



# WARE POTATO MARKET SURVEY IN KENYA 2015

REPORT BY SNV KENYA





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# OPERATIONAL DEFINITION OF TERMS

**Linkage:** Structured arrangement in which a trader buys potatoes from a particular supplier on pre-agreed terms.

**Marketing Margin:** It refers to the difference between the farm gate and retail prices of potatoes.

**Potato<sup>1</sup>:** Refers to the *solanum* potato, differentiating it from sweet potato the tuber.

**Ware potatoes<sup>2</sup>:** Potatoes that are grown for human consumption as fresh or processed products.

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1 Definition adopted from Bonabana-Wabbi *et al* (2013).  
2 Same as 1

## LIST OF ABBREVIATIONS

<b>Bprice:</b>	Buying price
<b>GMM:</b>	Gross marketing margin
<b>KEPHIS:</b>	Kenya plant health inspectorate service
<b>Locost:</b>	Loading cost
<b>Max:</b>	Maximum value
<b>Mean:</b>	Average value
<b>Min:</b>	Minimum value
<b>MoALF:</b>	Ministry of Agriculture, Livestock and Fisheries
<b>Otcost:</b>	The sum of other costs, which include cess charges, market tolls, etc.
<b>Qbot:</b>	Quantity of potatoes bought
<b>Qsod:</b>	Quantity of potatoes sold
<b>SBacost:</b>	Sorting and bagging costs
<b>Sd:</b>	Standard deviation
<b>Seprice:</b>	Selling price
<b>SNV:</b>	Netherlands Development Organisation
<b>Trcost:</b>	Transport cost
<b>Waste:</b>	Quantity of potatoes lost due to wastage

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# EXECUTIVE SUMMARY

Potato has been grown in Kenya since the 19th century when it was first introduced by European settlers. Its production and consumption has since grown making it an important food crop second only to maize. Potato farming has contributed immensely to food security in the country besides providing employment and income to many people involved both directly and indirectly in the sector. This growth has however, not been as smooth as the stakeholders in the sector would like. For instance, in Kenya, the yield per hectare averages at only 6.7tons/Ha, which compares unfavourably to Egypt and South Africa where the yield averages at 40tons/Ha.

In light of this, Netherlands Development Organization (SNV) Kenya commissioned the current study to analyse the ware potato market in Kenya. The study sought to: create an understanding of the overall ware potato supply chain performance, market dynamics, trends demand, supply, weaknesses and market opportunities; and based on the market analysis, identify three promising business cases to address key issues in the potato value chain.

This study was conducted in three counties in Kenya including Nairobi, Mombasa and Nakuru. Data was collected through personal interviews (to gather information from marketers of ware potatoes and potato products); document analysis (to collect information on policy and other factors that affect potato and potato products production, marketing and consumption); key informant interviews (KIIs) (to gather information on the potential of the ware potato sub-sector to impact the incomes of farmers and on the bottlenecks encountered in production, marketing and consumption of ware potatoes); and case study (to analyze business cases for their potential for scale up).

The findings highlight several key facts: ware potato market is large and growing; supply-demand gap exists in terms of desired potato varieties; there is lack of consumer-friendly potato packaging, branding and positioning; potato prices fluctuate by wide margins; the flow of information along the value chain is poor; there are limited trader-farmer linkages; post-harvest handling of potatoes is poor; and a huge gap exists between the farm-gate potato prices and prices of final potato products. On the basis of these findings, several recommendations have been made in the study.

The main deliverable, however, of this study was to propose three business cases that could be piloted and later scaled up to address the deficiencies identified in the value chain. Three business cases therefore have been recommended. The first proposed business case is to involve licensed seed potato companies e.g. Agrico East Africa to multiply, store and distribute the desired quality seed potato varieties in potato growing areas to ease access and cut transport costs for the smallholder farmers. The second proposed business case involves working with selected strategic processors such as Sereni Fries Ltd to buy from organised farmers' groups and link them to inputs suppliers so as to ensure they consistently produce and supply the desired varieties of potatoes. And the final one is proposed to involve a partnership between selected large volume ware potato supplier, a major supermarket and a yet to be identified firm to develop a consumer-centric campaign aimed at improving packaging, branding, positioning and marketing of potatoes across retailing outlets in Kenya. It is the view of this study, that implementing the three together will fill the gaps that have been identified in the value chain and make it efficient for the benefit of all the potato subsector stakeholders.

# 1 INTRODUCTION

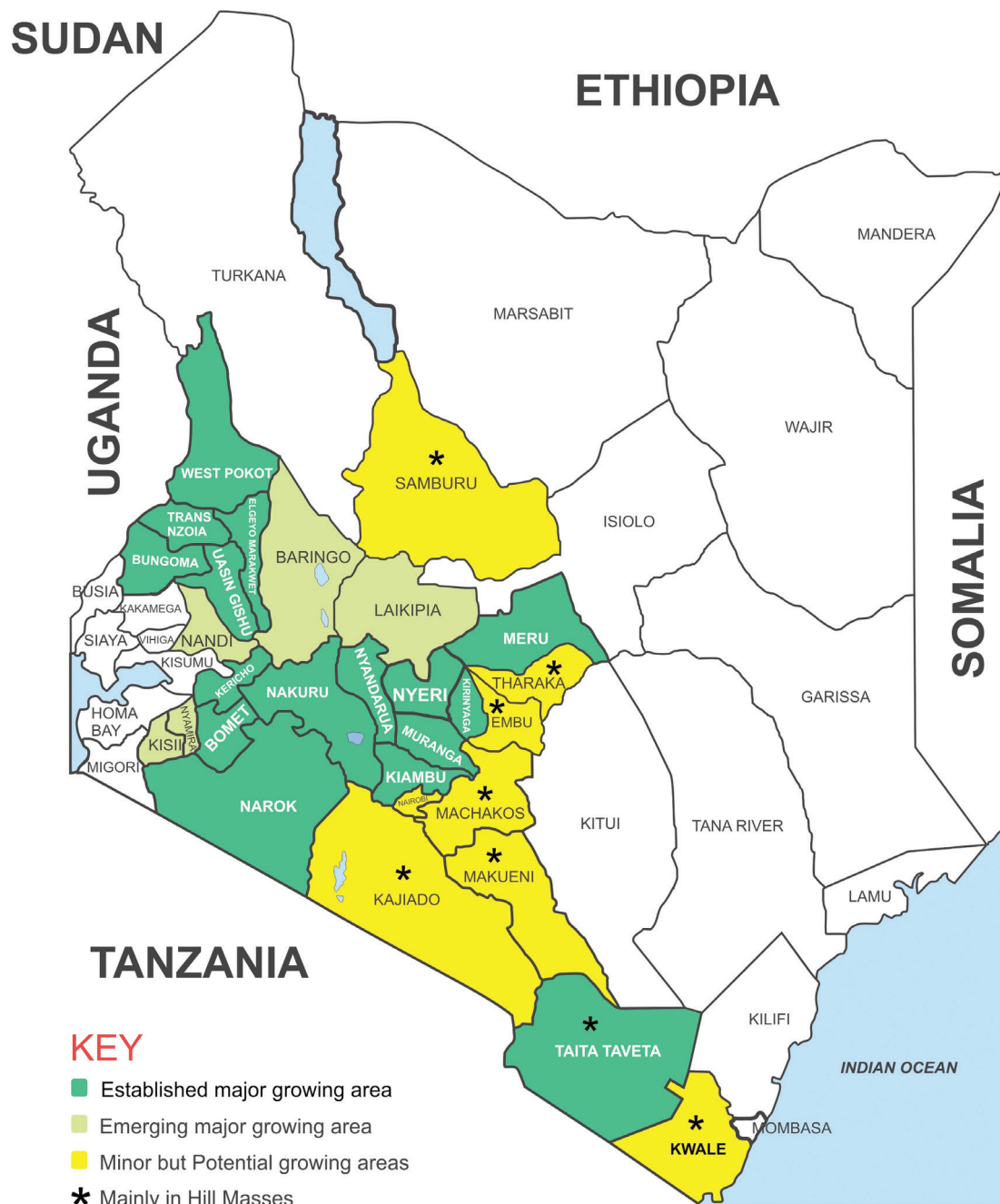
## 1.1 Background

Potato has been grown in Kenya since the 19<sup>th</sup> century when it was first introduced by European settlers (Durr and Lorenzl 1980). It has since become an important food crop second only to maize (Janssens *et al.* 2013). The trend shows a steady increase in the production and consumption of potato in terms of number of varieties grown, volume and geographical spread. According to the NPCK (2015), there are 36 potato varieties registered by KEPHIS in the country. Each variety has its unique characteristics, which make it suitable for production in specific geographic/ climatic conditions and also for specific consumers.

According to the Republic of Kenya (2014 and 2015), potato production increased 6.7 percent from 1.5M metric tons in 2012 to 1.6M metric tons in 2014. In the same period, domestic potato consumption grew by 6.3 percent from 1.502M metric tons in 2012 to 1.596M metric tons in 2014. The quantity of imported potatoes fell from 3000 metric tons in 2012 to less than 1000 metric tons in 2014, while exports grew fourfold from 1000 metric tons in 2012 to 4000 metric tons in 2014.

Potato production in Kenya is expected to expand further as the accelerating climate change impacts other food crops like maize and beans. The increasing spread of Maize Lethal Necrosis Disease (MLND) in the main maize producing zones of Kenya, has led farmers to take up an alternative crop, many of who have preferred potato. Indeed according to Thompson Reuters Foundation (2011), the number of potato farmers in the country grew from 500,000 in 2003 to 800,000 in 2011.

However, the yield per hectare remains low with a national average of 6.7 tons/ha. This compares unfavourably to other countries such as Egypt and South Africa where up to 40 tons/ha is achieved. Initially produced only in the highlands that included eight counties of Nyandarua; Narok; Nakuru; Bomet; Uasin Gishu; Kiambu; Nyeri and Meru due to ecological reasons, its production has now extended to over 25 counties (MoALF, 2015). Indeed among the top five potato producing counties in the country are Bungoma and Elgeyo-Marakwet at positions three and five respectively. These two are not among the traditional potato producing counties. The potato producing counties are shown in the map in fig. 1.1.



**Fig. 1.1: Map of Kenya, showing the potato growing counties**

Source: Adopted from Ministry of Agriculture, Livestock and Fisheries 2015 pp.15.

Potato is thus, both an important food crop and a source of income (Janssens *et al* 2013; Bonabana-Wabbi *et al* 2013; Republic of Kenya 2014) and indeed employment for the many value chain actors, some of who are far removed from the producing areas. The potato sub-sector is estimated to employ over

2.5 million people (Obare *et al* 2010). These range from input suppliers to roadside vendors of potato products such as chips. Thus improvement in the potato sector would not only improve the food security situation in the country, but also create employment opportunities and grow the economy.

With improvements in the efficiency of the value chain, this sector can aid a great deal in poverty alleviation, given that approximately 98% of the potato farmers in Kenya, are smallholders (Janssens *et al* 2013).

Yet the potato value chain in the country remains inefficient, encumbered by many challenges (Kasina and Nderitu 2010). In the upstream of the value chain, the main challenges include: low-quality seed; limited use of inputs; and prevalence of pests and diseases. These challenges are compounded by a problem that affects all farming activities in the country – lack of appropriate agricultural financing mechanism. At the downstream of the chain, which involves potato marketing, the main problems include: perishability of tubers; lack of adequate storage facilities; poor access roads; poor infrastructure in public wholesale and retail markets; non-implementation of quality standards; inadequate access to market information; and weak/nonexistent farmers' organizations.

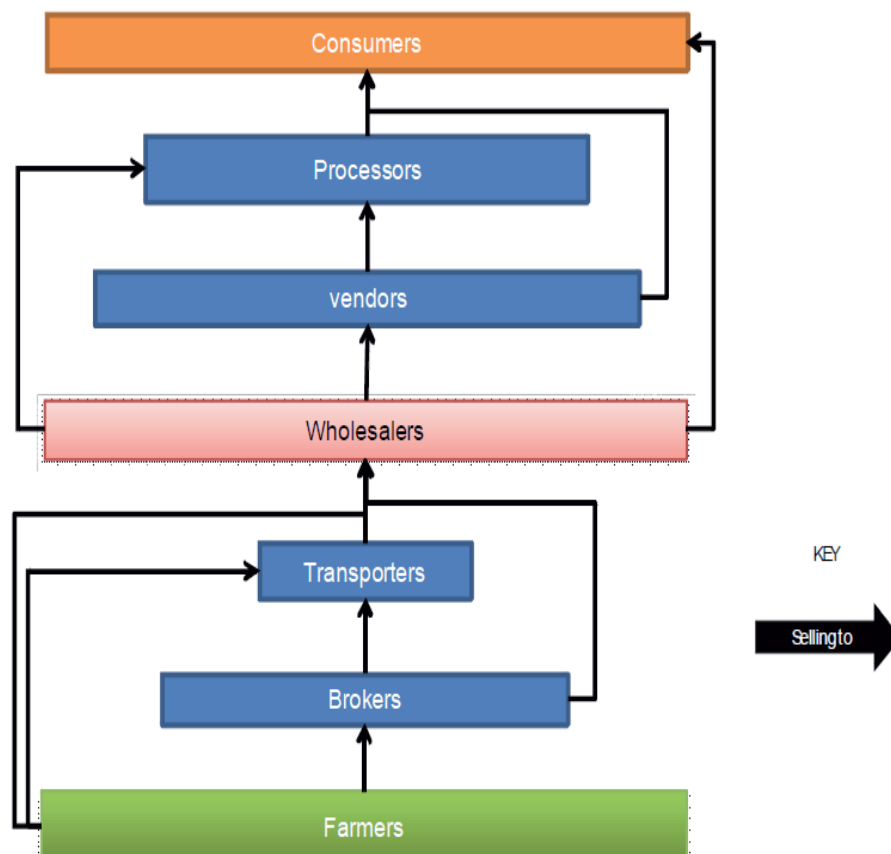
## 1.2 The potato value chain

The complete potato value chain, according to Kasina and Nderitu (2010) is represented by fig 1.2. The chain has seven actors including: farmers/producers; brokers/middlemen; transporters; wholesalers; vendors/retailers; processors; and consumers.

In this structure the farmer is the origin of potatoes, while the consumer is the final user. Potatoes, however, go through a variety of hands to reach the consumer. Bottlenecks to the flow of potatoes and potato products to the consumer exist at every stage, compromising the efficiency of the value chain to the detriment of all the players in the sub-sector.

**Fig.1.2: Illustration of potato market value chain actors in Kenya as depicted by farmers and traders in December 2009**

Source: Adopted from Kasina and Nderitu (2010) pp. 1200.



But the diagrammatic representation of the players in the potato value chain in fig.1.2 is in fact inadequate. It does not include one key player – the inputs supplier, yet one of the most constraining factors in potato business is the lack of quality seed potato and inadequate supply of other inputs. The correct list of stakeholders should start with inputs, including seed, supplier since the quality of any output is always a function of the quality of inputs.

In response to recommendations from a variety of studies on the potato value chain, the government of Kenya has unsuccessfully attempted to pass legislation to establish the National Potato Council. The Council would have had a broad mandate that includes but would not be limited to: regulating the potato industry, including the production, packaging and marketing of potatoes in the country; and advising both the National and County governments on all matters pertaining to the potato sub-sector (Republic of Kenya 2014b).

An analysis of the proposed potato legislation (Republic of Kenya 2014), however, reveals, as expected of government interventions, greater

inclination towards pursuit of public good through public incentives rather than profit optimization models. Yet, both empirical and theoretical evidence point to the profit motive being a more effective driver of innovation in all sectors, the potato sub-sector included. For instance, according to Kaguongo *et al* (2007), farmers' adoption of new potato varieties was driven first and foremost by market preference.

### 1.3 Objective of the market study

The Netherlands Development Organization (SNV) Kenya commissioned the current study to analyse the ware potato market in Kenya. The study sought to:

1. Create an understanding of the overall ware potato supply chain performance, market dynamics, trends, demand, supply, weaknesses and market opportunities; and
2. Based on the market analysis, identify at least three promising business cases to address key issues in the potato value chain.

## 2. METHODOLOGY

### 2.1 Conceptual Framework

This study proceeded on the basis of two assumptions: first, all the actors in this value chain are rational; and secondly, potato is a normal good. Rationality dictates that they seek to maximise their values subject to the constraints they face. While normality of the good means that it has a downward sloping demand curve. Seed suppliers maximise seed prices subject to farmers' preferences and the downward sloping demand curve that they face.

Farmers are assumed to maximise farm gate prices subject to market information available to them and the downward sloping demand curve that they face. Brokers maximise their commission subject to farm gate prices, market information and the downward sloping demand curve they face. Traders/wholesalers maximise market prices subject to the farm gate prices, brokers' commission and the downward sloping demand curve they face. Processors maximise prices of potato products subject to the wholesale prices of potato, costs of processing and the downward sloping demand curve they face. Consumers maximise utility subject to the prices of potatoes and potato products.

This study focused on the downstream of the value chain. Thus it focused on marketing margin maximisation by traders, processors and potato products marketers. The questions asked in this study include (Wohlgenant, M. K. 2001): what is the size of the marketing margin? Are margins scale-dependent? How are the margins shared among the different players in the value chain? What is the incidence of marketing costs on retail prices of potatoes in selected markets?

To answer these and other questions, this study adopted the view by Bonabana-Wabbi *et al* (2013) that the gross marketing margin is the most relevant

point of analysis given the influence of traders on the value chain. Thus the Mendoza and Rosegrant's model as cited by Bonabana-Wabbi *et al* (2013) was adopted and given in equation 2.1.

$$\text{Marketing margin (\%)} = \frac{\text{Sellingprice} - \text{Supplyprice}}{\text{Supplyprice}} \times 100 \quad (2.1)$$

### 2.2 Empirical model

Given the farm gate price of potatoes ( $P_f$ ), the value of potatoes traded at the farm gate was computed as:

$$\text{VAFG} = \sum_{i=1}^n (Q_f \times P_f) \quad 2.2$$

Where VAFG is the value of potatoes traded at farm gate;  $Q_f$  is quantity of potatoes bought by the  $i^{\text{th}}$  trader at farm gate; and  $P_f$  is the average price paid for a 50kg bag of potatoes to the farmers at the farm gate.

Given market prices of potatoes ( $P_m$ ), the value of potatoes traded in the market was computed as follows:

$$\text{VAMP} = \sum_{i=1}^n (Q_m \times P_m) \quad 2.3$$

Where VAMP is the value of potatoes traded in the market;  $Q_m$  is quantity of potatoes sold by the  $i^{\text{th}}$  trader in the market; and  $P_m$  is the price for a 50kg bag of potatoes charged by the  $i^{\text{th}}$  trader in the market.

Therefore:

$$\text{GMM} = \left( \frac{\text{VAMP} - \text{VAFG}}{\text{Supplyprice}} \right) \times 100 \quad (2.4)$$

Where GMM is gross marketing margin realised by sampled traders in potato business.

### 2.3 Data and Methods

#### 2.3.1 Study Area and Data Collection

The study was conducted in three counties in Kenya including Nairobi, Mombasa and Nakuru. The three were purposively sampled because they are the leading destination markets for potato and potato products.

Data was collected using pretested survey instruments. Four methodologies were deployed in the process: personal interviews were used to gather information from marketers of ware potatoes and potato products in the selected counties. Document analysis was used to collect information on policy and other factors that affect potato and potato products marketing and consumption in Kenya.

Key informant interviews (KIIs) were used to gather information on the potential of the ware potato sub-sector to impact the incomes of farmers and on the bottlenecks encountered in production, marketing and consumption of ware potatoes. And finally, case study was used to analyze business cases for their potential for scale up.

For the marketers' survey, stratified random sampling was employed in selecting respondents to ensure regional, enterprise class and gender representativeness. A sample of 310 respondents was interviewed out of which 253 were retailers of potato products; 50 were potato traders; and 7 were processors.

There are 10 licensed processors in the three counties. The study intended to collect data from all of them, but three could not be reached within the timeframe of the study. The numbers of the other actors were determined by the following statistical formula, borrowed from Watson (2001):

$$n = \frac{\left[ \frac{p[1-p]}{\frac{A^2}{Z^2} + \frac{p(1-p)}{N}} \right]}{R} \quad 2.4$$

where:

$n$  = Sample size

$N$  = Target population

$P$  = Proportion of observation units with desired characteristics as a decimal

$A$  = Margin of error as a decimal

$Z$  = Level of confidence

$R$  = Estimated response rate, as a decimal.

### 2.3.2 Data Analysis

This study was undertaken over a three-month period between December 2014 and March 2015. The data collected through fieldwork in January 2015, was reconfirmed, cross-checked and verified before being analysed. Information such as the volumes of potatoes traded, prices at farm gate and at the market, rate of wastage, characteristics of traders, varieties of potatoes traded and preferred by traders and consumers, among others was collected and analysed. Also analysed were the seasonal variations in supply of potatoes and prices.

- Identification of three business cases for piloting was also done. For each business case, the analysis considered the following:
- the efficiency of the model in terms of utilization of resources and delivery of the products in the most cost-effective manner;
- the innovativeness of the methods deployed;
- the sustainability of the marketing approaches in terms of the ease of their adoption and adaption;
- the potential impact of the model on the linkages among the players in the ware potato sub-sector; and
- the degree of harmony with the existing county and national governments' policies relevant to the sub-sector.

The data was collected in January 2015.

6

## 3. RESULTS AND DISCUSSION

This section presents the results of the market survey in three subsections: the traders' survey; the marketers' survey; and the processors' survey. The traders' survey focused on the potato market, the marketers' survey focused on the potato products market, while processors' survey focused on potato processing.

### 3.1 Potato traders survey results

#### 3.1.1 Characteristics of traders

**Table 3.1: Summary of trader characteristics**

VARIABLE	RESPONSE	OVERALL SAMPLE (%)	MOMBASA (%)	NAIROBI (%)	NAKURU (%)
<b>Gender of the respondent</b>	Male	55.1	70	52	50
	Female	44.9	30	48	50
<b>Type of trader</b>	Wholesaler	69.4	90	52	82
	Retailer	30.6	10	48	18
<b>Nature of trader</b>	Partnership	24.5	50	26	6
	Sole proprietorship	75.5	50	74	94
<b>Supplier of potatoes</b>	Farmers	49.0	70	47.8	37.5
	Middlemen	49.0	30	47.8	62.5
	Cooperatives	2.0	0	4.4	0
<b>Nature of linkage with farmer groups</b>	No linkage	64.9	71.4	56.5	85.7
	Informal agreement	10.8	28.6	8.7	0
	Verbal arrangement	18.9	0	26.1	14.3
	Written agreement	5.4	0	8.7	0
<b>Level of trust in linkage with farmers</b>	Distrust	0	0	0	0
	No trust	7.7	0	10	0
	A little trust	15.4	0	20	0
	Some trust	46.2	50	40	100
	Full trust	30.8	50	30	0
<b>Level of trust in linkage with cooperatives</b>	Distrust	0	0	0	0
	No trust	61.5	100	50	100
	A little trust	0	0	0	0
	Some trust	5.4	0	20	0
	Full trust	23.1	0	30	0
<b>Level of trust in linkage with traders</b>	Distrust	6.3	0	9.5	0
	No trust	6.2	0	9.5	0
	A little trust	21.9	37.5	19.1	0
	Some trust	56.2	50.0	57.1	66.7
	Full trust	9.4	12.5	4.8	33.3

Source: Survey data, January 2015

**Gender aspects:** A total of 50 traders, spread out in five markets in three counties were interviewed. The majority of the traders sampled were male at 55.1% while 44.9% were female. Across the selected counties, the gender distribution of respondents varied. In Mombasa County 70% were male and 30% female. In Nairobi County, 52% were male and 48% female. While in Nakuru County there was gender parity of respondents at 50% for both sexes (Table 3.1). There is an explanation for this. Mombasa is far removed from potato growing areas, which requires traders to travel long distances and even be away from home for days.

This may be the main reason Mombasa traders are mostly men, since most women cannot be away from home for days given their customary domestic responsibilities.

**Age and Years of experience of respondents:** The average age of respondents was 39.9 years. The average age of male respondents was 40.4 years while that of female respondents was 39.3 years. The oldest trader was 75 years old. The youngest trader was 27 years old (table 3.2). As shown in Fig. 3.1, the mean age of traders was highest in Nakuru County and lowest in Mombasa County. Among the female traders, the average age of wholesalers was higher than that of retailers in all counties. Among the male

traders on the other hand, the average age of the retailers was higher than that of wholesalers in both Nakuru and Nairobi counties (Fig.3.1).

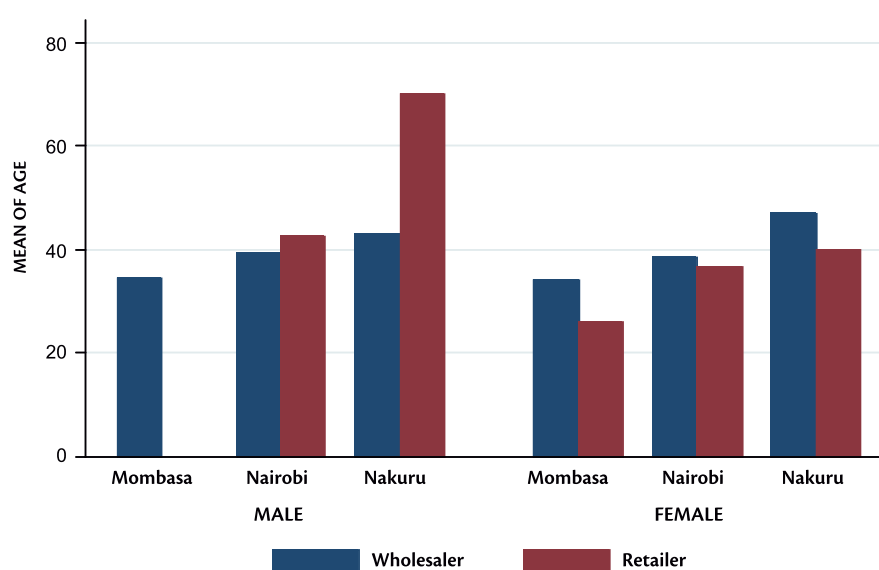
**Table 3.2: Age distribution of respondents by gender**

GENDER	STATISTICS	AGE	EXPERIENCE
Male	Mean	40.4	12.3
	Min	27.0	3.0
	Max	75.0	48.0
Female	Mean	39.3	10.7
	Min	26.0	3.0
	Max	62.0	40.0
Total	Mean	39.9	11.6
	Min	26.0	3.0
	Max	75.0	48.0

Source: Survey data, January 2015

There were no male retailers in Mombasa County. On average, the traders had 11.6 years of experience in the business. The years of experience, however, varied between three and 48 years. Among the male respondents, the average years of experience were 12.3 compared to their female counterparts who on average had 10.7 years of experience. The most experienced male trader had been in the business for 48 years, while the most experienced female trader had been in the business for 40 years (table 3.2).

**Fig. 3.1: Chart of the mean age of traders by county, gender and nature of trader**



Source: Survey data, January 2015

**Type of traders:** On average, 69.4% of the interviewed traders were wholesalers and 30.6% were retailers. In the counties, 90% of those interviewed in Mombasa, 52% in Nairobi and 82% in Nakuru were wholesalers compared to 10% in Mombasa, 48% in Nairobi and 18% in Nakuru who were retailers. Most of the traders interviewed (75.5%) were sole proprietors, while 24.5% were partnerships.

All the traders interviewed were either owners in case of sole proprietorship, or co-owners in case of partnerships. None were run by managers, indicating a generally low level of sophistication in the management of the businesses. In terms of the county distribution, the nature of traders was 50%, 74% and 94% sole proprietorship in Mombasa, Nairobi and Nakuru counties respectively (table 3.1).

Traders who operated as partnerships accounted for 50%, 26% and 6% in Mombasa, Nairobi and Nakuru counties respectively (table 3.1). This finding seems to suggest that the further away from the potato producing areas the market is the more structured the traders involved in it become.

### 3.1.2 Source of ware potato

Approximately 49% of the traders bought their potatoes directly from farmers, 49% from middlemen/brokers and 2% from cooperatives. In Mombasa County 70% of the traders interviewed reported buying potatoes from farmers and 30% reported buying potatoes from middlemen. In Nairobi County 47.8% of the respondents reported buying potatoes from farmers.

A similar percentage reported buying potatoes from middlemen/brokers, while 4.4% reported buying potatoes from cooperatives. In Nakuru County 37.5% bought potatoes from farmers and the remaining 62.5% bought their potato stocks from middlemen/brokers (table 3.1).

The potato production calendar for most potato growing areas in Kenya is as indicated in Table 3.3. This table also thus indicates the surplus and deficit supply periods, which are associated with harvesting and planting seasons respectively.

**Table 3.3: General potato production calendar in Kenya**

ACTIVITY	MONTH											
	J	F	M	A	M	J	J	A	S	O	N	D
<b>Long Rains</b>	H	H								P	P	
<b>Short Rains</b>			P	P			H	H				

### 3.1.3 Level of trust among players in the value chain

An estimated 64.9% of the surveyed traders reported no linkage with farmer groups, 10.8% had informal agreements with farmer groups, 18.9% had verbal arrangements, while only 5.4% had written agreements with farmer groups. Nakuru County had the highest rate of non-linkage with farmer groups at 85.7%, followed by Mombasa County at 71.4% and lastly Nairobi County at 56.5%. In Mombasa County 28.6% of the traders had linkage with farmer groups, but they all had only informal agreements with such groups. In Nairobi County 8.7% had informal agreements with farmer groups, 26.1% had verbal arrangements, while 8.7% had written agreements with farmer groups. In Nakuru County where 14.3% of traders had linkage with farmer groups, they all reported having verbal arrangements with such groups (table 3.1).

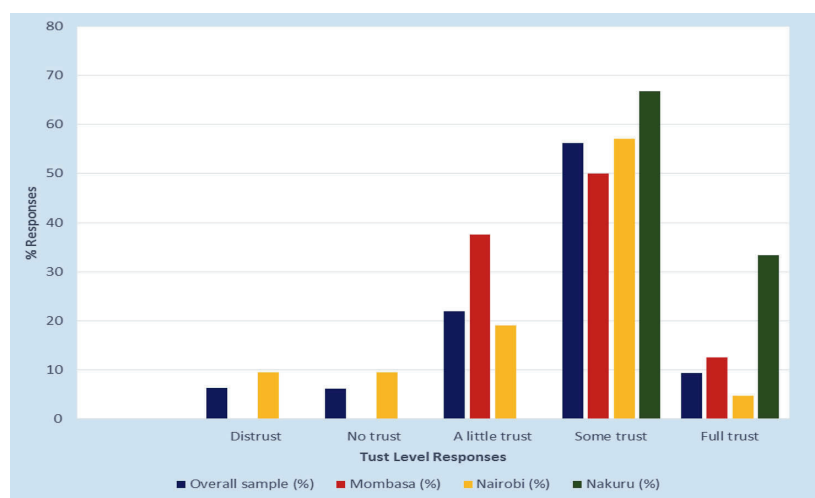
Out of the traders who had linkages with farmer groups, only 30.8% reported full trust in the farmer groups on average. However, 77% of the traders with linkages had some level of trust in them, which suggests that with consistent interaction, trust among the value chain players can be created. This would in turn improve efficiency and lower transaction costs. Across counties, Nakuru reported the highest level of trust (table 3.1). Reasons given for the low level of trust in farmers range from high farmers' default rates on

agreements when offered higher prices by competitors of the traders, to unreliability of supply due to variable quality and quantity of potato harvested.

On average, 61.5% of interviewed traders reported no trust in cooperatives, 5.4% reported some trust, while 23.1% reported full trust. Both Nakuru and Mombasa county traders reported no linkage to cooperatives and thus reported no trust in them. This makes sense since there had been no commercial interaction between traders and cooperatives in the two counties. In Nairobi County 50% of the traders reported no trust in cooperatives, 20% reported some trust, while 30% reported full trust. It is important to note that most of the traders in Nairobi had no linkage with cooperatives, yet they responded to the question on whether or not they trusted them. This points to information sharing that culminates into institutional reputation formation/destruction without direct contact.

Overall, only 9.4% reported full trust. Across the counties, the levels of full trust in other traders varied from 4.8% in Nairobi, through 12.5% in Mombasa, to 33.3% in Nakuru. The significantly higher level of trust in Nakuru County may be due to the fact that traders in the county are closely linked to the source of the potatoes they deal in, thus the reputational costs of defection are higher for individual traders compared to those in the other counties. The variations in levels of trust by county are shown in fig. 3.2.

Fig. 3.2: Trust level responses by county



Source: Survey data, January 2015

### 3.1.4 Potato prices, transaction costs and quantities traded in selected markets in Nairobi, Mombasa and Nakuru Counties

Data on prices, quantities traded, transport costs, sorting and bagging costs, rates of wastage and other related costs were collected from five markets spread across the three counties. These markets are Kongowea in Mombasa County, Nakuru in Nakuru County and Muthurwa, Marikiti and Githurai in Nairobi County. A summary of descriptive statistics of the findings is presented in table 3.4.

**Number of bags handled per trader:** On average, each trader in the sample handled 641 bags<sup>3</sup> of potatoes in the one month period preceding this study. The smallest trader traded in 15 bags of potato. The largest trader transacted in 4,000 bags. Each trader lost approximately 6.9 bags due to wastage. An average wastage rate of 1.1%<sup>4</sup> was reported. This wastage was attributed by traders to poor sorting at the farm level, where they argued that the farmers mixed the good potatoes and the cut ones, as well as potatoes that were too small to be bought by the end user in the bags. Such potatoes ended up as waste when the traders eventually failed to sell them.

**Potato handling, packaging and wastage:** Key informants, however, also attributed the wastage to improper handling of potatoes. Experience from leading potato producing countries in the world shows that wastage can be reduced significantly if potatoes were transported in crates rather than sacks as is the practice locally. Besides, the wrong size and type of sacks are used as shown in the pictures below. Use of this type of bags, especially when transporting potatoes for long distances causes increased rates of rotting due to poor ventilation and bruising. Some of the potatoes also get crushed when stacked in sacks due to the weight and friction from the sacks above.



Common practice of potato handling



Recommended manner of handling potato



Recommended packing material

3 Each bag in this analysis weighs 50 kilograms.

4 This rate of wastage is much lower than what is reported in most other studies. It is important to note that this survey did not cover farmers and therefore refers to wastage between the farm gate and the end user, which should be lower than on-farm wastage.

**Price trends & transactional costs:** The average buying price was Ksh.771.9, while the selling price was Sh.1,270.8 per 50kg bag. The buying price however, fluctuated between Sh.350 and Sh.1,500. Selling prices varied between Sh.550 and Sh.2,700 per a bag. It is important to note that despite some extended bags being spotted in the markets, the prices given in this survey are prices for 50kg bags. The traders would not admit to handling bags that were more than 50kgs due to the government's recent enforcement of the law to limit potato packaging to 50kgs. Besides the buying price, traders also incurred four sets of costs. On average, traders spent Sh.179.9 on transport, Sh.18.4 on loading, Sh.18.6 on sorting and bagging, and Sh.22 on other costs, which included Cess charges paid to county governments, storage charges and market levies per a bag. Transport costs varied between zero and Sh.400. Loading costs as well as sorting and bagging costs varied between zero and Sh.70, while other costs varied between zero and Sh.60 (table 3.4).

The quantities traded, wastage rates, prices and costs vary from market to market even within the same county. In Githurai, the mean quantity bought stood at 514.7 bags, average quantity sold was 510.9 bags thus leading to 0.7% wastage. The smallest trader in Githurai traded 15 bags of potato while the largest trader transacted 3,000 bags of potato in the month preceding this study. The mean buying price in Githurai was Sh.722.2, but the price fluctuated between Sh.350 and Sh.900 per bag. The average selling price was Sh.1,277.8, the lowest price was Sh.550 while the highest was Sh.2,000 per bag (table 3.4).

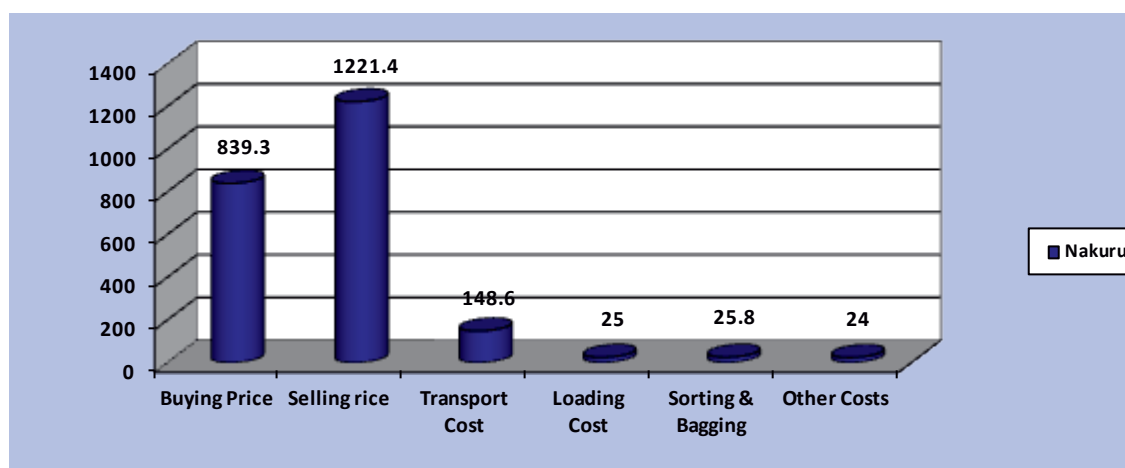
In Kongowea market in Mombasa County, the sampled traders on average traded in 897 bags of potato, with a negligible rate of wastage. The smallest

of the traders traded 30 bags of potato while the largest traded 1,500 bags in a month. On average, traders paid Sh.960 for a bag of potatoes and sold the same for Sh.1,650. The least buying price in Kongowea was Sh.700. The highest buying price stood at Sh.1,500. The selling price on the other hand fluctuated between Sh.1,400 and Sh.2,700.

In Marikiti market in Nairobi County, traders on average traded 961.8 bags of potato, with the quantities handled by individual traders varying between 30 and 4,000 bags. The wastage rate in Marikiti market was 1.9%. The buying price varied between Sh.450 and Sh.900 per bag, but on average traders paid Sh.572.7 for a bag of potato in Marikiti. They then sold a bag for between Sh.950 and Sh.1,250. The average selling price per bag was Sh.1,027.3 (Table 3.3). Traders in Muthurwa market, Nairobi County on average transacted 555 bags of potato in the month paying Sh.725 for a bag of potato and selling a bag at Sh.1,150. The smallest trader in the market transacted 60 bags, while the largest traded 1,200 bags of potato. Buying and selling prices varied between Sh.400 and Sh.1,000, and Sh.950 and Sh.1,250 respectively. The rate of wastage in the market was 2.3% (table 3.4).

Nakuru traders handled 311.8 bags of potato in the month preceding this study on average. They paid Sh.839.3 for a bag and sold each bag at Sh.1,221.4. The quantity traded varied between 35 and 1,200 bags. Buying and selling prices in Nakuru market fluctuated between Sh.500 and Sh.1,200 and Sh.1,000 and Sh.1,400 per a bag respectively. On average, the rate of wastage in the market was 2.6%. This is the highest rate of wastage reported in the five markets surveyed. This could be attributed to variations in the manner of handling of the potatoes and the level of sorting done at the farm gate (Fig. 3.3).

Fig. 3.3: Average revenues and costs (in Ksh.) per 50kg bag of potatoes in Nakuru Market



Source: Survey data, January 2015

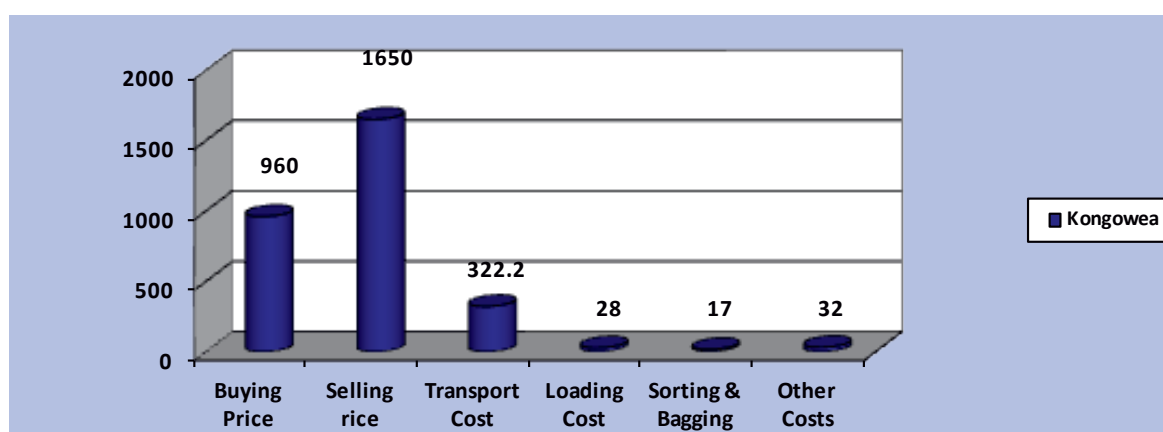
Table 3.4: Potato prices, costs and quantities traded in selected markets in Nairobi, Mombasa and Nakuru Counties

Market	stats	Qbot	Bprice	Qsod	seprice	waste	Trcost	Locost	SBacost	Otcost
Githurai	mean	514.7	722.2	510.9	1277.8	3.8	102.8	6.7	9.4	14.4
	sd	948.4	226.5	947.3	484.8	3.4	122.1	16.6	17.4	10.6
	min	15.0	350.0	15.0	550.0	0.0	0.0	0.0	0.0	5.0
	max	3000.0	900.0	2995.0	2000.0	10.0	325.0	50.0	50.0	30.0
Kongowea	mean	897.0	960.0	896.8	1650.0	0.2	322.2	28.0	17.0	32.0
	sd	584.4	236.6	584.5	380.8	0.4	56.5	17.5	23.9	8.2
	min	30.0	700.0	29.0	1400.0	0.0	250.0	20.0	0.0	10.0
	max	1500.0	1500.0	1500.0	2700.0	1.0	400.0	70.0	50.0	40.0
Marikiti	mean	961.8	572.7	944.0	1027.3	17.8	168.2	15.0	18.6	16.4
	sd	1100.4	142.1	1084.3	84.7	20.1	82.2	14.3	14.8	16.4
	min	30.0	450.0	29.0	950.0	0.0	0.0	0.0	0.0	0.0
	max	4000.0	900.0	3940.0	1250.0	60.0	260.0	50.0	50.0	50.0
Muthurwa	mean	555.0	725.0	542.5	1150.0	12.5	175.0	7.5	17.5	22.5
	sd	584.6	295.8	566.4	135.4	25.0	95.7	9.6	12.6	20.2
	min	60.0	400.0	60.0	950.0	0.0	50.0	0.0	0.0	5.0
	max	1200.0	1000.0	1150.0	1250.0	50.0	250.0	20.0	30.0	50.0
Nakuru	mean	311.8	839.3	303.7	1221.4	8.1	148.6	25.0	25.8	24.0
	sd	334.9	161.9	331.0	99.4	15.0	44.5	11.6	20.2	19.7
	min	35.0	500.0	35.0	1000.0	0.0	40.0	0.0	0.0	0.0
	max	1200.0	1200.0	1180.0	1400.0	50.0	220.0	50.0	70.0	60.0
TOTAL	MEAN	641.0	771.9	634.1	1270.8	6.9	179.9	18.4	18.6	22.0
	sd	776.5	235.4	768.9	345.9	15.3	106.0	16.2	18.3	16.2
	min	15.0	350.0	15.0	550.0	0.0	0.0	0.0	0.0	0.0
	max	4000.0	1500.0	3940.0	2700.0	60.0	400.0	70.0	70.0	60.0

Source: Survey data, January 2015

The amount of costs incurred also varied from market to market (table 3.4). Reported average transport cost was highest, as expected, in Kongowea market, which is far removed from potato growing areas. On average, traders in Kongowea market spent Sh.322.2 per bag on transport. The lowest transport cost for a bag in Kongowea was Sh.250, while the highest reported in that market was Sh.400. In the same market, traders spent between Sh.20 and Sh.70 on loading, zero and Sh.50 on sorting and bagging and Sh.10 and Sh.40 on other costs per a bag. On average, loading, sorting and bagging and other costs stood at Sh.28, Sh.17 and Sh.32 per a bag respectively (Fig. 3.4).

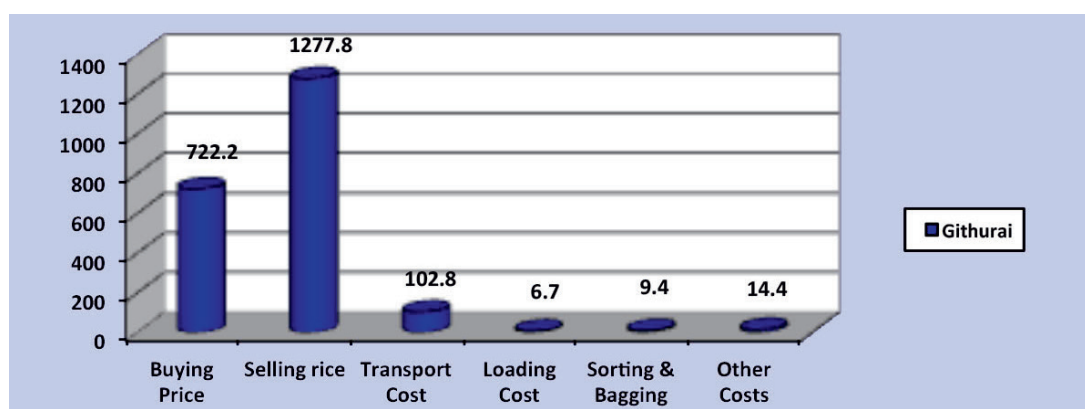
**Fig. 3.4: Average revenues and costs (in Ksh.) per 50 kg bag of potatoes in Kongowea Market**



Source: Survey data, January 2015

Transport cost was lowest in Githurai market, where it varied between zero and Sh.325. The zero cost was a result of some of the interviewed traders buying from wholesalers in the market and selling at the same market. On average, traders in Githurai spent Sh.102.8 on transport, Sh.6.7 on loading, Sh.9.4 on sorting and bagging and Sh.14.4 on other costs per a bag of potatoes. Loading charges varied between zero and Sh.50, sorting and bagging charges fluctuated between zero and Sh.50, while other costs ranged from Sh.5 to Sh.30 per a bag (Fig. 3.5). In Marikiti market, transport charges varied between zero and Sh.260, with an average of Sh.168.2 per a bag. Traders in the market also spent between zero and Sh.50 on loading, zero and Sh.50 on sorting and bagging, and zero and Sh.50 on other charges per a bag. On average, traders in Marikiti market spent Sh.15 on loading, Sh.18.6 on sorting and bagging, and Sh.16.4 on other charges per a bag (table 3.4).

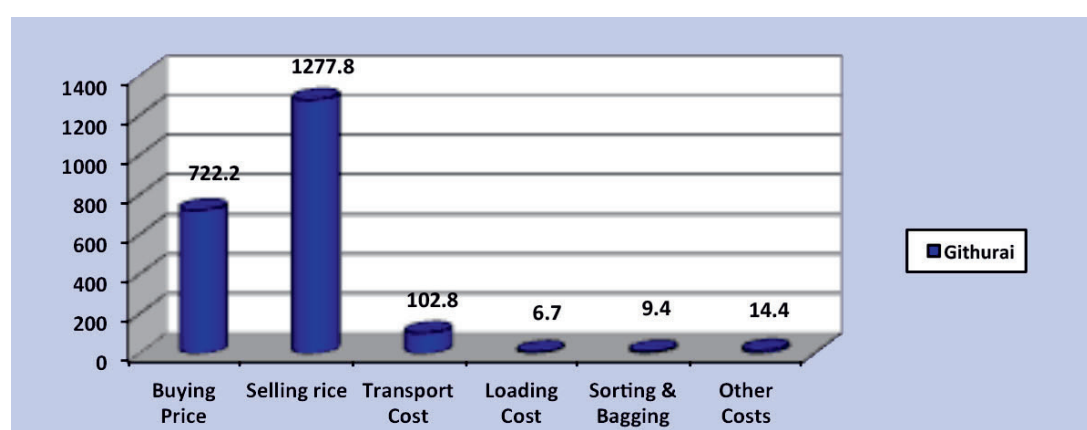
**Fig. 3.5: Average revenues and costs (in Ksh.) per 50kg bag of potatoes in Githurai Market**



Source: Survey data, January 2015

Traders in Muthurwa market spent, on average, Sh.175 on transport, Sh.7.5 on loading, Sh.17.5 on sorting and bagging, and Sh.22.5 on other charges per a bag of potatoes. Transport charges varied between Sh.50 and Sh.250 per a bag. Loading charges, sorting and bagging charges, and other charges varied from zero to Sh.20, zero to Sh.30 and Sh.5 to Sh.50 per a bag respectively (Fig. 3.6). In Nakuru market on the other hand, traders spent between Sh.40 and Sh.220 on transport, zero and Sh.50 on loading, zero and Sh.70 on sorting and bagging, and zero and Sh.60 on other charges per a bag. On average, the traders spent Sh.148.6 on transport, Sh.25 on loading, Sh.25.8 on sorting and bagging, and Sh.24 on other charges per a bag (table 3.4).

**Fig. 3.6: Average revenues and costs (in Ksh.) per 50kg bag of potatoes in Muthurwa Market**



Source: Survey data, January 2015

### 3.1.5 Gross Marketing Margin:

This study focused on the downstream of the value chain and therefore sought to establish marketing margin maximisation by traders, processors and potato products manufacturers. It adopted the view by Bonabana-Wabbi *et al* (2013) that the gross marketing margin is the most relevant point of analysis given the influence of traders on the value chain. This survey revealed that potato marketing in Kenya involves an average gross marketing margin (GMM) of 46.8%. The GMM varied between 28.0% at the minimum and 90.4% maximum. The average GMM varied across surveyed markets and the GMM varied within surveyed markets. The highest average GMM was reported in Kongowea market at 59.5%. In Kongowea, the GMM varied between 51.9% and 74.8%. In Githurai the average GMM was 47%, the lowest computed GMM was 29.3%, while its highest value was 65.6%. Traders in Marikiti market made the lowest gross marketing margins ranging from 28% to 45.4%. The average GMM made in Marikiti was 32.7% (table 3.5).

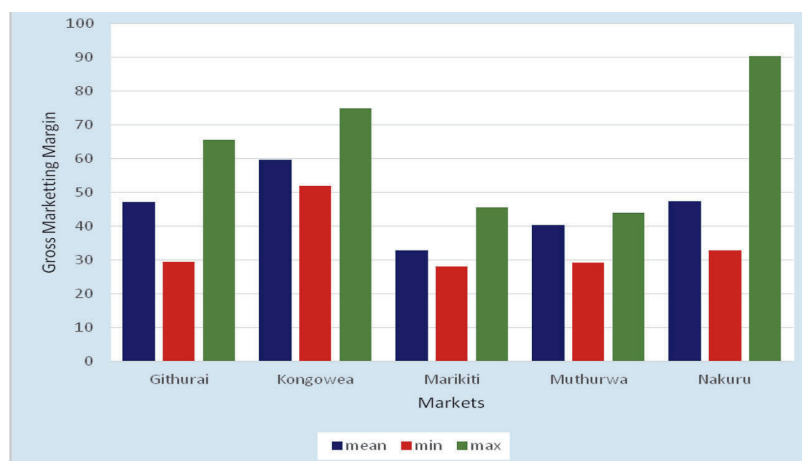
**Table 3.5: Gross marketing margin by destination market**

MARKET	VARIABLE	MEAN	MIN	MAX
Githurai	GMM	47.0	29.3	65.6
Kongowea	GMM	59.5	51.9	74.8
Marikiti	GMM	32.7	28.0	45.4
Muthurwa	GMM	40.2	29.2	43.9
Nakuru	GMM	47.3	32.7	90.4
<b>Total</b>	<b>GMM</b>	<b>46.8</b>	<b>28.0</b>	<b>90.4</b>

Source: Survey data, January 2015

Traders in Muthurwa market earned GMM of between 29.2% and 43.9%, with an average of 40.2%. Those in Nakuru market earned GMM of between 32.7% and 90.4%. The average GMM for traders in Nakuru stood at 47.3% (table 3.5). It is important to note that this GMM only represents a fraction of the margins in the potato trade. This has to be combined with the GMM earned from processors and traders in processed potato products to arrive at the actual GMM. This will be done in the conclusion section of this study report.

**Fig. 3.7: Gross marketing margin by destination market**



Source: Survey data, January 2015

### 3.1.6 Potato storage time by destination market

On average, interviewed traders stored potatoes for one and a half days. The length of storage, however, ranged between zero and seven days and varied from one destination market to the other. Muthurwa market reported no storage time, implying that traders there bought and sold all their potatoes on a daily basis. This is largely attributed to the lack of storage space that is safe and affordable. In addition the County Government of Nairobi does not allow overnight storage of produce in the wholesale market. Nakuru on the other hand reported the longest storage time, varying between 1.5 and 7 days, with the average storage time being 2.8 days. These variations could be explained by the fact that Muthurwa is mainly retail market, while Nakuru, is closest to major potato producing areas and supplies potatoes to other traders from far away markets, hence the longer storage time (table 3.6).

**Table 3.6: Potato storage time by destination market**

DESTINATION	VARIABLE	MEAN	MIN	MAX
<b>MARKET</b>				
Githurai	storetime	0.11	0.00	1.00
Kongowea	storetime	2.10	1.00	3.00
Marikiti	storetime	0.35	0.00	1.00
Muthurwa	storetime	0.00	0.00	0.00
Nakuru	storetime	2.80	1.50	7.00
<b>Total</b>	<b>storetime</b>	<b>1.41</b>	<b>0.00</b>	<b>7.00</b>

Source: Survey data, January 2015

### 3.1.7 Potato attributes desired by traders

The sampled traders reported considering five factors when choosing potatoes to buy from farmers and middlemen. These factors include size, price, variety, shape and colour. Size in this case referred to large size potatoes and it stood out as the most important factor influencing traders' choice of potatoes, being mentioned by 95.9% of the respondents, followed by price at 85.7%. Shape was the least important factor, only mentioned by 24.5% of the respondents, followed by colour at 32.7%. Variety was mentioned by 42.9% of the respondents (table 3.7).

**Table 3.7: Potato attributes desired by traders**

POTATO ATTRIBUTE	CHOICE RATE (%)
Size	95.9
Price	85.7
Variety	42.9
Colour	32.7
Shape	24.5

Source: Survey data, January 2015

Six potato varieties were mentioned by the interviewed traders. These included: *shangi*; *tony red*; *meru red*; *nyayo*; *ngorofu*; and *tigoni*. A majority of the traders (77.1%), however, reported dealing in only one variety, 14.6% dealt in two varieties, 6.2% dealt in three varieties, while only 2.1% dealt in four varieties. Despite being aware of the many varieties, all the respondents preferred *shangi* variety.

### 3.1.8 Factors influencing traders' choice of potato

Availability was the most compelling factor behind the popularity of *shangi* variety among the traders, with 79.8% of the respondents citing it (table 3.8). This suggests that traders are more concerned with their ability to reliably meet their customers' demand than any other factor in choosing which variety to deal in. The choices were, however made on the basis of a combination of factors. But this also raises questions that could be answered better from the farmer's perspective about the availability of *shangi* and not

other varieties. These questions have to do with the popularity of *shangi* among farmers that leads to its consistent production and supply in the market. They could also be attributed to the variety's characteristics in terms of disease resistance, availability of certified seeds, yield levels, among others.

**Table 3.8: Factors influencing traders' choice of potato**

POTATO CHARACTERISTIC	PREFERENCE RATE (%)
Readily available	79.8
Big size	34.7
Cheap to cook	32.7
Suitable for multiple uses	28.6
Long shelf life	26.5
Good taste	22.5
Affordable	20.4
Customers' preference	12.2
Other factors	8.2

Source: Survey data, January 2015

### 3.1.9 Ware potato customer

The traders sold their potatoes to a variety of customers. Out of the sampled traders, 81.6% sold to individual consumers; 69.4% sold to cafe's; 65.3% sold to retailers; 20.4% reported selling their potatoes to processors; while 8.2% sold to other categories of customers (table 3.9). This means that most of the potatoes produced in Kenya are bought directly by individual consumers who mainly comprise of households.

The majority of these households buy ware potatoes from estate based vegetable vendors commonly referred to as *mama mboga*; open air markets such as *Nakuru Municipal*, *Wakulima* and *Kongowea Markets* in Nakuru, Nairobi and Mombasa respectively and from roadside vegetable vendors commonly found along the major highways of the potato producing areas as shown in the pictures overleaf.



Road side potato retailer



Estate based potato trading



Off the truck potato trading at Kongowea market

From the observations made during these study only a minority of consumers buy potatoes from supermarkets and greengrocers. This underscores the need to focus on interventions geared towards

increasing potato availability at affordable prices throughout the year to consumers at the household level. Consumer focused campaigns towards increasing awareness on the nutritional importance and the diverse uses of potato will go a long way in increasing consumption hence increasing demand for the farmers produce. Nonetheless, each of the traders sold to more than one type of customers, highlighting the lack of specialization among them. The traders also reported that 83.3% of their customers demanded specific types of potatoes. This indicates a trend that could be harnessed by the value chain players to increase potato consumption in the country. It is also an opportunity for upstream chain actors such as seed producers/multipliers and farmers to respond to specific market needs.

**Table 3.9: Distribution of Potato buyers by customer type**

CUSTOMER TYPE	RESPONSE RATE (%)
<b>Individual consumers</b>	81.6
<b>Processors</b>	69.4
<b>Retailers</b>	65.3
<b>Cafe`s</b>	20.4
<b>Others</b>	8.2

Source: Survey data, January 2015

### 3.1.10 Potato attributes desired by Customers

Customers choose potatoes to buy on the basis of different combinations of the following attributes: size, price, quality, firmness, taste, amount of oil consumed when cooking, shelf life and a host of other factors. The respondents mentioned low price - 44.9%; big size - 38.8%; high dry matter content - 22.5%; good taste - 22.5%; long shelf life - 20.4; low oil use - 18.4%; and other factors - 8.2% (table 3.10). Most of the ware potatoes are consumed by households as established above in this survey. In addition, these customers want the potatoes at low (affordable) prices throughout the year. This finding points to the need to ensure that farmers are supported to produce & avail potatoes throughout the year especially considering that most key potato growing areas have favourable weather throughout the year. Interventions related to

ware potato storage would significantly contribute to this matter. These findings call on seed developers to align research and seed development to the attributes desired by the majority of consumers and traders. It is at the seed development stage that these desired attributes can be created in the potatoes.

**Table 3.10: Potato attributes desired by customers**

POTATO CHARACTERISTIC	CHOICE RATE (%)
Low price	44.9
Big size	38.8
Firmness	22.5
Good taste	22.5
Long shelf life	20.4
Low oil use	18.4
Other factors	8.2

Source: Survey data, January 2015

## 3.2 Corporate/Institutional potato buyers

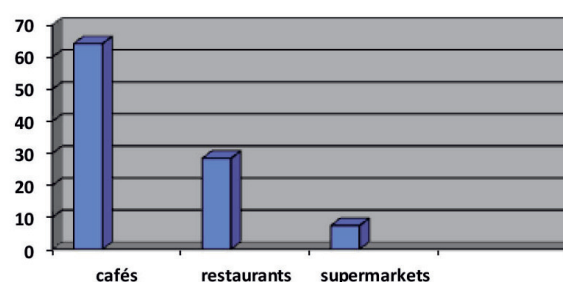
### 3.2.1 Characteristics of corporate/institutional ware potato customers

At the terminal end of the potato value chain sit other potato buyers. These are mainly institutional/corporate buyers and include cafes, restaurants, supermarkets and processors. A key characteristic of these corporate/institutional buyers is that potato or potato products are an integral part of their businesses and they buy either in large quantities throughout the year. A total of 253 respondents from this category were sampled. Out of these, 64.2% were cafe`s, 28.4% were restaurants, while 7.4% were supermarkets (Fig. 3.8). Processors are analysed in detail in a separate part of this report.

In this section, we have also analysed the nature of the potato traders who often deal with these corporate/institutional customers. These traders are categorized on the basis of their nature, i.e. corporate, partnership and sole proprietorship. Out of the sampled traders, 5.8% were corporate entities, 7.4% were partnerships, while 86.8% were sole

proprietorships. In terms of scale of operation, 5.7% were large scale, 43.5% were medium sized and 50.8% were small scale.

**Fig. 3.8: Types of institutional/ corporate potato customers**

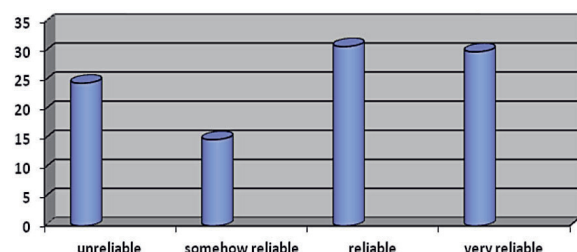


Source: Survey data, January 2015

The majority of the respondents from the institutional/corporate potato customers were employees of the businesses. Only 46.1% were owners. The remaining 53.9% of the respondents were divided between managers (41.1%) and chefs (12.8%). The respondents were 50% male and 50% female. The average age of respondents was 35 years. The oldest among them was 65 years old, while the youngest was 21 years old.

On average, the cafes, restaurants and supermarkets sampled had been in business for 4.5 years. However, the oldest of them had been in the business for 30 years while the newest had been in the business for less than half a year. Most of these institutions (76.6%) bought their potatoes from middlemen, 16.6% bought from individual farmers, 3.0% bought from cooperatives and 3.8% bought from wholesalers. Reliability of the suppliers was also scrutinized where 24.5% of the respondents considered their suppliers unreliable, 14.8% reported that their suppliers were somehow reliable, 30.8% said their suppliers were reliable, while 29.9% reported that their suppliers were very reliable (Fig.3.9). Thus according to the respondents, more than 60% of the potato suppliers in the market were reliable.

**Fig. 3.9: Chart of reliability of supply of potatoes**



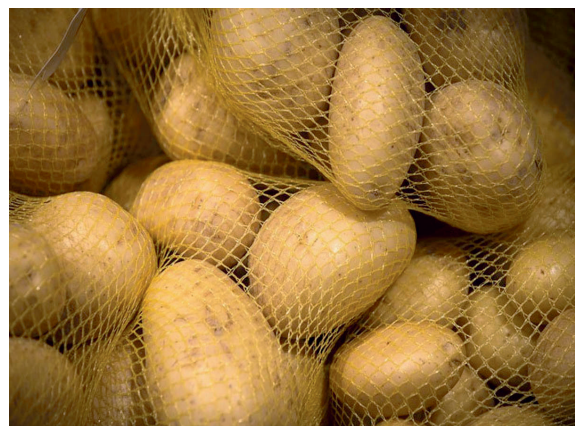
Source: Survey data, January 2015

### 3.2.2 Supermarkets & Greengrocers

Supermarkets in particular are more concerned with reliability of supply than anything else. Given that they are neither end users nor processors, their main concern is to have the product on the shelf as consistently as possible to avoid disappointing their customers. They demand consistency from suppliers of potatoes, as well as potato products. Supermarkets and greengrocers sell fresh ware potatoes by weight. They pre-pack them using a variety of materials, ranging from plastic nets to polythene bags. Sometimes they simply pour them onto the shelves for customers to select those they want, after which they are weighed and priced. The presentation of ware potatoes on the supermarket shelves is neither attractive nor informative.

Considering that the bulk of the ware potatoes are consumed at household level, there is nearly no branding or decent packaging of ware potatoes in the market place with the exception of a few top-notch green grocers and supermarkets. Potato types are distinguished by either their source e.g. Meru, or colour e.g. white potatoes.

There is no effort to market potatoes to the consumers – they are simply displayed. In addition customers have to request for gloves (or improvised most of the time) to protect their hands from the heavily soiled potatoes as they select and pick their choice from the shelved. This is not only time consuming but also discouraging to the extent that some customers do opt for alternative food items. The quality of the potato is also significantly compromised by this sort of handling. The pictures below show ware potatoes on display in a local supermarket.



Pictures of potatoes on display in some of the local supermarkets in Nairobi

In determining whether or not to buy potatoes and potato products, these institutions are influenced by price at 86.0%, size at 10.6%, colour at 2.1%, taste at 0.4% and variety at 0.9% (table 3.11).

**Table 3.11: Factors influencing potato products traders in choice of potato**

FACTOR	PERCENTAGE
Price	86.0
Size	10.6
Colour	2.1
Taste	0.4
Variety	0.9

Source: Survey data, 2015

### 3.2.3 Cafe's and Restaurants

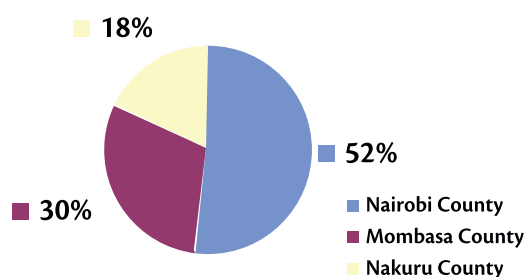
The survey established that most cafes and restaurants prefer to buy raw fresh potatoes (92.5% of them) rather than processed potato products like

raw fresh pre-cut/pre-cooked chips. The nature of this market, often referred to as the fast food market, is high volume and low price. Much as they desire high quality products and the convenience offered by the pre-cut option they are extremely price sensitive and easily accept average quality. This partly explains the absence of raw or pre-cooked chips processors targeting cafes and restaurants selling to the mass market e.g. the Kenchic branded fast food outlets.

The few chips processors in the market such as Sereni Fries Ltd and Njoro Canning target niche markets, which discern high quality products and are willing to pay equivalent prices. "This is because the costs of sourcing the raw material and processing are high, making selling to the mass market unviable" (Sereni Fries Interview). The study noted that most pre-cut chips available locally are raw and fresh. Only a few locally processed frozen chips brands such as Golden Valley from Njoro canning & Potatoes Fries from Spudz Ltd are available. Indeed other studies have shown that Kenyans prefer to eat fresh rather than frozen foods, hence the very low sales of these frozen brands.

The dealers in chips varied significantly in scale. The dealers in chips particularly varied from small roadside vendors to highly sophisticated corporate entities. The volumes traded also varied from county to county, with Nairobi County accounting for over 52% of the total volume transacted, followed by Mombasa County at 30% and Nakuru County at 18% (Fig.3.10). This can be attributed to the growing urban population, a significant portion of which are youth as well as the fact that potato chips are viewed as a trendy, tasty, easy to prepare and affordable food item in the urban areas.

**Fig. 3.10: Percentage of potato chips traded by county**



Source: Survey data, 2015.

Other common products include crisps and chevdas. Only 2% of the respondents dealt in crisps. Among crisps sellers, average revenue earned from sales in the one week preceding this study was Sh.12, 410. Revenue from crisps varied between Sh.70 and Sh.33, 500.

The others were sold by 20.9% of the respondents and brought in an average of Sh.57, 950. The lowest earning from sales of other potato products was Sh.40, while the highest revenue earned in a week was Sh.390, 000. Chips were the most popular potato product sold by 82.6% of the sampled institutions. On average, chips sellers earned Sh.209, 015, with earnings varying from Sh.2,000 to Sh.15,800,000 in a week.

### 3.3 Potato processing

This study has established that only a small percentage of the potato produced in Kenya is processed. There are 10 registered processors in the three counties selected for this study. These processors have been in existence for an average of 5 years, which implies that many of them are still finding their footing in the market. By the assessment of the respondents, the potato products market is broad and barriers to entry are much lower. Hence there are many other cottage industry level processors in all corners of the counties surveyed.

However these are not registered and difficult to identify. In the course of this survey the heads/managers of the following processors were interviewed: Sereni Fries Limited; Deepa Industries Limited; Viva Snacks; Pioneer Foods Limited and Njoro Canning. These processors reported high level of specialization and mechanisation.

#### 3.3.1 Snack foods category – crisps and chevda

The processors in this category differ in size and brand range, with some focusing exclusively on potato-based snack foods such as crisps and chevda. Crisps and chevda which are 90% potato are common snack foods in Kenya. Some of the common brands of crisps and chevda in the market are shown in the following pictures:

## Crisps



Nakumatt Holdings Ltd



Crisps - Pioneer Foods Ltd



Crisps-Propack Kenya Lt



Deepa Industries Ltd

## Chevda



Pioneer Foods Ltd

In recent years there has been increased volume of imported crisps brands such as Pringles and Lay's shown in pictures below. The volume and varieties of the imported brands of chips of crisps was reported by interviewees in this study to be increasing.

## Crisps



### 3.3.2 Chips varieties

Sereni Fries, Njoro Canning and Spudz Ltd are the few formally registered local chips processors focussing on either raw pre-cut/ pre-cooked potato chips or frozen chips. These processors particularly target niche markets such as upmarket restaurants and hotels, often franchises of international chains. They also target supermarkets with in-house restaurants, a growing trend in Kenya.

To meet the high quality expectations of these customers, these processors desire potatoes with the following attributes: long to oblong shape; large to medium size; yellow flesh colour; shallow eyes; available throughout the year; long shelf life; and minimum discolorations/oxidation after peeling. Potato varieties with the above attributes e.g. the newly released Dutch varieties are now available in

Kenya but uptake by farmers has been extremely low. This could be due to the lack of information on what the processors want, the high cost of quality seed potato, or the lack of price incentives/differentiation for such potatoes demanded only by niche market. Some of the common locally produced brands are shown in the pictures below:

## Chips



Spudz brand (frozen)



Njoro Canning brand



Sereni Fries products

During this survey, the raw fresh or precooked chips processors sited the main reason for not being able to sell to the mass market as the high costs of sourcing good quality raw material and processing, which eventually placed their end product above the price threshold of the ordinary fast food restaurants.

Secondly, processors face high packaging costs that average at Sh.115/kg of crisps or Sh.5.75/50gm packet and Sh.25/kg of chips. The study also established a growing presence of international frozen chips brands such as McCain from Ireland and Emborg from Demark in the local supermarkets especially the Nakumatt chain. Pictures of some of those found on the supermarket shelves are shown below.

Staff interviewed in the supermarkets though unwilling to share data indicated that the sales are slowly picking up with the main customers for the imported frozen chips brands being the international fast food chains and restaurant such as Kentucky Fried Chicken (KFC) and the expatriate community.

Besides being frozen, these international brands are also highly priced with a gram costing as high as Ksh1.14 (Emborg) compared to Ksh0.34 (Sereni) for locally produced fresh raw chips. Table 3.12 gives the prices of some of the commercially processed chips products in the market.



**Table 3.12: Retail prices for commercially processed chips**

BRAND	SOURCE	FORM	WEIGHT (GRAMS)	PRICE/ PACK (SHS)	PRICE (SHS/GRAM)
<b>McCain</b>	Import	Frozen	750	495.00	0.66
<b>Emborg</b>	Import	Frozen	250	285.00	1.14
<b>Spudz</b>	Local	Frozen	500	190.00	0.38
<b>Sereni Fries</b>	Local	Raw fresh	500	170.00	0.34
<b>Golden Valley</b>	Local	Frozen	500	245.00	0.49

Source: Survey data

The continued growth of the foreign brands of chips, crisps and other processed potato products in Kenya may point to limitations in the domestic potato processing industry. According to Deepa Industries, the manufacturer of the Tropical heat brand of crisps and chevda, the preferred potato varieties must have the following attributes:

- **Dry Matter Content** – requires potatoes with dry matter content of 21-23%. The higher the dry matter content the higher the yield ratio and the better the quality of the crisps.
- **Sugar level** – prefers varieties with low sugar content, less than 0.1%. This attribute affects the shelf life of the finished product.
- **Size** – prefers medium size i.e. 45mm –60mm in diameter. This is good for aesthetics because the crisps do not appear too small or too big in the packet. The very large crisps also present packing challenges when packing the smaller units of the finished product such as the 30g and 50g crisp packets.
- **Preferred varieties** - Dutch Robin due to its high dry matter content. Other new varieties such as Lady Rosetta, Royal and Markies are also preferred due to their low sugar level. However these are not readily available.
- **Maturity of potatoes** – potatoes for crisps processing must be mature and well cured in order to produce the desired product.
- **Freshness** – is an important attribute that affects quality of finished product. Potatoes are processed within 24 hours of delivery to factory.

The processors reported using mainly *shangi* variety of potatoes due to its availability, despite preferring other varieties such as *Dutch Robin*, *Lady Rosetta*, *Royal*, *Musica* and *Markies*. This means that processors are keen on supplying their customers with products that are consistent in taste and form. Thus stability of supply of a given variety is a major consideration for them.

The findings above also mean that supply of potatoes is not in sync with market demand dynamics. While processors, who are increasingly becoming important players in the value chain paying attention to the quality of potatoes, the upstream of the supply chain seems to be stuck with availability as the main driver of production and trade. Traders for example, did not mention any of the new varieties of potatoes that the processors mentioned or indicated preference for. Hence, this leads to the conclusion that either potato traders do not relay the market information in terms of customer tastes and preferences up the value chain, or they have given up doing that due to unresponsiveness of the primary players in the value chain.

The interviewed processors also indicated that sharp fluctuation of potato prices between glut and scarcity periods was a major challenge. Potato is mainly grown twice a year in the major potato growing areas. Hence, there two glut and two scarcity periods in a year. Gluts immediately follow harvesting in January-February and July-August (table 3.13), while scarcity exists in the intermediate periods. This is exacerbated by limited capacity of the traders and processors to buy and store the potatoes over long periods of time. To smoothen supply at stable price

and avoid effects of scarcity when prices skyrocket, processors need to buy and store potato for up to three months. Yet this is unaffordable for many of them due to the large amounts of capital required to finance such volume of purchases, as well as lack of appropriate storage facilities.

Given the bulky nature of potatoes, they require a lot of space to be able to store them. Indeed Nairobi-based processors prefer not to store potatoes at all due to the high cost of storage in Nairobi's industrial area where they operate from. Farmers equally face the challenge of storage. They consequently suffer the effects of gluts in the year when oversupply causes prices to plummet. These price fluctuations are a major challenge to processors, who cannot alter prices

of their products as frequently in the competitive snacks market, even when the price of their main input – raw potato, varies with seasons. To cushion themselves against these fluctuations, processors and marketers of processed potato products impose high mark-ups on the purchase price of the products.

The surveyed supermarkets imposed a mark-up of 28-35%, with an average of 30.5%. Processors charged the highest mark-ups of 33-60% with an average of 45%, while restaurants and cafes charged the lowest mark-ups of 15-30% with an average of 25.5%. Table 3.13 shows a summary of the gross marketing margins for the three institutional players in the ware market supply chain.

**Table 3.13: Gross marketing margin by type of institutional market**

MARKET	VARIABLE	MEAN	MIN	MAX
Processors	GMM	45.0	33.0	60.0
Supermarkets	GMM	30.5	28.0	35.0
Restaurants/cafes	GMM	25.5	15.0	30.0

Source: Survey data, January 2015

Thus the gross marketing margin for the ware potatoes from the farmer to the consumer who buys processed potato products from the supermarket is  $(46.8 + 45.0 + 30.5) = 122.3\%$ . This means that the price the potato farmer receives is less than half what the consumer pays for the final potato product in the market. The restaurants and cafes mark-up is not added to the total because most of those surveyed bought their potato supplies from the same sources as processors.

### 3.4 Conclusions

From the analysis of the collected data and review of relevant literature, several conclusions about the ware potato market in Kenya can be derived:

**The ware potato market is large and growing:**

From official government records, potato production and marketing in the country is on an upward trend. This can only happen when the demand for potato is expanding. Several factors explain the growth of the ware potato market including the growing youth population in the surveyed urban areas. Potatoes are also deemed easy to cook in a variety of ways and highly palatable. Furthermore, potatoes are relished by higher-income urban dwellers, who consider them as a high quality and prestigious food item. This is particularly so when served in form of snacks such as potato crisps and in the fast food industry as chips or French fries. From the available secondary data, the per capita consumption of potato in Kenya stands at of 25 kg per year.

**The supply-demand gap on desired potato varieties:**

There is a wide gap between the quality of potatoes desired by large potato processors and what the farmers supply. This is mainly because farmers produce varieties that processors consider to be of inferior quality. Potato processors e.g. Deepa Industries and Sereni Fries Ltd have specific potato variety requirements aligned to the quality of end products desired by their customers. Moreover, foreign firms and their franchises intent on setting up potato-based businesses in Kenya desire superior quality potato varieties. Often these variety quality specifications are either not known to the potato farmers, or farmers are simply unwilling to go the extra mile to deliver them, leading to missed opportunities at the market place. Either the farmers lack capacity to invest in the production of the high quality varieties, or they simply don't want to given that most of the consumers of potatoes currently, are households, who have not raised the bar in terms of the quality they demand.

**Lack of consumer friendly potato packaging, branding and positioning:**

In the course of this survey, visits to several supermarkets revealed that the presentation of ware potatoes on the supermarket

shelves is neither attractive nor informative. Considering that the bulk of the ware potatoes are consumed at household level, there is nearly no branding or decent packaging of ware potatoes in the market place with the exception of a few top-notch green grocers and supermarkets. Potato types are distinguished by either their source e.g. Meru or colour e.g. white potatoes. There is no effort to market potatoes to the consumers – they are simply displayed. In addition customers have to request for gloves (improvised most of the time) to protect their hands from the heavily soiled potatoes as they select and pick their choice from the shelved. This is not only time consuming but also discouraging to the extent that some customers do opt for alternative food items. The quality of the potato is also significantly compromised by this sort of handling.

**Price fluctuations:** Fluctuation of prices of potatoes has remained a major challenge in Kenya. Instability of potato prices is rooted in two facts about potato farming in Kenya: rain-fed farming of potatoes and absence of storage facilities that could enable storage over long spells of time. Since potato production is mainly rain-fed, supply to the market is seasonal resulting into gluts and scarcity. Following rainfall patterns in potato growing areas, potatoes are in abundant supply between January and March and July and September. The rest of the months are characterised by scarcity. Farmers need to store potatoes for at least three months to get a good price, while processors need to store potatoes for up to four months to avoid the adverse effects of price fluctuations caused by limited supply. Presence of storage facilities with capacity to preserve potatoes this long would smoothen supply and steady prices. This would in turn boost potato processing and expand consumption among the households.

**Poor flow of market information along the value chain:**

Processors are an important group of gate-keepers in the ware potato market. The fact that their quality expectation is much higher than that offered by the producers implies a gap in information flow within the potato value chain. The processors have clearly defined ware potato quality parameters. It is therefore expected that this information reaches the actors in the upstream of the value chain

especially the producers and seed potato suppliers. However, there seems to be a failure in the relaying of this information, or a systemic inability of the upstream actors, who include farmers, to respond to the information, or a combination of communication breakdown and systemic capacity deficit.

**Limited trader-farmer linkages:** Most traders interviewed reported having no linkages with farmers. Even those who had, they mostly had verbal agreements with the farmers, most of which were unenforceable. This limits the farmers' commitment to the crop and their potential to take risk with their investment in its production and encourages poor agronomic practices. The lack of commitment from farmers on the other hand reinforces perception of risk on the part of traders and processors, which in turn discourages their entry into binding contracts with farmers and farmer groups. A self-reinforcing vicious circle exists in these relationships. Besides, farmers also need organisation and production planning, which is currently lacking. This will give them a platform for information sharing and thus enhance their innovativeness and capacity to tap into the opportunities presented by the growing demand for ware potatoes.

**Poor post-harvest handling:** All potato production activities in Kenya are manually done using man power. Hence losses are a significant problem at all levels of the value chain. From literature, most losses happen when harvesting potatoes due to use of inappropriate harvesting methods and tools as well as wrong packaging and poor handling and transportation infrastructure. Lack of a proper mechanism of grading the potatoes for various uses is also a major contributor to losses – customers end up buying mixed sizes of potatoes, some of which are inappropriate for their purposes. From the survey data, Sereni Fries indicated that between 20% and 60% is lost through sorting depending on the season. Significant losses also occur during transportation, in the markets and in processing plants. This is attributed to poor handling by transporters; poor storage by traders; and low efficiency levels of the processing technologies used by the processors. According to Sereni Fries, for instance, their efficiency currently stands at 60% since a significant part of the

processing is done manually especially the removing of the 'eyes of the potato' which is extremely labour and time consuming and largely arises from the use of wrong varieties. These losses along the route to the consumer lower returns and diminish the desire to invest in the potato business.

**Huge gap between farm-gate potato prices and prices of potato products:** The ware potato market is characterised by a wide marketing margin of approximately 122.3%. This has two implications: first, there is disproportionate sharing of the benefits of potato business within the value chain, with the farmer as the most disadvantaged; and secondly, the potato value chain is inefficient thus imposing unnecessarily high cost on the consumer. The former fact could discourage investment in potato farming and thus cause the observed non-adoption of new potato varieties by farmers. The latter on the other hand discourages consumption and limits the growth of the market for ware potatoes in the country.

### 3.5 Recommendations

In the light of the conclusions drawn from the findings of this study, several recommendations are made on ways to improve the performance of the ware potato value chain:

- First, it is important to develop partnership models of potato production and marketing that incorporate value chain actors at all levels from seed development, production, multiplication and distribution through to potato processing and consumption. Such partnership will aid in removing bottlenecks in the value chain and enhance efficiency of the market feedback mechanisms that are key in driving innovation and investment. This is necessary to achieve sustainable growth of the ware potato market. Best practice on how to achieve this can be borrowed from the highly successful Eastern African Grain Council, the voice of the grain value chain actors or Kenya Association Manufacturer (KAM) the voice of the manufacturers, lobbying government and the involvement of all value chain actors

in matters that concern their wellbeing. Potato being the second most important food crop in Kenya deserves more attention and resources from both the County and National Government. The sector players through an organised entity can lobby for such attention.

- Secondly, lowering cost of potato production and pumping efficiency in the value chain is critical. Efforts to produce and avail to smallholder farmers, high quality seed potato at affordable prices should be intensified. Potato farmers should also be allowed to benefit from the government subsidised fertiliser programme. Available models of mechanised potato production need to be adapted and availed to the farmers if Kenya is to competitively produce potatoes. The significant role that medium scale and large scale farmers can play in catalysing this process should be explored. This is important to ensure that cost of technology and agronomical deficiencies do not hinder adoption of new and superior seed varieties. International companies with expertise, experience and technologies should be sought and encouraged to partner with local companies in this venture. This will go a long way in improving the quality and increasing supply while lowering prices for both individual and institutional consumers.
- Thirdly, proper consumer education on the nutritional value of potato and on the variety of ways in which potato can be consumed is essential to strengthen demand for potato by households. This can be done by appointing a potato ambassador, who is a well-known celebrity to create awareness about healthy potato consumption and carrying out media campaigns. This consumption of potato can be portrayed in the positive light through proper packaging, branding and positioning contrary to the current state, where potato consumption is greatly maligned by nutritionists and branded unhealthy. Indeed some studies associate potato consumption, which is mainly in form of chips and crisps, with obesity, overshadowing the significant nutritional benefits it offers. Yet

there are many other ways of preparing potato which retain its nutritional benefits besides giving a tasty food item on the menu.

- Fourthly, due gluts that are occasioned by harvesting at given times and inability to store the harvested potatoes for long, two suggestions are made here to solve this problem: first is to develop appropriate potato (vegetable) storage facilities in potato growing areas and deploy a warehouse receipt system that enables farmers to use their stored potatoes as collateral to get finances to fund production of a new crop of potato, while holding out for better prices. This would protect farmers from the risk of suffering the “winners curse”, often associated with seasonal supply of agricultural products. Secondly is to create encourage production planning and off season production using irrigation. This would lead to an all-year round supply of potatoes that would stabilize prices and protect consumers and processors from the risk of unstable prices;
- Fifthly, it is important for potato processors and traders who are the gate-keepers in the ware potato market to cooperate among themselves and develop standards for grading potatoes. They can also partner with established partners such as Kenya Bureau of Standards and borrow from International best practice from other countries who have been in this business longer in developing such standards. This will create a coherent message from the downstream to the upstream of the value chain and cause the adoption of improved potato varieties and quality of output. Development partners, governments and private sector can then support in the acquisition of the grading equipment, dissemination and enforcement of these standards in the market place. This will require the harmonization of potato standards across the Eastern Africa region owing to the fact that potato is commonly traded across the borders.
- Sixth, to make the value chain actors’ partnership alluded to earlier in this section

possible, farmer organization is paramount. This requires innovation in farmer organization. Given the bulkiness of the crop in question, farmers should be organized on the basis of geographical proximity with one another. Groups of 20-30 farmers could be formed and allowed to elect their own representatives and such representatives of say 30 groups could form an umbrella body that coordinates the involvement of farmers in the partnership with the other actors. Such organization could also be led by a processor in need of stable and reliable supply of potatoes to protect, especially small holder farmers from the governance problems often associated with the cooperative movement in Kenya.

- Seventh, traders and processors need financial, technological and technical support to improve their efficiency in handling, storing and processing of potatoes to cut wastage and losses. This would make potato business more attractive to investors and financiers who do their risk analysis of businesses based on returns and the stability of such returns.

- Finally, the marketing capacity of potato farmers needs to be improved through financial, organizational and technical support to enhance their bargaining power in the market. The potato sub-sector stakeholder should lobby the government to review the farmer produce packing law. The unit of sale should be based on weight (kg) and likewise the unit for charging transport and cess cost should be by weight just like it is done in the grains sector rather than on per bag basis. The government needs to review the tax regime on inputs into potato farming and processing to support expansion of potato production and consumption in the country. Such a review will make potato production, processing and marketing profitable and consumption affordable. This Unit of sale; Unit of transportation and Unit of Cess combination is what is required to make potato the leading staple in the country and an important export crop to the region since the farmer, the most critical player will get a fair reward.

## 4. PROPOSED BUSINESS CASES

The limitations of the current market situation alluded to in the earlier sections provide a basis for three possible business cases that would address the key bottlenecks. These cases are highlighted below with a focus on their ability to solve the challenges limiting the growth in this value chain, sustainability and scalability.

- **Business case one** - Strategically located Seed potato multiplication & distribution
- **Business case two** - Organised & coordinated potato producers
- **Business case three** - Strengthened linkages with processors and consumers.

### 4.1 Business case I: Seed potato multiplication and distribution

Seed potato is the basic unit for the production of ware potatoes. Therefore, access, availability and affordability of quality seed potato greatly influence the performance of the ware potato chain. The production of seed potato is a highly technical and specialised process and is done under the stringent control of KEPHIS. In addition seed potato is bulky, delicate and requires careful handling during transport and storage. Therefore, to improve access and availability of seed potato, there is need to do the following:

- Locate seed potato multiplication sites in close proximity to key ware potato producing areas in order to reduce transportation costs. Using the expertise located within seed multiplication farms, demonstration farms can be established and used to train farmers on good agronomic practices;
- Establish a wide seed potato distribution network in order to ensure that farmers have

quick access at minimum cost. Selected agro-dealers in potato producing areas can be trained and appointed seed potato agents;

- It is widely known that agro-dealers are a key source of information for farmers. Hence building their capacity with regard to ware potato production would ensure they are well equipped to provide extension support to the farmers besides selling the seed potato;
- Seed potato multiplication is complex and highly controlled by KEPHIS. Currently there are few private seed potato multipliers in Kenya, among them being Kisima farm in Meru County, Suera Ltd in Nyandarua County and Agrico East Africa. Hence there is need to decentralise the location of these multipliers into all key potato producing regions.
- A business case can be designed with these seed potato companies encompassing the foregoing suggestions on establishing strong distribution networks, just like it happens in the cereal seed sector;
- During this survey, it was established that Agrico E.A Ltd has a distribution agreement with Murphy Chemicals. Besides, Agrico East Africa is a subsidiary of the World's leading potato breeding company – Agrico. Combined with the fact that they are setting up in more than one location, these make Agrico East Africa a good model that seed multiplication partners in the proposed business case partnership should be encouraged and even supported to emulate;
- A business case in which these firms are supported to acquire the rights to replicate the most desired and highest quality seed potato varieties in their proposed replication sites is highly likely to succeed;
- The role of the seed firms' partners e.g. Murphy chemicals is equally crucial in ensuring farmers access the replicated seeds in good form and on time. A successful business model must therefore also include building the capacity of seed distributors, agro-dealers and transporters

that the seed firms might partner with a long the way to discharge their responsibilities efficiently; and

- It is important to note that failure in the quality seed delivery component is what made an otherwise very innovative model by Mamu Ltd to unravel.

## 4.2 Business case II: Organised and coordinated potato farmers

Ware potato production in Kenya is done mainly by smallholder farmers, producing potatoes on average 0.5ha of land. Therefore, in order to aggregate critical volumes of ware potato and guarantee consistent supply as required by the large potato traders and institutional buyers, the smallholder farmers need to be organised into well-coordinated producer groups. This can be done under the banner of producer cooperatives and companies. This unit becomes the entity through which:

- Buyers have access to a network of organised producers;
- Smallholder farmers are recruited as members, with common by-laws and organised into production clusters;
- Input suppliers as well as credit providers have access to a critical mass of producers, which in turn enables farmers to access inputs at competitive prices;
- Common good infrastructure such as ware potato storage facilities, grading equipment, etc can be set up for the producers
- Appropriate potato storage facilities will be critical in this business cases. Storage will allow the farmers to aggregate the produce at a central point from where it can be traded and sold to the market. In addition, during glut times the store can preserve the quality of the potatoes overtime without spoilage. This facility can be further linked to the warehouse receipting system allowing farmers to access credit, inputs as well as other services using their store potatoes as collateral.

- Quality of potatoes produced can be enhanced by linking the price of potatoes to the variety and grade delivered by the farmer such that the price is higher for the top grade of the preferred variety i.e. larger potatoes above 60mm diameter;
- Supply of different grades of potatoes enables the processors to segment the market into niche and mass market, each segment buying a different grade of potato/potato products and paying a different price;
- Organised production supporting services e.g. soil testing and extension support can be accorded to the farmers;
- Collective marketing of ware potato can be done, thereby enabling the farmers to benefit from collective bargaining and economies of scale; and
- Market oriented producer organisations can be supported to establish on a cost shared basis, storage infrastructure accessible to all farmers. From these facilities, using the stored potatoes as collateral, the farmers can be linked to credit and input providers.

In the course of this study we came across two such producer cooperatives that were beneficiaries of the Solidaridad led Kenya Horticulture and Food Security Programme (KHFSP) which had good models of producer organisation and management which can be scaled up and replicated in other areas namely Isei Cooperative in Bomet County and Munyeki Agricultural Marketing Unit (MAMU) Ltd in Nyandarua County. Mamu Ltd particularly presents a very innovative and fairly enduring model that can be reworked and scaled up with a high chance of great success.

In 1995, 20 members of the community from Munyeki area in the then Nyandarua district (Now Nyandarua County), 9 men and 11 women, registered a community based organization (CBO), which they called Munyeki Agricultural Marketing Unit (Mamu). It undertook various agricultural activities including livestock rearing.

In 2012, members mooted the idea of potato farming using high quality seeds. The group with

support from Solidaridad engaged with the Ministry of Agriculture (MOA) officials to pursue this goal. Solidaridad offered a solution to the problem of access to clean and certified seed, but the challenges of the market for their produce and inputs financing still persisted. To solve this problem, Mamu needed to engage with more partners. But first it needed to reorganize itself. Thus in 2012, Mamu Limited, a private company owned by members of Mamu CBO, was registered. Mamu Limited took up the function of mobilizing farmers into the CBO and then acting on behalf of the CBO in engaging with partners.

In early 2013, Mamu Ltd, acting on behalf of Mamu CBO, entered into a multilateral agreement with Midlands Limited, a potato processing company, Equity Bank Ltd and National Potato Council (NPC). This partnership sought to solve the identified problems facing potato farmers in the county namely: lack of access to quality inputs; lack of agricultural credit; and lack of access to structured markets of their produce. In this partnership, Midlands was to buy the potato when produced as well as source certified seeds for the farmers and supply them with fertilizers and pesticides; Equity Bank was to provide credit at a friendly interest rate of only 1% per month (fixed), giving farmers 5 months grace period; NPC was also to source seeds and do soil analysis to identify the ideal varieties to be grown by the farmers; while Mamu Ltd was to source contractors to provide ploughing and other services to the farmers.

This model was innovative particularly in the way it linked farmers to markets, credit and quality seeds and other inputs. With a membership of 400 at the time, Mamu Ltd asked interested members to apply to participate in the venture. A total of 250 farmers applied providing 310 acres of farmland. Eventually 188 members enrolled in the project. In order to run this project successfully, farmers were clustered into six zones. Each zone was managed by a committee member. The six committee members constitute the Management Committee of Mamu CBO. The management committee supervises the secretariat and reports to the executive committee of the CBO. Working under each committee member were two field officers who interacted with farmers routinely.

This model ensured that farmers got all the services they needed to produce potatoes and that the financing was done seamlessly by Equity Bank. Farmers signed off for the services received and the service providers received payment from the bank, which then became a loan to the farmers. A total of Ksh. 23.4 million was advanced by the bank. Midlands on buying the potatoes would then pay the bank loan for the farmer before remitting the surplus earnings to the farmer. Mamu CBO would then pay Mamu Ltd a 10% commission on the profits received by the farmers group. Mamu Ltd, which has 50 shareholders drawn from members of Mamu CBO, acts as an agent of Mamu CBO in creating vital linkages in the sector to facilitate efficient production and marketing of potatoes.

This model is completely innovative and viable. According to Mr. Ndambuki, who is the founder of both Mamu CBO and Mamu Ltd, the greatest challenge that the farmers encountered was lack of access to certified seeds. This made the whole arrangement to unravel. Contracted seed suppliers did not manage to supply on time, leading to poor yields that complicated loan repayments. Nonetheless the full amount of the loan advanced has been repaid plus interest as agreed. The innovativeness of the model lies in its strong accountability mechanism that guarantees proper utilization of the loan advanced by the bank, as well as repayment by individual farmers, unlike many other group lending models that hold entire groups responsible for individual members default cases.

It is recommended here that given the legal and other problems that Midlands Ltd has gotten mired into, that this model be replicated with another processing firm Sereni Fries Ltd would be an ideal candidate to take up the position of Midlands Ltd.

### 4.3 Business case III: Marketing potato and potato products

The findings of this survey indicate that the bulk of potato consumers are households in both rural and urban areas, followed by processors. The study further shows that household consumers prefer low

priced potatoes, large in size potato, firm, tasty and with long shelf life. On the other hand, in addition to the above attributes, processors desire specific potato varieties. Consistency of supply is thus a major driver of the variety traded and consumed. This can be delivered by businesses in cases I and II.

However, implementing only the aforementioned business cases presumes that the demand for potatoes is insatiable. Yet it is likely that once those two cases are successful, the problem of too little marketing of potato will become prominent. Thus it is proposed here that another business case involving a leading a processor and a well-established firm in commodity branding and marketing be implemented. Such a model will be able to do the following:

- Educate consumers on the nutritional value associated with potato and potato products consumption;
- Package, brand and position potatoes and potato products in ways that are attractive to consumers, but which also keeps them fresh while giving them longer shelf-life;
- Educate potential consumers on the various potato products that exist in the market, how to prepare them and the best ways and forms to consume them;
- Harness consumer tastes and preferences, monitor trends in such preferences and relay the signals to the upstream potato value chain actors for research and response;

- Conduct promotional activities that shape and influence consumer tastes and preferences of potatoes/potato products as prime food/snacks. This would be best undertaken in supermarkets and greengroceries. Indeed in this business case, a leading supermarket, preferably Uchumi supermarket, which is publicly owned, should be included as a partner;
- The role of the supermarket will be to brand and display the various varieties of potatoes and provide the customers with information about each variety's utility;
- Segment the market and deliver targeted products alongside targeted messages to the different segments of potato and potato products consumers; and
- Engage with other institutions – public and private on mainstreaming potato production and marketing in the country, including the possibility of inclusion of ware potatoes in school feeding programs.

Given their engagement in potato processing and thus some reasonable level of understanding of the potato products market in Kenya, Deepa Industries and Sereni Fries are the ideal candidates for inclusion in this business. They however, need a foreign partner with reasonable knowledge of the Kenyan/East African market and deeper experience in potato products branding and marketing and an established local supermarket chain. Such partnership would tie up the loose end left by the two earlier mentioned business cases and create a robust and sustainable potato subsector in Kenya.

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# APPENDICES

## A1: Work Plan

ACTIVITY	WEEKS					
	I	II	III	IV	V	VI
Signing of contract and briefing by SNV Kenya						
Desk Review						
Development of research tools & presentation of draft inception report						
Pretesting of the tools & presentation of final inception report						
Fieldwork						
Data analysis & production of draft report						
Presentation of draft report						
Preparation & submission of final report						

## Annex A2: Data Collection Instruments

### Annex 1: Traders Survey Questionnaire

This questionnaire will be used to collect data on ware potato marketing in Mombasa, Nairobi and Nakuru Counties, with a view to analyzing the opportunities for intervention to enhance the efficiency of the potato market in Kenya. Only individuals aged 18 years and above shall be interviewed. The information will **NOT** be used for any other purpose apart from this study. Confidentiality of the information given will be **STRICTLY** observed.

**START TIME** \_\_\_\_\_ **END TIME** \_\_\_\_\_

<b>Reviewed by:</b>
Supervisor name: _____ Date: _____
Question status 1) Ok _____ 2) Not Ok _____ (sign)
<b>If sent back for verification/correction:</b>
1. Date sent back to enumerator: _____
2. Date corrected and returned: _____
3. Reviewed again by: _____

**ENUMERATOR NAME** \_\_\_\_\_ **ENUMERATOR CODE** \_\_\_\_\_

**DATE OF INTERVIEW** (DD/MM /YY) / \_\_\_/\_\_\_/2015

#### A. General Information

- a. County: \_\_\_\_\_; Sub-county: \_\_\_\_\_;  
Ward: \_\_\_\_\_;
  - b. Type of trader: Wholesaler [1]; Retailer [2]
  - c. Nature of trader: Corporate company [1]; Partnership [2]; Sole proprietorship [3]; Farmers' group [4].
  - d. Position of respondent: Manager [1]; Owner [2]; Other [3], specify \_\_\_\_\_
  - e. Sex: Male [1]; Female [2]. Age: \_\_\_\_\_ years
- 1) How long have you been trading in potatoes? \_\_\_\_\_ years
  - 2) From whom do you buy potatoes? Farmers [1]; Middle men [2]; Cooperatives [3]; Others [4], specify \_\_\_\_\_
  - 3) What do you look for in a potato when making the decision to buy? Price [1]; Size [2]; Colour [3]; Shape [4]; Taste [5]; Variety [6]; Other [7], specify \_\_\_\_\_
  - 4) Explain your answer in 3 above \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  - 5) To whom do you sell potatoes? Processors [1]; Retailers [2]; Individual consumers [3]; Cafes [4]; Others [5], specify \_\_\_\_\_
  - 6) How many varieties of potatoes do you deal in? \_\_\_\_\_
  - 7) List the varieties<sup>5</sup>: \_\_\_\_\_  
\_\_\_\_\_

<sup>5</sup> Pick and label samples/ take photos of samples and label them.

- 8) Which of the varieties is the most preferred by buyers? \_\_\_\_\_
- 9) Give reasons for its preference: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
- 10) Do specific groups of buyers look for particular types of potato? Yes [1]; No [2].
- 11) What reasons do your customers give for demanding certain types of potato? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
- 12) Are there any agreed upon general guidelines in the industry on how to grade the potatoes? Yes<sup>6</sup> [1]; No [2].
- 13) Please indicate your costs, transaction volume and price of potatoes for the last one month in the table below:

MAIN SOURCE & DESTINATION MARKETS	QTY BOUGHT/ SOLD (NUMBER)	PURCHASE PRICE (KSH./ UNIT)	SELLING PRICE (KSH./ UNIT)	TRANSPORT COST (KSH./ UNIT)	LOADING COST (KSH./ UNIT)	SORTING & BAGGING COST	OTHER COSTS** (SPECIFY) (TOTAL)
Unit of measure	1= 50kg sack 2=100kg sack 3=110kg sack 4=20kg tin 5= 10kg tin	Range	Range	Range	Range	Range	
From:							
To:							
Wastage							

\*\* Other costs (storage, tax, etc)

- 14) What explains the wastage levels indicated in the table above? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
- 15) What is the average storage time before selling the potatoes? \_\_\_\_\_

<sup>6</sup> If there are standards take a copy/list the guidelines

16) How do you transport the potatoes to market? On donkey back [1]; By truck [2]; On human back [3]; On *boda boda* [4]; Other [5], specify \_\_\_\_\_

17) Please indicate the relationship you have with other organizations indicated in the following table:

	LINKAGE*	NATURE OF LINKAGE**	LEVEL OF TRUST IN LINKAGE***	FREQUENCY OF MEETINGS****/YEAR
Farmers groups				
Cooperatives				
Traders				
Processors				

\*: Yes [1]; No [2]; \*\*: Informal [1]; Verbal arrangement [2]; Written agreement [3];

\*\*\*: Distrust [1]; No trust [2]; A little trust [3]; Some trust [4]; Full trust [5].

\*\*\*\*: Once [1]; Twice [2]; Thrice [3]; Four times [4]; Irregularly [5].

18) Give reasons for the level of trust indicated in the linkages: \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

19) If you have no linkages, give reasons: \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

20) Outline the main problems in potato marketing in your area: \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

21) Please indicate by ticking, the potato activity calendar in your county:

MAIN ACTIVITY	JAN.	FEB	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
Planting												
Harvesting												
Marketing												
Low price												
Medium price												
High price												

22) What is the highest price you have paid for a sack of potatoes? Ksh. \_\_\_\_\_

23) What is the lowest price you have paid for a sack of potatoes? Ksh. \_\_\_\_\_

24) What is the highest price you have sold a sack of potatoes? Ksh. \_\_\_\_\_

25) What is the lowest price you have sold a sack of potatoes? Ksh. \_\_\_\_\_

26) What explains the fluctuations in the prices? \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

THANK YOU

**Annex 2: Processors Survey Questionnaire**

This questionnaire will be used to collect data on ware potato marketing in Mombasa, Nairobi and Nakuru Counties, with a view to analyzing the opportunities for intervention to enhance the efficiency of the potato market in Kenya. Only individuals aged 18 years and above shall be interviewed. The information will **NOT** be used for any other purpose apart from this study. Confidentiality of the information given will be **STRICTLY** observed.

**START TIME** \_\_\_\_\_ **END TIME** \_\_\_\_\_

<b>Reviewed by:</b>
Supervisor name: _____ Date: _____
Question status 1) Ok _____ 2) Not Ok _____ (sign)
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1. Date sent back to enumerator: _____
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3. Reviewed again by: _____

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**DATE OF INTERVIEW** (DD/MM /YY) /\_\_ / \_\_ /2015

- a. County: \_\_\_\_\_; Sub-county: \_\_\_\_\_; Ward: \_\_\_\_\_  
\_\_\_\_\_;
- b. Nature of processor: Corporate [1]; Partnership [2]; Sole proprietorship [3].
- c. Size: Large [1]; Medium [2]; Small [3].
- d. Position of respondent: Manager [1]; Owner [2]; Others [3], specify \_\_\_\_\_
- e. Sex: Male [1]; Female [2]. Age: \_\_\_\_\_ years
  
- 27) How long have you been processing potatoes? \_\_\_\_\_ years
- 28) From whom do you buy potatoes? Individual farmers [1]; Middle men [2]; Cooperatives [3]; Wholesalers [4]; Farmer groups [5]; Others [6], specify \_\_\_\_\_
- 29) How far away from your location is your furthest supplier? \_\_\_\_\_kms.
- 30) What do you look for in a potato when making the decision to buy? Price [1]; Size [2]; Colour [3]; Shape [4]; Taste [5]; Variety [6]; Other [7], specify \_\_\_\_\_
- 31) Explain your answer in 4 above \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- 32) What form of processing do you do? Peeling [1]; Chipping [2]; Slicing [3]; Blanching [4]; Frying [5]. (*Tick all that apply*).

33) Indicate the products you produce and their shelf life in the table below:

POTATO PRODUCT	ESTIMATED SHELF LIFE

34) Does each product require a particular variety of potato? Yes [1]; No [2].

35) Explain your answer in 8 above: \_\_\_\_\_  
 \_\_\_\_\_

36) Are there any industry potato grading standards? Yes<sup>7</sup> [1]; No [2].

37) To whom do you sell potato products? Individual consumers [1]; Cafes [2]; Retailers [3]; Wholesalers [4]; Supermarkets [5]; Others [6], specify \_\_\_\_\_

38) Indicate in the following table, the approximate shares (**in percentage**) of each of your products sold to each category of your clients:

PRODUCT \ BUYERS	CHIPS	CRISPS	OTHER
Individual consumers			
Cafes			
Retailers			
Wholesalers			
Supermarkets			
Others			
Total			

39) What is the geographic spread of your customers? Within ward [1]; Within Sub-county [2]; Within county [3]; Within country [4]; Beyond Kenya [5].

<sup>7</sup> If there are standards take a copy/list the guidelines

40) Please indicate your costs, transaction volume and price of potatoes and potato products for the last one month in the table below:

PROCESSED PRODUCT	QTY BOUGHT (NUMBER)	PURCHASE PRICE (KSH./UNIT)	QTY OF PRODUCT PROCESSED (UNITS)	SELLING PRICE (KSH./UNIT)	TRANSPORT COST (KSH.) (TOTAL)	PROCESSING/ PACKAGING COST (KSH.) (TOTAL)	OTHER COSTS** (SPECIFY) (TOTAL)
Unit of measure	1=50kg bag 2=100kg bag 3=110kg bag 4=20kg tin	Range		Range			
Chips			(Plates)				
Crisps			(Pkts)				
Other, specify _____ _____							
<b>Total</b>							

\*\* Other costs (storage, marketing, tax, etc)

- 41) Are your products distinctly branded? Yes [1]; No [2].
- 42) If yes, what is the brand name? \_\_\_\_\_
- 43) Have you ever changed your products' brand name? Yes [1]; No [2].
- 44) If yes, why? \_\_\_\_\_
- 45) On average, how long do you store potatoes before processing them? \_\_\_\_\_
- 46) As a processor, how many varieties of potatoes have you come across? \_\_\_\_\_
- 47) List the varieties: \_\_\_\_\_
- 48) Which of the varieties do you prefer<sup>8</sup>? \_\_\_\_\_
- 49) Give reasons for its preference: \_\_\_\_\_
- 50) How many sizes of potatoes exist in the market? \_\_\_\_\_
- 51) List the various sizes of that exist in the market: \_\_\_\_\_

8 Pick and label samples/ take photos of the samples and label.

- 52) Which size of potatoes do you prefer? \_\_\_\_\_
- 53) Give reasons for your preference: \_\_\_\_\_  
 \_\_\_\_\_
- 54) Among the products that you produce, which one is the fastest moving? \_\_\_\_\_  
 \_\_\_\_\_
- 55) Provide the list of your products, advantages and disadvantages associated with their production and marketing in the following table:

POTATO PRODUCT	ADVANTAGES OF PRODUCING	ASSOCIATED DISADVANTAGES

56) Please indicate potato buying price movements in your county:

PRICE LEVEL	JAN.	FEB	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
Low price												
Medium price												
High price												

- 57) What is the highest price you have paid for a bag of potatoes? Ksh. \_\_\_\_\_
- 58) What is the lowest price you have paid for a bag of potatoes? Ksh. \_\_\_\_\_
- 59) Give reasons for the fluctuations in the prices: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

60) Please indicate the relationship you have with other organizations indicated below:

	LINKAGE**	NATURE OF LINKAGE**	LEVEL OF TRUST IN LINKAGE***	FREQUENCY OF MEETINGS****
Farmers				
Cooperatives				
Traders				
Consumers				

\*: Yes [1]; No [2];

\*\*: Informal [1]; Verbal arrangement [2]; Written agreement [3];

\*\*\*: Distrust [1]; No trust [2]; A little trust [3]; Some trust [4]; Full trust [5].

\*\*\*\*: Once [1]; Twice [2]; Thrice [3]; Four times [4]; Irregularly [5].

61) Explain the level of trust you have in your linkages: \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

62) If you don't have any linkage, why? \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

THANK YOU

**Annex 3: Restaurants/ Cafe`s Survey Questionnaire**

This questionnaire will be used to collect data on ware potato marketing in Mombasa, Nairobi and Nakuru Counties, with a view to analyzing the opportunities for intervention to enhance the efficiency of the potato market in Kenya. Only individuals aged 18 years and above shall be interviewed. The information will **NOT** be used for any other purpose apart from this study. Confidentiality of the information given will be **STRICTLY** observed.

**START TIME** \_\_\_\_\_ **END TIME** \_\_\_\_\_

<b>Reviewed by:</b>
Supervisor name: _____ Date: _____
Question status 1) Ok _____ 2) Not Ok _____ (sign)
<b>If sent back for verification/correction:</b>
1. Date sent back to enumerator: _____
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3. Reviewed again by: _____

**ENUMERATOR NAME** \_\_\_\_\_ **ENUMERATOR CODE** \_\_\_\_\_

**DATE OF INTERVIEW** (DD/MM /YY) / \_\_\_/\_\_\_/2015

- a. County: \_\_\_\_\_; Sub-county: \_\_\_\_\_; Ward: \_\_\_\_\_  
\_\_\_\_\_;
- b. Nature of seller: Corporate [1]; Partnership [2]; Sole proprietorship [3].
- c. Type of seller: Cafe` [1]; Restaurant [2].
- d. Size: Large [1]; Medium [2]; Small [3].
- e. Position of respondent: Manager [1]; Owner [2]; Others [3], specify \_\_\_\_\_
- f. Sex: Male [1]; Female [2]. Age: \_\_\_\_\_ years

- 63) How long have you been selling potatoes/potato products? \_\_\_\_\_ years
- 64) From whom do you buy potatoes? Individual farmers [1]; Middle men [2]; Cooperatives [3]; Wholesalers [4]; Farmer groups [5]; Others [6], specify \_\_\_\_\_
- 65) How far away from your location is your furthest supplier? \_\_\_\_\_ kms.
- 66) What do you look for in a potato when making the decision to buy? Price [1]; Size [2]; Colour [3]; Shape [4]; Taste [5]; Variety [6]; Other [7], specify \_\_\_\_\_
- 67) Explain your answer in 4 above \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- 68) What potato products do you sell? \_\_\_\_\_  
\_\_\_\_\_
- 69) Which product is most preferred by consumers? \_\_\_\_\_
- 70) Give reasons for its preference: \_\_\_\_\_  
\_\_\_\_\_
- 71) To whom do you sell potato products? Individual consumers [1]; Corporate consumers [2]; Others [5], specify \_\_\_\_\_
- 72) How many varieties of potatoes are you aware of? (**specify number**) \_\_\_\_\_
- 73) Provide a list of the varieties: \_\_\_\_\_  
\_\_\_\_\_
- 74) Which variety(ies) do you prefer in making the products you sell? \_\_\_\_\_  
\_\_\_\_\_
- 75) Give the reasons for your preference: \_\_\_\_\_  
\_\_\_\_\_
- 76) What are the different sizes of potato that exist? (**list them**) \_\_\_\_\_  
\_\_\_\_\_
- 77) Which sizes do you prefer in making the various products that you sell? \_\_\_\_\_  
\_\_\_\_\_
- 78) Give the reasons for your preference: \_\_\_\_\_  
\_\_\_\_\_
- 79) How reliable is your supply of potatoes from your suppliers? Unreliable [1]; Somehow reliable [2]; reliable [3]; Very reliable [4].
- 80) Do you buy raw potatoes or processed products? Raw potatoes [1]; Processed products [2].
- 81) If you process, briefly describe the process from purchase of raw potatoes to a plate of potato product. \_\_\_\_\_  
\_\_\_\_\_
- 82) What is the volume you are able to process per day? \_\_\_\_\_ Kgs / Bags (**Tick unit**).
- 83) Why do you prefer raw potatoes over processed products? \_\_\_\_\_  
\_\_\_\_\_
- 84) What costs do you incur when processing? \_\_\_\_\_  
\_\_\_\_\_

9 Pick and label samples/take photos and label

85) If you buy processed products, why? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

86) Who is your supplier for the processed potato products? \_\_\_\_\_

87) Who are your main customers in terms of gender? Male [1]; Female [2]; Both [3].

88) Please indicate your costs, transaction volume and price of potatoes and potato products for the last one month in the following table:

PROCESSED PRODUCT	QTY BOUGHT (KGs)	PURCHASE PRICE (KSH./UNIT)	QTY OF PRODUCT PROCESSED (UNITS)	SELLING PRICE (KSH./UNIT)	TRANSPORT COST (KSH.) (TOTAL)	COOKING COST (KSH.) (TOTAL)	OTHER COSTS** (SPECIFY) (TOTAL)
Unit of measure	1=50kg bag 2=100kg bag 3=110kg bag 4=20kg tin	Range	Range	Range	Range		
Chips			(Plates)				
Crisps			(Pkts)				
Other, specify _____ _____							
<b>Total</b>							

\*\* other costs (packaging, tax, licensing, etc).

89) Do you operate other branches of this business? Yes [1]; No [2].

90) If the answer to 27 is yes, do you get the same number of plates of chips from the same size of bag of potatoes from all the outlets? Yes [1]; No [2].

91) Explain your answer in 28 above: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

THANK YOU

## Annex A 4: Key Informant Interview Guide

### General questions

- 1) What are the different (core) segments in the potato market structure?
- 2) Who are the actors involved in these segments?
- 3) What do the actors do?
- 4) What are the flows of product, information and knowledge in the market chain?
- 5) What is the number of actors, the volume of products and employment provided by the market actors?
- 6) Where does the product (or service) originate from and where does it go?
- 7) What types of relationships and linkages exist among the market actors?
- 8) How do you evaluate the relationships: Cooperative, competitive or rival?
- 9) Who are the dominant players in the ware potato market in Kenya?
- 10) What is the market share of potatoes and potato products within the snacks category?

### Cost and Margin of participating in Ware Potato marketing

- 1) What are the estimated costs incurred by a typical actor in order to enter the market? Provide the answers by segment.
- 2) What are the estimated revenues of each segment of market actors?
- 3) What are the estimated net profits and margins for each segment of the potato market?
- 4) How are investments, costs, revenues, profits and margins changing over time?
- 5) How are investments, costs, revenues and profits divided over the actors in the market?
- 6) Are the costs and margins of the potato marketing chain lower or higher compared to other agricultural products' marketing chains? In other words what are the opportunity costs of employing production resources for this particular marketing chain?

### What are the underlying causes of the division of costs and benefits in the marketing chain?









WARE  
POTATO  
MARKET  
SURVEY IN  
KENYA 2015