Proceedings of the 27th West Indies Agricultural Economics Conference

In collaboration with

The Ministry of Agriculture and Fisheries, Belize,

Caribbean Agricultural Research and Development Institute (CARDI),

The University of the West Indies (UWI)

and

la Asociación de Latinoamérica y del Caribe de Economía Agrícola (ALACEA)

Improving Marketing and Sustaining Natural Resource Systems in Latin America and the Caribbean

Belize City, Belize

23rd - 27th July, 2007

Sharon D. Hutchinson
Editor

The Identification of Emerging Agribusiness Opportunities in Selected CARICOM Countries

Ardon Iton*°

Govind Seepersad
Department of Agricultural Economics and Extension, The University of the West Indies, St. Augustine, Trinidad and Tobago

Christian Johnson*
**Caribbean Agricultural Research and Development Institute (CARDI), Trinidad and Tobago*
°*Corresponding Author. Tel: (868) 645-1205-7. E-mail:* aiton@cardi.org

Abstract

Pre-packed and Fresh-cut convenience vegetables for both retail and food service applications have been increasingly appearing in the global marketplace. This trend has extended into the CARICOM Region and is expected to experience substantial market growth for processing of fresh cut vegetables. However, these processors are also expected to face numerous challenges requiring a new and higher level of technical and operational sophistication.

The Convenience Food segment in the Region has been primarily driven by supermarket and fast food chains, with majority of the market controlled by imported tropical vegetables. This study seeks to identify some of the more important attributes driving consumer demand for convenience foods (Pre-packed Vegetables) in the Region that will guide Small Farmers to making a more substantial and/or continued contribution and participation to the segment in the development of their economies.

Keywords: fresh-cut vegetables; small farmers; business opportunities

Introduction

Small farmers in the Eastern Caribbean have largely focused on the production of traditional crops (bananas and sugar), which were sold under preferential marketing arrangements between the Caribbean

and the EU. However, within recent years successful challenges at the WTO lead to erosion of these preferential markets and consequentially loss of market share. Other producers such as the vegetable and fruit farmers targeting the domestic markets witnessed changes in the market, identifying border openings and reduced border control measures. This resulted in an array of endemic challenges, through increases in imports of agricultural commodities both in its range and volumes, seizing and retaining non-traditional markets that have been emerging. Recently identified is the convenience foods segment. This segment involved the movement of a wide diversity of tropical fruits and vegetables into the Region, proving to impact significantly with respect to their value added opportunities.

At the same time, Agriculture in the Region has continued along a path of commodity orientation, with an emphasis on efficiency and a focus on production. This has continued although food markets have been increasingly demanding more differentiated and value added products. The more these products are differentiated, the higher the degree of processing and sophistication is required. Further, increasing emphasis is being placed on production-related and market-related competencies.

The current transformation in the food industry worldwide is driven by numerous factors including technology, international market integration and environmental concerns. However, the greatest impact may be due to changing consumer food demand. Consumers today are demanding healthier products, more convenience, and value for money.

Further, the market for pre-packed convenience foods has been showing an increasing trend in the global marketplace. Supermarkets and food manufacturers have been working together to exploit the affluent and increasingly diligent consumers who are running out of time to purchase, prepare, cook and consume their food in traditional ways (Fearne and Hughes nd). Improvements in post harvest handling and processing technology have improved the quality, presentation and shelf-life of fresh-cut vegetables in the marketplace.

In this study, the terms “pre-packed vegetables” and “fresh-cut vegetables” are used interchangeably. There are several definitions for Pre packed and Fresh-cut vegetables today. For example, the USDA and FDA definition for “fresh” and “minimally- processed” fruits and vegetables imply that fresh-cut (pre-cut) products have been freshly-cut, washed, packaged and maintained with refrigeration. The International Fresh-cut Produce Association defines a fresh-cut product as fruits or vegetables that have been trimmed and/or peeled and/or cut into 100% usable product that is bagged or pre-packaged to offer consumers high

nutrition, convenience and flavour while still maintaining freshness.

Fresh agricultural produce is also increasingly being used to perform a more strategic role at attracting and preserving customers' loyalty in various supermarkets both in the Region and abroad. With this trend, two key factors need further examination in the interest of local growers and the retention of market share in the retail chain.

Objectives of the Study

The objective of this study is to identify new market opportunities for small vegetable producers and entrepreneurs in selected Eastern Caribbean countries. The results of this study will provide pertinent data for policy makers as well as provide critical information for farmers who may wish to develop sustainable trading arrangements among marketing intermediaries, convenience food processors, supermarkets and other retail outlets.

Approach to the Study and Methodology

For purposes of this study, two market channels have been identified as potential points of intervention in the fresh cut / pre-packed vegetables distribution channel (Figure 1). In the first instance, the farmer may supply already pre-packaged vegetables directly to the retail centres such as supermarkets or food service providers. In the other, farmers may supply whole vegetables to the processors for further processing.

The approach utilized in conducting the study comprised the following steps:

(i) A desk review of secondary data
(ii) Consumer surveys using a structured questionnaire in St. Lucia, Antigua and St. Kitts
(iii) Field visits and interviews with fresh cut / pre-packed vegetables processors and supermarket operators.
(iv) Discussions with key policy makers in the Ministries of Agriculture, other related public sector agencies and producers/ groups.

The latter served to confirm the findings and to determine the existing policy orientation as well as obtain suggestions for any modifications that may be required to facilitate growth of the sub-sector.

Estimation of the Market Size of the Pre-Packed Processors' Segment of the Vegetable Market

The market size for pre-packed vegetables at the level of the processor refers to the volume and value of the products consumed or expected to be consumed within a specified period[2]. This method of estimation is used by businesses to estimate the actual size or potential size of a particular market. The

[2] HIDD Development Discussion Paper No. 755

measure may be done on the supply-side or the demand-side. In order to arrive at the supply-side estimate for a given period based on official published statistics for a country, the following formula can applied:

$$\mathbf{M_s = P + (I - E) + (So - Sc)}$$

Where:
$\mathbf{M_s}$ = Market size (supply side definition)
P = Production of relevant products
I = Imports of relevant products
E = Exports of relevant products
$\mathbf{S_o}$ = Opening stocks
$\mathbf{S_c}$ = Closing stocks

To arrive at the demand-side market size estimate, the following formula can be applied:

$$\mathbf{M_d = n\ q\ p}$$

Where:
$\mathbf{M_d}$ = Market size (demand side definition)
n = Penetration (number of customers)
q = total volume purchased per customer in period
p = average price paid

This study utilized the supply-side measure at the retail level of the convenience vegetable market segment. Average retail market prices were used to convert volume to value statistics. Volume and price data were collected during discussions with the processors and trade data was sourced from the statistical departments in the various countries as well as online databases.

This simple approach presented above was adopted, given the small number of respondents in some countries and the difficulties experienced trying to determine more functional relationships of demand although this may possess greater predictive capability. The quality of price and trade data available in the study countries was a serious limitation. In this regard, the following assumptions were made:

(i) Average retail prices obtained from the processors were used when available.
(ii) When only wholesale prices were available, a wholesale/retail price spread of 50% was used.
(iii) When it was necessary to estimate the size of the market for mixed vegetables imported from the USA, the f.o.b. prices obtained from the USA export trade database were increased by 240% to include profit margins, freight and taxes/duties in the importing countries.

Market Size Assessment St Kitts and Nevis

The value of the convenience vegetable market segment in St Kitts and Nevis is estimated at USD 550,043 / annum. The most popular convenience-packed vegetables are carrot valued at USD 175,136 or 32%, tomato valued at USD 133,395 or 24%, followed by sweet peppers USD 71,152 or 13% of the market and pumpkin USD 59,898 or 11% (Figure 2). The other popular vegetables are cucumber USD 28,453 or 5% and okra USD 18,985 or 3%. Mixed vegetables, some of which is imported

frozen for enhanced shelf life comprise USD 38,556 or 7% of this market[3]. Lettuce, imported fresh/chilled comprise USD 8,289 or 2% and other vegetables were valued at $16,179 or just about 3% of this market segment.

St Lucia

The value of the convenience vegetable market segment in St Lucia is estimated at USD 5,578,887 / annum. The most popular convenience-packed vegetables carrots valued at USD 252,161 or 44%, spinach *(Basella alba)* valued at $64,254 or 12%, tomato USD 52,097 or 9%, followed by cabbage USD 42,393 or 8% of the market (Figure 3). The other popular vegetables are cucumber USD 33,611 or 6% and pumpkin USD 31,283 or 6% and lettuce USD 26,756 or 5%. A range of other vegetables such as bean sprout, celery and chives are also demanded by this segment, together valued at $55,332 or 10%[4] of total.

Antigua

The value of the convenience vegetable market segment in Antigua is estimated at USD 3,992,519 / annum. The most popular convenience-packed vegetables are tomato USD 1,028,795 or 25% followed by cucumber USD 625,840 or 16% and broccoli USD 555,125 or 14% of the market (Figure 4). Sweet pepper represents 10% of this market or USD 380,728.

Mixed vegetables, (mixtures of cauliflower, broccoli, carrots and snap beans) some of which are imported frozen are valued at USD 590,292 or 15% of the market and lettuce USD 229,506 or just about 6% of this segment. Other popular vegetables are cabbage USD 203,830 or 5% and hot peppers valued at USD 129,509 or 3%. Other vegetables such as spinach and pumpkin are also demanded by this segment, together valued at $124,904 or 3%[5].

RESULTS AND DISCUSSION

Percent of respondents purchasing convenience foods

Seventy four percent (74%) of the respondents from Kitts/Nevis purchased convenience packed pre-packed / fresh-cut vegetables, 59% from Antigua and 53% from St Lucia (Figure 5).

[3] Data Source: Department of Commerce, U.S. Census Bureau, Foreign Trade Statistics

[4] Note: In 2005 St. Kitts/Nevis imported USD 29,478 f.o.b. USA of vegetables (Table 5.2) .From this Total, USD 16,065 of mixed vegetables were imported to satisfy shortfall in domestic production; most of which are chopped and convenience packaged. Additively a range of other vegetables are also imported. See Table 5.1.

[5] Note: In 2005 St. Kitts/Nevis imported USD 29,478 f.o.b. USA of vegetables (Table 5.2) .From this Total, USD 16,065 of mixed vegetables were imported to satisfy shortfall in domestic production; most of which are chopped and convenience packaged. Additively a range of other vegetables are also imported. See Table 5.1.

Consumers Perception about the Price Levels Convenience Vegetables

The prices of vegetables or the cost of added convenience compared to lose vegetables which require sorting and selection are also known to inform the selection or choice process. In this regard, consumers' responses to convenience packed vegetable prices were also investigated. A total of 56% of the respondents expressed the view that the vegetables were more expensive than loose vegetables, 23% said it was "less expensive" and 21% indicated that it was "priced the same" (Figure 6).

Consumers Perception about the Cleanliness of Convenience Vegetable

Respondents were asked about their perception with respect to the sanitation/food safety of fresh lose vegetables compared to convenience vegetables. A total of 42% of the respondents thought convenience pre-packed vegetables were "cleaner and more sanitary" than lose vegetables; 36% considered it to be "no different" while 18% thought they were "less sanitary" (Figure 7).

Consumers Perception about the Food Quality of Convenience Vegetable

Just about 30% of those surveyed perceived that convenience vegetables were prepared from the best vegetables and 23% said that it was produced from spoiling or damaged vegetables (Figure 8). To some extent, the latter response is valid. Some processors indicated that "the good parts of the vegetables are sometimes salvaged to reduce losses". These may be mixed with other vegetables when preparing "mixed- vegetable packs" or even cooked in their in-house deli'.

Consumers Perception about the Health and Nutrition of Convenience Vegetables

When asked to compare the health and nutrition of convenience vegetables compared to lose vegetables, only 11% of the respondents thought that they were "healthier and more nutritious".

A total of 23% of those interviewed in thought these vegetables were not as healthy as the respective whole vegetables and 28% also thought that the pre-packed / fresh-cut vegetables were nutritionally not superior to the lose vegetables (Figure 9).

Consumers Perception about the Level of Added Convenience obtained from Convenience Vegetable

Generally, just about half of the respondents indicated a higher preference vegetables which were "washed and packed whole" (52%), indicating a willingness to pay for the convenience which reduces their effort at sorting and weighing. For

those who prefer a higher level of convenience, a higher preference is shown for the "sliced, mixed vegetable" packs (33%) as shown in Figure 10.

Consumer Loyalty to Locally Produced Convenience Vegetable

Consumers were asked to indicate their preference for the origin of the vegetables. A significant number of consumers were also indifferent with respect to the country of origin of the convenience packed vegetables. 37% did not show any concern about the source, 18% imported and 45% preferred the local vegetables (Figure 11).

Factors that Detract Consumers from Purchasing Convenience Vegetables

Factors which detract consumers from selection are also of major interest to researchers who are seeking to develop the market for certain commodities and products. Addressing these factors can prevent losses and also lead to increased market share. In this regard, consumers were prompted to indicate major factors which influence adverse selection of the convenience foods of interest.

1. **Discolouration** of convenience packed vegetables was the most important deterrent affecting the choice of purchase. Forty nine percent (49%) of the respondents were deterred from purchasing when vegetables were discoloured (Figure 12).
2. **Wilting or dehydration** of the convenience packed vegetables was also an important market concern. Losses of water from the tissues are caused by post harvest stress such as inappropriate storage temperatures and humidity, and may give the impression of lack of freshness. Forty eight percent (48%) of those surveyed expressed concern about freshness (Figure 12).
3. **Residues** on vegetables were analysed – both soil and pesticide residues as these are known to deter consumers from purchasing as they become more aware about health and food safety issues. A total of 44% were concerned about visible "soil and other residues" on convenience packed vegetables. In addition, 43% were concerned about visible pesticide residue (Figure 12).

Results of the Processor Survey

(i) Most of the fresh-cut / pre-packed processing units were located within the supermarkets of the selected countries, with just a few specialized processing units producing specialized, shredded ready-to-use vegetables for the chicken fast-food industry.

(ii) Most of the supermarkets / processors visited expressed a preference for purchasing directly

from farmers and packing the vegetables in-house. This practice allows for appropriate sizing of packages to suit the consumer expressed demand.

(iii) Processors had minimal information on issues such as food safety and quality assurance. In some cases, the processors who were aware of these issues contemplate that responsibility for this lies in the public domain or government agencies.

(iv) Facilities and processing equipment in most cases were rudimentary. Some processors indicated that they need assistance in identifying and sourcing appropriate packaging and processing equipment.

(v) Some operators refrain from wetting vegetables before packing as this is suspected to increase the rate of product deterioration.

(vi) Packaging material typically consisted of styrofoam trays, food grade plastic wrapping and plastic bags. The use of modified atmospheric packaging has not been employed as yet to enhance the shelf life of the vegetables in the countries being studied.

(vii) The issue of tracability has not been highlighted as a major issue in the pre-packed / fresh cut vegetable convenience foods industry. All processors indicated they have records or would be aware of source of supplies.

(viii) Maintenance of freshness and shelf life of products remains a major concern. The use of humidifiers in display chillers was uncommon and this may accelerate the rate of dehydration of fresh, lose vegetables.

(ix) The use of refrigerated vehicles for transporting convenience vegetables was rare. Entrepreneurs however used the cooler hours of the day when transporting vegetables.

(x) Formal contracts for the supply of vegetables in all countries of the study were not widely used. Further, where contracts were used, getting farmers to honour them remain problematic.

(xi) Stir fry and / or mixed vegetables have been exhibiting an increasing level of acceptance across countries.

(xii) The study found that fresh vegetables which have been bagged as well as those which have been chopped in various sizes, or shredded, and sometimes mixed with other types of vegetables compete in the marketplace with those (some of which are frozen for extended shelf life) which have been imported to satisfy shortfalls and/or deficit in supply.

Summary

Globalization and trade liberalization have been increasing the volume and variety of convenience vegetables available year-round. Regional producers are facing increasing

competition and this is expected to intensify in the future. In this regard, all facets of competitiveness must be addressed in order to compete successfully.

Based on this study, several important indicators for the continued growth of the convenience vegetables segment and obstacles that must be addressed for small farmers to exploit the opportunities offered by this sector in the region have been identified. Given the importance of price in the purchase decision of consumers in the Region, effort must be made to insure that locally produced convenience vegetables are competitively priced. So too, consumers were also concerned about sanitary / food safety factors such as discolouration, residues and post harvest handling. On the other hand, consumers showed a high preference for locally produced vegetables vis a vis imported when used in convenience food packages. This offers an opportunity for exploitation by vegetable farmers in the Region. In this regard, marketing campaigns should also take this factor into consideration and work to further nurture such allegiances.

Producers will face the challenge of ensuring year-round production, competitive prices and high quality. Thus, appropriate infrastructure such as those for irrigation, drainage, water and temperature control as well as appropriate varieties and new agronomic practices are critical for retention of market share.

Business Opportunities

Business opportunities exist in areas of vegetable production, procurement and supply from growers and imports, packing and fresh-cut processing, supply of packaging and other material including processing equipment. In addition, opportunities also exist in areas of training, quality assurance, agronomy and management / control, wholesale and retail sales. The structure of the industry allows for free entry and exit; however scale of operation may be an important determining factor. The processors also identified some critical factors that impact on the success and expansion of the industry:

- Guaranteed and steady supply year-round at competitive prices
- Honouring of contracts and/or supply relationships
- High quality vegetables, free of soil, pesticides and other residues
- Sturdy packages to prevent post harvest loses and to increase shelf life
- Attractive and appropriately labelled packaging to effectively compete with imported brands
- Vegetables must always be delivered fresh, should be graded and standardized

The climate in the Region can permit successful agronomy of many of the vegetables currently being imported. The range of vegetables included in various “Mixtures of Vegetables”

should also be examined in this regard. Based on this study, okra, cabbage, tomato, carrot, cauliflower, broccoli, sweet pepper, lettuce (Romaine), spinach (*Basella alba* and *Amaranthus spp*) shows potential for further development within the short term.

Should producers wish to grasp and retain this opportunity, they should follow approved Crop Protocols to address the quality and food health and safety of vegetables that enter the convenience vegetable segment.

REFERENCES

Cut for Convenience. Consumer trends in Fresh Produce Consumption. http://www.seedworld.com/sw/index.cfm?powergrid=rfah=%7Ccfap=&CFID=85064&CFTOKEN=50738258&fuseaction=showArticle&articleID=4778

Fearne, A., David Hughes., Food Industry Management., Wye College, University of London., Success Factors In The Fresh Produce Supply Chain: Insights From The UK. Insight from Industry (Supply Chain Management, Vol.4, No.3).

Mott, W. P., Flavio Feferman, David Webster and Vincent Malazita. Fresh Cut Vegetable Processing: Market Opportunities in Panama, Mexico, Honduras, Jamaica and Costa Rica. USDA. 1998

Safety Guide Proposed for Growing Fresh-cut Produce Market., Article dated: 09/03/2006 Available on the Internet. Date Visited, April 2006. http://www.foodqualitynews.com/news/ng.asp?n=66341-food-safety-fda-produce

S. Nicola, E. Fontana, C. Torassa, J. Hoeberechts. 2005. Fresh-cut Produce: Postharvest Critical Issues, www.actahort.org/books/712/712_23.htm

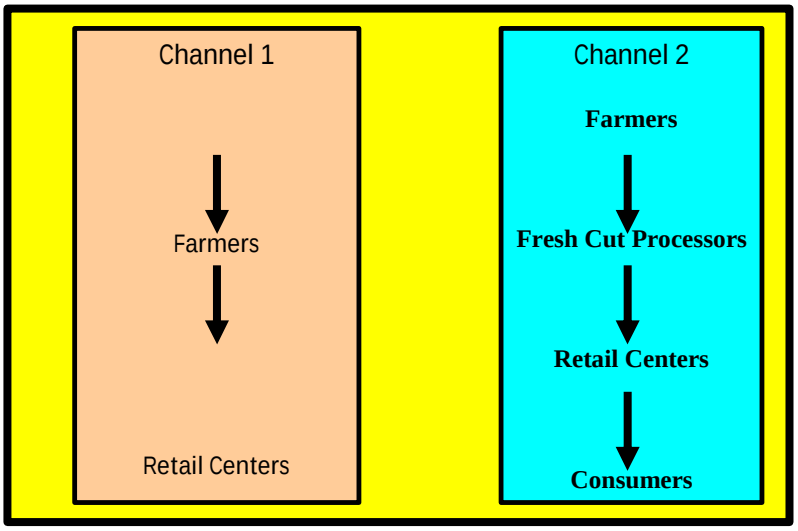

Figure 1: Market Channels for Fresh Cut / Pre-packed Vegetables in the OECS

Source: Compiled by author

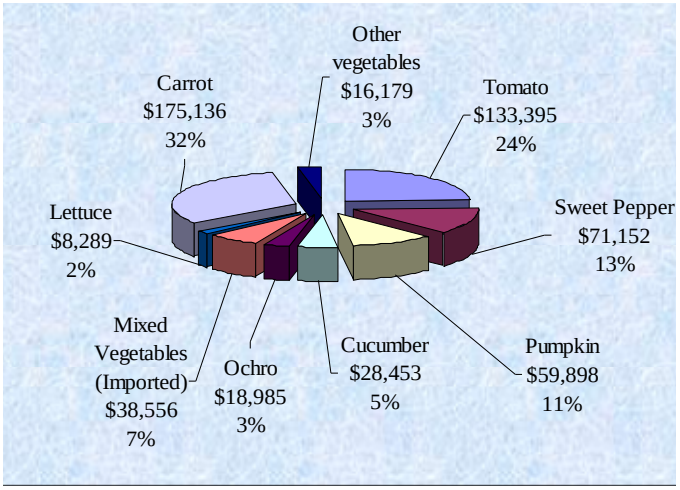

Figure 2: St Kitts & Nevis Convenience Vegetables Segment Market Share - Percent of Total and Value 2006 (USD)
Source: Compiled by author

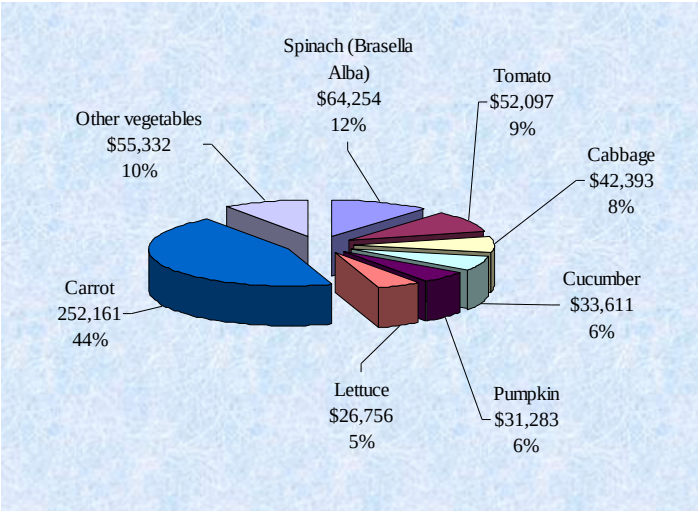

Figure 3: St Lucia Convenience Vegetables Segment Market Share - Percent of Total and Value 2006 (USD)

Source: Compiled by author

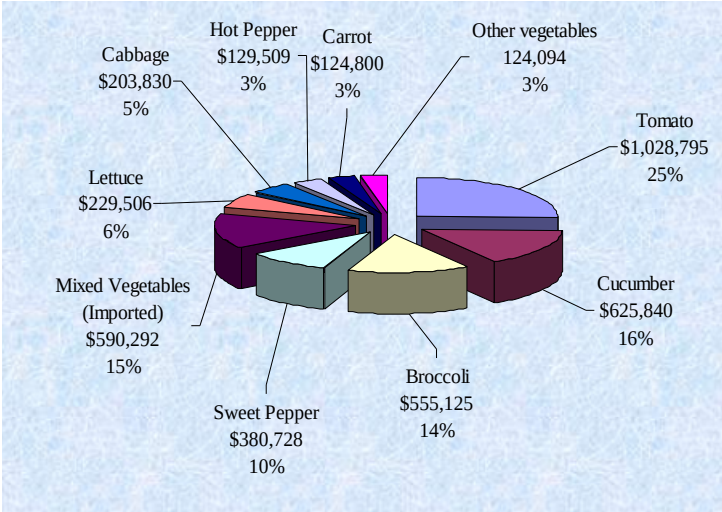

Figure 4: Antigua Convenience Vegetables Segment Market Share - Percent of Total and Value 2006 (USD)
Source: Compiled by author

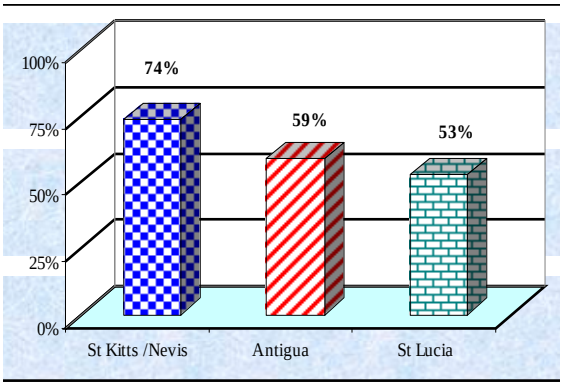

Figure 5: Percent of Survey Population which Purchase Pre-Packed / Fresh-Cut Vegetables (2006)

Source: Compiled by author

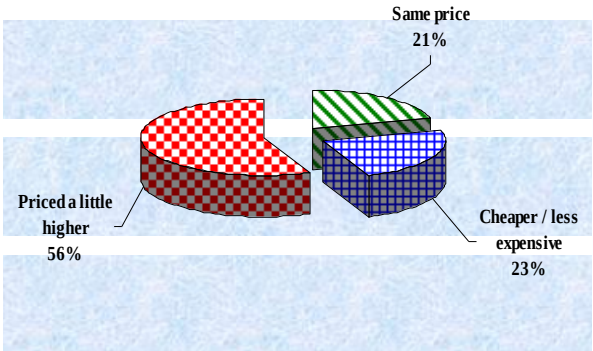

Figure 6: Eastern Caribbean Convenience Foods Consumer Survey Perception about Selling Prices of Processed Vegetables (2006)

Source: Compiled by author

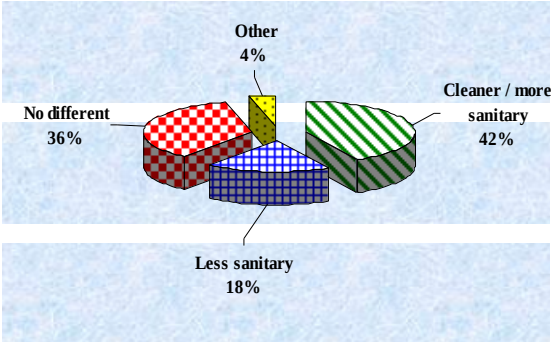

Figure 7: Eastern Caribbean Convenience Foods Consumer Survey Perception about Food Safety of Processed Vegetables (2006)

Source: Compiled by author

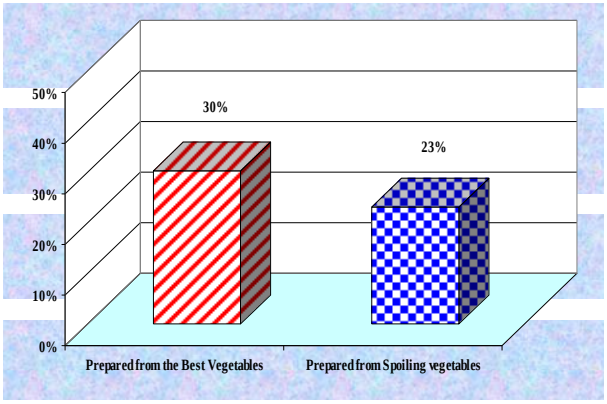

Figure 8: Major Drivers that Inform the Selection / Purchasing of Pre-Packed / Fresh-Cut Vegetables

Source: Compiled by author

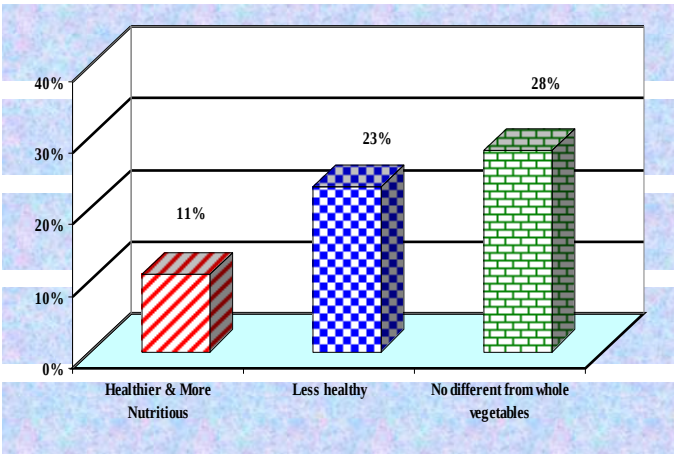

Figure 9: Major Drivers that Inform the Selection / Purchasing of Pre-Packed / Fresh-Cut Vegetables - Consumer Perception about Quality

Source: Compiled by author

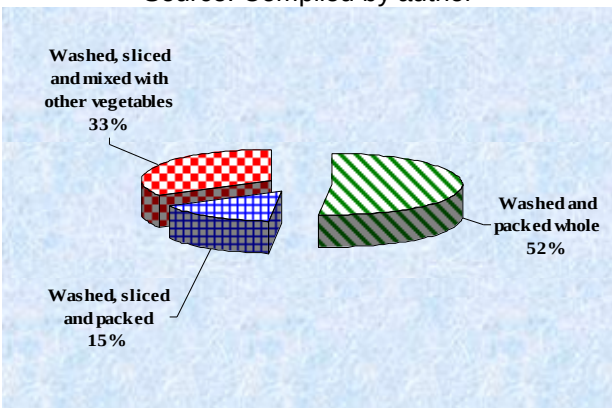

Figure 10: Eastern Caribbean Convenience Foods Consumer Survey Preferred Level of Vegetable Processing (2006)

Source: Compiled by author

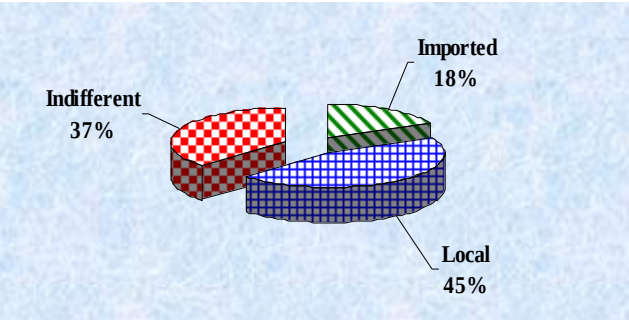

Figure 11: Eastern Caribbean Convenience Foods Consumer Survey Preferred Source of Origin of Processed Vegetables (2006)
Source: Compiled by author

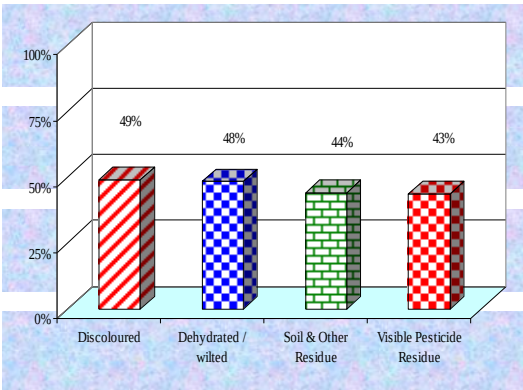

Figure 12. Major Deterrents - % of Sample Population which do not Purchase Pre-Packed / Fresh-Cut Vegetables which Display the following Characteristics.
Source: Compiled by author