Determination of unmet demand for the production and marketing of banana flour

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Abstract

This study is an important contribution for small green plantain producers in the Loreto canton, because it will allow their primary production to be given added value.

Therefore, this work began with a description of the theoretical basis that supported the development of the study, the methodology used for market segmentation, based on the size of the population of the area under analysis, which according to INEN is 21,163 inhabitants. Based on this data, we generated the sample considering that plantain flour is a consumer product per household, we segmented our market by number of households; Subsequently, to calculate the demand, we consider the information collected through the surveys, obtaining the per capita consumption, which in our case was 27.64 kg. plantain flour per household; With this information we proceeded to determine the demand that in our investigation was 95,500 kg of would be made per year; Finally, we calculated the supply present in the canton, which according to the surveys carried out, was 54% of the total demand. Finally, we established the current and projected unsatisfied demand, whose value was 48,176 kg.

KEYWORD: Unsatisfied demand, market, per capita consumption, supply, plantain flour.

INTRODUCTION

The green banana is a product that is part of most of the rural production systems of the coast and Ecuadorian Amazon, according to data from , it is estimated that in our country there are between 10,500 and 12,000 producers of fresh green bananas, which position the country as the thirteenth producer of this product globally, with a share of 1.7%; while, at the Latin American level, it ranks third, behind Colombia and the Dominican Republic. However, it ranks as the third largest exporter of bananas worldwide, with a 15% share.(Express, 2022)

However, despite the large national production and the important nutritional contribution that its consumption means, in the domestic market the vast majority is marketed in its primary presentation, that is, as a fruit, which implies that in most cases small and medium producers are victims of intermediaries.   which affects the final price of the product making these production systems unprofitable and sustainable over time.

Faced with this reality, it is essential to define, generate, new marketing alternatives, where associativity becomes a significant strategy, and through these structures, generate added value to this product that has been since time immemorial part of the daily diet of the Ecuadorian family. In this sense, this proposal seeks to establish a market for a by-product (banana flour), which guarantees not only access to fair prices, but also allows small producers to access formal and permanent markets.

In this context, the following objectives are defined:

• Perform a segmentation of the target market.

• Determine unmet demand for the product

• Analyze the marketing channels of this product.

Below, certain concepts that are indispensable and that will serve as guides in the construction of this document are described.

Market.

Markets are, to put it very simply, the "physical or virtual space in which you proceed to buy or sell various products and services" In this space various agents participate, interact and relate, each of them seeking to meet their needs, interests and objectives, linked to the sale or purchase of products and services.(IICA , 2018)

In the market we find two fundamental actors called Client or plaintiff and the offeror or seller, the plaintiff is also known as customer

Demand

Demand is understood as the quantity ofgoods and services that the market requires or requests, to satisfy a specific need at a given price. To obtain the demand it is necessary to consider the information from primary sources, that is, consumption trends must be established directly from potential customers, using tools such as: surveys, interviews, direct observation of consumer culture, additionally secondary information will be considered that is, information reported by other authors.(Gonzales, Alba, & Ordieres., 2014)

According to , it defines demand as (Cordova, 2011)the quantity and quality of goods and services that can be purchased at different market prices by a consumer (individual demand) or by all consumers (collective demand).

In this sense for , the demand depends on several aspects among them: the tastes and preferences of the members of society, the size of the population, level and distribution of income, factors that affect(Rojas, 2015) their behavior, the same as described below:

• Consumer income. - If income varies, the buying trend varies, if it increases it is known as superior good, if it is maintained, it is well neutral, if it decreases it is known as inferior good.

• Number of consumers (N): if the number of consumers in the market varies, demand changes in the same direction.

• Price of complementary goods P: when the price of a complementary good varies, they are modified in the opposite direction.

• Price of substitute goods P: if the price of a substitute good varies, the demand is modified in the same direction.

• Tastes and preferences (GP): it cannot be quantified, but it is important to anticipate it for decision processes.

• Expectations (E): The expectation causes the customer to advance or postpone purchases.

For the calculation of demand it is necessary to define two variables: the price that is considered as an independent variable and the level of consumption as a dependent variable, in these circumstances in the case of demand this, increases as the price of the product decreases consequently it can be said that , that is to say that the demand is a function of the price, and answers the following equation : $Q = f(P)$
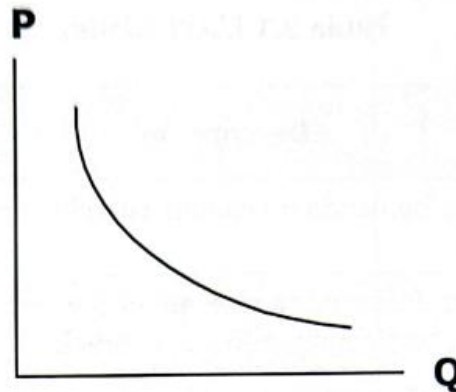
$$P = f(q1, q2, \dots I)$$

From where:

- P = price.

- q1 = Quantity demanded of the good or service

- q2 = Quantity demanded of substitute products.

- I = income levels

Figure 1 Demand curve

Source: Rojas 2015.

Elasticity of demand.

(Moreno, 2021), points out that the elasticity of demand, also known as the price-elasticity, is a concept that in economics is used to measure the sensitivity or responsiveness of a product to a change in its price. In principle, the elasticity of demand is defined as the percentage change in the quantity demanded, divided by the percentage change in price. The elasticity of demand can be expressed graphically through a simplification of demand curves.

(Miranda, 2002)It defines the elasticity of demand as the exchange ratio between quantities demanded in the face of changes in price or income. In the case of changes generated in the quantities demanded produced by price alterations it is called "price elasticity", if it is the case of quantities demanded as a result of variations in income to the "income elasticity.

(Miranda, 2002), states that the price elasticity coefficient or income elasticity are represented by an abstract number, negative in the first case and positive in the second, given the inverse relationship between price and quantity demanded, and the direct relationship between quantity and income. When the value is greater than 1 the demand is said to be elastic, and when less than 1 inelastic; Indeed, if prices fall and the demand curve is elastic then the amount of total expenditures on that item will increase; On the other hand, if the precise ones go down and the demand curve is inelastic, the expenses for the purchase of that

good will decrease; And if finally, prices decrease and the curve has a unit elasticity, the expenses applied to that good will remain the same.

Potential demand.

(Sanchez J. , 2016) It states thatpotential demand is a maximum level of demand achievable for a given product in a scenario conditioned by several variables. It can also be understood as the probability of reaching the maximum consumption of a product in a given market lowor particular conditions, and it is obtained through the following formula

$Q = n * p * q$ from where:

- Q= Potential demand
- n= Number of potential consumers
- p= Selling price of the product
- q= Quantity of product consumed in a given time.

Consumer.

(Sanchez J. , 2016), The consumer is a person or organization that consumes goods or services, which producers or suppliers make available in the market and which serve to satisfy some type of need and defines it as:

• It is a person or organization that consumes goods or services.

• It offers its resources, usually money, in exchange for such goods or services.

• With its consumption, this person satisfies your needs.

• It is in the last stage of the production process.

• It is a key element within the production chain.

• It is vital for the development of economies.

• They are a fundamental agent in consumer societies.

Apparent consumption.

According to, A first approach to the study of demand can be done through the determination of apparent consumption that responds to the following mathematical expression:(Miranda, 2002)

$$Ca = P + I - E + \underline{\Delta} i$$

From where:

- Ca = Apparent consumption.
- P = Estimated production.
- I = Imports

- E = Exports
- $\triangle i$ = Variation in inventories.

The limitation of the calculation of demand using apparent consumption is that unfortunately it is difficult to access historical information of most products, a necessary condition to use this tool.

Percapita consumption.

Given that the figures are almost always available, whether real or estimated and that we know the evolution of consumption recorded by a certain good or product, it is easy to relate this consumption with the number of consumers, facilitating the determination of demand in a period of time.(Miranda, 2002)

In this sense, (Meanings , n.d.) it defines per capita consumption as the total consumption (of products, food, water, energy, etc.) of a country or region divided by the number of its inhabitants in a given period of time. It is an indicator that allows measuring and analyzing consumption rates in a population.

Offer

(Read, 2010) It defines supply as: the quantity of goods or services that a certain number of suppliers (producers) are willing to make available to the market at a given price, and classifies it as:

• Competitive or market offer (the product is circulating in free competition)

• Oligopolistic Offer (the product is offered by a small number of bidders)

• Monopoly Offer (The product is offered in the market by a single bidder)

(Rojas, 2015), defines supply as the part of the market that is responsible for offering goods or services to consumers, that is, when we analyze the offer we are evaluating the role played by competition.

(Cordova, 2011), notes that supply as a relation showing the quantities of a commodity that sellers would be willing to offer for each available price over a given period of time if all else remains constant. The quantity supplied of a good varies directly with its price; that is, at higher prices, lower quantities offered, lower prices lower quantities supplied.

Elasticity of supply.

(Cordova, 2011), notes that the elasticity of supply isthe percentage change in quantity supplied resulting from a similar change in price. It seeks to measure the impact on the offer of a product or service given a variation in its price and classifies it into:

• Elastic offer. Inthis case a small change in price produces an infinitely large change in the quantity supplied.

• Relatively elastic offer. It is relatively elastic when a percentage change in price translates into a larger percentage change in the quantity supplied.

• Offer of unit elasticity. It occurs when a percentage change in price causes the same percentage change in the quantity supplied.

• Relatively inelastic offer. It occurs when a percentage change in price produces a smaller percentage change in the quantity supplied.

• Inelastic offer. When a percentage change in the price does not cause any change in the quantity supplied.

Unmet potential demand

(Read, 2010), states that unmet potential demand is the quantity of goods or services that the market is likely to consume in future years, on which it has been determined that no current producer will be able to satisfy if the conditions under which the calculation was made prevail. And it is determined through the comparison of demand minus supply.

Figure 1. Scheme: calculation of unmet demand
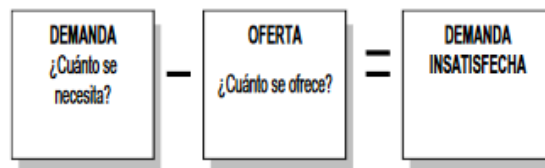
Fountain: (Valencia, 2011)

MATERIALS AND METHODS.

For the development of this work, the following aspects were considered.

Market segmentation.

It refers to the structure of how the market is formed, called consumer segment, whose particularity is that they have common characteristics, demographic, geographical, psychological, economic, ethnic, cultural, etc. From the above it follows that the purpose of segmentation is to detect the possible demand, in the greatest possible level of detail, in order to identify the characteristics of the segments and based on this knowledge define the most appropriate strategy conducive to satisfying the needs of each of the groups or segments that make up the global population.   Market stratification allows us to organize and classify demand according to certain attributes that lead us to know:

• Current number of applicants.

• Estimated potential number of potential buyers.

• The places where consumers usually shop.

• The geographical u8bication of consumers and producers.

• Frequency with which they make purchases.

• Motivations and attitudes regarding the merchandise purchased.

• Indicators of change in shopping habits

• Characteristics of buyers or users(Miranda, 2002)

Population.

According to EL the (INEN, 2022) population of Loreto (place where the market study was carried out), is 21. 163.00 inhabitants, information that is important to carry out market segmentation, considering that banana flour is a product of family consumption we proceeded to segment the population by leaf, which according to INEC data in the Loreto canton on average the number of members per household is 4.9 people this means that in the place under study there are approximately 4,319.00 households.

To carry out the market segmentation, some important criteria are considered, such as the global population of Loreto (it is the place where our product will be sold), which according to INEC data is 21. 163,00 inhabitants, as banana flour is a family-type food, we calculate the number of households that according to the previous source is 4. 319.00 households that corresponds to the potential population, finally through surveys the target population was determined, whose result indicates that 80% of households consume banana flour regularly, the rest stated that their consumption is marginal which was not considered for the present study

Sample size

For the development of this research work we will use a simple sampling that according to , occurs when a single sample of the population is extracted(Jumps, 2001), An aspect that is important to establish is that statistically speaking sample is a small and representative portion of the population.   In this sense we will consider to define the sample size to 4. 319.00 households in the Loreto canton, applying the following mathematical expression.

$$n = \frac{N\sigma^2 Z^2}{(N-1)e^2 + \sigma^2 Z^2}$$

According to this calculation, it was determined that the sample corresponds to 358 households that were surveyed to analyze the particularities of consumption with respect to the product under study.

Data collection techniques.

Thefollowing techniques were considered.

Observation, which does notserve to determine the behavior of people.

(Concept, n.d.) Surveys are a type of information gathering instruments, which consist of a predesigned set of standardized questions, aimed at a socially representative sample of individuals, in order to know their opinions or visions regarding some problem or issue that affects them. In this sense, 358 households were surveyed and randomly selected to ensure the purity of the results.

RESULTS

The following results were obtained.

Potential demand.

In order to determine the potential demand, the following is obtained from the information collected from households through surveys:

• Do you consume banana flour?

The survey shows that 80% of consumers consume banana flour, and 20% do not consume this product.

• How much banana flour (melts 500 grams) do you consume weekly at home?

58% of consumers consume 1 to 2 covers, 39% consume 2 to 3 covers, 3% consume 3 to 4 covers per week these data denotes how indispensable this flour is in homes in the canton of Loreto.

Calculation of annual demand

We start from the following formula:

$$Q = n * q$$

From where:

• Q= Potential demand

• n= Number of potential consumers

• q= Quantity of product consumed in a given time

Determination of the potential population. (n)

For the determination of the potential population, the current population of the Loreto canton was considered.

$$n = 4.319,00 \ hogares * 80\% \ households \ consume$$

$$n = 3.455,00 \ households \ willing \ to \ consume \ plantain \ flour$$

Determination of per capita consumption

Table 1 Percapita consumption

Consumption of flour sleeves of 400 gr / weeks	Frequency	Class mark	Consumption/week
0,5 a 1	164	0,7	114,8
1 a 2	110	1,5	165
2 a 3	8	2,5	20
TOTAL	282		299,8
CONSUMPTION PERCAPITAL / WEEK = 1.95 COVERS OF 500 Gr =			1,06
PERCAPITAL CONSUMPTION / ANNUAL IN COVERS OF 400 gr. =			55,28
PER CAPITA CONSUMPTION IN Kg/Year =			27,64

Source: Research Team 2023

Calculation of demand

$$Q = n * q$$

$$Q = 3.455,00 * 27,64$$

$$Q = 95.500,12 \ kg \ plantain \ flour/year$$

According to the data obtained, the demand for banana harían for the Loreto canton was determined to be 93. 952.00 kg/year. With this data we proceeded to calculate the projection of demand.

Demand projection.

Considering that it is important to determine the future demand this was projected for the next 4 years.

Table 2 Demand projection

YEARS	NUMBER OF PROJECTED HOUSEHOLDS	% POPULATION CONSUME BANANA FLOUR	PERCAPITA CONSUMPTION CHICKS 1 DAY	PROJECTED DEMAND
2022	4.319	80%	27,64	95.501
2023	4.970	80%	27,64	109.891
2024	5.005	80%	27,64	110.677
2025	5.041	80%	27,64	111.463
2026	5.076	80%	27,64	112.249

| 2027 | 5.112 | 80% | 27,64 | 113.035 |

Source: Research Team 2023

Offer.

In the canton loreto after the investigations carried out it was determined the non-existence of industrial producers of banana flour, however, in order to determine the supply of our product we proceeded to determine the consumption preferences of this product by brand, obtaining the following results: Oriental and Dominic Banana Flour whose consumption preference is with 15% and 14%, respectively, giving a total of 25% of the supply of industrialized flour, the rest consumes this product made in an artisanal way. Based on this information we consider that the supply of this product according to consumption preferences is approximately 54% of the demand for banana flour, information that helped us to determine the supply present in the Loreto canton market.

Projection of the offer

Table 3. Projected offer.

YEAR	DEMAND BANANA FLOUR	CURRENT FLOUR CONSUMPTION	BANANA FLOUR OFFER	PROJECTED ECONOMIC GROWTH RATE	PROJECTED OFFER
2022	95.501,28	54%	51.570,69	1	51.570,69
2023	109.891,14	54%	59.341,22	1,04	61.714,87
2024	110.677,16	54%	59.765,67	1,07	63.949,27
2025	111.463,19	54%	60.190,12	1,1	66.209,13
2026	112249,209	54%	60.614,57	1,135	68.797,54
2027	113035,231	54%	61.039,02	1,168	71.293,58

Source: Eequipo Investigación 2023

 Projected unmet demand

It refers to the demand that is not covered by the current market and is calculated from the following formula.

DI=calculated demand-calculated supply

Table 3 Projected unmet demand.

YEAR	DEMAND	OFFER	UNMET DEMAND
2022	95.501	51.571	43.931
2023	109.891	61.715	48.176
2024	110.677	63.949	46.728
2025	111.463	66.209	45.254
2026	112.249	68.798	43.452
2027	113.035	71.294	41.742

CONCLUSIONS

• After the corresponding analysis, it was determined thatbananas are part of the primary diet of households on the coast and Ecuadorian Amazon, because it is one of the main sources of carbohydrates within the nutrition of people.

• The market segmentation was carried out according to the number of members per household, which, according to the data provided by INEN, the average number of members per household is 4.9 people.

• By analyzing the results we were able to determine that there is a current unsatisfied demand for 43,931 kg of banana flour which determines that there is a market for this product, which decreases the risk of bankruptcy of the enterprise.

• The generation of added value to primary production is one of the great challenges facing the country, considering that it is one of the most effective strategies to achieve fair prices for small and medium producers.

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