

# Effects of Sharing Farmers' Information Using Content Management System

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**Abstract.** In recent years, new business models for agricultural markets have appeared. Under this perspective, we develop a new information system for urban markets to facilitate the transactions. Both sides, consumers and farmers, require certain information from markets about agricultural products. For example, consumers may make requests about the exact information of agricultural products or their safety, while farmers may want to make requests about the information on how to boast their produce. Under the considerations of such requirements at the markets, which may be conflicting, we propose a new information system to assist in the negotiation between parties.

## 1 Introduction

In recent years, the number of agricultural-product markets is over the number of convenience stores in Japan. However, many farmers are experiencing a lot of problems nowadays. Farmers are rapidly aging because young people who get a agricultural job are decreasing in number. Consumers worry about the safety of the food which Farmers produce because the problem of the quantity of the agricultural chemicals used for agricultural products. And, there is also a growing concern that the Trans-Pacific Partnership(TPP) has a negative influence on domestic agriculture. These problems could be a big opportunity to try and change domestic agriculture in Japan by introducing IT. We have already developed a Menu Recommendation System which gathers data on what people like to eat, and with that data, it can make automatic recommendations for an individual[9]. This idea can also be applied in developing the Agricultural Information System for urban markets, for the benefit of farmers and the local agriculture in Japan. This system will provide information on what agricultural products are in demand by analyzing consumer consumption and market trends. With this information, the farmers can have a better idea of what crops to prioritize. This can also help stabilize the economic sustainability of farming by improving farm management. With the system at work, it will reduce oversupply and undersupply of certain agricultural products, and the stable supply-demand relationship will prevent the underpricing of agricultural products and help in stabilizing market prices.

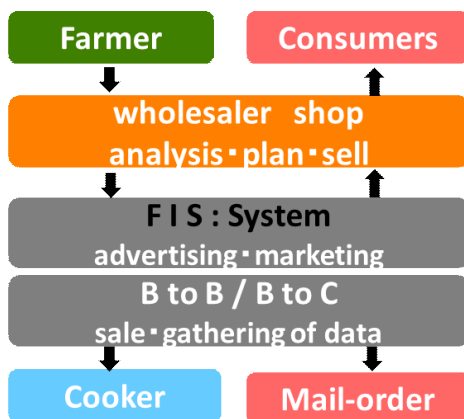
## 2 Present Conditions of Japanese Gricultural

A long time ago, the Japanese agricultural system was by the self-sufficiency which makes agricultural products by itself and is eaten by itself. The agricultural products to need were created as needed. The farmhouse created agricultural products and consumers bought agricultural products directly by development of the food system. Next, agricultural products were sold from Central Wholesale Market from farmhouse to retail, and were sent to consumers. Consumers' opportunity to get to know the place-of-production information on the purchased agricultural products decreased from such change. Also at the restaurant, a customer's opportunity to get to know the detailed information of the foods used for a menu decreased. Similarly, a farmhouse's opportunity to acquire consumers' information decreased. For example, the customer needs the information what kind of products they want to buy and how season they want to get the products.

The problem of food attracted attention since about 2000. Consumers changed to become interested to food of secure and safe. Consumers began to ask for getting to know how and where agricultural products were made. Consumers came to get interested also in quantity of the agricultural chemicals of agricultural products and growing information of agricultural products. If such information about food were released to the public, a menu has added value. For example, we think that the quantity of agricultural chemicals and the information on a place of production become important. The foods of the bastard size may also be needed at a restaurant.

Many researchers did systems development and have proposed from various viewpoints [8], [5], [3]. The agricultural problem is tackled also in countries other than Japan. The food safety management system in Korea is largely managed [4]. The Agri-food Safety Information System planned to be upgraded continuously by connecting practical safety management information and by constructing Emergency Warning System and Crisis Coping System which can be used to promptly cope with situation when a food accident occurs. The agricultural extension system in Tanzania has faced many problems [1], [6]. Moreover, farmers has a problem of reduction in income. Farmers are pressed for the need for change from the old selling method. The Farmers need to plan and grow the agricultural products which consumers regard as wanting rather than need to create without a plan. The Farmers need to investigate best-selling agricultural products in advance, and need to sell them in a store. However, there is a big problem here. The problem is the physical distance between consumers and farmers. Now, many of sales information of Farmers is not managed. The Farmers have not acquired a customer's sales trend.

Jensen expressed whether improvements in information impact market performance [2]. When information is limited or costly, agents are unable to engage in optimal arbitrage in fishery and agriculture. Between 1997 and 2001, mobile phone service was introduced throughout Kerala, a state in India with a large fishing industry. Using microlevel survey data, they showed that the adoption of mobile phones by fishermen and wholesalers was associated with a dramatic reduction in price dispersion, the complete elimination of waste, and near-perfect adherence to the Law of One Price. We think



**Fig. 1.** Configuration of the Farmers Information System

farmers release information and sharing information leads to the stability of the prices of agricultural products from this case.

In addition, IT-related company has begun entry in agriculture [7]. They are applied for agriculture using a clud-computing. They have focused on introducing the latest technologies (sensors, wireless networks and Cloud computing), radically revising approaches to agriculture and conducting business feasibility studies to make a hypothesis model of Cloud services that truly contribute to agriculture.

However, it is very difficult for farmers to build the large-scale system which has a network all over the country. Therefore, it is difficult for farmers to share information mutually. Moreover, it is very difficult for local farmers to do the same measure as a major company. In this research, we consider those problems, and we aims at the configuration of the farmers information system which can be used also in district agriculture(Figure1 ).

### 3 Problem and Solution

We think there are three problems about agricultural management. The first problem is stabilizing agricultural management. If the quantity of production is unstable, market prices would also be unstable. If supply and distribution is indefinite, the income of a farmer is also indefinite, thereby making it difficult to recruit the younger generation to engage in farming. This particular problem means that the farming industry workforce is not infused with new laborers while the existing farmers become older. In 2010, the percentage of farmers aged 65 and over was 62percent. The average age of farmers is 66 years old. The income that farmers make today is only half of what a farmer makes 20 years ago. The area of agricultural land which is not being used and cultivated is continuously increasing. The farming experience and wisdom of the expert farmers are not being put to good use and because there is no one to inherit their knowledge

of farming. If the farmers do not adjust their farming schedule to fit the demand of consumers, they automatically lose that sales opportunity. It is then very important that the farmers take into consideration what the consumers really want, to avoid not being able to sell their products or worse, sell it for a very low price. Farmers should focus on producing products that has actual consumer demand. They have to adjust their farming schedule in a way that by the time they harvest, their product is actually sought upon by consumers. For example, the farmers should only plant watermelons just in time for the summer, when it is popular.

The next problem is the unstable supply of agricultural products. Long term storage of certain agricultural products just to maintain a steady supply is difficult to do because some agricultural products have short shelf life. This problem makes it impossible for farmers to supply market demands for certain periods of time. Sometimes, certain environmental phenomenon, like the weather, affects the planting, harvesting and even delivering goods to the market difficult. Our goal is to design a system that will provide farmers information on when to plant so that the harvesting can be synchronized with actual market demands. To accurately approximate the time between the planting preparations up to the time of harvest, information on rate of seedling growth before planting, growing information and shipping time approximations until the product reaches the markets, will be used make a planting prediction. This information is then disclosed to the public via the web. This way, ordinary consumers, the food service industry, the farmers and other sectors than can benefit from this information may have access. The information on which agricultural products the Farmers can supply and be made available to the market at a given time, may be known buy prospective buyers and consumers alike. If this is so; consumers and buyers can plan their purchases in advance. The food service industry can also take advantage of this information by being able to plan ahead the kind of food they can serve on the menu during that certain period. This system will give both farmers, consumers and the food industry sufficient time to prepare and make necessary adjustments and preparations.

The last problem is that worth of agricultural products is cheap, even though Farmers grew the agricultural products carefully. It is necessary for the farmers to provide the consumers the information related to the production of the products. Consumers are interested with the process because they need to be secure that the products they are buying are of good quality and that they were grown carefully. This agricultural information system would include pictures of the actual farmers and their farms, information on growing practices and methods will also be included, along with the information on what type of chemicals or fertilizers were used in growing the products, or what type of preservatives were added to the products, if ever there was any. The objective of the system is to provide consumers information that cannot be known by simply looking at the products. This information can be considered as a value added to the products, thereby resulting to better acceptance of the products and better market prices.

## **4 Farmers Information System**

This system is a system which connects farmers, a customer, and a sales store. The system has some pages. Farmers disseminate the information on agricultural products.



Fig. 2. FIS's Top of System

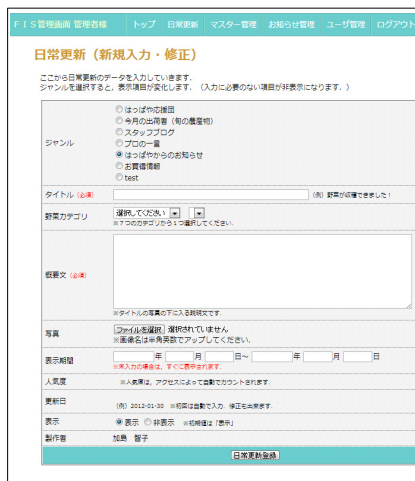


Fig. 3. FIS of Input Form

The system can perform an information input simply. For example, a farmer only sends the photograph taken by the cellular phone by e-mail. The system can exhibit what kind of agricultural products farmers are making. The system can exhibit the date of scheduled harvest of agricultural products. Moreover, farmers can display relief on web by displaying the photograph of products. The photograph and comment which contributed are immediately displayed on a system. Consumers can peruse the page of farmers. Consumers can also write a comment to the photograph and comment which farmers posted. They can peruse the cooking method of the purchased vegetables. Moreover, they can post the dish of boast built using the purchased vegetables. A grocery store has a duty which gives the information of farmers to consumers. Many information gathers for a system. The information is printed by paper like a newspaper. Consumers can see the information on a system with a personal computer or a cellular phone. However, it is also effective to distribute information to the consumers who came to the store in paper. The new information in a system is published by paper.

Figure2 and Figure3 shows the details of a system. There are some functions in the system. A function summarizes the new information on a system to one sheet. The information on one sheet becomes like a newspaper. At the store, shop assistant can give the newspaper to customers who do not see the web site. The other function posts the information on the Farmers and agricultural products which the store obtained. The shop assistant can post easily from a cellular phone or a personal computer. New information is displayed on this space(Figure2). This space is posted by Farmers, consumers, seller, sommelier of vegetables, etc. The other function is information effective in consumers and the master chief of a restaurant. Consumers can know that agricultural products are raised safely. The master chief of a restaurant can know the

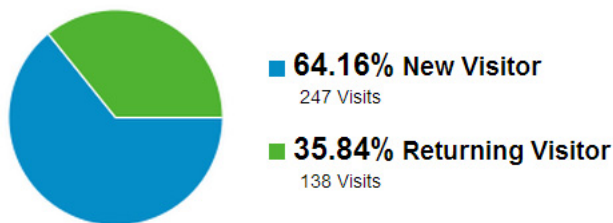


Fig. 4. Visitor of FIS

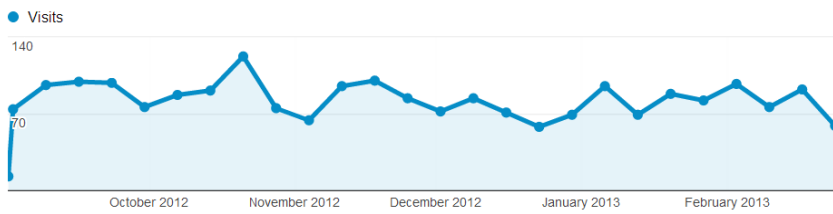


Fig. 5. Audience over view of FIS

information on the agricultural products harvested next, when creating a menu. Farmers who checked this web site can acquire various information. Usual, there was no opportunity for Farmers to get to know how the agricultural products which he raised are eaten by consumers. Farmers become an opportunity to get to know consumers' comment over agricultural products. The information is useful for next cultivation for Farmers. A system has a page of Farmers, a page of information sending, a page of a recipe, an event page, etc. other than a top page. The detailed information of the agricultural products into which each agricultural products raise the page of Farmers is displayed. The page has the harvest time and the amount of agricultural chemicals of agricultural products. The calender with harvest information can be known visually.

5 Results

We report the results of analysis of the system about the visitor. Figure4and Figure5 show the percentage of visitors and new visitors of the system. In this period, SEO and listing advertising measures have not done. New visitors accounted for approximately 65% in spite of not doing the advertising. Figure6 lets you see where visits originate. Location is derived from mapping IP addresses to geographic locations. A figure shows that there are most visits from Kobe which is an enforcement place of this study. As an attention point, many visiting places to the 2nd are Shibuya in Tokyo distant from Kobe. The good effect of transmission of information has shown up.

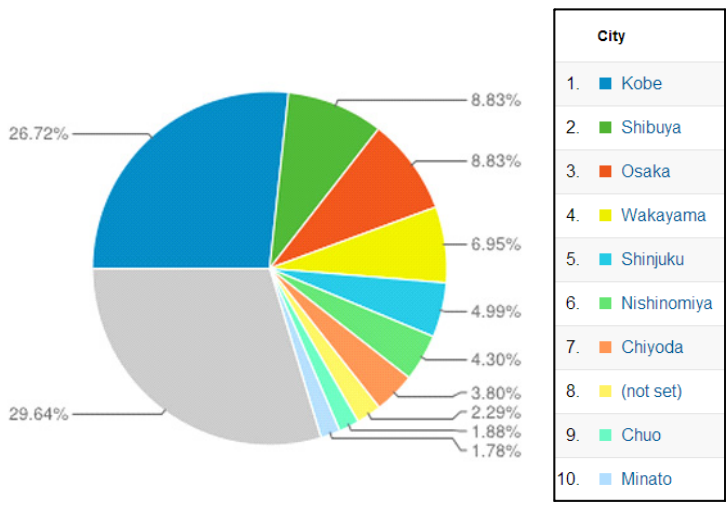


Fig. 6. Ration of Total Visit Region

6 Conclusion

In this paper, farmers information system for carrying out a remedy to three problems was proposed. The problem about the present agriculture was shown in this paper. Solution was proposed to those problems and the support system was developed. The structure which connects Farmers, consumers, and a store was built. The solution of the problems takes much time. However, this system will be useful for a problem solving.

As future works, the authors will support social activities towards the applications for marketing and policy planning by understanding customer’s attributes and activities from stored data through the operation in the real worksite. This study hopes to construct a business support model for restaurants considering some external factors from the viewpoint of entire optimization, but the local improvement only for mall. To achieve this objective, a simulation model is needed to be constructed. The authors are planning to make a computational model based on the game theory which enables to examine the changes of overall benefit depending on collaborative relationships between restaurants.

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