

COMMERCIALIZATION BULLETIN: SWEET POTATO

Bulletin #04

INTRODUCTION

This is a traditional household crop with low yielding varieties, although it is undergoing some transition through better yielding variety introductions. Sweet potatoes are amongst the most popular tubers sold in Kenya. It is used as food e.g. as a substitute for bread in urban centers like Nairobi and Mombasa, animal feed and manufacture of processed industrial starch and ethanol. China is the leading producer of sweet potato at over 76 million tons followed by Uganda and Nigeria each at over 2.7 million tons a year. Kenya is ranked 10th largest producer in the world with over 930,000 tons. The USA is the largest exporter with over 67,000 tons followed by China (over 26,000 tons) and The Netherlands (7,350 tons). In terms of productivity per hectare, Egypt leads by producing 26.5 tons/Ha, followed by USA 22.5 tons/Ha and China does 21.6 tons/ha; Kenya is at 12 tons per ha. The EU is the largest importer at 67,000 tons, followed by UK (over 38,900 Tons) and Canada (over 35,700 tons); these exports to EU are mainly from USA and target ethnic communities from Africa and Asia. The target would be to increase productivity per hectare for this bulky and low yielding commodity, hence making it a cheap source of food that can play a significant role in food security; this can be done through continued introduction of higher yielding varieties and use irrigation. To be able to sell international, growers are advised to produce a cheap and high quality commodity. A problem farmers have to contend with is the high costs of transport as the commodity is bulky. This bulletin analyses markets, production, investment required and a case study of a successful farmer.

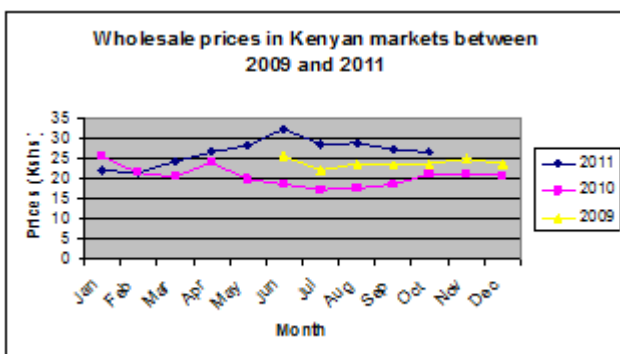


MARKETS

Much of the sweet potatoes are marketed domestically; although exporters are looking at the possibility of producing improved sweet potatoes varieties aimed at export market and food security. Sweet potatoes are one of the super foods as it is loaded with nutritious vitamins, minerals and has a great taste. The major markets for the tuber are the urban centres of Mombasa, Nairobi, Nakuru and Kisumu with marketing channels being the intermediaries. Red skinned and Yellow Fleshed sweet potatoes have the highest market share in domestic markets due to its high demand and it mainly traded in informal market. Red skinned and white fleshed or white skinned and white fleshed is rated second. The white skinned has high demand in formal markets; mainly supermarkets and groceries but it's rarely traded in major wholesale markets. This notion is changing as consumers understand the nutritional value especially for healthy eating of the orange, purple and pink flesh varieties. The market is under-supplied at times during the year with additional produce being imported from Uganda and Tanzania. This represents a production and sales opportunity for Kenyan growers. Some processed products include sweet potato flour, sweet potato biscuits and sweet potato fries.

VOLUMES

In 2009, over 45,000 tons (around 5 % of total production) valued at Ksh 1.2 billion was supplied into major markets like Nairobi's Gikomba Kawangware and Kangemi; Limuru; Naivasha; Nakuru; and Mombasa. Market supply of sweet potatoes is derived from wholesaler's sourcing from various production areas in Kenya, Tanzania and Uganda and the value chain is dominated by fresh root tubers (Farm Concern). The other 95 % is produced and consumed at farm level without entering the market value chain. An insignificant amount is sold as processed product.



PRICES

Before planting, it is essential to make contact with buyers and get more information on the variety and quality requirements of the target market. The current farm gate prices range from Ksh 10 to 20 per kilo. The average wholesale price in Kenyan markets was Ksh 24 in 2009; Ksh 21 in 2010 and upto October 2011 was Ksh 27; the average retail price was Ksh 47/- per kg. If growers produce good quality sweet potatoes and store them well they can increase the prices they get for their produce and make better return. The wholesale price variation is depicted in the side figure.

COMPETITION

There is certainly high demand of sweet potato across the population in Kenya, many families consume sweet potatoes due to its high nutritional value and this clearly fuels demand. The planting season favours Kenyan farmers but there is competition from Tanzania and Uganda produce due to difference in planting seasons which once it enters the Kenyan market results in prices dropping.

PRODUCTION AREAS

In 2010, 78,943 Ha were under sweet potato production from 820,971 tons compared to 74,937 ha that gave 724,646 tons in 2006. Major areas of production are in Nyanza regions of Rachuonyo, Sirare, Rongo and Kisii; Central region of Kirinyaga; Eastern region of Meru; Western region of Bungoma, Kakamega, and Lugari; and Coast region Shimba hills.

SWEET POTATO PROPAGATION

Free draining sandy loam soils are the best type for sweet potatoes growing and therefore very heavy or waterlogged soils should be avoided. Soils containing well decomposed manure or compost will produce higher yields. It grows best in warmer areas, provided that there is water supply when planting and tuber formation period. As the market is under-supplied growers can plant as much as they can provide care for in the field. This is a smallholder friendly crop that requires low labour input. A yearly soil test is recommended to assess soil properties like pH and nutrient levels before ground preparation.

Planting Material

The varieties include Kabonde, Tainung, SPK004, Sally Boro, Mugande, KSP20, Musinya, Amina, Nyathi odiewo (yellow fleshed), Kimei, ejumla although there are others being promoted like Arror and Ortum (for lower altitude areas), Sandak and Kemblo. Vines for planting are cut from the mother plant. Planting material can be sourced directly from reliable propagators such as KARI and buyers of the tubers or authorised propagators.

Land Preparation

Sweet potato is grown on raised beds or mounds. This provides the developing roots with loose friable soil to expand to their potential size and shape without restriction. It also allows adequate drainage and provides easy harvesting. Therefore, prepare raised beds well in advance of planting and add as much, well decomposed manure as possible. The vines should not be planted too deep as this might prevent the sweet potato tubers from expanding as it grows. Plant out in cool weather or late in the afternoon.

CROP MANAGEMENT

The growing area should have adequate water supply and must be free of perennial weeds as sweet potatoes need to be kept weed free especially in the initial stages of growth. Water logged soils should be avoided. Ensure enough water is available while the tubers are swelling but four weeks before harvest should if possible be dry. Live barriers should be planted around the edges of the crops to keep out pests and to protect from the effects of strong winds. Normally live barriers are made from grasses such as maize, sorghum, sugar cane and Napier grass.

Pests

Scout for pests such as nematodes; insects i.e. tuber weevils, leaf thrips and aphids and also diseases such as virus. Insects include the Sweet potato tuber Weevils (This pest can be very damaging as it attacks the mature tubers); Giant Termite (Termites can be a major problem especially on newly cleared ground where the activity of established colonies has not been identified); Aphids and whitefly. Diseases – the major diseases are Potato Mosaic Disease and Powdery mildew but it has been observed that early maturing varieties may outgrow viral diseases; please note that diseases may not be of economic value. Domestic animals especially chicken; wild hogs/pigs which feed on the foliage causing tubers not to form and rodents such as rats, mice, squirrels and moles feed on tubers when they are formed.

Fertility Management

Soil analysis is recommended before any fertilizer application in order to advice on the right nutrients to apply in the soil. Very few farmers apply fertilizers on sweet potato, however it is suggested that 16 tons (500 'debes') of well decomposed manure and DAP or NPK or TSP of 250 kg per hectare is applied during planting. It is recommended that a top dress of CAN is done four weeks after planting; with a handful of CAN being used for every 2 meters per row (this translates to 125 kg per hectare).

HARVESTING AND YIELD

Time to First Harvest and Seasonality

The sweet potatoes are mature three to five months after planting depending on the variety. In normal circumstances the mature tubers crack the soil around the vine. Some varieties produce flowers. To confirm maturity, simply dig out a few tubers. Harvest and grading personnel should have trimmed nails without rings or bracelets. Cut the vines or top foliage four days before harvesting after confirming maturity. Dig out sweet potato tubers ensuring that you do not damage the tubers. The tubers should be lifted with a fork not just pulled from the ground as this will cause mechanical damage. Harvest when soil is at field capacity i.e. it is not wet. Note that mechanical damage, insects, dehydration and sun damage can account for up to 100% crop loss. 20 to 40 tonnes per hectare of marketable roots are achievable depending on variety and management but average yields of 25 tons per hectare are expected. After harvesting, curing commences; this involves lifting the harvested sweet potatoes and placing them on sacks in an open airy place out of direct sun. Do not pile the sweet potatoes too deep as they will not cure properly and may rot. Do not allow the sweet potatoes to get wet from heavy dews or rain while curing. The curing process increases the shelf life of the sweet potatoes enabling better marketing and higher prices; it also prevents rots forming while the sweet potatoes are transported or stored. Size and grade the sweet potatoes, removing any with damage or signs of rot. Store them in a cool, well aerated place i.e. on racks in layers of no more than 2 sweet potatoes deep. If they are to be stored for long periods, turn the sweet potatoes every 2 weeks, removing any with signs of rot or sprouting. Months of January and April tend to have less supply and hence sweet potatoes attract higher market prices.

Post-harvest handling, storage and product specifications

Ensure the potatoes are not bruised as this damage may fetch lower prices of the product at the market. Handle carefully during transport as sweet potatoes are easily bruised and if damaged they fetch lower prices. The potatoes should be free from dirt and any foreign materials such as pests. Do not use gunny bags or plastic bags as they will not allow air movement through the sweet potatoes and they will sweat. Sweet potatoes packaging is done as per customer requirements in netting bags or aerated packaging. For domestic sales, packaging may vary but packs of 150 kg bag or 70 kg bag are common at the farm gate; the packaging used by various intermediaries varies widely along the value chain. At wholesale level the major packages are polythene bags weighing, 260kg, 160kg and 120kg; the majority of wholesalers in Nairobi use the 260kg bag. This is made up of two or more nylon bags of 90kg joined together to make an extended bag, which is locally known as 'mtoro'. The 98 kg pack is the recognized pack for selling in the wholesale markets. For export sales, the pack should be medium sized (300grams), colored skin, and colored fresh, elongated sweet tubers.

INVESTMENT: GROSS MARGIN ANALYSIS*All values in Kenyan Shillings***Table I: Typical cost of production and expected income for sweet potato**

Item	Unit price(Ksh)	Quantity per Ha	Cost (Ksh) per Ha	Quantity per Acre	Cost (Ksh) per Acre
1. Vines / split	2	25,000	50,000	10,000	20,000
2. Land preparation – initial ploughing	10,000	Once	10,000	Once	4,000
Land preparation – preparation of beds	4,000	Once	4,000	Once	1,600
Land preparation - furrowing	150	25 mandays (md)	3,750	10 md	1,500
3. Manure	1,000	10 tons	10,000	4 tons	4,000
4. DAP/TSP/NPK	60	250 kg	15,000	100 kg	6,000
5. CAN (optional)	30	125 kg	3,750	50 kg	3,000
6. Insecticides (once or twice but optional)			5,000		2,000
7. Labour weeding (twice)	150	60 md	9,000	24 md	3,600
Labour - planting	150	32 md	4,800	13 md	1,950
8. labour harvesting and on farm transport	150	200 md	30,000	80 md	12,000
10. Labour grading cost	0	25,000 kg	6,250	10,000 kg	2,500
Total cost of production			151,550		62,150
Total revenue	15	12,000	180,000	4,800	72,000
TOTAL GROSS MARGIN			28,450		9,850
TOTAL YIELD			12,000		4,800
MARGIN PER KG			2		2
AVERAGE MONTHLY INCOME (5 months)			5,690		1,970

Profitability : A well-managed one hectare sweet potato agri-enterprise yielding 25 tons and sold at a farm gate price of around Ksh 15 will give a farmer a net income of over Ksh 43,000 per month; equivalent to a white collar job in a major urban centre like Nairobi.

INVESTMENT REQUIREMENTS

Most production within Kenya for the sweet potato is done on a small scale basis. The basic investment requirement would be a sizeable piece of land and the vines (seed). The estimated cost of production as per the production analysis would be around Ksh 158,050 per hectare. This is affordable to many farmers practising it on a small scale like 1/8 of a hectare (i.e. a plot 30 x 10 m) who will require around Ksh 20,000 to start the enterprise and earn over Ksh 5,000 per month.

CASE STUDIES

Case Study: Karen Owino, Oriang, Homa Bay County, Nyanza region

Karen Owino is a 34 year old farmer from Oriang in Homa Bay County with two acres with 1/3 of an acre under sweet potatoes; she grows the local varieties called Nyathi odiewo which is yellow fleshed or Amina; she gets her planting material from her neighbours; her enterprise is rainfed and no manure or fertiliser is applied. Challenge she encounters include the menace of moles, which she controls through trapping; and weevils. This variety takes four to six months from planting to harvesting, which she normally harvests between December and February. Normally she grades them into different sizes which would go for an average of 20/- per kg. She harvests 30 bags of 70 kg each from the 1/3 of an acre she farms; this translates to approximately 2,100 kg and turnover of Ksh 42,000. Costs include hire of land for Ksh 3000; cost of cultivation for Ksh 3,000; various costs linked to labour for planting, weeding and harvesting was Ksh 3,200; all this coming to Ksh 9,200. The net income comes to Ksh 32,800 which means she can earn Ksh 5,500 per month if she organized her enterprise to have consistent sales throughout the year. She sells to middlemen from Nairobi, Nakuru and Gilgil; also some of the potatoes she sells on the road side or in the market.

IMPORTANT CONTACTS

Service provider	Service	Contact
KARI	Production of planting material	The Director, KARI
		P.O. Box 5781 I-00200, City Square, NAIROBI, Kenya
		Email: Resource.center@kari.org
		Fax: +254-020-4183344
		Tel No(s): +254-020-4183720, 4183301-20
		GSM: +254 733 333223/333224, +254 722 206986/206988
Farm Concern International	Farmer support services; commodity marketing research	Director, Farm Concern International
		P.O. Box 15185-00100, Nairobi, Kenya
		Tel: +254-20-2626017/18
		Email: info@farmconcern.org
		Website: www.farmconcern.org

Kenya Horticulture Competitiveness Project

USAID-KHCP is a five-year project designed to increase smallholder farmer incomes through enhanced productivity, crop diversification and improved market access.

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