

## Development of the Food and Agriculture Value Chain by Using “Tsunagu” Distribution Platform

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### Abstract

NTT DOCOMO conducted a field experiment of the Let's Eat Local Food Project in February 2019. In this experiment, we demonstrated a mechanism that enables the purchaser to purchase agricultural products at a lower price, even if the seller of the products sells at a higher price than before, by reducing the logistics cost and time involved in collection and delivery of agricultural products. Until now, our *smart agriculture* initiatives have been focused on improving productivity throughout the production process. Going forward, we will support Japan's agricultural industry from production to distribution and sales by developing the food and agriculture value chain.

*Keywords: food and agriculture value chain, smart agriculture, food loss*

### 1. Smart agriculture initiatives by NTT DOCOMO

NTT DOCOMO has been striving to improve the efficiency of production processes for agricultural products as part of the initiatives of *regional co-creation* and *solving social issues*. In particular, we have been working on environmental sensors—which enable remote monitoring of conditions in fields, cowsheds, and fishing grounds—as well as remote monitoring and image analysis using drones. These efforts have made it possible to improve efficiency and save labor in the production process and boost production volume. However, the income of farmers is determined by a formula given as *price of agricultural products × quantity*. If the total amount of agricultural products becomes large, an oversupply will occur, and the price of products will tend to fall. Thus, even if the use of information and communication technology spreads across the industry and production volume of agricultural products overall increases, the agricultural products produced will be traded at low prices. This situation will not increase the income of farmers and further accelerate the shortage of workers. Feeling a sense of urgency about this

situation, we collaborated with the software development company Tsunagu Co., Ltd., to study a distribution platform that makes it possible to trade agricultural products at an appropriate price and conducted a field experiment of the Let's Eat Local Food Project.

### 2. Overview of field experiment

To optimize the price of agricultural products, three requirements must be met: (i) streamline the current commercial distribution, (ii) trade at a price commensurate with value, and (iii) produce according to demand. In the case of normal market distribution, as shown on the left side of **Fig. 1**, agricultural products after being harvested incur significant cost and time through repeatedly assembling and transporting. To improve the conventional model whereby many intermediate players intervene, we established the food and agriculture platform called Tsunagu, which enables sellers and buyers to directly connect to one another and buy and sell agricultural products. In the field experiment, the seller was Japan Agricultural Cooperatives (JA) Yokohama and the buyers were corporations including restaurants (**Fig. 2**). This

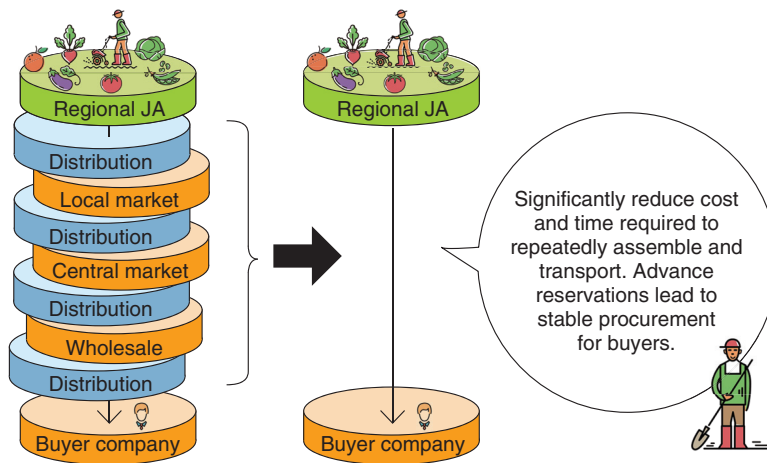


Fig. 1. Current distribution (left) and distribution with Tsunagu (right).

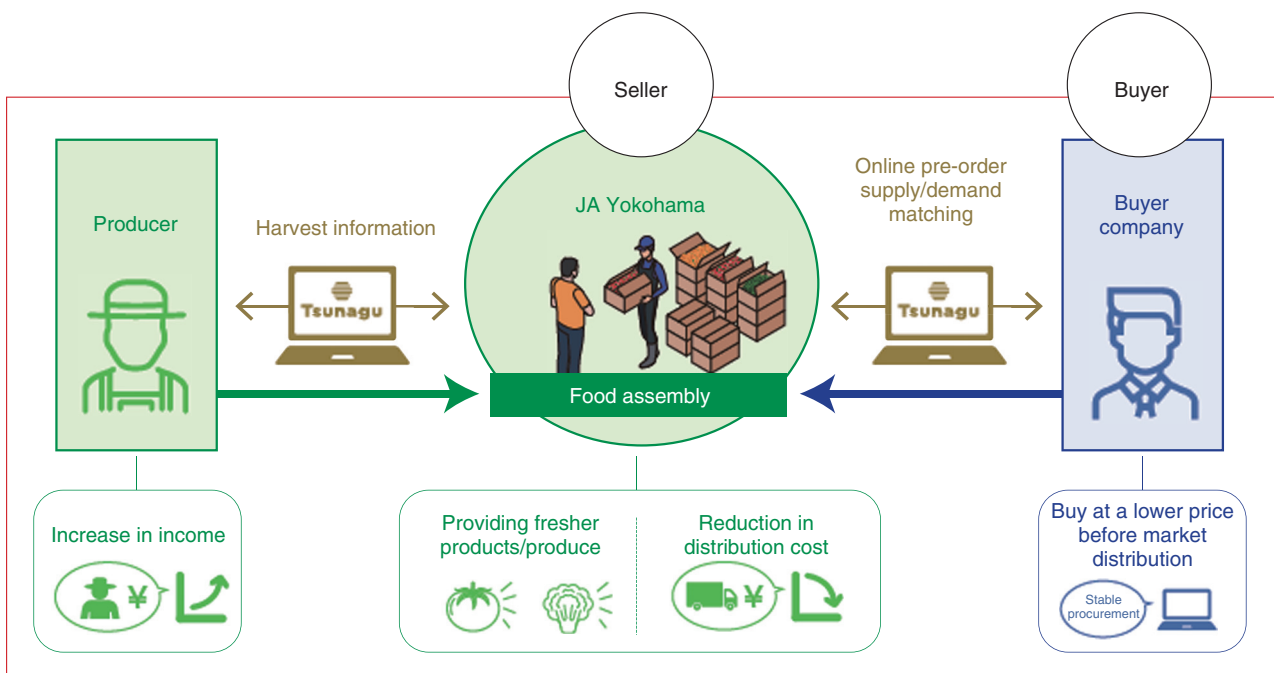


Fig. 2. Players in the Let's Eat Local Food Project.

platform differs from other such buyer-seller matching platforms in that the buyer and seller were both corporations (i.e., the “Bs” in business-to-business (B2B) model).

**2.1 Significance of implementing a matching platform under the B2B model**

To reduce the number of intermediate players as

much as possible, the customer-to-business (C2B) and customer-to-consumer (C2C) models (where the first “C” is the producer), whereby products are sold directly by the producer to the buyer, are the most effective. Many other matching platforms take this approach; however, if the buyer is B, their business activity will be affected if the yield of agricultural products cannot be secured. In this initiative, therefore,

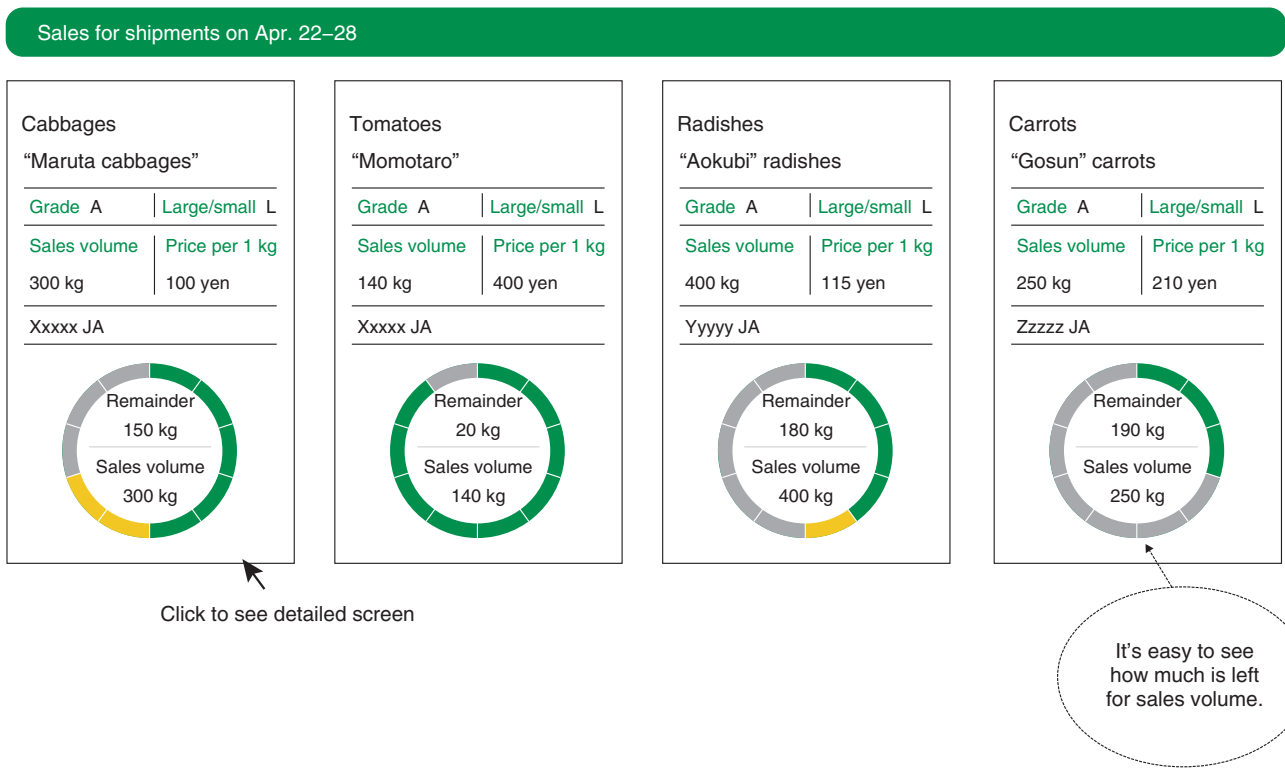


Fig. 3. Sales of agricultural products from the buyer’s perspective.

with a view to the following advantage, we implemented a B2B model in which the seller is JA.

- Agricultural products can be secured with a certain standard and quality set by JA.
- Yield for B can be secured by creating a producer group consisting of multiple producers of JA.

## 2.2 Matching method

The triggers for matching sellers and buyers used on Tsunagu consist of two pieces of information: *sales information provided by the seller* and *request from the buyer*. Regarding *sales information provided by the seller*, JA registers sales information about agricultural products, such as grades, quantity in one box (e.g., number of items/bundles/etc. and weight), and unit price, on Tsunagu about two weeks before the products are harvested. The buyer side views the information (Fig. 3) and makes a reservation for the desired products. By making advance reservations, buyers can reduce uncertainty about procurement and prepare fresh agricultural products at direct-sales prices in units of boxes. Distribution of sales via Tsunagu is not done by individual items, but by the box.

In the event that supply and demand cannot be matched, products can be distributed to the market as before. One advantage of this supply-demand matching method is that the sales strategy can be flexibly set up, that is, if the matching is successful, the product is sold via Tsunagu; however, if the matching is not successful, the product is put on the market as usual.

For the other piece of trigger information, *request from buyer*, Tsunagu provides a function with which the buyer can show JA the information about the desired agricultural product when there is no such product in the sales information. For example, when *komatsuna* (Japanese mustard spinach) is not being sold, it is possible to make requests like “Request for *komatsuna*” or “2L-sized carrots instead of M-sized carrots.” The buyer side specifies the desired delivery date, grade, desired price, required amount, etc., and the seller accepts the request only when it can respond to the request. At that time, a request can be accepted even without satisfying all the conditions presented by the buyer. When each JA producer enters the amount, grade, size, desired price, etc. that it can provide, the buyer side can comprehensively judge the

Management number: 10120		Seller	Grade	Large/ small	Transaction volume
ABCD Corporation		Xxxxx JA	A	M	60 kg
Komatsuna		Yyyyy JA	B	L	40 kg
		Zzzzz JA	A	L	20 kg
Asking price (Price per 1 kg)	400 yen				
Desired quantity	80 kg				
Shipping period	Apr. 22–28				
		Current order volume 120 kg		Under review 00 kg	

Fig. 4. Example of request application.

situation of each JA producer (**Fig. 4**) and makes a formal order for each producer. At that time, it is possible to buy from multiple JA producers instead of buying from only one. Doing so will broaden the range of transactions and enable more efficient purchases.

The *request from the buyer* is also advantageous for the JA side. Most agricultural products in Japan are produced based on farmer-oriented production systems, so-called product-out approach. As a result, sometimes not enough agricultural products are available, and sometimes their yield is too high, so products are discarded at the production site<sup>\*1</sup> to maintain prices. On the contrary, if a market-in approach—whereby the production system is tailored to *request from the buyer*—is adopted, food loss is less likely to occur. Moreover, farmers can produce agricultural products while ensuring buyers for stable income, thus allowing them to continue farming with peace of mind.

### 2.3 Means of logistics

In this field experiment, the assembly and pickup method was adopted as a form of matching seller and buyer to reduce logistics, and the harvested agricultural products were picked up by the buyer at the JA collection point. In this manner, it is possible to reduce extra costs related to logistics and provide agricultural products with assured freshness. The price of one box of agricultural products is relatively low, so if the buyer's transport or those of other companies are used for the distribution, the shipping fee

will account for a considerable percentage of the total cost of the product. The buyer may have to come and pick up the product themselves; even so, the assembly and pickup method gives a sense of security because the buyer can confirm the product at a single collection point.

### 3. Future developments

In this field experiment, in which it was assumed that the seller was JA, the agricultural products produced by each producer were collected by the buyer at the collection point. On the basis of the request from the buyer, it is possible to give guidance to growers while addressing the above-mentioned standards and quality issues and yield issues, thereby enhancing the benefit of a producer joining JA.

The Let's Eat Local Food Project was completed at the end of March 2020, after which commercialization of the proposed Tsunagu supply-demand matching platform will be considered. Agricultural products have an off-season<sup>\*2</sup>; accordingly, to constantly acquire agricultural products, it is necessary to obtain them from different production areas according to the season. To that end, we will comprehensively verify

\*1 Discarded at production site: If agricultural products are over-harvested in various places, their prices are lowered, and shipping costs are increased even if they are shipped to market. Thus, to maintain the market price, the harvested products (e.g., vegetables) are disposed of at the production site.

\*2 Off-season: The period during which agricultural products cannot be harvested. It depends on the place of origin and the crop.

how to introduce logistics and which features should be strengthened to more efficiently establish the matching between buyer and seller in collaboration with Tsunagu Co., Ltd. to provide a highly convenient platform. We will strive to expand this initiative

to cover the whole process for sales of agricultural products to reduce food loss by producing agricultural products according to demand and maintain and stabilize agricultural products to revitalize Japan's agricultural industry.



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