18. Consumers' Knowledge of and Preference for Indigenous Vegetables: A Market Demand and Consumption Behavior Analysis

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Abstract

Katuk (*Sauropus androgynous*), kucai (*Allium odorum*), honje (*Etlingera elatior*) and tebu telor (*Saccharum officinarum*) are four indigenous vegetables that have a high market demand in greater Bogor and Jakarta, Indonesia. Demand for all four commodities exceeds existing supply in village, subdistrict and city markets. A consumers' preference survey was conducted to inform local smallholder farmers, traders and other stakeholders on opportunities for expanding production and commercialization of those indigenous vegetables. Data was collected from 150 shoppers in three village markets, Leuwiliang subdistrict market, and Bogor city market. Results indicated that city and subdistrict consumers are more affluent, quality conscious, and willing to pay higher prices if commodities are perceived to be scarce. City and subdistrict consumers visit markets a minimum of weekly. They prefer markets as the main source of vegetables to meet their household needs. Village consumers are price conscious and quality aware. They visit markets less than monthly and will decrease their purchases if they perceive prices are high or if quality low. Village consumers prefer to purchase vegetables directly from neighboring farmers rather than go to the market themselves for both convenience and to save time and money. Consumers at all levels are generally satisfied with commodity prices, availability and quality, but would increase their purchases if availability and quality improved. City and subdistrict consumers are willing to pay premium prices one to four times higher for high quality commodities. This would provide farmers and traders the opportunity to increase the production, processing and marketing of quality commodities. Commercialization opportunities are better in lucrative city and subdistrict markets. In serving this demand, farmers and traders need to be mindful of the additional costs related to producing and transporting higher quality commodities. Katuk and kucai are familiar to all consumers and demand for these products is strong. Honje and tebu telor have positive market recognition, but are less familiar and available to consumers in the lucrative markets. Efforts to expand marketing of honje and tebu telor should include enhancing consumer awareness.

Keywords: Consumer preference, indigenous vegetable, consumption behavior, Nanggung, agroforestry

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1. Background

Agriculture is a main component of government programs and strategies to eradicate poverty in Indonesia. In the past, Indonesian agriculture had made significant contributions to local livelihoods and the national economy, accounting for 13.8% of gross national product (BPS, 2008). It is estimated that there are 24 million hectares (ha) of underutilized dry agricultural land in Indonesia. Poor households located in those areas have a high level of dependency on agriculture as the non-agricultural economic sectors are not developed. It is crucial that the government implement policies that stimulate and diversify the smallholder agricultural, horticulture and livestock sectors – including the rehabilitation of private land with high-value timber and fruit tree species. If given appropriate support, the smallholder sectors can contribute to the reduction of rural poverty and can begin strengthening national economy.

There is a large demand for fruits and vegetables in Indonesia. To help satisfy that demand the country imports considerable quantities of horticultural products, for instance, in 2008, 501 tons of fruits and 917 tons of vegetables (Dirjen Hortikultura, 2008). During the same period, Indonesia exported only 320 tons of fruits (BPS, 2008) and 296 tons of vegetables (Dirjen Hortikultura, 2008). This high level of imports represents opportunities lost by the agricultural sector, particularly smallholders, to expand and strengthen the production of horticultural crops.

Agroforestry is a diversified land use system that integrates annual crops and/or livestock with trees. Farmers adopt agroforestry systems for two main reasons: (1) to increase the productivity and diversity of their farms, and (2) to increase farm-based incomes (Beetz, 2002). Agroforestry systems are common in smallholder communities where dryland agriculture and tree-based systems are significant land uses. Agroforestry systems are particularly appropriate where labor, agricultural inputs and capital are limited. Fruit and vegetable crops are common components of agroforestry systems.

As in all other agricultural enterprises, the farmers' success in developing fruit and vegetable agroforestry systems depends on the availability and utilization of resources and information. Good access to market information and market channels is essential for farmers' production – for instance, which commodity to produce, calculate the desired yields, determine the timing to supply, and identify the best options for commodity delivery to consumers are some of the most important aspects to the complex agricultural sector. Crop selection is an important step in developing a market oriented agroforestry system.

A research study was conducted in and around Bogor, West Java to document consumer knowledge and preference as well as consumption behavior of four indigenous vegetables: katuk (*Sauropus androgynous*), kucai (*Allium odorum*), honje (*Etlingera elatior*, ginger bud in English), and tebu telor

(*Saccharum officinarum*). The study aimed at informing local smallholder farmers, traders and other stakeholders about the opportunities for the commercialization of indigenous vegetables based consumer behavior and preference.

2. Materials and Methods

2.1 Location

Bogor is both the capital city and a district of the province of West Java. The city has a population of about 800,000 (Pemerintah Kota Bogor, 2010), plus an additional 2,000,000 who live outside the city, or an approximate district population of 3,000,000. There is a high demand for vegetable and fruit crops in Bogor, including indigenous vegetable crops that are important components of traditional cuisine. Bogor has several vegetable and fruit markets throughout the city and district, some of which specialize in indigenous crops. Bogor is 1-2 hours from Jakarta, the national capital, which has additional demand for indigenous horticultural crops.

The study covered smallholder farmers in Nanggung Subdistrict. Located in Bogor District, Nanggung is only 1 hour from Bogor city and 30 minutes from Leuwiliang, one of the main horticultural markets in Bogor District. Although agriculture is the main occupation of 59.4% of Nanggung's working population, it provides only 14% of household incomes. Average landholdings are only 0.42 ha/household (Wijaya et al., 2007). There is wide farmer interest in expanding vegetable production in the agroforestry systems, but the farmers are not sure where and how to target their efforts (Roshetko et al., 2004).

2.2 Vegetable species

Katuk (*Sauropus androgynous*), kucai (*Allium odorum*), honje (*Etlingera elatior*) and tebu telor (*Saccharum officinarum*) were included in the study because of the strong, stable and lucrative market for these commodities and demand exceeds supply. All four are indigenous to West Java and are components of traditional cuisine. Nanggung farmers are familiar with the species, but cultivation is not widespread.

2.3 Consumer knowledge and preference study

The study was conducted from June to September 2007 using a semi-structured questionnaire. There were 150 respondents representing vegetable customers at the village, subdistrict and city levels. Village level respondents were randomly selected to represent the average consumers of indigenous vegetables. These included 30 housewives in each of three villages located in Nanggung - Sukaluyu, Hambaro and Parakan Muncang. Thirty subdistrict level respondents were purposively selected to represent consumers buying

indigenous vegetables from the Leuwiliang market, while 30 city level respondents were purposively selected to represent consumers purchasing indigenous vegetables in the city's main market, Pasar Bogor Kota.

2.4 Data analysis

Data collected through the consumer preference study was analyzed using simple regression to quantify the effect of independent variables on the quantity of commodities purchased by consumers. Independent variables included: age of consumer, commodity unit price, consumers' frequency of market visits, consumers' perception of commodity price, consumers' preference for commodity consumption, consumers' satisfaction with commodity quality, and consumers' perception of commodity availability.

3. Results

Survey results are summarized here by the following:

- characteristics of respondents
- consumer familiarity with commodities
- consumer perception of commodity use
- consumer perception of commodity price
- consumer satisfaction with commodity quality
- factors influencing consumer purchase decision
- consumer perception of commodity availability

3.1 Characteristics of respondents

Respondents were characterized by area of residence, age, gender and frequency of shopping. As per the survey design 60% of the respondents lived in villages (90 individuals), 20% near the subdistrict market of Leuwiliang (20 individuals) and 20% in Bogor city (30 individuals). All the respondents were women aged 20 to 65 years old. Village and subdistrict level respondents had an average age of 33 years, while city respondents had an average age of 38 years. Overall average age of respondents was 34 years. Age distribution by age and location of residence is shown in Table 1. The most common frequencies of shopping were weekly, monthly or less than monthly. Most village respondents (61%) visited the market less than monthly, while most subdistrict and city consumers visited markets a minimum of weekly, 45% and 70% respectively.

Table 1. Age distribution of respondents

Age of Respondents	Location						Total	
	Village		District		City			
	No.	%	No.	%	No.	%	No.	%
Less than 21 years old	4	4.4	1	3,33	1	3.3	6	4.0
21 - 30 years old	**42**	**46.7**	10	33.3	6	20.0	**58**	**38.7**
31 - 40 years old	26	28.9	**13**	**43.3**	**10**	**33.3**	49	32.7
41 - 50 years old	11	12.2	6	20.0	9	30.0	26	17.3
51 - 60 years old	5	5.6	0	0.0	4	13.3	9	6.0
61 - 70 years old	2	2.2	0	0.0	0	0.0	2	1.3
Total	**90**	**100**	**30**	**100**	**30**	**100**	**150**	**100**

3.2 Consumer familiarity with commodities

Consumer awareness varied by location and commodity. At the village and subdistrict levels, nearly all consumers were familiar with the four commodities; combined only one consumer (>1%) was unfamiliar with honje and three consumers (2.5%) were unfamiliar with tebu telor. In the city there was a greater level of unfamiliarity: 2.6% of respondents were unfamiliar with kucai, 26.7% unfamiliar with honje and 30% unfamiliar with tebu telor. All consumers were familiar with katuk. Only two city residents (1.3% of all respondents) were not familiar with kucai. A total of nine district and city residents were not familiar with honje (6.0% of all respondents). Twelve respondents across all locations were unfamiliar with tebu telor. Table 2 summarizes consumer awareness of commodities by species and location.

Table 2. Respondent awareness of local vegetables

Vegetables	Answer	Territory						Total	
		Village		District		City			
		No.	%	No.	%	No.	%	No.	%
Katuk	Known	90	**100**	30	**100**	30	**100**	150	**100**
	Unknown	0	**0**	0	**0**	0	**0**	0	**0**
Kucai	Known	90	**100**	30	**100**	28	**93.3**	148	**98.7**
	Unknown	0	**0**	0	**0**	2	**6.7**	2	**1.3**
Honje	Known	90	**100**	29	**96.7**	22	**73.3**	141	**94.0**
	Unknown	0	**0**	1	**3.3**	8	**26.7**	9	**6.0**
Tebu telor	Known	88	**97.8**	29	**96.7**	21	**70.0**	138	**92.0**
	Unknown	2	**2.2**	1	**3.3**	9	**30.0**	12	**8.0**
Total	***Known***	*358*	***99.4***	*118*	***98.3***	*101*	***84.1***	*277*	***92.3***
	Unknown	*2*	***0.6***	*2*	***1.7***	*19*	***15.9***	*23*	***7.7***

3.3 Consumer perception of commodity use

There are four main uses of the commodities: vegetable, spice, fruit[1], and medicinal/herb. Respondents considered the main use of katuk, kucai and tebu telur as vegetables. Only a few respondents (2.0% to 7.3%) considered those commodities to be useful spices, fruits or medicines/herbs. Honje on the other hand is perceived as having multiple uses: about 59.3% of respondents considered honje a fruit, 42.0% considered it a spice, 41.3% considered it a vegetable and 4.7% considered it a medicine/herb. Table 3 provides details regarding consumers' perceptions.

Table 3. Respondent perception regarding main uses of the commodities

Use	(% respondents)			
	Katuk	Kucai	Honje	Tebu telor
Vegetable	98.0	92.7	41.3	87.3
Spice	2.7	4.0	42.0	2.0
Fruit	2.7	6.0	59.3	4.0
Medicine/ Herb	7.3	2.7	4.7	0.7

3.4. Consumer perception of commodity price

Katuk, kucai and tebu telor are sold by the bunch and konje by the individual fruit. Respondents in the village considered a reasonable price for katuk and

[1]In the survey vegetables indicated the commodity was cooked and fruits indicated the commodity was not cooked.

cukai to be not more than Rp1,000/bunch. Subdistrict and city respondents considered fair price for either commodity up to Rp2,000/bunch. For Honje, village respondents said that a fair price should not exceed Rp1,000/fruit. Respondents at both the subdistrict and city levels were unable to estimate the reasonable price for honje due to limited familiarity with the commodity and pricing. Both village and the subdistrict respondents agreed a reasonable price for tebu telur should not be more than Rp1,000/bunch, while city residents considered Rp4,000/bunch as reasonable. Higher commodity quality was the determining factor of consumers' willingness to pay the prices indicated. Consumers were not willing to pay premium prices for the commodity quality currently available in the markets.

3.5 Consumer satisfaction with commodity quality

Consumer satisfaction with commodity quality was high, averaging 85.6% across all locations and species. Satisfaction with individual species was roughly the same, varying from 87.8% (kucai) to 84.0% (tebu telor). Satisfaction by consumer groups differed noticeably: 86.1% of village respondents, 79.4% of subdistrict respondents, and 92.0% of city respondents were satisfied with commodity quality. Satisfaction with quality relates to current market prices. The only consumers dissatisfied with commodity quality were a small number of village residents, 3.9% were dissatisfied with katuk and kucai, while 1.5% were dissatisfied with honje and tebu telor. Figure 1 illustrates consumer satisfaction by location and commodity.

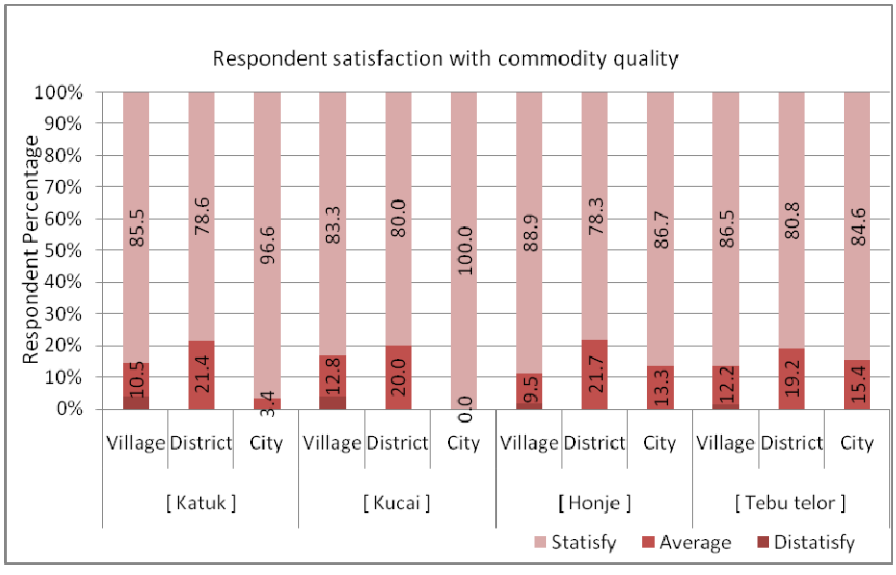

Figure 1. Respondent satisfaction with commodity

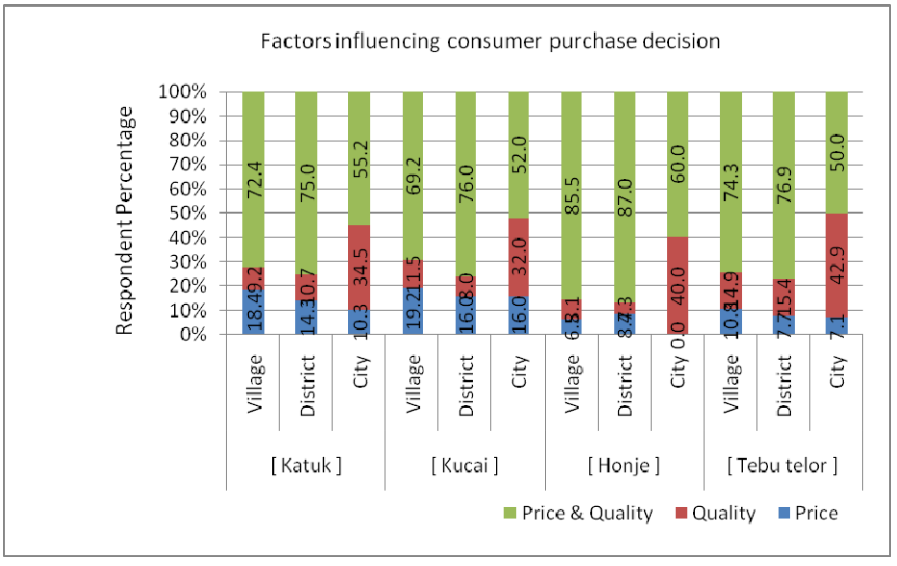

Figure 2. Factors influencing consumers purchase decision

3.6 Factors influencing consumer purchase decision

For all four commodities, consumers' purchase decision was primarily based on a combination of price and quality - accounting for 75.8% of purchase decisions at the village level, 78.7% at the subdistrict level and 54.3% at the city level. Across all locations, an average of 69.5% of purchase decisions were based on a combination of price and quality. Price as a single factor accounted for 13.7% of purchase decisions at the village level, 11.7% of purchases at the subdistrict level and 8.4% at the city level. Quality alone was the most important to city consumers accounting for 37.4% of purchase decisions, roughly four times more compared to the subdistrict (9.6%) or village (10.9%) consumers. Figure 2 illustrates factors influencing consumer purchase decision by location and commodity.

3.7 Consumer perception of commodity availability

Consumer perception of availability of commodities varied greatly by species and location. City and subdistrict consumers considered katuk and kucai easy to find, as those commodities are always available in the market. However katuk and kucai were difficult to find in village markets. Honje was commonly available in subdistrict markets, usually in village markets, but difficult to find in city markets. Tebu telor was difficult to find at all locations. With the exception of honje, village consumers considered all commodities difficult to find. Subdistrict and city consumers considered only tebu telor difficult to find.

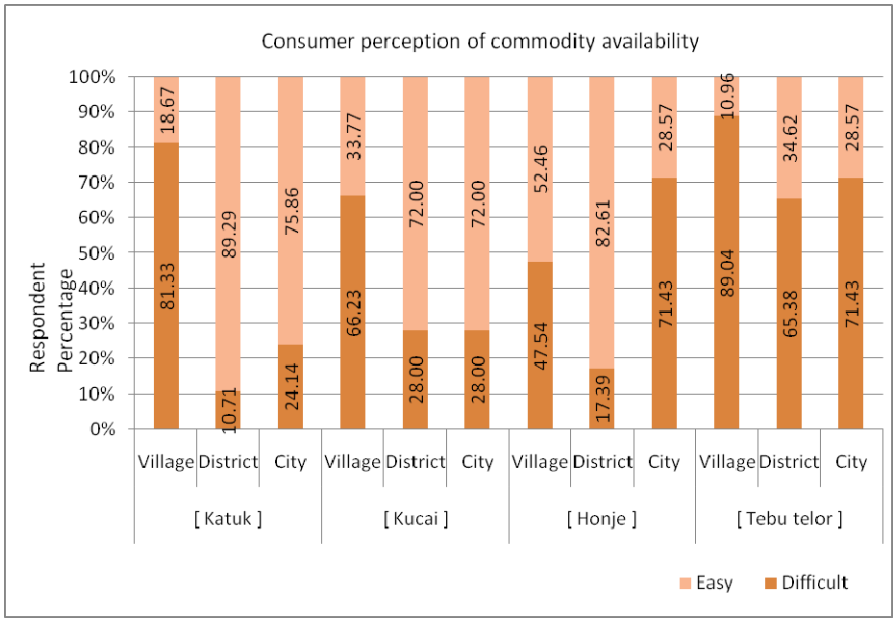

Figure 3. Consumer perception of commodity availability

3.8 Regression analysis

Regression analysis showed significant effects of independent variables on katuk and tebu telor purchases at village and subdistrict levels and on kucai and honje purchases in all three locations. Each relationship is summarized below.

At the village level, **katuk** purchase is influenced by unit price (X_2). An increase of Rp1000/bunch decreases the average purchase by 1.7 bunches. The relationship is represented by the following equation:

$$Y_{11} = 3.153 - \left(1.69 \times 10^{-3}\right) X_2$$

$$R^2 = 0.115$$

At the subdistrict level, katuk purchase is influenced by age of consumer (X_1) and frequency of market visits (D_{12} and D_{14}). As consumer age increases by one year purchase of katuk increases by 0.1 bunch. Consumers who visit the subdistrict market weekly purchase 2.3 more bunches of katuk compared to consumers who visit the market less frequently. Consumers who visit the subdistrict market less than monthly purchase 1.6 less bunches of katuk than consumers who visit markets more frequently. The following equation describes the relationship:

$$Y_{12} = 0.952 + \left(7.669 \times 10^{-2}\right) X_1 + 2.311 D_{12} - 1.336 D_{14}$$

$$R^2 = 0.439$$

Kucai purchases in village markets are influenced by unit price (X_2), frequency of market visits (D_{13}), and frequency of consumption (D_{32}). An increase in kucai price of Rp1,000/bunch decreases the average purchase by 0.1. Consumers who visit village markets monthly purchase 1.8 less bunches of kucai compared to consumers who visit markets more frequently. Consumers who eat kucai weekly purchase 0.9 more bunches of kucai than consumers who eat kucai less frequently. The equation for kucai purchasing in the village is:

$$Y_{21} = 2.709 - 0.810 D_{13} + 0.949 D_{32} - 0.03 \times 10^{-3} X_2$$

$$R^2 = 0.203$$

Kucai purchases in subdistrict markets are influenced by age of consumer (X_1), unit price (X_2), consumer price perception (D_{41} and D_{42}), and frequency of market visits (D_{13}). As consumer age increases by one year purchase of kucai increases by of 0.1 bunch. An increase in kucai price by Rp 1000/bunch decreases sales by 0.8 bunch. Consumers who visit the subdistrict market monthly purchase 3.0 less bunches of kucai compared to consumers who visit markets more frequency. Consumers who have a lower perception of fair price purchase 2.6 less bunches of kucai than consumers with a higher perception of fair price. The regression equation that best represents kucai purchases in subdistrict markets is:

$$Y_{22} = 7.196 - 3.38 \times 10^{-2} X_1 - 2.950 D_{13} - 8.43 \times 10^{-4} X_2 - 2.603 D_{41} - 2.440 D_{42}$$

$$R^2 = 0.803$$

In the city market, kucai purchases are influenced by consumer preference for consumption (D_{31}). Consumers who prefer to eat kucai daily purchase 2.2 more bunches compared to other consumers. The relationship is described by the following equation:

$$Y_{23} = 2.264 + 2.159 D_{31}$$

$$R^2 = 0.513$$

Honje purchases in village markets are influenced by frequency of consumption (D_{32}), consumer price perception (D_{42}), and consumer's satisfaction level (D_{51}). Consumers who eat honje weekly purchase 1.9 fruits more than consumers who eat honje less frequently. Consumers who have lower perception of fair price purchase 0.7 less fruits of honje than consumers who have a higher perception of fair price. Consumers who are not satisfied with honje quality purchase 1.3 less fruits than other consumers. The following equation best represents the purchase of honje at the village level:

$$Y_{31} = 1.695 + 1.861D_{32} - 0.667D_{42} + 1.305D_{51}$$

$$R^2 = 0.460$$

In the subdistrict market, **honje** purchases are influenced by consumer price perception (D_{41}) and consumer's satisfaction level (D_{52}). Consumers who have lower perception of fair price purchase 4.2 less fruits of honje than other consumers. Consumers who are satisfied with commodity quality purchase 1.2 more fruits of honje than other consumers. The following equation represents the relationship of the purchase of honje at the subdistrict level:

$$Y_{32} = 5.00 - 4.250D_{41} + 1.250D_{52}$$

$$R^2 = 0.952$$

At the city market level, **honje** purchase is influenced by age of consumer (X_1), frequency of consumption (D_{32}), consumer's satisfaction level (D_{52}) and the availability of the commodity (D_6). As consumer age increases by one year purchase of honje increases by 0.1 fruit. Consumers who eat honje weekly purchase 1.1 more fruits of honje than consumers who eat honje less frequently. Consumers who consider commodity quality to be only average purchase 1.0 less fruits than other consumers. Consumers who perceive that the commodity is difficult to find purchase 0.6 more fruit than other consumers. The relationship is represented by the following equation:

$$Y_{33} = 7.040 \times 10^{-2} X_1 + 4.101D_{32} - 0.955D_{52} + 0.603D_6$$

$$R^2 = 0.982$$

The purchase of **tebu telor** in village markets is influenced by frequency of market visits (D_{13}), frequency of consumption (D_{32}) and consumer's satisfaction level (D_{52}). Consumers who visit the village market monthly purchase 0.6 less bunche than consumers who visit markets more frequently. Consumers eat tebu telor weekly purchase 1.0 more bunches than consumers who eat tebu telor less frequently. Consumers who consider commodity quality to be only average purchase 0.6 less bunch than other consumers. The following equation represents the purchase of tebu telor at the village level.

$$Y_{41} = 1.535 - 0.644D_{13} + 1.005D_{32} - 0.569D_{52}$$

$$R^2 = 0.392$$

Tebu telor purchases at the subdistrict level are influenced by purchase price (X_2), frequency of market visits (D_{13}), frequency of consumption (D_{34}) and the availability of the commodity (D_6). An increase of Rp1000/ bunch increases the average purchase by 2.4 bunches. Consumers who visit the subdistrict market monthly purchase 2.7 less bunches than consumers who visit markets more frequently. Consumers who eat tebu telor monthly purchase 0.7 less bunches of tebu telor than consumers who eat the commodity more often. Consumers who perceive that the commodity is difficult to find purchase 0.9 more bunches than other consumers. The following equation describes the relationship:

$$Y_{42} = -2.741D_{13} - 0.713D_{34} + 2.356 \times 10^{-3} X_2 + 0.911D_6$$

$$R^2 = 0.750$$

4. Discussion

The age of survey respondents averaged 34 years across all locations; village and subdistrict respondents averaged 33 years old and city respondents slightly older at 38 years. Regression analysis determined that older consumers, at the city and subdistrict levels, made slightly larger purchases of commodities. Age and location are indicators of affluence. In Bogor district, and families living in towns and cities maintain higher living standards than families in villages (BPS Bogor, 2008). The age of consumers has been related to larger expenditures on food in general and fresh produce specifically (Buse, 1989; Eastwood et al., 1987; Smallwood and Blaylock, 1981).

Survey results show that city consumers were more concerned with quality as a single factor affecting purchase decisions than either village or subdistrict level consumers. Village level consumers were most concerned

with price as a single factor affecting purchase decision, followed by subdistrict consumers and trailed by city consumers. The price consciousness of village consumers is also supported by regression analysis that shows that as the price of katuk and kucai increase in the village markets, the size of consumers purchases decreases. Regression analysis indicated that city consumers were not sensitive to commodity price. At the subdistrict level consumers increase the purchase of tebu telor when the price increases, because that is when the commodity is scarce, but decrease the purchase of kucai when prices increase.

Shopping frequency varied greatly by location. Over 60% of village consumers visited markets less than monthly, while 45% of subdistrict consumers and 70% of city consumers visited markets a minimum of weekly. Consumers who visited markets weekly purchases larger quantities of commodities per transaction compared with consumers who visited markets monthly, because they consume the commodities more frequently. For all consumer groups an increase in consumption resulted in larger purchases. Villagers' reluctance to shop in markets conforms to findings that 89% of locally grown vegetables in Nanggung are sold directly to households by farmers. Direct sales benefit both farmers and households in convenience, as well as in time and money saved by not traveling to the markets (Roshetko et al., 2011).

Consumer awareness of commodities varied by location and species. Almost all consumers at the village and subdistrict levels were familiar with all four commodities. Katuk was known to all consumers and kucai known to 98.7% of consumers. Honje and tebu telor were unknown to 26.7% and 30.0% of city consumers, respectively. Consumers perceived katuk, kucai, and tebu telor primarily as vegetables. In contrast, honje was seen as a multiple use commodity; useful as a fruit, spice, vegetable and medicine.

Perceptions of a fair price for quality katuk and kucai doubled from Rp1,000/bunch in village markets to Rp2,000/bunch in subdistrict and city markets. For quality tebu telur a fair price in village and subdistrict markets was not more than Rp1,000/unit but increased to Rp4,000/unit in the city. Based on commodity quality, consumers' willingness to pay compared favorably with current market prices, where prices were 100% higher in the city compared to the villages for all commodities except konje (Table 4). The premium for quality at all market levels and affluent consumers' willingness to pay one to four times more than other consumers should send a signal to local farmers and traders to increase commodity quality and better serve the lucrative markets. Farmers and traders should consider the additional costs associated with producing, processing and transporting quality commodities to all markets. Villager respondents consider a fair price for all commodities to be Rp1,000/bunch or fruit, a response which may reflect more their level of disposable income rather than the actual economic utility of the commodity. Regression analysis indicates that village and subdistrict consumers are price conscious; they will decrease purchases if prices are perceived to be high, regardless of the actual price.

Consumers' perception of current market quality is high and roughly the same for all four commodities, averaging 85.6% across locations. Satisfaction by consumer group varies noticeably – 92.0% with city consumers, 86.1% at the village level and 79.4% in the subdistrict. Regression analysis shows that if consumers feel the quality of the commodity is high they will increase their purchases. However, consumers will not increase purchases if they perceive quality to be only average. Consumers at all levels would like to see more reliable and higher commodity quality – and are willing to pay for it. Only village consumers specifically expressed dissatisfaction with commodity quality (2.7% average over all commodities). Villager dissatisfaction and subdistrict consumers' lower level of satisfaction indicate that traders grade commodities and send higher quality material to the more lucrative and quality conscious city markets. The dissatisfaction with commodity quality also explains why village consumers visit local markets infrequently and prefer direct purchases from farmers (Roshetko et al., 2011). Commodity price and quality are closely linked. Most consumers' purchase decisions (69.5% across locations and commodities) are based on price and quality combined.

Perceptions of commodity availability vary by both location and species. Katuk and kucai are always available in subdistrict and city markets, but difficult to find in village markets. Tebu telor is difficult to find in all markets. Village consumers comment that tebu telor is even difficult to source from local farmers or neighbors' gardens. The availability of honje varies by market location. With the exception of honje, the other commodities are rarely available in village markets. Village consumers report that honje is easy to purchase from farmers and neighbors. Subdistrict and city consumers consider all commodities, except tebu telor, available in adequate quantities. Greater availability in subdistrict and city markets indicates that traders prefer to supply commodities to those lucrative markets. However, even subdistrict and city consumers report irregular consumption of indigenous vegetables due to scarcity in the markets. They cannot satisfy their preference for consumption and would like to see more regular and reliable supplies. Regression results indicate that city consumers are more likely to increase their purchases of commodities that are perceived to be scarce, when those commodities are available. Village consumers do not respond in the same way because they lack the affluence – 52% and living below the poverty line (Wijaya et al., 2007).

Table 4. Average unit price of local vegetables (rounded to nearest Rp50)

Location	Average price per unit			
	Katuk	**Kucai**	**Konje**	**Tebu telor**
Village	600	700	600	450
Subdistrict	750	1,000	800	550
City	1,250	1,500	900	900

5. Conclusions

City and subdistrict markets are more lucrative and profitable for traders. Consumers in those locations are affluent, quality conscious and willing to pay higher prices. A perceived scarcity can result in affluent consumers increasing their purchases. Frequent weekly visits indicate those consumers prefer markets as a main source of vegetable produce for their households. Traders have responded to this opportunity by developing appropriate market chains. Higher quality katuk, kucai and honje are available in city and subdistrict markets compared to that at the village level.

Village level consumers are price conscious and quality aware. They visit markets less frequently (monthly) then consumers at the city and subdistrict level, and purchase smaller quantities of commodities. Village consumers decrease their purchases in response to high prices and perceptions of low quality. These results support related studies that found village consumers commonly purchased vegetables directly from neighboring farmers, a transaction that provided mutual benefits to both parties in terms of convenience and time and money saved by not traveling to markets.

All four commodities are known to consumers at all three market locations. Katuk and kucai are more familiar to consumers and have high market demand. Honje and tebu telor have positive market recognition, but are less familiar and available to consumers in the lucrative markets. There appears to be good potential to expand commercialization of all four commodities by enhancing production and supply. Efforts with honje and tebu telor should include enhancing consumer awareness.

While city and subdistrict consumers generally expressed satisfaction with quality of commodities currently available in markets, they would prefer to have more reliable supplies in terms of quantities and higher quality – and are willing to pay premiums for higher quality. Village consumers also expressed a willingness to pay a higher price for better quality material. The perceived shortage commodities and consumers' willingness to pay premium prices for quality provides opportunity for farmers and traders to increase the production, processing and marketing of quality commodities. This opportunity is particularly great in lucrative city and subdistrict markets where consumers are willing to pay premium prices approximately one to four times higher than other markets. In serving this demand, farmers and traders need to be mindful of the additional costs of producing and transporting higher quality commodities.

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