CHAPTER VI

CONSUMER CHARACTERISTICS, PURCHASING BEHAVIOR, AND PREFERENCE TESTING

This chapter focuses on characteristics of households, such as age, educational level, positioning in a family, family size, and income distribution. Mango preferences and purchasing behavior of both households and will be described. In addition, using regression analysis will break through results from preference testing.

6.1 Household Characteristics

One hundred consumers were selected randomly from five different areas of the zip code. Thirty-two percent of them were aged from 21 to 25 years old, which is the largest percentage. Followed by 26 to 30 year-old and 31 to 40 year-old (figure 6.1). Educational level ranged from primary school to a Master's degree; half of the total respondents had obtained a bachelor's degree, followed by high school graduation (figure 6.2). People aged 21-25 were the new generation, who have had more opportunity to study higher than the elderly. Because of a rather high percentage of this group, 50% of the total respondents had bachelor's degree. An educational level below that was collected from parents and grandparents. However, 12% of them were uneducated. The reason behind the difference in educational level is that the old generation (grandparents) used to be peasants. Their children, later, had more opportunity to go to school. Then, when these children became parents, they encouraged their children to study higher. Today, the Chinese government

foreseen a significant role in education; therefore, many new educational institutions have been set up. Thus, the new generation has higher education.

Figure 6.1 Age distribution of total respondents

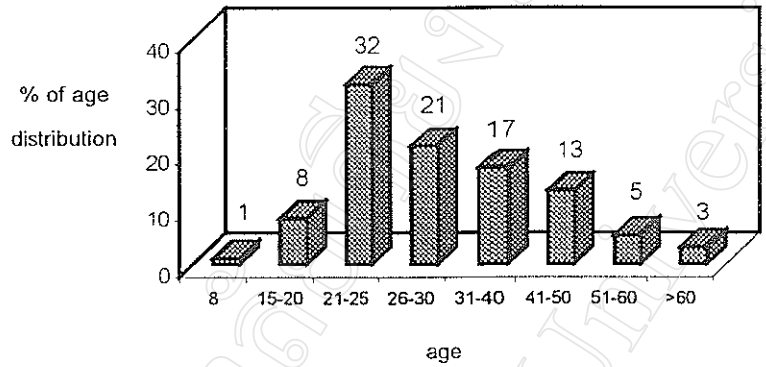
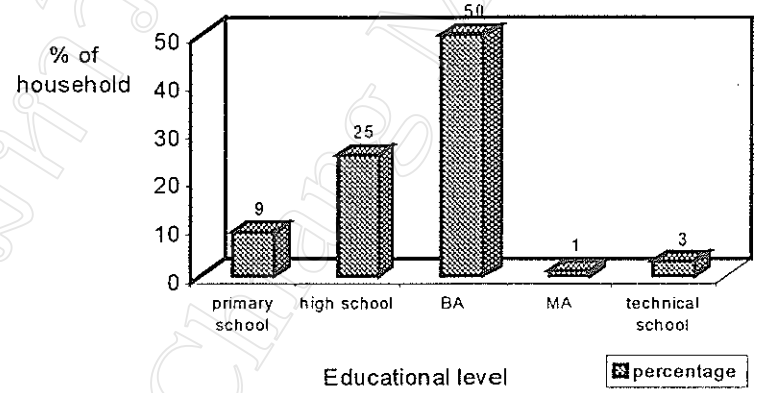


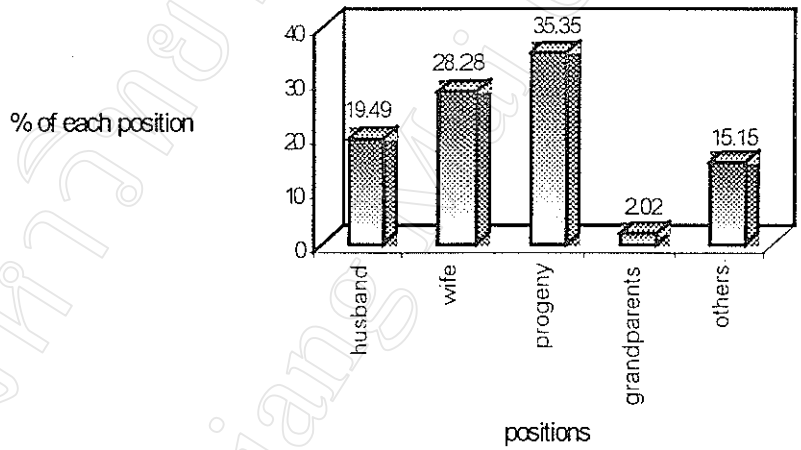
Figure 6.2 Percentage of different educational levels observed from 100 households



Out of the total respondents, women were accounted for more than half, which was fifty – eight percent. Considering the position of each respondent in the family, most of them were progeny, wives and husbands. Thirty-five percent were progeny, while twenty-eight and nineteen percent were wives and husbands, respectively (figure 6.3). Particularly wives and husbands were those who purchased fruits.

The government policy of "one family one child" has had a great effect to lessen family size. From this survey, the largest group of family size was 3 people, followed by 4 (figure 6.4). Some families had two generations – father, mother, and progeny within the same house, while others composed three generations – grandparents, father, mother, progeny, plus other relatives. Nevertheless, those people who were single separated themselves from their families to stay alone. The rest was new couples, who have just created their own families.

Figure 6.3 Percentage of each position in families observed from 100 households

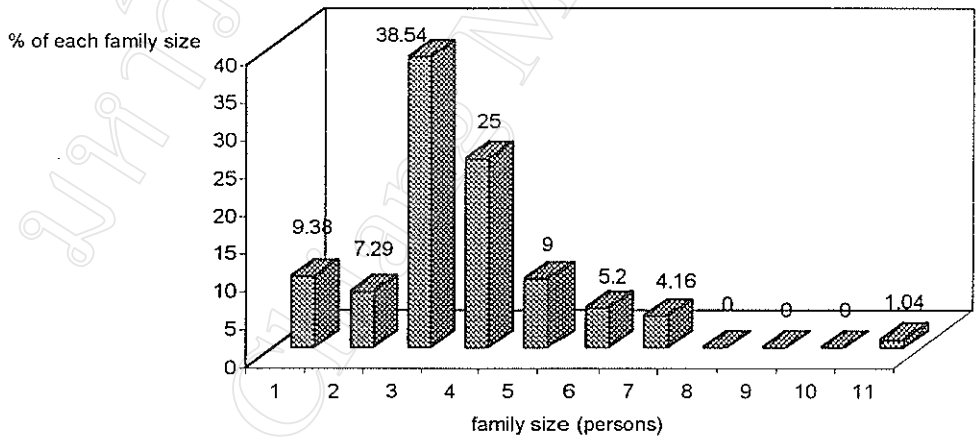


Household incomes ranged from 500 to 2,000 Yuan / month. The largest percentage (22.73%) clustered in a low income group which was 500-1,000 Yuan per month. Followed by 20% of 1,600-2,000 Yuan per month and 15% of 1,100-1,500 Yuan per month. See table 1 and figure 7-5. The average household income was approximately 2,700 Yuan per month.

Table 6.1 Household income distribution

Income Range	Percentage of Household (%)	Accumulated (%)
< 500	1.14	1.14
500-1,000	22.73	23.87
1,001-1,500	14.77	38.64
1,501-2,000	20.45	59.09
2,001-2,500	5.68	64.77
2,501-3,000	6.62	71.39
3,001-3,500	9.09	80.48
3,501-4,000	4.55	85.03
4,001-4,500	2.27	87.30
4,501-5,000	4.55	91.85
5,001-5,500	0	91.85
5,501-6,000	4.55	96.40
>6,000	3.60	100.00

Figure 6.4 Percentage of each family size observed from 100 households



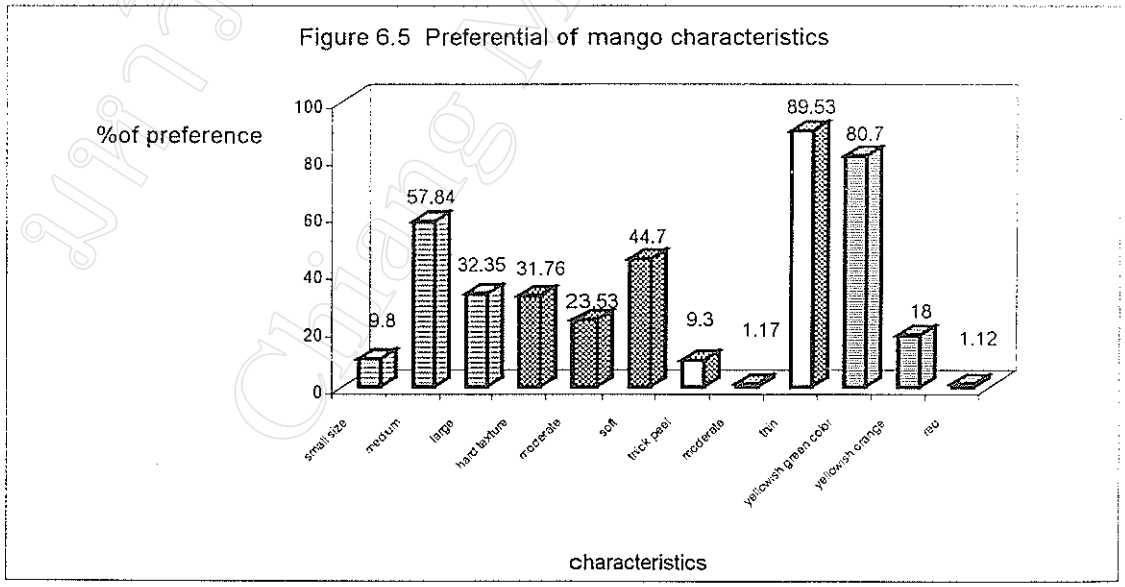
6.2 Mango Preferences and Purchasing Behavior and Preferential Fruits.

The study of purchasing behavior focuses on mango preference only. Mango attributes, for example, size, thickness of peel and its color, texture, taste, amount purchased at each time, and life after purchase, were iincorporated to personal interview. The results are as follows.

6.2.1 Kunmingnese Preferential Mango Characteristics

From this survey, fifty-eight percent of respondents agreed that medium sized (250-300 grams) are preferred (figure 6.5). Note that small sized weighed from 150 – 249 grams, while large size ranged from 301-450 grams. Eighty – seven percent of

Figure 6.5 Preferential of mango characteristics

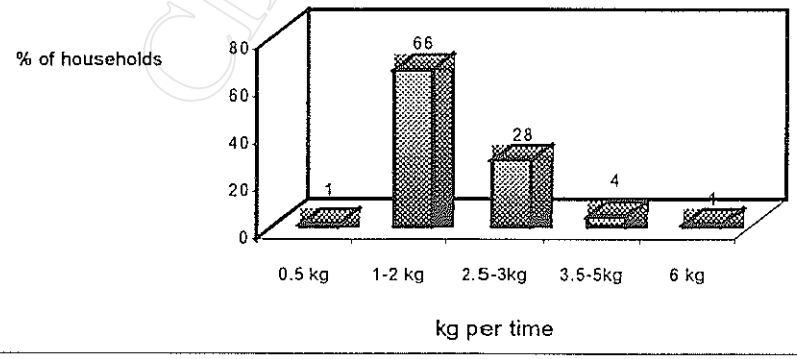


the respondents preferred ripe mangoes rather than green ones. Among the ripe mangoes, a soft texture was the most preferred. Eighty-nine percent of respondents picked thin peel, and fifty-six percent selected greenish yellow color. The popular varieties – Ying Zui and Xiangya, have greenish yellow shade of peel. As a result, they were familiar and favored this shade.

6.2.2 Purchasing Behavior and Life after Purchased

Purchasing 1-2 kilograms per time was the most common practice for respondents. Sixty-six percent of total respondents preferred to purchase this amount per time, whereas twenty-eight percent purchased.2.5 to 3 kilogram per time. This group of people resides 0.5-1 km from the market place with a family sized of 1 to 3 people. The farther they live, the larger amount of mangoes they purchased per time (figure 6.6). After purchasing, thirty-nine percent of the households left them for 2-3 days while another twenty-five percent left for 3-5 days. However, it was found that only 5.19 % of them finished all mangoes purchased within one day.

Figure 6.6 Amount of mangoes purchased per time



Seventy-five percent of the respondents revealed that they went shopping at the fresh markets, while the rest preferred to go to supermarkets. They believed that fresh markets supply fresher fruits than supermarkets. Forty-one percent of respondents went to the markets once a week, whereas twenty percent of them went there everyday (see figure 6.7). Most of those who went shopping everyday were the housewives and retired workers. Additionally, forty-two percent of them purchased fruits 2-3 times a week, those who purchased them once a week accounted for thirty-two percent (figure 6.8).

Figure 6.7 Frequency of going shopping observed from 100 households

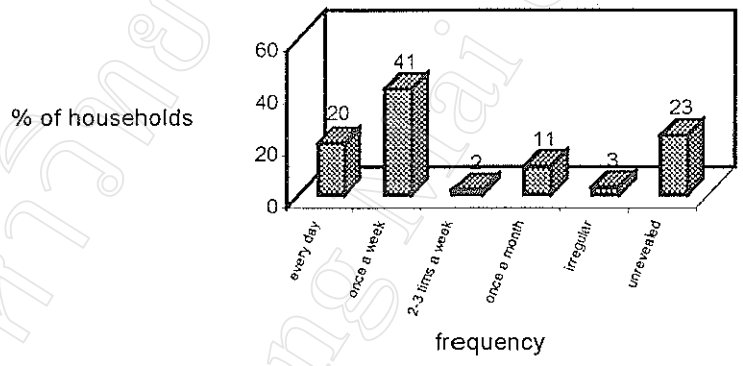
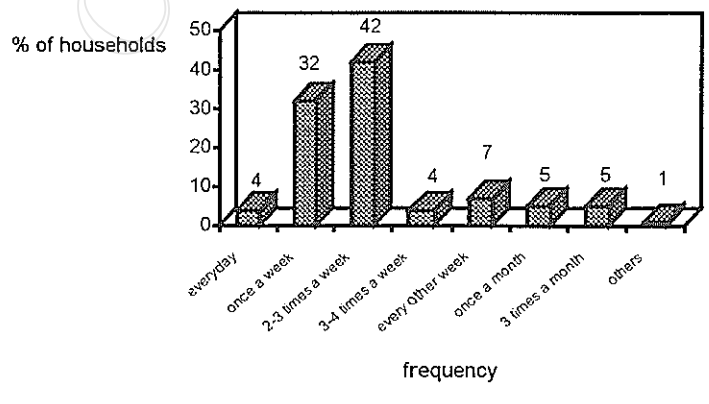


Figure 6.8 Frequency of purchasing fruit observed from 100 households

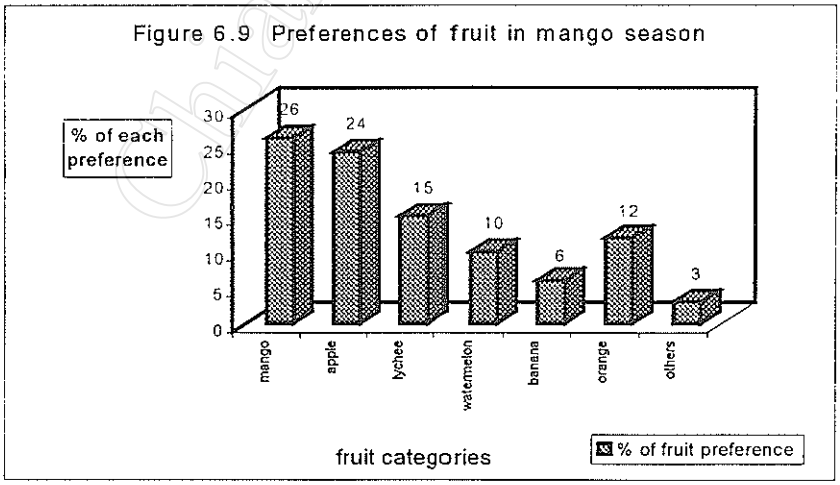


6.2.3 Preference for Fruits.

Each respondent was asked to rank the most five preferred fruits. This question aims at observing mangoes' rival fruits and their prices. Out of 25 fruit categories, the top five were mango, apple, lychee, watermelon, and banana. Mango was the most preferred fruit on the market during that period of time since it was a mango season (figure 6.9). Apple was the second popular fruit because it has been grown in China for a long time and it is also available all year round and comparatively cheap.

Substitution concept is necessary to be proposed to the respondents in order to investigate the ability of mango substitution to other kinds of fruit, and vice versa. This survey found that 92 % of the respondents believed that mangoes could not substitute other kinds of fruit. Only 8% of sampled consumers believed that mangoes can substitute peaches, oranges, lychees, pineapples, and pears (figure 6.10).

Figure 6.9 Preferences of fruit in mango season



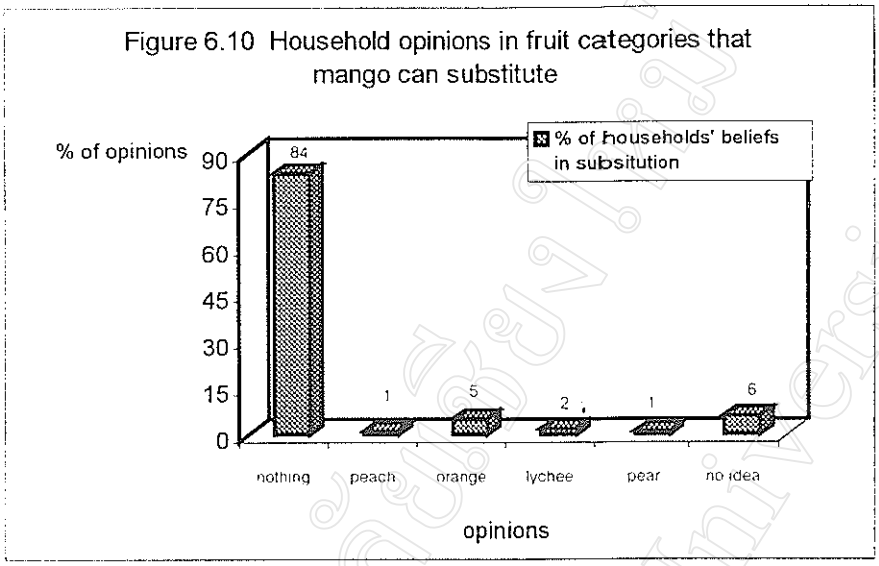


Figure 6.10 Household opinions in fruit categories that mango can substitute

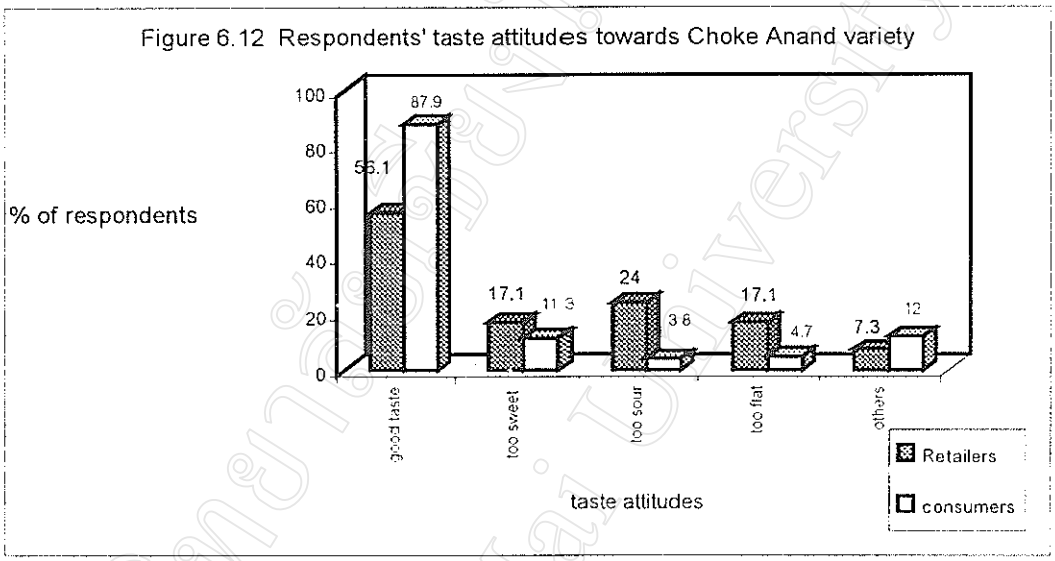
6.3 Sample Testing of Consumers and Retailers

The sample testing was conducted to investigate both consumer and retailer attitudes towards Thai mango variety (i.e. Choke Anan). Besides an evaluation of mango characteristics (size, taste, texture, color, and peel), they were asked to suggest prices (Yuan/ kg.).

In accordance to create the three models (see chapter 2) relate with suggested prices, ranking preference for mangoes and quality and health consciousness, sample testing was required to obtain relevant data from each household and retailer. Before tasting Choke Anand variety, each of them was asked to describe the taste of the mangoes they had experienced. After that, they were asked to try the samples reveal some information about Choke Anand attributes.

By experiencing mango varieties available in the markets, fifty-three percent revealed that sweetness is the uniqueness of mangoes, thirty percent said aroma, while the rest stated richness of juice (figure 6.11).

Figure 6.12 Respondents' taste attitudes towards Choke Anand variety

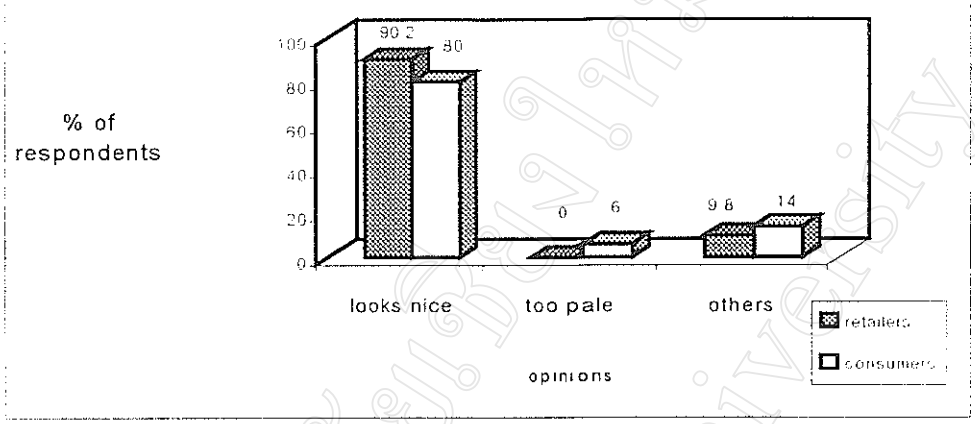


6.3.1 Attitudes Toward Choke Anand

One hundred and forty respondents tasted Choke Anand and were asked to give some idea about its attributes. Sixty-eight percent accepted that it had good taste, while 11% said it was too sweet (figure 6.12). With respect to retailers, 56% percent agreed that Choke Anand variety has a good taste. In contrast, 17% revealed that it was too sweet and other 17% stated that it was lacking of flavor.

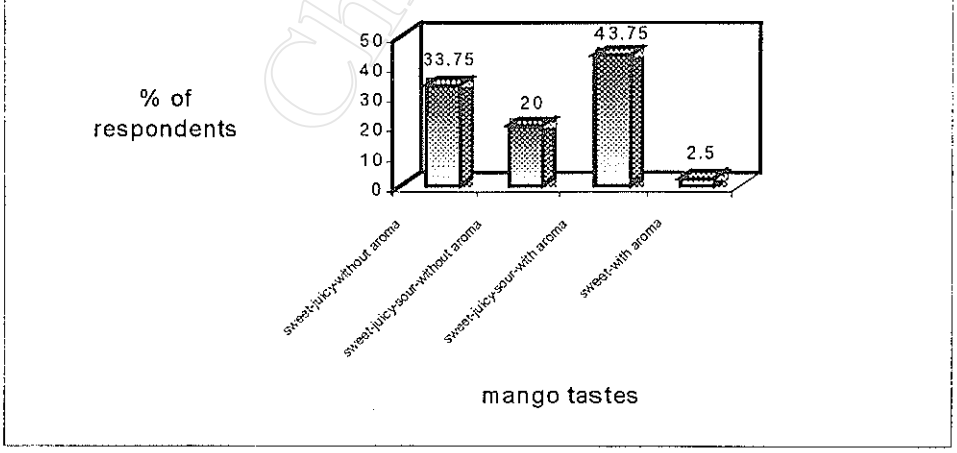
The peel color was another attractive attribute. Eighty percent of total sample consumers stated that its color looked nice. In contrast, 60% criticized that it was too pale (figure 6.13). On the other hand, 90% of the retailers said that the color of the peel looked nice. It was obvious that no one revealed that it was too pale.

Figure 6.13 Respondents' opinions about Choke Anand peel color



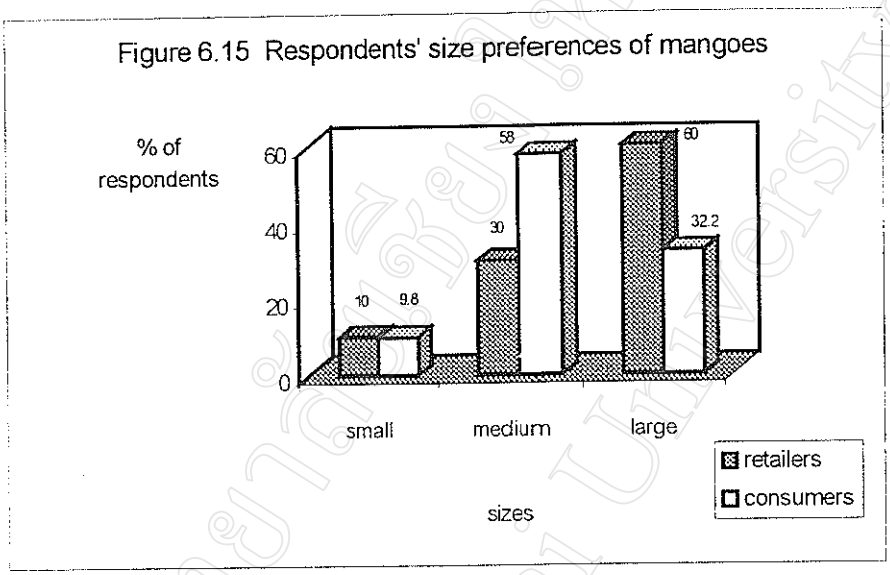
Regarding a preferred taste, 44 % of them said that they selected sweet + sour + juicy with strong aroma, while sweet taste without aroma was preferred by 33% of them, and followed by 20% of sweet-sour-juicy-without aroma taste preference (figure 6.14). Refer to the size preference, 58% of the consumers preferred medium sized (250-300 grams per fruit), 32.20% and 9.8% of them selected large sized and medium sized, respectively. In contrast to consumers, 60% of retailers preferred

Figure 6.14 Mango tastes respondents prefer



large sized (300-450 grams per fruit), whereas 30% preferred medium sized and another 10% preferred small sized (below 250 grams per fruit) (figure 6.15).

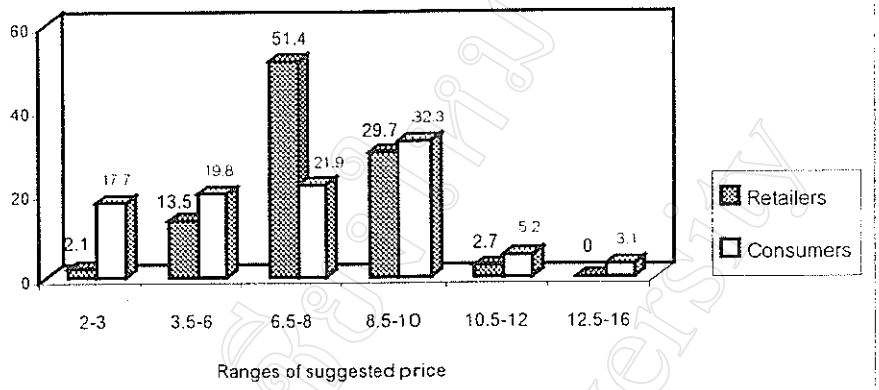
Figure 6.15 Respondents' size preferences of mangoes



6.3.2 Suggested Price

Each respondents, furthermore, were asked to suggest the price to the samples. Thirty-two percent of consumers stated price at 8-10 Yuan per kilogram, while the highest price ranged from 12-16 Yuan per kilogram accounting for 3.13%. Fifty one percent of retailers, on the other hand, revealed that the price should range from 5-6 Yuan per kg. Nevertheless, 30% of them suggested the price should be around 7-8 yuan per kg (figure 6.16).

Figure 6.16 Percentage of suggested price range for Choke Anand variety



6.4 Regression Analysis

Regression analysis, a mathematical tool, applied to examine the data precisely. Discovered price for Thai mangoes was evaluated through Hedonic Price model and Suggested Price for Thai Mangoes (in relation to consumer characteristics) model. Ranking Preference Model was applied to point out the characteristics of consumers who leveled mangoes as the early fruit choice. Quality and Health Consciousness model, moreover, is an explanation model for the Ranking Preference Model. It was created to identify the characteristics of consumers who prior concerned about quality and health for making decision in purchasing fruits.

6.4.1 Discover of Significant Mango Characteristics Influenced Suggested Price.

In accordance to analyse the mangoes' characteristics that determine a price level, a Hedonic Price Model was employed to achieve the third objective. The descriptive statistics (EVIEW 3.1) for each variable are shown in table 6.3.

With reference to the suggested price for Choke Anand variety, the price extended from 2 – 16.5 Yuan per kg (10 – 82.5 Baht per kg), with mean valued at 6.83 and 2.60 standard error (table 6.2). Hedonic Price Model was employed to discover significant factors that determine the offered price for Thai mangoes. Five mango attributes were incorporated in this model namely: texture, taste, peel color, thickness of peel, and. These explanatory variables are dummy variables except size which is treated as a continuous variable (grams / fruit). The dependent variable is in terms of monetary unit (Yuan / kg.).

Due to the descriptive analysis of consumer preferences and importers' opinions about mangoes, this model was hypothesized that texture, peel color, and taste have positive sign, but thickness of peel does not. Size was expected to have either plus or minus sign because most households selected medium sized (figure 6.15). Taste1 (sweet + sour + juicy) was anticipated to have higher value of coefficient than taste2 (sweet + sour + juicy + strong aroma). It is because most Chinese consumers did not prefer strong aroma fruits. Peel color2 (yellowish green) had greater value of coefficient than peel color1 (yellowish orange) since the popular variety (Ying Zui) is yellowish green peel. The hypotheses regarding to sizes and signs of coefficients are restated as the following:

1) Coefficient of taste1 is greater than that of taste3
2) Coefficient of color2 is greater than color1
3) Coefficient of texture2 is greater than texture1
4) Thickness of peel has negative sign
5) Size has either positive or negative sign

Table 6.2 Household Offered Prices for Choke Anand Variety in terms of Yuan and Baht per kg.

Offered Prices (Yuan/ kg)	Offered Prices (Baht/ kg)	Offered Prices (Yuan/ kg)	Offered Prices (Baht/ kg)	Offered Prices (Yuan/ kg)	Offered Prices (Baht/ kg)	Offered Prices (Yuan/ kg)	Offered Prices (Baht/ kg)
6	30	3	15	7	35	8	40
8	40	2	10	8	40	5	25
4	20	9	45	7	35	6	30
8	40	6	30	7	35	5.5	27.5
7	35	5	25	5	25	13	65
7	35	10	50	3	15	8	40
8	40	5	25	2	10	7	35
8	40	7	35	2.5	12.5	7	35
8	40	3	15	3	15	7	35
7	35	4	20	8	40	5	25
8	40	10	50	7.5	37.5	8.5	42.5
10	50	7.5	37.5	8.5	42.5	8	40
3	15	16.5	82.5	7.5	37.5	8	40
3	15	10	50	7	35	10	50
10	50	8	40	6	30	6.5	32.5
5	25	10	50	4	20	6.83	34.15
5	25	8	40	6	30	2.6	13

(Mean = 6.83, SD = 2.60)

Table 6.3 Descriptive Statistics of Variables from Hedonic Price Model

	Price	Color1	Color2	Peel	Taste1	Taste2	Taste3	Texture1	Texture2	Size
Mean	6.92	0.78	0.20	0.11	0.28	0.30	0.09	0.41	0.30	356
Median	7	1	0	0	0	0	0	0	0	330
Maximum	16.50	1	1	1	1	1	1	1	1	450
Minimum	2	0	0	0	0	0	0	0	0	250
Std. Dev.	2.64	0.42	0.41	0.32	0.45	0.46	0.30	0.50	0.46	70
Skewness	0.66	-1.33	1.47	2.48	0.99	0.89	2.81	0.38	0.89	0.23
Observations	54	54	54	54	54	54	54	54	54	54

Table 6.4 Ordinary Least Square Estimation of Selected Model 1 to 5

Model'	Statistics	Var1	Var2	Var3	Var4	Var5	Var6	Var7	Var8	Var9	Var10
1		X1	text1*	text2	taste1	taste2	taste3*	col 1*	col 2*	size	peel
R2=0.29	Coefficient	1.14	2.14	1.23	1.37	0.65	2.81	5.20	6.76	-0.01	-0.78
Prob - F statistics =0.02	SE	3.13	0.78	0.81	0.81	0.76	1.20	2.45	2.53	0.00	1.06
	P-value	0.72	0.01	0.13	0.09	0.39	0.02	0.04	0.01	-1.07	0.46
2		X1	text1*	text2	taste1	taste3*	col 1*	col 2*	size	sqsize	peel
R2=0.31	Coefficient	-13.16	2.21	1.36	1.30	2.42	5.79	7.24	0.07	-0.00	-0.93
Prob - F statistics =0.01	SE	9.70	0.77	0.80	0.75	1.11	2.45	2.51	0.05	0.00	1.04
	P-value	0.18	0.01	0.09	0.09	0.03	0.02	0.01	0.14	0.12	0.38
3		X1	text1*	text2*	taste1*	taste3*	col 1*	col 2*	size	sqsize	peel
R2=0.39	Coefficient	-14.29	2.99	1.83	4.33	2.71	5.02	5.34	0.08	-0.00	-0.35
Prob - F statistics =0.003	SE	9.34	0.80	0.82	1.39	1.08	2.40	2.55	0.05	0.00	1.03
	P-value	0.13	0.00	0.03	0.00	0.01	0.04	0.04	0.08	0.06	0.74
4		X1	text1	text2	tatse1	taste3*	col 1*	col 2*	size	sqsize*	peel

Table 6.4 (continued)

Model[1]	Statistics	Var1	Var2	Var3	Var4	Var5	Var6	Var7	Var8	Var9	Var10
R2=0.47	Coefficient	-5.80	-3.21	0.66	5.97	3.14	5.04	4.70	0.04	-8E-05	-0.18
Prob - F statistics =0.00	SE	11.90	3.73	1.06	5.06	1.10	2.31	2.46	0.06	-7E-05	0.99
	P-value	0.63	0.39	0.53	0.24	0.01	0.03	0.06	0.48	0.33	0.86
5		X1	text1	text2	taste1	taste3*	col 1	col 2*	size	sqsize	peel
R2=0.47	Coefficient	-3.73	-3.20	0.66	5.15	3.23	3.96	4.85	0.03	0.00	0.14
Prob - F statistics =0.00	SE	15.00	3.77	1.07	6.25	1.18	5.24	2.56	0.07	0.00	1.02
	P-value	0.80	0.40	0.54	0.41	0.01	0.45	0.07	0.66	0.43	0.89

([1] Model 1 – 5 are differed by inclusion of variables and/ or functional form (see also table 6.4;

X1 = constant term; * = significant at 95% level of confidence; Var = variable)

Note that dependent variable is suggested price to Choke Anand variety offered by interviewed households. The explanatory variables are as follow (also see chapter2).

Text1 = soft texture

Text2 = moderate texture

Taste1 = sweet – sour – juicy

Taste2 = sweet – juicy – aroma

Taste3 = sweet – sour – juicy – aroma

Col 1 = yellowish orange

Col 2 = yellowish green

Size = size of mangoes (grams / fruit)

Sqsize = square size

Peel = thickness of peel

It is apparent that taste and color are significant factors in every model (table 6.4). The hypotheses of model 5 are all correct and R^2 is relatively high. Thus, model 5 is the most reliable. Though R^2 is rather low, Prob (F-statistic) is absolutely significant.

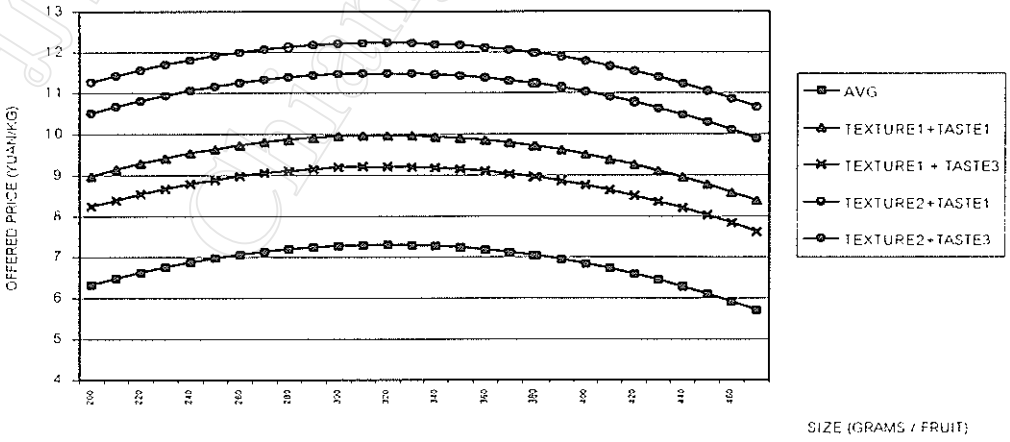
In short, at 95 % and 90% of confidence level, taste, peel color, and the interaction of texture and taste are significant variables that determine the offered

price. Obviously, medium sized mango yields highest suggested price (figure 6.17). Moderate texture incorporate with the proper tastes (sweet - sour - juicy - without aroma) resulted relatively high offered price.

Table 6.5 Comparison of Hedonic Price Models

Model	Variable Selection	R^2	(P) F-statistic	Detection of Hypothesis	Remarks
1	Includes all variables	0.29	0.02	H1 failed	-
2	From model 1, drop taste2 add sqsize	0.31	0.01	H1 and 3 failed	-
3	From model 2, add interactive variables	0.39	0.00	H3 failed	Add text1taste1 text2taste1
4	From model 3, add more interactive variables	0.47	0.00	H2 failed	Add text2taste2 taste1size, text1size
5	From model 4, add one more interactive variable	0.47	0.00	All correct	Add sizecol1

Figure 6.17 Suggested Price Chart of Thai mangoes based on the sizes



6.4.2 Suggested Price for Thai Mangoes (in Relation to Consumer Characteristics Model

This model enhances a precise study of consumers who were likely to offer relatively high price to the Thai mangoes. The characteristics such as family size, occupation, household income level, educational level, positions in families, reasons for purchasing mangoes, and sex were treated as explanatory variables in this model. Descriptive statistics of these variables are shown in table 6.6. Income was expected to have positive sign. The rests were unexpectable. Nevertheless, the value of coefficient of edu2 was hypothesized to be more than edu1. As well as pos1 and rea1 were also anticipated to have larger value of coefficient than pos2 and rea2, respectively. The hypotheses with reference to consumer characteristics are stated as followed:

1) Family size has positive sign
2) Occupation has positive sign
3) Household income has positive sign
4) Edu2 has larger value of coefficient than Edu1
5) Pos1 has larger value of coefficient than Pos2
6) Rea1 has larger value of coefficient than Rea2

The higher educated households may have better rationale and judgment of evaluating quality and price of a certain commodity. Considering the family budget control, wives could be more economically and rationale than husbands, thus they might offer lower price than their husbands. For those who have business related

might have more rationale to judge the price of commodity, given a certain level of quality.

Table 6.6 Descriptive Statistics of the Variables in Suggested Price for Thai Mangoes (in relation with consumer characteristics) Model.

	Price	Age	Famsize	Edu1	Edu2	Income	Occupation	Pos1	Pos2	Rea1	Rea2	Sex
Mean	6.93	31.34	3.51	0.36	0.57	2405.70	0.19	0.15	0.45	0.72	0.06	0.66
Median	7	27	3	0	1	2000	0	0	0	1	0	1
Maximum	16.50	82	11	1	1	6000	1	1	1	1	1	1
Minimum	2	18	1	0	0	500	0	0	0	0	0	0
Std. Dev.	2.66	12.24	1.76	0.48	0.50	1496.30	0.40	0.36	0.50	0.46	0.27	0.48
Observations	53	53	53	53	53	53	53	53	53	53	53	53

Table 6.7: Ordinary Least Square Estimation of Model 1 and 2

Model	Statistics	variable 1	variable 2	variable 3	variable 4	variable 5	variable 6	variable 7	variable 8	variable 9	variable 10
		X1*	famsize	Income*	edu1*	edu2*	pos1*	pos2	rea1	rea2	occup
R2=0.56	Coefficient	2.53	-0.11	0.00	1.63	3.61	1.79	0.73	0.46	0.25	1.20
Prob - F statistics =0.00	SE	1.15	0.16	0.00	0.62	0.57	0.80	0.59	0.73	1.19	0.73
	P-value	0.03	0.50	0.04	0.01	0.00	0.03	0.23	0.53	0.84	0.11

(* = significant at 90% level of confidence)

The meaning of each abbreviation is described below (also see more details in chapter2).

Famsize = family size (persons/ family)

Income = household income (yuan per month)

Edu1 = high school gradation

Edu2 = bachelor's degree or higher

Pos1 = husband

Pos2 = wife

(Pos1 = Pos2 = 0 refer to progeny and grandparents)

Rea1 = reason for purchasing mangoes because of its food quality and good for health

Rea2 = reason for purchasing mangoes because of its relatively cheap price

Occup = occupation (either business related or non-business related)

At 95 % and 90% of confidence level, income, educational level, and position in a family are significant variables that determine the offered price. This model yields 0.557 of R^2 with (P) F-statistic approaches zero. Moreover, the hypotheses are all correct. Educational level at equals or higher than bachelor's degree contributes the greatest impact, among other factors, to offered price. High school level is also significant but the importance is less than bachelor's degree. Position in a family, moreover, also has an impact to the offered price. Husbands offered higher price than wives. The intuition is that wives (or housewives) are responsible for buying food and controlling expenditures at the same time. Thus, they have accumulated experiences in various kinds of fruit at different price level. Accordingly, the price they offered might be relied on the market price (see chapter 5).

6.4.3 Ranking Preference of Mangoes Model

To construct 'Ranking Preference of Mangoes Model' with sample sized of 73, respondents were asked to give rank of the first preferred 5 fruits. The dependent variable was equal to 0, if a respondent preferred mangoes as the first and second choice. In case that mangoes were preferred as the 3rd choice, dependent variable valued at 1. For the 4th and 5th choice, dependent variable was equal to 2. The model was estimated by using Limdep version7.O. According to the descriptive analysis (Eview 3.1) (table 6.8), 40% of them ranked mangoes for the first and second, 14% ranked for the third and the rest 46% ranked the fourth and the fifth.

Seven explanatory variables, expected to influence the rank, include age, family size, income, offered price, purchasing place, real, and sex. The relationship between ranking preference and other explanatory variables apart from price was unexpected. Price was expected to have negative sign.

Table 6.8 Descriptive Statistics of Variables in Ranking Preference Model

	YIII	Age	Famsize	Income	Purchasing place	Real	Sex
MEAN	1.08	31.77	3.55	2684.93	0.32	0.64	0.63
Median	1.00	27.00	3.00	2250.00	0.00	1.00	1.00
Maximum	2.00	82.00	11.00	10000.00	1.00	1.00	1.00
Minimum	0.00	16.00	1.00	500.00	0.00	0.00	0.00
Std. Dev.	0.92	12.09	1.66	1759.12	0.47	0.48	0.49
Observations	73	73	73	73	73	73	73

It is obvious that purchasing place and real are significant in every model (table 6.9). Even though the correct prediction of model 4 is the lowest, the smallest the

Table 6.9 Statistics of Ranking Preference Model (Model 1 to 4)

Model	Statistics	variable 1	variable 2	variable 3	variable 4	variable 5	variable6	variable 7	variable 8
1		X1	age	famsize	income	price	Purchasing place	rea1*	sex
significance level = 0.02	Coefficient	0.15	0.02	0.12	-0.00	0.01	-0.63	-0.80	0.08
	SE	0.89	0.03	0.12	0.00	0.06	0.40	0.34	0.33
	P-value	0.87	0.38	0.34	0.59	0.86	0.09	0.02	0.82
2		X1	-	famsize	income	price	Purchasing place*	rea1*	sex
significance level = 0.01	Coefficient	0.66	-	0.13	-0.00	0.01	-0.80	-0.85	0.01
	SE	0.62	-	0.13	0.00	0.06	0.39	0.34	0.33
	P-value	0.29	-	0.29	0.78	0.91	0.04	0.01	0.98
3		X1	-	famsize	income	-	Pruchasing place*	rea1*	sex
significance level = 0.01	Coefficient	0.7056	-	0.13	-0.00	-	-0.80	-0.84	0.01
	SE	0.52	-	0.13	0.00	-	0.39	0.32	0.33
	P-value	0.17	-	0.28	0.78	-	0.04	0.01	0.10
4		X1	-	famsize	-	-	Pruchasing place*	rea1*	-
significance level = 0.00	Coefficient	0.69	-	0.12	-	-	-0.81	-0.84	-
	SE	0.46	-	0.12	-	-	0.38	0.32	-
	P-value	0.13	-	0.30	-	-	0.04	0.01	-

Note that :

Purchasing place = 1 if it is a supermarket; 0 if it is a fresh market

rea1 = 1 if gives 1st and 2nd rank to good taste and good for health, respectively, and vice versa; 0 otherwise

sex = 1 if female; 0 if male

Table 6.10 The Ordered Probit of Ranking Preference of Mangoes Model

model	variables	significance level	Frequency of correct prediction
1	Include all 7 variables	0.02	Correct prediction = 60%
2	From model 1, drop age	0.01	Correct prediction = 61.43%
3	From model 2, drop price	0.01	Correct prediction = 62.86%
4	From model 3, drop sex	0.00	Correct prediction = 58.57%

significant level. Moreover, the p-value of significant variables are smaller than other p-values from other models (table6.10). In overall, the probability to prefer mangoes as the 1st or 2nd fruit choice (Y = 0) is 0.385, while the probability of Y = 1 (preferred mangoes as the 3rd rank) and Y = 2 (preferred mangoes as the 4th or 5th rank or higher) are 0.157 and 0.457, respectively (table 6.11). From the estimated model 4, marginal effect of each variable can be calculated (William and Greene, 1997), and the result is shown in table 6.12. The marginal effect of a variable, for example, family size, means if there is an additional member in a family, the probability to prefer mangoes as the first fruit choice would drop by 0.05. The consumers who go shopping at the supermarket tend to prefer mangoes as the first choice with the probability of 0.30. In addition, for those who gave the reason for purchasing mangoes relate with health and quality of mangoes would have probability of 0.317 to prefer mangoes as the first and second choice.

Table 6.11 Probabilities for Outcomes

Y	Probability
0	0.385
1	0.157
2	0.457

Table 6.12 Marginal Effects for Ordered Probit Model of Ranking Preference for Mangoes

variable	y = 0 (1^{st} –2^{nd})	y = 1 (3^{rd})	y = 2 (4^{th} –5^{th})
Constant	-0.26	-0.01	0.27
Famsize	-0.05	-0.00	0.05
Purchasing place	0.30	0.02	-0.32
Rea1	0.32	0.02	-0.33

6.4.4 Quality and Health Consciousness Model

"Quality and Health Consciousness Model" was estimated from 91 sample size (run by Limdep version 7.0) by treating consumer consciousness as dependent variable. That is price concern (Y = 0), health concern (Y=1), and quality concern (Y=2). Educational level and family size are the first two incorporated variables. Following by adding some more variables such as price, income, sex, and age. 31% have quality consciousness, while half of them and other 19% of them concern about health and price/ purchasing place, respectively (table 6.13). Educational level, income, and age were hypothesized to have positive relationship with the probability of more quality consciousness. For the probability to have more health consciousness, educational level, family size, income, and age were expected to be complemented variables. On the other hand, price consciousness group might be those who have relatively small household income. The hypotheses are restated as followed:

1) Quality Consciousness Group

1.1) Educational level had positive relationship with the probability of quality consciousness

1.2) Income level had positive relationship with the probability of quality consciousness

1.3) Age had positive relationship with the probability of quality consciousness

2) Health Consciousness Group

1.4) Educational level had positive relationship with the probability of health consciousness

1.5) Income level had positive relationship with the probability health consciousness

1.6) Age had positive relationship with the probability health consciousness

1.7) Family size had unexpectable relationship with the probability health consciousness

3) Price Consciousness Group: Income level had negative relationship with the probability of price consciousness

Table6.13 Descriptive Analysis of Variables in Quality and Health Consciousness Model

	YII	Age	Famsize	Edu2	Income	Price	Sex
Mean	2.21	30.76	3.22	0.52	2430.17	6.97	0.62
Median	2.00	27.50	3.00	1.00	2000.00	7.50	1.00
Maximum	3.00	61.00	7.00	1.00	10000.00	17.00	1.00
Minimum	1.00	8.00	1.00	0.00	600.00	2.00	0.00
Std. Dev.	0.79	9.80	1.30	0.50	1838.67	2.72	0.49
Observations	58	58	58	58	58	58	58

Due to the statistics of model 1 to 6 shown in table 6.14, edu2 appears to be significant in every model, while price is significant in model 2, 4, and 6. These three models also have relatively low significance level. Regarding model 6, apart from edu2, price and sex are also significant. Though model 2 gave the highest frequency of correct Prediction, model 6 provided relatively higher

correct prediction than model 1, 3, 4, and 5 (table6.15). In a big picture, probability for a consumer to have price/ purchasing place concern, health concern, and quality concern are 0.2, 0.325, and 0.475, respectively (table6.16). Regarding health consciousness group, high educational group (finished bachelor's degree or higher) tended to have a probability of health concern for 0.134, as well as family size that an additional family member would lead to an increase in probability for 0.034. On the other hand, high educational group was likely to concern less about quality (taste) for 0.261. An increase in family size for 1 member would drop the probability of quality consciousness for 0.066 (table 6.17). To consider the price/ convenient consciousness, one unit increase in offered price for Choke Anand variety would reduce the probability of the consciousness for 0.069. High educational level consumers, in addition, were likely to take the price/ convenient into account at the probability of 0.1263.

Table 6.14 Statistics of Quality and Health Consciousness Model (Model 1 to 6)

Model	Statistics	variable 1	variable 2	variable 3	variable4	variable 5	variable 6
1 significance level = 0.015		X1	edu2*	famsize			
	Coefficient	1.74	-0.64	-0.16			
	SE	0.48	0.26	0.13			
	P-value	0.00	0.01	0.19			
2 significance level = 0.00		X1	edu2*	famsize	price*		
	Coefficient	-0.23	-0.65	-0.17	0.32		
	SE	0.72	0.29	0.15	0.06		
	P-value	0.75	0.03	0.25	0		
3 significance level = 0.036		X1	edu2*	famsize	income		
	Coefficient	1.71	-0.65	-0.18	0.00		
	SE	0.48	0.26	0.14	0.00		
	P-value	0.00	0.01	0.20	0.79		

Table 6.14 (continued)

Model	Statistics	variable 1	variable 2	variable 3	variable4	variable 5	variable 6
4 significance level = 0.00		X1	edu2*	famsize	price*	sex	
	Coefficient	-0.64	-0.66	-0.20	0.34	0.58	
	SE	0.77	0.30	0.13	0.07	0.32	
	P-value	0.40	0.02	0.13	0	0.07	
5 significance level = 0.05		x1	edu2*	famsize	income	age	
	Coefficient	2.05	-0.64	-0.18	0.00	-0.01	
	SE	0.70	0.28	0.14	0.00	0.01	
	P-value	0.00	0.02	0.21	0.67	0.40	
6 significance level = 0.00		X1	edu2*	famsize	income	price*	sex
	Coefficient	-0.65	-0.65	-0.17	-0.00	0.36	0.55
	SE	0.76	0.30	0.14	0.00	0.07	0.33
	P-value	0.40	0.03	0.24	0.60	0	0.09

Table 6.15 Development of Quality and Health Consciousness Model

Model	Variables	Significant level	Correction of hypothesis	Frequency of correct prediction
1	Start with 'edu2' and 'famsize'	0.01	H 1 failed	Correct prediction = 46.25%
2	From model 1, add 'price'	0.00	H 8 failed	Correct prediction = 63.75%
3	From model 2, add 'income' drop 'price'	0.04	H 1 failed	Correct prediction = 47.5%
4	From model 3, add 'price' and 'sex'	0.00	H 1 and 8 failed	Correct prediction = 60%
5	From model 4, add 'age' and 'income', drop 'price' and 'sex'	0.05	H 1 and 3 failed	Correct prediction =45%
6	From model 5, add 'sex' and 'price'	0.00		Correct prediction = 62.5%

Table 6.16 Probabilities for Outcomes

Y	Probabilities
0	0.200
1	0.325
2	0.475

Table 6.17 Marginal Effects for Quality and Health Consciousness Model

variable	y=0 (price/ purchasing place)	Y=1 (health)	y=2 (quality)
X1	0.05	0.04	-0.09
Price	-0.07	-0.06	0.16
Edu2	0.13	0.12	-0.26
Famsize	0.04	0.03	-0.07

6.5 Summary

The largest group of household age was 21-25 years old, following by 26-30 and 31-40 years. Half of them had obtained a bachelor's degree, followed by high school graduation. Regarding the position in family, the largest group was progeny, pursued by wives, and husbands. The family size was mostly three. Household income in average was 2,700 Yuan per month (or 13,500 Baht). According to the mango preference, medium size (250-300 grams) of ripe mangoes with thin peel and yellowish green shade of peel is preferred.

Regarding purchasing behavior, 1-2 kilograms purchasing per time at the fresh markets is the most common practice. After purchasing, most of them leave them for 2-3 days. In mango season, most consumers prefer mangoes, apples, (which is a traditional fruit), and lychees. However, most of them did not believe in mango substitution.

Considering the attitudes towards Choke Anand variety, most of households and retailers expressed their positive attitudes towards its attributes. Kunmingneses preferred ripe moderate texture of sweet-sour-juicy mangoes. The size of 340-350 grams per fruit is the most selected. The highest suggested price for Thai mangoes was 16.50 Yuan per kg. (or 82.50 Baht / kg.), while the average

suggested price was 6.83 Yuan per kg (34.15 Baht per kg). For those consumers who would offer high price were those who have relatively high income and finished bachelor's degrees or higher. Moreover, it was found that husbands offered comparatively high price than that other family members suggested.

The probability for a consumer to rank mango as the first/ second fruit choice was 0.385. Consumers who went shopping at the supermarket tend to prefer mangoes as the first choice with the probability of 0.3033. For those who concerned about their health and quality of fruits have probability of 0.0159 to prefer mangoes prior to other kinds of fruits. In general, the probabilities for a consumer to concern about price/ convenient, health, and quality of fruit were 0.20, 0.325, and 0.475, respectively. High educational group of consumers had probability to concern about price/ purchasing place for 0.126, and health concern for 0.134. Consumers who offered 1 more Yuan/ kg. for Choke Anand variety have more probability to concern about quality for 0.142. In contrast, well educated group was likely to be less consciousness in mango taste because it was offset by price/ purchasing place and health consciousness.