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POTATO MARKET SURVEY IN KENYA: AN AGRICULTURAL PRODUCT VALUE CHAIN APPROACH

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ABSTRACT: *The Irish potato is a prominent food security and cash crop in Kenya currently second to Maize in importance as the largest consumed staple in the country. The crop, grown mostly by smallholder farmers, provides a source of food, income and employment to many Kenyans. A study to assess the market dynamics of potatoes in the country was carried out between July and September 2013. The Agricultural Product Value Chain (APVC) approach was employed in which stakeholders at critical levels of the potato value chain were interviewed. Purposive judgmental sampling of three producing counties and five consuming towns was done due to their high level of activity. A standardized questionnaire and an interview schedule were used to gather data. Descriptive statistics and proportions were used to describe the results. A total of 570 respondents were interviewed but due to overlapping roles played by some stakeholders operating at more than one level of the value chain, the number of respondents (considered on role play) rose to 679. Results revealed that some potato varieties were popular across the country due to qualities demanded by the market like long shelf life, size and shape of tubers as well as quality of end products like potato chips and crisps. Producers preferred the shortest marketing channel especially direct sales or through organized marketing groups while production depended on price of inputs especially seed, cooking qualities and buyer demands. Demand was found high throughout the year as supply fluctuated with seasons. A number of constraints across the value chain were identified including huge price differentials between farm gate and market sometimes influenced by middlemen, the use of extended bags sometimes weighing up to 200 kilograms, poor enforcement of regulations, inappropriate and inadequate storage facilities and poor physical conditions of the markets. Despite the constraints, the future of the potato business was described as bright with most players in the value chain declaring improvement in business over the previous five year period. The findings had implications on all value chain players and stakeholders.*

KEYWORDS: Product value chain, demand, supply, preferences, middlemen, stakeholders

INTRODUCTION

The Irish potato has become increasingly an important crop the world over. It is the fourth most important food crop after rice, wheat and maize. The average consumption is about 33 kilogrammes per capita per year with China and India currently leading in production and consumption. In Kenya, the potato is a strategic food security crop, second to maize in importance as a staple due to its high nutritional value and adaptation to various production environments.

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Most of the potatoes produced in the country are consumed locally hence it is not at risk of ill effects of speculative activity. Being bulky and highly perishable discourages exports across long distances hence potato prices in Kenya like other countries are determined by local demand and supply conditions, not by the vagaries of international market speculation (FAO, 2013). The performance of the potato value chain in Kenya has not been very efficient. Potato business has been characterized by a number of constraints leading to declining production and yields at a rate of 11 % per year (FAO, 2010) attributed to adverse weather conditions, declining soil fertility, use of low yielding varieties, poor quality seed (Kaguongo *et al*., 2008) as well as high occurrence of diseases and pests. In an effort to advance the status of the potato crop given its prominence and impact on the national food security and socio-economic wellbeing, it was found necessary to evaluate the state of its marketing in the country with a view of addressing constraints along the product value chain.

The Agricultural Product Value Chain Approach

The United Nations Industrial Development Organization (UNIDO) describes a value chain as the range of activities required to bring a product from the initial input-supply stage, through the various phases of production to its final market destination (UNIDO, 2009). Hoobs *et al*., (2000) defines a value chain as a vertical alliance or strategic network between a number of independent business organizations within an entire supply chain from production on the farm, through processing, distribution and retailing to the consumer (from gate to plate). Along these steps, various activities are carried out that transform a potato tuber into food. This study used the value chain approach to analyze the various levels of the chain and stakeholder issues at every level with a view of establishing the most appropriate measures of addressing constraining factors along the product value chain.

The study was necessitated by the need to establish prevailing conditions in the potato market using the product value chain approach. This information would be used by stakeholders in formulating appropriate interventions in potato improvement to ensure the commodity realized its potential as the second and probably the leading food and cash generating entity in Kenya. This would ensure improved income generation, food security and improved livelihoods of smallholder Kenyan farmers.

Statement of the problem

Kenya is a net importer of food especially for the major staples like maize, wheat, rice and potatoes. The country is therefore vulnerable to food insecurity exacerbated by absence of substantive diversification in food production and consumption. Maize is the leading staple with an annual per capita consumption of 98 Kg which translates to an overall demand of about 40 million (90 kilogram) bags against a domestic production of about 25 million bags a year. Therefore, there is always a shortage of the major staple except for occasional years when production reaches peak demand. Potatoes and other alternative staples contribute to filling the maize gap.

Food prices in Kenya have been increasing steadily in the recent years due to global effects, draughts, and pests and diseases among other causes. Government policy has also been blamed for food price increase especially with regard to inputs. To ease the strain on food price inflation,

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diversification of crop base with focus on nutritious and versatile staple foods which are not susceptible to vagaries of international commodity markets like potatoes becomes a critical option. Given its numerous favourable attributes (high nutritional value, rich in protein, calcium, potassium and vitamin C with a particularly good amino acid balance and a variety of culinary qualities), the potato is a suitable candidate for staple crop diversification in Kenya being.

However, despite its importance as a staple and commercial food commodity and its potential contribution to combating hunger, poverty and unemployment, the potato has tended to be a low priority crop in the country's agricultural development policies and practices. Numerous constraints have limited crop productivity and profitability, and actual yields are well below those which could be reached by using the available technologies and adopting appropriate post-harvest practices. This leads to poor returns on investment that is insufficient to make potatoes available for use as seed or for consumption in urban markets (FAO, 2013).

The growing importance of potatoes in the Kenyan diet and its favourable qualities in terms of versatility as a food and commercial commodity has exerted pressure on stakeholders to explore ways of promoting the crop to its desired position as a leading commercial enterprise in the country. To do this, there is need to understand the dynamics underlying potato marketing in the country. Market information on demand, supply and pricing of potatoes and the preference of varieties is largely lacking. Filling this knowledge gap would make better use of resources by stakeholders interested in putting in place necessary interventions and investors interested in the potato industry.

To achieve desired results, there was need to carry out a market survey to identify supply and demand side constraints for possible interventions in ensuring potato business is not only profitable but also sustainable and on upward growth. In so doing, this study sought to address the following questions;

i. What stakeholders dominated the various levels of the potato value chain and what were their roles?
ii. What were the existing market channels and linkages used by potato stakeholders in the business and how efficient were they?
iii. Which varieties were the most popular in the selected production areas and what were their favourable qualities that could be tapped and improved on for marketing?
iv. What were the demand and supply dynamics and trends in the market?
v. How profitable and sustainable was the potato business in the study areas and in Kenya in general?

To address the above questions, the following objectives were pursued;

Objectives of the study

The overall objective was to carry out a survey of the potato marketing in Kenya using the Agricultural Product Value Chain (APVC) approach and establish which parts of the value chain were constraining for possible interventions for growth and sustainability of the potato business. The following specific objectives were addressed:

i. To map out key players along the potato value chain, their roles, linkages and effects on performance of the potato business at all stages of the potato product value chain.

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ii. To identify potato varieties preferred by different players or markets, their suitability and need for promotion.
iii. To assess the existing market linkages and marketing channels from farmer to market.
iv. To identify the current demand and supply trends of various market outlets and opportunities including the seed market for improvement of potato business.
v. To assess the outlook of the potato market, its profitability and sustainability for investment in the sector.

Justification

Kenya needs to expand its crop base to meet the growing demand for staple foods for the increasing population. Potatoes offer a good candidate both as a commercial and food security crop. The increase in population coupled with the anticipated fast development of cities and towns following the recent devolution in the country lay a strong basis for promotion of potatoes as a source of fast foods desired in towns. To meet the growing demand for potatoes which is a major constituent of fast foods like chips and crisps, there is need to address factors constraining the value chain especially of the most popular varieties. The purpose of this study was to avail information on market dynamics and other underlying factors that affect the potato industry to enable the commodity achieve its optimum potential as a leading food security and economic entity in Kenya. Farmers and other stakeholders on the value chain need incentives to invest in sustainable business to derive value in order to continue playing their critical role in the value chain. However, some value chain players have been blamed for exploiting skewed market information to create asymmetries which make them benefit from disproportionate economic rent. To level the playing field and improve performance of stakeholders, this study sought to establish existing conditions with respect to the various levels of the potato value chain with a view of improving on constraining factors and making the business vibrant, lucrative and sustainable. The study was timely in informing necessary interventions toward promotion of the potato value chain.

Scope of the study

This study was limited to three production areas and five consuming towns in Kenya. The three production areas were Meru, Bomet and Uasin Gishu counties (selected on basis of history of potato production) while consumption areas were Nairobi, Nakuru, Kisumu, Eldoret and Mombasa (selected on basis of being the most populous towns and cities in Kenya). The number of respondents per category was determined by willingness to participate in the study and the number of players at the particular level of the value chain making it purposive judgmental sampling. Sekaran (2003) supports purposive judgmental sampling for specific target respondents when these are the ones who can give the information and random selection is not likely to provide desired results.

Operational definition of terms used

Input dealers - these are value chain players who are critical in carrying out activities that enable producers to grow potatoes in a timely manner by providing necessary inputs like seed, fertilizers, chemicals and sometimes information. They include stockists, technicians, other farmers, local dealers and traders in potato seed.

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Producers - these are farmers who grow potatoes mostly in the field at small, medium or large scale. Most potatoes in Kenya are grown by small scale farmers with land holdings ranging from 0.2 acres to 5 acres mostly depending on rainfall.

Middlemen/brokers - these are intermediaries in the potato product value chain who exploit knowledge gaps in the chain to generate economic rent. They hoard knowledge from key players in the value chain and create relevance which necessitates their engagement in the value chain. Occasionally, some play a critical role especially in linking producers to markets.

Traders -merchants dealing with potatoes. Traders are in two categories- those dealing with large quantities of potatoes like whole bags referred to as wholesalers and those dealing with small quantities (less than a bag-either in tins or small potato heaps) referred to as retailers.

Transporters -these are value chain players who ship potatoes in large quantities from one region to another especially from production areas (farms) to market centers (towns) using trucks. Some of them are wholesalers or even farmers.

Wholesalers - sellers in bulk, especially full bags of potatoes from trucks or at strategic positions in the buying centers or municipal markets.

Retailers- these are sellers who sub-divide bags of potatoes into smaller quantities and package them for re-sale to consumers. The potatoes are packaged into different size containers or heaps at strategic positions to attract buyers.

Processors- these are dealers in potatoes that add value to the commodity at various stages. For purposes of this study, processors go beyond basic value addition like cleaning and grading potatoes to actual chopping and processing into potato chips, crisps or other products.

Performance - this is the outcome of an activity carried out by a firm or individual for a desired purpose especially profit. In this study, performance was taken as the improved wellbeing of the value chain player as a result of their engagement in potato business. It was measured through improved profits, increased sales turnover, increase in the chain player's market share, or return on investments into the potato business.

METHODOLOGY

Study design

The survey was designed as a descriptive study. Descriptive research design is about what, where and how of a phenomenon (Cooper & Schidler, 2003). The study was undertaken for purposes of ascertaining and describing the characteristics of potato market to give it a profile. The descriptive design sought to establish and describe the situation with stakeholders at various levels of the potato value chain and elaborate means of addressing constraining factors to optimal functioning of the value chain.

Population

The general universe, established on the basis of the agricultural product value chain, consisted of stakeholders at various levels (stages) of the potato value chain in selected parts of Kenya. The selected stages were pre-production, production, haulage (transportation), wholesaling, retailing, processing and secondary selling of processed products. At the pre-production stage, the population was the number of input dealers in the target areas while that at production level involved growers at the county with the middle and upper end of the value chain consisting of other players including traders, transporters, processors and consumers. In all, indications were

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that there were in excess of 3000 producers and other stakeholders in each of the potato producing counties meaning the population of target respondents would be close to 10,000 hence the need for sampling. Sampling was informed by expert knowledge and consultation with stakeholders especially industry regulatory agencies.

Sampling

Sampling was non-parametric, purposive judgmental, and was done in consultation with experts and regulatory agencies. Government officers, especially County Agricultural Officers of the Ministry of Agriculture, enabled the researcher to formulate representative sample sizes by giving an indication of the number of farmers in the sample counties from which a representative sample would be worked out on basis of covering 70 percent of the target population. The resulting sample sizes in producer counties were; Meru -121, Bomet- 101 and Uasin Gishu- 87. In consuming towns, the samples were; Nairobi - 85, Nakuru - 67, Kisumu -70 and Mombasa - 39. Eldoret, the biggest town in Uasin Gishu County, was considered in the producer category.

Study instruments

Data was collected through either a structured questionnaire or an interview schedule. The questionnaire consisted of two sections; one on general information and the other on detailed survey. In the detailed survey section, information was gathered through direct entries, choice options or selection of respondent assessment on a 5 point Likert type scale. The questionnaire and interview schedule took care of each of the objectives. Each section of the questionnaire had both open and Likert scale type questions while interview schedule had open and close ended questions. The survey instruments were validated through discussions with industry players (researchers, National Potato Council of Kenya) and experts and found appropriate before they were used to collect data.

Data collection

Both primary and secondary data was collected for the study. Secondary data was gotten from desk survey by analyzing materials, publication and relevant information sources from reputable institutions dealing with potatoes or having credible data like the National Potato Council of Kenya (NCPK), KARI Tigoni, the Horticultural Crops Development Authority (HCDA), Ministry of Agriculture or the Food and Agriculture Organization (FAO) of the United Nations (UN). Primary data was gathered directly from respondents in the field at selected levels of the potato value chain.

The questionnaires were self-administered by drop and pick method for respondents who could fill them in while interview schedules were used by the lead researcher and research assistants to solicit information from other players who could not fill in the questionnaire. Timing of common interest groups where possible, enhanced chances of having more respondents. Production and pre-production activities were studied in three selected counties of Uasin Gishu, Bomet and Meru while market information was sought from these and selected major cities and towns. Linkages in marketing channels between the main players in the value chain were established and mapped.

Data collection took place between the months of July and September 2013. All data was gathered through interview schedules and questionnaires. Descriptive statistics and proportions were used

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to describe the results as presented using APA format. Mapping out the potato value chain players involved desk survey from available literature, discussions with stakeholders at various levels and analysis of dealers at the operational level thus extracting the peculiarities or commonalities of market behavior for the cities or producer regions. It also entailed analysis of linkages between key players in potato marketing. In addressing linkages, the study was looking at the production aspects and constraints that influence the marketing function through supplies, quality, quantity, reliability (or lack of it) and timing of deliveries as well as storage and physical market conditions. Other linkages looked at aspects of the supply chain beyond the production level to the market. These included haulage, transformation (processing) and trade (whole-selling and retailing).

Establishing preferred potato varieties and reasons for their popularity

Producers are highly price sensitive and focus on producing for the market. Consequently, it is always important for farmers to work with the market demand in mind as they go into production. The demand for potatoes is high and increasing especially with the increasing development of towns and cities due to preference of fast foods by the growing population. Potatoes lead the pack of fast foods in terms of ease of preparation like potato chips and crisps. There is a rising demand in quality and quantity of potatoes that are amenable to various preparations of fast foods. This raises the bar for the right varieties meeting desired qualities. It was necessary, in this survey, to carry out an analysis of the varieties produced in various areas, their desired characteristics and factors affecting their performance to enhance their promotion. To extract this information, respondents were asked to indicate on a Likert scale, their opinions of various aspects of varietal qualities which were then analyzed. The varietal choices for players who indicated dealing with more than one variety were listed in order of preference.

Establishing existing market linkages and marketing channels

It was necessary to establish market linkages between players in the potato value chain to map them out for efficiency of operations. Linkages to information and regulatory systems like research and state agencies are critical to industry development. This required critical analytical study through observations, interviews and interactions with various players in the major potato markets of the country. Potato marketing in Kenya, like other commodities, is characterized by presence of middlemen who sometimes form cartels (akin to collusive oligopoly) that distort market information and/or create information asymmetry leading to exploitation of some players in the value chain especially producers. To establish the most preferred channel to the market, the study sought to analyze channel preferences by stakeholders at production and higher levels of the value chain. Where elaborate and efficient channels were established and working, they would be recommended for strengthening and replication in other potato marketing regions.

Demand and supply analysis

Demand and supply analysis was carried out for purposes of establishing trends in preceding five years and proposing measures of equalizing demand to supply to tame price fluctuations for the commodity. This would also reveal the opportunities available for maximizing on production and productivity as well as marketing of the potato in Kenya.

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Profitability and sustainability analysis

The objective of profitability analysis was to establish potato market stability that would determine sustainability hence continued involvement of players in the business. Performance analysis was carried out through indications of profitability, sales turnover, return on investment, growth in market share, and general improvement in the welfare of the value chain operators as perceived by the stakeholders at every level of the value chain. The potato value chain remains one of the most lucrative commodities in the Kenyan agricultural and agribusiness sectors.

Data analysis

The tools used to collect data were checked for completeness and comprehensiveness at the point of data entry before they were shipped to the analysis center in Nairobi. Where information or data was not complete or had errors, it was corrected for completeness to ensure that the questionnaires would be amenable to requisite analysis. Interview schedules which contained mainly open ended questions seeking respondents' explanations were analyzed through qualitative methods as well as descriptive statistics to establish the regional and varietal characteristics as well as diversity among the value chain players. The data collected through the various study instruments was coded and analyzed. The results were presented in various appropriate formats.

RESULTS AND DISCUSSION

Results of the study were presented in tables, charts, graphs or descriptive narratives according to objectives for the target areas (counties) and consuming towns as below.

Mapping Potato Value Chain Players in Producer Counties

Results revealed that a number of players in the selected counties dominated more than one level of the potato product value chain. The results were presented by counties and cities as here below.

Meru county

The proportions of players at various levels of the value chain were as presented in figure 1.

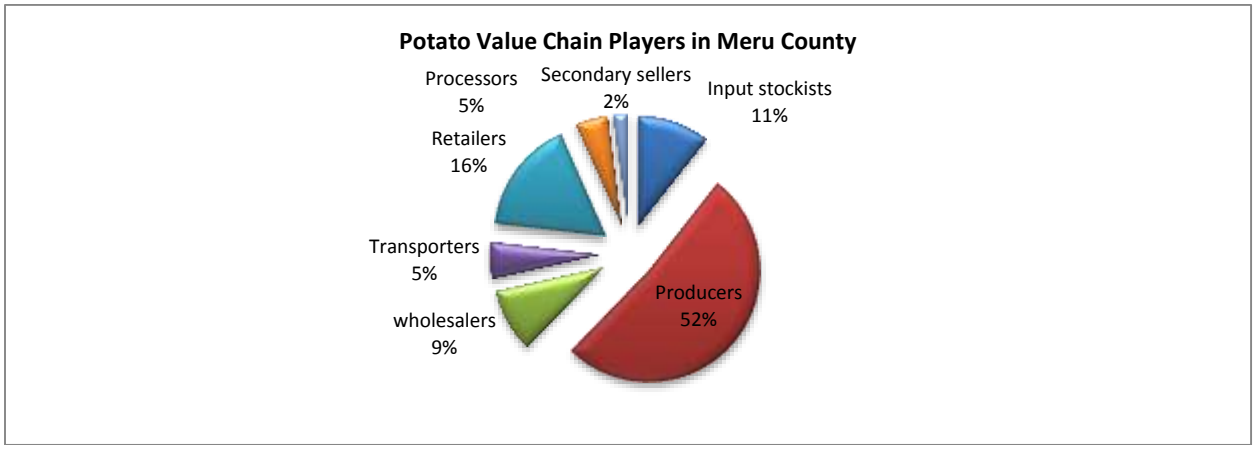

***Figure 1*: Potato value chain players in Meru County**

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Notice the huge number of producers compared to other players due to their dominance of the value chain among those interviewed in the county. The huge proportion was attributed to more interviews carried out at farm level than other levels of the value chain and a higher propensity of participants to respond to research queries at that level compared to those of other levels (eg marketing) who consider time to participate in research as most precious and unavailable. Table 1 gives results of value chain players in Meru county showing who occupied exclusive levels of the value chain and those dominating more than one level (overlapping) meaning one person engaging in more than one potato related business.

Table 1. *Value Chain Players operating at more than one Level of the potato Value Chain in Meru*

Main Level in the value chain	Subsidiary level	Number of players in duo roles	V.C players for exclusive roles	Total
Producer	Input stockist	4	Stockists = 12	**16**
Producer	Producer	0	Producers =78	**78**
Producer	wholesaler	8	Wholesalers= 6	**14**
Producer	Transporter	4	Transporter =4	**8**
Producer	Retailers	12	Retailers =13	**25**
Producer	Processors	2	Processors = 5	**7**
		30	**121**	**151**

Source. Survey data (2013).

Note. From the table, it is evident that 30 potato value chain participants operated at more than one level of the value chain. These doubled up either as input dealers and producers at the same time or producers and sellers of various kinds and so on in the value chain. The overlaps were consistent with Mutunga (2013) assertion that it is difficult to delink some sections of the value chain (eg production from pre-production) because the actions and actors are the same people or similar (pp 43). Some of the actors at one stage of the value chain may play an equally important role at another stage. Table 2 gives the gender disaggregation of the value chain players in the county.

Table 2. *Gender disaggregated value chain players in Meru County*

Category	Male	Female	TOTAL
Input stockists	9	7	**16**
Producers	27	51	**78**
wholesalers	6	8	**14**
Transporters	4	4	**8**
Retailers	9	16	**25**
Processors	4	3	**7**
Secondary sellers	2	1	**3**
TOTAL	**61**	**90**	**151**

Note. From the table, the majority of practitioners were producers and females dominated production and retail levels of the value chain. This is normally the case with small scale farming

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in Kenya in which women carry out most of the activities especially at the farm level while men engage in off-farm or other activities like marketing. Gender disparity was not significant among other players of the value chain except retailers.

Figure 2 shows overlaps of the players in the value chain. These included producers who doubled up as wholesalers, retailers, transporters or even processors while most transporters were wholesalers and some wholesalers also did substantial retail businesses.

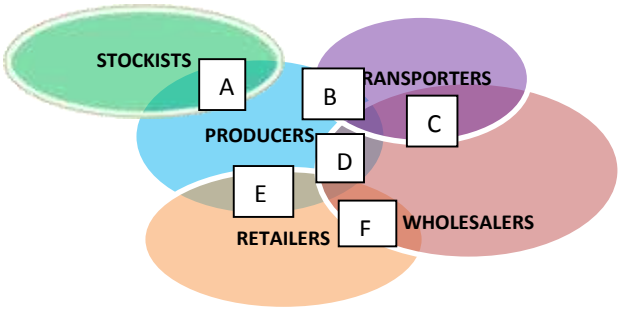

***Figure 2*: Overlaps among Potato Stakeholders**

KEY:

A: producer/stockist =4
B: Producer/Transporter =4
C: wholesaler/transporter =0
D: producer/ wholesaler =8
E: producer/retailer =12
F: retailer/wholesaler =0

Bomet County

The number of respondents and their proportions in the county were as presented in Figure 3.

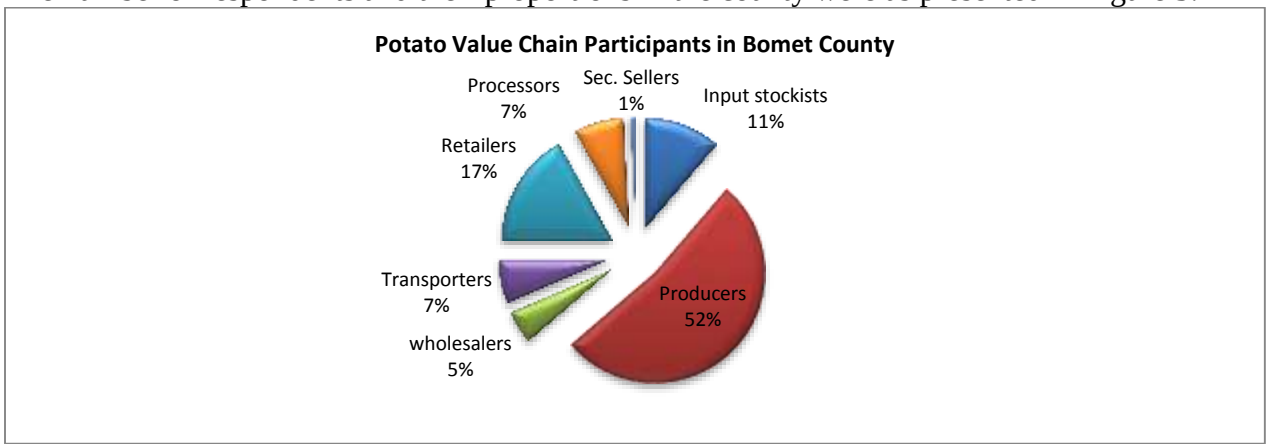

***Figure 3*: Value chain players in Bomet County**

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Notice that like for Meru, over half (52%) of the stakeholders were in production while retailers (17%) and input stockists (11%) formed the bulk of other stakeholders in the second and third positions respectively. Like for Meru, there were noted overlaps of stakeholders operating at more than one level of the value chain as shown in Table 3.

Table 3. *Value chain players dominating more than one level in Bomet County*

Main Level in the value chain	**Subsidiary level**	**Number of players**	**Add Full time V.C players**	**Total**
Producer	Input stockist	3	Stockists =11	14
Producer	Producer		Producers = 65	65
Producer	wholesaler	3	Wholesalers =4	7
Producer	Transporter	3	Transporters = 4	7
Producer	Retail	8	Retailers =13	21
Producer	Processors	6	Processors =3	9
TOTAL		**23**	**101**	**124**

From the table, it can be noted that 23 players were participating at more than one level of the value chain. Gender disaggregation among the players in the value chain was analyzed like for Meru county and results presented in Table 4.

Table 4. *Gender disaggregated value chain players in Bomet County*

CATEGORY	**Male**	**Female**	**TOTAL**
Input stockists	10	4	**14**
Producers	43	22	**65**
wholesalers	5	1	**6**
Transporters	6	2	**8**
Retailers	8	13	**21**
Processors	8	1	**9**
Sec. Sellers	1		**1**
TOTAL	**81**	**43**	**124**

In terms of gender disaggregation, Bomet County differed from Meru in that men (53%) were more than women (26%) at production and among input stockists. However, other stages mirrored the scenario at Meru County. The domination of men over women in the producer category could have been due to some interviews carried out amond common interest groups in workshops and seminars which are normally attended by more men than women or due to the lucrative nature of potato farming attracting more men than women in this county. The gender balance was in contrast to Meru and Uasin Gishu counties for producers.

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Uasin Gishu County

In Uasin Gishu, the results of value chain players were as shown on Figure 4.

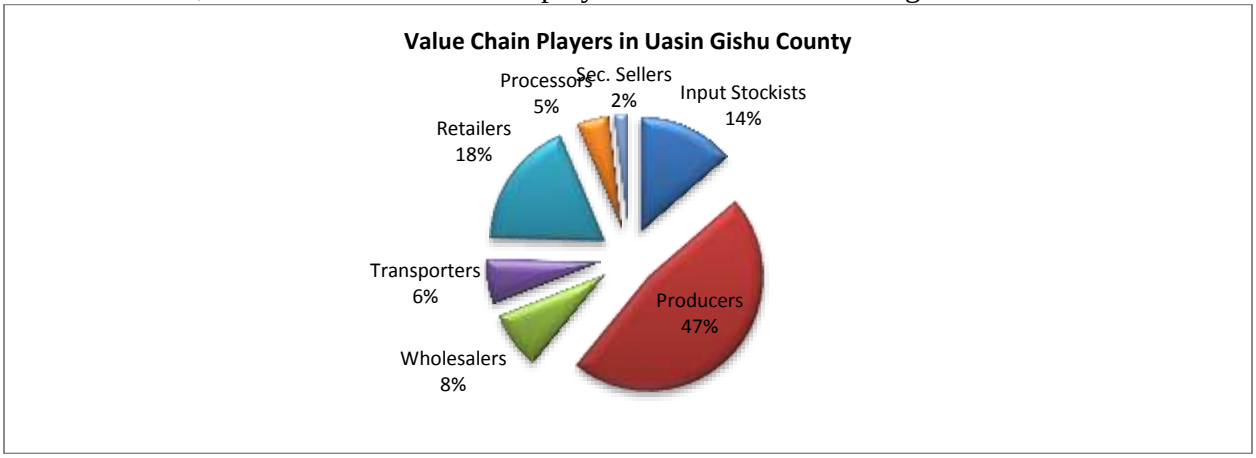

***Figure 4*: Potato Value Chain Players in Uasin Gishu County**

The county, like the other two had overlapping roles among the various players in the value chain. Table 5 shows the number of players with overlapping roles in the county.

Table 5. ***Potato stakeholders operating at more than one level of the chain in Uasin Gishu County***

Main Level in the value chain	Subsidiary level	Number of players	Full time V.C players	Total
Producer	Input stockist	3	Stockists = 12	15
Producer	Producer		Producers =52	52
Producer	wholesaler	4	Wholesalers= 5	9
Producer	Transporter	5	Transporter = 2	7
Producer	Retail	9	Retailers =11	20
Producer	Processors	2	Processors = 3	5
			Sec. Sellers =2	2
TOTAL		**23**	**87**	**110**

The number of players overlapping at more than one stage was 23 meaning a substantial number of people carried out different value chain activities in Uasin Gishu like other counties. Gender

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disaggregated value chain players were as shown in Table 6. Many Kenyan farmers have small landholdings which are not able to engage the entire family throughout the year necessitating looking for alternative commercial activities for some members of the family. The seasonality of rainfall also makes full time engagement on potato farming untenable making some family members especially men to look for non-farm activities which explains the overlaps in roles.

Table 6. *Gender disaggregated value chain players in Uasin Gishu County*

Category	Male	Female	TOTAL
Input stockists	8	7	**15**
Producers	17	35	**52**
wholesalers	7	2	**9**
Transporters	6	1	**7**
Retailers	7	13	**20**
Processors	3	2	**5**
Sec. Sellers	1	1	2
TOTAL	**49**	**61**	**110**

The proportion of men to women in production and retail was biased towards women while men dominated the wholesale with other levels exhibiting fair gender equity. Other levels of the value chain reflected the position of Meru and Bomet counties.

Analysis of the Middle and Upper End Potato Value Chain Players (Transporters, Wholesalers, Retailers, Processors, Secondary sellers and Consumers).

Data on players who were beyond preproduction and production was gathered both in the producing counties and consumer towns. Table 8 shows the categories of value chain players interviewed in the selected towns.

Table 8. *Potato stakeholders at higher levels of value chain in consumer towns and cities*

S/No.	Town or City	Type and Number of players						Total
		Transporters	Wholesalers	Retailers	Processors	Consumers	Sec. Sellers	
1	Nakuru	5	19	21	2	18	2	**67**
2	Nairobi	8	35	18	3	18	3	**85**
3	Kisumu	5	14	26	2	21	2	**70**
3	Mombasa	6	6	15	2	8	2	**39**
4	**Total**	**24**	**74**	**80**	**9**	**65**	**9**	**261**
	Proportion	**9.2%**	**28.4%**	**30.7%**	**3.4%**	**24.9%**	**3.4%**	

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As described earlier, these stakeholders were dealers in potatoes who occupied higher levels of the value chain when the potato had left the farm. Transporters were hired to ship potatoes from production areas to consuming towns. They owned trucks with which they ferried the produce to wholesalers, or sold the produce themselves doubling as transporters and wholesalers. In the study, transporters were interviewed at production towns or municipal markets in consumer towns and their responses analyzed. Other key stakeholders in the value chain include the final handlers before consumption either as processors or secondary sellers.

The dominance of value chain players at various levels in the producer counties is common practice with most small scale producers and businessmen in Kenya in which they involve themselves with several enterprises or several levels of the same enterprise. This does not mean that they dominate the product value chain if they do not transform the product between the level of the chain consistent with the definition of the value chain as the 'the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services) delivery to the final consumers and final disposal after use (Mutunga, 2013).

The main players in the consumer towns were as represented in figure 5.

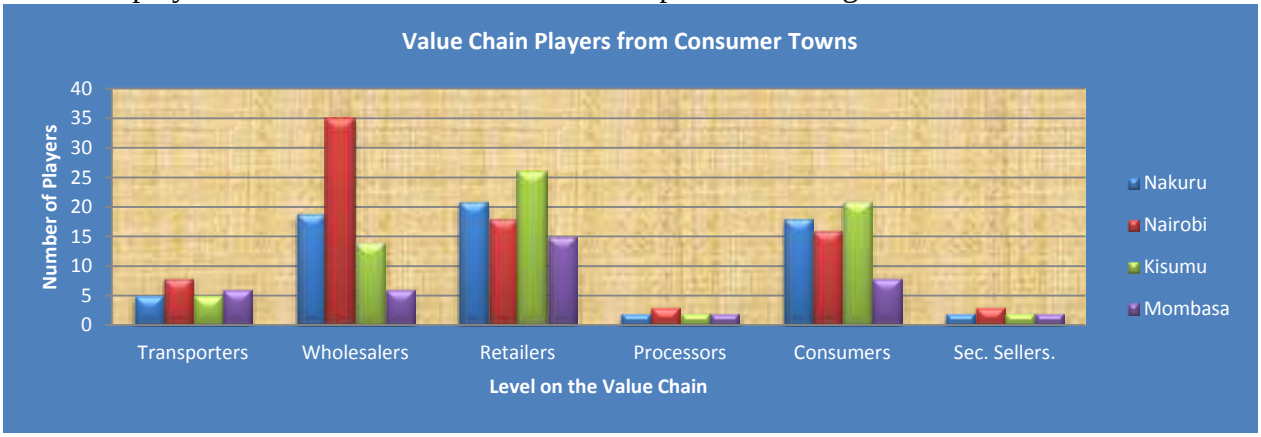

Figure 5: Potato value chain players from consumer cities and towns

Among the players interviewed in consuming cities representing high levels of the value chain, there were overlaps between transporters, wholesalers and retailers (Table 9).

Table 9. V*alue chain players with overlapping roles in Nairobi.*

Main Level on the Chain	No.	Subsidiary level	No.	Total Overlap	Exclusive Categories					
					Transporter	Wholesaler	Retailer	Processor	Consumer	Sec. sellers
Transporter	8	Wholesaler	7	7	8		7			

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Wholesaler	35	Retailers	20	20		15	0	2				
Retailer	18	Consumer	6	6			12				6	
Processor	3								3			
Consumer	18									18		
Sec. sellers	2											2
TOTAL				**33**	**8**	**22**	**32**		**3**	**24**		**2**
Proportion					**8.7%**	**27.2%**	**39.5%**		**3.7%**	**29.6%**		**2.4%**

Note. From the table, there were 33 stakeholders actively participating at more than one level of the value chain. The largest proportion of operators in the potato value chain interviewed in Nairobi city was retailers followed by consumers and wholesalers.

Potato Varietal Preferences and popularity

Varietal preferences differed according to regions, the type of respondent or their position in the value chain (farmers prefer varieties for production and productivity qualities while consumers do so for culinary qualities and so on) and purpose or intended use. Going by the criteria established of rating in order of priorities the highest listed first, the second listed as the next important and so on, Asante was the most preferred variety in Meru followed by Sherehekea, Tigoni, Shangi and Kaumbiro. Reasons advanced for varietal preferences included high yields, disease resistance, good cooking and keeping qualities, market preference especially for chips (shangi, sherehekea) and high prices. Some varieties like Asante, Shangi and Tigoni were widely distributed nationally while others like Kaumbiro were local. The preferred varieties were leading in yields besides cooking and keeping qualities explaining their preference.

In Bomet county, the most popular variety emerged as Dutch (Super Dutch or Dutch Robijn) followed by Deseree, Shangi, Tigoni, Alika and Golf in that order. Their preference factors mirrored those of Meru varieties in cooking qualities, storage capability, market preference and high prices. Disease resistance, adaptability and sugar content were also cited as contributory to the preference

In Uasin Gishu County, Dutch led the pack followed by Deseree and Shangi respectively. Other varieties found in the county included Tigoni and Kenya Karibu and the reasons for their preference were similar to those of other production areas. On local traditional varieties with potential for improvement that were identified, respondents indicated that research would enhance their desirable qualities. This was consistent with Chrisman (1989) assertion that varieties are selected either on the basis of farmer's own or trader preference, limits placed on the farmer by the availability of genetic variability, disease resistance capability of varieties, the intended use of the potato, farmers' lack of experience with certain varieties, lack of information or its high cost and lack of necessary inputs or resources to purchase alternative variety seed.Local varieties that were popular had special conditions favouring them including good soils, resistance to diseases,

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climatic favourability, good taste and long shelf life. Other aspects from local varieties that could be incorporated into favourable varieties through breeding included adaptability, low water content, and high yields.Varietal preference among consumers differed on aspects of cooking qualities and shelf life. Dealers at the middle of the chain (transporters, wholesalers and retailers) prefer varieties that can store long, are desirable by buyers for various aspects like good chips or crisps and have substantially long shelf life. Shangi, a local Kenyan Variety that is in the process of being registered, was the most popular in the country.

Market linkages and Marketing Channels

Participants at every level of the potato product value chain had their preferred market channels and reasons for the preference. This differed between counties but huge similarities were detected among the three counties under study. In Meru county, the majority of players especially producers preferred a channel where a broker or middleman was involved before the actual sale (Table 10).

Table 10. Marketing channels in Meru County

	F-B-M	F-C-M	F-B-M-D-M	F-B-P	F-P	F-M	
Producers	33					2	**35**
Transporters	2	1			1		**4**
Wholesalers	**2**		**1**	**1**	**1**		**5**
Retailers	5		2	2	1	7	**17**
Processors	**1**			**2**	**2**		**5**
Sec. sellers				1	2		**3**
TOTAL	**43**	**1**	**3**	**6**	**7**	**9**	**69**
PROPORTION	**0.62**	**0.014**	**0.043**	**0.086**	**0.101**	**0.130**	

Note. The proportion of industry players who prefer a channel where there are no middlemen were not as many as those who preferred presence of a middleman (62 percent) with the next category being direct farmer selling at 13 percent.

Notice the high preference of farmer- to - broker to market among the producers followed by farmer to market as the preferred Channels.

Legend:

F-B-M = Farmer – Broker –Market F-C-M = Farmer – Cooperative – Market

F-B-C-M = Farmer- Broker – Cooperative – Market

F-B-M-D-M =Farmer – Broker – Middleman – Dealer – Market F –B –P-M=Farmer – Broker – Processor-Market

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F-P =Farmer – Processor -Marker F – M =Farmer – Market

An indication of marketing channels in producer towns was given by Meru (figure 6)

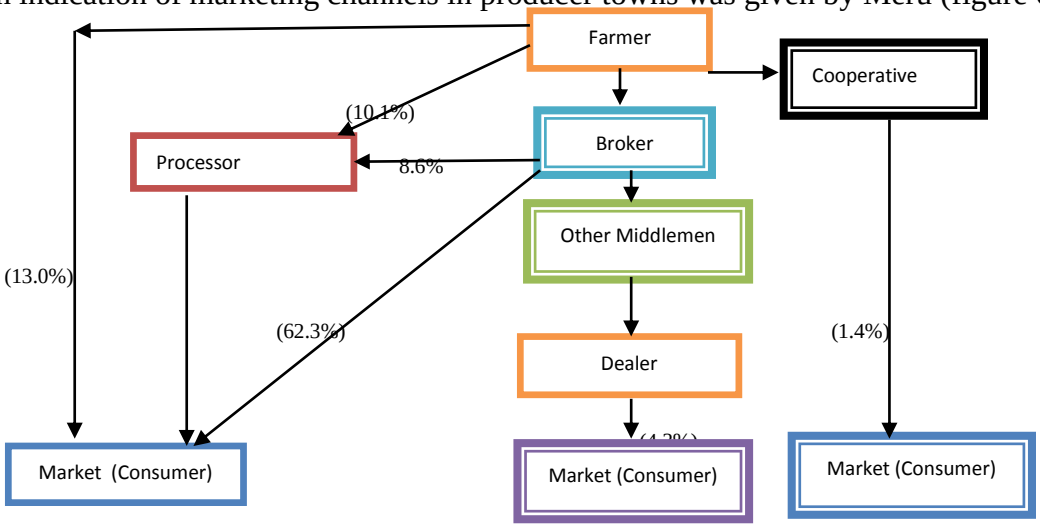

Figure 6: **Potato marketing channels in Meru County**

In Bomet County, the situation was as shown in Table 11.

Table 11. *Potato marketing channel in Bomet County*

	F-B-M	F-C-M	F-B-C-M	F-B-M-D-M	F-B-P	F-P	F-M	OTHER	
Pre-Producers	2	2		1	2		1		**8**
Producers	8	0	0	4	3	2	17	0	**34**
Transporters	3				1	2			**6**
Wholesalers	2			3			1		**6**
Retailers	6	1	1	1		1	3		**13**
Processors					1	2			**3**
Sec. sellers								1	**1**
TOTAL	**21**	**3**	**1**	**9**	**7**	**7**	**22**	**1**	**71**
PROPORTION	**0.2957**	**0.04225**	**0.01408**	**0.126760**	**0.09859**	**0.0985**	**0.3098**	**0.01408**	

Note. The largest proportion of respondents preferred farmer –broker – market (29.6%) but were less than those of Meru (62.3%).

Marketing channels in Consumer towns

Linkages and strengths of various players in consuming towns were analyzed as well. Results indicated that in Nairobi, 12.5% of transporters, 41.1% of wholesalers who mostly doubled up as

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retailers as well and 35.7% of retailers indicated the farmer-broker- market as the main marketing channel. The channel with more than one intermediary, mostly several middlemen, was indicated by 50% of transporters, 20.6% of wholesalers and 21.4% of retailers. Other major channels included farmer- processor and farmer to cooperatives for organized group marketing. Further to the marketing channels used by various players for their potatoes, analysis of the strength of the key market players was carried out. Results revealed that the strength of resources like finances especially for transporters and wholesalers as well as market information for brokers and middlemen (which they mostly hoard and use to their advantage), were viewed as key to their success. The majority of respondents (over 80%) reported that brokers and agent middlemen possess enormous market information (hence power) which they use to gain undue advantage of producers and local sellers at producer villages. It implies that farmers, especially smallholder players like those covered in this study would benefit more if they combined efforts in accessing markets for higher gains through economies of scale and scope. Table 12 shows marketing the perceived importance of marketing channels in cities.

Table 12. *Proportions of Perceived Marketing Channels for Potatoes in Nairobi City*

Channel/ category	**F-B-M**	**F-C-M**	**F-B-C-M**	**F-B-M-D-M**	**F-B-P-M**	**F-P-M**	**F-M**
Transporters	0.125	0.375					0.1176
Wholesalers	0.411	0.0294	0.0588	0.2052	0.0588	0.1176	0.2142
Retailers	0.3571		0.1428	0.2142	0.0714		
Average	0.297	0.134	0.067	0.140	0.043	0.039	0.110
Proportion	0.3578	0.1614	0.0807	0.168	0.0469	0.0469	0.1325

In Nakuru county, 20% of transporters, 38.9% of wholesalers and 21% of retailers indicated the common channel as farmer through broker to market (Table 13) while several levels of middlemen were indicated by 60%, 27.7% and 19.0% of transporters, wholesalers and retailers respectively. Other channels were also indicated in Table 13 below.

Table 13. *Percentage of perceived common market channels and linkages in Nakuru County*

	F-B-M	**F-C-M**	**F-B-C-M**	**F-B-M-D-M**	**F-B-P-M**	**F-P-M**	**F-M**
Transporters	20	20		60			
Wholesalers	38.8	5.55	5.55	27.77	5.55	16.66	
Retailers	21	4.76	4.76	19.04	4.76		28.57

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In Kisumu the same was repeated with different levels of stakeholder (value chain players) indications of the preferred marketing channel. Table 14 shows the marketing channels used in Kisumu city as perceived by several respondents in the survey.

Table 14. *Proportion of Marketing channels and linkages in Kisumu city*

	F-B-M	F-C-M	F-B-C-M	F-B-M-D-M	F-B-P-M	F-P-M	F-M
Transporters	0.2	0.4		0.4			
Wholesalers	0.5	0.0714	0.0714	0.1428	0.0714	0.1428	
Retailers	0.3461		0.0769	0.2307	0.0384		0.3076

Notice the high proportion of middlemen in the farmer to broker to market channel or the farmer-several middlemen to market category.

For Mombasa, the preferred marketing channels among stakeholders were farmer to market but brokers still took a major stage in the marketing channels (Table 15).

Table 15. *Common marketing channels and linkages in Mombasa*

	F-B-M	F-C-M	F-B-C-M	F-B-M-D-M	F-B-P-M	F-P-M	F-M
Transporters	0.1667			0.5			0.3333
Wholesalers	0.5					0.1667	0.3333
Retailers	0.4		0.1333	0.2			0.2667

Demand and supply analysis

The demand for potatoes in all sampled regions was reported to be high throughout the year. However, demand declines during the harvest period when all farmers take their potatoes to the market. The seasonality of demand depends on the production areas but in towns, demand is constantly high throughout the year sometimes reaching critical levels that necessitate importation. In this study, both demand trends in the last five years, the current demand and supply situation and forecast for the near future were analyzed and reported below.

Perceived Demand and Supply Trends over the Last Five Years

Demand and supply was analyzed in the three production areas selected for this study and in the consuming cities and towns. Results indicated that the demand of potatoes is fairly constant throughout the year. The supply is however not stable depending on seasonality of rainfall and production factors like timely availability of fertilizers. Most respondents expressed mixed

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reactions on the trend over the previous five year period characterized mostly by stable demand but fluctuating supply. The majority of respondents (over 50%) expressed more demand than supply characterized the market at any one time except a few months in a year when there is abundance and prices fall significantly. To stabilize supply, a lot needed to be done on storage of the perishable commodity during periods of glut. However, appropriate storage is normally not available.

Further to indicated trends, respondents from Meru indicated a steady and continuously increasing trend of potato production over the previous five years. Indications of increased profitability and expansion of level of operation of potato business were also made during the period. Most producers indicated satisfaction with the trend in the business save for the high cost of inputs. Some indicated satisfaction with dealers and middlemen in their marketing role especially during periods of glut where they play a critical role of looking for markets. Most respondents expressed desire for organized marketing groups to ensure stable and high prices. Stable and predictably high prices were also cited as factors contributing to the increased interest in the potato business.

On factors leading to sustained business growth, it was reported that affordable inputs and especially Government subsidized fertilizers were a major contributor to continued improvement of potato business. Other factors cited as contributing to improved business included; loaning schemes, price setting, provision of good disease resistant varieties, accessible capital, improvement of marketing infrastructure and structures like organized groups, improvement in seed quality, training on value addition, provision of affordable inputs, improvement in market linkages, price controls and package standardization. Improvement in farmers' organization as groups for marketing or cooperatives was also cited as a driver of growth in the potato business. The other factor proposed by few respondents as likely to propel growth was contract farming. Investment into a common storage facility came out strongly as a possible driver of growth as well. Training and organized marketing were strongly proposed for improved marketing.

The Uasin Gishu respondents advanced the same factors that would propel growth of the sector as those given by Meru respondents. In addition, they cited giving farmers' incentives, relevant training and subsidized inputs as well as organized marketing as other factors for accelerated growth. Besides the factors given in the two production areas, respondents in Bomet felt that in addition, invigorated research and extension services would enhance potato business.

Therefore, all producing areas were advancing common concerns with regards to potato business in Kenya. It means that the challenges facing producers were common across the country which the Government and stakeholders in the potato business need to seriously and proactively address.

Demand and Supply Trends in Consuming Towns and Cities

Nakuru

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The main supply of potatoes to Nakuru comes from Mau Narok and Bomet. The potatoes are sold at the main municipal market, some at Bondeni, Ponda Mali and the rest at Free Area. Potatoes come by trucks from these sources but some come by bicycles going directly to retailers and consumers. The average retail price of potatoes is between Ksh. 25-40 ($0.29 – 0.47 $) per kilogram.

Nairobi

Potatoes consumed in Nairobi come from all possible growing areas in Kenya and some from Tanzania when there are serious shortages. These areas include Meru, Mau Narok, Nyandarua, Kinagop, Londiani, Burnt Forest, Molo, and Bomet among others. They are mainly sold by trucks to wholesalers and retailers at Wakulima market, Githurai, Kawangware and City Park among other outlets. The trucks are normally offloaded very early in the morning around 4 am to enable wholesalers and retailers time to deliver the commodities to their outlets. Most of the deliveries are then made on hard carts or pick-ups where they are sold on retail basis. Some are sold in the same markets by wholesalers or retailers who buy from trucks or from wholesalers and transporters and re-package into smaller quantities in containers or heaps along walkways or in temporary sheds and other outlets. The average retail prices range from Ksh.30 ($0.35) to Ksh.50 ($0.56) per kilogram during normal supply periods while this can escalate up to Ksh. 100 ($1.18) per kilogram during times of shortage. On supply and demand trends, the majority of respondents (62%) felt that it was fluctuating.

Kisumu

Most of the potatoes consumed in this market are gotten from Nandi Hills, Uasin Gishu, Molo and Bomet. They are also shipped on trucks and distributed to wholesalers or retailers as described for other towns above. The main outlet market is Kibuye while other outlets are becoming increasingly important. Some are also delivered to hotels and institutions by a few individuals who are involved in value addition. Demand and supply fluctuations were analyzed at the city as well. Respondents indicated trends similar to those of other towns and cities.

Mombasa

This is a large consumer city for potatoes. Being the second largest city in Kenya and located in a tourist coastline, there is demand for potatoes from both locals and large tourist hotels. Quality is an important consideration depending on the hotel outlets. The main wholesale market is Kongowea municipal market which, like Nairobi's Wakulima market, receives potatoes from all parts of the country and serves as a distribution hub to other outlets in the city. The main retail markets are Mwembe Tayari and Mbombolulu, among others. Kongowea market is also reported to be receiving substantial amounts of potatoes from the United Republic of Tanzania when there is acute shortage of the commodity in Kenya. Prices per extended 110 Kilogram bag ranged from Ksh. 3,000 ($35) to Ksh.7000 ($82) shillings depending on seasonality and varieties. The most popular variety in the market is Shangi. Most potatoes are consumed in hotels due to high demand for fast foods but a substantial amount is also consumed at home.

Addressing the Demand Gap in Potatoes

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Most respondents reported plummeting prices during harvest due to over-supply and lack of storage facilities. It was also reported that organized marketing groups were either lacking or in their formative stages. To address fluctuations in demand and supply and increase output as well as stabilize prices, several measures were considered which included production and handling enhancements as well as marketing strategies like group based marketing. Many farmers felt that price fluctuations due to supply and demand forces were not desirable and would be stemmed by irrigated production if that capacity was appropriately developed. However, this was not very practical to many smallholder producers who felt it was not cost effective due to their small landholdings. A few farmers reported having invested in off-season production through irrigation, on a small scale though.

On storage of potatoes, 88 percent of the producers reported storing their potatoes for a short period with only 12 percent selling them directly after harvest. However, appropriate storage facilities were either critically lacking or reportedly too expensive to establish. Many respondents however indicated that plans were underway to establish storage facilities through group dynamics and interventions by some development partners.

On dealing with shortages, many respondents recommended appropriate storage and fetching of potatoes from areas where they would be produced cheaply during periods of shortage. However, increasing the area under production and use of high quality inputs like fertilizers and seed would see more potatoes in the market. The realization of this can be seen in the jump in the national pototo production yields from 2.4 million tones in 2011 to 5.6 million tones in 2012 (Figure 7).

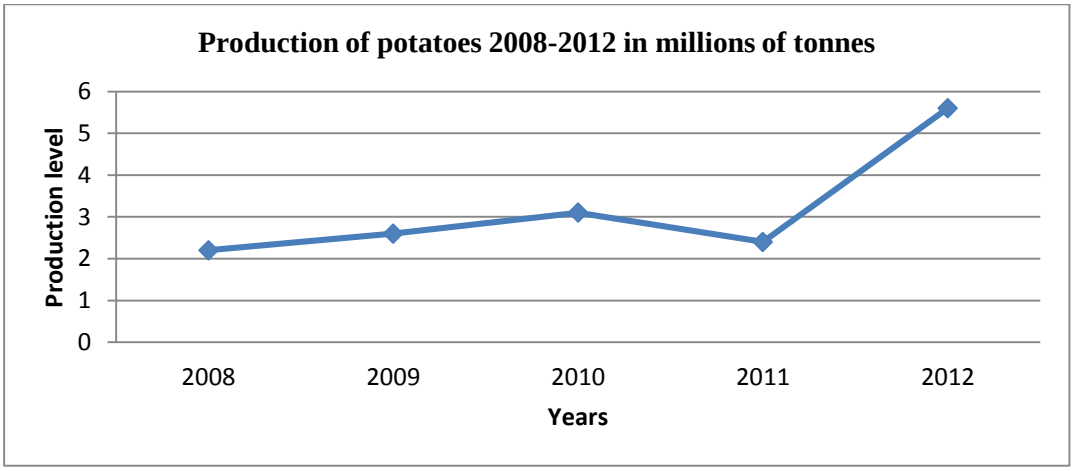

Figure 7. **National average production of potatoes in Kenya.**

Note: The supply more than doubled in 2012 to stand at 5.6 million tons compared to 2011. This was buoyed by good weather and availability of subsidized fertilizers. The demand from the urban areas is also a key factor fueling the growth of the industry. This confirms the respondents'

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agreement on increased growth in popularity of the commodity as a food security and commercial crop.

Packaging/Bagging and sale of potatoes

Standards for production and marketing of potatoes were established through the ministry of agriculture legal notice no. 44 of 2005, but they are yet to be accepted by the industry though notable efforts have gone into enforcement of these regulations. Regulations require that potatoes are packaged in sisal or jute bags with a maximum capacity of 110 kilograms (enforced by legal notice no 113 in form of adoptive by- laws of the ministry of local government stipulating that no local authority may allow the sale of potatoes using extended (130-200 Kg) bags, but this is hardly followed) showing the difficulty encountered in enforcement of legal provisions. This is because most dealers at the upper end of the value chain prefer the extended bag. Enforcement of regulations has been hampered by preferences by powerful market players and perceptions by authorities on how critical the matter is with some considering it less serious.

Perceived Profitability and Future Prospects of Potato Business in Kenya

Respondents at all levels of the potato value chain were asked to give an indication of their performance in the potato business and the prospects for the future. Almost without exception, all players in the product value chain indicated satisfaction with performance of the business and positive prospects for the future. In the production and consuming areas sampled, the majority of the respondents were happy with potato trade, thought the future was bright and industry set to grow. No respondents indicated that the industry or potato business was set for a decline.

3.6.1. The perceived negative role of middlemen in marketing

Middlemen dominate most levels of agricultural product value chains in Kenya. The major municipal markets like Wakulima, Kongowea, and Kibuye in Nairobi, Mombasa and Kisumu respectively are dominated by middlemen who specialize on particular commodities and play a brokerage role between producers or wholesalers and retailers. The practice is so rampant that no agricultural commodity can be sold directly in an established market without going through a broker. Middlemen take advantage of information that is not available at either end of the value chain. For example, they have knowledge on the retail prices at the upper end of the market which they hoard from the producers and set lower prices for the latter creating a huge differential between the two levels and sometimes benefiting from undue economic rent. In controlled markets like Wakulima and Kongowea, middlemen actually control prices. These salesmen (as they prefer being called at Wakulima market), are paid on commission regardless of whether the trader (wholesaler) makes profit or not. Sometimes they create artificial shortages by communicating with suppliers to withhold deliveries in order to regulate price (Kirumba et al., 2004) seemingly operating in collusion with clients indicative of price fixing and little competition akin to cartels that lead to market failures. Sometimes middlemen meet to set prices that are not informed by market dynamics of demand and supply akin to hoarding the commodity at the expense of the consumer and trader. Although the practice occasionally enables the market to stabilize prices

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especially when there is over supply, it most often leads to overpricing of the commodity leading to exploitation of consumers and producers at the same time. The other concerns raised by stakeholders especially farmers is that often, they set very low producer prices and benefit unfairly at the expense of actual producers. However, occasionally, middlemen are known to assist farmers with sale of their produce during gluts hence a positive contribution to the functioning of the chain. Middlemen trade on information asymmetry. Their major competence is the knowledge and information on both production and marketing dynamics which gives them power over other value chain players (Kirumba, et al., 2004). This study fell short of categorizing middlemen as either good or bad for the industry since it found out that they are useful in particular occasions but often detrimental to market forces of supply and demand. Where their activities can be controlled or regulated, they definitely have a useful role in the value chain. The lack of control and the practice of cartels is the undesirable practice that should be discouraged for the benefit of other players in the value chain especially producers.

Poor Conditions of physical markets

Most municipalities and local councils lack physical markets for display and trade in perishable commodities like potatoes. Where physical markets are available, in most of the producing and consumer towns surveyed, the conditions were at best poor at worst deplorable. In some areas, the conditions under which potatoes were marketed extremely wanting limiting most potential buyers from venturing into those areas. Most municipal markets have been lacking appropriate sanitation, drainage and cleaning services leading to pile ups of rotting garbage including potatoes. The recently constituted County governments have faced great challenge at developing appropriate storage and display shelters for perishable produce in their municipal markets. Although the efforts are going on in earnest, it will take a while before adequate appropriate market outlets are developed. At markets like Githurai, Kawangware and others, the marketing conditions are deplorable with potatoes spread on the ground getting muddy when it rains.

Role of research and technical advisory services

The study delved into the possible role of research and the State Extension Service in promotion of potato marketing business. Respondents, while appreciating the current efforts Government institutions were putting in promoting the crop, had reservations on the adequacy of those efforts indicating that more needed to be done. Research was challenged to produce more disease resistant better yielding varieties and potato seed with desirable characteristics like sweetness, improved cooking qualities and longer shelf life. The extension service was challenged with training farmers on better soil analysis methods and agronomic practices, advice on market regulations, standardization of packaging, price control mechanisms, and capacity building on group dynamics in marketing as well as technical advisory services.

Competitiveness, Profitability and Sustainability of Potato Business

Competitiveness in the potato business was assessed among all value chain players at production and major levels of post production activities in consuming towns. The parameters used to assess

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industry performance and sustainability were profitability and welfare improvement as perceived by respondents. Bomet and uasin Gishu were taken to represent the three production areas targeted by the study while Nairobi and Mombasa were taken to represent consuming towns for comparison purposes. It was found necessary to contrast the responses to find area specific similarities and differences. Results showed that 70 percent of the respondents in Bomet felt that the increase in profitability over the previous five year period was much compared to 56 percent in Uasin Gishu county. Average increase in profitability was indicated by 19 percent of respondents in the same county compared to 27 percent in Uasin Gishu while those that felt the increase in profitability was little were 11 percent in Bomet and 15 percent Uasin Gishu. The important thing is that all respondents felt that there was an increase in profitability over time.

Comparison was also made on impact of the potato business on stakeholders' welfare. The comparative results for Bomet and Uasin Gishu showed that those in the latter county had experience much higher improvement in welfare at 73 percent compared to the former county at 58 percent. Those whose welfare had an average improvement were at 30 percent for Bomet compared to 17 percent for Uasin Gishu while 6 percent of the stakeholders expressed little improvement in welfare in Bomet compared to Uasin Gishu at 10 percent.

Stakeholders profitability and improvement in welfare were further assessed in consumer towns and compared for Nairobi and Mombasa respectively. Profitability increase over five years was fairly similar at 64 percent for Nairobi compared to 58 percent for Mombasa while the two cities had a similar average of 18 percent. On the other hand, 13 percent of Nairobi respondents felt that there was little improvement in profitability over the previous five year periods compared to 22 percent for Mombasa.

On improvement in the overall welfare of stakeholders in the two cities, 71 percent and 63 percent of respondents felt that their welfare had substantially improved in Nairobi and Mombasa respectively. Those that perceived average improvement were 16 percent for Nairobi compared to 19 percent for Mombasa which was very close. However, those that felt there was little effect on the project were 13 percent and 18 percent for Nairobi and Mombasa respectively.

CHALLENGES TO POTATO MARKETING

Other challenges to potato marketing included the following;

i. Perishability of commodity and lack of proper storage: potato remains a very perishable crop. Though efforts at increasing shelf life have been made through breeding programmes, the commodity still required specialized storage facilities if it had to remain useful for months after harvest. Cold storage would easily achieve this but that capacity is not developed and where available, it is grossly inadequate.
ii. Seasonal fluctuation in supply leading to price changes: the stability of the market and predictability of business by stakeholders in the marketing of the commodity are normally impaired by seasonal fluctuations in production amidst ever growing demand. This makes

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the business rather shaky while consumers have to pay dearly for the critical food security commodity. This needs serious consideration towards stabilizing supply through appropriate means like irrigated production.

CONCLUSION

From the findings of the study, the potato business was confirmed as viable, profitable and sustainable in the country. However, the potato crop faces both supply and demand side constraints highlighted by the respondents and espoused in this study. Since the business was confirmed lucrative, it is incumbent upon stakeholders to address the identified constraints to propel the commodity to the leading status as a food security and commercial crop. This will make the business as profitable as possible and ensure investors benefit substantially from the enterprise as well as remain in business. This will in turn ensure increased production and productivity and promote the potato crop to the required high level. To do this, the current study recommends that stakeholders devote requisite resources to address the identified constraints.

RECOMMENDATIONS

1. There is need to promote popular varieties of potatoes through research. KARI and other research institutions should put more efforts in promoting popular varieties by improving on desirable qualities like disease resistance, shelf life and market desired culinary qualities. This should also be done for local varieties with desirable qualities.
2. Linkages in the value chain that are critical to the success of the potato business should be strengthened while bottlenecks in weak links addressed to streamline and strengthen the power of every player in the potato value chain. Stakeholders like farmer organizations and their collaborators should address issues that weaken some levels of the value chain link like lack of appropriate market information which can be provided through an efficient market information system.
3. Undue strength of any level of value chain players over others should be discouraged and stemmed out. As was established in this study, the market situation is such that middlemen still continue to benefit more than producers by playing around with information. This should be discouraged by local authorities who should destroy all cartels in municipal markets since they distort markets.
4. County governments should invest in development of physical markets with appropriate infrastructure for hygienic marketing of the perishable commodity among other perishable horticultural crops. Where possible, investment in cold storage is also encouraged.
5. Market demand for potatoes is high and increasing. To sustain that demand and maintain the crop as the second leading staple in the country, there is need for stakeholders to redouble their efforts at promoting both the production and marketing sides of the value

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chain. On marketing, more lucrative and versatile arrangements like contract farming and group marketing should be explored while on production side, more land, superior varieties and irrigated production should be used to increase yields.

6. Stakeholders should be more engaged in improving sustainability of the potato business. This should be done by more frequent engagements in appropriate fora to analyze trends and emerging issues in the commodity market. Discussions on emerging challenges and opportunities should inform appropriate control measures to ensure the crop remains a leader in the staple foods and economic spheres in the country.

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