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THE ASSESSMENT OF CUT FLOWER CONSUMER PREFERENCES: A CASE STUDY OF ISPARTA PROVINCE IN TÜRKİYE

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Abstract

The consumption of cut flowers is a widespread practice, valued for their aesthetic appeal and ability to enhance emotional well-being. Flowers beautify living spaces and positively influence mood in homes, workplaces, and public areas by offering stress relief and promoting positive emotions. This study investigates the potential for cut flower consumption and examines consumer trends based on primary data collected through face-to-face interviews with 384 urban residents of Isparta province, Türkiye. The survey sample size was determined using the 'unclustered single-stage simple random probability sampling' method. A logistic regression model was employed to identify key factors influencing cut flower purchasing behavior. The results show that 64.6% of participants reported purchasing cut flowers, with birthdays (41.7%) and Mother's Day (40.1%) being the most common occasions for these purchases. Roses (54.7%), carnations (34.1%), and daisies (33.6%) were the most preferred flower types, while red (29%) and white (12.4%) were the most popular colors. Consumers prioritized flower type and variety when purchasing, followed by price considerations. Notably, 55% of respondents perceived cut flowers as expensive, and 42% reported that price increases affected the quantity of flowers they purchased. Logistic regression analysis revealed that age and income level were statistically significant variables of purchasing behavior at the 1% level. Education level also had a significant impact, with the first and third categories being significant at the 5% and 10% levels, respectively. The findings suggest that the likelihood of purchasing cut flowers increases with higher age, education, and income levels.

Key words**:** *cut flower, consumption, preference, behavior, logistic regression*

INTRODUCTION

The history of ornamental plants in Türkiye dates back to the Ottoman Empire, representing a sector once valued highly enough to lend its name to a historical era. The production of flowers and potted plants in Türkiye began in the 1940s and continues today [26]. Ornamental plants are defined as decorative plants grown for aesthetic, functional, and economic purposes. They can also be described as plants that display visual appeal through their buds, flowers, fruits, leaves, branches, or forms, or as plants that stand out due to these characteristics. Globally, ornamental plants are categorized into three groups: cut flowers, outdoor plants, and indoor (potted) plants, while in Türkiye, they are classified based on usage purposes into four groups: cut flowers, outdoor ornamental plants, indoor ornamental plants, and native flower bulbs [25]. The concept of cut flowers generally refers to fresh, dried, dyed, or bleached flowers, buds, branches, and leaves used in bouquets, baskets, wreaths, and arrangements [24]. Additionally, cut flowers are now offered in creative arrangements featuring chocolates, sweets, and fruits to appeal to new consumer preferences and younger consumers.

The initiation of cut flower production in developed countries is largely attributable to the fact that these countries are also the largest consumers of cut flowers. Initially, developed countries produced only to meet their own domestic needs; however, as consumption increased and became more widespread, they combined their accumulated expertise with new technologies and emerged as major producers of cut flowers globally. Today, however, it is observed that most production areas have shifted to developing countries. From a commercial perspective, this shift indicates that almost all developing countries have become exporters, while most developed

countries have transitioned to being importers [13].

Colombia, Brazil, India, Indonesia, Ecuador, Mexico, China, and South Africa are among the world's leading countries in cut flower cultivation and are also some of the richest nations in terms of global plant biodiversity. According to 2021 data, global cut flower exports reached $11.6 billion. The top exporting countries in this sector are the Netherlands, Colombia, Ecuador, Kenya, and Ethiopia, with Türkiye ranking 15th. In 2022, Türkiye's cut flower exports decreased by 17% compared to the previous year, totaling $49.4 million. The primary export markets for this product group are the Netherlands, the United Kingdom (UK), and Russia. In 2021, global cut flower imports amounted to $10.354 billion. Major importing countries for cut flowers include the United States of America (USA), Germany, the Netherlands, and the UK [1].

Given the delicate and perishable nature of cut flowers, the development of cold chain logistics from harvest to marketing is critically important [11]. Although the sector has yet to achieve the desired and anticipated levels under current conditions, its substantial production and export potential necessitate dedicated attention and focus.

Türkiye, located at the intersection of three major gene centers of the world, possesses remarkable plant genetic diversity and rich potential due to its varied geomorphological and climatological characteristics [40]. In Türkiye, cut flower production has notably developed in the Marmara, Aegean, and Mediterranean regions. In 2022, ornamental plant cultivation spanned a total of 5,687 hectares, with 70% of production areas dedicated to outdoor plants and 26% to cut flowers. Antalya and Izmir are the leading provinces for cut flower production, with Antalya producing high-quality, export-oriented flowers, primarily grown in greenhouses [2]. The study area, Isparta, has also become an important province for cut flower production in recent years. According to 2022 data from the Turkish Statistical Institute (TUIK), Isparta produced 750,000 roses and 243 million carnations across 1,815 decares [41].

The consumption of cut flowers is a common practice worldwide due to their aesthetic appeal and natural beauty. From an aesthetic and psychological perspective, flowers enhance living spaces, positively influencing mood in homes, offices, and public areas. They help reduce stress and promote positive emotions [37]. In terms of ecosystems and natural resources, cut flowers are derived from plants cultivated with essential resources like water, soil, and sunlight, thereby supporting the horticulture and floriculture sectors [42]. Economically, the cut flower industry represents a multi-billion-dollar market globally. It contributes significantly to the agricultural sector by creating jobs in many countries and promoting economic growth. Additionally, it holds substantial value in international trade [14]. Socially and culturally, flowers are used as symbols of love, appreciation, and respect on important occasions such as weddings, birthdays, and graduations [23]. Environmentally, the cultivation of flowers requires a significant amount of energy, water, and chemicals. Therefore, sustainable resource use is an important consideration for both producers and consumers [33].

The increasing number of informed consumers in society has led to a growing emphasis on consumer behavior in the literature. Consumer behavior refers to the processes involved in individuals' decisions regarding which goods and services to purchase, from whom, how, where, and when to make purchases—or whether to purchase at all. In other words, consumer behavior encompasses how and why individuals, as consumers, make decisions and behave in relation to goods and services that meet their needs. The foundation of consumer behavior is purchasing behavior [3].

The literature includes various studies on the consumption of cut flowers or ornamental plants [5, 6, 15, 20, 21, 22, 27, 28, 30, 32, 34, 35, 36, 39]. However, studies specifically focused on Türkiye are relatively scarce [8, 10, 12, 17, 31, 43, 44, 45]. A review of the literature on consumer behavior related to flowers reveals that past studies have not adequately addressed preferences concerning

cut flower products. This underscores the significance of the present study.

This study aims to assess the potential for cut flower consumption and analyze consumer preferences in Isparta province, Türkiye. By examining consumer behavior, we seek to identify the key factors driving purchasing decisions for cut flowers. Understanding the factors influencing cut flower purchases and developing targeted production and marketing strategies are crucial for stakeholders directly or indirectly involved in the cut flower industry, including private sector representatives and policymakers. Thus, this research aims to serve as a reference for producers, consumers, researchers, and policymakers.

MATERIALS AND METHODS

Data

The primary data source for this research comprises responses collected from a survey conducted through face-to-face interviews with 384 consumers residing in the province of Isparta who voluntarily participated. The sample size for the survey was determined using the 'unclustered single-stage simple random probability sampling' method [9].

(1) $N = t^2 \frac{(p*q)}{e^2}$

where:

N: Sample size

t: Table value corresponding to a 95% confidence level (1.96)

p: Probability of the event occurring (set to 0.50 in this study to maximize the sample size)

q: Probability of the event not occurring (q = 1 - p, i.e., 0.50)

e: Acceptable margin of error in sampling (5%)

Given this information, the sample size was calculated as 384, and participants were randomly selected. The collected data were analyzed using the SPSS 26.0 statistical software package [38] and MS Excel [29].

The survey questions prepared to obtain primary data were designed in alignment with the research objectives, drawing on previous studies conducted for similar purposes. The survey includes questions on demographic information, preferred days for purchasing cut flowers, reasons for preferences, types of preferences, locations, and times of purchase. Proportional distributions and the logistic regression model were used in the data analysis—the logistic regression model aimed to identify the factors influencing the purchase of cut flowers.

Additionally, various secondary data sources were utilized, including past studies on consumer behavior related to cut flowers, reports, theses, and existing statistical data obtained from national and international research organizations.

Model

The logistic regression model was employed to analyze the factors influencing the purchase of cut flowers using primary data collected through face-to-face surveys with participants. The model is a nonlinear regression model specifically designed for binary dependent variables. The econometric model, based on the logistic probability function, is expressed as follows [18]:

(2)
$$Prob(Y_i = 1) = P_i = F(Z_i) = F(\alpha + \beta X_i) = \frac{1}{\left(1+e^{-(Z_i)}\right)} = \frac{1}{1+e^{-(\alpha+\beta X_i)}}$$

(3) $$Prob(Y_i = 0) = 1 - P_i = \frac{1}{1+e^{(\alpha+\beta X_i)}}$$

Here, F represents the cumulative probability function, e is the exponential constant, α is the intercept coefficient, β is the parameter to be estimated for each explanatory variable, and X_i denotes the i-th independent variable. From Equations (2) and (3):

(4) $$\frac{Prob(Y_i=1)}{Prob(Y_i=0)} = \frac{P_i}{1-P_i} = e^{Z_i}$$

Taking the natural logarithm of both sides of Equation (4) yields the following equation.

(5)
$$L_i = ln\left[\frac{P_i}{1-P_i}\right] = Z_i = \alpha + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n + \varepsilon_i$$

In the model, the dependent variable (WP: willingness to purchase cut flowers) is expressed as the natural logarithmic value of

the ratio of preferring a particular option to not preferring it. It is assumed that if participants are willing to purchase cut flowers, y = 1; and if not, y = 0. The independent variables included in the model were determined based on the information obtained from the literature review. Thus, the identified independent variables are, respectively, the participant's gender (GND), age (AGE), education level (EDU), occupation (OCP), and monthly income (INC).

(6)

$$WP = \alpha + \beta_1 GND + \beta_2 AGE + \beta_3 EDU + \beta_4 OCP + \beta_5 INC + \varepsilon_i$$

The logistic regression model is advantageous because it does not rely on the assumption of linearity between the dependent and independent variables, nor does it assume homoscedasticity. Due to these advantages of the approach, logistic regression estimation has been used in the study. To assess the model's fit between the observed and predicted values, the Hosmer-Lemeshow test [19] was applied. Additionally, the analyses were conducted using SPSS 26.0 [38].

RESULTS AND DISCUSSIONS

Research Findings

It was observed that 55.7% of the individuals who agreed to participate in the survey are male, 58.6% are married, 41.1% hold a bachelor's degree, and 35.4% are civil servants. Among the occupational groups, civil servants (35.4%) constitute the largest group, followed by students (17.4%) and workers (15.6%). When analyzing the participants by age group, the highest proportion (26%) belongs to the 16-25 age range, followed closely by the 26-35 age group at 25.1%. These proportions are significantly lower than those reported in the study by Djokoto et al. (2018) [15]. In Gençer's (2014) [17] research, the majority of consumers (42%) were over the age of 40, while only 24% were aged 30 or below. Regarding the participants' average monthly personal income, those earning above 10,000₺ represent the highest proportion at 60.4%. In terms of average household income, it was found that 81% of participants have a household income exceeding 10,000₺. This figure is relatively low in comparison to the study by Li et al. (2016) [27], where 53% of the sample reported earning approximately 50,000 $ annually.

Table 1. Descriptive statistics of the sample population

Variables	Group	f	%
Gender	Female	170	44.3
	Male	214	55.7
Marital Status	Married	225	58.6
	Single	138	35.9
	Divorced/Separated	21	5.5
Occupation	Student	67	17.4
	Civil Servant	136	35.4
	Worker	60	15.6
	Retired	22	5.7
	Housewife	26	6.8
	Freelancer	48	12.5
	Farmer	3	0.8
	Unemployed	11	2.9
	Other	11	2.9
Age	16-25	100	26.0
	26-35	97	25.1
	36-45	88	23.0
	46-55	62	16.2
	56-65	28	7.4
	66-75	9	2.5
Monthly Income (Personal)	Below 5,000 ₺	95	24.7
	5,001-10,000 ₺	57	14.9
	Above 10,000 ₺	232	60.4
Monthly Income (Household)	Below 5,000 ₺	21	5.5
	5,001-10,000 ₺	52	13.5
	Above 10,000 ₺	311	81.0
Education	Primary School	34	8.9
	Secondary School	89	23.2
	Bachelor's Degree	222	57.8
	Postgraduate	39	10.1

Source: The author's calculations.

When examining consumer preferences for cut flowers, it was found that 248 out of 384 participants (64.6%) expressed a preference for purchasing them. In a study by Djokoto et al. (2018) [15], only 30% of participants reported buying cut flowers, while in a study by Asiedu (2014) [4], 79% of participants made a purchase. When the participants were asked about specific occasions for which they preferred to buy cut flowers, it was found that the most popular occasions identified were birthdays (41.7%) and Mother's Day (40.1%). In contrast, the least popular occasions were holidays (0.8%) and funerals (1.6%) (see Table 2). Additionally, a study by Yazıcı and Gülgün (2020) [44] conducted in the Tokat province of

Türkiye revealed that the most popular occasion for purchasing cut flowers was Valentine's Day (64.3%), followed by birthdays (50.6%) and Mother's Day, which ranked third at 43.8%. Regarding expenditures on cut flowers for special occasions, the highest amount spent was 3,000₺ for engagements, weddings, and bridal ceremonies. This was followed by 2,000₺ for Mother's Day and Father's Day. The lowest expenditure recorded was 10₺ for World Working Women's Day.

Table 2. Preferences for cut flowers on special occasions

Special Occasions	f	%
Birthday	160	41.7
Mother's Day	154	40.1
Valentine's Day	99	25.8
Wedding Anniversary	76	19.8
Father's Day	54	14.1
Hospital Visit	48	12.5
Teacher's Day	41	10.7
World Working Women's Day	29	7.6
Birth Congratulations	23	6.0
Engagement, Wedding, and Bridal Ceremonies	21	5.5
Promotion and Appointment Celebrations	19	4.9
New Year	10	2.6
Grave Visit	9	2.3
Religious Holidays	6	1.6
Funeral	3	0.8
Other Special Occasions	3	0.8

Source: The author's calculations.

When examining the preferred types of cut flowers, the results showed that roses (54.7%), carnations (34.1%), and daisies (33.6%) were the most preferred. In contrast, the least favored types were eryngium (1.0%) and lisianthus (0.8%). In terms of purchasing frequency, most consumers typically buy cut flowers two to three times a year (43.2%), followed by those who purchase them once a year (See Table 3). Regarding potted ornamental plants, the majority of respondents (60.9%) reported that they do not purchase them at all. Among those who do, the most common frequency was once per year (15.1%). Similarly, when it comes to artificial flowers, most participants (85.4%) indicated that they do not prefer to buy them, while a smaller portion (9.4%) reported purchasing them annually.

Table 3. Frequency of Purchasing Cut Flowers

Ferquency	f	%
Once a week	1	0.3
2–3 times a week	1	0.3
Once a month	15	3.9
2–3 times a month	10	2.6
Once a year	58	15.1
2–3 times a year	166	43.2
Never	133	34.6
Total	384	100.0

Source: The author's calculations.

When choosing cut flowers, consumers prioritize various factors. The type and variety of flowers rank first, followed by price, which comes in second. In the survey, 55% of respondents considered cut flowers to be expensive, while 42% stated that increases in the price of cut flowers affected the quantity they purchased. These findings highlight the importance of price as a secondary factor in consumers' decision-making processes regarding cut flowers. Flower color was identified as the third most important criterion, while the longevity of the flowers was deemed the least significant factor in the selection process.

The preferred points of purchase for cut flowers were identified as follows: florist shops (55.2%), online platforms (33.6%), street vendors (13.3%), and supermarkets (10.4%). The least popular sales channel was flower stalls, with only 5.2% of participants choosing this option (see Table 4). In a study conducted by Paiva et al. (2020) [32] in Brazil with 1,047 participants, flower shops were the most favored locations for purchasing cut flowers (61.5%), followed by supermarkets (37.8%). In contrast, only 3.2% of participants preferred online shopping for cut flowers. Similar to our findings, a survey by Rombach et al. (2018) [36] in Germany indicated that 47.5% of participants purchased cut flowers online. These findings underscore the growing importance and role of online platforms in the purchase of cut flowers, especially in Türkiye.

Table 4. Preferred places for purchasing flowers

Places	f	%
Florist shop	212	55.2
Street vendors	51	13.3
Supermarket	40	10.4
Internet	129	33.6
Flower stalls	20	5.2
Telephone orders	35	9.1

Source: The author's calculations.

The findings indicate that 41% of consumers perceive flower sales outlets as adequate, whereas 22% consider them inadequate. Additionally, 37%

of consumers did not express an opinion on this matter. When asked whether they could find flowers of the desired quality and type, 47% of respondents answered affirmatively, while 15% reported otherwise. An analysis of the reasons for consumers' preference for cut flowers revealed that the primary factors were aesthetic appeal (39.6%), perceived meaningfulness (33.3%), a preference for cut flowers by the person from whom they purchased (29.9%), and the availability of a wide range of colors and varieties (26.8%). These findings align with those of Yazıcı and Gülgün (2020) [44], who identified aesthetic appeal (20.5%), perceived meaningfulness (13.7%), and the recipient's preference (12.3%) as the most significant factors influencing the choice of cut flowers.

An analysis of the preferred seasons for purchasing cut flowers revealed that a significant proportion of consumers (29.7%) do not differentiate between seasons; they purchase cut flowers year-round. Among those with seasonal preferences, spring was the most favored season (12.5%), followed by summer (10.4%). Regarding color preferences, the most commonly chosen colors were red (29%), white (12.4%), and pink (5.7%). Similarly, Yazıcı and Gülgün (2020) [44] found that white (56.1%), red (41.1%), and pink (28.6%) were the most preferred colors for cut flowers. Their findings align with the current study, particularly in identifying red, white, and pink as the leading color choices, albeit with differing proportions.

Model Estimation

To determine the factors influencing the willingness to purchase cut flowers, a logistic regression analysis was conducted, as previously mentioned. For this purpose, this analysis incorporated various socio-demographic factors, such as gender, age, and education, as well as economic factors, including income and occupation, which are hypothesized to affect individuals' willingness to purchase cut flowers. The results of the logistic regression model are presented in Table 5.

The Hosmer-Lemeshow test yielded a goodness-of-fit statistic of 11.99 (p-value = 0.15, which is greater than 0.05). This indicates that there is no significant difference between the model and the observed data, confirming the model's suitability for the dataset. According to the findings, the age and income level factors are statistically significant at the 1% level. Among the education level variables, the first is statistically significant at the 5% level, while the third is significant at the 10% level. In contrast, the variables of gender and occupation were found to have no statistically significant effect on consumers' willingness to purchase cut flowers.

Table 5. Logistic regression results

Variable	B	S.E.	P value	Exp (B)
GND	0.27	0.25	0.28	1.31
AGE	0.03	0.01	0.01***	1.03
EDU (1)	1.49	0.72	0.04**	4.42
EDU (2)	0.72	0.55	0.19	2.06
EDU (3)	0.89	0.52	0.09*	2.43
OCP	0.10	0.06	0.10	1.11
INC (1)	1.39	0.34	0.00***	3.99
INC (2)	1.37	0.34	0.00***	3.94
Constant	-3.86	0.76	0.00***	0.02
Hosmer- Lemeshow Test			11.99	
-2 Log likelihood			444.51	
Nagelkerke R Square			0.18	

Source: The author's calculations.

The estimation results indicate that consumers' willingness to purchase cut flowers increases by 3% with each additional year of age, aligning with the findings of Li et al. (2016) [27]. Income level also emerged as a significant factor, with higher income associated with a greater likelihood of purchasing cut flowers. Similarly, Djokoto et al. (2018) [15] found that participants with higher income levels were more likely to buy cut flowers. This finding reinforces the understanding that cut flowers are a discretionary purchase valued for their aesthetic appeal rather than a necessity. In contrast to Rombach et al.'s (2021) [35] findings in Germany, this study demonstrated that education level significantly influenced the willingness to purchase cut flowers. Similarly, a survey by Dalgıç et al. (2024) [12], which analyzed the consumption of ornamental plants in Eskişehir province, Türkiye, found that education level was statistically significant at the 5% level, aligning with our results. Specifically, our research indicates that primary school graduates and undergraduate degree holders are 4.4 and 2.4 times more likely, respectively, to purchase cut flowers compared to postgraduate degree holders.

These findings suggest that consumers' purchasing behaviors are influenced by social, economic, and demographic factors. As individuals age, they tend to prioritize aesthetic and emotional values, leading to a greater interest in gifts or decorative products such as cut flowers. This shift can be attributed to accumulated life experiences and a growing appreciation for aesthetic values over time. Additionally, individuals with higher education levels are more likely to choose environmentally friendly products and to place greater importance on aesthetics. This trend can be explained by the fact that increased education often correlates with higher levels of knowledge and awareness, which in turn drives greater investment in the consumption of cut flowers. The practice of giving cut flowers as gifts or using them for decorative purposes also aligns with social norms and fulfills psychological needs. As individuals' income levels rise, their spending on items associated with social interactions and aesthetic appeal is expected to increase. Cut flowers, which are considered nonessential yet carry aesthetic and social prestige, become more desirable to individuals once their basic needs have been met. This inclination toward luxury and aesthetic products typically grows with higher disposable income [7, 16]. Consequently, the findings align with our expectations.

CONCLUSIONS

Although cut flowers, in particular, are not considered essential needs, they play a significant role in social life by allowing individuals to express their emotions and thoughts, and they bring joy when purchased for themselves or loved ones. Despite Türkiye's considerable potential for cut flower cultivation, there is a notable lack of scientific studies addressing this subject.

This study investigates the potential for cut flower consumption and consumer trends through face-to-face interviews conducted with 384 individuals residing in the urban area of Isparta province, Türkiye. The findings reveal that 64.6% of participants reported purchasing cut flowers. Birthdays (41.7%) and Mother's Day (40.1%) emerged as the most common occasions for buying flowers. Regarding expenditures, the highest amounts were allocated to engagements and weddings, whereas the lowest expenses were associated with World Working Women's Day. The most preferred types of cut flowers were roses (54.7%), carnations (34.1%), and daisies (33.6%). Regarding color preferences in cut flower purchases, red was the most popular (29%), followed by white (12.4%). Most consumers did not limit their purchases to specific seasons, with 29.7% purchasing cut flowers throughout the year. On average, participants reported buying cut flowers 2–3 times per year. However, the majority expressed a low preference for potted ornamental plants, with 60.9% indicating they did not purchase them. In terms of purchase locations, 55.2% of consumers favored florists, while 33.6% preferred online shopping. The primary motivations for choosing cut flowers included aesthetics (39.6%), their symbolic or meaningful value (33.3%), the recipient's personal preferences (29.9%), and the availability of diverse colors and varieties (26.8%). When prioritizing their purchasing decisions, consumers placed the greatest emphasis on the type and variety of flowers, followed by price. Notably, 55% of consumers perceived cut flowers as expensive, and 42% indicated that price increases influenced the quantity of flowers they purchased.

The results of the logistic regression analysis indicate that the variables of age and income level were statistically significant at the 1% level, while the first of the education level was significant at the 5% level and the third at the 10% level. The analysis further revealed that as consumers' age and education level increased, their tendency to purchase cut flowers also increased. Similarly, higher income levels were associated with an increased likelihood of purchasing behavior.

Consumer demand plays a crucial role in the growth and development of the cut flower sector. Consequently, it is imperative to focus on diversifying product offerings and implementing effective advertising strategies to stimulate cut flower consumption. For example, high-quality or designer-cut flowers can be specifically marketed to educated and

older consumers. Furthermore, cut flowers sourced from organic or sustainable farms may appeal to this demographic. Highlighting environmental benefits through the use of labels or certifications indicating sustainability can further attract environmentally conscious consumers. Given that individuals in this group tend to prefer culturally and aesthetically appealing products, developing targeted advertising campaigns is essential. Additionally, creating engaging social media content tailored to their preferences can enhance consumer interest and engagement.

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