

Market Analysis of Pumpkin Leaves: An Indigenous Vegetable in North West Province, South Africa

Joseph N. Lekunze

School of Agriculture, North-West University, South Africa

KEYWORDS Food Security. Commercialization. Consumers. Harvesters. Women

ABSTRACT The study uses North West Province as a case study to make a market analysis of pumpkin leaves as an indigenous vegetable in South Africa. The analysis shows that 42% of local retailers marketed pumpkin-leaves. Gender analysis of participants reveals that the majority of producers/harvesters (83%), marketers (65%) and consumers (83%) were female. The output of pumpkin leaves was significantly impacted upon by supply, profit and costs incurred per year. The commercialization of the indigenous vegetables could provide income and household food-security to the study area. The study revealed that pumpkin-leaves are being bought and sold. Government should support this process through policies and financial support.

INTRODUCTION

Marketing is defined as the aggregate of functions involved in transferring and moving goods from producer to consumer. Marketing is not just about selling. It requires a clear and perfect understanding of what consumers want, and the ability to deliver this to them at a profit, through the most appropriate channels. It includes the planning, pricing, promotion, and distribution of products and services for consumers, both present, and potential (Agricultural Marketing Resource Center 2007). In South Africa, many livelihoods depend on the production and marketing of crops. The large and rich biodiversity of indigenous plants of South Africa offers a valuable source for investigation into new crops (Reinten and Coetzee 2002). Smith (1995) describes indigenous crops as those truly native to a particular area and their wild forms can still be found in the area. This is in contrast with traditional foods which initially were foreign to the area, however, introduced, having been grown and consumed from one generation to the next. This differentiation illustrates that there are today in some areas several food crops which many would believe are indigenous, however, were brought in from outside the area. Orchard and Nwerume (2003) also defined indigenous foods as crops or plants that have evolved naturally within the confines of the boundaries of a particular environment. These indigenous crops include vegetables. Marketing of these vegetables exists in many different parts of Africa today. Irungu et al. (2007) also reported that indigenous vegetables, especially African Leafy Vegetables, have health, economic, and socio-

cultural values; they contribute towards biodiversity in Nairobi. Although South Africa has a high food-security rate among households through cultivation and commercialization of existing traditional crops, pockets exist especially in some rural areas where there is food insecurity; indigenous vegetables can solve this challenge. However, areas of production and marketing of indigenous vegetables are being neglected, owing to tedious commercial aspects such as: market information, marketing costs, entrepreneurial and business-skills training, literacy levels, social awareness, access to finance, environmental awareness, and inadequate government-support policies. Local and indigenous vegetables offer a potential resource currently underutilized, which can enhance household food security (Quirien et al. 2001). Despite the beneficial attributes, commercialization remains very low.

Problems identified in the marketing of indigenous vegetables include: specialization in a few profitable species as demanded by the market, unstable market conditions, low product prices, changing tastes, poor infrastructure, droughts, inadequate government policies and support, including longer food-preparation time. As such, efforts towards the institutional marketing structuring of these vegetables have been neglected. Several research studies on various aspects of indigenous food crops have been conducted (Harts 2003; Irungu et al. 2007) in ascertaining the role indigenous crops can play on household food security. Dinello et al. (2000) argue that marketing is the most critical element in the profitable production of agricultural crops. The sum total of functions involved in the trans-

fer of crops from the farmer to the buyer is referred to as marketing. Therefore, functions of agricultural marketing include processing and assembling of the raw commodities, grading and packaging, transportation, preparation for use, storage, shifting, and sharing risks, change in ownership, pricing and exchange, wholesale selling, and retailing. Unlike traditional agricultural enterprises, indigenous vegetables do not have established producers/ harvesters, marketers or consumers. Successful indigenous vegetable production/harvesting rely heavily on the producers' or harvesters' ability to identify appropriate market outlets. Most markets will not absorb an increased volume of a product without a corresponding price reduction. Often, small crop hectares will be fairly profitable in an area, however, if over-planting occurs, no one makes money. Potential suppliers must study markets carefully before selecting such crops or marketing seasons not in oversupply.

Despite the contribution and importance of indigenous vegetables, accurate data on the description of production, marketing, processing, and consumption, have been very scarce for this important crop. Statistics on the actual number of producers/harvesters, marketers, and consumers of indigenous vegetables are unknown. What is known is that indigenous vegetables have played a sustenance role in rural areas in the past. What is known about the marketing of these vegetables is that someone is producing/harvesting and marketing these vegetables; and someone is buying and consuming them. What happens to indigenous vegetables from when they are produced/harvested to when they are consumed is unknown. As Gold et al. (2004) put it, this ushers in a series of unanswered questions such as how many times the product changes hands from when it leaves the farm to when it reaches the final consumer? How do the producers/harvesters get to the market? What are the costs and potential returns in the marketing of indigenous vegetables? Who are the buyers and consumers of indigenous vegetables? Who are the competitors? What strategy should be applied in order to be successful in the marketing of indigenous vegetables? What policies exist in the promotion and marketing of indigenous vegetables? These are the many questions that need to be answered in order to address the marketing challenges faced by indigenous vegetables. This article attempts to

provide answers to the production/harvesting, marketing and consumption of these vegetables. The overall objective of the article is to analyze the marketing of pumpkin-leaves in selected rural and urban communities of the North-West province, with the specific objective of examining the socio-economic characteristics of producers/harvesters, marketers, and consumers of pumpkin-leaves through analysis of: threat of entry, threat of rivalry, threat to supply, threat to buyers' buying power, threat to substitute, using the Porter's competitive model. The study hypothesized that there is no significant relationship between socio-economic characteristics and marketing of indigenous vegetables. The article has adapted the "Porter's Competitive Model (1979)", which utilizes the four forces in determining competitiveness. The goal of this model is to determine the intensities and attractiveness of indigenous vegetables markets. In the study, attractiveness refers to the profitability of the indigenous vegetable industry; unattractiveness refers to the decreasing profitability of the industry. This model has been adapted to the market analysis of many different products around the world (Chobanyan 2007; Gold et al. 2004; Karaan et al. 2005), providing a useful basis for appropriate policies and decisions when fostering competitiveness and profitability of a particular industry.

MATERIAL AND METHODS

The North West Province (NWP) of South Africa is predominantly a rural province divided into four main districts. The demographic characteristics of these districts are not only diverse, they have a dual economic structure in which first and second economies coexist. The social structure in the province is highly stratified into the relatively urban wealthy and rural indigent. The areas chosen for the study were based on three criteria: intensities of household participation in small-scale agricultural production; the rural-urban divide; and population stability within a particular setting. A meeting was held with officials of the provincial Department of Agriculture and Ngaka Modiri-Molema District. Dr Ruth Segomotsi Mompatsi District was chosen as both the urban and rural setting for the study. The total population of the study area identified as involved in indigenous vegetable production/harvesting was 396. The population was strati-

fied into three categories: producers/harvesters, marketers, and consumers, depending on which category each participant participated in the most. From the above stratification, 216 participants were producers/harvesters, 127 were marketers, and 53 were consumers of indigenous vegetables. A list of all the identified producers/harvesters, marketers, and consumers was designed. The size of the sample was limited to 109 producers/harvesters, 71 marketers and 30 consumers. In order to obtain unbiased results, the names of all producers/harvesters, marketers, and consumers were written on pieces of papers and put into a bag. After shuffling the papers in the bag, draws were conducted, thus selecting the producers/harvesters, marketers, and consumers to be interviewed, using a well-structured questionnaire. Simple Random sampling was conducted in selecting 109 producers/harvesters from the total population of 216, 71 marketers from 127, and 30 consumers from 53, ensuring that each respondent in the region had an equal chance of being selected. A total of 210 participants were interviewed, based on the categories outlined above. During the administration of the questionnaires, standardization on all the measurements was conducted. In achieving this, 75 bundles of pumpkin-leaves and pumpkin-beds were sampled during the data-collection process. A scale and tape were used to measure the weights of bundles and the length and width of the beds. The sum of the weights of pumpkin leaves was divided by 70 to find the mean. The result shows that 1 bundle $\approx 0.53\text{kg}$ and 1 bed of pumpkin-leaves $\approx 7.3\text{m}^2$. These averages were used to convert bundles and beds to kilograms (kg) and hectares (Ha), by multiplying the mean by the number of bundles and beds given by the respondents during data collection. Both quantitative analysis and qualitative representation of data were performed. Graphs such as tables and bar charts were used where necessary in analysing the data. The software package SPSS was used to run the data; Excel was used to draw graphs. Regression equations based on a modified four pillars of Porter's Model were specified and used for the regression analysis. The five forces are:

Demand Conditions

This refers to the sophistication of home demand and pressure from local buyers of pump-

kin-leaves to upgrade and record this demand, along with their ability to accomplish this. As such, home-demand composition, size, and its internationalization play an important role in establishing a competitive pumpkin-leaves sector. Furthermore, demographic characteristics and some measurable variables affecting demand in the study area of indigenous vegetables were analysed. This analysis was effected using regression as specified below, while ratings were used to ascertain the impact of these variables on the competitiveness of indigenous vegetables in the study area.

Threat to Enter Pumpkin-leaves Market (Y)

It is determined by;

$$Y = A + X_1Ag + X_2Gd + X_3HHS + X_4Ms + X_5Dp + X_6Epl + X_7Edul + X_8Qtysld/yr + X_{10}Ns + X_{11}Inc/yr + X_{12}Pr + X_{13}Pft + X_{14}Qtysld/s + \dots e \dots \dots \dots (1)$$

Where A is a constant; Y is the dependent variable (number of buyers); and e = error term. X_1 is estimates of the elasticities or regression coefficients.

Ag = age, Gd= gender, HHS=household size, Ms=marital status, Dp=number of dependents, Epl= employment, Edul=educational level, Qtysld/yr= quantity sold per year, Ns=number of sellers, Inc/yr=income per year, Pr=price per unit, Pft= profit per season and Qtysld/s= quantity sold per season

Threat to Buying Power of Consumers of Pumpkin-leaves (Y)

It is determined by Age (X_1), Gender (X_2), Household size (X_3), Marital status (X_4), Employment(X_5), Educational level (X_7), Quantity sold per year (X_8), Amount spent per year (X_9), and Number of sellers (X_{10}).....(2)

Hence; $Y = C + X_1 + X_2 + \dots X_n$, where C is a constant, X_n are the explanatory variables and Y is the dependent variable (Number of buyers).

Firm's Strategy, Structure, and Rivalry

This refers to the conditions governing the way in which enterprises involved in indigenous vegetables in the study areas are created, organised, and managed; and the nature of domestic rivalry. Such an analysis will determine the level of investment, the type of strategies employed, and the intensities of local rivalry. Also, analysis on the measurable demographic and other

measurable variables affecting the indigenous vegetables industry in the study area was regressed as specified below:

Rivalry amongst Pumpkin-leaves Marketers (Y)

Age (X_1), Gender (X_2), Household size(X_3), Marital status (X_4), Dependents (X_5), Employment (X_6), Educational level (X_7), Number of buyers (X_8), Price per unit (X_9), Quantity sold per year (X_{10}) and Quantity sold per season (X_{11})..... (3)

Hence; $Y = B + X_1 + X_2 + \dots + X_n$, where B is a constant, X_n are the independent variables and Y is the dependent variable (Number of sellers).

Related and Supporting Industries

Any enterprise which hopes to operate optimally depends on access to related and supporting industries. Enterprises must access affordable inputs such as capital, fertilizers, and pesticides. The lack of these products can mitigate seriously against the ability of an enterprise to compete effectively in the market. Furthermore, where there is a lack of supporting industries, such as marketing agents and transport contractors, this makes it very difficult for marketers to access markets owing to lack of intermediaries. It goes without saying that the overall success of any industry and its enterprises to compete favourably is dependent on the conditions that government creates with respect to its domestic and international policies. Government can influence all the other pillars either positively or negatively through policies, legislation, institutions, and operational capacities. As such, the role of government in the competitiveness of the indigenous food-crop marketing under study should be viewed in combination with all the other pillars, in determining the competitiveness of this industry. Hence, in analysing the impact of externalities with respect to indigenous vegetables in the study area, measurable demographics and other variables are regressed, as shown below, while ratings are used to analyse the impact of non-measurable variables on the competitiveness with indigenous vegetables in the study area.

Threat to Supply Pumpkin-leaves by Producers/Harvesters (Y)

It is determined by Age (X_1), Gender (X_2), Household size(X_3), Marital status (X_4), Employment(X_6),

Educational level (X_7), Quantity sold per year (X_8), Profit per season (X_9), Costs of harvesting per year (X_{10}), costs of inputs per year (X_{11}) and Number of buyers (X_{12}).....(4)

Where; $Y = D + X_1 + X_2 + \dots + X_n$, where D is a constant, X_n are the independent variables and Y is the dependent variable (output/yield).

Factor Conditions

This relates to the region's position regarding factors of production such as natural resources, level of production costs, price of labour, fuel, fertilizers, pesticides, human resources, capital resources, physical infrastructures, administration, information, scientific and technological infrastructure to compete in a given industry. In the study area, these factors are almost non-existent; those that exist are very poorly developed, which places indigenous enterprises in this region at a competitive disadvantage. As such, sequential removal of the above constraints will unleash the potential of the indigenous vegetables industries, making it competitive. Furthermore, sustainable growth is possible if new constraints are alleviated by further reforms. Hence, there is need for participants in this indigenous vegetables industry to have immediate access to technology, resource use, institutions, knowledge, and markets, so as to deal with successive difficulties that affect indigenous vegetables in response to natural resource exhaustion, degradation, and diversity, in taking advantage of new opportunities. Furthermore, capital inputs are key determinants of agricultural productivity and competitiveness and as such, rural infrastructure development, strengthening research and extension services, enhancing human capital in rural areas through health, education, access to productive resources, preserving capacity of indigenous vegetables and the environmental management are crucial in sustaining of production achievements. In the analysis of indigenous vegetables in the study area, demographic factors are regressed as specified below. Analysis of the non-measurable variables in other factors determines the competitiveness of indigenous vegetables through:

Threats to Substitute Pumpkin-leaves by Consumers (Y)

It is determined by Age (X_1), Gender (X_2), Household size(X_3), Marital status (X_4), Dependents (X_5)

Employment (X_6), Educational level (X_7), income per year (X_8), quantity bought per year (X_9), and amount spent per (X_{12}).....(5)

Hence; $Y = E + X_1 + X_2 + \dots + X_n$, where E is a constant, X_n are explanatory variables and Y is the dependent variable (Number of buyers).

In order to ascertain reliability and validity, questionnaires were checked by other experts; inputs made by the experts were incorporated into the final questionnaire. The questionnaire was face-evaluated once more to ensure that it covered all aspects of the study. This process guaranteed the reliability of the study. Samples of the questionnaire were pre-tested on the field in order to identify possible difficulties that might arise during the administration and completion of questionnaires. Difficulties identified during the pre-testing processes were incorporated into the final questionnaire. This was to ensure validity of the study. The data used in the study was both dichotomous and continuous (see Table 1).

RESULTS AND DISCUSSION

Table 2 presents the composition of identified indigenous vegetables, including pumpkin-leaves, produced/ harvested, marketed, and consumed in the study area. Table 2 also indicates the proportion of participants engaged in each group, whether producers/harvesters, marketers or consumers of indigenous vegetables.

From the table, pumpkin-fruit is the most produced indigenous vegetable (64.2%), followed by bean-leaves (57.8%) and pumpkin-leaves (44.1%). Amaranths (90.8%), followed by Cowpea-leaves (87.5%) and pumpkin-leaves (56%) are the most-harvested indigenous vegetables. It is expected that, since pumpkin-fruit is the most cultivated indigenous vegetable, pumpkin-leaves production will be equally high, their being complementary. The study found that most of the pumpkin-leaves are harvested because those who cultivate pumpkin-plants need the fruit; harvesting of the leaves will impact negatively on fruit yields. Hence pumpkin leaves are mostly harvested from dump areas, where they grow as wild vegetables. Those who are marketers - 84.5%, 42.2% and 43.7% of participants, stated that pumpkin-fruit, pumpkin-leaves and bean-leaves are the most marketed indigenous vegetables, while amaranths (10%) and cowpea-leaves (10%) are the least marketed. The analy-

sis shows that nearly 90%, 46.7% and 16.7% of consumers consumed mostly pumpkin-fruit, bean-leaves and pumpkin-leaves, respectively; while 90% of them indicated that they consumed amaranths and cowpea-leaves least, respectively. However, unlike Kenya where production, marketing, and consumption have shown increasing trends since 2001, there is limited evidence of such a trend in our study area, except for pumpkin-fruit and bean-leaves.

Results on demographics and socio-economic characteristics of indigenous vegetables producers/harvesters, marketers and consumers found that over 37.7% of producers/harvesters are over 50 years of age; 40.9% of marketers are between 40-49 years of age; while 53.3% of consumers were found to be older than 50 years. The analysis reveals that the majority of participants involved in indigenous vegetables fall in an age-range from middle-age to elderly. Analysis on gender found that 83%, 64.8% and 83.3% of producers/harvesters, marketers and consumers were females. The result also reveals that 53.2% of households of producers/harvesters have between 5-10 members; while 67.7% marketers have household sizes of 5-10 members; and 40% of households of consumers have between 5-10 members.

The analysis also shows that numbers of dependants per household are fairly large, except for consumers, who have fewer than 5 dependants per household. Owing to the rising costs of staple and exotic foods, indigenous vegetables can substitute for non-indigenous foodstuffs, ensuring household food-security. The results indicate that the majority of participants involved in indigenous vegetables (producers/harvesters, marketers and consumers) are females. Hence, women dominate the indigenous-vegetable sector in each category. More men must be encouraged to enter the sector, given that they can provide the manpower and much needed resources, assisting the women; this will result in improving the supply and marketing of pumpkin-leaves in the study area.

Results of the regression analysis on the threat to enter the market, found age to have a positive and significant effect ($t = 2.20$; $p = 0.002$) on the number of marketers of pumpkin-leaves. Any shift in the current age-structure of pumpkin-leaves marketers, from the middle- to old-age group to younger participants, will result in a 127% increase in the marketing of pumpkin-

Table 1: Measurement and description of variables and expected signs

<i>Variables</i>	<i>Description of the variables</i>	<i>Method of measurement</i>	<i>Expected signs</i>
<i>Threat to Entry (Y)</i>	Dichotomous	Yes = 1, No = 0	Negative (-)
Age (X_1)	Continuous	Number	Negative (-)
Gender (X_2)	Dichotomous	Male =1, Female = 0	Negative (-)
Household-size (X_3)	Continuous	Number	Positive (+)
Marital status (X_4)	Dichotomous	Yes =1, No =0	Positive (+)
Dependants (X_5)	Continuous	Number	Positive (+)
Employment (X_6)	Dichotomous	Yes = 1, No = 0	Negative (-)
Educational level (X_7)	Dichotomous	Yes = 1, No = 0	Positive (+)
Quantity sold per year (X_8)	Continuous	Figure	Negative (-)
Number of sellers (X_9)	Continuous	Figure	Negative (-)
Income per year (X_{10})	Continuous	Rand	Negative (-)
Price per unit (X_{11})	Continuous	Rand	Negative (-)
Profit per season (X_{12})	Continuous	Rand	Positive (+)
Quantity sold per season (X_{13})	Continuous	Figure	Positive (+)
<i>Threat to Rivalry (Y)</i>	Dichotomous	Yes = 1; No = 0	Positive (+)
Age (X_1)	Continuous	Number	Positive (+)
Gender (X_2)	Dichotomous	Male =1, Female = 0	Positive (+)
Household-size (X_3)	Continuous	Number	Negative (-)
Marital status (X_4)	Dichotomous	Yes = 1, No = 0	Negative (-)
Dependants (X_5)	Continuous	Number	Negative (-)
Employment (X_6)	Dichotomous	Yes = 1, No = 0	Negative (-)
Educational level (X_7)	Dichotomous	Yes = 1, No = 0	Negative (-)
Number of buyers (X_8)	Continuous	Figure	Negative (-)
Price per unit (X_9)	Continuous	Rand	Negative (-)
Quantity sold per year (X_{10})	Continuous	Rand	Positive (+)
Quantity sold per season (X_{11})	Continuous	Rand	Positive (+)
<i>Threat to Supply (Y)</i>	Dichotomous	Yes = 1; No = 0	Positive (+)
Age (X_1)	Continuous	Number	Positive (+)
Gender (X_2)	Dichotomous	Male = 1, Female = 0	Negative (-)
Household-size (X_3)	Continuous	Number	Positive (+)
Marital status (X_4)	Dichotomous	Yes = 1, No = 0	Negative (-)
Dependants (X_5)	Continuous	Figure	Positive (+)
Employment (X_6)	Dichotomous	Yes = 1, No = 0	Negative (-)
Educational level (X_7)	Dichotomous	Yes = 1, No = 0	Negative (-)
Quantity sold per year (X_8)	Continuous	Rand	Positive (+)
Profit per season (X_9)	Continuous	Rand	Positive (+)
Costs of harvesting per year (X_{10})	Continuous	Rand	Negative (-)
Costs of inputs per year (X_{11})	Continuous	Rand	Negative (-)
Number of buyers (X_{12})	Continuous	Figure	Positive (+)
<i>Threats to Buyers' Power (Y)</i>	Dichotomous	Yes = 1, No = 0	Positive (+)
Age (X_1)	Continuous	Number	Positive (+)
Gender (X_2)	Dichotomous	Male = 1, Female = 0	Positive (+)
Household-size (X_3)	Continuous	Number	Positive (+)
Marital status (X_4)	Dichotomous	Yes = 1, No = 0	Positive (+)
Dependants (X_5)	Continuous	Figure	Positive (+)
Employment (X_6)	Dichotomous	Yes = 1, No = 0	Positive (+)
Educational level (X_7)	Dichotomous	Yes = 1, No = 0	Positive (+)
Quantity sold per year (X_8)	Continuous	Rand	Negative (-)
Amount spent per year (X_9)	Continuous	Rand	Negative (-)
Number of sellers (X_{10})	Continuous	Figure	Positive (+)
<i>Threat to Substitution (Y)</i>	Dichotomous	Yes = 1, No = 0	Positive (+)
Age (X_1)	Continuous	Number	Positive (+)
Gender (X_2)	Dichotomous	Male = 1, Female = 0	Positive (+)
Household-size (X_3)	Continuous	Number	Positive (+)
Marital status (X_4)	Dichotomous	Yes = 1, No = 0	Positive (+)
Dependants (X_5)	Continuous	Figure	Positive (+)
Employment (X_6)	Dichotomous	Yes = 1, No = 0	Negative (-)
Educational level (X_7)	Dichotomous	Yes = 1, No = 0	Positive (+)
Income per year (X_8)	Continuous	Rand	Positive (+)
Quantity bought per year (X_9)	Continuous	Rand	Negative (-)
Amount spent per (X_{12})	Continuous	Rand	Negative (-)

Table 2: Percentage distribution of indigenous vegetables among respondents

<i>Indigenous crops</i>	<i>Production/ harvesters (n = 109)</i>		<i>Marketers (n = 71)</i>		<i>Consumers (n = 30)</i>	
	<i>Produce</i>	<i>Harvest</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>
Amaranth (<i>hybridus</i>)	9.2	90.8	8.5	91.5	10	90
Cowpea-leaves (<i>Vigna unguiculata</i>)	12.9	87.2	15.5	84.5	10	90
Pumpkin-leaves	44.1	56	42.2	57.7	16.7	83.3
Pumpkin-fruit	64.2	11	84.5	15.5	90	10
Bean-leaves	57.8	42.2	43.7	56.3	46.7	53.3

leaves, everything else remaining constant. This finding is supported by the demographic analysis. It demonstrates that the pumpkin-leaves market is not attractive to the younger generations who have the resources and knowledge to improve on this sector. This finding is similar to that of Omiti et al. (2009), who found that age of the household head improves the intensity of market participation.

Gender was also found to have a positive impact on the threat to enter the pumpkin-leaves market, significant at ($t = 5.23$; $p = 0.000$). The analysis demonstrates that any change in the current gender structure of marketers of pumpkin-leaves from females to males will result in 419% increase in the marketing of pumpkin-leaves. This analysis is supported by the demographic analysis, which shows that 64.8% of marketers surveyed were females as opposed to 35.2% males. This can act as a threat to enter the market even if the returns are given. This is because “African societies” tend to attribute certain types of trade to women and others to men. Furthermore, engaging in the marketing of this crop by women might mean raising additional income for acquiring of basic necessities for the household. It may, however, increase the number of marketers without gaining a corresponding increase number of buyers. This will result in a reduction in price and profit. Omiti et al. (2009), in their study, also commented that gender represents differences in market orientation between male and female heads of households, where men are likely to sell earlier in the season when prices are still high, while women prefer to store more output for household self-sufficiency. As a result, should this observation hold in the present study, the gender coefficient will be positive; otherwise, a negative sign would be expected. This will prevent new entrants into the market,

because the objective of household food security will not be met.

Household size and number of dependants was also found to have a negative impact on the marketing of pumpkin-leaves and significant at $t = -0.86$; $p = 0.000$ and $t = -1.47$; $p = 0.000$ respectively. This shows that any change in the current household structure will result in a 24% and 28% reduction in the marketing of pumpkin-leaves. The negative impact of household-size in the marketing of pumpkin-leaves can be attributed to the fact that most households engaged in the marketing of pumpkin leaves are fairly large. As such, their main reason for marketing this crop is for household food-security not for marketing; hence this eliminates any threat to enter the market. Furthermore, there is a direct relationship between household-size and number of dependants. Most participants involved in the marketing of pumpkin-leaves have a fairly large household-size and number of dependants. Table 3 shows the threat to entry, rivalry, buyer's power, supply and substitution to marketing of pumpkin leaves.

A larger number of dependants will eliminate the threat to enter the market, because most dependants are attending school. Owing to the rising costs of staple foods which are “exotic”, indigenous food-crops such as pumpkin-leaves may be substituted for non-indigenous food-stuffs thereby ensuring food-security. Furthermore, pumpkin-leaves are produced not for their own sake but for the pumpkin-fruit, for which demand is fairly high; this has positive effects on household food-security. Most participants will have little interest in entering the pumpkin-leaves market for profitability and price, rather than for discharging the excesses available after household consumption has been met. This assertion is supported by Cunningham et al. (2008) that male household heads sell output soon af-

Table 3: Threat to entry, rivalry, buyer's power, supply and substitution to marketing of pumpkin leaves

Variables	Pumpkin-leaves	Variables	Pumpkin-leaves	Variables	Pumpkin-leaves	Variables	Pumpkin-leaves	Variables	Pumpkin-leaves
Threat to enter pumpkin-leaves market		Threat of rivalry among pumpkin-leaves marketers		Threat to buying power of consumers of pumpkin-leaves		Threat to supply among producers/harvesters of pumpkin-leaves		Threat to the substitution of pumpkin-leaves by consumers	
Constant	1.95 (2.64)	Constant	4.09 (0.46)***	Constant	8.98 (7.09)	Constant	4.61 (4.84)	Constant	6.80 (5.48)
Age	1.27 (0.575)**	Age	-0.03* (0.01)***	Age	-8.62 (3.64)**	Age	-0.01 (0.04)	Age	-0.13 (0.07)*
Gender	4.19 (0.801)***	Gender	-0.83 (0.18)***	Gender	-0.13 (0.91)	Gender	-0.50 (1.20)	Gender	3.29 (2.44)
Household-size	-0.24 (0.28)***	Household-size	0.55 (0.18)**	Household-size	-3.41* (1.44)**	Household-size	0.21 (0.25)	Household-size	1.40 (0.57)**
Marital status	-4.11 (0.67)	Marital status	-0.15 (0.08)**	Marital status	0.59 (0.53)	Marital status	-0.16 (0.59)	Marital status	-0.33 (0.22)
Dependants	-0.28 (0.19)***	Dependants	-0.42* (0.17)**	Dependants	7.73 (7.76)	Dependants	-0.06 (0.32)	Employment	-0.97 (1.35)
Employment	0.94 (0.37)	Employment	-0.04 (0.03)	Educational level	0.15 (0.10)	Employment	0.11 (0.20)	Educational level	0.004 (0.04)
Educational level	-0.06 (0.04)	Educational level	0.02 (0.01)	Quantity bought per year	0.07 (0.24)	Educational level	0.78 (0.60)	Income per year	0.001 (0.003)
Number of buyers	-0.10 (0.10)	Number of buyers	0.01 (0.01)	Amount spent	0.01 (0.12)	Quantity sold per year	0.02 (0.02)	Quantity bought per year	-0.07 (0.12)
Income receive per year	0.13 (0.09)	Price per unit	0.01 (0.022)	F	4.67	Profit per season	0.004 (0.002)*	Amount spent	0.06 (0.07)
Price per unit	-0.08 (0.19)	Quantity sold per year	0.004 (0.01)	P	0.06	Costs of harvesting per year	-0.42 (0.34)	F	1.48
Profit per season	0.14 (0.14)	Quantity sold per season	0.01 (0.01)	R	0.46 ^c	Costs of inputs/year	0.04 (0.02)*	P	0.59
Quantity sold per season	0.18 (0.12)	F	0.48	R ²	0.21	Number of buyers	-0.001 (0.003)	R	0.86 ^d
F	0.71	P	0.51	DW	2.04	F	4.52	R ²	0.75
P	0.66	R	0.76 ^b			P	0.05	DW	2.39
R	0.86 ^c	R ²	0.58			R	0.39 ^b		
R ²	0.75	DW	2.00			R ²	0.15		
DW	2.00					DW	1.92		

Significant <0.01***; significant, <0.05**; significant, <0.10*

ter harvest (early in the season when prices are much lower owing to oversupply in the market), unlike female household heads who hold stocks for internal food-security. The researchers also found that there is a negative correlation between price and total output.

Analysis on the rivalry among marketers of pumpkin-leaves also found that age and gender of the marketers were negative, however, these factors had a significant impact on rivalry among marketers of pumpkin-leaves at $t = -3.0$; $p = 0.000$ and $t = -4.61$; $p = 0.000$ respectively, indicating that any change in the current age and gender structure of marketers of pumpkin leaves will result in 3% and 83% reduction in the number of marketers of this crop thereby, reducing inter and intra rivalry. This may be explained in that, while other non-indigenous crops (existing traditional crops) attract young and new entrants, pumpkin-leaves attract marketers whose ages range from middle- to old-age; this affects sales negatively. Furthermore, males can travel to distant markets to sell their produce; this can reduce rivalry significantly; while females do not travel to distant markets to sell pumpkin-leaves. This may have a positive impact on rivalry amongst females who compete for limited buyers of pumpkin-leaves.

Household-size was also found to have a positive and significant impact on rivalry ($t = 3.05$; $p = 0.003$), while number of dependants had a negative but significant impact at $t = -2.47$; $p = 0.017$ respectively. This is an indication that the current household-size structure of marketers has resulted in 55% increase in rivalry among marketers of pumpkin-leaves; while the number of dependants per household resulted in a 42% reduction in rivalry among marketers of pumpkin-leaves. This implies that in situations where the household has more children of school-going age, this household may not occupy points in the market which would increase rivalry. However, the large numbers of dependants who do not contribute financially to the household, but significantly increase household consumption, may force household heads to fight for a greater share of the market in meeting household food-security, thereby increasing rivalry in the markets. This is supported by Quirien et al. (2001) who commented that local and indigenous food-stuffs offer a potential resource that is currently underutilized, which may provide a solution to the challenge of household food-security.

Further analysis found marital status to have a negative and significant impact ($t = -1.88$; $p = 0.054$); while number of buyers was found to be significant, having a positive impact on the marketing of pumpkin-leaves at ($t = 1.0$; $p = 0.045$), respectively. This is an indication that the current structure of marital status may have resulted in a 15% reduction in the rivalry among marketers of pumpkin-leaves. On the other hand, the number of buyers of pumpkin-leaves has resulted in a 1% increase in inter- and intra-rivalry amongst marketers. This may be attributed to the fact that single people who have never been married have more time and yet limited resources. Such people will engage in business activities that generate the highest returns, thereby reducing rivalry among marketers of pumpkin-leaves. Also, those who are single as a result of separation may have many dependants to sustain, therefore facing difficulties in meeting their household-food needs. As a result, they turn to their environment, harvesting pumpkin-leaves as a means of food security. For those who are married and living together, these indigenous food-crops may have cultural significance to them; consuming this food gives them fulfillment. Alternatively, as the level of income of these household increases, the impact on marital status to the rivalry among marketers of pumpkin-leaves will grow negative; they may substitute pumpkin-leaves for traditional crops that bring better returns.

With respect to the number of buyers of pumpkin-leaves, rivalry can only occur if there is a limited number of buyers in the market, and many suppliers of the product. However, the numbers of buyers in the market are limited compared with sellers. This results in a positive impact on rivalry amongst the marketers, in line with the findings of Consumer International (2009) on "the value of consuming indigenous foods in Africa". This study generalises that indigenous foods are valued for their sustenance role, being associated with rituals, superstition, folklore, cultural history, and civilization. However, production is low, owing to competition from non-indigenous food crops. The analysis also found that the constant has a positive and significant impact ($t = 8.89$; $p = 0.000$) on the number of sellers of pumpkin-leaves; indicating that people are buying pumpkin-leaves.

Further analysis on the threat to buying power of consumers of pumpkin-leaves found age

and household-size to have a negative impact on this aspect; however, this was significant at $t = -2.37$; $p = 0.017$ and $t = -2.37$; $p = 0.060$, respectively. The implication of this analysis is that the current ages of participants range from middle-aged to elderly, which accounts for the reduction of about 862% in the consumption of pumpkin-leaves. Any shifts in the age structure of consumers to include the younger generation will have a positive effect on the quantity of pumpkin-leaves purchased. Household-size of consumers also range from low to average. This has resulted in a 341% reduction in the consumption of pumpkin-leaves. This may be an indication of differences in taste among individuals of a particular household - if all the members enjoy eating pumpkin-leaves, consumption will increase, and the effect will be positive; however, if most of the members in a household do not enjoy the vegetable, consumption of pumpkin-leaves will be low, and the effect will be negative. The current level of consumption of pumpkin leaves may be attributed to cultural values rather than principally on the basis of food-security. Furthermore, household sizes are larger, owing to larger number of dependants per household. Hence, any positive impact on buying power of consumers of pumpkin-leaves may depend on the acceptability of this vegetable by the children, otherwise the impact is negative, as revealed in the above analysis.

Analysis on the threat to the supply of pumpkin leaves found profit and costs of inputs per year to have a positive and significant impact on the output ($t = 2.0$; $p = 0.099$ and $t = 2.0$; $p = 0.079$), respectively. The analysis indicates that an increase in profit and costs of inputs per year will result in 0.4% and 4% increase in the production of pumpkin-leaves. This finding is consistent with the observation by Oluwasola et al. (2008), that indeed, geographical distance imposes higher inputs costs on rural farmers, thereby reducing their ability to produce and sell in better but far-away markets, such as large supermarkets in big cities. Consequently, weak rural-urban linkages often contribute to lower farm incomes, especially among households in remote rural localities. In the rural areas, prices are lower owing to somewhat less preference for product differentiation. Results obtained in their study demonstrated that a unit price increase can significantly motivate farmers to increase the percentage of vegetables sold in both rural

and peri-urban areas and consequently augment the output. Alene et al. (2008) concluded that price and amount of output are key determinants of the percentage of farm produce sold.

In analysing the threat to substitution of pumpkin-leaves, age of consumers was found to have a negative but significant impact at $t = -1.86$; $p = 0.012$ on the substitution of pumpkin leaves; while household-size had a positive and significant impact on the substitution of pumpkin-leaves ($t = 2.46$; $p = 0.089$). The implication of the analysis is that the current age structure of consumers of pumpkin-leaves, which ranges from middle-aged to elderly, has resulted in a 13% decrease in the substitution of pumpkin-leaves. This could be because people of these ages may consume pumpkin leaves for cultural and sentimental reasons. However, as the current generation of youths grow older, substitution may shift further towards the negative, as most of these consumers will turn to exotic vegetables rather than pumpkin-leaves. The current household structure has resulted in a 140% increase in the consumption of pumpkin-leaves. This is because the majority of household members are unemployed. Their current levels of income do not allow them to substitute pumpkin-leaves for exotic vegetables, even if most household members do not prefer this vegetable.

CONCLUSION

The study has shown that demographics, marketing, and production factors affect the marketing of pumpkin-leaves in the selected rural and peri-urban areas of the North-West Province of South Africa. The study identified problems in the marketing of pumpkin-leaves to include unstable market conditions, low product prices, changing tastes, aging consumers, reduction in the number of buyers, inadequate government policies, and longer food-preparation time. The study assumed that someone is producing/harvesting, marketing pumpkin-leaves and someone is buying and consuming this product. The study hypothesized that there is no significant relationship between socio-economic characteristics and marketing of pumpkin-leaves. The article found age, household-sizes, gender, marital status, employment, educational levels, and distance from the market have impacted either positively or negatively on the marketing of pumpkin-leaves in the study

area. Although the data used was discrete, the regression analysis rejected the hypothesis that no significant relationship exists between socio-economic characteristics and marketing of pumpkin-leaves. The study therefore lays the groundwork on which solutions to the challenges in the marketing of indigenous vegetables in the study area may be improved, thus ensuring household food-security, increased income, and a better standard of living of households. The findings if properly managed can make a meaningful contribution to employment, food-security, and to the general multiplier effect, leading to a vibrant local economic development in the study area.

REFERENCES

- Alene AD, Manyong VM, Omanyua G, Mignouma HD, Bokanga M, Odhiambo G 2008. Smallholder market participation under transactions costs: Maize supply and fertilizer demand in Kenya. *Food Policy*, 33: 318–28.
- Agricultural Marketing Resource Center 2007. *Direct Marketing of Agricultural Produce; Lesson 3, Value-added Agricultural Profile*. Ames: Iowa State University
- Chobanyan A 2006. The competitive advantage of nations: Applying the “Diamond” model to Armenia. *International Journal of Emerging Markets*, 1(2): 147–164.
- Consumer International, Regional Office for Africa 2009. Value of consuming indigenous foods in Africa; Briefing paper III. *African Journal for Food, Agriculture and Nutritional Development*.
- Cunningham LT, Brown BW, Anderson KB, Tostao E 2008. Gender differences in marketing styles. *Agricultural Economics*, 38(1): 1–7.
- Dinello F, Hall C, MaFachern G, Dreesen L 2000. *Agricultural Marketing Series, GS-1146 Position Classification Standard for Agricultural Marketing Series*. United States office of Personnel Management in Cooperation with the Department of Agriculture.
- Gold MA, Godsey LD, Josiah SJ 2004. Markets and marketing strategies for agro forestry specialty products in North America. Kluwer, *Academic Publishers, Agro forestry Systems*, 61: 371–382.
- Harts T 2003. *Indigenous Knowledge and African Vegetables*. Human Science Research Council (HSRC); Center for Poverty, Employment and Growth, South Africa.
- Irungu C, Mburu J, Maundu P, Grum M, Hoeschle-Zeledon I 2007. Analysis of Markets for African Leafy Vegetables (ALVs) Within Nairobi and its Environs and Implications for on-farm conservation of Biodiversity. Global Facilitation Unit for Underutilized Species (GFU).
- Karaan M, Ham C, Akinnifesi F, Moombe K, Jordan D, Franzel S, Aithal A 2005. *Baseline Marketing Surveys and Supply Chain Studies for Indigenous Fruits Markets in Tanzania, Zimbabwe and Zambia*. World Agro-forestry Centre and CD Wild Research Alliance.
- Morrison D 2008. B.C Food Systems Network; Working Group on Indigenous Food Sovereignty (March 2008); Final Report, South Vancouver Island.
- Orchard JE, Ngwerume FC 2003. *Improving Livelihoods of Peri-urban Vegetables Growers through Promotion of Fresh and Processed Indigenous Vegetables*. Final Technical Report; Department of Research and Extension, Horticultural Research Center, Marondera, Zimbabwe and Natural Resources Institute, Chatham Maritime, United Kingdom.
- Omiti JM, Otieno JD, Nyanamba T, McCullough E 2009. “Factors influencing the intensity of market participation by smallholder farmers: A case study of rural and peri-urban areas of Kenya”. *African journal of Agricultural Research (Ajjare)*, 3(1).
- Porter ME 1985. “Competitive Advantage”. New York: The Free Press.
- Quirien VO, Westby A, Tomlins K 2001. *Food Africa: Improving Food Systems in sub-Saharan Africa: Responding to a Changing Environment; Overview Summary*. Natural Resources Institute, University of Greenwich, Central Avenue, Chatham ME4.
- Reinten E, Coetzee JH 2002. Commercialization of South African indigenous Crops: Aspects of research and cultivation of products, pp. 76–80. In: J Janick, A Whipkey (Eds.). Trends in New Crops and New Uses. ASHS Press, Alexandria, VA. *American Journal of Agricultural Economics*, 82(1): 245–59.
- Smith FI 1995. *The Case for Indigenous West African Food Culture*. BREDA SERIES. No, 9, Dakar: UNESCO Regional Office.