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**Consumer Attitudes and Preferences for Peanut Paste in Sub-Saharan Africa:
Evidence from Ghana**

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Introduction

Peanuts are an integral component of daily diet in many African countries. In Ghana, the majority of consumers include peanuts or peanut product in the main meal of the day regularly. The most widely eaten peanut product is paste made of ground peanuts added as an essential ingredient to soups or sauces. Peanut paste is made for household consumption in rural areas, whereas in urban areas peanut paste is typically purchased in open air markets. The suppliers of peanut paste are predominantly cottage industry operators, many of whom supplement their income by processing a batch of peanuts on a relatively regular basis. The numerous suppliers and vendors of peanut paste apply generally the same production process relying primarily on experience. The purchased peanut paste attributes may vary widely and the prepared taste of the dish with peanut paste may not meet expectations of consumers.

This paper examines the preferences for several peanut paste attributes that were identified as important through discussions with processors, vendors and consumers. Each attribute is influenced by processing. To provide proper guidance to SME that emerge from among cottage industry operators, but also to draw attention of cottage operators to the key processing stages, this paper provides insights about factors that influence the perceived importance of paste attributes. Knowledge from the study is expected to enable commercial peanut paste manufacturers to know what consumer characteristics and, possibly, consumer behavior such as shopping or eating habits, influence the expressed attribute importance. Such knowledge allows to develop a controlled processing method that will consistently yield paste with the market desired attributes enhancing sales of highly popular product. The economic effects will include the sustainable, commercial peanut processing industry, which will affect the supply of peanuts upstream and distribution and retailing downstream generating benefits

extending beyond consumer satisfaction. The applied data were collected from urban consumers of three largest cities in Ghana, i.e., Accra, Takoradi and Tamale, in 2011.

Preferences for peanut attributes

Peanut preferences studies have addressed the roasted peanut attributes (Moon et al, 1999) and peanut paste attributes (Resurreccion, Chinnan, Florkowski, Paraskova, et al., Peanut Science; I think that paper was about testing a product in Bulgaria) in temperate zone countries. Yet, despite a wide consumption of peanut paste in Sub-Saharan Africa, there have been few studies of consumer preference for that product. Such studies might have received little attention because peanut production or safety were more important than commercial processing. However, Ghana has experienced an economic growth that led to a noticeable per capita income increase creating a growing demand for food, especially in urban centers. The beginning of oil production in Ghana is anticipated to further stimulate economic growth. In response to the growing demand, foreign supermarket chains have positioned themselves on major urban markets and represent a buyer potentially interested in quality manufactured food products.

Peanuts are eaten in various forms. Roasted peanuts are eaten as a snack, sometimes in combination with roasted cassava or plantain they represent a meal. Peanut paste is added to sauces and eaten with vegetable dishes. In West Africa, a popular dish is peanut soup, where one of the ingredients is peanut paste. The soup is fairly thick and eaten with fufu made of grain or root flour. Snacks are also made from cake left after pressing oil out of peanuts. Among new forms of eating peanuts is eating open face sandwiches with peanut paste, which reflects the adoption of overseas eating habits. The importance of peanut paste is unquestionable and supported by its role as a source of protein and other vital nutrients.

This study recognizes the potential for regional differences in preferences for the preparation of peanut paste at home and peanut paste attributes. The differences arise from the established differences in per capita income between the coastal urban centers of Takoradi and Tamale and the capital of Northern Region, Tamale. The selection of Tamale is not coincidental. The region is the primary peanut growing area in Ghana due to its natural conditions (dry savannah). It is also a hub of the wholesale trade in peanuts supplying the Accra wholesale market. The accessibility to peanuts in Northern Region and the relatively lower incomes than in the southern regions of the country could encourage that some households make peanut paste at home. Observations in the field suggest that mills are located in various neighborhoods and near open air markets and custom grind grains, cassava chips and peanuts. "Homemade" peanut paste making involves preparation of peanuts for grinding, which typically involves some sorting and light roasting. For some, given that homemade paste involves several tasks including the purchase of raw peanuts, roasting and custom grinding, the purchase of ready-made paste is a viable option. What triggers the switch from making paste at home rather than purchase it at the market is likely the matter of household income.

However, for this study, it is also important to learn whether there are differences in preferences for peanut paste attributes. The homemade peanut paste may differ in its attributes from the purchased paste. From a commercial peanut paste manufacturer standpoint knowing the set of social, economic, demographic or cultural factors that influence the preferences matters because differences create both opportunities and risk in marketing the finished product. Moreover, residents of different regions may differ in their preferences, for example, between Northern Region and coastal towns because of different cultural and natural conditions influence their diet and lifestyle even at the same income level.

Objectives

This study investigates the attitudes of Ghanaian households towards peanut paste consumption and production based on product characteristics. Specific objectives are to: (1) examine the factors deriving household's peanut paste consumption; (2) study household's choice towards making peanut paste at home or purchasing; and (3) identify the point at which households switch to purchase peanut paste due to changing household income.

Data and Methods

Data was collected through face-to-face interviews in 2011 from 1,076 households in Tamale, Takoradi, and Accra. The representative sample was selected with the assistance of Ghana's National Statistical Service.

This study explores three major aspects of peanut paste consumption in Ghana. First, respondents are asked whether their household members eat peanut paste. Then, positive respondents were asked how often they eat peanut paste (very often, often, sometimes, seldom). When dealing with cross-sectional data, a censored-response problem arises when households respond negatively to the initial question. Thus, estimating peanut paste consumption frequency through single-step regression methods leads to inconsistent estimation of the parameters. Hence, we employ Heckman's (1979) two-step censored systems estimation approach. The first step involves probit estimation of the selection equation, which explains household's peanut paste consumption decision (i.e., whether or not to eat peanut paste). Due to the ordered nature of responses in the second question, in the second stage, we model frequency of peanut paste consumption as an ordered probit regression of y on X and λ (an inverse Mills ratio from the

first-step), where $(x, z, w) \in X$ and x and z are household's demographic and socioeconomic characteristics and w is the product-specific attribute (color, aroma, viscosity, taste).

The second part of the study examines household's choice and rationale of making peanut paste at home. Respondents are asked if they make at home and/or buy from select outlets. Since making at home or buying decisions are inter-dependent, the above two questions of interest are estimated simultaneously with each dependent variable appearing on the rhs of the other. In both equations, dependent variable is modeled as a function of X and other specific factors of interest that hypothesize about specific anecdotal evidence. E.g. we hypothesize that the households with 13-18 years old children are likely to make paste at home since children may assist mothers in home meal preparation.

In the third part of the study, we investigate factors behind the choice and frequency of making peanut paste at home subject to the budget constraint. Intention is to identify the point at which households switch to purchasing due to changing budgets (income). Household's frequency of making peanut paste at home is modeled as

$$y = \beta_0 + \beta_1 \text{income} + \beta_2 \text{income}^2 + \gamma X + \varepsilon \quad (1).$$

We hypothesize positive β_1 and negative β_2 implying that as income increases making peanut paste at home becomes more frequent (β_1) but

to a point where it becomes negative (β_2). The switching point is:

$$\text{income}^* = -\frac{\beta_1}{2\beta_2} > 0$$

Heckman's two-step approach is used to account for selection bias arising from household's initial choice of making peanut paste at home as discussed in part two. The first step involves probit estimation of the selection equation, which explains household's decision to make peanut paste at home. Due to ordered nature of responses in the second question, we estimate (1) as an ordered probit regression by adding the inverse Mills ratio, λ , from the first step.

Variable Description

The dependent or response variables are household consumption of peanut paste and the frequency of peanut paste consumption. In the second part of the study the respondents are asked to explain their rationale of making peanut paste at home and buying from the market. Lastly, frequency of making peanut paste at home. The independent or explanatory variables include various demographic, socio-economic, and various descriptors of product attributes such as income (per capita), expenditures, age, marital status (married=1), level of education, employment status, peanut paste taste, relative consideration for being an inexpensive product, easy to prepare, nutritional values, and bad experience with prior consumption.

Results and Discussion

This study uses household survey data to develop a profile of a retail buyer and quantify each effect providing a benchmark for the growers and grower groups and food distributors in their efforts to take advantage of the potentially expanding market opportunities. Government decision-makers may gain insights helpful in urban planning, school feeding programs, public health issues, and infrastructure needed for shipping, transport, and storage of peanut products.

Results are expected to improve understanding of Ghanaian household's perception of peanut paste characteristics and provide local producers, marketers, and distributors with knowledge of customers and, hence, enable them to produce, market, and position peanut paste products more effectively. Results are also expected to aid marketers to develop more effective marketing strategies based on households' income level.

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