

# COMMERCIALIZATION BULLETIN: ONIONS

*Bulletin #01*

## INTRODUCTION

China is the leading producer of bulb onions with over 21 million tons followed by India (over 13.8 million tons) and USA (over 3.4 million tons). The highest productivity per hectare is Korea Republic (67 MT/ha) followed by USA (57 MT/ha) and Spain (54 MT/ha). The onion is an important spice for foods, soups, seasoning salads and stews. It is rich in vitamin E and has therapeutic properties. Analysis of the Kenya onion enterprise shows it needs extra investment targeting increasing total production from the current 96,000 tons of bulb onions and 24,000 tons of green leaf onion with an average production of 15 tons per hectare to over 60 tons per hectare. Another area would be research into new varieties to make it more lucrative. Quality of bulb onions is an aspect that may hinder Kenya's produce getting better prices in times when the produce from Tanzania gets into the market as bulbs that are not fully cured are marketed by Kenyan farmers. This bulletin analyses markets, production, investment required and a case study of a successful farmer.



## MARKETS

Bulb onions are amongst the most popular vegetables sold in the Kenyan market. Kenya has a market for both red and white bulb onions; and green green leaf onions across the country. The red bulb variety is more preferred by the market than the white bulb onions. The bulb onion is required for limited specialized uses like cuisines. Medium sized bulbs are preferred for both red and white onions. There is also a highly specialized 60 tons a year business that involves the export of salad onions into the EU market as vegetable mixes in pre-packs. Well dried, good quality, non-damaged bulbs fetch much higher prices and it is important that the neck is tight with no sign of green sprout. The Kenyan market demands are not met through domestic production and additional produce is imported from Tanzania. This represents a production and sales opportunity for Kenyan growers. Onions are also sold to processing companies to be found in processed products such as potato crisp and cheveda.

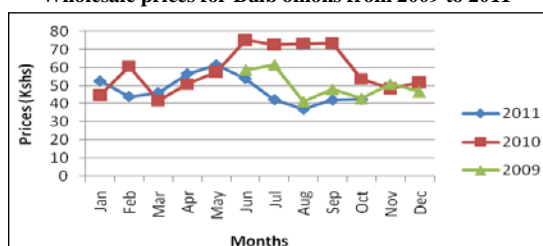
## VOLUMES

In 2010, over 96,000 tons of bulb onions and over 24,000 tons of green leaf onions were produced by farmers in Kenya; this was an increase over 2009 which was attributed to the favourable weather and high demand for the crop in Central and Rift Valley regions. Most of the domestic production of onions is consumed locally and approximately 4 % is imported, mainly bulb onions from Tanzania.

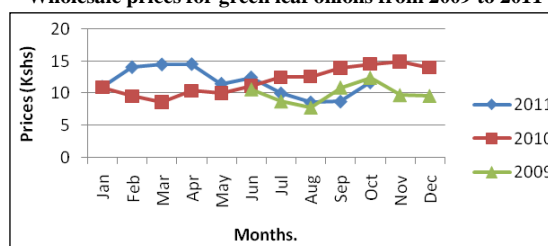
## PRICES

Wholesale prices of bulb onions in 2011, 2010 and 2009 were on average Kshs. 48, 59 and 50 per kg, while for green leaf onions in 2011, 2010 and 2009 were Kshs. 12, 12 and 10 per kg respectively. This shows a general declining price for bulb onions, although the prices of 2009 and 2011 have been about the same; for green leaf onions the prices have been relatively constant between 10 and 12 Kshs. The national average prices at farm gate level in 2010 were Kshs. 28 per kg for bulb onions; although this varies with demand as it may go as high as 45 Kshs per kg. There is no clear trend for supply of bulb onions into the domestic markets, although June has had a consistently higher than average price from 2009 to 2011 and hence bulb onions are very expensive in that month. The supply of green leaf onions into the domestic markets is rather stable throughout the year and the prices tend not to fluctuate.

Wholesale prices for Bulb onions from 2009 to 2011



Wholesale prices for green leaf onions from 2009 to 2011



## COMPETITION

In the East African region, Kenya is a net importer of onions especially from Tanzania. In 2010, Kenya exported into the region over 602.5 MT of onions and green leaf onions valued at Kshs. 13.3 million and imported 4,755.8 MT valued at Kshs. 59 million. The Mang'ola and Singida areas in Tanzania are some of the largest onions producing areas in East Africa and receive buyers who sell into the Kenyan market especially in. The season for Kenyan onions is January to May while the Tanzanian season starts from June to January, during which Tanzanian onions flood the Kenyan markets; in 2011 the wholesale prices start to from June possibly because of this.

## PRODUCTION AREAS

Onions can be cultivated in a wide range of areas mainly through rain-fed systems, although irrigated crops will produce greater yields in most years. Production is found in the Rift Valley regions of Oloitokitok, Perkerra, Kericho, Narok South, Narok North, Bomet, Naivasha, Kipkelion, West Pokot, Baringo, Bureti and Trans Nzoia West; Western regions of Bungoma East and Bungoma West; Central regions of Karatina, Laikipia, Nyeri North and Laikipia East; Coast regions of Taveta; Eastern regions of Meru; and Nyanza regions of Masaba, Kisii South, Nyamira, Kisii Central, Borabu, South Gucha, Rachuonyo, Manga, Siaya, Homa Bay, Kisumu East, Nyando, Kuria West and Kisumu West. Areas like Perkerra, Oloitokitok and Kimana grow onions under irrigation due to the arid conditions. The production trend in Kenya between 2006 and 2010 is captured below.

**Table 1: Bulb onion production statistics for period 2006 – 2010**

Province	Area (Ha)					Production (MT)				
	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
Western	674	1,246	1,412	1,064	1,885	10,110	18,690	28,240	21,280	24,505
Nyanza	1,975	2,523	2,347	1,250	1,292	29,625	37,845	35,205	18,755	19,380
Eastern	1,738	1,738	1,705	1,762	1,938	26,070	26,070	17,050	16,696	18,366
Rift valley	1,747	1,709	1,419	1,728	1,414	26,205	25,635	28,380	16,273	15,649
Central	539	583	530	729	855	8,085	8,745	7,950	10,935	10,560
Coast	259	259	312	265	438	3,885	3,885	4,680	3,975	6,468
N/Eastern	140	161	136	115	89	2,100	2,415	1,360	805	1,062
Nairobi	28	35	31	20	30	420	525	403	205	204
Totals	7,100	8,254	7,892	6,934	7,941	106,500	123,810	123,268	88,923	96,194

**Table 2: Green leaf onions production statistics for period 2006 – 2010**

Province	Area (Ha)					Production (MT)				
	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
Rift valley	843	1,098	981	1,220	1,342	10,116	13,176	29,430	11,636	12,800
Nyanza	98	98	98	540	341	1,176	1,176	2,058	10,584	6,820
Central	195	100	165	96	296	2,340	1,200	4,455	1,926	2,807
Western				127	135				1,524	1,620
Eastern	40	45	46	57	35	480	540	1,150	664	408
Coast	4	4	4	3	3	48	48	80	33	31
Nairobi				2	2				20	18
Totals	1,180	1,345	1,294	2,045	2,154	14,160	16,140	37,173	26,387	24,503

## ONION PROPAGATION

Before any production, it is advisable that soil analysis is done one month before in order to determine the fertility levels, pH, soil-borne pests, soil-borne diseases and any inherent challenge that may be in the soil. The results will be used to determine fertiliser and manure requirements during the growth period. This kind of tests can be done in accredited laboratories like in KEPHIS.

### *Planting Material*

Onions are mainly propagated through seed. The most commonly grown varieties in Kenya include the following: For **bulb onions** they are – Red Creole; Red Tropicana; Tropicana FI hybrid; Texas grano; Red comet FI; Bombay red,

Orient FI, Sivan FI hybrid, Grano 2000 FI hybrid, BGS 130, Flare FI and BSS 230. Hybrid seed is recommended as it will produce far better bulbs than non-hybrid varieties. For **green leaf onion** common varieties are – Spring Green bunching and White Lisbon. Since bulb onions are propagated through seed and later seedlings, nurseries for planting material should be prepared. A seed rate to cover one hectare is 3.5 kg for bulb onions. Transplanting beds should also be prepared. Green leaf onions are directly sown into the prepared land at a rate of 6 kg per hectare. Onion seed does not store well and seed more than 6 months old will probably have lower germination than fresh seed. To avoid diseases, ensure you obtain seeds from KEPHIS registered seed companies, dealers and stockists.

### **Land Preparation**

Land preparation for bulb onions should take into consideration use of decomposed manure applied at a rate of 20 tons and TSP (46 %  $P_2O_5$ ) at 200kg per hectare should be applied. One hectare is expected to have 300 to 375,000 plants transplants. The green leaf onions are direct sown 1.5 cm deep in single rows of 15 to 20 cm; the plants should be thinned to 8 to 10 cm apart.

### **CROP MANAGEMENT**

Bulb onion need proper care such as: watering as expected, weed control, mulching, soil crumbling, all round soil covering of the crop and control of pests. Bulb onions should not be over watered hence weekly watering maybe enough in dry weather but soils need to be moist all the time especially the early stages of growth. Ensure enough water is available while the bulbs are swelling but stop irrigating 3 – 4 weeks before harvest.

Green leaf onions need frequent irrigation at the growing stage, but excessive moisture must be avoided. Proper moisture management is important in alleviating “pink rot” problems. Weeding should be done carefully as green leaf onions have shallow roots in order to minimize or avoid root damage.

### **Pests**

Bulb onions and green leaf onions are susceptible to a wide range of pest and diseases; hence a number of strategies collectively called integrated pest management are recommended. All pesticide sprayed should be done in consultation with qualified personnel and post-harvest intervals (PHI) should be observed. Expect insect pest challenges such as onion thrips (considered the most destructive insects on onions); onion fly (maggot), cut worms, army worms, leaf miners and aphids; for diseases expect purple blotch (the most serious fungal disease of onions); rust, downey mildew, bulb rots, neck rot and onion smut.

### **Fertility Management**

Bulb onions and green leaf onions are susceptible to a wide range of pest and diseases; hence a number of strategies collectively called integrated pest management are recommended. All pesticide sprayed should be done in consultation with qualified personnel and post-harvest intervals (PHI) should be observed. Expect insect pest challenges such as onion thrips (considered the most destructive insects on onions); onion fly (maggot), cut worms, army worms, leaf miners and aphids; for diseases expect purple blotch (the most serious fungal disease of onions); rust, downey mildew, bulb rots, neck rot and onion smut.

### **HARVESTING AND YIELD**

#### **Time to First Harvest and Seasonality**

Green leaf onions mature in 8 to 10 weeks (70 days) from planting and the plants should be pulled when they are 30 to 40 cm high and have a stem thickness of 8 to 15 mm; the roots or leaves should not be cut; after harvesting the plants are bunched into 300 to 400 gram bunches using rubber bands to hold each bunch; yields of 14 tons per hectare are expected.

The bulb onions are mature when  $\frac{3}{4}$  of the tops have bent or fallen over and dried i.e. around 18 – 22 weeks from planting of the seed but this depends on variety (most varieties take 135 to 165 days to mature), weather and the part of the onion that was planted. When  $\frac{1}{3}$  of the field has bent tops, manually bend the remainder to prevent over-maturity. Yields of 15 to 20 tons per hectare are expected (national averages are around 12 tons per hectare); but higher yields like over 60 tons per hectare have been reported. Lift the bulb onions when the tops are dry, being sure not to damage the bulbs. The bulbs should be lifted with a fork, not just pulled from the ground as this damage them and allows rotting to start. Anti-sprouting agents can be applied to prevent sprouting when 50 % of the tops have fallen

over before harvesting to prevent sprouting in storage; this is not a common practice in Kenya as farmers just cure the harvested bulb onions.

### **Post-harvest Handling**

Bulb onions should be cured i.e. they should undergo a process of drying the necks and leaves of the bulb to prolong shelf life and hence enabling better marketing and higher prices. Curing can be done in the field if harvesting coincides with dry months or in a protected environment away from the adverse weather conditions. Well preserved onions can stay upto six months without getting spoilt; although it is wise to use or sell them as early as possible as they will slowly lose weight. Market standards have been set in order to supply the right quality of bulbs to the local market. The bulbs should have similarity if for export in shape, color, flavor and texture. Onions should be sold in netting bags or appropriate bags as they that allow air movement through the onions and to prevent sweating. Locally the domestic wholesale and retail market net bag is 13 kg.

Green leaf onions with blemishes on leaves or any poor looking produce should be removed at the packing shed. Fresh and whole plants are then put into bundles/bunches and packed into 142 kg gunny bags for sale in domestic wholesale and retail markets.

### **INVESTMENT: GROSS MARGIN ANALYSIS**

*All values in Kenyan Shillings*

**Table 3: Bulb Onion Gross Margin Analysis**

Item	Unit Cost (Ksh)	Quantity - 1 Ha	Total Value (Ksh) - 1 Ha	Quantity - 1 Acre	Total Value (Ksh) - 1 Acre
<b>Gross Income</b>					
Sales (kg)	28	15,000	420,000	6,000	168,000
Total Income			420,000		168,000
<b>Cost of Production</b>					
Planting material	2,200	4	7,700	2	3,300
Nursery Management( MD)	100	250	25,000	100	10,000
Ploughing (No. )	6,250	5	31,250	2	12,500
Transplanting (MD)	100	75	7,500	30	3,000
Fertilizer					
Manure	2,000	20	40,000	8	16,000
TSP (50kg bag	3,700	4	14,800	2	5,550
CAN(50kg bag)	1,900	4	7,600	2	2,850
Crop protection products	1,400	3	3,500	1	1,400
Weeding	100	250	25,000	100	10,000
Harvesting	100	125	12,500	50	5,000
Drying	100	18	1,800	7	700
Packaging	15	550	8,250	220	3,300
Total Variable Cost			184,900		73,600
<b>Gross Margin Per Hectare</b>			<b>235,100</b>		<b>94,400</b>
<b>TOTAL YIELD (KG)</b>			<b>15,000</b>		<b>6,000</b>
<b>MARGIN PER KG (Kshs)</b>			<b>16</b>		<b>16</b>
<b>AVERAGE MONTHLY INCOME for 6 months (Kshs)</b>			<b>39,183</b>		<b>15,733</b>

Most production of onions in Kenya is done on a small scale. The basic requirements would be land, planting material and the right environment. An estimate of the total cost of production would be Kshs. 184,900 per hectare or Kshs. 73,600 per acre of land.

**Table 4: Green Onion Gross Margin Analysis**

Item	Unit Cost (Ksh)	Quantity - 1 ha	Total Value (Ksh)	Quantity - 1 acre	Total Value (Ksh) - 1 Acre
<b>Gross Income</b>					
Sales (kg)	14	12,000	168,000.00	4800	67,200.00
<b>Total Income</b>			<b>168,000.00</b>		<b>67,200.00</b>
<b>Cost of Production</b>					
Planting material (kg)	2200	6	13,200.00	2.5	5,500.00
Ploughing (No.)	6250	5	31,250.00	2	5,000.00
<u>Fertilizer</u>					
Manure	2000	10	20,000.00	4	8,000.00
TSP (50kg bag)	2700	2	5,400.00	1	3,700.00
CAN (50kg bag)	1900	2	3,800.00	1	1,900.00
Crop protection products	1400	2.5	3,500.00	1	1,400.00
Weeding (Man days – MD)	150	45	4,500.00	18	2,700.00
Harvesting (MD)	150	40	4,000.00	16	2,400.00
Packaging (Bags)	15	85	1,275.00	34	510
<b>Total Variable Cost</b>			<b>86,925.00</b>		<b>31,110.00</b>
<b>Gross Margin</b>			<b>81,075.00</b>		<b>36,090.00</b>
<b>TOTAL YIELD (KG)</b>			<b>12,000.00</b>		<b>4,800.00</b>
<b>MARGIN PER KG (Kshs)</b>			<b>6.75</b>		<b>7.5</b>
<b>AVERAGE MONTHLY INCOME for 3 months (Kshs)</b>			<b>27,025.00</b>		<b>12,030.00</b>

**INVESTMENT RETURNS: REGIONAL ANALYSIS****Table 5: Investment returns per region for bulb onion**

Bulb onion	Value (Ksh '000)				
Province	2006	2007	2008	2009	2010
Nyanza	1,036,875	1,324,575	1,196,970	637,650	658,920
R/Valley	917,175	897,225	1,135,200	628,936	625,967
Western	353,850	654,150	1,129,600	425,600	490,100
Eastern	912,450	912,450	426,250	417,400	459,140
Central	282,975	306,075	262,350	273,375	254,140
Coast	135,975	135,975	163,800	119,250	194,025
N/Eastern	73,500	84,525	54,400	48,300	47,790
Nairobi	14,700	18,375	20,150	9,190	5,110
<b>Total</b>	<b>3,727,500</b>	<b>4,333,350</b>	<b>4,388,720</b>	<b>2,559,701</b>	<b>2,735,192</b>



**Table 6: Investment returns per region for green leaf onions**

Green leaf onions	Value (Ksh '000)				
Province	2006	2007	2008	2009	2010
R/Valley	60,696	79,056	323,730	243,941	268,335
Nyanza	7,056	7,056	30,870	105,840	68,200
Central	14,040	7,200	49,005	57,780	61,932
Western	-	-	-	22,860	24,300
Eastern	2,880	3,240	11,500	4,184	2,592
Coast	288	288	800	330	310
Nairobi	-	-	-	750	264
<b>Total</b>	<b>84,960</b>	<b>96,840</b>	<b>415,905</b>	<b>435,685</b>	<b>425,933</b>

## CASE STUDIES

### *Case Study 1: Daniel Gakuu Ndungu, Kieni West District*

43-year-old, Daniel Gakuu Ndungu, decided in 2004 to quit his job as a farm manager and venture into full-time onion farming. He has used onions to educate his children, put food on the table and even used it to provide capital for investment. The area in 2010 under onions was one acre and he got Kshs. 150,000 which translates to Kshs. 37,500 per month when divided by four months; the duration onions take to mature. Daniel was a farm manager before he started farming onions and used to earn Kshs. 7,200 per month. In the 2011 January to April season, he planted 4 ½ acres of onions which yielded 28,950 Kg, which he sold for Kshs. 868,500 having spent Kshs. 247,500 for planting and management, land lease, land preparation, planting material i.e. seeds, weeding and purchase of fertilizers and pesticides. This gave him a yield of 6.4 tons per acre (16.1 tons per hectare); a gross margin of Kshs. 621,000; monthly net income of Kshs. 155,250; margin per kg of Kshs. 21.45 and; an average price per kg of Kshs. 30. This makes bulb onion growing as one of the most horticultural enterprises since there a lot of imports meaning Kenya can't grow enough bulb onions.

Daniel praises Farm Concern International which evolved smallholders in Kieni into commercial villages to facilitate market access. Initially he used to cultivate the traditional variety locally known as Bombay which produced grade one and two onions but now Farm Concern International has introduced onion variety which grows faster, weighs more and has high seed germination thrives even with little rainfall and produces first grade of onions and this has increased returns a great deal. Daniel and other farmers in the region sell their onions to Farm Concern International which buys directly from them, but before that he used to sell the produce to brokers who exploited them or took on credit and defaulted. The challenges he has encountered include; relying on rainfall which means losses for him during the dry season e.g. in 1999, he cultivated 3 acres of onions at Kshs. 200,000 and due to drought, he only got Kshs. 180,000 a loss of Kshs. 20,000. Other challenges include lack of laborers since on the onset of rains all farmers focus on their farms; and diseases like mildew and purple blotch. Bulb onion prices fluctuate a lot and in April this year onions were selling at Kshs. 45 per kg after farmers had already sold for Kshs. 30 per kg. He concluded with saying that onion farming is labor intensive and any farmer should therefore be prepared to work hard.

**IMPORTANT CONTACTS**

Service provider	Service	Contact
HCDA	Licenses commercial nurseries with planting material; advisory services	Managing Director, Horticultural Crops Development Authority (HCDA) Nairobi Horticultural Centre, Airport Road, Opp. JKIA P.O. Box 42601-00100 Nairobi, Kenya (E.A) Telephone: +254-20-2088469, +254-20-2031560; Fax: +254 -20-3235898; <a href="mailto:md@hcda.or.ke">Email: md@hcda.or.ke</a> ; <a href="http://www.hcda.or.ke">Website: www.hcda.or.ke</a>
KEPHIS	Inspects and certifies planting material nurseries; Does pesticide residue analysis tests; registers seed companies / dealers / stockists	Managing Director, KEPHIS P.O. Box 49592-00100, Nairobi, Kenya; Tel.: +254-20-3536171/2; Fax: + 254-20-3536175; Email: <a href="mailto:director@kephis.org">director@kephis.org</a> ; Website: <a href="http://www.kephis.org">www.kephis.org</a>
PCPB	Registers pest control products and sellers of pest control products	Managing Director/Secretary, PCPB P.O. Box 13794-00800, Nairobi Tel.: 0208021846/7/8 Email: <a href="mailto:pcpboard@todays.co.ke">pcpboard@todays.co.ke</a> ; <a href="mailto:md@pcpb.or.ke">md@pcpb.or.ke</a> ; <a href="http://www.pcpb.or.ke">Website: www.pcpb.or.ke</a>
Farm Concern International	Farmer support services	Director, Farm Concern International P.O. Box 15185-00100, Nairobi, Kenya Tel: +254-20-2626017/18 <a href="mailto:info@farmconcern.org">Email: info@farmconcern.org</a> <a href="http://www.farmconcern.org">Website: www.farmconcern.org</a>
Ministry of Agriculture	Technical advisory and extension service	Director, Crop Management Kilimo Hse, Cathedral Road P.O Box 30028, Nairobi, Kenya <a href="mailto:inquiry@kilimo.go.ke">Email: inquiry@kilimo.go.ke</a> Tel: +254-20-2718870

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