

## Smallholder Summer Flower Production in Kenya: A Myth or a Prospect?

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### Abstract

“Summer flowers”, the general name given to annual species and bulbous perennials traditionally grown during summer in northern Europe, they include *Ornithogalum saundersie* (commercially known as “Arabicum”), *Alstromeria* spp., *Ornithogalum thyrsoides*, *Erygium* spp., *Cyperus alternifolius*, *Polianthes tuberosa*, *Rumohra abiantiformis* and *Limonium sinuatum*, just to mention a few. The floriculture industry is one of the fastest growing sub-sectors of the horticultural industry in the Kenyan economy. In 2004, floriculture contributed 53.1% of all horticultural export volumes and 57.4% of all horticultural export earnings. The cut flower industry is dominated by large-scale sophisticated outfits, growing mainly flowers in greenhouse. Smallholder contribution to the total earning from the sector has been declining steady, from an estimated 13.5% share of total value of exports in 2000 to an estimated 5.1% in 2004. A study was carried out to analyse the profitability of smallholder flower enterprises and Arabicum was used as a model crop. The two-stage purposive random sampling technique and a structured questionnaire were used to interview 45 farmers in Kiambu, Thika and Murang’a districts. The analysis revealed that most of the farmers had no indication of the return on capital or the amount of capital utilize. Most of the farmers were aware about their day-to-day costs such as labour, fertilizer, and chemical use. Most of these farmers had no information on the market, because the marketing and logistics are handled by a marketing agent, who has the access to the relevant infrastructure. The study concluded that smallholder flower production in Thika and Murang’a districts was not profitable while in Kiambu district the enterprise was profitable with a Benefit cost ratio (BCR) of 0.2 and 1.4 respectively.

### INTRODUCTION

The cut flower industry contributes more than 50% of foreign exchange earnings from total horticultural exports. For instance, in 2004 the value of total horticultural exports were KES 32,590.8 billion, and contribution of cut flowers was KES 18,719.9 billion (HCDA, 2005). Between 1995 and 2004, flower and horticultural export earnings grew by more than 300%, in a period when overall export growth was only 40% (HCDA, 1995-2004 reports). The floriculture industry has approximately 5000 producers ranging from smallholder farmers (less than 0.4-1.6 ha) to medium scale operations (4-10 ha) and large commercial operations (20- more than 100). Fifty medium- to large-scale operations produced 75% of total exports and another 10-15% of exports were produced by several dozen small- to medium-scale operations. The remaining 5-13% of exports was produced by 3,000 - 4,000 smallholder farmers (Table 1) (Fintrac, 2005; Kolavalli, 2004).

Smallholder production started in the late 1970s in Kiambu district through a public-private donor program initiated by Updown/Sulmac/UNDP/FAO/HCDA. The growers started with production of *Dianthus* spp., *Limonium sinuatum* and several greens such as eucalyptus and later *Alstromeria* spp. (Kolavalli, 2004). Flower production (both by small and large holder farmers) concentrated in three provinces in Kenya: Rift valley (large holder farms), while Eastern and Central (small holder farms). Within Central province, Kiambu had the highest numbers of smallholder farmers followed by Thika, and

Murang'a districts. As shown in Table 1, *Ornithogalum saundersie* (commercially known as "Arabicum") and *Ornithogalum thyrsoides*, produced the highest volumes and values over the last four years. *Ornithogalum thyrsoides*, thrived in Central province especially in Kiambu district, where farmers invested in irrigation and shade netting. On the contrary Arabicum is an annual flower, which performed well in most flower growing regions of the country and therefore will be studied as a model crop. The upward trend seen for Arabicum is due to the fact that it is amenable to either rain-fed or irrigated production systems. This makes it a popular flower for new comers in the business.

The objective of this study was to examine why the most smallholder flower producers abandon the business within the first or second year of establishment. The results of this study will be useful in providing additional information to smallholder information service delivery practitioners.

## **MATERIALS AND METHODS**

### **Study Area**

Kiambu, Thika and Murang'a districts located in varied ecological zones namely - upper highland, low highland, upper midland and low midland. They are furnishing very good climatic conditions for mixed farming, thereof cut flower production is one of the key farming enterprises in the districts. In order to get a comparison basis across the districts the Arabicum flower type was used.

### **Research Questions**

The questions addressed in this study were: What are the land sizes under Arabicum? How many seasons is Arabicum planted in a year? What good agricultural practises do the farmers use? What kind of investment does Arabicum production require? What are the variable costs involved in production? What are the marketing channels, how accessible is market information and intelligence?

### **Data Source, Type, Collection and Analysis**

Data was obtained using structured questionnaires via face-to-face interviews with 30 smallholder flower farmers in two districts (Thika and Murang'a) in Central province in November 2005. The two stage purposive random sampling technique was used to achieve the selected sample size. As a control, a sample of 15 farmers from Kiambu district, which is considered as the origin of smallholder production of summer flowers in the country, was used.

Desk review and descriptive statistics were used to describe the production trends over the last five years, which followed by a profitability analysis of the business.

The cost items were classified into (i) investment cost (land, and irrigation), (ii) input costs (labour and farm inputs) (iii) marketing costs (transportation and packaging).

## **RESULTS**

### **Production of Arabicum**

Farmers interviewed in Thika and Murang'a district said that they started growing the crop in the late 1990s with seed purchased from Kiambu district, while the farmers in Kiambu reported that they started production in the early 1990s. Five percent of farmers interviewed had been producing flowers for more than five years, however they did have a regular pattern of productions and were not flower type specific. Eighteen percent of the farmers had been involved in cut flower production for more than three years. The average area under Arabicum production has increased by 2.5 times the original area in Thika and Murang'a district as compared to 1.3 times in Kiambu district (Table 3). Farmers in Thika and Murang'a made a production for only one season per year, while Kiambu farmers produced twice during the year.

### **Profitability of the Enterprise**

**1. Investment Cost.** All the respondents did not lease land and the farmers relied on irrigation. However, only the farmers in Kiambu had invested in the establishment in sprinkler irrigation systems at US\$ 0.25 per m<sup>2</sup>. The Thika and Murang'a districts were used the bucket irrigation system, which cost US\$ 0.001 per m<sup>2</sup>.

**2. Input Costs.** Seed cost per bulb was US\$ 0.03 in Thika and Murang'a and the farmers source the material locally. In Kiambu, seed cost per bulb was US\$ 0.07. Other inputs included, manure (farm yard), fertiliser (DAP, 17:17:17 and 23:23:23), and pesticides. The average cost of input per m<sup>2</sup> in Thika was US\$ 0.12; in Murang'a US\$ 0.11 and in Kiambu US\$ 0.20. The average labour use in Thika and Murang'a was estimated at US\$ 0.06 per m<sup>2</sup> compared to US\$ 0.10 in Kiambu. The man-day rates in each district were different, US\$ 1.39 in Thika, US\$ 1.11 in Murang'a and US\$ 2.08 in Kiambu.

**3. Marketing Costs.** Thika and Murang'a farmers incurred no costs for packaging and transport because flowers were collected at the farm gate, while the Kiambu farmers more often than not incurred these costs at average of US\$ 0.14 per m<sup>2</sup>.

**4. Net Profit.** In Thika, the average net profit is US\$ 0.04 per m<sup>2</sup>, this is 19 times lower than the profit margin of the Kiambu farmers (Table 4).

**5. Sensitivity Analysis.** The benefit cost ratio (BCR) of the Arabicum enterprises in the different districts was calculated based on the following equation.

$$BCR = \frac{\sum_t (B(n))/(1+d)^t}{\sum_t (C(n))/(1+d)^t}$$

where d is a rate of discount, t is the number of years from the base year, B(n) and C(n) are total benefits and total costs in the year n.

The results showed that business in Kiambu was profitable with a BCR of 1.4 compared to Thika and Murang'a, which presented a BCR of 0.2.

## **DISCUSSION**

### **Investment by Smallholders in Cut Flower Production**

The smallholders concentrated on summer flowers that did not require high capital investment. In reference, to Arabicum, the farmers were growing the same variety grown in the early 1990s. The Kiambu farmers had invested in irrigation; the Thika and Murang'a farmers applied different cultivation system, making it difficult to get assurance on flower production schedules from farmers in the two districts. The reliance on rain fed production system caused fluctuations in the number of stems produced per season. This made it difficult for these farmers to assure quality and quantity.

### **Marketing of Cut Flowers**

Ninety five percent of the Arabicum produced in Kenya was exported. The links between farmers, exporters and importers were usually a loose contractual link that is neither vertical nor symmetric in nature. Most farmers relied on information from the exporter agent, about the demanded flower type, time and quantity to produce. These agents provided information with preconceived selfish intentions; therefore, this information was not objective for future planning. Most smallholder farmers did not have complete access to information and therefore were not able to make decisions based on the profit margins that the business attracts.

The study purports that farmers can use average fixed and variable cost of production to make decisions about continuing or stopping production in time of temporary adversity. Fixed costs have to be met whether anything is produced or not; however the farmer can make a decision on whether or not to meet the variable costs in the short run. If the farmer is able to pay for all the variable cost and some of the fixed cost, hence reducing the overall loss, the farmer is better off producing than not producing

in the short run. However, if the farmer is not able to pay the variable costs at all, it is better not to be in production because the farmer will run into heavy losses (Makeham et al., 1986).

## CONCLUSIONS

- Arabicum production was profitable in Kiambu and not in Thika and Murang'a districts.
- Most of the respondents did not pay special attention on how much money they had invested in Arabicum production and especially in Thika and Murang'a where there was lack of investment.
- Smallholders have a perceived impression that the money they receive at the pay point is their profit margin. They re-invest when returns are high without taking into account the initial investment. Similarly, abandon the enterprise when returns are low. This leads to a scenario where the smallholders tend to have unpredictable production cycles.
- Smallholder summer flower production can only be profitable if the farmer is able to get access to relevant information and infrastructure that will assist in making the decisions on what to produce and when to produce. Before these issues are resolved it will be difficult for smallholders to produce summer flowers profitably.

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## Literature Cited

- Fintrac Inc. 2005. Summary report, baseline survey of Kenyan smallholder flower sector. Nairobi, Kenya.
- HCDA. 2004, 2005. Horticultural export statistics Nairobi, Kenya.
- HCDA. 2001. Horticultural Crops Development Authority, Annual report, 2001. Nairobi, Kenya.
- HCDA. reports 1995-2004. Nairobi, Kenya.
- Government of Kenya. 2005. Economic survey 2004. Government printers, Nairobi, Kenya.
- Kolavalli, S. and Whitaker, M. 2004. Floriculture in Kenya, Uwazo - Creative Directions [www.uwazo.com](http://www.uwazo.com).
- KFC. 2002. Kenya Flowers Council, Annual Report 2002. Nairobi, Kenya.
- Makeham, J.P and Malcolm, L.R. 1986. The Economics of Tropical Farm Management. Cambridge University Press, Cambridge.
- Ndungu, B., Muthoka, N., Nakhumicha, A. and Kamau, M. 2002. Marketing of Flowers by Small Scale Farmers in Kenya, Paper Presented at the KARI 3rd Socio-Economics Conference, April 2002.
- Nyongesa, D.J.W and Gikaara, D. 2005. Kenya's Horticulture Industry: A Case of Small-scale Cut Flower Farming in Meru Central District. Poster presented in conference of 9TH Biennial Scientific Conference Held at Kari Headquarters, 8th-12th November 2004. KARI, Nairobi, Kenya. (in press)
- Opondo Magdalene, M. 2002. Policy Analysis in Small-scale Flower Marketing in Kenya, University of Nairobi, Kenya.

## Tables

Table 1. Export statistics of selected summer flowers grown by smallholder farmers (2005).

Crop	Value in KES Million				Volume in Metric Tonnes			
	2000	2001	2002	2003	2000	2001	2002	2003
Agapanthus	4.0	3.4	5	14.4	40	25	42	67
Alstromeria <sup>1</sup>	140	66	112	113.7	1,089	723	567	767
Arabicum	23.7	21.2	48.3	50	421	141	213	208
Asclepias(Morbydick)	-	0.001	0.5	7.8	-	-	5	47
Erygium	30	28	30	78.6	479	330	488	387
Molucella	6.1	5.5	13	14.5	49	47	92	106
Ornithogalum	22.7	16.1	20.3	56.6	203	114	123	290
Tuberose	1.2	1	0.2	0.92	27	10	2	4

<sup>1</sup>Only 26% of the exported flowers were produced by Smallholders.

Table 2. Estimated summer flower share of the total exported flowers (2000-2003) (2005).

	Volume (MTs)				Value (KES Million)			
	2000	2001	2002	2003	2000	2001	2002	2003
Total	38756.7	41396	52106.7	60982.9	7165.6	10626.9	14792.3	16495.5
% share of total	13.5	9.2	6.4	5.1	8.6	6.2	4.1	4.8

Table 3. Area of land under Arabicum production in acres.

	Ave. farm size	Area under Arabicum during the first year of production	Area under Arabicum in 2005
Kiambu	2.2	0.3	0.4
Murang'a	3.9	0.2	0.5
Thika	3.9	0.2	0.5

Table 4. Profitability measures for Arabicum per m<sup>2</sup> (1US \$ = 72 KES).

	Labour cost	Input cost	Cost of planting material	Irrigation cost	Marketing cost	Total cost	Gross revenue	Net revenue
Kiambu	0.10	0.20	0.07	0.25	0.14	0.76	1.54	0.78
Thika	0.06	0.12	0.03	0.01	0.00	0.22	0.26	0.04
Murang'a	0.06	0.11	0.03	0.01	0.00	0.20	0.24	0.03

