

**An Evaluation of Factors Influencing Consumer Purchase Decisions of Cut Flowers, A Study of Washington Consumers**

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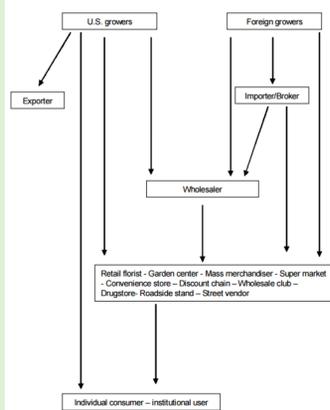
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## Abstract

Shipping flowers from foreign countries can leave an enormous carbon footprint, and the flowers may carry undesirable residues of chemical pesticides or fungicides. As a result of increased import competition, the WA industry is now made up of smaller scale producers growing specific flowers that aren't easily imported and that are sold directly to consumers. In this study we identified factors influencing WA consumers' purchase decisions for cut flowers, separating the analyses into flowers purchased for personal use and for a gift. Evaluating consumer cut flower purchase decisions, for personal and for gift use, provides information useful in identifying market opportunities as well as barriers for Washington producers.

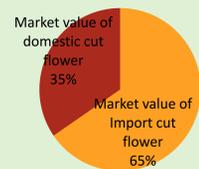
## 1. U.S cut flower industry

Figure 1 Major distribution channels for fresh cut flowers in the United States



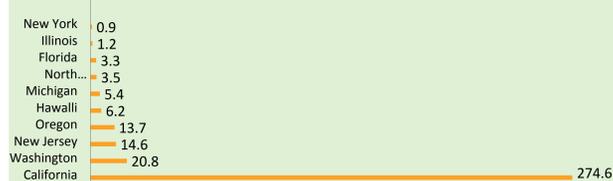
Imports account for 80% of fresh flowers sold in the US. Shipping cut flowers from distant countries incurs huge transportation and storage costs and these flowers may carry undesirable chemical residues.

Figure 2: Market Value of Imported vs. Domestic Cut Flowers in the United States



The wholesale value of domestically produced cut flowers was \$354 million for 2014, down 3 percent from 2013. While the imports of cut flowers were \$670 million dollars in 2014. Colombia, the main supplier in this field, supplied fresh cut flowers of more than \$490 million 2014.

Figure 3: Wholesale Value of Cut flowers -Top 10 States in U.S in 2014 (million dollars)



### Cut Flower Market in Washington State

- Washington state is continuously among the top ten cut flower producing states.
- The majority of the production is by a relatively small number of large commercial producers.
- It is very difficult for the large numbers of small-scale specialty cut flower producers to reach the consumers in a market where 70-80% of all cut flowers are imported.

## 2. Empirical model

The expected utility of consumer  $i$  from purchasing cut flowers for purpose  $m$  (personal use and gift use) can be represented by a random utility model such that:

$$U_{im} = \alpha'_{im}x_{im} + \varepsilon_{im} \text{ for } m = 1,2$$

- $U_{im}^*$  is the difference between expected utility from purchasing and not purchasing. A consumer will buy cut flowers if the expected utility from purchasing is greater than the expected utility from not purchasing ( $U_{im}^* > 0$ )

- $U_{im}^*$  is an unobservable latent variable but the decision to purchase cut flowers is observable, such that:

$$y_{im} = \begin{cases} 1 & \text{if } U_{im}^* > 0 \\ 0 & \text{if } U_{im}^* \leq 0 \end{cases} \text{ for } m = 1, 2$$

- Where  $y_{im} = 1$  if the consumer decides to buy cut flowers for purpose  $m$  and  $y_{im} = 0$ , otherwise; so consumer's purchasing decision of cut flowers for personal use and gift use can be specified as:

$$y_{i1} = \beta'_1 x_{i1} + e_{i1}$$

$$y_{i2} = \beta'_2 x_{i2} + e_{i2}$$

$$\text{Corr}(e_{i1}, e_{i2}) = \rho$$

- A bivariate probit model was used in this analysis

Table 1: Selected Variables Descriptions in the Study (n=466)

Variable	Description	Percentage
Selected Demographic Variables		
<b>AGE</b>	Age of consumer =1 means 18-30 years =2 means 31-40 years =3 means 41-50 years =4 means 51-60 years =5 means 61-70 years =6 means 71-80 years =7 means 81 years older	20.2% 21.2% 18.7% 21.9% 14.4% 3.0% 0.6%
<b>GENDER</b>	=1 if consumer is male, 0 otherwise	26%
<b>INCOME</b>	=1 if the average income level of the consumer is below \$50,000; 0 otherwise	52.8%
<b>MARITAL</b>	=1 if married, 0 otherwise	54.5%
<b>EDUDUM1</b>	=1 if high school or less education, 0 otherwise	20.0%
<b>EDUDUM2</b>	=1 if some college or 2 year college, 0 otherwise	48.4%
<b>EDUDUM3</b>	=1 if 4 year college and above, 0 otherwise	31.6%
Perception about imported cut flower market in U.S		
<b>IMPORTPERCEPTION</b>	Percentage of imported cut flowers in U.S =1 if believed to be 0-25% =2 if believed to be 26-50% =3 if believed to be 51-75% =4 if believed to be 76-100%	51.5% 21.2% 23.0% 4.3%
Preference for local		
<b>DIRECTACCESS</b>	=1 if consumer use direct access (farmers market, CSA, roadstand, u-pick and own garden) to obtain food, 0 otherwise	82.5%
<b>GROWWA</b>	Interest in purchasing cut flower which are grown in Washington State (from 1 to 5), where 1 means not at all interested and 5 means very interested	4.0
Floral Knowledge		
<b>CLEANFRESH</b>	=1 if the consumer has the correct knowledge about cut flower which is clean, plain water will keep flowers fresh as long as water with floral preservatives or flower food, 0 otherwise	38.2%
Importance of cut flower characteristics		
<b>COLOR</b>	Importance for cut flower characteristics (from 1 to 5) where 1 means unimportant and 5 means important	2.3
<b>UNIQUE</b>	Interest in purchasing cut flower when there are more unique flowers (from 1 to 5, where 1 means not at all interested and 5 means very interested)	4.0

## 3. WA state cut flower consumers

- The data for this research was collected using an online survey of consumers in Washington State (general population, over age 18) in 2012.

- Sample size: 594 respondents were asked to complete the survey; 466 observations were available for analysis after eliminating missing and incomplete responses.

- Variables included in empirical model: Demographic information - gender, education; cut flower purchasing habits - preferred location, important flower characteristics, reason for purchase; knowledge of cut flowers and opinions about imported cut flowers.

Figure 4: Number of Consumers Buying Cut Flower for Personal Use or Gift use (n=466)



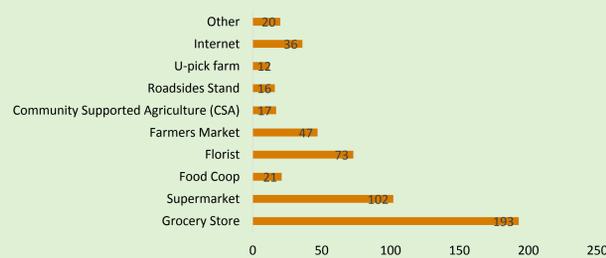
About 65% of the consumers in this sample purchased cut flowers for personal use or for gift use. There were 49.1% of the consumers indicating that they bought cut flowers for personal use in the last year whereas 55.2% of the consumers said that they had purchased cut flowers as a gift for others.

Table 2: The Most Important Characteristic of Cut Flowers When Consumer Buying Cut Flowers (n=466)

Characteristics	Percentage of Cut Flower Consumers (n=466)
Available where I usually shop	10.2%
Color	9.8%
Customer Service	2.2%
Delivery Option	2.2%
Fragrance	3.5%
Geographic Origin	0.2%
Grown in Environmentally Friendly	1.2%
Grown Organically	1.2%
Longevity (vase life)	7.3%
Prearranged Bouquet	2.4%
Price	21.0%
Quality of Booms and Foliage	18.7%
Symbolic Meaning or Tradition	0.6%
Visual Appeal	15.9%
Other	3.5%

The "price" of the flowers is selected as the first one according to 21% of the respondents. About 19% and 16% of the respondents said the most important characteristics is "quality of bloom and foliage" and "visual appeal".

Figure 5: The Location Where Consumers Usually Buy Cut Flower (n=466)



The location where consumers usually buy cut flowers was very diverse as shown in the figure above. The most popular places where consumer shop for cut flower are grocery store and supermarket. The farmers market is the most popular place for buying cut flower by direct access to consumers



Figure 1. Mixed bouquets at a Seattle Farmers market. (Photo credit: Jenny R. Connolly, Washington State University)

## 4. Results – Factors influencing cut flower purchase decisions

Table 3: Selected Results from Bivariate Probit Model for Cut Flower Purchase Decisions (n=466)

Parameter Estimates for the Bivariate Probit Model			
Independent Variables	Purchase Decision Equations		Purchase for Gift use
	Purchase for Personal Use		
Demographic Variables	Coefficient		Coefficient
<b>AGE</b>	-0.1411***		-0.2121***
<b>GENDER</b>	-0.2089		0.6370***
<b>MARITAL</b>	0.3139**		-0.0337
<b>EDUDUM1</b>	-0.2629		-0.5625***
<b>EDUDUM2</b>	-0.0914		-0.3864**
<b>INCOME</b>	-0.4695***		-0.3062***
<b>LONGEVITY</b>	0.8564		0.2131
<b>CLEANFRESH</b>	0.4124***		0.1937
<b>PRESERVATIVE</b>	0.1297		0.1568
<b>Preference for local</b>			
<b>DIRECTACCESS</b>	0.0515		0.3552*
<b>GROWWA</b>	0.2758***		0.1450*
<b>SHOPMUCH</b>	0.0432		0.0180
<b>Importance of cut flower characteristics</b>			
<b>COLOR</b>	0.1841**		0.1834**
<b>QUALITY</b>	0.0588		0.0894
<b>UNIQUE</b>	0.0028		0.1831**
<b>Perception about imported cut flower market in U.S</b>			
<b>IMPORTPERCEPTION</b>	0.0371		-0.0567

\* Means 10% level of significance, \*\* means 5% level of significance and \*\*\* means 1% level of significance

The overall model is significant at 1% level of significance and the correlation of the error terms across equations is 0.5840.

## Summary

- GROWN IN WASHINGTON** positively impacted cut flower purchase decisions, for both personal and gift use. This is consistent with findings from other studies about fresh produce and animal products (Carpio and Isengildina 2009; Loureiro and Hine 2002).

- Results indicate that factors affecting purchases for personal use are not the same as those affecting purchases for gift use.

- Consumers more likely to buy cut flowers for **gift use**:
  - were males
  - had higher education levels
  - used direct access to food products and valued uniqueness in cut flowers.
- Consumers more likely to buy cut flowers for **personal use**:
  - were married
  - had comprehensive knowledge about how to make cut flowers last longer.

## Conclusions and Discussion

Implications of research for Washington Cut Flower Industry:

- Potential consumers are more likely to be younger and the average annual income is above \$50,000.
- Selling cut flowers with the label of Washington Grown appears to be an effective approach.
- Cut flowers sold to consumers for personal use should include more information about longevity, color or specific cut flower care information.
- Cut flowers targeted to consumers for gift use should emphasize the variety or uniqueness and use direct sales to consumers.

Factors identified as important in this study can help small-scale cut flower producers in their production and marketing efforts to improve the profitability of their cut flower businesses.