

## Spread Develops Technology for Mass Production of Pesticide-free Strawberry in Vertical Farms

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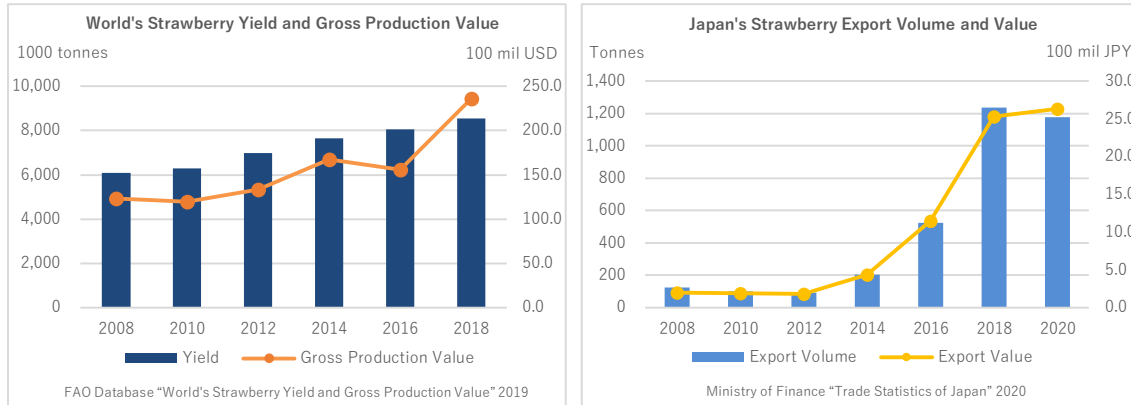
Kyoto, Japan. --Spread Co., Ltd. (HQ: Kyoto, Japan; CEO: Shinji Inada, hereinafter “Spread” ) has succeeded in developing the technology for mass production of pesticide-free, high quality strawberries in a vertical farm using artificial lighting. This technology was made possible by applying Spread's deep and broad know-how in lettuce cultivation, accumulated over more than a decade, to strawberry production. As the next step, Spread plans for broad utilization of automation technologies and large-scale, pesticide-free cultivation of the safe and delicious berries in Japan and around the world.

### SPREAD'S MISSION

Spread's “Create a Global Food Infrastructure” concept imagines a world where everyone has a free access to fresh and nutritious produce. Spread already successfully runs two large-scale vertical facilities in Kyoto, Japan, producing over 5 tons of lettuce daily, and plans to reach 100 tons of daily production domestically by 2030. Recognizing the need to feed the Earth, Spread is widening its product range by actively working on grains, mushrooms, fruits and more. In 2018, Spread started developing vertically farmed strawberry following the rising global demand and high global market growth potential for the berry.

## EXPECTATIONS AND CHALLENGE

Strawberries are globally in high demand, and both yields and production value are on the rise.<sup>\*1</sup> In particular, Japanese strawberries are widely recognized for their excellent quality and wide range of varieties, which is shown by the steady increase in exports.<sup>\*2</sup>



On the other hand, strawberry production is also known for heavy pesticide use. According to USDA's data, on average, strawberries in USA carry the residue of 7.8 different pesticides, compared to 2.2 for other crops, with some of these pesticides linked to serious potential risks for human health.<sup>\*3</sup> Another issue is overconcentration of production in one place (in USA over 90% of all strawberries are produced in California), meaning significant food miles.<sup>\*4</sup>

Vertical farmed strawberries are able to solve these issues due to pesticide-free cultivation and year-round production. However, until now many vertical farmers have struggled to ensure stable production, with challenges in indoor pollination and high cost. Utilizing know-how of a large-scale production, Spread developed technologies allowing for a move towards more accessible prices.

## SPREAD'S TECHNOLOGIES

### Stable Production at Large Scale

Spread is able to achieve stable harvest volume of berries utilizing proprietary environmental control technologies. By applying them to a large-scale production and adding automation, Spread estimates it will be able to cut costs significantly.



### Stable Harvest Volume and Quality

Stable production made possible through precise control of temperature, humidity, light intensity, CO<sub>2</sub> and other factors



### Indoor Pollination

Stable pollination using bees, indoors under the LED lighting



### Pesticide-free, Clean Cultivation

Pesticide-free cultivation and hygiene/quality control management certified by JAS 0012 and GLOBALG.A.P.

## **FUTURE VISION**

Spread is considering the deployment of strawberry vertical farms in Japan and overseas, targeting North America, Europe and Asia. Spread will also proceed with the product design and the development of the vertically farmed strawberry brand.

Spread will continue to pursue further business opportunities through technological innovation both in Japan and overseas. Spread aims to provide solutions for the global problems of climate change and food security, and the delivery of a truly sustainable society.

## **CEO MESSAGE**

Since Spread started the vertical farm business, creation of a sustainable society where future generations can live with peace of mind, has always been the goal. Our challenge led us to the development of crops other than leafy greens, and I am feeling really happy and proud that our team established mass production technology of “Japanese quality” strawberries that are in high demand worldwide. Spread will aim for stable production and supply of even broader range of food products in the future.



CEO Shinji Inada

\*1 FAO Database “World’s Strawberry Yield and Gross Production Value” 2019

\*2 JETRO “Nihonsan Shokuzai Pikkuappu Ichigo” [Highlighted Japanese Ingredient: Strawberry]

\*3 EWG “Dirty Dozen Strawberries” 2020

\*4 Samtani et al. “The Status and Future of the Strawberry Industry in the United States” American Society for Horticultural Science, 31 Jan 2019

ABOUT SPREAD

◆ **Kameoka Plant, the Profitability Pioneer of Vertical Farming**

**Capacity : 21,000 heads/2.1t/day**

Spread's Kameoka Plant cracked one of the toughest challenges in commercial vertical farming. Since starting operations in 2007, Spread has developed sophisticated environmental control technologies, and significantly improved the overall operational efficiency at the Kameoka Plant.

Together this has brought the operating rate to 97% and enabled Kameoka Plant become profitable for the first time in 2013.



◆ **Techno Farm Keihanna. Stable Production via Innovative Technologies**

**Capacity : 30,000heads/3t/day**

Started operations in 2018. The first vertical farm to utilize next generation food production system *Techno Farm™*. At the R&D facility attached to the farm, development of the new cultivation techniques, as well as IoT and AI systems is underway. As the mother plant of *Techno Farm™*,

Techno Farm Keihanna will serve as the foundation for the never-ending evolution of new technologies.

Innovative technologies, allowing for simultaneous increase in productivity and environmental sustainability:

- Automated cultivation
- Saving over 16,000 liters of water per day via water recycling
- Advanced environmental control
- Energy saving due to LED lighting, tailored for vertical farming usage
- Upgrade in operational efficiency due to IoT-based management system



◆ **Next Generation Food Production System *Techno Farm™***

Developed by Spread with the help of partner companies, *Techno Farm™* builds on the know-how developed at the Kameoka Plant in more than 10 years of its operation.

Automated cultivation, water recycling and environmental control technologies, specialized LED lighting as well as IoT and AI make for simultaneous increase in productivity and environmental sustainability.

Spread will continue to promote this technology as an essential part of sustainable agriculture.

URL : [www.technofarm.com/en](http://www.technofarm.com/en)



◆ **Over 70 Million Packs Sold in Total** \*1.

**Vertically Farmed Vegetables Brand *Vegetus***

Under the concept of “Sustainable Vegetable”, *Vegetus* strives to be healthy for both Earth and people. Spread’s current lineup includes 3 unique varieties: crunchy Frilly Lettuce, smooth and sweet Pleated Lettuce, soft yet crispy Fringe Lettuce. Each of these delivers a clean and fresh taste and is rich in beta-carotene. \*2 *Vegetus* is a favorite of children, easy to prepare and fits into any meal, not only salads or sandwiches.

URL : [www.vege-tus.com](http://www.vege-tus.com) (Japanese only)



◆ **Contribution to the United Nations’ Sustainable Development Goals**



Examples of Spread’s contribution

- Goal 2: Promotion of sustainable food production
- Goal 3: Preventing food poisoning risk via hygiene and cultivation management practices
- Goal 8: Labor saving through automation and digital transformation
- Goal 9: IoT-based management system for efficient cultivation
- Goal 12: Helping to reduce food loss due to most part of lettuce being edible
- Goal 13: Promoting resilient agriculture
- Goal 15: Efficient usage of land resources and pesticide-free cultivation
- Goal 17: *Techno Farm*<sup>TM</sup> partnership business

\*1 Actual numbers of lettuce, produced and sold by Spread

\*2 *Vegetus* clears Japanese Ministry of Health, Labor and Welfare standards for the “beta-carotene rich” vegetables (equal or more than 600µg/100g)

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