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Evaluation of the Factors Affecting the Preferences and Perceptions of Consumers Toward Local Dairy Products in Palestine

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Abstract: Local foods have a positive environmental impact. Local foods not only reduce energy consumption and, consequently, the carbon footprint of the supply chain, but also require less additional packaging from producers to protect food products during transportation and marketing. This study aims to evaluate consumers' preferences and perceptions towards local dairy products in Palestine. 799 participants were surveyed and segmented based on their purchasing behavior, perceptions, and willingness to buy local dairy products. The study revealed that consumers are more inclined to purchase local dairy products compared to imported dairy products, the main competitors. Consumers showed higher intentions to buy Nabulsi cheese and Labneh compared to other dairy products, with significant positive correlations between product attributes. Based on Principal Components Analysis (PCA), three components were extracted from 18 variables. The three components identified are (1) PCA1: product attributes; (2) PCA2: perception of local products; and (3) PCA3: willingness to purchase local dairy products. These components explained 38.73%, 26.10%, and 5.71% of the total variation, respectively. Cluster analysis grouped consumers into two clusters with marked differences in socio-demographic structure and in certain perceptions of local dairy products compared to their imported counterparts. In conclusion, despite that satisfaction in the quality characteristics of local products was not very high, respondents still expressed a strong desire to buy local dairy products.

Key words: Local foods, principle component analysis, perception, dairy products.

Introduction

There is no universal consensus on the definition of local foods. According to the literature, there were three aspects to the definition of local foods: geographical, geopolitical, and agricultural (such as organic) (Cappelli et al., 2022). Local foods are characterized by the short transportation distance between the producer and the market (Grebitus et al., 2013). Therefore, many governments in the world exploit this aspect to strengthen their economies by encouraging environmentally aware consumers to buy local foods. This trend has been reinforced by the recent growth of interest in environmental issues (Feldmann and Hamm, 2014; Cappelli et al., 2022).

The production of local food products is associated with environmental, social, economic, and health benefits. Local food is believed to have a positive environmental impact by minimizing energy consumption and thereby reducing the carbon footprint of the supply chain. Additionally, producers need less additional packaging to protect food products and maintain their freshness during transportation (Shabir et al., 2023). In relation to the social effect, local food can foster trust and connectedness between and within consumers and producers, as well as between urban and rural populations, leading to better social integration (Feldmann and Hamm, 2014).

Social responsibility, sustainability, consumer activism (such as boycott movements), the desire for fresher and higher-quality products, and the growing interest in supporting local communities and economies are some of the factors influencing consumers' shift to buy more locally-produced foods (Feldmann and Hamm, 2014; Cappelli et al., 2022). Additionally, the COVID-19 pandemic has highlighted the significance of local food systems as a means of ensuring food security and minimizing supply chain disruptions. Under this umbrella, in Palestine, there is a rise in farm cooperatives and other farmer initiatives to directly organize vegetable boxes sold to consumers. In this context, certain herbal crops, like Origanum syriacum (za'atar), have gained national and economic significance and symbolism (Alwafa et al., 2021; Mudalal et al., 2022). Additionally, global efforts have been launched to use fruit and vegetable box schemes. This was notably used in England and the South of France, where consumers reported that easier access to local products and quality were the most important motives, respectively, for the shift (Brown et al., 2009). In both examples, these priorities were followed by “ecological commitment and access to organic food”, which highlights that broader systemic factors play an important role in shaping consumers’ choices. In Norway, the most important drivers for purchasing local food are empathy for local producers and social concerns. Additionally, Norwegian consumers have also valued the freshness and taste of local food (Skallerud and Wien, 2019). These findings suggested that the motivations for purchasing local food may vary across different cultural contexts. Meeting the expectations of consumers toward local foods can be achieved by improving the label visibility (Maria et al., 2015).

In addition to these benefits, the promotion of local food production and consumption can contribute to achieving a number of Sustainable Development Goals (SDGs). Increased local food production and consumption can support more people working in the agricultural and industrial sectors (SDG 8), as well as create more sustainable and secure food systems (SDG 2 and 12), which in turn can help reduce poverty (SDG 1). All these factors, when combined with their contributions to healthier diets, can also lead to improvements in overall health (SDG 3) (Sustainable Development Goals | United Nations Development Programme, n.d.).

Focusing on the Palestinian context, in 2012, it was established that local food products held a market share of 50%. However, it is important to highlight that this percentage was believed to be overestimated, according to the insights of field experts. The economic decline, including a 12% drop in GDP per capita in 2020, is also expected to have a further reduction effect on the domestic product share (PCBS, 2021). Regulatory and economic policies at various levels of government are frequently noted as being necessary to achieve this growth (Rodríguez-Espíndola et al., 2022).

However, these policies often overlook the demand side of the local food market, focusing instead on the supply side. Understanding the variables that influence consumers' behaviors toward buying local foods is necessary for active policy planning (Brune et al., 2021). Local dairy products have a significant cultural role in the Palestinian diet and economy. Moreover, they are consumed across all demographics and serve as a critical source of nutrition, particularly for children and vulnerable populations.

Based on the aforementioned information, there remains a lack of knowledge and understanding of variables affecting the preferences and perceptions of Palestinian consumers toward local products, and in particular, dairy products. The unfair trade imposed by the occupation, through

unfair trade agreements, has left Palestinian consumers facing many complications in purchasing and consumption of local products. Hence, this study represents the first attempt to evaluate the preferences and perceptions of Palestinian consumers toward local dairy products with respect to imported products (as the main competitors to local products).

Materials and Methods

Data Collection and Survey Instrument

The study was based on data collected via an online survey that was conducted on the Google Forms platform. Online platforms (e.g., social media, email lists) were used to recruit the participants. The study targeted participants from different specified rural (villages such as Jayyous, Beita, Anabta, etc.), urban (cities such as Nablus, Jenin, Tulkarem), and refugee camps (such as Jenin camp, Balata camp, Tulkarem camp) regions by posting the link to the questionnaire on Facebook pages and other social media relevant to the regions. The total number of respondents who completed the questionnaire in a valid way was 799. The respondents were distributed over various geographic areas of the West Bank and were from diverse socio-economic backgrounds based on household income. The survey was performed during the months of June and September, 2022.

The study employed a structured questionnaire as the research instrument. The questionnaire was constructed to evaluate consumers' preferences, purchase behaviors, and attitudes toward local foods. The questionnaire has been designed based on an extensive literature review of studies examining local and non-local food products (Adam and Salois, 2010; Gracía, 2013; Feldmann and Hamm, 2014; Maria *et al*., 2015; Berg and Preston, 2017; Wenzig and Gruchmann, 2018; Meyerding *et al*., 2019). Additionally, criteria and variables pertaining to local foods were collected to inform the questionnaire's development. Moreover, consultations with experts from food industries were carried out to adjust the variables and criteria. A pilot study was executed to refine the questions of the survey as well as for validation. For participants' accessibility, the questionnaire was in Arabic, but it was originally created in English. It was translated to Arabic with a high guarantee of accuracy and cultural relevance. This process includes forward translation, expert review, and reverse translation.

The questionnaire consisted of five sections. The first section consisted of socio-demographic information of respondents including age, gender, family income, educational level, marital status, living place, and number of family members. The second section was related to purchase behavior; purchase frequency, places of purchase, purchase intentions (Likert-type 5-point scales), and quality traits that affect purchase decisions (10-point scale). The third section consisted of questions about consumer attitudes and practices toward local products, including attitudes of consumers towards some traits of local products (5-point scale) and safety indicators. The fourth section was related to comparisons between local and non-local foods, including comparisons in quality traits between selected Palestinian and imported dairy products (5-point scale). In the fifth section, there were questions related to consumers' opinions about the concept of local food (multiple-choice questions about different definitions of local food) and general notes.

The study questionnaire underwent rigorous assessments to ensure content validity and reliability. In terms of validity, the questionnaire was reviewed by three experts to check the components of the questionnaire and evaluate their validity to measure the concept to be measured by the study. These steps were done to ensure both face validity and content validity. Cronbach's alpha was used to evaluate the reliability of the questionnaire; reliability values of 0.70 or higher

are considered acceptable. Reliability was measured according to the 30 questionnaires that were collected as a pilot test and showed that the Cronbach alpha result was greater than 0.9.

Statistical analysis

The data were analyzed using SPSS (Statistical Package for Social Sciences) software v21.0. The following analyses were performed sequentially:
Reliability analysis: Cronbach's alpha = 0.963
Descriptive Analysis: descriptive statistics (frequencies, means, standard deviations, etc.) and Pearson correlations were obtained where appropriate.

Principal Component Analysis (PCA): factor analysis with principal components (Pearson, 1901; Hotelling, 1933) was carried out to determine the variables with the highest importance in predicting consumer purchase behavior and to help cluster consumers into distinct groups. It was clear from the high Kaiser-Meyer-Olkin Measure of Adequacy test value of 0.94 and the highly significant result of Bartlett's test of sphericity ($P < 0.001$) that PCA multivariate analysis is the appropriate approach for this data analysis. Rotated solutions of principal components were obtained using the Varimax rotation method. The use of this rotation method to obtain orthogonal solutions was justified by the very small component correlations when using oblique (nonorthogonal) methods like the Direct Oblimin method (both methods gave similar rotated solutions). Factor scores were calculated using the regression option (REGR scores) and used in the clustering analysis.

Cluster analysis: a two-step cluster analysis (Chiu *et al*., 2001; Bacher *et al*., 2004) based on Shwarz's Bayesian Criterion (BIC) was performed to cluster consumers into segments using socio-demographic factors and the factor scores from the PCA analysis.

T-test and Cross-tabulation: first, a t-test was used to examine differences between the two identified clusters in mean scores of dependent variables (perceptions and willingness to buy local dairy products and the importance of product characteristics in determining purchasing behavior). Then, a cross-tabulation analysis was performed to compare the profiles of the identified clusters in relation to socio-demographic factors, purchasing behavior, and the definition of local products.

Results and Discussion

The socio-demographic characteristics of the study participants are shown in Table 1. The majority of respondents were females (64.6%). More than 48% of respondents belonged to the 20-to-30-year age group, with only 8.6% being older than 50 years, while the percentage of respondents that had an age between 31 and 41 years was 19.6%. With respect to the living place, 85.9% of respondents were from the Northern West Bank, 5.1% from the Southern West Bank, and 9% from the Central Areas and Jericho. Based on the type of locality, 52.6% of respondents live in villages, and 43.9% live in cities. A very low percentage of respondents (3.5%) live in refugee camps, and this may be due to a lack of internet, low educational level, or lack of interest. In this context, it was found that 80% of Palestinian households had internet access (PCBS, 2021). Even though males had more access to the internet than females (72% vs. 69%), females were more involved in filling out the questionnaire.

About 92% of respondents who participated in this study lived with their families, and the rest lived alone. Considering educational level, 70.1% of participants had a bachelor's degree, 12.1% had a master's degree, 11% finished high school or less, and 6.6% had a diploma. About 50% of respondents were married, and about 48% were single. Considering the unemployment rate, 48.8% of participants in the study had no job, 36.7% had a full-time job, and 11.9% had a part-time job.

This result was in agreement with a previous study where the unemployment rate among youth aged 19–29 reached 48.3% (PCBS, 2023).

Table 1. Socio-demographic characteristics of the study participants

CHARACTERISTIC		N	%
Sex	Female	516	64.6
	Male	283	35.4
Age	<20	88	11.0
	20-30	385	48.2
	31-40	157	19.6
	41-50	99	12.4
	>50	69	8.6
	Missing	1	0.1
Region- Place of living	Southern West Bank	41	5.1
	Central areas and Jericho	72	9.0
	Northern West Bank	686	85.9
Type of locality	City	351	43.9
	Village	420	52.6
	Camp	28	3.5
Living with family or alone?	Alone	66	8.3
	With family	733	91.7
Educational level	High school or less	88	11.0
	Diploma	53	6.6
	Bachelor's degree	560	70.1
	Master's degree or higher	97	12.1
Marital status	Single	384	48.1
	Married	402	50.3
	Divorced	8	1.0
	Widow	5	0.6
Job status	Full-time job	293	36.7
	Part-time job	95	11.9
	Retired	20	2.5
	No job	390	48.8
	Missing	1	0.1
Family size	≤3	123	15.4
	4-5	231	28.9
	6-7	283	35.4
	≥8	158	19.8
	Missing	4	0.5
Household monthly income, ILS*	<1850	88	11.0
	1850-2999	173	21.7
	3000-5000	337	42.2
	>5000	201	25.2

** ILS to USD was 0.2937, and ILS to EUR was 0.2873, extracted from xe.com on Jul 31, 2022.*

The majority of participants (64.3%) belonged to medium-sized families (4-5 individuals) and large-sized families (6-7 individuals). The average household size in Palestine was 5.8 individuals in 2007 and declined to 5 individuals in 2021 (PCBS, 2023).

Concerning household monthly income, 11% of respondents had income below the poverty line (1850 ILS), while 42.2% and 25.2% of respondents had incomes of 3000-5000 ILS and >5000 ILS, respectively.

The results of the purchasing behavior of respondents are shown in Table 2. The study showed that 46.7% of respondents do most home shopping, 28.5% do it sometimes, and 24.8% rarely do it. Ainslie and Rossi (2017) found that purchasing or shopping frequency had a significant effect on consumers' awareness of marketing practices. Customers who had a high purchasing frequency showed a higher preference for domestic products and were also more price-sensitive. Regarding the place of purchase, our study revealed that 60.5% of respondents bought their foods from hypermarkets, while 39.5% did so from mini- and micro-markets.

Additionally, it was found that 25.2% of respondents did not use any indicators or did not know anything about quality indicators. The certificate issued by the Ministry of Health of Palestine was regarded as a valid proof of food safety by the largest proportion of respondents who demonstrated awareness of certificates, amounting to 33.7%. Previous studies indicated that trust in food quality and food safety certificates varied based on the issuing party (Eden *et al*. 2008; Troung *et al*., 2021). Maria *et al*. (2015) found that major parts of respondents (more than 40%) considered quality certificates such as PDO/PGI and European Organic Farming labels as indicators of quality and safety. Conversely, a smaller fraction of respondents (5%) perceived ISO certificates as indicative of quality. The respondents in the current survey also regarded ISO certificates and Palestinian standards as reliable indicators of safety (20.2% and 21.0%, respectively). The observed lack of knowledge of safety certificates among respondents may potentially be linked to their low-income levels, as indicated by the fact that 75% of participants reported earning less than 5000 ILS. Liguori *et al.* (2022) showed that in low-income countries as well as in low-income families, the perception and awareness of food safety were low compared to accessibility to food. The results of the present study are in line with Borda *et al.* (2021) who found that about half of consumers had a lack of awareness in the biological safety of foods.

Table 2. Purchasing behavior and other characteristics of the study participants

PURCHASING BEHAVIOR		N	%
Purchasing frequency	I do home shopping sometimes	228	28.5
	I do most of the home shopping (more than 50% of the time)	373	46.7
	I rarely do shopping	198	24.8
Purchasing location	Mini and micro markets	316	39.5
	Hypermarkets and malls	483	60.5
Certificates for quality and safety	I do not know	201	25.2
	ISO certificates	161	20.2
	Ministry of Health certificates	269	33.7
	Palestinian standard certificates	168	21.0

The results related to consumers' definitions of local dairy products are shown in Table 3. There was no consensus among respondents on a strict definition for local foods. Specifically speaking, 62.8% of respondents considered dairy products local if all ingredients were domestic. Simultaneously, 78.1% of respondents considered dairy products local when all the ingredients are planted or produced on Palestinian farms, and this definition got the highest percentage among other definitions. Moreover, 63.5% of respondents agreed that dairy products are considered local if their

main ingredients are of Palestinian origin. Some respondents agreed that the local dairy products should be at least fabricated, transformed into a marketable form, or refilled in Palestine. In general, the results of the present study showed that there is no restricted definition for local foods among the respondents. In previous studies, there were also different approaches used by consumers to identify products as local foods. Meanings of "local food" differ based on the research topic and authors. Three aspects of proximity can be broadly linked to local food systems: relational proximity (close relationships among food system actors), geographical proximity (physical proximity, distance between food production and consumption), and proximity in values (place of origin, traceability, freshness, quality) (Enthoven and Van den Broeck, 2021). For example, several studies found that consumers defined local food based on their identification of the distance from the production place (Pirog and Rasmussen, 2008; Maria et al., 2015). This is in agreement with our results, where the most accepted definition for local dairy products among respondents was “all the ingredients of the product are planted or produced in Palestinian farms”. Hand and Martinez (2010) found that local food was defined based on the proximity of production to the consumers’ geographical area. On the other hand, other consumers defined local foods based on certain political boundaries (Onozaka et al., 2010), while the definition in Mediterranean countries was associated with the regional level (Scarpa et al., 2005). Some European consumers defined local food based on the distance between production sites and the place of purchase and consumption (100 km) (Kneafsey et al., 2013). Moreover, some researchers indicated that consumers defined local foods that were produced within specific political boundaries (Ilbery & Maye, 2006; Darby et al., 2008).

Table 3. Definition of a local dairy product by consumers

DEFINITIONS		N	%
All ingredients of the product should be of Palestinian origin	I do not know	86	10.8
	No	210	26.3
	Yes	502	62.8
	Missing	1	0.1
All the ingredients of the product are planted or produced in Palestinian farms	I do not know	69	8.6
	No	104	13.0
	Yes	624	78.1
	Missing	2	0.3
The main ingredients of the product should be of Palestinian origin	I do not know	103	12.9
	No	187	23.4
	Yes	507	63.5
	Missing	2	0.3
At least, the product has been fabricated, or transformed into a marketable form, or refilled in Palestine	I do not know	108	13.5
	No	197	24.7
	Yes	492	61.6
	Missing	2	0.3

The results related to the participants’ intentions to buy local dairy products in the presence of imported products are shown in Table 4. Overall, results showed that respondents were willing to buy local dairy products in the presence of imported dairy products. The average buying intention scores for all local dairy products, ranged from 3.83 to 4.25, exceeding the score of 3 out of 5, indicating that many participants expressed a "probably" or "definitely" intention to purchase local dairy products. Our study showed that respondents had significantly higher intentions to buy Nabulsi white cheese and Labneh (a type strained yoghurt) compared to other dairy products. In

general, those two products are well known as artisanal products, and they are still homemade in some Palestinian households. Many authors indicated that local foods were associated with traditional processing practices and the culture of specific geographical regions (Sylvander, 2004; Fonte, 2008). Moreover, there is no real competition between these two products and those that are imported.

Yogurt drink (laban up), a popular local product in the Palestinian community, had the second highest buying intention. In regard to the remaining products, such as flavored milk, flavored yogurt, creamy yogurt, sweetened yogurt drink, and mozzarella cheese, respondents significantly had a lower intention to buy compared to other products. This may be attributed to the tight competition between local products and imported products from neighboring countries, as well as products imported from more distant countries. These products are available on the market from local and imported sources.

Table 4. Average scores for degree of intention to buy different local dairy products in the presence of imported products.

TO WHAT DEGREE DO YOU INTEND TO BUY THE FOLLOWING LOCAL PRODUCTS?	N	MEAN*	STD. DEVIATION
Flavored milk	797	3.92[c]	1.32
Flavored yogurt	795	3.93[c]	1.29
Flavored creamy yogurt	797	3.83[c]	1.34
Sweetened yogurt drink	797	3.88[c]	1.32
Laban up	797	4.07[b]	1.29
Mozzarella cheese	795	3.84[c]	1.35
Nabulsi white cheese	797	4.20[a]	1.24
Labneh	797	4.25[a]	1.22

**Mean was calculated based on a 5-point scale (1 = Definitely would not purchase, 2 = Probably would not purchase, 3 = May or may not purchase, 4 = Probably would purchase, 5 = Definitely would purchase).*
*** Means in the same column with different superscripts are significantly different (P < 0.05).*

The findings related to the perception of local dairy products in comparison to their imported counterparts are shown in Table 5. Overall results showed that many respondents agreed (mean score was more than 3) that local dairy products were better in many quality traits than imported ones, except for attractiveness of the packaging and expiration period, where the respondents were almost undecided or neutral (3.08 vs. 3.03), respectively. The components "Does local dairy products support local agriculture" and "trust in local dairy products" obtained significantly the highest average scores by respondents compared to other components.

Globally, several authors have observed a growing interest in local foods due to various benefits, including their potential to reduce environmental pollution and support local economies (Brown *et al*., 2009; Conner *et al*., 2010). Local foods were perceived as more natural and healthier than non-local foods (Hein *et al.,* 2006). Residents of many countries around the world have numerous

reasons to purchase local foods, including supporting local farmers, promoting environmental sustainability, and recognizing the superior quality from a consumer's perspective. Palestinian consumers have a unique perspective on local foods, which is significantly influenced by national motives that support boycott campaigns against imported products. In times of global crisis, such as the COVID-19 pandemic and wars, local food systems are frequently promoted as more robust food systems (Stephens *et al*., 2020). There are not many studies about the quality of local dairy products in comparison to imported ones in Palestine. In this context, Mudalal *et al*. (2019) found no significant difference in sensory traits between certain products of local and imported UHT milk.

The current package design of local dairy products appears to lack persuasive design among the local consumer base. In this regard, enhancement of packaging design has been suggested. According to Wikström *et al.* (2018), these enhancements in packaging design necessitate an understanding of the needs of the food item across the whole life cycle of product-package combination, the uses of the product at critical junctures in that life cycle, and the packaging's food protection capabilities. Additionally, packaging design may serve as a vehicle for educating consumers about acceptable practices, such as communicating portions or alerting them when a product has expired. It is also important to note that imported products only display an expiration date without indicating the production date. Conversely, Palestinian dairy products display both production and expiration dates. Consequently, the participants expressed a neutral stance on these elements due to their inability to make a judgment.

Table 5. Perception of local products in comparison to their imported counterparts

How much do you agree with the following statements?	N	Mean	Std. Deviation
Local dairy products have better taste (LP1)	798	3.49[b]	1.10
Local dairy products support local agriculture (LP2)	797	3.79[a]	1.07
Local dairy products are healthy, natural, and have less additives (LP3)	797	3.50[b]	1.07
Local dairy products have more attractive packaging design (LP4)	797	3.08[d]	1.01
Local dairy products have a longer expiration period (LP5)	797	3.03[d]	1.06
Local dairy products have more clear labels (LP6)	797	3.27[c]	1.12
Local dairy products have lower prices (LP7)	795	3.44[b]	1.09
I have trust in local dairy products (LP8)	798	3.69[a]	1.13

**The mean was calculated based on a 5-point scale (5= strongly agree, 4 = agree, 3 = undecided or neutral, 2 = disagree, and 1 = strongly disagree).*
*** Means in the same column with different superscripts are significantly different (P < 0.05).*

Table 6 displays the mean values of the importance of product characteristics in determining consumer purchasing behavior. Safety had the highest average importance (7.60), followed by taste and flavor (7.57) and expiration date (7.07), while the average value of product size importance was 5.96. The results of our study are in agreement with previous studies. For instance, Van den Heuvel *et al*. (2007) found that consumers perceived attributes such as safety and naturalness to be major determinants of food quality.

In general, product characteristics that affect consumer purchase behavior may vary according to multiple factors, including buying motivation, level of knowledge, and level of involvement in

the purchase process (Engel *et al*., 1993). The importance of product attributes can be judged in terms of their ability to satisfy consumer needs (Aaker *et al*., 1992) or impart benefits to consumers (Aaker, 1991). Some authors showed that product attributes were perceived differently between females and males. In this context, researchers found that females sought more detailed subjective and objective knowledge about the food they bought compared to males, a behavior that is in turn associated with buying local foods (Fatha and Ayoubi, 2023).

Table 6. The mean importance of product characteristics in determining consumer purchase behavior.

PRODUCT CHARACTERISTIC	N	MEAN*	STD. DEVIATION
Naturalness (no additives)	796	6.53^{cd}	3.39
Size	795	5.96^{e}	3.11
Safety	798	7.60^{a}	3.28
Nutritional value	797	6.85^{bc}	3.19
Price	796	6.45^{d}	3.11
Supporting local products	796	6.85^{bc}	3.27
Expiration period	794	7.07^{b}	3.32
Taste and flavor	795	7.57^{a}	3.28
Package design	777	6.37^{d}	3.12

** The mean value of importance was measured on a 10-point scale (1: very little or no importance; 5: neutral; 10: very high importance).*
*** Means in the same column with different superscripts are significantly different (P < 0.05).*

Product characteristics exhibited strong positive correlations, as seen in Table 7, with correlation coefficients ranging from 0.66 to 0.92, all of which were statistically significant (P < 0.01). In particular, there were strong correlations between safety and nutritional value (0.85) as well as between safety and taste and flavor (0.92), which suggests participants believe safety to be an important factor and are highly likely to perceive nutritional value and taste and flavor as key factors. Similarly, there was a very high correlation between the expiration period and both flavor and taste. In a study conducted by Lusk and Briggeman (2009), it was claimed that there are negative relationships between product qualities, specifically safety and flavor.

Table 7. Correlations between variables represent the importance of product characteristics in determining consumer purchase behaviors

	Additives	Size	Safety	Nutritional value	Price	Supporting local products	Expiration period	Taste and flavor	Package design
Additives	1	0.68**	0.77**	0.81**	0.66**	0.72**	0.70**	0.74**	0.66**
Size		1	0.70**	.684**	0.71**	0.67**	0.65**	0.68**	0.67**
Safety			1	0.85**	0.75**	0.82**	0.84**	0.92**	0.74**
Nutritional value				1	0.71**	0.80**	0.78**	0.80**	0.73**
Price					1	0.70**	0.75**	0.77**	0.69**
Supporting local products						1	0.76**	0.81**	0.73**
Expiration period							1	0.85**	0.74**
Taste and flavor								1	0.77**
Package design									1

*** Correlation is significant at the 0.01 level (2-tailed).*

The principal component analysis (PCA), using 18 variables, was used to evaluate the perception of consumers for local dairy-product attributes as well as purchase intentions. Three components (factors) were extracted with eigenvalues > 1 (Table 8). In general, factors with eigenvalues less than 1 are not statistically significant. Altogether, the three components explained 70.55% of the total variation: the first component (PCA1) explained 38.73%, the second component (PCA2) explained 26.10% of the total variation, and the third component (PCA3) explained 5.71% of the variation.

The component plot (Figure 1) and the rotated component matrix (Annex A, Table 1-supplementary) show the factor loadings (the contribution of studied variables to extracted components). Variables with absolute loading values closer to unity have a higher contribution to the component (factor loadings less than 0.60 are considered non-important). The importance of product characteristics (loadings between 0.81 and 0.93) dominated PCA1. Perception of local products (loadings between 0.70 and 0.84) dominated PCA2, while one variable, the degree of willingness to purchase local dairy products, dominated PCA3. Hence, the first component is mainly characterized by the importance of product attributes; the second component is defined by the perceived quality of local products; and the third component is defined by the willingness of consumers to buy local products.

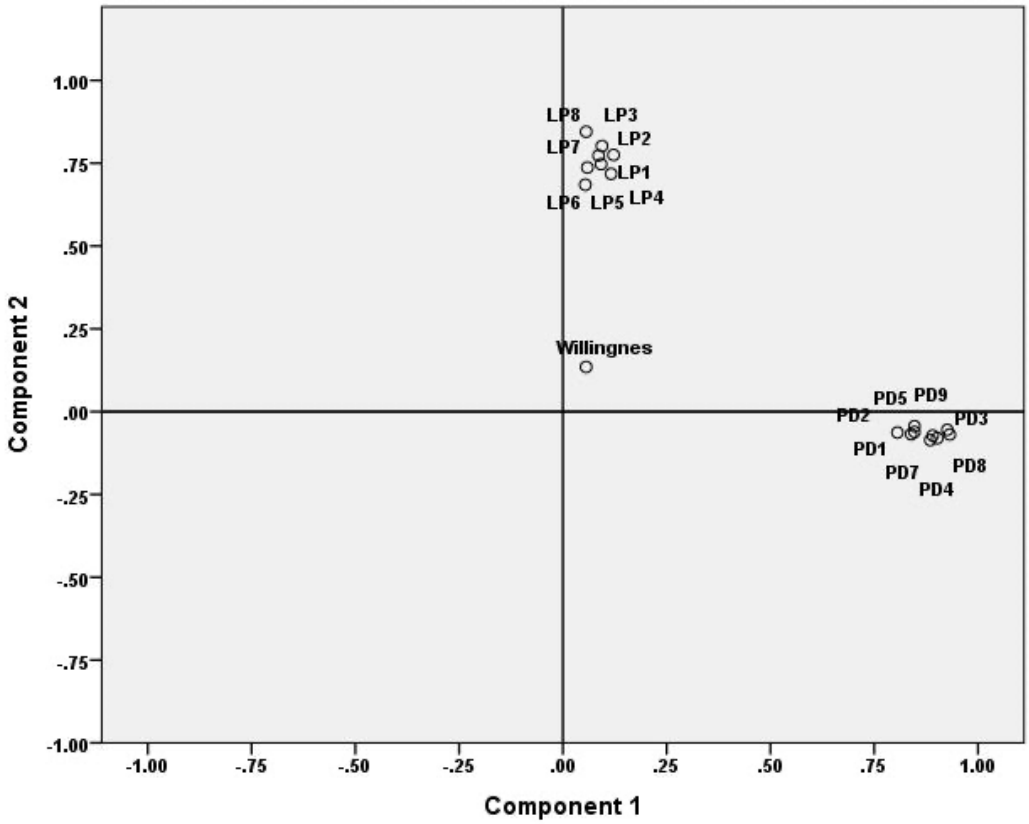

Figure 1: Component plot in rotated space showing the contribution of each of the studied product characteristics: PD1= naturalness (no additives), PD2 = size, PD3 = safety, PD4 = nutritional value, PD5 = Price, PD6 = supporting local products, PD7 = Expiration period, PD8 = Taste and flavor, PD9 = package design. LP1, LP2, ...LP8 are as defined in Table 5.

Table 8. The rotated component matrix from Principal Component Analysis shows the factor loadings (contributions) of variables to the extracted components.

IMPORTANCE OF DAIRY PRODUCT CHARACTERISTICS INFLUENCING PURCHASING BEHAVIOR:	COMPONENT		
	1	2	3
Safety	.93	.02	.01
Taste and flavor	.93	.03	-.02
Nutritional value	.91	.00	.01
Expiration period	.89	.01	-.04
Supporting local products	.89	.00	.00
Additives	.85	.02	.04
Price	.85	.03	.01
Packaging design	.84	.01	-.01
Size	.81	.01	.06
Perception of local dairy products:			
I have trust in local dairy products	-.03	.84	.17
Local dairy products are healthy, natural, and have less additives	.02	.81	.00
Local dairy products have better taste	.05	.78	.09
Local dairy product supports local agriculture	.01	.77	.20
Local dairy products have lower prices	.02	.75	.01
Local dairy products have more clear labels	-.01	.74	.03
Local dairy products have more attractive packaging design	.05	.74	-.14
Local dairy products have longer expiration period	-.01	.70	-.18
Willingness to buy local dairy products	.03	.08	.95

Two clusters of consumers were identified using the two-step cluster analysis. The first cluster included 343 consumers (42.9%), and the second cluster included 456 consumers (57.1%), (Figure 2). Marital status was the most important variable in clustering consumers, followed by age, job status, family size, gender, and educational level. The remaining variables have lower contributions, with REGR1 (factor score from the first PCA component) being the least important factor (Figure 3).

The main socio-demographic characteristics of the two clusters are in Figure 2. The first cluster was characterized by a high percentage of single participants (98.5 %), young consumers aged 20-30 years (74.9%), unemployed (83.1% with no job), and predominantly females (84.3%). The

second cluster included mostly married (87.3%), employed respondents (59.9% have a full job) with 50.2% being males, and the dominant age group was 31-40 years (34.4%). About 63% in the first cluster live in villages while 52.4% from the second cluster live in cities. The first cluster has a higher proportion living in the northern region of the West Bank (93.6% vs. 80.0%) and higher proportion with a bachelor degree than in the second cluster (86.9% vs. 57.7%) but a lower proportion living with their family (85.4% vs. 96.5%), The household income in the two clusters was quite similar.

The two clusters differed significantly ($P < 0.05$) in the average factor scores of the first principal component (0.09 vs. -0.07) and the third principal component (- 0.21 vs. 0.16) but did not differ ($P > 0.05$) in the average factor score of the first component (0.03 vs. -0.02), (Figure 2).

Clusters

Input (Predictor) Importance

1.0 0.8 0.6 0.4 0.2 0.0

Cluster	2	1
Label		
Description		
Size	57.1% (456)	42.9% (343)
Inputs	Marital status Married (87.3%)	Marital status Single (98.5%)
	Age 31-40 (34.4%)	Age 20-30 (74.9%)
	Job status Full time job (59.9%)	Job status No job (83.1%)
	Family size 4-5 (38.8%)	Family size 6-7 (44.6%)
	Gender Male (50.2%)	Gender Female (84.3%)
	Educational level Bachelor degree (57.7%)	Educational level Bachelor degree (86.9%)
	Living with family or alone? With family (96.5%)	Living with family or alone? With family (85.4%)
	Type of locality City (52.4%)	Type of locality Village (63.3%)
	Region Northern West Bank (80.0%)	Region Northern West Bank (93.6%)
	REGR3 0.16	REGR3 -0.21
	Household income 3000-5000 ILS (42.1%)	Household income 3000-5000 ILS (42.3%)
	REGR2 -0.07	REGR2 0.09
	REGR1 -0.02	REGR1 0.03

Figure 2a: Two-Step clustering of consumers.

	Cluster	1	2
	Size	 42.9% (343)	 57.1% (456)
Inputs	Marital Status	Single (98.5%)	Married (87.3%)
	Age	20-30 (74.9%)	31-40 (34.4%)
	Job Status	No job (83.1%)	Full time job (59.9%)
	Family size	6-7 (44.6%)	4-5(38.8%)
	Gender	Female (84.3%)	Male (50.2%)
	Educational Level	Bachelor Degree (86.9%)	Bachelor Degree (57.7%)
	Living with Family or Alone?	With Family (85.4%)	With Family (96.5%)
	Type of Locality	Village (63.3%)	City (52.4%)
	Region	Northern West Bank (93.6%)	Northern West Bank (80.0%)
	REGR3	-0.21	0.019
	REGR2	0.09	-0.07
	REGR1	003	-0.02
	Household Income	3000-5000 ILS (42.3%)	3000-5000ILS (42.1%)

Figure 2b: Two-Step clustering of consumers.

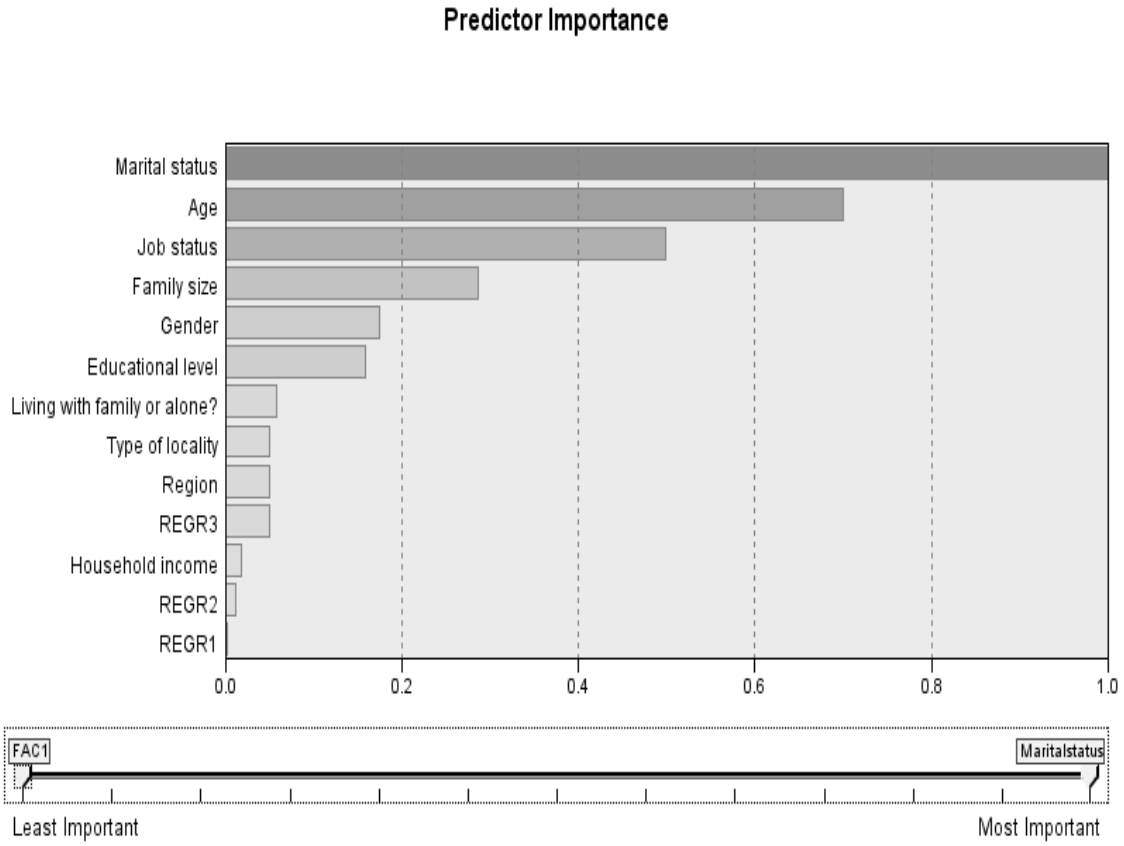

Figure 3: Importance of predictor variables used in the two-step clustering of consumers

The purchase behavior traits for the two consumer clusters are shown in Table 10. About two-thirds (65.5%) of respondents in the first cluster do most of their home shopping, mainly in hypermarkets and malls (67.3%), and 35.2% considered the certificate from the Ministry of Health as an indicator for quality and safety. In the second cluster, 42.9% of respondents rarely shop, and 31.7% consider the certificate from the Ministry of Health as an indicator of quality and safety. Overall, respondents showed high confidence in local food quality certificates (in our case, certificates from the Ministry of Health).

Table 9. Purchasing behavior of the identified consumer segments

	CLUSTER	
CHARACTERISTIC	1	2
Purchasing frequency	I do most of home shopping (65.5%)	I rarely do shopping (42.9%)
Purchasing place	Hypermarkets and malls (67.3%)	Hypermarkets and malls (51.6%)
Indicator of quality	Ministry of Health (35.2%)	Ministry of Health (31.7%)

More than half of respondents in the two clusters (64.1% and 60.5%, respectively) considered foods as local when all ingredients originated from Palestine (Annex A, Table 2 - supplementary). The highest proportion of respondents in both clusters (79.5% and 76.4%) endorsed the item "All the ingredients of the product are planted or produced in Palestinian farms" as a definition of local foods. In cluster 2, a lower proportion of respondents (57.6%) compared to the first cluster (67.9%) considered food as local if "it was at least fabricated, transformed into a marketable form, or refilled in Palestine".

There were differences in mean scores among the identified clusters regarding the importance of dairy product characteristics in purchasing behavior, perception, and willingness to purchase local dairy products (Annex A, Table 3-supplementary). Both clusters of respondents considered the characteristics of dairy products (such as the presence of synthetic additives, size, safety, etc.) to have high importance in determining their purchase with no significant difference between the two clusters ($P > 0.05$). The first cluster of respondents believed that local dairy products were superior to imported products in various traits, including sensory, labeling information, package design, and price, compared to the second cluster. Even though the second cluster of respondents perceived some local product traits lower than the first cluster, their intention to purchase local products was significantly higher than that of the first cluster ($P < 0.001$). This may indicate that other factors may be important in determining the difference in willingness to buy local products.

According to Johansen, Naes, and Hersleth (2011), food choice is a complicated process that is impacted by both the product and the consuming situation. It encompasses the consumer's knowledge, attitudes, and beliefs. As a result, consumers may have varying reasons for consuming a specific food product. Through efficient marketing strategies that impact consumer purchasing behavior, segmentation enables marketers to pinpoint unique market possibilities (Peltier & Schribrowsky, 1997). The use of causative variables to identify market categories is one advantage of segmentation (Duncan *et al*., 2015).

Conclusion

In conclusion, our study showed that Palestinian consumers are aware of food quality attributes and have a high intention to buy local dairy products. Overall, the results indicated that respondents lacked a clear definition of what local foods are. Local dairy products still require further development in comparison to their competing products. The potential growth in the consumption of local dairy products is possible by resolving important quality issues, raising awareness of product labeling and certification, and putting focused marketing techniques into practice. Local dairy products might become even more competitive when compared to imported alternatives if local production is strengthened via legislative assistance and consumer education.

Practical and Humanitarian Considerations

Although only 3.5% of our sample came from refugee camps, their inclusion provides critical understanding of food choices and diet challenges for one of the most vulnerable groups in Palestine. Refugees living in camps often struggle with high levels of food insecurity, which is associated with humanitarian aid dependence, acceptability issues, and other financial constraints. This is linked to the influence on their diet quality, diversity, and pattern. In turn, for this population, food choices are often not a reflection of preference but rather a consequence of systemic constraints. Limited availability, affordability, and accessibility of diverse foods significantly reduce their ability to make choices based on source, taste, nutrition, or cultural preferences. By focusing on these specific underrepresented groups, policymakers and stakeholders should address their needs by improving food accessibility, availability, and sustainability across all Palestinian communities.

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Annex A

Table 1 – supplementary: Eigenvalues and percentage of total variance explained by each principal component.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative%	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.97	38.73	38.73	6.97	38.73	38.73	6.95	38.62	38.62
2	4.70	26.10	64.84	4.70	26.10	64.84	4.70	26.12	64.74
3	1.03	5.71	70.55	1.03	5.71	70.55	1.05	5.81	70.55
4	.78	4.32	74.87						
5	.58	3.24	78.11						
6	.53	2.93	81.04						
7	.44	2.46	83.50						
8	.40	2.21	85.71						
9	.39	2.16	87.86						
10	.37	2.05	89.92						
11	.36	2.03	91.94						
12	.30	1.67	93.61						
13	.27	1.52	95.13						
14	.24	1.36	96.49						
15	.22	1.23	97.72						
16	.17	.95	98.67						
17	.16	.92	99.58						
18	.07	.42	100.00						

Extraction Method: Principal Component Analysis.

Table 2 - supplementary: Definition of local products by consumer segments

Characteristic	Cluster	
	1	2
All ingredients of the product should be from Palestinian origin	Yes (64.6)	Yes (60.5)
All the ingredients of the product are planted or produced in Palestinian farms	Yes (79.4)	Yes (76.4)
The main ingredients of the product should be of Palestinian origin	Yes (67.9)	Yes (57.6)

Table 3 supplementary - Differences between identified clusters in mean scores of the importance of dairy product characteristics in purchasing behavior, perception, and willingness to buy local dairy products.

	Cluster		P value
	1	2	
Importance of Dairy Product characteristics influencing purchasing behavior:			
Additives	6.48	6.56	0.734
Size	5.95	5.96	0.946
Safety	7.76	7.47	0.228
Nutritional value	6.96	6.77	0.403
Price	6.48	6.43	0.821
Supporting local products	6.93	6.79	0.553
Expiration period	7.21	6.97	0.324
Taste and flavor	7.70	7.47	0.330
Packaging design	6.47	6.29	0.422
Perception of local dairy products compared to their imported counterparts:			
Local dairy products have better taste	3.50	3.47	0.736
Local dairy product supports local agriculture	3.80	3.79	0.874
Local dairy products are healthy, natural, and have less additives	3.59	3.44	0.049
Local dairy products have more attractive packaging design	3.18	3.00	0.014
Local dairy products have longer expiration period	3.10	2.97	0.100
Local dairy products have more clear labels	3.34	3.21	0.103
Local dairy products have lower prices	3.53	3.37	0.039
I have trust in local dairy products	3.80	3.61	0.017
Willingness to buy local dairy products	3.77	4.15	< 0.001