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**AARES National Conference 2010 – Adelaide Convention Centre, Feb 10-12.**

**Long-Distance Marketing of Sweet Potato from the Highlands of Papua New Guinea: An Analysis of Consumer Preferences and Supplier Responsiveness.**

Norah Omot, John Spriggs and Christie Chang

# **Long-Distance Marketing of Sweet Potato from the Highlands of PNG: An Analysis of Consumer Preferences and Supplier Responsiveness.**

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## **Abstract**

Sweet potato is by far the most important staple food in Papua New Guinea. While much is consumed as a subsistence crop, it is also an important income earner for many small holder farmers in the Highlands of PNG. Of the Highlands sweet potato sold, about 90 percent is traded informally on open markets, locally or in coastal urban markets. Data from a consumer survey, from an informant interview of highlands suppliers and from consumer and supplier observations at the Lae market (the largest coastal urban market for sweet potato) was used to explore the extent to which Highland sweet potato in the coastal urban market of Lae, may be considered a differentiated product. As a staple food being sold on informal markets one may think it is best represented as an undifferentiated commodity. On the other hand, there are many different varieties as well as different offerings (e.g. heap sizes, washed/unwashed and Highland/Lowland) which suggest some product differentiation characteristics. Results suggest that consumer preferences in the Lae market are sophisticated and preferences are highly differentiated. It was also found that Highland suppliers do have some appreciation of the consumer preferences in the Lae market. However, it is also apparent that suppliers do not know how to differentiate their product to effectively meet demand and hence they are not very customer-responsive. The implications are that there is considerable potential to improve marketing strategy and management to take advantage of sophisticated consumer preferences.

**Keywords** Consumer preferences, differentiated product, Highland suppliers, supplier awareness, supplier responsiveness, marketing strategies, Lae.

## **Introduction**

Sweet potato is an important staple food in Papua New Guinea both in terms of production and consumption. Production and consumption occurs throughout the country, but the main areas of concentration are five Highland provinces (Eastern Highlands, Chimbu, Western Highlands, Enga and Southern Highlands) in the Highlands region. Around 2.9 million tonnes of sweet potato is produced in PNG every year and 75 percent of the total production occurs in the Highlands region (Bourke and Vlassak 2004). Most of the sweet potatoes produced are used for home consumption and animal feed but many households will produce excess for the market to supplement their income.

For farmers in rural highlands, sweet potato has become a good source of income for many and there are a growing number of small-holder commercial growers who produce sweet potato primarily for the market. Sweet potato is most often sold on local and roadside markets, but returns to farmers are low because of excess supply in the highlands. Long distance marketing (from highlands to coastal cities) appears to

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be more profitable, but there many issues. Both opportunities and constraints exist for long distance marketing. Opportunities exist because of strong demand due to increasing urbanisation, particularly with large number of immigrants from the highlands for whom sweet potato is the main staple and declining value of kina, which makes sweet potato competitive to other staple food, particularly rice. Constraints exist because of a long, fragmented supply chain, implying quality deterioration (due to transport disruptions and multiple handling) and poor communications between buyers and suppliers (in general though there are few exceptions). Poor communication is due to lack of coordination in the supply chain.

Previous development work (e.g. Menz 1989; Spriggs and Chang 2007) treated sweet potato as an undifferentiated commodity. Anecdotal evidence suggests it may be differentiated in the minds of consumers in terms of different varieties, and different physical and eating characteristics. To the extent that this is true, there are opportunities for gaining higher incomes through product differentiation.

It is argued in both economic and marketing literature that consumer preferences and purchase decisions are influenced by many factors (Schiffman et al. 2002; Moon et al. 2002; Concepcion et al. 2004; Kotler et al. 1994; Schaffner et al. 1998; Lancaster 1966) and an understanding of those factors will help suppliers to be customer responsive. It provides the basis for product differentiation. This is important in the case of sweet potato in Lae as this market is quite complex. There are different varieties, different offerings (quality, heap size, tuber size) and many close substitutes (lowland sweet potato, cooking banana, taro, cassava). In addition, there is an absence of grading and quality standards for sweet potato in PNG, which also makes it very difficult to ascertain just what product attributes or characteristics of sweet potato consumers prefer and value. Farmers who want to supply according to customer preferences (i.e. be demand driven) will find it difficult to do so. But on top of this, there is the question of whether suppliers are even focussed on customers' needs. An investigation based on a study on long-distance peanut marketing from Lae to Port Moresby suggests that farmers may be more supply-driven than demand-driven (Omot et al. 2005). That is, they supply what they are good at producing or what accords to their own preferences, rather than what the market wants.

Anecdotal evidence also suggests that consumers sometimes have difficulty identifying the varieties they like at the market because Highlands-grown sweet potato are often covered with dirt and are not labeled. Many of the varieties have very similar characteristics for example, skin colour and flesh colour, which are difficult for consumers to identify because suppliers do not provide adequate information on those varieties. If this is indeed the case, sweet potato may need marketing strategies that are associated with differentiated products (e.g. price, product, promotion, place) than those associated with commodities (i.e. cost minimization). Hence, it is hoped that the findings of this study would be useful for scoping out market segmentation and marketing strategy for Highland-grown sweet potato sold in Lae.

The main research questions of this study were (i) to what extent is sweet potato considered a differentiated product by consumers in Lae? and (ii) are Highlands-based suppliers of sweet potato customer focused? And if they are, to what extent are they responsive to consumer requirements in Lae?

## **Study areas and their characteristics**

The main study area is Lae which is located on the West Coast of Papua New Guinea and is the capital of the province of Morobe. It is the second largest city of PNG. Lae is an industrial city that connects to the highlands-hinterland of PNG by a national highway. It has an estimated population of 120,000 people, which is about 2 percent of the population of PNG. It is a multicultural city because of its central location. Most of the sweet potato sold in Lae comes from the Highlands provinces and more than 90 percent of the volume is sold in open markets. The open markets in Lae includes a large central market run by the city council and several smaller markets including roadside markets, which are within as well as in the periphery of the city. Nearly all the local people in and around the city buy their sweet potato from the open markets. Sweet potato can also be found in the supermarkets, but the volume is small with limited selection in terms of variety.

The other study areas were Mt Hagen and Goroka which are the main centres for sweet potato growing in the Highlands. Mt Hagen is the capital of Western Highlands Province and is located in the central northern hinterlands of PNG. It has an estimated population of 45,000 people. It is the largest producer of sweet potato in the country and is also the largest supplier of sweet potato to the Lae markets. Goroka is the capital of Eastern Highlands Province and is located in the central hinterland of PNG. It has an estimated population of 30,000 people. It is the second largest producer of sweet potato in the country and is also the second largest supplier of sweet potato to the Lae markets.

## **Methodology**

To answer the research questions, a number of data collection exercises were pursued. All data collections were done between January and March, 2009. Firstly, primary data were collected from questionnaire survey of consumers in Lae. Samples for the survey were selected from women groups – both from church groups and social groups and convenience sampling was used to select samples for the survey. Seven women groups were contacted and 90 usable questionnaires were obtained. The questionnaire had four sections from which information were sought as follows:

- A - consumer preference for sweet potato and other staple food.
- B - consumer preference for sweet potato characteristics.
- C - sweet potato information at the market.
- D - demographic information.

Consumer responses were statistically analysed using SPSS.

Secondly, primary data were collected on key supplier informants. A total of 15 suppliers were selected to provide in-depth information on the marketing behaviour and practices of the suppliers. This is because the number of suppliers involved in long distance marketing is quite small and they are scattered in rural communities.

The questionnaire used in the interviews had five sections from which information was sought, as follows:

- A - supplier preferences for varieties.
- B - supplier perceptions of consumer preferences.
- C - accessing and communicating information.
- D - strategies for marketing sweet potato.
- E - demographic information of suppliers.

Supplier responses were statistically analysed.

Thirdly, primary data were collected from consumer and supplier observations at the Lae main market. For the consumer observation study, the population considered were the urban families in Lae. Samples were selected from the buyers who had gone to buy sweet potato at the market during the observation days. The observations took about 10 minutes each. A total of 132 observations were made. An unstructured observation data sheet was used to collect data on what consumers were buying and whether they seek information about what they were buying.

For the supplier observation study, the population considered were the Highlands suppliers who were at the Lae market and engaging in the selling of sweet potato. Three observations were made per day, on various days over two weeks. An unstructured observation data sheet were used to collect data on who was selling at the market, what they were selling, the price they were charging, how they were promoting their sweet potato at the market and whether sweet potato was sold in bags to buyers who would be selling in other markets. Data from the observation studies were analysed statistically.

## **Discussion of Results**

The main question to be addressed with respect to preferences for sweet potato is whether there are significant differences in perceptions for different offerings of sweet potato. Do consumers treat sweet potato as an undifferentiated commodity or not? And if not, how is it differentiated? These are explored in the following sections, beginning with a discussion on whether sweet potato is differentiated by area of production.

### *Is Highland-grown sweet potato differentiated from other types of sweet potato?*

Since we are interested in this research in Highland-grown sweet potato, the most logical point of difference to explore is whether consumers in Lae differentiate between sweet potato from the Highlands and that grown in Lowland areas.

In fact we found strong points of difference in preference for Highland-grown sweet potato. This is presented in Table 1, where the table shows Highland-grown vs Lowland-grown sweet potato and the preference of consumers. The figures represent the responses of consumers.

**Table 1. Preference for Highland-grown vs, Lowland-grown sweet potatoes**

<b>Preference of consumers (N=90)</b>	<b>Highland-grown</b>	<b>Lowland-grown</b>
Preference for Sweet Potato Type (%)	70	30

Results show that 70 percent of consumers indicated a preference for Highland-grown sweet potato compared to 30 percent of consumers who indicated preference for Lowland-grown sweet potato. This point of difference in preferences allows us to clearly conclude that Lae consumers do have differentiated preferences for sweet potato.

Having established that there is a significant preference for Highland-grown sweet potato, the next thing to explore is the differentiation of sweet potato by product characteristics.

#### *Differentiation by product characteristics*

In this section, the extent of product differentiation by physical and eating characteristics is explored. From the results, it was found that there were significant points of differences in consumer preference for the characteristics. From a market strategy perspective, it is proposed to categorise those characteristics into 3 categories. The 3 categories include:

1. *Single market characteristics.* These are characteristics that are generally preferred by consumers and which could probably be selected for with no need to consider market segmentation. They include taste (sweet) and surface (smooth).
2. *Segmented market characteristics.* These are characteristics for which 2 or more sizable market segments exist and hence which support a strategy of market segmentation. They include: cleanliness (washed/unwashed), shape (long/round), texture (powdery/non-powdery), flesh (yellow/orange).
3. *Segmented major/niche market characteristics.* These are characteristics which may support a strategy of market segmentation to target a major market segment and a niche market segment. They include: maturity (*major-mature/niche-immature*), firmness (*major-firm/niche-soft*), size (*major-medium/niche-small*), skin (*major-red/niche-white*), and flesh (*major-yellow, orange/niche-white*).

The results of the consumer survey on preferences for product characteristics and the proposed categories are presented in Table 2. Column 1 lists those characteristics about which consumers might show a preference. Column 2 indicates the particular preferences as exhibited by 80 percent or more of consumers surveyed. The characteristics in Column 2 are categorised in the category *single market characteristic*. These are the characteristics that the majority of consumers indicate they want so all sweet potato should have those characteristics. It also indicates areas where marketing strategists may well wish to focus their attention on product development. For example, the most desirable eating characteristics are sweet, firm and powdery.

Columns 3 and 4 indicate preferences of secondary and tertiary importance respectively by consumers. Some characteristics in Columns 3 and 4 are categorised under the category *Segmented market characteristics* while others are categorised under the category *Segmented major/niche market characteristics*. Secondary preferences were those exhibited by 50 to 80 percent of consumers surveyed. While the tertiary preferences were those exhibited by 20 to 49 percent of consumers surveyed.

Further analysis of consumers having secondary and tertiary preferences may yield important niche market segments. Hence they may form the basis for product development of sweet potato catering for these preferences and the associated niche markets.



**Table 2. Categories of sweet potato characteristics, according to preferences of consumers**

<b>Characteristics</b>	<b>1<sup>st</sup> Preference (≥80% of consumers)</b>	<b>2<sup>nd</sup> Preferences (50-80% of consumers)</b>	<b>3<sup>rd</sup> Preference (20-49% of consumers)</b>	<b>4<sup>th</sup> Preference (&lt;20% of consumers)</b>
Region of Production		Highland-grown (70%)	Lowland-grown (30%)	-
Physical - Flesh Colour - Skin Colour - Tuber Size - Tuber Shape - Surface Appearance - Maturity of Tuber - Cleanliness of Tuber	- - - Smooth (83%) - -	Yellow flesh (45%) Red skin (49%) Medium size (58%) Long shape (64%) - Mature 73% Washed (47%) Unwashed (53%)	Orange F (32%), White F (23%) White skin (20%), Small size (24%) Round shape (36%) - Less mature (27%) -	- Y-B/W <sup>††</sup> (18%), B/O <sup>†</sup> (7%), Pink (6%). Large size (17%) - Rough surface (17%) - -
Eating - Sweetness - Taste - Firmness - Internal Texture	Sweet (97%) Good taste (97%) - -	- - Firm (77%) Powdery (69%)	- - Soft (23%) Non-powdery (31%)	Non-sweet (3%) Poor taste (3) - -

Note: \* - B/W = Brown/White.

† - B/O = Brownish Orange

†† - Y-B/W = Yellowish Brown/White

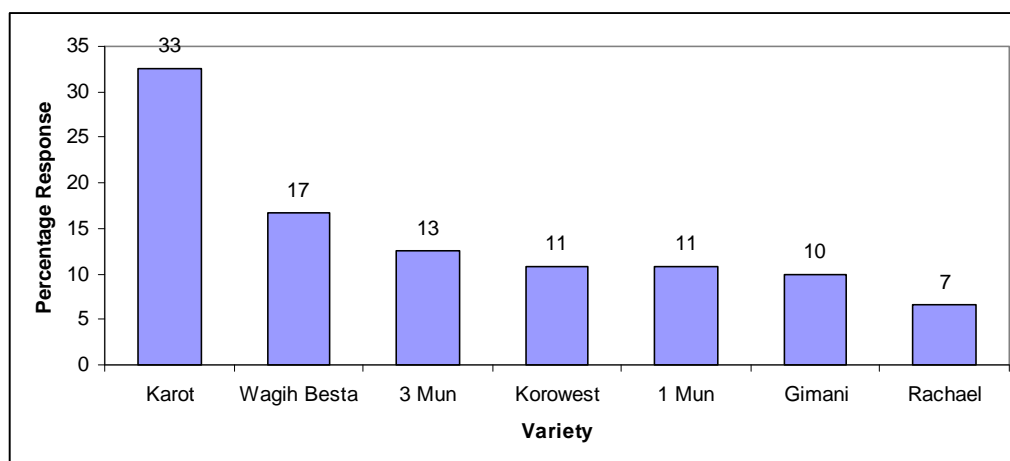
Having established that there were significant points of differences in consumer preferences for characteristics, the next thing to explore is whether suppliers are aware of consumer preferences. Gaining an understanding of consumers preferences may be useful in devising marketing strategies.

*Extent to which suppliers are aware of consumer preferences for variety*

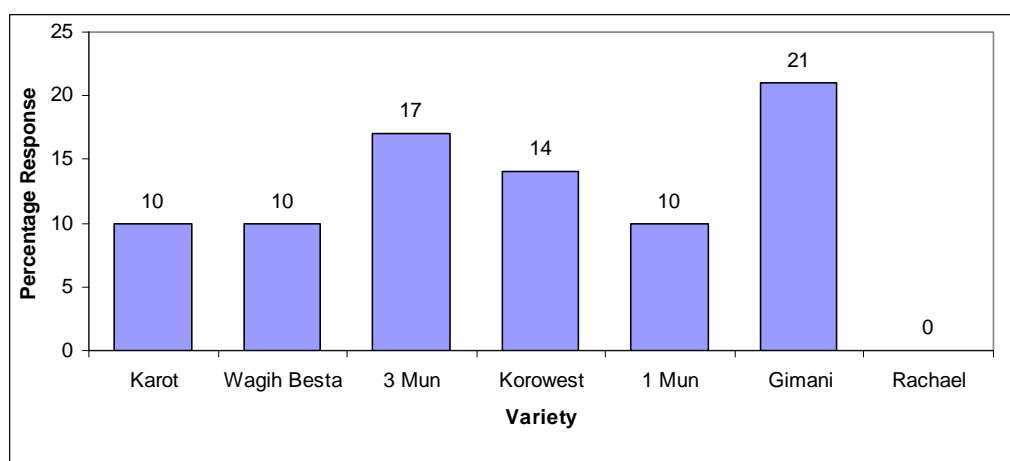
This analysis begins by making comparison on the basis of what consumers and producers say about consumer preferences (using “mirror image” questions in the consumer and supplier surveys).

Figures 1a and 1b show the varieties that consumers say they want and varieties that suppliers say consumers want, respectively. Responses are presented in percentage against each variety.

**Figure 1a. Sweet potato varieties consumers in Lae say they want.**



**Figure 1b. Sweet potato varieties Highlands suppliers say consumers in Lae want.**



Results suggests that Highland suppliers only have a modest awareness of varieties consumers in Lae want and there is a considerable mis-match of preferences, for example, the variety Karot which appeared to be the most important on the consumers list (Figure 6.1a) is considered by the suppliers interviewed (Figure 6.1b) to be of only

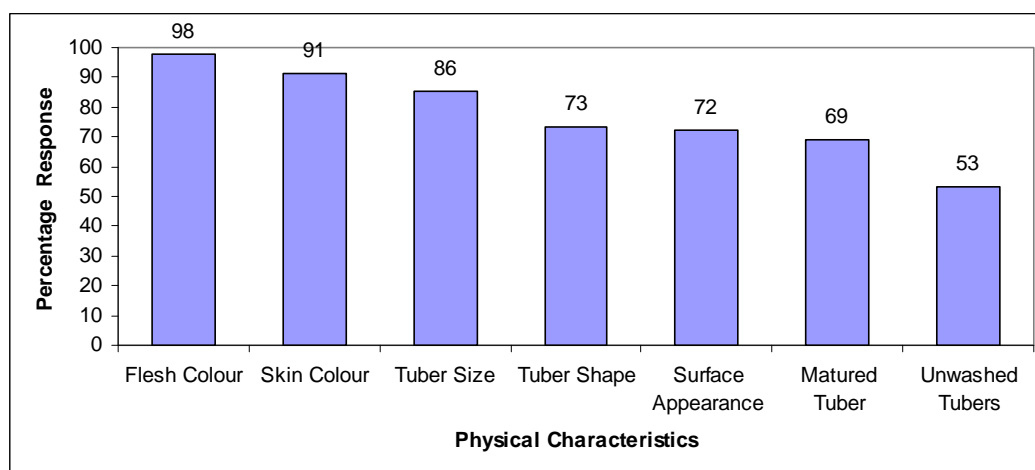
minor importance to consumers. Consumers also indicate they want variety Rachael, however the suppliers did not mention Rachael at all, as being preferred by consumers. On the other hand, varieties Waghi Besta, 3-Mun, Korowest and 1-Mun were indicated as important by consumers, and these varieties were also mentioned as important varieties that Highland suppliers think consumers want.

The next two sections explore the interviewed suppliers' awareness of consumer preferences for physical and eating characteristics.

*Extent to which suppliers are aware of consumer preferences for physical characteristics*

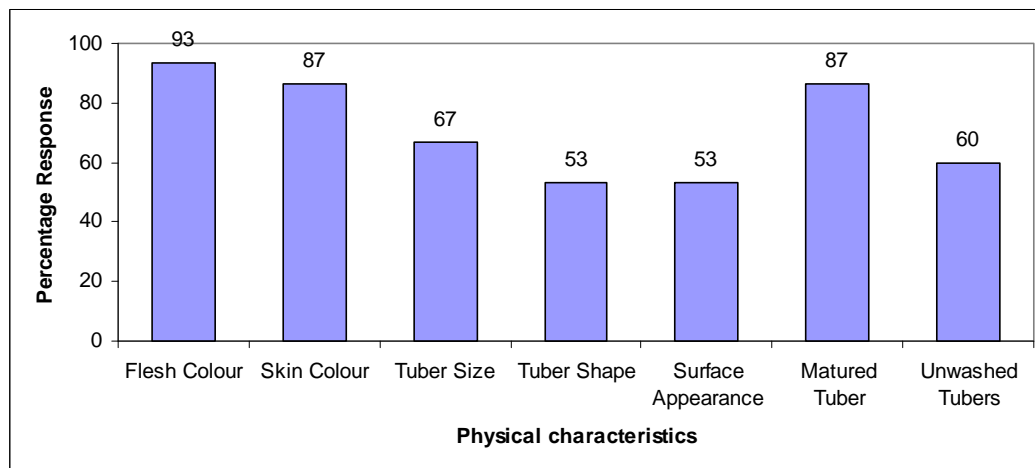
In this section, a comparison will be made on the basis of what consumers and the interviewed suppliers say about preference for physical characteristics. The comparison is made between Figures 2a and 2b. The figures show the different physical characteristics of sweet potato and corresponding responses from consumers and suppliers, respectively. Their responses are given in percentages.

**Figure 2a. Physical characteristics of sweet potato that consumers in Lae say they want.**



Note: There were multiple responses. Some consumers indicate preference for more than one characteristic.

**Figure 2b. Physical characteristics of sweet potato that Highland suppliers say consumers in Lae want.**



Note: There were multiple responses. Some consumers indicate preference for more than one characteristic.

Comparing the results in Figures 2a and 2b, it appears there is some awareness by Highland suppliers of product characteristics that consumers in Lae want. In particular, two most important physical characteristics indicated by consumers (flesh colour and skin colour) are also seen by the suppliers as being the most important to consumers. However, what they identified as the third most important characteristic to consumers (matured tubers) is in fact listed low on the consumers list. Tuber size was mentioned by suppliers as being the fourth most important characteristic to consumers, whereas, in fact, consumers ranked it as third most important.

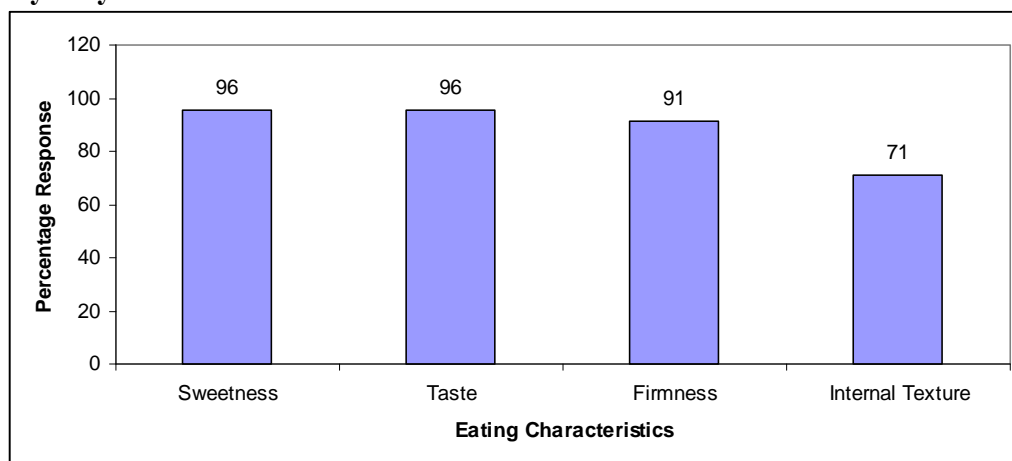
It appears therefore that, suppliers have some awareness on consumer preferences for physical characteristics but their perceptions on some characteristics clearly do not match what consumers say they want.

The next section explores suppliers' awareness of consumer preferences for eating characteristics.

*Extent to which suppliers are aware of consumer preferences for eating characteristics*

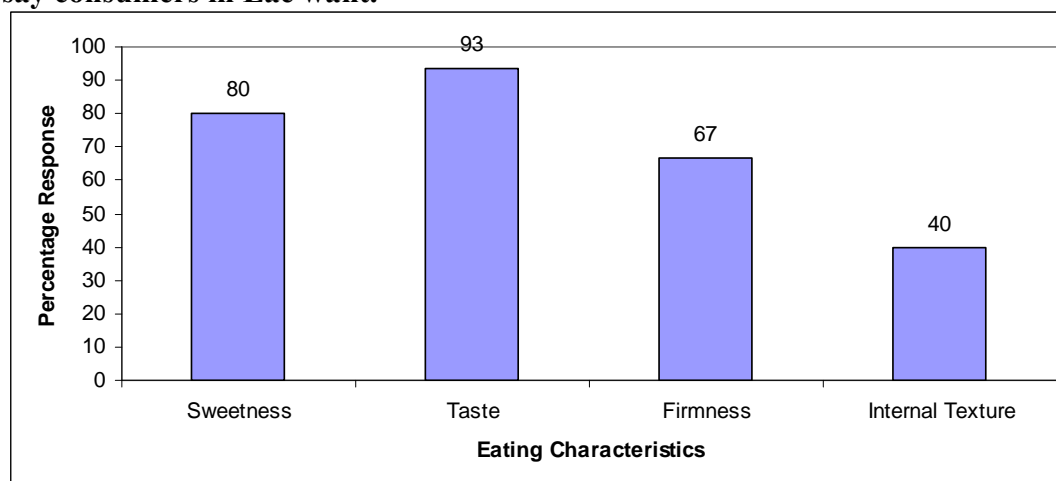
In this section, a comparison will be made on the basis of what consumers and suppliers say about consumer preferences for eating characteristics. The comparison is made between Figures 3a and 3b. The figures show the different eating characteristics of sweet potato and corresponding responses from consumers and suppliers, respectively. Their responses are given in percentages.

**Figure 3a. Eating characteristics of sweet potato that consumers in Lae say they want.**



Note: There were multiple responses. Some consumers indicate preference for more than one characteristic.

**Figure 3b. Eating characteristics of sweet potato that Highlands suppliers say consumers in Lae want.**



Note: There were multiple responses. Some consumers indicate preference for more than one characteristic.

Comparing Figures 3a and 3b, there appears to be some awareness by Highland suppliers, of eating characteristics that consumers in Lae want. For example, the two most important eating characteristics that consumers say they prefer in sweet potato are sweetness and tastes (Figure 3a).

Those characteristics are also ranked very highly by suppliers, in terms of what they think consumers want (Figure 3b). However, suppliers ranked taste higher than sweetness, while consumers consider sweetness to be as important as taste. Both consumers and suppliers ranked 'firmness' as third in order of importance. However, consumers gave it a much higher preference rating (91%) than was given by suppliers (67%).

It appears therefore that, suppliers have some awareness on consumer preferences for physical and eating characteristics for example, consumers stated preferences for flesh colour, skin colour and taste, closely matches the perceptions of suppliers regarding those characteristics. Thus, there are opportunities to develop strategies targeting those characteristics.

Having explored supplier awareness of consumer preferences in this section, in the next section, supplier responsiveness to consumer preferences will be explored.

#### *Supplier responsiveness to consumer preferences*

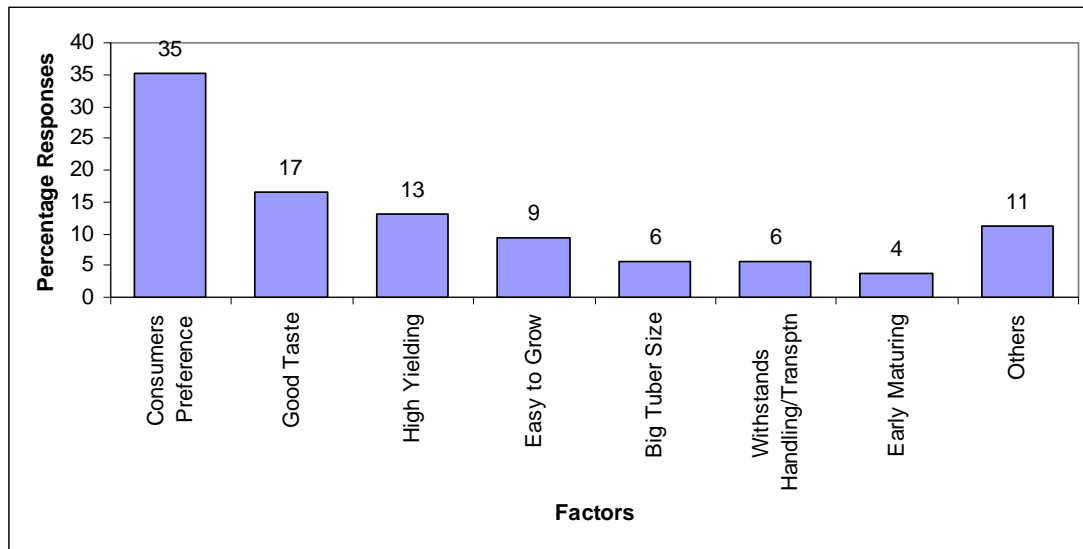
While supplier awareness of consumer preferences is important, responsiveness to these preferences is even more important if the suppliers are to maximise returns from the Lae market. In this section it is proposed to explore the question of responsiveness from two perspectives: the suppliers and the consumers. These are discussed next.

- *Responses from the supplier perspective*

To gain insight into the question of responsiveness from the suppliers’ perspective, this section undertakes to explore their selection of variety and their marketing strategies.

Suppliers were asked to indicate the factors influencing their decisions on what varieties to grow for the market. Their responses are presented in Figure 3. The figure shows the different factors that influence suppliers’ decisions and their responses against each factor.

**Figure 4. Factors influencing suppliers’ choice of varieties for the Lae market.**



From Figure 4 it is clear that suppliers believe they are customer responsive. “Consumer preference” was given as the single most important factor that motivated their selection of varieties for the Lae market. Given this, perhaps it can be said that suppliers intend to be customer responsive. The real question however, is, to what extent are they actually customer responsive? This question is explored further in subsequent sections.

To determine the extent to which suppliers are actually responsive to consumer preferences, this section analyses the strategies in which they engage in marketing sweet potato. The strategies are presented in Tables 3. The table shows the different marketing strategies and how suppliers use them in their attempt to respond to consumer preferences.

**Table 3. Strategies suppliers use when selling their sweet potato in Lae (N=15).**

Strategies	What Suppliers Do
1. Product	Bringing quality sweet potato every time to the market (1 Supplier)
2. Price	Offers low price by selling bigger heaps than other sellers (4 Suppliers); Offers discounts (4 Suppliers)
3. Place/ Distribution	Sells in bag (4 Suppliers); Sells in bags to black marketeers (1 Supplier); Sells to Port Moresby middlemen (1 Supplier); Sells to <i>kaibars</i> (1 Supplier); Get a good spot at the market (1 Supplier)
4. Promotion	Cuts sweet potato (9 Suppliers); Call out name of variety (8 Suppliers); Call out where sweet potato is from (6 Suppliers); Being friendly to customers (5 Suppliers); Telling customer about sweet potato variety, characteristics (4 Suppliers); Call out price (2 Suppliers); Shows skin colour (1 Supplier); Cuts bag to show sweet potato to customers (1 Supplier)

From the results, it appears that suppliers are attempting to be customer responsive by carrying out some product differentiation. For example, they are attempting to meet consumers need for quality, they attempt to maximise on product attributes (especially varieties and physical characteristics) through promotions such as calling out variety name, they attempt discount pricing, they attempt promotion strategies (involving direct marketing) and placing of products by selling to intermediaries. Whilst this is good, suppliers are found to be doing this on an individual, uncoordinated, fragmented and haphazard basis. There is no evidence of a coordinated approach, (e.g. using grades and standards, branding and labelling of products), mentioned by other researchers (Stanton et al. 2005; Ubilava et al. 2008; Kotler et al. 1994).

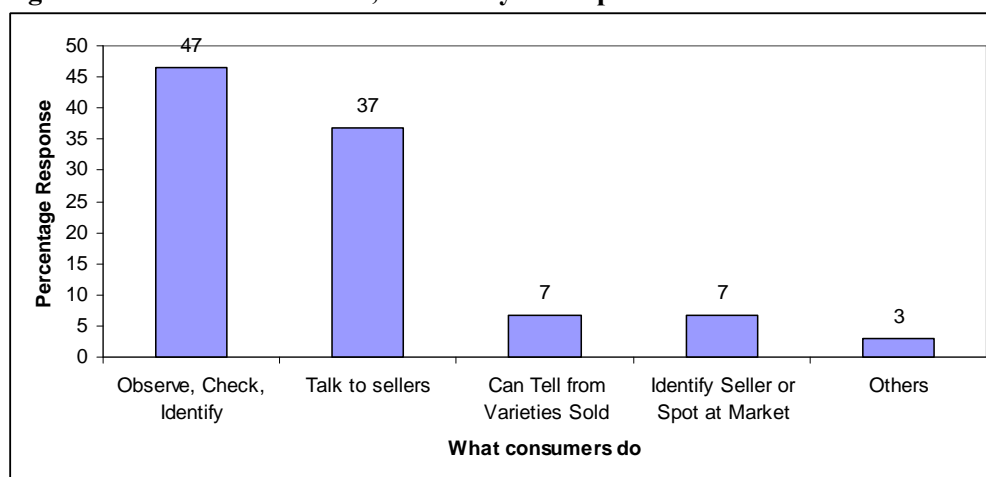
It appears that suppliers' attempts at addressing consumers' preferences (which are found to be sophisticated) are minimal. The extent to which suppliers are actually customer responsive is explored further in the next section, from the perspective of consumers.

- *Supplier Responses from the consumers' perspective*

To gain insight into the question of supplier responsiveness from the consumers' perspectives, consumers' experience in terms of search costs and need for information at the Lae market is explored. Presumably, the greater the responsiveness of suppliers to consumers' preferences, the lower will be their search costs at the Lae market, for sweet potato meeting their particular requirements.

Consumers were asked to express in their own words, what they do when searching for sweet potato at the market. Their responses are presented in Figure 5. The figure shows what consumers do to identify sweet potato they like at the market and their responses on each activity, which is presented in percentage terms.

**Figure 5. What consumers do, to identify sweet potato at the Lae market.**



Results shows that a large number of consumers (47 percent) had to walk around to check, identify and compare sweet potato before they buy, which is frustrating to those who have less experience with the varieties that are on offer, and who must spend so much time to identify what they want. This suggests that the way sweet potato is currently presented at the market makes it difficult for consumers to identify sweet potato they like. The marketing implication of this finding is that, strategies should be developed in relation to product presentation.

It was found that many non-highlanders do not know the name of the varieties that are sold at the market. They identify sweet potato by attributes such as flesh colour, skin colour and place of production. In addition, many of the consumers (37 percent) indicate they talk to sellers to find out more about the sweet potatoes that are on offer. They ask about variety, characteristics, and production area. The single most important thing that consumers were found to ask suppliers about is variety.

Given the high search cost to consumers, they were asked to explain in their own words, what type of information they require to reduce their search. Their responses are presented in Table 4. The table shows the type of information consumers want, the number of consumers expressing the request and details of each information required.

Nearly 40 percent of the consumers interviewed indicated they want additional information to be provided by suppliers. The single most important information that consumers want is on varieties and characteristics.



**Table 4. Additional information that consumers of sweet potato in Lae indicate they want, in-order to make better choices at the market.**

<b>Information Needed</b>	<b>Details of Information Needed</b>	<b>Freq</b>
1. Varieties and characteristics	<i>Total</i>	17
	1. Information on the different types or varieties of sweet potato sold (including names of varieties, characteristics etc)	10
	2. Sellers should label the names of sweet potato they are selling	3
	3. Display samples at market	1
	4. Information on taste and eating quality	1
	5. Sellers to have common names for sweet potato which buyers also know of.	1
2. Area of production	Information on where sweet potato is from	7
3. Harvest dates and dates sweet potato taken to market	<i>Total</i>	6
	1. Information on when sweet potato was harvested (and how long it has been on sale at the market)	5
	2. Information on time and day sweet potato was brought to the market	1
4. Spot at the market where sweet potato is sold	All same highlands sweet potato and sweet potato from the same area (in the highlands) to be in one location/spot in the market.	5

Note: Details of table are provided in the appendix.

Interestingly, the information that consumers are requesting for, is almost identical to what they talk to suppliers about, that is, variety, characteristics and place of production. However, suppliers do not seem to be very responsive to consumers' need for information, given the current marketing practices at the market.

According to Caswell (1998) and Modjduszka and Caswell (2000), information is vital during search and purchase. It reduces uncertainty faced by consumers regarding products and quality. Furthermore, in mainstream neoclassical economics, it is assumed that if consumers can access and process information, they will behave rationally in their choices and preferences.

Hence, from the consumers' perspective, it also appears that suppliers' attempts to address consumers' preferences are minimal. There is a serious need for suppliers to improve the way they are responding to consumer preferences if they want to be competitive and to maximise returns.

### **Implications of Research Findings**

First the implications for suppliers (in terms of potential marketing segments and marketing strategies) are discussed, followed by implications for policy makers.

### *Implications for Suppliers*

Porter (1980) identified 3 generic strategies that suppliers can use to increase their profits, increase or maintain market share and to remain competitive. They are: (1) overall cost leadership, (2) differentiation and (3) focus. The overall cost leadership strategy tends to be most appropriate when there are no clear opportunities to segment the market and where the suppliers are competitive on costs. The differentiation strategy tends to be most appropriate when there are no clear opportunities to segment the market and where the product has unique characteristics. The focus strategy tends to be most appropriate when there are good opportunities to segment for niche markets. In this case, low-cost suppliers may do best to follow a cost leadership strategy on a particular market segment, while suppliers with a unique product may choose to follow a differentiation strategy on a particular market segment.

The results of this study suggest that, in general, Highland-grown sweet potato may, best be considered as a differentiable product in which case a differentiation strategy may be the most appropriate. The evidence of this thesis suggests that Highland-grown sweet potato could be marketed in Lae using a differentiation strategy. At the most basic level, Highland-grown sweet potato may be considered as a differentiated product in Lae as consumers from all regions of origin indicate a preference for it over Lowland-grown sweet potato.

This suggests a strong role for researchers to explore what are the important technical and economic points of differentiation. The researchers, in turn would need to work with the suppliers to develop and market the differentiated product. To sustain the product in the market, the supplier would need to develop a reputation for quality.

Kotler et al. (1994) proposes four important aspects to a differentiation strategy: product, price, promotion and placement. These are collectively known as the *marketing mix* and are discussed below in relation to the findings of this research.

**(1) Product Strategy** – Product strategies for differentiation are based around several decision factors that include product attributes, branding, packaging and labeling (Kotler et al. 1994). With regard to product attributes, the earlier discussion on research findings suggested that the potentially differentiable product attributes for Highland-grown sweet potato are physical characteristics (e.g. smooth surface, mature tuber, firm tuber) and eating characteristics (e.g. sweet taste). With regard to branding, suppliers may develop brands (individually or in groups) to differentiate their product from those of their competitors. For sweet potato, suppliers may consider brand identities based on locality of production variety or product attribute. But for branding to be successful, consideration also needs to be given to promotion, consistency of supply, quality control and brand protection. Packaging is another possible way of seeking to differentiate a product. It does this by providing information about the product (such as brand name, packing date, used by date, serving suggestions, weight, etc) through labeling as well as providing protection for the product. However, it is unlikely that packaging will be used for this purpose in the near future because of costs. Labeling can serve a number of functions including “identifying the product or brand, grading the product, describing things about the product and promoting the product” (Kotler et al. 1994). For sweet potato in PNG, labeling could play an important role in improving marketing efficiency by reducing search cost to consumers. From the discussion of research findings, it is clear that

consumers want adequate information that will help them in searching and selecting sweet potato they want.

**(2) Pricing Strategy** – With this strategy, suppliers are trying to influence and attract consumers to purchase their products so they consider prices that they can set, which consumers in their target market can afford but which will earn them a profit (Kotler et al. 1994). Suppliers were found to be using the pricing approach ‘discount pricing and allowance’ which refers to such innovations as “cash discounts and quantity discounts.” Given that in PNG, prices of sweet potato are not set on a fixed quantity unit basis, the pricing strategy currently used by suppliers may be the most appropriate. It will lead to uncertainty and added search costs to consumers until such time as pricing methods based on fixed quantities are introduced. Perhaps this is an area of further study for policy researchers.

**(3) Promotional Strategy** – This strategy includes a mix of strategies namely advertising, personal selling, direct marketing, sales promotion and public relations that suppliers engages to promote their products. Suppliers use promotional strategy to communicate effectively with their customers with the aim to attract customers to their products (Kotler et al. 1994). From this study, it was found that sweet potato suppliers are attempting the promotion mix but only at a minimal level and on an individual basis. For example, all suppliers were found to be involved in personal selling (oral presentation with customers) and direct marketing (using promotion activities such as calling out names of varieties, skin colour or flesh colour) and some suppliers were involved in sales promotion (using short term incentives e.g. price and quantity discounts) and public relations (building good relations with some of their customers). However, search costs are still high and so perhaps more could be done to reduce search costs through collective promotion. This might involve regional branding and the introduction of grades and standards.

**(4) Placement Strategy** – This strategy considers how and where to deliver products so the products can be where customers want them. From this study, it was found that most of the Highland-grown sweet potatoes are transported to and sold at the Lae main market. Smaller quantities are sold to urban middlemen or black-marketers who sell in peri-urban markets but it appears that most consumers prefer buying their sweet potato at the main market where prices are low (more tubers/heap) and there are opportunities for discounts. This therefore indicates that placing of different sweet potato types within the main market is important. One suggestion (made by consumers in the consumer survey) was for all suppliers of a particular variety or from a particular region in the Highlands to set up their stalls in the same area of the market so as to reduce search costs to the customers.

From the discussion of the marketing mix strategies, it appears that ‘product’ strategy requires more attention from Highland suppliers of sweet potato. The product strategy will be of much value in supporting the other strategies and maximizing income to suppliers.

Having discussed the implications for suppliers, the next section discusses the implications for policy makers.

### *Implications for Policy Makers*

The key research findings raise some issues that may require the involvement of policymakers if sweet potato is to be developed as a differentiated product. These include:

- (1) Facilitating the development of grading standards. This would include implementation, monitoring and enforcement;
- (2) Facilitating communication between suppliers and consumers. This could involve an extension role and assistance with developing communication infrastructure
- (3) Enforcing market laws (possibly including the allocation of spots at the market for sale of single varieties or sweet potato differentiated by production area).
- (4) Facilitating the development of collective promotion through the formation of supplier groups, regional branding as well as the support for agricultural shows to create greater awareness of the different types of sweet potatoes there are at the market.
- (5) To facilitate an integrated research and development program that would encourage a good process of new product development and complementary marketing mix (where technical experts who have an understanding of what is technically feasible come together with marketing experts who understand what is economically feasible).
- (6) Introduce government programs to build capacity among suppliers for business/marketing, communications, group marketing and supply chain management (to ensure consistency and quality of supply).
- (7) Look at the price system for sweet potato to see if it is possible/worthwhile to move from heaps to kilograms basis.

### *Directions for further research*

The purpose of this research study has been a first attempt to explore sweet potato as a possibly differentiated product. The research has provided evidence that sweet potato can be usefully considered as a differentiated product and has discussed some possible avenues for exploiting this result. However, there is much more that needs to be done in the way of research. The key findings of this research suggest the following directions for further research:

- (1) To assist in the development of appropriate focus strategies by identifying the key demographic factors associated with segmented market characteristics.
- (2) To undertake cost-benefit analyses and pilot testing of different marketing strategies to determine which technically feasible opportunities are also economically worthwhile.
- (3) To explore the constraints to suppliers working collaboratively to develop collective promotion strategies (e.g. regional branding)

- (4) To explore alternative grading standards for sweet potato with an eye to determining a set of standards that are technically feasible and economically sound
- (5) To explore alternative mechanisms for improving communication between suppliers and consumers in long distance markets

## **Conclusion**

From the analysis of consumer preferences and supplier awareness of and responsiveness to consumer preferences, several important findings were made.

The study explored the extent to which sweet potato is differentiated in the minds of consumers, and found that there are strong points of difference in preference for Highland-grown sweet potato over Lowland-grown sweet potato. Consumers also differentiate sweet potato on the basis of varieties, and physical and eating characteristics. Based on the findings that sweet potato is a differentiated product, 3 categories were proposed as useful basis for exploring marketing strategies.

The study also explored the extent to which Highland suppliers are aware of consumer preferences for sweet potato in Lae, and found that suppliers have awareness of consumer preferences for some varieties and product characteristics but the lack of awareness of other varieties and characteristics is also evident. In terms of being responsive to consumer preferences, it was found that suppliers believe they are being responsive to consumer preferences by bringing varieties they think consumers want to the market.

However, in terms of the extent to which they are actually customer responsive, it was found that although suppliers are differentiating products in an attempt to be customer responsive, there is little coordination of their efforts. The high search costs and information needs of consumers indicate also that suppliers' attempts to be customer responsive are inadequate and minimal.

It appears therefore that, there is considerable potential to improve marketing strategy and management to take advantage of sophisticated consumer preferences. The efforts of suppliers could be better coordinated if there are attempts to develop better marketing strategies through using grading and quality standards, product branding and labelling and product promotion. Researchers could assist with developing information on varieties and characteristics, pilot testing new ideas e.g. on brands, and establishing minimum standards for grading sweet potato. The role for policy in this study is to enforce grading standards developed by researchers.

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