



## **Improving the Farm Business and Resilience of New Farmers: Case of a Greenhouse Tomato Farmer in H City, Tokyo**

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**Abstract** Among new farmers, farming discontinuation within a few years is prevalent due to various issues, including difficulty in securing farmland, insufficient technology adoption, low income, and weak branding. In recent years, the importance of recruitment and support services for new farmers has been gaining recognition. Therefore, studies that can provide insights and innovations to improve the business operations and resilience of each new farmer are relevant and timely. Tomato is the most common fruit vegetable consumed fresh or processed in Japan. For new farmers, tomatoes are considered one of the favored high-value commodities for production. In response to the needs of a young female new farmer who ventured into greenhouse tomato farming in H City, Tokyo, this study aims to clarify the consumption and purchasing behavior, satisfaction and brand familiarity of randomly selected tomato consumers. We conducted a consumer survey from May to June 2022. Although we had 470 respondents, we only utilized responses from 213 consumer-respondents to capture the characteristics and preferences of those who experienced buying tomatoes from the selected farm (NF Farm). Through this case study approach, the survey revealed that supermarkets (31%) were the main place of purchase for fresh tomatoes due to convenience, followed by direct stores (28%) and unmanned stores (17%) due to both convenience and good product quality. Results indicated that cherry tomatoes were the most widely consumed across all seasons, while summer was the season with highest consumption of all tomato types, with prices ranging between 101 JPY and 500 JPY (1 USD = 133.9 JPY). After only 5 years in business, NF Farm seemed to have gained a fan base. Unfortunately, 63.8% of consumer-respondents indicated no knowledge of the farm logo. Most related the farm to the name of the farmer. Thus, there is a need for NF Farm to re-evaluate its farm brand (e.g., logo, farm name, labeling) so that it will be properly recognized even by its long-time customers.

**Keywords** new farmers, preference, brand familiarity, farm resilience, women farmer

## INTRODUCTION

Japanese agriculture faces various challenges, including the need for more farmer successors and an increasing number of aging farmers. Among the new farmers, farming discontinuation within a few years is prevalent due to various issues (MIC Japan, 2019), including difficulty, securing farmland, insufficient technology adoption, low income, and weak branding. In recent years, the importance of recruitment and support services (including financial and technical aspects) for new farmers has been gaining recognition (McGreevy et al., 2019; Fujisaki and Saitou, 2020). There are also studies focusing on the challenges of support systems for new farmers during the entry process into agriculture (Okamoto and Miyake, 2022) and the roles of marketing-related policy support (Yoshida and Yagi, 2019).

According to the Ministry of Agriculture, Forestry and Fisheries (MAFF Japan, 2022b), the number of new farmers experienced a decrease from 55,670 persons in 2017 to 52,290 persons in 2021. New farmers aged 49 years old and younger showed a similar downtrend from 20,760 persons in 2017 to 18,420 persons in 2021. On the other hand, the number of new female farmers has been on the increase, with the number of newly employed and newly applied female farmers increasing by 6.9% and 11.1%, respectively.

Tomato is the most common fruit vegetable consumed fresh or processed in Japan. In terms of agricultural income produced, tomatoes had the highest share (10%) among vegetables (MAFF Japan, 2023). For new farmers, tomato is considered one of the preferred high-value commodities for production. However, with a wide variety of tomatoes available in the market, new farmers seemed to face various issues related to price, market competitors, market channels, sweetness, production management, and brand recognition. These same challenges may influence a new farmer's decision to continue or discontinue farming. Therefore, studies that will provide insights and innovations to improve farm business operations and resilience of each new farmer are relevant and timely. Resilience is vital for farmers for adapting to the current and changing environment (Shimoguchi and Mojica, 2016). The provision of accessible markets may encourage these farmers to continue farming (Shimoguchi et al., 2020).

It should be noted that this study has been conducted in consultation with the young female new farmer in H City to address her inquiries and concerns about her venture into greenhouse tomato farming, including understanding her consumers and clarifying brand status, with an aim of improving her farm business and resilience.

## OBJECTIVE

This study aimed to identify the characteristics of consumers, determine their fresh tomato purchasing and consumption behavior in general, and clarify consumer satisfaction and their brand familiarity with the greenhouse tomato farm (thereafter, NF Farm) managed by a young female farmer in H City, Tokyo.

## METHODOLOGY

Based on an interview conducted in March 2022, it became clear that NF Farm needed assistance in determining its consumer base, identifying their perception of the taste and price of tomatoes, evaluating their satisfaction level, and clarifying their farm recognition. A total of 470 consumer-respondents were collected from the fresh tomato consumer survey conducted from 1 May to 30 June 2022 in H City, Tokyo. To capture a wide range of consumers, this study was conducted in the places where the tomatoes of NF Farm are being sold, specifically a *mujin hanbai* store (which refers to an unmanned store using an honor system for payment and located on the farm premises), three (3) retail stores, SNS, and events. We utilized three survey methods using a structured questionnaire, namely: face-to-face survey, online survey via quick response (QR) code shown in in-store point-of-purchase (POP) displays, and online survey via near-field communication (NFC) tag placed on POP displays. The structured questionnaire consisted of three parts: (1) consumer profile, (2) fresh tomato

purchasing and consumption behavior, and (2) knowledge, tomato preference, and recognition of the NF Farm logo. Moreover, a four-point Likert scale was used to determine their satisfaction level with NF tomatoes.

After identifying those who have experienced buying tomatoes from our selected farmer, survey results from 213 consumer-respondents were utilized and analyzed using descriptive analysis.

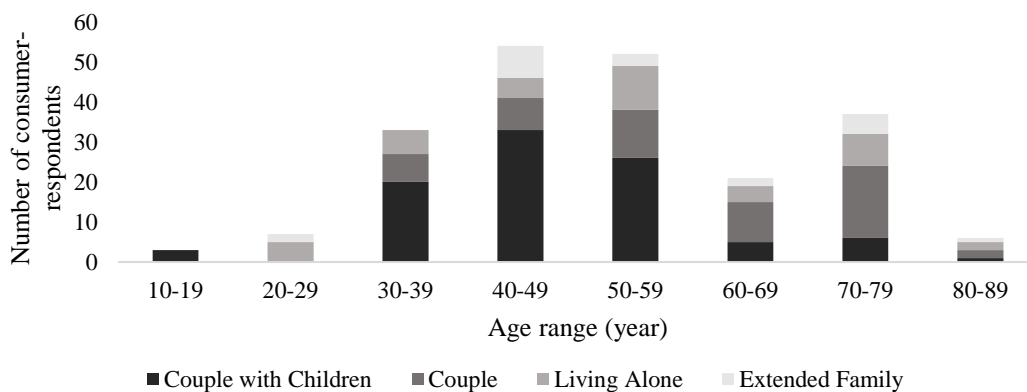
## RESULTS AND DISCUSSION

### Profile of NF Farm

NF Farm was established in 2019 by a young female aspiring farmer. Under the provisions of the revised Law on Productive Green Areas (also known as *seisan ryokuchi ho* in Japanese), she was able to rent a 2,000 m<sup>2</sup> plot of land in 2018, where she operates a greenhouse for tomato production (including cherry, medium size, and large size tomatoes), produces seasonal vegetables (e.g., cabbage, zucchini) on an open-field, and processes some of the harvested tomatoes into puree. Freshly harvested vegetables are sold at an unmanned store (commonly known as *mujin hanbai* in Japanese) located on the farm. In addition to this *mujin hanbai*, NF Farm also sells via JA direct stores, supermarkets, specialty retail stores, events (e.g., Marche, weekend markets), and its own online store.

### Characteristics of the Consumer-respondents

Based on survey results from the 213 consumer-respondents, the average age was 52 years old. In terms of gender, there were fewer males than females. Regarding the distribution by age and family structure, Fig. 1 indicates a wide age range of consumer-respondents. Family structures have four types: couples with children, couples living alone, and extended family. Most respondents are couples with children in the age range of 30 to 59 years, followed by couples and those living alone.



**Fig. 1** Number of tomato consumer-respondents by age range and family structure (n=213)

### Purchasing and Consumption Behavior of the Tomato Consumer-respondents

Table 1 shows the consumer-respondents' purchasing behavior in terms of preferred place of purchase for fresh tomatoes and the reason for choosing that place. There were four types of places of purchase: supermarket, direct store, *mujin hanbai*, and other, and four types of reasons: convenience, quality, price, and other. Regarding choice of place of purchase, the supermarket was their top choice (66 consumer-respondents, 31%) in purchasing fresh tomatoes, followed by direct store (60 consumer-respondents, 28%) and *mujin hanbai* (38 consumer-respondents, 18%). Most of the consumer-respondents chose the supermarket due to convenience. The direct store was preferred by 32 and 16 consumer-respondents due to good quality and convenience, respectively. Similar to

the reason for choosing direct stores, consumer-respondents valued convenience and quality for choosing *mujin hanbai*. The results also indicate that affordability was not a primary reason for purchase. We assume that there were no significant price gaps among these stores for fresh tomatoes. Moreover, convenience and quality seemed to be more important when choosing a place of purchase. Some consumer-respondents mentioned that they purchase NF Farm tomatoes as their way of supporting this young female farmer.

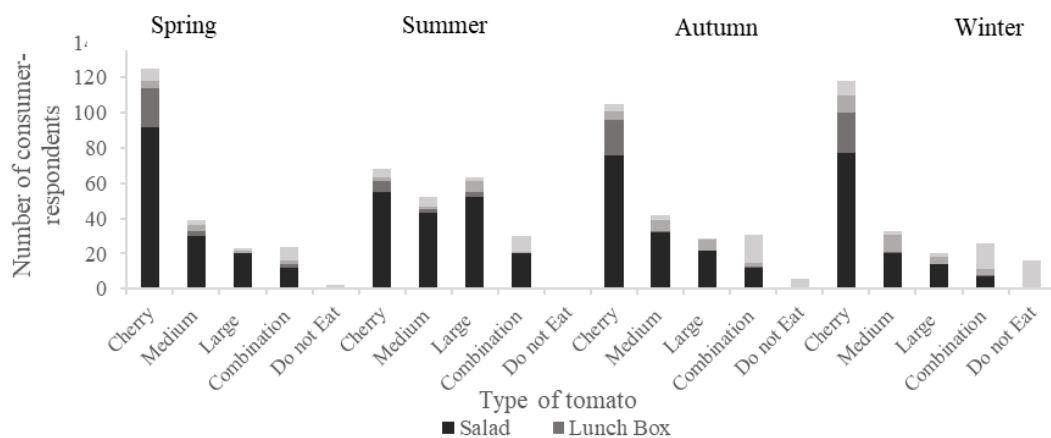
**Table 1 Number of tomato consumer-respondents by place of purchase and reason for choosing the place (n=213)**

Reason for choosing the place	Place of purchase				Total
	Supermarket	Direct store	<i>Mujin hanbai</i>	Other	
Convenience	41	16	17	13	87
Good quality	9	32	19	16	72
Affordable price	2	1	1	0	4
Other	14	11	1	20	46
Total	66	60	38	49	213

Notes: *Mujin hanbai* refers to an unmanned store with an honor system for payment.  
Pearson's Chi-squared test ( $p$ -value =  $6.201e-07$ )

Regarding the frequency of purchasing fresh tomatoes, cherry tomatoes seemed to be purchased on a regular basis (74% of the consumer-respondents) compared to medium size (irregular basis 48%) and large size (59%) tomatoes ( $p$ -value =  $7.341E-14$ ). If the consumer-respondent purchases once a week, cherry tomato was their main choice (49%). This is expected, since cherry tomatoes are often used in lunch boxes and salads in Japan.

In Japan, tomatoes are produced all year round. However, it is assumed that consumers have a specific preference for the type of tomato to purchase and how it is utilized depending on the season. Figure 2 shows the utilization of tomatoes by type and season. This information is important for farmers in planning what type of tomatoes to produce by season. Types of tomatoes were categorized into cherry, medium size, large size, and combination, while utilization was divided into salad, lunch box, cooked, and others. For all seasons, cherry tomatoes showed to be the main type consumed, and mostly used for salads. Since this finding is in line with MAFF Japan's (2022a) report that cherry tomato is the most commonly produced tomato, accounting for 21% of total harvested volume, it can be said the cherry tomatoes are still popular for both consumption and production. Moreover, summer is an exception, with the high consumption frequency of all tomato types can be seen when comparing with all seasons. In terms of tomato utilization, tomato salads had the highest frequency in both types and seasons.



**Fig. 2 Utilization of tomato by type of tomato and season (n=213)**

### Level of Satisfaction with NF Farm Tomatoes and Preferred Price

Table 2 shows the satisfaction level of consumer-respondents with the NF Farm tomatoes based on various factors: freshness, color, taste, size, acidity, hardness of peel, sweetness, and price. Looking at the average satisfaction level calculated using the Likert scale, consumer-respondents were satisfied with all factors, with freshness (3.52) as the top factor, followed by color (3.43), taste (3.38), and size (3.38). Since NF Farm harvests tomatoes daily and supplies them to most of its clients on the same day, consumer-respondents seemed to acknowledge that the tomatoes are freshly harvested. Moreover, price is the least important for them, conveying that some of them purchase tomatoes as part of supporting the initiatives of this young female farmer.

**Table 2 Satisfaction level with NF Farm tomatoes (n=213)**

Factors	Average	SD
Freshness	3.52	0.54
Color	3.43	0.56
Taste	3.38	0.60
Size	3.38	0.54
Acidity	3.27	0.57
Hardness of peel	3.25	0.58
Sweetness	3.23	0.60
Price	3.07	0.60

Note: Satisfaction level is based on the following scale: 1 – very unsatisfied, 2 – unsatisfied, 3 – satisfied, 4 – very satisfied

Table 3 shows the cross-tabulation between the price range of tomatoes and taste satisfaction among the consumer-respondents. Price categories ranged from 100 JPY and below to 1,001 JPY and above. Most of the consumer-respondents (94%) were either very satisfied or satisfied with the NF Farm tomato taste, especially those consumer-respondents paying a price range of 101 to 300 JPY and 301 to 500 JPY. This may also convey that the NF Farm needs to keep the tomato price ranging between 101 JPY and 500 JPY.

**Table 3 Tomato price range and taste satisfaction for NF Farm tomatoes (n=213)**

Tomato price range (JPY)	Taste satisfaction				Total
	Very satisfied	Satisfied	Unsatisfied	Very unsatisfied	
100 and below	1	0	0	0	1
101 to 300	33	40	2	1	76
301 to 500	37	50	4	0	91
501 to 700	13	6	1	0	20
701 to 1,000	9	3	1	0	13
1,001 and above	0	1	1	0	2
No Answer	0	9	1	0	10
Total	93	109	10	1	213

Notes: (1) Pearson's Chi-squared test ( $p$ -value = 0.0390),

(2) Exchange rate is 1 USD = 133.9 JPY (June 2022, MUFG Bank)

### Brand Familiarity of the Consumer-respondents

Table 4 explains the consumer-respondent's familiarity with NF Farm and its brand. Cross tabulation was conducted between sources of initial NF Farm and how long the respondents know about the farm. Among the listed information sources, "living nearby and *mujin hanbai*" was the most common reason followed by "media", "SNS and event", and "acquaintance". The majority of the consumer-respondents have known NF Farm more than a year ago. Although "living nearby and *mujin hanbai*" seemed to be an effective way as initial source of information, there is a need to determine the impact of SNS and other publicity as a method of disseminating information about the farm.

**Table 4 Number of consumer-respondents by first knowledge and purchase, recent tomato purchase and brand recognition of the NF Farm (n=213)**

Particular factors	First time to know about the farm and purchase tomato			Total
	One year ago, and above	Between less than one year and six months ago	Within six months	
<b>Source of Information</b>				
Living nearby and <i>mujin hanbai</i>	111	22	14	147
Media (TV and newspaper)	20	1	4	25
SNS and event	14	3	5	22
Acquaintance	15	2	2	19
<b>Most recent purchase</b>				
Within a week	72	6	9	87
Few weeks ago	48	13	11	72
Few months ago	24	8	3	35
One year ago	13	0	0	13
Others	5	1	0	6
<b>Brand recognition</b>				
Yes	60	10	7	77
No	102	18	16	136
Total	162	28	23	213

Notes: *Mujin hanbai* refers to unmanned stores.

For those people who knew the farm longer than a year, their most recent purchase of NF Farm tomatoes was within a week or a few weeks ago. This implies that the longer consumer-respondents knew about NF Farm, the more frequently they purchased NF Farm tomatoes. However, despite the familiarity and purchasing behavior among the consumer-respondents, they seemed not to recognize the brand by logo and name (63.8%). Instead of a logo, consumer-respondents associate the farm with the name of the farmer. This offers additional evidence for the lack of brand recognition among the consumer-respondents, and that the publicity efforts through SNS and other information sources seem not sufficiently effective in raising recognition of NF Farm and its products.

## CONCLUSION

Consumer-respondents were mostly female (77%) with an average age of 52.2 years old. Couples with children (44%) were the most common, followed by couples (27%). In purchasing fresh tomatoes, the supermarket (31%) was the main place of purchase due to convenience, followed by direct stores (28%) and *mujin hanbai* (17%) because of convenience and good quality. Cherry tomatoes seemed to be the most widely consumed of all seasons, and summer was the season with the highest consumption of all tomato types.

With regard to NF Farm tomatoes, consumer-respondents were most satisfied with their freshness. This is a given factor, since tomatoes are shipped to retail stores immediately after harvest. Price had the lowest satisfaction rating, conveying that consumer-respondents seemed to not mind the price as an act of support to the farmer initiative. With only a few years in business, NF Farm seemed to have gained a fan base. Unfortunately, 63.8% of consumer-respondents indicated no knowledge regarding the farm logo. Most associated the farm with the name of farmer.

This study recommends that NF Farm increase and improve production of cherry tomatoes because of their apparent all year-round demand, while keeping the price within the 101 to 500-yen range. Since most consumer-respondents consider convenience and good quality when choosing a place of sale, NF Farm may consider increasing its supply to supermarkets.

For further study, there is a need to re-evaluate the NF Farm brand (e.g., logo, farm name, labelling) so that it will be properly recognized by consumers. Moreover, determining the

characteristics of NF Farm's repeat customers may give further insights on how to maintain good relationships with them while achieving sustainability of its farm business.

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