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## Tradition and Japanese vegetables: history, locality, geography, and discursive ambiguity

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## ABSTRACT

**Background:** Traditional vegetables are produced and consumed throughout Japan. Individual vegetables, including Kyo vegetables and Kaga vegetables, are individually defined with their own criteria for history and quality standards and are registered in their respective regions. Several traditional vegetables are utilized as symbols of regional revitalization. For example, Kaga vegetables are tourist attractions, and Noto vegetables are promoted in the Noto region and were registered under the Globally Important Agricultural Heritage Systems (GIAHS).

**Methods:** We will review the distribution, public standards, and definitions of *dento-yasai*, traditional Japanese vegetables. Quantitative analysis on the status of the branding of traditional vegetables will be conducted.

**Results:** First, the ambiguity and distribution of traditional vegetables are demonstrated. Next, as a case study, the results of a quantitative analysis of Kaga vegetables and Noto vegetables are provided. Kaga vegetables have their own quality standards and definition, and producers have acknowledged the positive impact of the regional certification, GIAHS, on the amount sold. However, a social conflict has been caused by their standards and definition. On the other hand, Noto vegetables do not have a strict quality standard, and they were registered relatively recently. Because of their comparatively lax standard, producers could not acknowledge the positive impacts of GIAHS certification.

**Conclusion:** Origins of traditional Japanese vegetables and relationships with their regions have innumerable ambiguous points. The results of the analysis of two types of traditional vegetables show that quality standards and definitions strongly influence branding and brand management.

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## 1. Introduction

Traditional vegetables (or *dento-yasai*) are inherited within certain regions as an aspect of the area and landscape. There is no standard definition for *dento-yasai* or customary history or quality, and the concept is ambiguous [1]. Frequently, definitions are given locally and are not standardized at the national level. This study is the first of its kind to provide an overview of the definitions, standards, and geographical distributions of the so-called Japanese traditional vegetables. These vegetables are frequent ingredients in ethnic goods and are passed on from generation to generation within certain boundaries. We will provide a contemporary

overview of traditional vegetables in order to elucidate the general trends and also deepen the public's understanding of their similarities and uniqueness at the local level. This understanding will contribute to policy formation. We reviewed various definitions of traditional vegetables to see whether they are given in a clear manner or not. We further checked if the clearer definitions had an influence on patterns of consumer choice or collaboration amongst different stakeholders (e.g., producers, tourism, and service sectors).

Traditional vegetables provide us with a unique opportunity to explore products with local names. For example, Kyo vegetables are named after the city of Kyoto. Agricultural products, including traditional vegetables, with regional or local names are promoted as brands in the municipalities of Japan. This is highly relevant to the Regional Collective Trademarks or more recent Geographical Indications (GIs) in Japan [2].

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Despite their importance, the degree of definition and branding of these products remains unexplored as does the relationship between local and regional names. Our study is the first of its kind to explore the relationship between the degree of definition and trends in agricultural products with local and regional names.

First, we review the diversity and ambiguity of traditional vegetables from the perspectives of their geographical distribution and varied definitions. Furthermore, we review the existing studies that analyzed products with local or regional names. Second, we analyze two brands from Ishikawa prefecture, where they have different degrees of definition and a relatively large number of items. By doing so, we analyze the effect of clear definitions (and the assumed consensus surrounding the standards) of the brands. We compare two brands with different degrees of definition and examine how the amount supplied and pricing trends differ. It should be noted that the two brands have histories of differing lengths. The brand with established items has a longer history, which could partially explain its clearer definition.

## 2. Review

In the following section, the diversity and ambiguity of traditional vegetables are explored. Their geographical distributions and varied definitions are presented below.

### 2.1. Distribution of traditional vegetables

A group of researchers from Yamagata University played an active role in developing more scientific terms for indigenous and local vegetables [3–7]. Currently, traditional varieties of vegetable are often “re-discovered” or even created in areas throughout Japan. Thus, traditional vegetables are distributed nationwide. This framing is frequently mobilized for regional revitalization. In the modern history of Japan, the distribution of the seeds of traditional vegetables has been implemented by vegetable seed companies [8]. However, their distributions differ significantly and are geographically skewed. The very definition of “traditional vegetables” differs from region to region. The tradition and length of production also differ. For example, the term “Kaga vegetables” is limited to those produced before 1945 when World War II ended. For Kyoto vegetables, those produced before 1868, or the Meiji period, are listed. Alternatively, it is “roughly 30 years of production history” for Noto, Ishikawa, while “from ancient times” is the wording used in Higo, Kumamoto. There are further variations in production mode and quality, but strict modes of production or quality controls are absent for most traditional vegetables. Some traditional vegetables lack any definition. Due to their ambiguity, it is difficult to list or count all of the existing traditional vegetables. Therefore, few studies have captured nationwide trends.

This is all in contrast to the GI system, where a product must have “roughly 25 years of production history” and quality controls are part of the registration. The ambiguity of traditional vegetables may be due to the fact that the framing is for brand promotion purposes, rather than registration. Under such circumstances, the distribution of traditional vegetables was analyzed based on reference documents [9] that introduce these products. Many traditional vegetables are distributed in areas where large cities such as Tokyo, Nagoya, and Osaka are located (Fig. 1), and Nagano, Niigata, and Yamagata form a continuous area with many vegetables. Although information sources for distribution data are limited, there is enough information to discuss the factors affecting traditional vegetables in each region.

Firstly, the reason that the number of traditional vegetables is high in areas with big cities is probably because there are a relatively large number of consumers seeking traditional vegetables

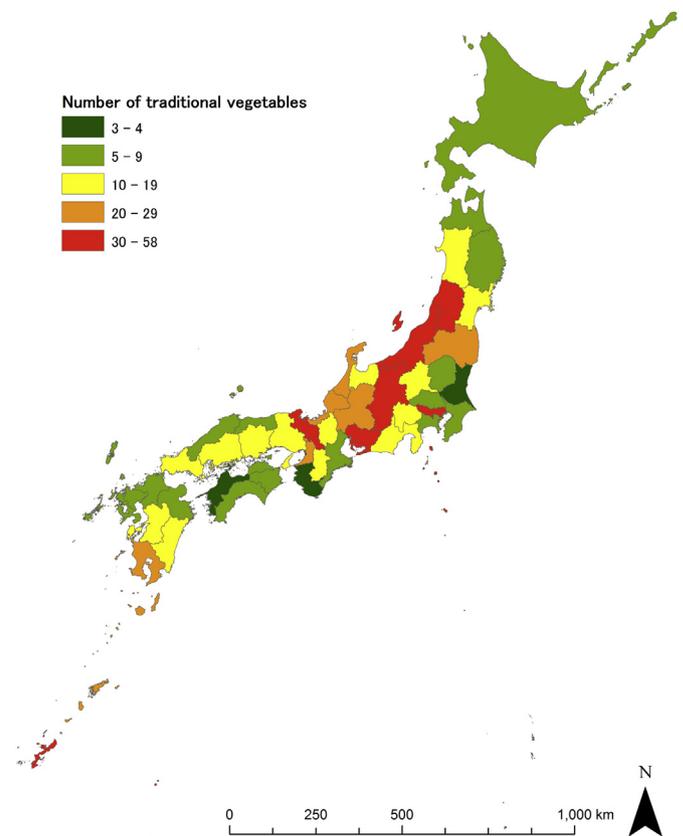


Fig. 1. Number of traditional vegetables in individual prefectures. Data source: Ishikura, H. and Maki, F. “Japanese Traditional Vegetables,” Tokyo: Iwasaki Shoten; 2015.

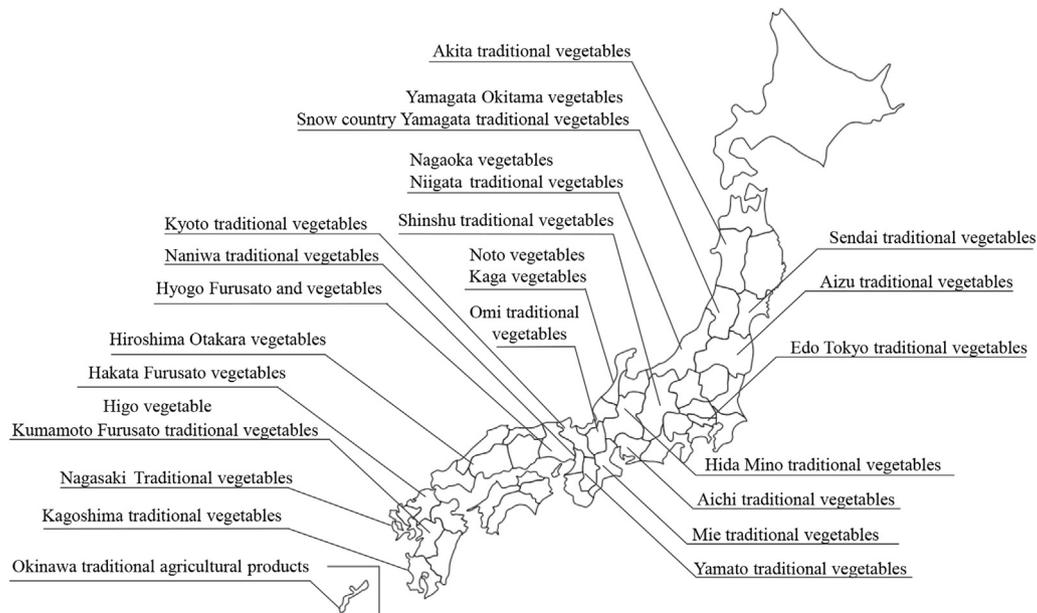
that differ from ordinary mass-produced produce. In rural areas, even if the proportion of consumers seeking traditional vegetables is high, it is difficult to sustainably produce them due to the smaller populations. Nagano is located at the nodal point of trade connecting the eastern and western regions of Japan, and its position may be why it has many traditional vegetables. In Niigata and Yamagata, in addition to the trade route, ecological elements may have influenced the number of traditional vegetables. The distribution of traditional vegetables certified or promoted by local municipalities (Fig. 2) shows the same trend as Fig. 1. Some traditional vegetables are found in Hokkaido and Shikoku, places that are far from large-scale consumption areas. However, efforts to recognize local vegetables as a group including a certain number of traditional vegetables like Kaga and Kyo vegetables are not proactively promoted. Based on the analysis results seen in the Figs. 1 and 2, it can be seen that traditional vegetables are maintained through the relationship with consumption areas and by being branded.

In the next section, we will present the results of our review of the effect of adding a place name to a product’s brand name.

Hakata Furusato vegetables were introduced by a private organization with the help of various local stakeholders, and other vegetables are promoted or certified by individual local municipalities.

### 2.2. Branding of agricultural products with local and regional names

In the European Union, there are systems called Protected Designations of Origin (PDO) and Protected Geographical Indications (PGI) which register products that are linked with the place where they are produced (the degree is different for PDO and



**Fig. 2.** Distribution of traditional vegetables. Source: Kohsaka, R. and Tomiyoshi, M. “Japanese vegetables in globalization era: national icons or transplanted traditions?” Asahi-eco Books. Tokyo: Shimizukobundo; 2015, p. 59.

PGI). PDOs are products that must be produced, processed, and prepared exclusively within the region. On the other hand, production, processing, or preparation of PGIs may take place outside of the designated area. There are also institutional settings such as Appellation d’Origine Contrôlée in France and Denominazione di Origine Controllata in Italy. For example, Sanz-Macias [10], focusing on the Spanish olive oil “Sierra Magina” from Andalucía, analyzed how the PDO system was established, innovation in the food chain system, and interactions within the PDO regulatory boards. The findings clarified that: (1) the labeling of PDO by PDO regulators works as a quality assurance system; (2) PDO regulatory boards facilitate innovation and knowledge transmission for enhancing the quality of products; and (3) certification of local products can contribute to regional environmental management and sustainable development.

It has been found that GIs have functions in addition to protecting product brands [11]. They further serve to protect flora and fauna, landscapes, and cultural diversity. It has been identified that products registered under the GI system contribute to the conservation of biological diversity by maintaining local, original methods of production [11]. Protecting local products via the GI system also leads to preservation of diversity in the production areas, affecting animals, plants, landscapes, culture, etc. Indeed, most of the products certified for place of origin display are produced via systems that contribute to the conservation of biodiversity based on unique regional methods [11].

Mesías et al [12] studied the influence of PDO certification on consumer choice when purchasing Spanish Iberian ham. According to their research, consumers revealed that they liked Iberian ham with PDO, though they were unaware of the guaranteed characteristics such as types of bait. Meanwhile, when consumers selected products, it was also clarified that importance was attached to price and ham type over PDO certification. The results of the analysis suggested that consumers who are willing to pay a premium for PDO-certified Iberian ham are relatively few. Bouamra- Mechemache and Chaaban [13] investigated factors in producers’ adoption of PDO certification in the French blue cheese industry. The results revealed that the price of blue cheese was approximately 40%

higher for PDO-certified items than for non-certified ones, so small-scale producers tended to acquire PDO certification. In the production of PDOs, relatively expensive region-specific materials are needed; therefore, the efficiency of production decreases and the price of the products increases. However, the increase in production cost can offset the market price and raise profits. Therefore, producers of PDOs are not in a disadvantageous position compared to producers of non-PDOs [13].

Amenta et al [14] pointed out that traceability has been an important factor in discussing food safety in recent years. They analyzed and compared the ingredients of “Limone di Siracusa” lemons from Sicilia, which are certified PGI, and non-PGI lemons. They found a big difference between “Limone di Siracusa” and non-PGI lemons. Conventionally, traceability could only be confirmed with labels and administrative documents, and it was not possible to confirm an accurate geographical origin. PGI covers food quality and safety together with geographical origin. Therefore, it has been pointed out that PGI is a valuable system from the viewpoint of traceability.

Compared with the European case studies above, research on GIs in areas other than Europe is relatively limited. For example, Bowen and Zapata [15] conducted a survey on the tequila industry in Mexico, which is the first GI outside of Europe. In addition, Verdonk et al [16] are conducting research on Australian wine’s GI, and interest in GI has spread beyond Europe. Also, in Japan, GIs for agriculture, forestry, and fishery products began in 2015, in addition to regional collective trademark. Under such circumstances, an analysis of the effect and influence of the inclusion of Japanese GI certification of place names in product names is required.

### 3. Methodology

As mentioned earlier, Kaga vegetables are items produced before 1945, and their production is limited to within the boundary of Kanazawa City (under the Japan Agricultural Cooperatives (JA) Kanazawa). Alternatively, Noto vegetables are items that have been produced for roughly over 30 years. The Noto area covers a

relatively wide range and the overall Noto Peninsula is designated as the area. The definitions and production boundary or scope of production are stricter for Kaga than for Noto. Kaga vegetables have a longer history as a brand than the Noto varieties. Kaga vegetables have an institution, Branding Associations, which is associated with Kanazawa City, while Noto vegetables are administrated by a section of the Ishikawa prefectural body.

We analyzed sales of traditional vegetables in Ishikawa through the specialized market of a delivery service by a regional co-op. The co-op was first established in 1976 and has 133,339 association members (as of 2015). It provides a delivery service to households based on orders from a catalog, usually from the previous week. It is aimed at households with higher safety and quality awareness. Sales data (quantity and prices) were analyzed for this paper. The products in focus were local products in the Hokuriku area that are sold through “Jiwa-mall” (literally “locality mall”). Different trends in Kaga vegetables and Noto vegetables were captured and analyzed. “Jiwa-mall” is one of the catalogs distributed to members of the co-op for home delivery services. It promotes local production and consumption and specializes in products from within the Hokuriku area (i.e., Ishikawa and adjacent prefectures), providing us with a unique opportunity to analyze the sales and consumption of locally produced products. “Jiwa-mall” is a paper catalog published and delivered weekly; it lists 15 types of vegetable. Prices are decided based on data on market price trends 3 months prior to the publication of the catalog (publication is a month prior to catalog delivery). As a result, the market prices from 1 month to 4 months prior decide the prices, and the catalog cannot accommodate sudden market price changes. The most frequent users of “Jiwa-mall” are females in their 40s and 50s. This study focuses on commodities under the category “agricultural products.” The period under review is from April 2010 to March 2016 (72 months). During this period, the Noto Peninsula was certified under the Globally Important Agricultural Heritage Systems (GIAHS) by the Food and Agriculture Organization in June 2011. Also, the Hokuriku Shinkansen opened in March 2015. The purpose of this paper is to analyze the impact of the GIAHS certification on agricultural products’ quantities and prices. The number of listed products was 5,153 in 2010, 8,414 in 2012, 8,025 in 2013, 8,386 in 2014, and 15,750 in 2015. This study focuses on commodities under the category, “agricultural products.” The commodities are categorized under the following groups: agricultural product, marine product, stock raising, daily delivery, food, and household commodity, as the medium group; egg, beverage, snack, milk, liquor, food, marine product, stock raising, daily delivery, agricultural product, rice, and frozen food. For the agricultural products, there are sub-categories of fruit vegetable, mushroom, edible root, water-containing, processed agricultural products, and leaf vegetables. To complement the quantitative data, we interviewed workers in charge of “Jiwa-mall.” In order to measure the impact of the GIAHS designation of Noto, we classified the regions indicated in the brand names or explanations of the following products; Kaga vegetables (vegetable items with Kaga in their brand name/items officially listed as Kaga traditional vegetables), Noto vegetables (vegetable items with Noto in their brand name), Kaga region name (agricultural products including the Kaga region name, as in Table 1), Noto region name (agricultural products including the Noto region name, as in Table 1), and others (other agricultural products). We reviewed the volume of items and trends in prices (without tax) of these categories as handled in “Jiwa-mall.” If a certain vegetable item with the Kaga traditional vegetable branding appeared four times a year in “Jiwa-mall,” then the frequency was four. We excluded from the specific data the high-value grapes called “Ruby Roman,” because they are an item with particular trends and therefore were excluded from the datasets and “other” classification.

**Table 1**  
Keywords that were used in classification.

Group	Keywords
Kaga vegetables	<i>Gorajima, Kaga renkon, Kaga huto kyuri, Heta murasaki nasu, Kinjiso, Kaga tsurumame, Utsugi akagawa amaguri kabocha, Gensuke daikon, Kanazawa ippon huto negi, Hutatsuka karashina, Aka zuiki, Kuwai, Kanazawa shungiku (takenoko or bamboo shoots were excluded because the production sites were not identified)</i>
Noto vegetables	<i>Nakajimana, Sawano gobo, Kinshi uri, Mikohara kuwai, Kogiku kabocha, Kamo uri, Noto kabocha, Noto aka tsuchi bareisyo, Noto sansai, Noto shiro negi, Noto suika, Noto kintoki, Noto mini-tomato</i>
Including the name of Kaga region	<i>Kanazawa, Komatsu, Kaga, Hakusan, Nomi, Nonoichi, Kahoku, Kawakita, Uchinada, Tsubata</i>
Including the name of Noto region	<i>Hakui, Hodatsushimizu, Shika, Nanao, Nakanoto, Kashima, Wazima, Suzu, Anamizu, Housu, Noto</i>

The individual items under the classifications are listed in Table 1. Kaga traditional vegetables are composed of 15 items and are listed as “Kaga brand vegetables” in Table 1. Bamboo shoots were also excluded because the names were not distinguishable from products from other areas. The Noto brand vegetables are composed of Noto traditional vegetables and Noto special vegetables that are officially designated. The names Kaga and Noto were searched for using different writing forms (Chinese characters and Japanese characters). Individual names of cities, towns, and villages within the Kaga and Noto areas were also recorded.

#### 4. Analysis results

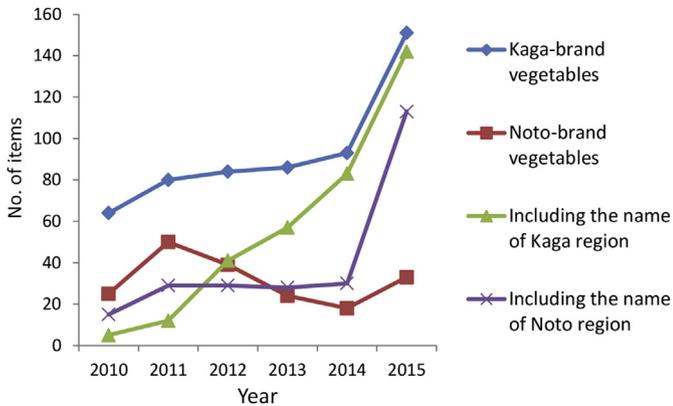
##### 4.1. Number of items and changes in the share of the actual number of each item

First, we will present the trends in the number of each product (Kaga brand, Noto brand, Kaga place name, Noto place name) being supplied and the analysis results on the number of items in “Jiwa-mall.” Looking at Fig. 3, the real number of Kaga-brand vegetable rose moderately from 61 items in 2010 to 93 items in 2014, and in 2015, it increased dramatically to 151 items. The number of Noto-brand vegetables trended upward from 25 items in 2010 to 50 items in 2011, but then decreased until 2014 (18 items), and increased again to 33 items in 2015.

The name of Kaga region was found on 5 items in 2010, but this increased to 57 items in 2013 and 142 items in 2015. On the other hand, the name of Noto region was found on 15 more items than the Kaga region in 2010, and in 2013, the name of Noto region was found on fewer than 28 items. However, in 2015, this increased sharply to 113 items.

Fig. 4 shows the overall number of items in “Jiwa-mall.” Agricultural products and others were found to be increasing along a similar trend. Although they increased from 2010 to 2012, the number of items barely changed from 2012 to 2014, but then increased significantly from 2014 to 2015.

The background to these analysis results is the opening of the Hokuriku Shinkansen and the registration of the World Agricultural Heritage of Noto Peninsula. With the opening of the Hokuriku Shinkansen in March 2015 and improved access from the Tokyo area, products named after Kaga were noticed by tourists. As a result, the residents of Ishikawa prefecture may have become interested in products bearing the area's name, such as Kaga vegetables.



**Fig. 3.** Number of items of each brand product (Kaga brand, Noto brand, Kaga place name, Noto place name).

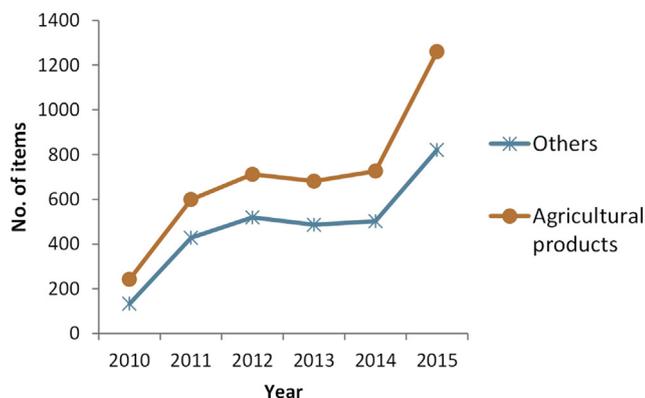
Sato-satoyama on the Noto Peninsula was certified as a world heritage site in 2011. However, the change in the number of items after the accreditation was relatively moderate. Regarding the difference between Kaga vegetables and Noto vegetables, the number of items has increased remarkably for Kaga vegetables with a strict definition.

The trend in Kaga vegetables was quite similar to the trend in agricultural products as a whole. On the other hand, the number of Noto vegetables did not show a clear increasing trend. Regarding products with names including the Noto name, they increased significantly since 2014.

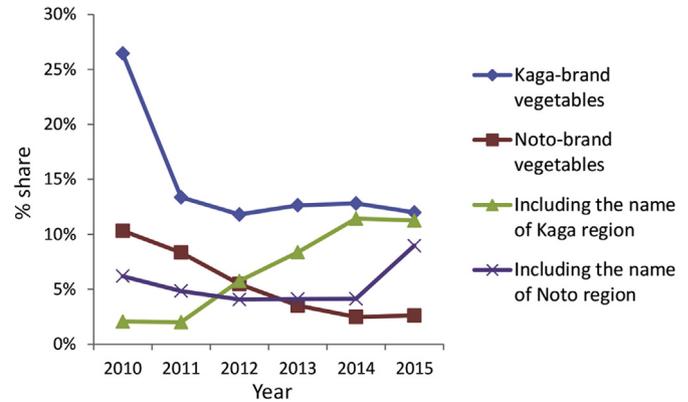
Fig. 5 shows the share of each vegetable with respect to the total number of items. Kaga vegetables, Noto vegetables, vegetables mentioning Kaga, and vegetables mentioning Noto each show a different trend. First of all, regarding Kaga vegetables, their occupancy rate sharply declined from 26.4% to 13.4% in 2011, and since then it has not changed much. On the other hand, the share of Noto vegetables declined from 10.3% to 2.5% between 2010 and 2014.

On the other hand, vegetables named after Kaga rose from 2.0% to 11.4% between 2011 and 2014. Also, vegetables named after Noto declined in 2011, but by 2015 had risen by 3% compared to 2010. From the results above, it can be seen that Kaga vegetables were strictly defined and maintained a share, whereas Noto vegetables lost some market share. In addition, regarding the share of vegetables named after Kaga and Noto, it was a period of remarkable increase.

Kaga vegetables and Noto vegetables do not necessarily include place names in their product names. Therefore, regarding the share



**Fig. 4.** Number of items of agricultural products and other products.



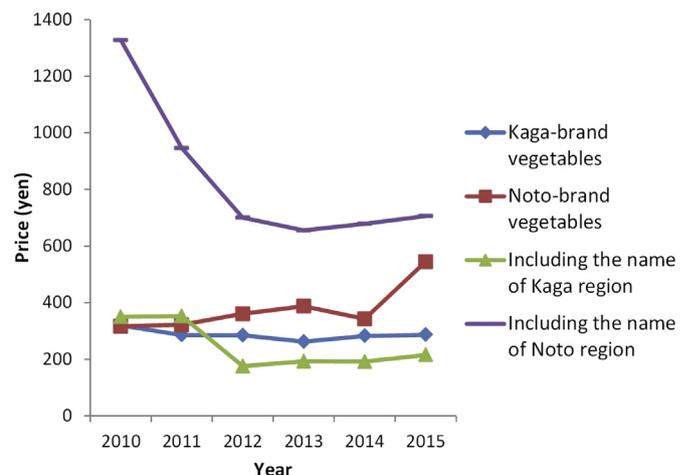
**Fig. 5.** Share of each brand product (Kaga brand, Noto brand, Kaga place name, Noto place name) with respect to the total number of items.

of products, it may be fairly important to include place names in product names.

#### 4.2. Changes in average price

Looking at the average price trends (Fig. 6), the prices of Kaga vegetables, vegetables named after Noto, and other vegetables declined from 2010 to 2013, then rose slightly in 2014 and 2015. The average price trend of vegetables including the Kaga place name was unchanged between 2010 and 2011, but fell sharply in 2012; subsequent changes have been limited. Noto vegetables showed greater fluctuations than other vegetables, with prices rising from 2010 to 2013, and also rising sharply in 2015. The analysis revealed that the price of Noto vegetables, whose definition is relatively ambiguous, is increasing, as Kaga vegetables, with a strict definition, show relatively small price fluctuations. The small number of Noto vegetables may be behind the relatively high prices, or producers might be raising the prices of their products. When comparing the value as a brand based on these average prices, it is necessary to consider that the prices vary depending on the type and number of vegetables.

The rising prices themselves may not be welcome from the perspective of the sustainability of the supply. The reason for this is that the risk of being unable to provide a stable supply may be reflected in the price. In fact, the number of Noto vegetables has not increased, and the share has also declined. The number of items is



**Fig. 6.** Average price (yen) for each brand product (Kaga brand, Noto brand, Kaga place name, Noto place name).

an index correlated with the supply amount, and the share of Noto vegetables is decreasing.

## 5. Discussion

In this research, the definition and distribution of traditional vegetables were reviewed, and the ambiguity and maldistribution of the vegetables were identified. Their origins and relationships with their regions have innumerable ambiguous points. Based on the results of the review, a quantitative analysis on the status of the branding of Kaga vegetables and Noto vegetables was conducted as a case study. As a result, Kaga vegetables were found to have their own quality standards and definition, and various factors such as the regional certification, GIAHS, and the opening of the Hokuriku Shinkansen, had positive impacts on their sales. However, a social conflict was caused by the strict standards and definition. On the other hand, Noto vegetables do not have strict quality standards and definitions compared to Kaga vegetables, and they were relatively recently registered in the region. Because of their more lax standards, we could not acknowledge the positive impacts of GIAHS certification. When considering the differences between the two brands, the difference in their histories needs to be noted in addition to the standards and definitions.

Branding of traditional vegetables is a way to facilitate the transmission of traditional products and relevant knowledge to future generations. The results of our analysis of two types of traditional vegetable indicated that the quality standards and definitions strongly influence the effects of branding and brand management. When it comes to policies and activities of transmission and retention of traditional products and knowledge, relevant quality standards and definitions need to be considered.

## Conflicts of interest

The authors declare no conflicts of interest.

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