such as Murphy and Twiga Chemicals providing agro chemical products and training on application of these chemicals. Brokers provide market for the fruits.

#### Link to market

- 25 to 30% mango farmers are linked to market
- 20% of avocado farmers are linked to market
- 30-35% of the passion farmers is linked to market.

#### Production

Karurumo location has a high concentration of mango and avocado hence the farmers who participated in the FGD were for these two fruits. The FGD brought together eleven micro and small-scale farmers and was held in Karurumo Primary School.

On average the typical number of avocado tree fruits grown by the farmers is 10 trees, while for mango the average is 124 trees per farmer.

In total avocado occupy 138 hectares within the division and total production is 486 ton, mango 265 hectares with production of 1325 tons and passion 128 hectares and production of 1024 tons.

### Muranga District

#### Main growers areas

- Mangoes: Kiharu Division, Gikindu Location
- Passion Fruits: Mathioya Division, Gitugi Location
- Avocados: Kahuro Division, Mugoini Location

Avocados are sold through brokers who usually offer very low prices (50 cents each). The only fruit processor in the district—Seven Trees—was closed down years ago. Avocados mature from April - June but you can have some few through out the year.

Mangoes are also sold through brokers. The peak Mango season is from December to March.

Passion fruits: some few farmers are connected to the market - an exporter and others sell to companies from Nairobi. Passion fruits matures mostly in January and February, but with irrigation it can be an all-year round harvest.

#### Problems facing these sub sectors

- Lack of market
- Pests and diseases
- Lack of enough capital to invest in farming
- Lack of special pumps especially for spraying mangoes and avocados
- Unreliable rainfall and lack of water for irrigation
- High cost of chemicals

## Thika District

Interviews with the District Agricultural and Horticultural Officer (Mercy).

Thika District has 6 divisions, 20 locations, and 89 Sublocations.

### Hectare per sub sector

- Mangoes - 130 hectares
- Passion fruit - 22 hectares
- Avocados - 110 hectares

### Farm families

The district has a total of 117,874 farm families. Distribution of farm families per division

Division	No. of Farm Families
Thika	15,890
Ruiru	12,330
Kakuzi	18,870
Gatanga	20,980
Gatundu	30,254
Kamwangi	19,550
<b>Total Farm Families</b>	<b>117,874</b>

### Production (tons)

Division	Passion Fruit	Avocado	Mangoes
Gatanga	1000	400	152
Kamwangi	280	480	184
Gatundu	160	240	100
Thika	30	100	280
Ruiru	16	50	90
Kakuzi	24	16	330
<b>Total District Production</b>	<b>1,510</b>	<b>1,296</b>	<b>1,196</b>

### Hectare per division

Division	Passion Fruit	Avocado	Mangoes
Gatanga	200	100	19
Kamwangi	240	35	23
Gatundu	16	32	20
Thika	10	3	28
Ruiru	5	4	15
Kakuzi	2	4	35
<b>Total District Production</b>	<b>475</b>	<b>178</b>	<b>144</b>

## Market

About 80% of passion fruit either go to the local or export market. 40% of avocados go to both local and export markets; the rest unaccounted for i.e. waste. Mangoes have only 60% getting market the rest is wasted.

## Harvest seasons

- Mangoes: from December to February
- Avocados: from January to March
- Passion Fruits: Throughout the year, especially when under irrigation.

The Ministry of Agriculture assists the farmers to form marketing groups, which enable them to have bargaining power for prices of their produce. This is being done through NALEP programme (Natural Agricultural and Livestock Programme).

### Thika Division

Interviewed: the Divisional crops officer - Daisy Kinyanjui, who is responsible for two locations: Thika, with two sublocations and Gathanyaka with three sublocations. The district has a total of 13 agricultural units, and 15,890 farm families (with an estimated population of 104,787 people). Tree fruits growing areas: Avocados in Thika Location and Passion fruits and Mangoes in Gathanyanga Location.

### Hectares (area) under cultivation

- Mangoes cover 50 hectares.
- Avocados cover 25 hectares.
- Passion Fruits covers 2 - 3 hectares.

The Officer has worked in Thika division for the last 7 years.

### Marketing

Majority of the produce sold at Thika town, sold locally within the villages, through market, brokers, and some companies go direct to the farmers especially for passion fruits i.e. Uchumi Supermarket is supplied by some farmers in the area.

### Production

- Avocados - 10 tons per hectare
- Mangoes - 15 tons per hectare
- Passion Fruit - 10 tons per hectare

### Embu District (2nd report)

Embu district has five divisions and a total of 14 locations. The divisions are:

- Kyeni, with three locations
- Runyenjes, with three locations
- Nembure, with three locations
- Central with two locations
- Manyatta, with three locations

### Population per division

Division	Population
Kyeni	59,480
Runyenjes	81,623
Nembure	68,228
Central	53,433
Manyatta	74,694
<b>District Total Population</b>	<b>337,458</b>

### Perennial crop production statistics

CROP	Cumulative Ha	Productive Ha	Total Prod. (tons)
Mangoes	714.08	698.7	1397.4
Passion Fruit	471.7	467.3	3504.75
Avocados	351.85	348.33	2089.98

### Nursery production - 2002 (total)

Division	Mangoes	Avocado	Passion Fruit
Bembure	1000	-	8100
Runyenjes	2600	-	600

Central	18000	400	900
Kyeni	6550	100	-
Manyatta	-	-	6500
<b>Total</b>	<b>28,150</b>	<b>500</b>	<b>16,100</b>

#### Observation

- Mango seedlings sold to farmers from districts. Prices ranged from 80-100 Kenya shillings per seedlings.
- There was a dramatic drop in avocado seedling production due to low demand. A 25% drop in demand was noted.
- Demand for passion fruit seedling has dropped to about 16% of its volume in 2001.

#### Production per nursery - seedlings

Division	Nursery	Mangoes	Avocado	Passion Fruit
<b>1.NEMBURE</b>	Kiawanja	150	-	500
	Gichege	100	-	-
	Geche	50	-	-
	Nyaga Ndevi	-	-	600
	Joseph Nthiga	-	-	400
	Harrison Njeru	-	-	100
	Joseph Kithegi	100	-	500
	Muchonoke F.A.	600	-	6000
<b>TOTAL</b>	<b>8</b>	<b>1000</b>	<b>-</b>	<b>8,100</b>
<b>RUNYENJES</b>	Runyenjes Municipality	600	-	-
	Muregwa	200	-	-
	Habitat Group	-	-	600
	<b>TOTAL</b>	<b>3</b>	<b>2,600</b>	<b>-</b>
<b>CENTRAL</b>	Kamiu	1,700	400	900
	Kanjikenu	1,000	-	-
	<b>TOTAL</b>	<b>2</b>	<b>18,000</b>	<b>400</b>
<b>KYENI</b>	Karurumo Grp.	300	-	-
	Kathunguri	2500	-	-
	Njeru Kamsua Ugane	3400	100	-
	Magacha 4K Club	350	-	-
	<b>TOTAL</b>	<b>4</b>	<b>6,550</b>	<b>100</b>
<b>MANYATTA</b>	Kirigi Wendani Horticultural Growers	-	-	6,500
<b>TOTAL</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>6,500</b>

#### Growing areas

CROP	DIVISION	AREAS
<b>MANGOES</b>	KYENI, central Runyenjes and Nembure	Karurumo, Kiamwangi, Kigumo, Iweche, Ugowan, Nthangaiya, Ena, Kithimu
<b>PASSION FRUIT</b>	District -wide	Widespread in 4M, 1,2,3

<b>AVOCADO</b>	District wide except Uni.IV	Widespread except Un.IV
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Source: Horticultural Section Report 2003 by Njuguna G.M (the Horticultural Crop Officer for Kyeni Division)

Kyeni division has three locations and ten sub-locations with six ecological zones. Crops officer is Mr. Johnson Njagi Kathieri since 1998 - 5 years old in the division. It has a population of 52,000 with 9,260 farm families.

Growing areas

- Karurumo for mangoes and passion fruits (only through irrigation for passion fruits)
- Kyeni South for avocados
- Kyeni North leads in passion over 70% of the total production

Harvest seasons

- Mangoes: from December to February
- Avocados: from May to July
- Passion Fruits: from June to July, but can be produced throughout the year under irrigation.

Production 2003

CROP	HECTARES	PRODUCTION (TONS)
Avocados	138	486
Mangoes	265	1325
Passion Fruits	128	1024

Service provides in the area

- |                       |  |
|-----------------------|--|
| • Service Provider    | Specific Services  |
| • Murphy Chemicals )  | Demonstration on chemical spraying                                     |
| • Twiga Chemicals )   |  |
| • Farmchem Chemicals) | Advice on when to spray  |
| • Min. of Agriculture | Offers technical service i.e. diseases control, and marketing grafting |

Market

Passion fruits have market from Nairobi, Thika i.e. an Indian from Embu who acts as a middleman for export companies in Nairobi. Farmers linked to the market are as follows:

- Mangoes - used to be 30% but has gone as down as 25% now.
- Avocados - used to be 50% linked but now ha gone as low as 20% due to lack of export market.
- Passion Fruit - 35% linked to market especially export and local (Uchumi Supermarket).

Commercial service providers

In the mangoes sub sector 15% of the farmers have a link to commercial service providers. Avocados only less than 10% of farmers have access to these service providers. Passion fruit has 25% access to these service providers. These commercial service providers include Twiga Chemicals, Farmchem, and individuals.

Observations

- Majority of the small scale farmers sell their produce through brokers (over 98%) and only a mere 2% or less have a direct link to the market or have contracts to supply companies or institutions.
- Most farmers are trained on how to graft the seedling or have access to somebody locally who can graft the seedling for them.
- Most seedlings are the local ones, which can survive, or suitable to the prevailing climatically conditions, which are then grafted using the high variety seedling. In some areas private nurseries sell the grafted seedlings.

- Government institutions like Thika and Ruiru prisons have nurseries for mangoes, avocados, and passion fruits. Maragua ridge is a major seedling producer in Central province and they even offer free training and seminars to willing farmers.
- Agrochemical companies also organise demonstrations through agricultural extension officers. They advise the farmers on the right chemicals to spray, time to spray, and how to spray. However most farmers complained of high cost of these chemicals. These companies include Bayer East Africa, Twiga Chemicals, and Murphy Chemicals.
- Some farmers do not take care of their tree fruits due to the low turnover as a result of lack of a good market. One farmer had this to say "The brokers only come to con us, imagine after spending so much on chemicals somebody (broker) comes and tells you he/she will buy a piece of mango at Kshs 2 and avocado at 50 cents a piece. It's no cost effective at all."
- Hectare per farmer range from 0.25 to 2.5 hectares in most areas.
- Harsh climatic conditions sometimes affect production hence the need for irrigation in the drier areas.
- Local varieties fetch very low prices i.e. one sack of mangoes and avocados going for less than Kshs 150.
- Passion fruits seems to have a higher demand comparatively thus fetching a better price but also the risks are high because they are prone to pests and diseases. The cost of caring for passion fruits is higher than mangoes and avocados - i.e. they need constant care, spraying, watering daily, and pruning.
- For avocados and passion fruits supply can be year round provided the trees are watered promptly, but for mangoes the best season is between December to March except for some varieties, which extend to early April like Tommy and Kent.

In Embu District Agricultural Office, the District Horticultural Officer was interviewed. Embu District has five divisions and 14 locations. The population of each division ascending to 2001 data is:

Division	Population
Kyeni	59,480
Runynjes	81,623
Nambile	68,228
Central	53,433
Manyatta	74,699

#### Harvest seasons

- Mangoes: There are two varieties, one that matures between November and February and another between March and April
- Avocados: between May and July
- Passion: matures in two main seasons, namely: from May to June and between December and February.

#### Service Providers

The above various service providers which includes:

- Ministry of Agriculture - Extension services
- HCDA - Horticultural CAP Development Authority has a centre in Mwea and it is supposed to buy mango but only target farmers organised groups, therefore it has not assisted extra farmers.
- Companies such as - Everest - Buy passion fruits
- Makindu growers: Passion
- Bonga Tuu: also buys passions
- E. Africa growers: Mango
- Brokers - buys the three fruits for local and export market.
- Pharmaceutical companies (Buyer) - provide agro chemicals
- Farmers with private fruit nurseries -provide seedlings
- SIDA has an ongoing programme called National Agriculture and livestock extension program (NALEP), which provide extension services to farmers and especially on passion fruits.
- ICRAF - provide research and development of mango varieties

- KARI (Thika) - provide research and development of passion varieties
- \*For more report on Embu District refers to the report we were given.

#### Kyeni division, Embu district

Within Embu District, the Kyeni Division was sampled for household interviews and focus group discussion. Interview with the divisional Crop Officer established that the division has three locations and 10 Sublocations, and that the total population is 52,000 people with 9,260 farm families.

Within the locations, Karurumo Location has the highest concentration of mango; Kieni South is leading with avocado and Kyeni North with passion.

#### Harvest Seasons

- Mango: between December to February
- Passion: from June to July
- Avocado: from May to August.

Service providers include Ministry of Agriculture, providing extension services, pharmaceutical companies, such as Murphy and Twiga Chemicals providing agro chemical products and training on application of these chemicals. Brokers provide market for the fruits.

#### Link to market

- 25 to 30% mango farmers are linked to market
- 20% of avocado farmers are linked to market
- 30-35% of the passion farmers is linked to market.

#### Production

In total avocado occupy 138 hectares within the division and total production is 486 ton, mango 265 hectares with production of 1325 tons and passion 128 hectares and production of 1024 tons.

#### Main avocado growing areas

From the Horticultural Production Trends the main avocado growing areas are Central Province accounting for 35% with 18,090 MT production, Eastern Province accounting for 29% with 15,232 MT production but Coast province only accounts for 1% with 544 MT production.

Small-scale farmers currently estimated at 5,000 are the main producers of avocado. Although the areas planned under avocado seems to have stagnated at about 2,500 hectares during the early 1990s, significant area expansion have been recorded since 1997 with the area rising from approximately 2,700 hectares to over 4,000 hectares in he year 2000. Avocados are mainly grown in:

- Central -Thika, Murang'a, Kiambu, Kirinyaga, Nyeri
- Eastern - Machakos, Meru and Embu
- Coast - Taita Taveta

#### Main mango growing areas

The main mango producing areas in Kenya is Coast Province (Malindi, Lamu, Kilifi, and Kwale), accounting for 39% and Eastern province (especially. Machakos) accounting for 32%. Both these provinces produced about 80,000 MT in the year 2000, accounting for nearly 71% of the country's total output. Central province produces 5,999 MT, 5%.

#### Main passion growing areas

The area under passion fruit accounts for just a mere 2% of total area under fruits. Cultivated area has however nearly doubled over the last seven years reaching approximately 2,700 hectares, in he year 2000 which is just about 18% of the area under either citrus or avocado. The main passion growing areas are:

- Central \_ Thika, Muranga, Kiambu and Nyeri
- Eastern - Meru and Embu

The number of farmers will be estimated based on the total acreage in a specific area, divided by the average farm size of the small holder farmers. The challenge we may face is that we need to cover the chosen districts exhaustively but the time given may not be adequate. The secondary research has however guided us in preparing our methodology on how to carry out the survey. We will start with Central, to Easter and finally to Coast. Reference:

- Horticultural Production Trends
- MOARD - Annual Report (2000)
- Central Bureau Statistics Report.

#### Focus group discussion (FGDs) in Karurumo location, Embu district

Karurumo location has a high concentration of mango and avocado hence the farmers who participated in the FGD were for these two fruits. The FGD brought together eleven micro and small-scale farmers and was held in Karurumo Primary School.

On average the typical number of avocado tree fruits grown by the farmers is 10 trees, while for mango the average is 124 trees per farmer.

The typical harvesting season for these two tree fruits is December to March for mango and May to August for avocado. For Avocado, fruits can be produced all year round depending on how well the trees are taken care of.

To calculate the average production for each season was not easy for the participants but they approximated 2,500 Kgs for avocados and 1,000 kg for mangoes.

According to the FGDs, the domestic consumption of the tree fruits rarely exceeds the total fruits harvested from a single tree in the case of Avocados and Mangoes. However, the rest of fruits produced is the biggest problem facing the MSEs, and most farmers (nearly 99 per cent rely on brokers for marketing of mango and avocado, the 1% have contract to supply to markets and factories in Thika and Nairobi.

In taking care of the tree fruits, the same farmers pay for service such as manual labour during planning, weeding, pruning, and grafting. Other expenditure is purchase of inputs such as fertilisers and agro-chemicals. The participants are aware of commercial service providers and the specific services they provide:

- Ministry of Agriculture - provide services and information on seedling and fruit variety, pests and diseases control, grafting and pruning and organise the farmers into groups to market their produce.
- Pharmaceutical firms such Murphy provides agro-chemical produce for pests and disease control.
- Brokers provide ready market for the fruits
- NGOs, such as GTZ had a programme on organise farming and drying of mango.
- Private farmers who assist in provision of seedling and informal training on special variety, pests, and diseases control.

#### Main avocado growing areas

From the Horticultural Production Trends, Central Province accounting for 35% with 18,090 MT productions, Eastern Province accounting for 29% with 15,232 MT productions is the main avocado growing area. But Coast province only accounts for 1% with 544 MT productions.

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### Main passion growing areas

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- Horticultural Production Trends
- MOARD - Annual Report (2000)
- Central Bureau Statistics Report.

### Meru South District

#### Interview with the district horticultural officer Mrs. Mutungi

Meru South district has five divisions, 25 locations, and 76 sub-locations. It has an estimated population of 205,252 persons and 34,440 households based on the 1999 national population census.

#### Demographic Data (Meru South)

Division	Population	No. of Households
Chuka	53,063	10,400
Igamba Ng'ombe	23,309	4,080
Magumoni	32,544	6,000
Muthambi	31,981	5,900
Mwimbi	64,355	12,060
	205,252	38,440

The three target fruits (mango, avocado and passion) are grown in Meru South. On Mango fruits according to the District Horticultural Officer there are about 50 farmers in the district growing improved variety of mango fruit, an average of 200 to 1,600 trees per farmer. 10 farmers out of the 50 have reached high production level. In total, 147 hectares on the district are under mango tree fruits; out of which 8070 is of the local mango variety. The harvest seasons for mango are from November to February. The farmers are organised and they belong to Meru Fruits Growers Association, which covers the whole of Meru region.

### Service providers

There are several commercial service providers assisting mango growers namely:

- Ministry of Agriculture (Horticultural Development) - currently the Ministry of Agriculture in collaboration with SIDA is implementing National Agriculture and Livestock Extension Programme (NALEP). Under this project the Ministry identifies a local NGO, which should have a maximum of

400 farmers. These farmers are assisted with agricultural extension services for a period of one year.

- Mango farmers in Meru South District have benefited under this project. About 50 members are being trained to produce high quality mangoes.
- Pharmaceutical companies - These companies in collaboration with Ministry of Agriculture are offering training on pests and disease control to farmers with anticipation that the farmers would buy their produce. The companies actively involved are Bayer, Twiga, Farmchem and also chemicals they provide farmers fare and subsistence allowance during training and demonstrations.
- Agro-chemical stockists - These are shops in towns and markets with the district that sell agro chemicals and other input to the farmers. There are about 15 stockists with the district and the main ones are in Chuka and Chogoria town.
- Meru fruit growers, Association - Assists its members in forming organised groups, training on general care of fruits and marketing of the fruits.
- Research institutions such as KARI (Embu).

The Igamba Ng'ombe division has high concentration of Mango JKUAT provide research and development of mango varieties as well as provision of seedlings.

Private tree fruit nurseries - provide seedlings to farmers there are four registered private nurseries within the district. Horticultural Crop Development Authority (HCDA) - it has a storage depot at Kimbimbi in Mwea town. HCDA is about to register a subsidiary company Kenya Horticultural Produce Handling Company (KHPHC) that will act as its marketing agency. The Ministry of Agriculture is training the farmers to improve quality and quantity of production to target HCDA facilities.

Christian Children Fund and Catholic Church support farmers in provision of seedling and training.

There are a few farmers linked to direct market on four in particular who supply improved mango variety to two supermarkets in Chuka town. The other farmers rely on brokers and local markets.

### Avocados

Meru South District has high potential for avocado growing however due to declining and unpredictable marketing there has been declining in production. Avocado growing is scattered in 3 divisions - Chuka, Mwimbi and Magumoni Divisions. About 51 hectares are under avocado growing in the district.

Due to over production and declining demand of Fuerta variety, only 30% of the total produce is sold locally, while 70% is either consumed at household levels or goes to waste. The harvesting season for avocado is from March to May.

The service providers in the district include the Ministry of Agriculture, KARI (Thika), Agrochemical stockists in Chuka and Chogoria town, and brokers, each one of them providing a different service. KARI (Thika) provides seedling for improved varieties currently 15 is supplying Hass variety, which has high demand in the market. The cost of one scion of Hass variety cost KShs.2 (two). The farmers buy the seedling through the Horticultural Office. Already about 1,000 seedlings has been bought for farmers.

### Marketing

During 1990 - 1992 when there was high demand of Fuerte variety three farmers had a link to market. Exporters were buying from the farmers. Although there is no organised market for avocado the demand is improving. The major source of market is the brokers who collect the produce in 3 sites, Katharaka, polepole and Kisasha along Embu-Meru Road to sell in Nairobi.

### Passion Fruits

Just like mango and avocado, passion has high potential, in 2001 - 2002, 54 hectares were under passion fruit within the district and 23 farmers were directly linked to market, they were contracted to supply passion fruits. However an outbreak of a disease wiped out the fruits a year ago. This

disease (Fusarium) affected the local variety of passion. A new improved rootstock of passion (yellow passion) was introduced that is resistant to disease but it needs to be grafted with the purple variety.

About 60 farmers in the district are now growing exotic bread of passion for commercial purpose. 10 farmers of the 60 are now selling passion fruits. On average only 0.25 acre per farmer is under passion fruit. Passion growing in the district is concentrated in the upper zone along the slopes of Mt. Kenya where they are grown under irrigation. The commercial service providers are the same to those of mango growers. There are private nurseries owned by farmers groups. These nurseries are in Ntuntuni, Karingini and Kyeni; they buy passion seeds from Thika KARI at Kshs 60 per gram. In total, the groups have bought 30 grams of passion seeds. Currently the price of passion fruit is improving in the local market 5 passion fruits is going for Kshs 10.

#### Focus group discussion (kieni self help group)

The Kieni Self Help Group is within Kieni fiscal area, an area identified by the Ministry of Agriculture to implement the SIDA-funded NALEP project. The focal area has 383 farm families. In total, the area has 470 mango tree fruits and 1,319 seedling in nursery of which 75 are grafted. For avocados there are 350 tree fruits and 1,180 in nursery, while for passion about 10 farmers are growing and these are about 200 tree fruits and 418 seedlings in nursery.

Kieni Self Help Group has 15 members and they are involved in growing of these fruits. Harvesting seasons are June to August and January to March for passion fruits, January to March for mango and June to August for avocados.

From the total produce of the three fruits, about 10% is consumed at the household level, 40% is sold, and the balance goes to waste due to pests, disease, and lack of market.

#### Marketing

The 40% of the produce sold are 80% is marketed through brokers. Some farmers with the group organise themselves and buy the fruits in season in bulky to sell them in Nairobi. Also brokers from outside buy fruit from the farmers. Prices for these fruits are mango 1 bag goes for Kshs 150 at highest, avocado 1 bag for Kshs 80 at highest and passion 3 fruits at Kshs 2.

The group also has a scout who does marketing survey in Nairobi and buys produce from the farmers to sell in for market. The scout who is a farmer and a member of this group offer three times better price than the brokers do.

#### Service Providers

As earlier mentioned the group is under NALEP programme hence has benefited from ministry of Agriculture terms of Extension services. Other service providers are Agrochemical companies, especially Osho and Twiga Chemicals who have organised training of pests and disease control. Brokers and the scout provide market while KARI (Thika) provides seeds for avocado and passion. Other groups growing these fruit also offer technical assistance, the group is organising exposure and education tour to another group in Meru Central District. All group members use these commercial farmers.

In growing these fruits the group is facing problem of high cost of seedling from KARI especially passion (one gram of passion seed cost Kshs 60) other problems are high cost of agricultural inputs especially fertilisers and chemical. The biggest problem most identified is lack of potential market for the fruits as 50% of the total produce goes to waste due to lack of market. Brokers who exploit the farmers worsen this.

#### KWALE DISTRICT

Key Informant interview With the District Soil And Water Conservation Officer: Mr. Bakari Mwakunena: The officer has been in-charge of Matuga Division for 4 years and then promoted to the District level by the beginning of this year. From the interview with him we learnt that Kwale District has five divisions, 50 locations and 75 sub-locations. The total population is 496,133 people as per National Census data of 1999. The breakdown of the population per division is as follows:

Division	Population	Number of Households
Matuga	72,377	14,425
Msambweni	211,814	43,622
Kubo(Shimba Hills)	48,769	8,620
Kinango	72,027	11,857
Samburu	91,011	14,020
National Park	135	50
Total	<u>496,133</u>	<u>92,594</u>

It was not possible to get the data for typical number of mango, avocado and passion fruit trees and the typical acreage under each fruit tree. Because the District Agricultural Officer and District Crop Officers were not available and are the custodian of such data. However, we were informed that the total hectare under mango fruit trees in the district is 2874.4 hectares. Likewise we were not able to get data on typical output per fruit tree per season.

In Kwale District the harvest season for mango is November to January and May to July. Passion fruits are harvested between May to July but if the rains are good it is all year round fruit. Avocado are very few such that they are not included in the district crops data. The main varieties for mango are Apple and Ngoe type, while for passion fruit is the local yellow variety.

#### Market linkages:

Marketing according to the officer is the most pressing problem to the farmers. There is no elaborate marketing channels only half of the total fruits yield goes to waste due to lack of market 30% is sold locally in Kwale, Ukunda and Mombasa retail markets and 20% sold to far market such as Nairobi or exported through brokers.

Though Kwale has tourist hotels in Diani and Ukunda it is the brokers who buy mango and passion fruits from the farmers to supply to the hotels. Likewise there are few fruit processing companies in Mombasa but the brokers supply them with the fruits. There are no formal agreements between the farmers and the brokers (middlemen), or a standard price of the fruits. It is the brokers who dictate the price therefore exploiting the farmers.

#### Service providers:

There are several services providers assisting the farmers according to the District Information however according to the farmers there are no service providers targeting mango, avocado and passion fruits per se. The information from the District Office listed the following service providers:

- Ministry of Agriculture - in each sub-location there is agricultural extension office providing extension services to farmers such as advice on seedling, planting, spraying and pruning, harvesting and market information.
- Pharmaceutical companies especially Bayer - which has provided training on application of agro-chemicals.
- KARI (Matuga Station) - Research and Development of variety of seedling for mango and passion fruits and provision of improved seedlings.
- Coast Development Authority (CDA) provides sporadic training on crop husbandry and such fruits seedling to farmers at between KShs.100 - 200 per improved mango variety.

- Agro-Chemical stockists - In Kwale nd Ukunda town supply agro-chemicals to farmers.
- Brokers and hotels provide markets for mango and passion fruits.
- Private fruits nurseries - farmers groups own them and there are about 20 in the district, the cost of improved mango seedling from these private nurseries is KShs.50.

It is only the Ministry of agriculture and the brokers who provide free service.

### Focus group discussion with Masumalume farmers field school group

Masumaluma Farmers Group has 33 members but those who participated in the discussion were 15 members. Those who were present all grow mango fruits but few have passion fruits. There was no farmer growing avocado fruit tree.

On average each farmer grows 8 mango fruit trees, though there were some with 15 or more mango trees. For passion fruit trees: on average, each farmer has 13 passion fruits, though some have 20 trees and one has 50 passion fruit trees.

The harvesting seasons for thee two fruits trees is June and August and November to January for mango and July to August are the peak season for passion fruits. According to the participants one mango tree could produce 500 to 1000 pieces of mango fruits. Therefore to compute total fruits produced in season on average is  $1000 \times 8 \text{ tree} = 8000$  pieces of mango. It was not possible for the participants to estimate the total produce of passion fruits in each harvesting season.

The participants reported that 50% of the total produce of mango and passion fruits are both consumed at family level and goes to waste while the other 50% is sold.

The 50% that is sold is bought by the middlemen (brokers) who then sell to local markets or export markets. The brokers get order from local and external markets then buy the fruits from the farmers at very low price of a mango fruit at KShs.1.50 at the highest. There is no formal contract between the farmers, and the MSEs are at the mercy of the brokers who may, or may not buy.

On growing mango and passion fruit trees the farmers do not engage paid services, the whole work is done by the families. These two fruits the farmers only undertake weeding but also it is done to other crops such as maize and then the fruits benefit from it.

The farmers are aware of several commercial service providers butt hey have not been assisted specifically in growing of mango and passion fruits. These service providers are:

- Ministry of Agriculture
- Stockists of agro-chemicals and farm inputs
- Brokers who provide market.

### Problems:

The participants highlighted the following problems facing them on mango and passion fruits growing:

- Lack of formal market and low prices offered by brokers.
- Lack of knowledge and skills on pests and disease control.
- Lack of good transport to transport fruits to far markets.
- High cost of farm inputs such as seedlings, chemical and fertilizers.
- Ignorance on general crop and fruits management from the right seedling, to harvesting and marketing.

FGD participants:

- Mohamed Abdallah
- Chizi Charo

- Hamis Mohamed
- Mwanalima Ali
- Mwanamisi Abdallah
- Mejuma Chimetse
- Ali Chamaungu
- Juma Ngazi
- Mangale Sombo
- Abdallah Mwamtsami
- Juma Raji
- Saidi Matsudzo
- Justine Mkono
- Niazado Mwakuneni
- Mwanasha Salimu

### Kwale District

Mr. MWAKUNENA: District Soil & Water Conservation Officer (District Mechanisation). He has worked for four years in Matuga Division, then 5 months in the district head office. Kwale has five divisions, 50 locations and 75 sub-locations.

Division Area	Population	Household Farm Families
Matuga	72,367	14,425
Msambweni	211,814	43,622
Kubo	48,769	8,620
Kinango	72,027	11,857
Samburu	91,011	14,020
National park	135	50
Growing Areas	496,133	92,594

- Mangoes, Matuga Kundusi (Simba location, Golini location, Waa location and Ng'ombeni, - Msambweni Division. - Kubo Division, Season: from May to June and November to January
- Passion Fruits, Msambweni and Kubo Divisions; evenly distributed: Season, Peak from May to June but its annual
- Avocados, just a few trees in Msambweni, Kubo and Matuga.

### Market:

- 20% linked to market.
- 30% of the harvest is sold locally
- 50% go to waste

### Marketing channels

- Individuals can book the farm or buy the produce then take to Nairobi or export market - brokers.
- Take to Kongowea Market in Mombasa
- Sell along the roadsides
- Nearby hotels - buys mangoes from farmers when they get orders

There is no fruit processing company located in Mombasa; and they only come and buy the mangoes and passion fruits from the MSEs.

#### Service Providers:

- Ministry of Agriculture through extension services i.e. in each of location or sub-location has one extension officer to provide these services - planting, crop husbandry, marketing, processing.
- Chemical companies - Bayer -provide training through Ministry - safe use of chemical.
- The Coast Development Authority - provides training and seedlings on wholesale at between Kshs 100 and Kshs 200 per seedling, compared to the Kshs 60 charged by KARI for Mangoes seedlings.
- Nurseries: Msambweni - Mamba FFS, selling seedlings at Kshs 100 for 30. Majority of the nurseries are not registered.
- Stockist in Kwale, Msambweni, Kubo, (all divisions have a few stockists)

Passion fruits: mainly local is produced; improved variety is now coming up because of KARI. Seedlings are selling for Kshs 40 each. Total Mango acreage in the district is 2873.7.

Five out of six service providers do it commercially i.e. only Agricultural Ministry - do it freely - Home economic department, drying mangoes, mango juices which they (farmers) sell.

#### Manga Malume - Group, Kilifi District

The key informant discussion on mango, avocado and passion fruits in the district was done with District Farm Management Officer (Mrs. Priscilla Mnene.) Kilifi District has seven divisions, 36 locations and 108 sub-locations. The total population of the district is 550,000 persons with 63,862 farm families. The number of division's farm families is as follows:

<b>Kaloleni</b>	<b>2,000</b>
<b>Ganze</b>	<b>3,124</b>
<b>Bahari</b>	<b>7,410</b>
<b>Kikambala</b>	<b>7,700</b>
<b>Chonyi</b>	<b>35,275</b>
<b>Bamba</b>	<b>4,409</b>
<b>Vilungeni</b>	<b>3,944</b>
<b>Total</b>	<b>63,862</b>

The hectare under mango fruit trees in the district is 1,280 and average yields are 10 tons per hectare. For passion fruits is 15 hectare and average yields is 4 tons per hectare.

Mango fruit trees are concentrated in Kikambala and Bahari Divisions while passion fruits are concentrated in Chonyi Division. The harvest seasons for mango fruits are between May to July and December to February. The passion fruits were described as all year fruits.

#### Market Linkages

In Bahari, Kikambala, Chonyi and Kaloleni Divisions there are no major problems in marketing of fruits. On average 60-70% of the farmers are linked to the market through middlemen popularly known as brokers. These brokers buy fruits from the farmers and sell to either major dealers who export or to local markets. Some farmers supply to nearby Kongowea Market in Mombasa. There is a fruit processing company in Mtwapa called Milly Fruit Processing Company, which contract some farmers to supply mango and passion fruits.

#### Service providers

The officer identified the following service providers assisting the farmers:

- Ministry of agriculture - provide extension services
- Private fruit nurseries - operated by individual and groups of farmers and sell mango seedling at between KShs.50 to 80 per seedling.
- KARI (Mtwapa) - undertaken research and development of better mango and passion varieties and also provide training on pests and disease control.
- Brokers and fruit processing company - provide market to farmers.

The major problems facing farmers in the poor marketing structure and pests and diseases especially fruit flies.

#### FOCUS GROUP DISCUSSION (KILIFI DISTRICT, BAHARI DIVISION)

The discussion was conducted in Matsangoni location in Bahari division. It consisted of 11 (eleven) farmers of the Mpenda Kula Farmers Field School plus two Ministry of Agriculture staff.

Out of the total 100% of them grow mangoes than a few have fruit trees of passion fruits.

#### Breakdown of fruit trees (Total in the group)

Avocados	-	0
Passion fruits	-	9
Mangoes	-	164

#### Mangoes:

According to this group the season for mangoes is normally two seasons in a year namely: April - August and December - February.

The production for each mango tree was agreed as 270 Kgs. = 43,280 Kgs. But this is what the farmers can account. They said that 50% of the produce goes to waste due to lack of market. The rest (above figure 43,280 Kgs.) is normally sold at throwaway prices between 1 - 2/- per piece.

#### Passion fruits

The peak season is normally between June and August. They only have the local variety (yellow passion). This sub sector is not highly practised here since most farmers do not have access to the improved variety hence only a few farmers have between 3-5 fruit trees.

#### Marketing channels

Most of the fruits are sold through brokers over 99% of those sold. These include businessmen and women who come to buy the produce from the farms then pack them into cartons or sacks and transport them to Mombasa's Kongowea Market or to Nairobi for local consumption and export.

Tropicana processing company in Mtwapa gets some of the produce but also through these brokers. The group only knew only one farmer in the whole division who usually buys mangoes from them and also takes his own produce (mango) to Kongowea (Mombasa) and Nairobi. All the farmers do not have any contracts to supply their output.

#### Taking Care of the Fruit Trees:

Due to the low incomes from mangoes most farmers have neglected the fruit trees hence they don't consider it as a source of income. Most farmers do not (almost all) spray the mango trees; in fact none in the group has ever sprayed his/her fruits. Time taken to care for the fruit trees is only seasonal activities i.e. when weeding for their maize or coconut trees, which are intercropped with the mango trees.

#### Service Providers:

The present farmers mentioned the following service providers in the area:

- Bayer - which took some members of the group for a seminar on general agriculture.
- Asali Tamu group - which has now started nurseries for mangoes
- KARI Mtwapa has mango seedling but most farmers complained of the high cost of seedling (at Kshs 60) hence none has ever bought.
- Agricultural extension officers - these officers are said to have a bias on livestock only but not fruits.
- Kwetu group - used to have a solar mango drier but it stalled due to lack of market of their end products (They supplied a buyer who never paid them).

#### Problems

The farmers cited the following problems facing them:

- Poor and unpredictable market
- Pests and diseases
- Poor varieties (local)
- Lack of training/knowledge
- Transport - interior the roads are impassable during rainy season

Members present (Mpenda Kula Group)

- Mary Sasua - Chairlady
- Johnson Mwangome - Secretary
- Christine Aliwazi
- Junor Gichenga
- Badzo
- Maringa
- Monicah
- Evarlyne Shizelu
- Sigi Charo
- Esther Karani
- Esther Jena

NB: The above group has a total of 23 members.

Conclusion:

The group was impressed by Kenya mission and promised to produce more than four times the amount and assured to get stable and reasonable markets. They said they could start taking care of the fruit trees (mangoes) if they get a ready market. Passion fruits are no popular in the district.

## Annex 3

### Summary of the literature reviewed

References for this research is drawn from the Ministry of Agriculture annual reports, Central Bureau of Statistics, The Kenya Statistical Abstract 2002, The Gemini tools for Microenterprise programs, Kenya BDS Market assessments, Reports from the Horticultural Crop Development Authority.

MSE's employ vast number of people in a highly competitive and fast changing environment in third world.

A sub sector refers to a network of firms that supply raw materials, transform them, and distribute finished goods to a particular consumer market.

#### Aims

- Look for opportunities and constraints
- Establish the vertical supply claims i.e. purchase of inputs and outputs.
- Competition - main competitive large scale
- Co-ordination i.e. how policies and regulation influence the market access, interaction and how insiders regulate product flow.

#### Major findings

- Smallholder farms range from 0.2 to 2 hectares according to the statistical abstract 2002 from Central Bureau of Statistics (CBS).
- Small farmers produce 70% of the gross marketed product.
- Main producing areas include Kilifi, Kwale, Malindi, Machakos, Lamu for mangoes; Avocados are highly produced in Kiambu, Thika, Embu, Machakos, Muranga, Nyeri and Taita Taveta; Passion fruit is grown in Thika, Nyeri, Kiambu, Muranga, Embu and Meru.

#### Key players

- Regulatory and supportive institutions
- Input suppliers, i.e. fertilisers, agrochemical, and seeds
- Farmers, traders/brokers
- Distribution, wholesale traders
- Fresh produce exporters, supermarkets and fruit processors, and consumers.

#### Constraints

- Stringent export market requirements
- Market competition
- Poor rural infrastructure
- Lack of market information -new fruit varieties, direct link to market
- Lack of good quality seeds and planting materials
- Lack of skilled personnel and co-ordination among involved institutions
- Prevalence of pests and diseases
- Low yields/profit margins, and poor crop husbandry.

#### Avocado

Avocado is mainly grown in Central Province accounting for 35%, Eastern 29%, Nyanza 14% and Western 11% of the total output.

#### Market

The domestic market consumes over 80% of the total production and only 20% are exported largely as fresh fruits. Major market (export) is France accounting for 86% in year 2000. Small-scale farmers for avocados are currently estimated at 5,000 who are the main producers.

## Mango

Kenya's Coast Province (Malindi, Lamu, Kilifi, and Kwale) accounts for 39% and Eastern Province (especially in Machakos) 32%. These two provinces account for nearly 71% of the country's total output (Source: HCDA/MOARD). About 98% of total mango output are consumed locally and only 2% are exported.

## Passion fruit

Accounts for just per cent of total area under fruits, and only 4% of its total production is exported (leaving 96% of output to the local market).

## Opportunities in the tree fruits sub sector

- Income generation - potential for increasing rural household incomes through stimulating growth of business enterprise.
- Employment
- Potential for positive multiplier effects with other sectors of the economy.
- Outreach - the size of participating MSEs is likely to grow.
- Market - look for market worldwide where there is demand.

## Processing

Processed fruit products include fruit concentrates, fruit juices, sliced fruits, jams, marmalade and chutneys (canned).

The following are some of the major fruit processors in the three provinces dealing with mango, avocados, and passion fruits:

- Malindi Fruit processors
- Kenya Fruit Processors Ltd. - Thika
- Milly Fruit Processors - Mombasa
- Bawazir Food Processors - Mombasa
- Seven Trees Farm Ltd. - Muranga
- Matinyani Multipurpose Women Group - Kitui
- Travellers Oasis Food Co. - Sultan Hamud
- Picawa Processors - Mtwapa

Elida Ponds - Mombasa

Annex 4

MSE Household Questionnaire

Section A:

District

Location/sublocation (\*delete as appropriate)

Section B:

Name of the MSE being interviewed

Tree fruit(s) being grown by the MSE

Tree fruit	Number of trees/vines	Acreage	Harvest season (s) (months in the year)	Average harvest per season (in Kgs)
Mango				
Avocado				
Passion				
Total				

For each tree (Mango):  
How old are the trees?

Were the trees planted by the MSE (or have the trees grown own their own)?

(If the trees were planted by the MSE), where did they get the seedlings?

How much time does the family/household spend taking care of the trees?

Has the MSE obtained any services in helping to take care of the trees (1. In the last six months, 2. In the last three years)?

Last six months

Last three years

(If yes), from whom did the MSE obtain the services?

Which of these services did the MSE pay for?

How much did the MSE pay for these services?

For each tree (Avocado):  
How old are the trees?

Were the trees planted by the MSE (or have the trees grown own their own)?

(If the trees were planted by the MSE), from where did they get the seedlings?

How much time does the MSE invest in taking care of the trees?

Has the MSE obtained any services in helping to take care of the trees (1. In the last six months, 2. In the last three years)?

Last six months

Last three years

(If yes), from whom did the family obtain the services?

Which of these services did the MSE pay for?

How much did the MSE pay for these services?

For each tree (Passion):  
How old are the vines/plants?

Were the trees planted by the MSE (or have the plants grown own their own)?

(If the trees were planted by the MSE), where did the MSE get the seedlings?

How much time does the MSE invest in taking care of the trees?

Has the MSE obtained any services in helping to take care of the trees (1. In the last six months, 2. In the last three years)?

Last six months

Last three years

(If yes), from whom did the MSE obtain the services?

Which of these services did the MSE pay for?

How much did the MSE pay for these services?

Section C:

For each tree fruit grown (Mango):

Does the MSE household consume all the fruits produced in every season?

(If no), how much of the fruit is sold per season (in Kgs)

How does the MSE sell the fruits that are not consumed by the MSE's household?

Does the MSE have any contracts to supply the fruit?

(If yes), with which organisation/person does it have a contract?

Has the MSE ever had a contract to supply the fruit in the past (indicate the exact last time it did)?

For each tree fruit grown (Avocado):

Does the MSE's household consume all the fruits produced in every season?

(If no), how much of the fruit is sold per season (in Kgs)

How does the MSE sell the fruits that are not consumed by the MSE's household?

Does the MSE have any contracts to supply the fruit?

(If yes), with which organisation/person does it have a contract?

Has the MSE ever had a contract to supply the fruit in the past (indicate the exact last time it did)?

For each tree fruit grown (Passion):

Does the MSE's household consume all the fruits produced in every season?

(If no), how much of the fruit is sold per season (in Kgs)

How does the MSE sell the fruits that are not consumed by the MSE's household?

Does the MSE have any contracts to supply the fruit?

(If yes), with which organisation/person does it have a contract?

Has the MSE ever had a contract to supply the fruit in the past (indicate the exact last time it did)?

Section D:

Do you know of any commercial service providers in your area?

(If yes), how many do you know about currently?

What are the names of these service providers?

For each provider that you have mentioned, what specific services do they provide to MSEs in the tree fruits sub sector (Mango, Passion, and Avocado)?