

Demand for Organic Vegetables in the Philippines

—A Study of Food Establishments and Consumers in Metro Manila—

By

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(Received February 15, 2005/Accepted December 9, 2005)

Summary : Vegetable is considered a cheap nutritional source by most Filipinos, and an important component for the healthy lifestyle of the wealthy few, who represent the niche market for the organic vegetable industry. Because there is a need for updated research for a demand-driven industry, we conducted a series of survey of the demand for organic vegetables in Metro Manila from 2002 to 2003. We collected information from 11 hotels and restaurants, 118 general consumers, seven supermarkets and four organic markets.

The main findings of this study were as follows : (1) the majority of the hotels and restaurants showed no intention of purchasing organic vegetables due to their high regard for low price, good quality and stable supply of produce, while general consumers still seemed to be the potential buyers especially if a variety of organic vegetables are regularly available and at an affordable price ; (2) carrots accounted for 30% of the total volume of the 75 vegetables sold in the organic markets ; and (3) demand for carrot medium, tomato ordinary, onion and potato ordinary were highly elastic to price changes, meaning that if there would be stable supply for these vegetables, prices are expected to be lower, resulting in a higher demand. (4) Carrot combined with celery was popularly consumed as juice to naturally cure or prevent cancer. Through the cross-price elasticity analysis, carrots and celery appeared to be complementary goods.

Key words : hotels and restaurants, carrot, celery, price elasticity of demand

Introduction

Recently, organic agriculture has experienced tremendous development and significant market growth in response to the human and environmental issues around the world¹⁰. The world market doubled to US\$23-25 billion (2003) from US\$11.8 billion (2000). Although most markets are still small and in their infancy stage in Asia, countries such as Japan, Thailand, China, and the Philippines are expected to play a significant role in both domestic and international demand.

In the Philippines, organic agriculture only emerged in the early 1980s through the efforts of NGOs and people's organizations^{3,4}. The market size is estimated at US\$6.15 million, of which the domestic market accounted for 40%⁵. With the development in the

Philippine organic industry, organic vegetables have attracted several studies in the past : benchmark survey¹, farm production¹², market studies^{2,6,13,16} and industry profile^{4,5}. These studies examined the economic viability and technological performance of organic vegetable farming and marketing system ; but only few studies were conducted on the actual consumers of organic vegetables.

This paper aims to identify the issues and potential of organic vegetables within the demand sector. We conducted a broader demand study using a series of surveys involving the food establishments (e.g. hotels and restaurants), general consumers, retail markets and key persons in Metro Manila in 2002 and 2003.

Data sources were three-fold. First, institutional buyers including organic buyers were interviewed in

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Table 1 Vegetable Demand of the Food Establishments in Metro Manila per Month, 2003

| Establishments | Total Volume of Vegetables (Kg) | Organic Vegetables | | | |
|-------------------|---------------------------------|--------------------|-------------|---------------------------|--|
| | | Demanded or Not | Volume (Kg) | Share to Total Volume (%) | |
| Hotel | | | | | |
| A | 20,000 | yes | 60 | 0.3 | |
| B | 2,000 | yes | na | na | |
| C | 800 | yes | 20 | 2.5 | |
| D | 4,000 | no | 0 | 0 | |
| E | na | yes | 8 | na | |
| F | na | yes | na | na | |
| Restaurant | | | | | |
| A | 400 | yes | 144 | 36 | |
| B | 1,640 | yes | na | na | |
| C | 400 | no | 0 | 0 | |
| D | 5,000 | no | 0 | 0 | |
| E | na | no | 0 | 0 | |
| Hotel | 26,800 | | 88 | 0.3 | |
| Restaurant | 7,440 | | 144 | 1.9 | |
| Total | 34,240 | | 232 | 0.7 | |

Source: Hotel and Restaurant Survey, March 2003.

Notes: 1) The total volume of vegetables per week for hotels and restaurants were 6,700 kg and 1,860 kg, respectively.

2) In total, vegetable demand of hotels and restaurants per week was 8,560 kg.

3) Three institutions were buying tomato and leafy greens grown hydroponically.

order to clarify their purchasing behavior for vegetables in March 2003. Actually, 24 establishments were targeted in Metro Manila based on referrals, previous farm interviews and business track record, but only a total of six hotels and five restaurants were cooperative to our research. All establishments catered to high and medium-high income classes. The restaurants ranged from fast food chain to fine dining offering a wide array of cuisines (e.g. Italian, Vietnamese and American).

Second, a questionnaire survey was conducted on people referred by market organizers, living or working in Metro Manila in the summer of 2002. A total of 118 general consumers were asked regarding their vegetable demand, awareness on vegetable production and food safety, problems encountered in buying organic products, and purchasing behavior towards organic products. A consumer can be characterized with a positive behavior when he/she is willing to buy a certain good at higher price than the value given and vice versa. All respondents were female with an average age of 34.8 years old. Eighty-three percent of them had college degrees and most of them were employed, with an average annual household income of 648,921 pesos (US\$12,453). The average household size was 4.2 persons. There were 23 organic consumers and 95 non-organic consumers identified.

Third, several interviews of traders/managers were also conducted in weekly organic markets and supermarkets in order to obtain information on their business operation in general, and the kind and volume of

organic vegetables traded in particular. General information was taken from a total of four organic markets and seven supermarkets, while specific information was obtained from four organic markets with regular clients.

This paper is divided into six sections. Following this introduction, section two will examine the actual vegetable demand of hotels and restaurants, including the demand for organic vegetables. The third section will present the vegetable demand, organic perception and buying intentions of the general consumers. The fourth section will show the status of the market, focusing on the organic markets and supermarkets. The fifth section will attempt to estimate the price elasticity of demand for selected vegetables. Section six will be the conclusion of this paper.

The Case of Hotels and Restaurants

Vegetables Demanded and Their Sources

As shown in Table 1, the total vegetable demand by the 11 food establishments was estimated to be 34,240 kg per month : 26,800 kg by hotels and 7,440 kg by restaurants. According to one purchasing manager interviewed, hotels usually procured more than 100 kinds of vegetables. The kind and volume of vegetable demanded varied depending on the type of cuisine, season (including events) and extent of the business operation. Most conventionally grown vegetables demanded were carrot, potato and tomato. This is in line with an earlier finding that potato, onion, tomato, button mushroom and carrots were the top vegetables demanded by

hotels and restaurants in Luzon¹⁵).

It is important to note that seven out of the 11 buyers demanded organic vegetables. The total volume of organic vegetables ranged from 20 kg to 144 kg per month, or 0.3% to 36% of the total vegetables, indicating that organic vegetables still had very small share. In fact, organic vegetables demanded by these establishments were largely limited to lettuces and herbs. It should be noted that the high share of 36% was from a restaurant which offered several dishes using organic lettuces to their targeted vegetarian and health conscious customers. Three institutions reported their purchase of hydroponically grown vegetables, consisting of tomato and leafy greens.

According to TAGARINO¹⁵), institutional buyers tended to purchase vegetables based on certain qualities. For instance, carrots fully trimmed, large and free from cracks, holes and soft spots were preferred in order to satisfy their economic and culinary requirements. Our study revealed that both local and imported vegetables were being utilized in order to obtain good quality vegetables. Certainly, most of the vegetables were supplied by Baguio City through traders and/or wholesale markets, but some hotels reported purchasing cauliflower, broccoli and lettuce from Australia and France through a locally-based trader. Although imported vegetables were usually priced twice as high, they were apparently clean and trimmed. One purchasing manager added that they were more economical because of better size, quality and longer shelf life.

Institutional buyers regarded vegetables as an important commodity among the fresh produce they regularly demanded. To attain good quality, reasonable price, sufficient supply at all times, institutional buyers especially hotels did not engage in contracts with suppliers. Instead, every Monday, a weekly price list from three to five pre-selected suppliers is collected. A master list is made to serve as the silent bidding form, and the supplier of a certain vegetable is chosen from the lowest bid for a given week. It seemed that price and quality were the main factors in purchasing vegetables. Trust was shown to be a strong factor as well.

Problems of Organic Vegetables Demand

Cavite farmers were regular suppliers to five-star hotels and restaurants, and fast-food chains in Metro Manila¹²). However, our study identified four major problems for organic vegetable demand. First, past buyers declined to be interviewed because of no further interest in organic vegetables and no more purchasing of such produce. This conveyed that there was still an unstable demand for organic vegetables by

food establishments and institutions.

Second, some establishments were considering to stop or not to expand their purchase of organic vegetables, for the following reasons: unstable supply, high price, no certification, unreliability, poor quality and no demand from current clients. With the general demand for low priced vegetables, the establishments seemed to have no intention of buying high priced organic vegetables.

Third, aside from the strong competition with conventional vegetables, there was also an emerging threat from hydroponically grown vegetables. Three out of the 11 establishments were buying these vegetables at the time of study. With its good quality in terms of size and cleanliness, other establishments showed an interest in purchasing them as well. Moreover, if imported organic vegetables establish a market in the future, demand for locally produced organic vegetables is expected to decrease.

Fourth, among the current buyers of organic vegetables, only one restaurant, stressing health foods, indicated in their menu that organic lettuces were used. Other buyers did not do this because of the relatively small volume purchased.

Our examination of hotels and restaurants revealed that the demand for organic vegetables appeared to be very small. With high consideration for good quality, low price and stable supply, it seemed difficult for organic producers to penetrate into the food catering market. At the moment, suppliers could only target health-oriented small and medium enterprises. Growth and development of organic agriculture is mainly demand-driven, raising a question as to whether there is a potential demand for organic vegetables among general consumers.

The Case of General Consumers

Our study found that there was 69% awareness of the organic concept among the 118 general consumers surveyed. Almost half of the respondents understood the term organic to mean free of chemical fertilizers and pesticides. This is in line with earlier studies in Metro Manila^{6,13}). It is important to note that their sources of information varied from personal communication among colleagues to television and newspapers, which could be the result of the various events and information dissemination conducted through the efforts of NGOs, private institutions and government agencies¹⁶).

Table 2 shows the average household food spending by the consumers surveyed. It should be noted that information from only 63 out of 118 consumers were

Table 2 Average Annual Household Food Spending by the Consumers Surveyed, 2002

| Food Group | Organic Consumers (n=16) | | Non-Organic Consumers (n=47) | | All Respondents (n=63) | |
|--------------|-----------------------------|------------|---------------------------------|------------|---------------------------|------------|
| | Pesos | % | Pesos | % | Pesos | % |
| Grain | 16,981 | 13 | 13,423 | 15 | 14,327 | 14 |
| Seafood | 29,981 | 22 | 16,685 | 19 | 20,062 | 20 |
| Meat | 31,688 | 24 | 22,136 | 25 | 24,562 | 25 |
| Dairy | 15,026 | 11 | 11,852 | 13 | 12,658 | 13 |
| Fruits | 17,106 | 13 | 10,940 | 12 | 12,506 | 12 |
| Vegetable | 23,644 | 18 | 13,343 | 15 | 15,959 | 16 |
| TOTAL | 134,426 | 100 | 88,379 | 100 | 100,074 | 100 |

Source: Consumer Survey, 2002.

Note: Of the 118 consumers surveyed, information could be ascertained only for a total of 63 consumers.

ascertained and used to estimate household food spending. Among them, there were 16 organic consumers. For non-organic consumers, the average annual household food spending was 88,379 pesos, of which vegetables accounted for 15%, while an organic consumer on the average spent 134,426 pesos and vegetables accounted for 18%. This implies that organic consumers actually spent more on vegetables than non-organic consumers. About 60% of the consumers bought vegetables weekly at the wet market. The major vegetables demanded were cabbage, eggplant, potato, carrots and string beans. Organic consumers mainly bought their vegetables at the supermarket and/or organic markets, and there were 20 kinds of organic vegetables mentioned, including carrots, eggplant, tomato, as the main ones.

Table 3 presents the percentage of consumers who were conscious of vegetable production methods and food safety when buying vegetables. In general, there seemed to be a low concern on vegetable production methods, except for more than 60% of organic consumers who knew about the use of chemical pesticides and herbicides. With regard to food safety, more than 60% of the 118 consumers were aware of the possible harm of chemical pesticides and herbicides to health and the environment.

More than 50% of the organic consumers pointed out unavailability and limited choice as their main problems. On the other hand, non-organic consumers complained of high prices and unavailability of organic vegetables in the market. Actually, past studies also reported that consumers would start buying organic vegetables only if a wide variety of these vegetables are regularly available and at affordable price⁶⁾.

Ironically, the need for certification was not emphasized by both organic and non-organic consumers, indicating that the majority of vegetable transactions seemed to be based on trust or the *suki* system. *Suki* system is a Philippine traditional mutual agreement prevalent in different services and commodities such as vegetables⁹⁾. In general, the system involves a

Table 3 Percentage of Conscious Consumers of Vegetable Production and Food Safety When Buying Vegetables, 2002

| Particulars | Organic Consumers (n=23) | Non-Organic Consumers (n=95) | All Consumers (n=118) |
|---|-----------------------------|---------------------------------|--------------------------|
| Vegetable Production | | | |
| Producing area | 48 | 26 | 31 |
| Production method | 48 | 26 | 31 |
| Use of chemical pesticides | 74 | 43 | 49 |
| Use of chemical herbicides | 61 | 24 | 31 |
| Food Safety | | | |
| Possible harm of chemical pesticides and herbicides to health | 78 | 58 | 62 |
| Possible pollution of water by chemical pesticides and herbicides | 83 | 59 | 64 |

Source: Consumer Survey, 2002.

buyer and a seller who guarantee each other the transaction of a certain volume of produce at an agreed price on a regular basis.

It should be noted that 60% of the non-organic consumers showed the intention of purchasing organic vegetables if there would be improvements of the problems. Almost half considered the supermarket as their main place of purchase. Despite this finding, there are still two issues to be considered. First, the low vegetable consumption of Filipinos at 39 kg annually was a critical factor for further expansion of the potential market. Thus, only those people with healthy lifestyle could be the target for marketing of organic vegetables. Second, organic vegetables were pegged at a high premium price. Economic condition could be a significant hindrance for the majority of Filipinos. Unless the price decreases, organic vegetables will just be for the niche market.

In the meantime, consumer education, regarding not just organic farming but also the importance of vegetables, should be given emphasis. This could eventually increase the demand for vegetables, especially organic vegetables.

The Organic Market

Since the first organic market was established in Greenbelt, Metro Manila in 1994, several other markets were established and survived, while some operated only for a short span of time or moved locations. Organic vegetables were currently available in various organic markets, supermarkets, health shops and doctor's clinics (mostly attending to cancer patients) through the efforts of many NGOs and private entities, such as Alliance of Volunteers in Development Foundation (AVDF), The Source, Organic Producers Trade Organization (OPTA) and Gracia Plena Social Action Center.

We conducted a transaction survey at four organic markets, namely A, B, C and D, in Metro Manila in August 2003. A total of 75 kinds of vegetables were sold in these markets from January to June 2003. It should be noted that all kinds of vegetables were not regularly available, and some were offered in small quantities. As shown in Table 4, a total volume of 9,946 kg of organic vegetables were sold during this period. Each consumer bought an average of 4.6 kg per week.

Table 4 Vegetables Sold in Four Organic Markets Studied in Metro Manila, January–June 2003

| Kinds of Vegetables | Volume | |
|---------------------|----------------|---------------|
| | Kg | % |
| Carrot Medium | 2,372.3 | 23.85 |
| Carrot Big | 649.4 | 6.53 |
| Cucumber Local | 447.7 | 4.50 |
| Cabbage Green | 363.8 | 3.66 |
| Chayote | 349.5 | 3.51 |
| Celery | 320.9 | 3.23 |
| Tomato Salad | 274.8 | 2.76 |
| Potato Medium | 265.7 | 2.67 |
| Squash | 250.4 | 2.52 |
| Tomato Ordinary | 236.8 | 2.38 |
| Other Vegetables | 4,415.0 | 44.39 |
| TOTAL | 9,946.3 | 100.00 |

Source: Transaction Survey, August 2003.

Assuming the average household size of 4.54 persons¹¹⁾, this was equivalent to an annual per capita consumption of 52.6 kg, indicating that their vegetable consumption appeared to be higher than the country's average annual per capita consumption of 39 kg; however, still less than the recommended intake of 69 kg per year.

Of the total volume sold, carrot medium accounted for the largest share of 2,372.3 kg. This was followed by carrot big and cucumber local, amounting to 649.4 kg and 447.7 kg, respectively. Overall, carrots (including medium and big) alone accounted for 30% of the total volume of vegetable sold. According to several traders interviewed, most carrots were usually sold in bulk of 10–15 kg weekly, and celery was often sold together because these were processed together and consumed as fresh juice. Researches show that consumption of carrot, which is a good source of beta-carotene, decreases cancer risk or prevents worsening of the health condition¹⁴⁾. One trader mentioned that a third of his customers were cancer patients and physicians.

Table 5 shows that the average number of customers, volume and value of vegetables per market day for organic markets were 23 people, 105.8 kg and 7,819.1 pesos, respectively. For comparison, the same information was taken from a supermarket in Los Baños, Laguna in November 2003, and it became clear that the organic market stood at 1%, 18% and 25% of the supermarket in terms of number of customers, volume and value of vegetables, respectively.

According to a past study, eight out of 12 supermarkets studied in Metro Manila were selling organic vegetables¹³⁾, of which only two sold organic vegetables without any brand. It should be noted that the brand being referred to in this section is a seal or a mark indicating the name of farm, producer or company and where the commodity was produced. We made a follow-up survey of seven supermarkets in 2003, including five identified by the earlier study. It was revealed that

Table 5 Average Number of Customers and Volume of Organic Vegetables Traded per Market Day, January–June 2003 (N=94)

| Market | Average Number of Customers | Average Volume (Kg) | Average Value (Pesos) |
|---------------------------------------|-----------------------------|---------------------|-----------------------|
| Organic ¹ | | | |
| A | 20 (7.7) | 78.1 (36.6) | 5,756.9 (2,864.3) |
| B | 21 (8.0) | 110.7 (52.1) | 8,248.9 (3,471.9) |
| C | 27 (13.8) | 131.8 (82.2) | 9,798.5 (6,263.5) |
| D | 26 (15.6) | 84.1 (53.5) | 5,984.6 (3,851.5) |
| Overall | 23 (11.6) | 105.8 (63.9) | 7,819.1 (4,742.5) |
| Conventional Supermarket ² | 2,397 | 592.9 | 30,828.7 |

Source: 1) Transaction Survey, August 2003.

2) Personal communication with a store manager in Los Baños, Laguna in November 2003.

Note: Figures in parentheses are the standard deviations.

only two supermarkets still offered organic vegetables but of different brand, and one new supermarket sold unbranded ones. The share of organic vegetables in the total sale of vegetables was estimated to be 5% by a manager and was expected to increase in the near future. In addition, another supermarket transacted about 400 kg of organic leafy greens per week.

It is noteworthy that two major supermarket companies in Metro Manila already established an organic vegetable section within their stores through the cooperation of respective NGOs and private entity. However, according to store managers and division supervisors, most of them still have difficulties in finding a stable supplier of organic vegetables. In contrast, some organic farmers interviewed informally mentioned that there was a lack of buyers and retailers (e.g. supermarkets) in Metro Manila, pointing to the fact that supply-demand chain was still weak. It seemed that

the issue of the inaccessibility of consumers, traders and producers²⁾ was still apparent and there is a need for establishing an effective distribution system such as the *teikei* (producer-consumer contract) system⁷⁾ in Japan.

Table 6 presents the price differentials for selected organic and conventional vegetables based on our surveys. It became clear that organic vegetable prices were generally higher than conventional vegetables by 6% for cauliflower to 240% for cabbage. A PBSP study¹³⁾ reported a 15–50% price premium, while TAGARINO¹⁶⁾ revealed that organic vegetables were sold at 5–250% higher prices than conventional vegetables.

Figure 1 shows the average weekly price trends of selected organic vegetables. Vegetable prices seemed to be lower during dry months from December to March compared to the wet months. According to a market facilitator, selling price was usually lowered the next market day for unsold produce, reflecting the nature of perishable commodities. Moreover, she also mentioned that prices depended on the purchasing power of the buyer. For instance, a well-off customer could be offered with carrots at a higher price than cancer patients with an average income. Prices were also affected by environmental factors such as typhoons. For example, typhoon “Chedeng” damage caused a drastic increase in vegetable prices from week 20 to week 21.

Table 6 Price Differentials for Organic and Conventional Vegetables in a Supermarket in Metro Manila, August 17, 2003

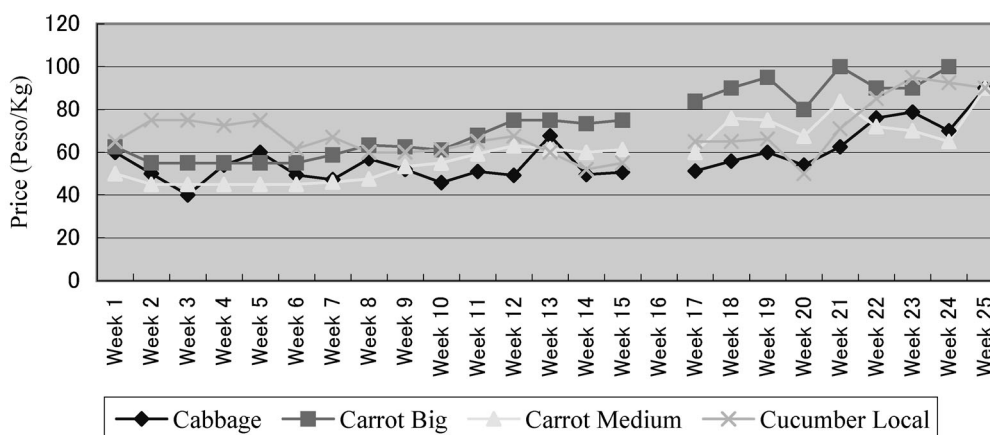
| Kinds | Organic Vegetables ¹ pesos/kg (OV) | Conventional Vegetables ² pesos/kg (CV) | Price Differentials (OV-CV) | |
|-----------------------|--|---|-----------------------------|-----|
| | | | Pesos | % |
| Cabbage | 80 | 23.50 | 56.50 | 240 |
| Petchay - Wombok | 63 | 19.25 | 43.75 | 227 |
| Squash | 45 | 23.50 | 21.50 | 91 |
| Sayote | 36 | 19.25 | 16.75 | 87 |
| Okra | 63 | 36.00 | 27.00 | 75 |
| Baguio Bean | 99 | 66.25 | 32.75 | 49 |
| Kinchay | 324 | 220.00 | 104.00 | 47 |
| Ampalaya | 90 | 61.75 | 28.25 | 46 |
| Tomato American/Salad | 108 | 81.00 | 27.00 | 33 |
| Cucumber | 72 | 59.00 | 13.00 | 22 |
| Eggplant | 72 | 59.00 | 13.00 | 22 |
| Cauliflower | 170 | 160.00 | 10.00 | 6 |
| Carrot | 45 | na | na | na |
| Onion - White | 63 | na | na | na |
| Potato | 99 | na | na | na |

Sources: 1) Organic Market Survey, 2003.

2) Supermarket Survey, 2003.

Estimation of Demand Elasticities

During the transaction survey conducted in August 2003, price and volume of organic vegetables from January to June 2003 for four markets were collected. The actual price and volume for a total of 94 market days were further calculated for 24 weekly averages. Excluding four weeks of data for January when only



Source: Transaction Survey, August 2003.

Fig. 1 Weekly Average Prices for Selected Organic Vegetables, January–June 2003

Table 7 Estimates of Price Elasticities for Selected Organic Vegetables, 2003

| Kind of Vegetable | Elasticity Coefficient | t | R ² | n |
|-------------------|------------------------|--------|----------------|----|
| Broccoli | -1.155 | -0.792 | 0.034 | 20 |
| Carrot Medium | -1.660 *** | -5.097 | 0.591 | 20 |
| Celery | -0.953 | -1.232 | 0.078 | 20 |
| Onion | -1.714 | -0.605 | 0.030 | 14 |
| Potato Medium | -1.590 | -1.208 | 0.079 | 19 |
| Tomato Ordinary | -2.216 ** | -2.551 | 0.372 | 13 |

Notes: ** Denotes significance at the 5% probability level.

*** Denotes significance at the 1% probability level.

three markets were open, the total of 20 weekly data were used in this section to estimate own-price elasticity for selected organic vegetables and cross-price elasticity of demand for carrot medium. Unfortunately, socio-economic factors for each transaction could not be ascertained.

Table 7 shows the estimates of price elasticity of selected organic vegetables using a log-linear model: $\ln Q_v = a + b \ln P_v$, where Q_v and P_v were defined as volume (kg) and price (peso per kg) of a given vegetable, respectively. Although not statistically significant, the estimated coefficients for broccoli, potato medium and onion were -1.155 , -1.590 and -1.714 , respectively. Except for broccoli, all were highly elastic. On the other hand, the estimated coefficients for carrot medium (-1.660) and tomato ordinary (-2.216) were statistically significant at the 1% and 5% probability level, respectively. These elasticities imply that for one percent increase in its own price per kg, the demand for these vegetables decreases by about 1.7% and 2.2%, respectively, indicating highly price-elastic nature of the commodities. If there will be a stable supply of these commodities, the prices are expected to decline, resulting in an increase in demand for organic vegetables. For the case of celery, own-price elasticity was -0.953 and not statistically significant. The estimate indicates that the demand for celery was not responsive to its own-price. We assume that demand for celery maybe affected by other vegetables (e.g. carrot).

Because carrots and celery appeared to be commonly processed and consumed as juice, it is useful to calculate the cross-price elasticity of demand for carrot medium. We assume that carrot and celery are complementary goods. Thus, we expect a negative sign for cross-price estimates. Using the log-linear model: $\ln Q_{CM} = a + b \ln P_{CM} + c \ln P_{CEL} + D_s$, where Q_{CM} , P_{CM} , P_{CEL} , and D_s were defined as volume of carrot medium, price of carrot medium, price of celery, and season dummy (0 = dry season; 1 = rainy season), respectively, we obtained the following results:

$$\ln Q_{CM} = 9.007 - 1.257 \ln P_{CM} - 0.008 \ln P_{CEL} - 0.223 D_s$$

$$(2.934) \quad (-2.437) \quad (-0.182) \quad (-1.038)$$

$$R^2 = 0.618$$

$$\text{Adjusted } R^2 = 0.546$$

$$N = 20$$

Figures in parentheses are the t-values, indicating that only the regression coefficient of carrot medium price was statistically significant at the 10% probability level. Although the coefficient for celery price was not statistically significant, it had a negative sign pointing to the tendency that carrot medium and celery were complementary goods. The regression coefficient for the seasonality variable was not statistically significant, but had a negative sign. This suggests that the demand volume for carrot medium decreases in the rainy season, because the price gets higher due to the limited availability of the commodity.

It should be noted that the actual price often reflected the purchasing power of customers and the volume of left-over from the earlier market day, implying that the demand and price relationship was largely determined by other variables. Especially celery was more perishable than carrot medium and the price for left-over celery tended to be much lower on the following market day. Our estimation is still in the preliminary stage, and future analysis should include other variables such as socio-economic and environmental factors. Moreover, comparison with conventional vegetables should also be considered. We also realize the need for the inclusion of various seasonal data (e.g. annual, monthly, weekly, daily, holidays, paydays) to improve the results of the demand estimation.

Conclusion

This study aimed to examine the potential of the organic vegetable industry in the Philippines, by clarification of the demand aspect, based on the series of surveys conducted on hotels and restaurants, general consumers and organic markets located in Metro Manila from 2002 to 2003. The main findings of this

study were as follows: First, hotels and restaurants showed a relatively small demand for organic vegetables, limited to lettuces and herbs. Further demand for organic vegetables could not be expected due to high price, low quality and unstable supply, except for some specialized establishments. Second, consumers still appeared to be the potential buyers of organic vegetables, but the premium price and low annual per capita vegetable consumption of Filipinos could hinder further expansion. Third, a total of 75 kinds of organic vegetables were identified at the on-going organic markets, of which carrots accounted for 30% of the total volume. The prices of organic vegetables were 6% to 240% higher than conventional vegetables. Fourth, demand for carrot medium, tomato ordinary, onion and potato ordinary were highly elastic to price changes. This means that if there would be stable supply of these vegetables, prices are expected to decline, resulting in a higher demand. Based on cross-price elasticity analysis, carrot and celery appeared to be complementary goods. There also seemed to exist a seasonal influence on the determination of price and demand for carrot, which requires further analysis in the future.

It seemed to be important for the organic vegetable industry to focus on maintaining and strengthening its current niche market through consumer education and information dissemination, while improving the production capability and quality of products. Moreover, with the advancement of organic vegetable production in other countries, and the influx of high quality and reasonably priced imported vegetables, the impact of international trade on the industry should also be considered in the near future.

In addition, further research is needed on creating a *teikei* system between consumers and producers in the local setting. With perishable goods, this is one method of achieving efficiency in marketing, while having harmonious relationship between consumers and producers.

Acknowledgements

We deeply acknowledge the generous cooperation of the supervisors of the food establishments and markets, and consumers surveyed. Also, Mrs. Alexis BANTILES (AVDF), Mrs. Mara PARDO DE TAVERA (The Source), Mrs. Rosalina TAN (OPTA-Philippines) and Mr. Eduardo SAMANIEGO (Zachy's Farm) were most helpful. We also thank the two anonymous referees for their comments in improving our paper. The field surveys were conducted as a part of the Academic Frontier Cooperative Research Project, Tokyo University of Agriculture.

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フィリピンにおける有機野菜需要の研究

—マニラにおける外食産業と一般消費者を事例として—

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(平成 17 年 2 月 15 日受付/平成 17 年 12 月 9 日受理)

要約：野菜は多くのフィリピン人にとって安価な栄養源であるだけでなく、少数の裕福な人々にとっては、健康的な生活を送るための重要な食物の一つである。この少数の裕福な人々が、フィリピンにおいてニッチマーケットである有機野菜産業を支えている。有機野菜の需要動向を検討するため、我々はマニラにおけるホテルやレストランなどの外食産業と一般消費者の有機野菜需要について、2002～2003年に質問票及びインタビュー調査を実施した。調査対象はホテル・レストランが11軒、一般消費者が118人、スーパーが7軒、及び有機農産物を販売する4つの市場である。

本研究の主な成果は、以下の通りである。(1) 主要なホテルやレストランは有機野菜を購入しないが、一般消費者は購入する可能性が高い；(2) 有機農産物市場で売られる75種類の野菜のうち、ニンジンが総量の30%を占めた；(3) 中型サイズのニンジン、普通サイズのトマト、たまねぎ、中型サイズのジャガイモは、価格変動への弾力性が大きい。それは安定供給による価格低下が可能となれば、需要は増加する可能性があることを意味する；(4) ガン患者やガン予防のために、ニンジンはセロリと一緒にジュースとして消費されることが多いと言われている点を、両者の交差価格弾力性の計測結果から明らかにした。

キーワード：ホテル・レストラン、ニンジン、セロリ、需要の価格弾性値

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