Vol. 40 · March 2020
DOI: https://doi.org/10.7719/jpair.v40i1.772
Print ISSN 2012-3981
Online ISSN 2244-0445

Marketability of Mango-based Products: Input to Product Development of Locally Farm Produced Mangoes in Central Luzon, Philippines

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Originality: 100% • Grammar Check: 100% • Plagiarism: 0%

ABSTRACT

Mangifera Indica, commonly known as mango, is a high-value crop with yield gaps brought by its seasonal production. The study was conducted to determine the marketability of mango-based products as one of the most abundant commodities in the Philippines. The study made used of a descriptive survey method to describe the type of consumer market and determine their preferences in fruit-based food items. The study revealed that the market consists of varied generations, with the majority under the generation Y or the millennials. Most of them were female, single, college graduates, employed, preferred to purchase fruit-based products weekly, and answered that they would be willing to try mango-based products. The market likewise considers products' nutritional value that researchers, food technologists, and other food manufacturers must capitalize on incubating new product lines and marketing strategies to employ.

Keywords — Marketing, Mango-based product, Customer Preference, Descriptive Survey Method, Central Luzon, Philippines

INTRODUCTION

Mango is one of the most popular and economically important crops in tropical regions throughout Asia, South America, Hawaii, Central America, the Caribbean, and Africa, with India remaining as the top mango producing country that approximately supplies 50% of the global mango supply that remains to be a seasonal fruit (Zahedi et al., 2016).

According to Pawar et al. (2016), India, China, Thailand, Indonesia, and the Philippines rank among the largest exporters and commercial producers of mangoes. The global market for processed mangoes is projected to rise with the increasing preference of consumers in naturally sweet fruit-based ingredients. The Philippines, in the Mango Global Value Chain (2017), significantly contributes to the mango processing segment. Processed mango exports climbed to US$91 million with dried mangoes represented the largest share among all processed products by 77%, followed by juices at 9%, airtight 8%, and 7% in purees (PSA, 2007-2014). In this segment, fruit quality is less of an issue, products that fail to meet quality standards for exportation as established in the World Trade Organization on Application of Sanitary and Phytosanitary Measures can still be processed.

Food export rejection can be a harmful barrier to sustainable international food trade (Wen et al., 2018). This can be a challenge to third world countries to improve products to meet the demand for quality. However, inevitably, the incident causing damages to produce, with the volume of rejections that are not suited for fruit export, may be processed for consumption and exportation in a different form. With the foreseeable increase in post-harvest fruit damage of mango production in Central Luzon, the study was conducted to determine mango-based products' marketability.

Market research is an indispensable part of any business process, which is beneficial in all business levels regardless of the type of products and services being offered. The core point lies in the identification of customer preference; hence, if the customer is satisfied, the business will be successful. Other factors, such as innovation, competition, inventions, technology, and the like, are only secondary (Jiang et al., 2019). This study determined the consumer behavior and preference of the market on mango-processed products, which are vital inputs used by Bataan Peninsula State University Food Technologists and scientists in developing new product lines.

OBJECTIVES OF THE STUDY

The study aimed to determine the marketability of mango- based products as input to product development of local farm produced mangoes in Central Luzon. It specifically determines the respondent's profile in terms of age, sex, civil status, place of residence, highest educational attainment, occupation, monthly income, and frequency of purchase on fruit-based products. It further identifies the consumer preference for mango-based products, acceptable price range, and the most engaging promotional tools from the consumers' perspective.

METHODOLOGY

Research Design

The study made use of the descriptive survey method in describing the consumer preferences on mango-based products and in determining the marketable mango-based products.

Research Site

The research was conducted at the selected provinces in Central Luzon, specifically Bataan, Pampanga, and Zambales, which have demo farms that were included in the BPSU Science and technology transfer project in Central Luzon.

Respondents

The participants of the study were the residents who purchased food items around the market areas, supermarkets, trade fairs, and public squares in each province. A stratified sampling technique was utilized to determine the sample size from the total population of the three provinces using the Raosoft software sample size calculator, generating 392 actual respondents.

Instrumentation

This study made use of a researcher-made survey tool to gather data. The research instrument consisted of two (2) parts. The first part of the questionnaire dealt with the demographic profile of the respondents, while the second part consists of the description questions relating to the consumers' preferences on fruit-based products.

Validation of Instrument

The instrument was validated by experts in the field of research, business, psychology, and food technology. The comments and suggestions given during the evaluation were considered in the revision to achieve the content and face validity of the researcher-designed tool. Clearance for the study's conduct and use of the instrument was secured from the Peninsulares Research Ethics Committee. Informed consent was attached in the questionnaire, where voluntary participation was observed.

Data Analysis

The gathered data were tallied, analyzed, and processed using statistical software, SPSS. Frequency distribution and the percentage was computed.

RESULTS AND DISCUSSION

As seen in Table 1, it can be observed that all generations were well represented in the study sample with the Generation Y or the Millennials were the predominant buyer at the public markets and public areas of the provinces, consisting of 47.4 % this is because millennials are characterized to be outgoing and participative that they want their views, ideas and opinion to be heard through the survey, this supports the article by Chou (2012), stating that millennials express themselves and are not easily intimidated by others because of lack of experience and status.

Table 1. Distribution of Respondents According To Age

Age Range/ Generation	Frequency	Percentage
17 and Below (Generation Z)	50	12.8
18-34 (Generation Y)	186	47.4
35-50 (Generation X)	103	26.3
51 and Above (Baby Boomers)	53	13.5
Total	392	100

Table 2 reveals that there were more females in the total number of respondents, accounting for 47.4%. This data indicates that women are the primary shoppers for household goods and handle most of the grocery shopping as they rule the kitchen and other household areas.

Bowers (2000) opined that food preparations and dining styles might have changed over the years, but food preparation remains to be associated with women.

Table 2. Distribution of Respondents According to Sex

Sex	Frequency	Percentage
Male	132	33.7
Female	260	66.3
Total	392	100

Table 3 shows that the majority (66.3%) of the respondents were still single, consisting of 56.4%. This result relates to the data contained in Table 1, wherein the age range of the respondents at the time of the survey was below 17 to 35 years old, with a combined proportion of 60.2%.

There is also a growing trend in supermarkets to be the singles' hotspot, according to Bernon (2018). Singles bars are an outdated concept, and even the Wall Street Journal (2018) detailed that one of the reasons adults find dating and social success at the supermarket are because meeting people while shopping is low-key, non-confrontational, and does not involve deviating from their normal routine.

Table 3. Distribution of Respondents According to Civil Status

Civil Status	Frequency	Percentage
Single	221	56.4
Married	149	38.0
Widow/Widower	13	3.3
Annulled/Separated	5	1.3
Solo Parent	4	1.0
Total	392	100

Table 4 reveals that the three provinces that served as the research locale was well represented in the distribution of respondents. However, more respondents came from the Province of Bataan, considering that the researchers were residents and where the largest number of adopted mango farms were located.

Table 4. Distribution of Respondents According To Place of Residence

Province	Frequency	Percentage
Bataan	171	43.70
Pampanga	126	32.0
Zambales	93	23.8
No Data Provided	2	0.5
Total	392	100

As seen in Table 5, a larger percentage of the respondents at 47.7% were college graduates, while only 37% were high school graduates. This finding indicates that the data were gathered first hand from the respondents out of their volition without any biases and that the content of the survey questionnaire was clearly understood. The data also implies that market-goers were well educated and appears to be smart shoppers.

Table 5. Distribution of Respondents According To Highest Educational Attainment

Level of Education	Frequency	Percentage
Elementary	14	3.6
High School	145	37.0
College	187	47.7
Masters/Doctorate Degree	23	5.9
Others	23	5.9
Total	392	100

The data contained in Table 6 reveals that the majority of the respondents at 54.8% were employed. This figure indicates that the respondents were not only shoppers, but they have the tendency to get the best value for their money's worth as they are the ones earning them, these findings support the study of Ramya and Ali (2016) that social status often associated by employment is a factor in consumer buying behavior.

Table 6. Distribution of Respondents According To Employment Status

Employment Status	Frequency	Percentage
Employed	215	54.8
Self-employed	63	16.1
Unemployed	30	7.7
Student	64	16.3
Others	20	5.1
Total	392	100

As seen in data in Table 7, there were more respondents whose monthly income was within the range of Php5, 000.00 and below, consisting of 39.5%, while the highest income for the 3.8% of the respondents was within Php25, 000.00. As observed during the survey, the respondents showed hesitation to provide data on their earnings tend to hide how much they earn in a month.

These findings strengthen the results of paper worked by the National Bureau of Economic Research in Cambridge that revealed that some individuals have a strong preference for concealing their salary and that these privacy norms usually leads to the misperception that their earnings were significantly lower.

Individuals have to learn about seniority instead of salary, and diffusion of salary information leads to labor market phenomena (Cullen & Truglia, 2018).

Table 7. Distribution of Respondents According to Monthly Income

Income Range	Frequency	Percentage
PhP 5,000.00 and below	155	39.5
PhP 5,001.00-10,000.00	62	15.8
PhP 10,001.00-15,000.00	53	13.5
PhP 15,001.00-20,000.00	40	10.2
PhP 20,001.00-25,000.00	37	9.4
PhP 25,001-30,000.00	15	3.8
PhP 30,001.00-35,000.00	18	4.6
PhP 35,001.00 and above	12	3.1
Total	392	100

The information in Table 8 reveals that more respondents purchased fruit-based products weekly. This result relates to the common consumer buying behavior of grocery shopping at least once a week to stock up household supplies for a week's consumption to save money and stick to a clear shopping plan and budget.

This result relates to the findings of the study conducted by Hollis-Hansen et al., (2020), which opined that on mothers' weekly food purchase and thinking intervention, they are likely to improve the calorie and nutrient content selection of their food purchases.

Table 8. Number of Times Respondents Buy Fruit-Based Products

Number of Times	Frequency	Percentage
Once a day	84	21.4
Once a week	225	57.4
Once a month	78	19.9
Once a year	1	.3
Never	4	1.0
Total	392	100

The data in Table 9 shows that the majority of the respondents answered that they preferred to purchase drinks like fruit juices for direct consumption.

Commonly the consumption of fruit drinks would rise when the weather is hot.

Filipinos, given with a tropical climate, are into drinking various types of beverages. In conjunction with the increase in consumer preference and lifestyle change towards healthier choices, the juice sector demonstrates positive and dynamic growth (Priyadarshini & Priyadarshini, 2018).

Table 9. Respondents' Preference in Fruit-Based Products

Fruit-based Products	Responses		
	N	Percent	Percent of Cases
Drinks (Fruit Juices)	322	50.5%	82.6%
Bakery Food Items (Cakes; pastries)	135	21.2%	34.6%
Confectioneries (Sweets; candies)	87	13.7%	22.3%
Fruit Jams/Spreads	93	14.6%	23.8%
Total	637	100.0%	163.3%

As seen in the data in Table 10, more respondents (40.6%) answered that they would be willing to spend PHP 50.00 or less on fruit-based products per purchase at any given time. Furthermore, there were 34.9% that is equivalent to 137 respondents who responded that they would be willing to purchase fruit juices within the price range of PHP 51.00 to PHP 100.00 per item.

Consumers are more responsive to price promotion of unhealthy foods and beverages than healthier items (Backholer, Sacks, & Cameron, 2019).

Table 10. Amount of Money in Which Respondents Were Willing To Spend On Fruit-Based Products per Consumption

Amount	Frequency	Percentage
Below PHP 50.00	159	40.6
PHP 51.00-100.00	137	34.9
PHP 101.00-150.00	47	12.0
PHP 151.00-200.00	21	5.4
PHP 201.00-250.00	11	2.8
More than PHP 250.00	17	4.3
Total	392	100

When the respondents were asked as to their willingness to purchase mango-based products, as seen in Table 11, the majority of the respondents, comprising 58.7%, said that they would be willing to try the product. Another 36.5% answered that they probably would try the abovementioned product. This data is a good indication that the product being introduced in the market has a chance to be patronized by general consumers.

Table 11. The Willingness of Respondents to Try Mango-Based Products

Response	Frequency	Percentage
Definitely won't	11	2.8
Probably won't	8	2.0
Probably will	143	36.5
Definitely will	230	58.7
Total	392	100

Table 12 reveals that the majority (68.8%) of the respondents said that they preferred mango juice among other mango-flavored types of beverages that Bataan Peninsula State University researchers and food technologists initially concocted. Based on common observation, the respondents would opt to select mango juice due to its popularity and familiarity, parallel to the result of a study of Torrico et al. (2019) revealed that product familiarity and culture affect the sensory acceptability of consumers towards different food products.

Table 12. Respondents' Preference in Purchasing Mango-Based Drinks

Mango Flavored Drinks	Responses		
	N	Percent	Percent of Cases
Mango Juice	330	68.8%	85.7%
Mango flavored alcoholic beverage	35	7.3%	9.1%
Mango flavored Energy drink	56	11.7%	14.5%
Mango flavored Slimming drink	59	12.3%	15.3%
TOTAL	480	100.0%	124.7%*

**The percent of cases is from multiple responses having more than 100% total*

Table 13 reveals that more (45.7%) of the respondents answered that they preferred to purchase dried mangoes, among other confectioneries or sweet mango based processed goods. This data could be a good consideration for future production, since the drying of fruits and vegetables enhances storage stability, minimizes packaging, and reduces transport weight (Sagar & Kumar, 2010).

It can also be observed from the data that the usual Filipino confectioneries, pastillas, and polvoron were preferred by 28.9% and 19.6% of the respondents, respectively. This result signifies that Filipino food is still rooted in Filipino tastes despite the introduction of foreign processed products in the Philippine market.

Table 13. Respondents' Preference in Purchasing Mango-Based Confectioneries or Candies

Fruit-based Products	Responses		Percent of Cases
	N	Percent	
Mango Polvoron	104	19.6%	27.7%
Mango Pastillas	153	28.9%	40.8%
Mango Barquiron	31	5.8%	8.3%
Dried Mango	242	45.7%	64.5%
Others	0	0	0
TOTAL	530	100.0%	141.3%*

**The Percent of Cases is from multiple responses having more than 100% total*

Table 14 shows that there were more (36.6.7%) of the respondents answered that they would be willing to buy mango cake, while a considerable proportion of the respondents exhibited preference on mango tart (20.7%) and mango cookies (19.6%) respectively. This data denotes that baked items are the most common and readily available in the Philippine market.

Table 14. Respondents' Preference in Purchasing Mango-Based Bakery Food Items

Fruit-based Products	Responses		Percent of Cases
	N	Percent	
Mango Tart	114	20.8%	31.8%
Mango Cookies	107	19.6%	29.8%
Mango Empanada	52	9.5%	14.5%
Mango bar	74	13.5%	20.6%
Mango cake	200	36.6%	55.7%
Others	0	0	0
TOTAL	547	100.0%	152.4%*

**The percent of cases is from multiple responses having more than 100% total*

Table 15 shows that the majority (64.5%) of the respondents preferred to purchase mango jams as a spread. This relates to the fact that Filipinos are inclined to jam consumption. Thomas (2016) said that sandwich is a popular lunch food in the west while in the Philippines it is eaten for breakfast, morning and afternoon snacks and if most Westerners would prefer bacon, cheese, beef, Nutella, tomato, lettuce, ham, or tuna as their filling, Filipinos have their favorite sandwich spread, among the best-loved "*palaman*" are margarine, peanut butter, and jams.

Table 15. Respondents' Preference in Purchasing Mango-Based Spreads or Condiments

Fruit-based Products	Responses		
	N	Percent	Percent of Cases
Mango Marmalade	67	16.4%	19.3%
Mango Jam	264	64.5%	76.1%
Mango Pickle	78	19.1%	22.5%
Others	0	0	0
TOTAL	409	100.0%	117.9%*

**The Percent of Cases is from multiple responses having more than 100% total*

Table 16 shows the information and promotional tools that the respondents answered as they purchase food items. It can be observed that 81.9% said that they considered Nutritional Value when buying foods. This finding complements to the result of the study on Philippine consumer patronage of healthy meal options in food establishments (Glorioso et al., 2018).

It can be noted that price (67.1 %), free trial or free taste (53.9%), and discounts (49.7%) were also considered by them before buying food items.

With price as one of the elements in marketing strategy, it could be a motivating factor for buyers to consider (Armstrong et al., 2018) while free samples helped customers to learn about a product, while free tastes offer a more subconscious level where expectations and actions of people are in response to each other's similar way as reciprocity which is a very strong instinct that when something was done or was given, people feel a surprisingly strong obligation to do something back for them and in this case, buying the actual product being presented (Zulkifli & Yazid, 2020).

Table 16. Promotional Tools Respondents Respond To In Purchasing Products

Fruit-based Products	Responses		
	N	Percent	Percent of Cases
Nutritional Value	316	16.0%	81.9%
Packaging	160	8.1%	41.5%
Label	129	6.5%	33.4%
Price	259	13.1%	67.1%
Printed Materials	45	2.3%	11.7%
Social Media Advertisements	73	3.7%	18.9%
Telemarketing	13	.7%	3.4%
Personality Promotion	39	2.0%	10.1%
Face to Face Selling	82	4.2%	21.2%
Discount	192	9.7%	49.7%
Coupon	52	2.6%	13.5%
Premium Offer	90	4.6%	23.3%
Free Trial/ Free Taste	208	10.6%	53.9%
Accessibility of the Store	170	8.6%	44.0%
Word of Mouth	143	7.3%	37.0%
TOTAL	1971	100.0%	510.6%*

**The Percent of Cases is from multiple responses having more than 100% total*

CONCLUSIONS

Based on the results of the study, it can be concluded that there is a market for mango-based food products in Central Luzon. Consumers are demographically diverse, engaged, and educated, who are conscious of what they want in a mango-based product that ranges from the food type, price, processing, shelf-life, packaging, and preparations.

TRANSLATIONAL RESEARCH

It is highly suggested that Food Technologist, researchers, and food manufacturers develop a product that would suit the taste of the millennials, innovating on developing new product lines that bear longer shelf life that would suit the fast-paced lifestyle of the new generation. Likewise, it is recommended that product development enterprises be established through cooperatives, Small

Medium Enterprises, with the support of Local Government Units (LGUs) and other service agency providers. Production of instructional materials, manuals, and other printed materials on food processing may also be compiled and distributed.

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