

Mirai Co., Ltd.

Mitsui Fudosan Co., Ltd.

Japan's Largest Plant Factory Producing 10,000 Vegetables Daily Starts Full-Scale Operation at Kashiwa-no-ha Smart City Plant Factory

■ Mirai Co., Ltd. (Mirai) and Mitsui Fudosan Co., Ltd. started full-scale operations of Japan's largest plant factory, Kashiwa-no-ha GREEN ROOM 2, at Kashiwa-no-ha Smart City in June 2014.

■ These plant factories are highly productive multilevel cultivation facilities that enable the stable supply of vegetables. Horticultural technicians control compounds, enabling production of vegetables with superior functionality. The facility will produce at least 15 types of vegetable, including lettuce, green leaf, romaine, and red-leaf lettuce. It is Japan's largest plant factory, capable of producing and shipping 10,000 plants daily.

■ Kashiwa-no-ha Smart City is advancing the three initiatives of An Environmental-Symbiotic City, A City of Health and Longevity and A City of New Industry Creation, and this project is one aspect of A City of New Industry Creation that stipulates supporting startups in communities that utilizes Japanese technology. Mitsui Fudosan is the developer of the plant factory (of which Mitsui Home Co., Ltd. was contractor) and Mirai will operate the factory and produce vegetables. Those vegetables will be packed and shipped by Mirai Trading Co., Ltd., which is funded by Sixth Industrialization Fund set up by an alliance of the JA Group, its related organizations and the national government.

* Refer to project schematic on the following page

■ Mitsui Fudosan has opened incubation offices to move forward together on co-creation with startups possessing advanced technological capability at places like KOIL (Kashiwa-no-ha Open Innovation Lab) in Kashiwa-no-ha Campus City and LIAISON-STAGE Kasumigaseki in the Kasumigaseki Building Mirai has been a tenant since LIAISON-STAGE Kasumigaseki first opened. The plant factories are an initiative regarded as a representative case study for Mitsui Fudosan for not only providing offices but joining a startup to create a market.

Main Features of Kashiwa-no-ha GREEN ROOM 2, the Kashiwa-no-ha Smart City Plant Factory

- Cultivates vegetables without using agricultural chemicals in an environment closed to the outside air, enabling stable, year-round supply.
- Using multilevel cultivation beds allows for efficient vegetable production and harvesting in narrow spaces.
- Original cultivation technology software ensures vegetables produced with little bitterness, but high in nutritional value.
- Use of a new, standing-type packaging enhances cleanliness and lengthens preservation periods.
- Safety and productivity are enhanced by advanced airtightness and insulation in an expansive area created using wood construction techniques.



■ Plant Factory Initiatives at Kashiwa-no-ha

The smart city that Kashiwa-no-ha aims to become is not merely about being high-tech urban development using a smart grid to reduce energy use. It's about urban development that creates an Environmental-Symbiotic City where residents can unconsciously reduce energy use while utilizing the rich natural environment. A City of Health and Longevity supports community food, exercise and participation with an underlying theme of preventative treatment in a rich and healthy lifestyle for children through to the elderly. A City of New Industry Creation seeks to advance community bonding to support the creation of technology startups and new industries that support future society.

Since the opening of the Center for Environment, Health and Field Sciences, Chiba University in 2003, Kashiwa-no-ha has continued researching and testing plant factories.

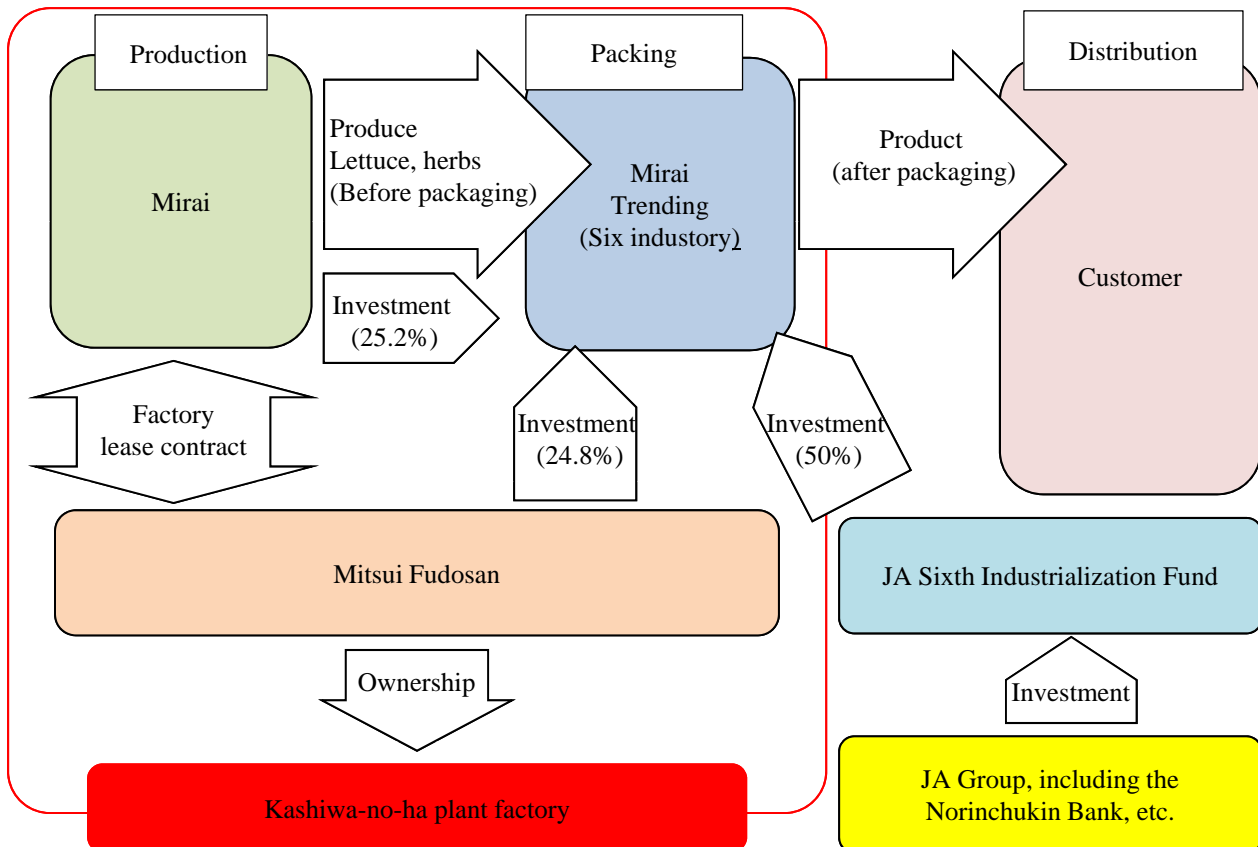
In October 2009, Chiba University, Mirai and Mitsui Fudosan installed a 6.6 m² small-scale plant factory inside the LaLaport KASHIWANOHA shopping center. In May 2012, Chiba University set up a large-scale plant factory for demonstration testing on campus, and the Urban Plant Factory Consortium Kashiwa-no-ha Association was established as a consortium made up of academic institutions and companies involved in the research and development of plant factories with Mitsui Fudosan as its leader.

Furthermore, in September 2012, Chiba University, Mitsui Fudosan, Panasonic Corporation and Mirai developed a small household-use, network-style, wagon-type plant factory and conducted a test on vegetable cultivation for approximately one year using Kashiwa-no-ha area residents as monitors.

■ Social Background Requiring Plant Factories

Society's interest in plant factories is growing in intensity due to issues such as food safety and security, rising vegetable prices due to climate change, greater interest in health, local production and local consumption and raising self-sufficiency rates. Plant factories have minimal risk of damage from the likes of climate, sickness or pests and plants are cultivated in an optimal environment, which enables safe and secure greens to be supplied with a stable quantity and quality while also addressing such societal issues as those mentioned above.

■ Project schematic (Details on previous page)



Mirai's vegetables

[Crops]

- As nitric acid concentrate levels are kept to low levels, there's little harsh bitterness, making the greens easy for children to eat
- Widespread standardization of size and quality among plants
- Use hydroponics instead of soil, cutting down the cleaning process and easier for cooking
- Packed with rich amounts of vitamins and minerals
- Cores are small and edible areas large, reducing waste

[Mirai Vegetables, Examples of Produce Cultivated]

* Customized commercial development is ongoing



Lettuce



Green leaf



Sanchu leaf



Romaine



Red romaine



Peppermint



Coriander



Kale



Rocket salad



Mitsuba



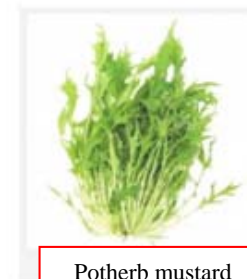
Watercress



Rororossa



Mustard green



Potherb mustard



Garland
chrysanthemum

GREEN ROOM Structure

[Details of the Plant Factory Devices]

Mirai's Plant Factory GREEN ROOM is a cultivation facility with an artificially controlled environment including temperature, light, water and nutrients.

[Functions]

As plants are cultivated in multi-level beds, it's possible to harvest many plants in a narrow space. With a 6-meter-high ceiling, placement of at least 10 levels of cultivation beds is possible, enabling cultivation of large numbers of plants. At 10 levels, productivity is high with area efficiency more than 100 times greater than growing outdoors.

[Growing Systems]

Employs a fully controlled hydroponics system. An ideal and stable cultivation environment is controlled automatically.

Overview of Facilities

- Artificial lighting for cultivation (Fluorescent lighting, partially LED)
- Closed circuit culture filtrate circulation system
- Control of atmospheric components such as nitric acid concentrate levels
- Air conditioning system, etc., the creates ideal temperatures
- * Total control by sensor, making constant stable growth a reality.

[Cultivation Software]

Plant cultivation won't necessarily be stable simply by taking place in a controlled environment. Mirai drew on its rich track record of plant cultivation and data on its experiences to develop its own cultivation software that it puts to use. Data acquired day and night is reflected immediately, continuously improving cultivation precision.

[Original Packing]

We have introduced a new type of packaging machinery and use a new package design. New, standing-style packages enhance cleanliness and lengthen preservation periods, while automating the packing process raises productivity and cuts costs.

[Hygiene Management]

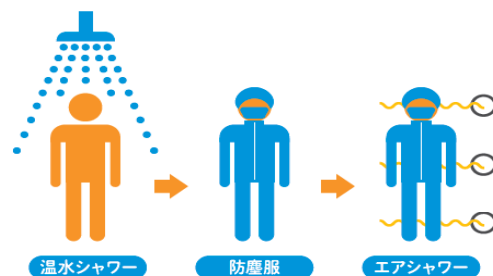
Workers must have a warm shower and wear disinfected work clothes before they may enter the GREEN ROOM. Maintaining such a strict hygiene management combined with utilizing a multiple-room structure prevents entry by external pests and creates a sterile environment. Consequently, agrochemicals are not needed, enabling the production of safe and secure vegetables.

人工光型植物工場



社員の衛生管理

徹底した3段階の衛生管理



Building Features

[Mitsui Home's Advanced Technologies Enable Space in Even Wooden Buildings]

- Benefits of Building in Wood

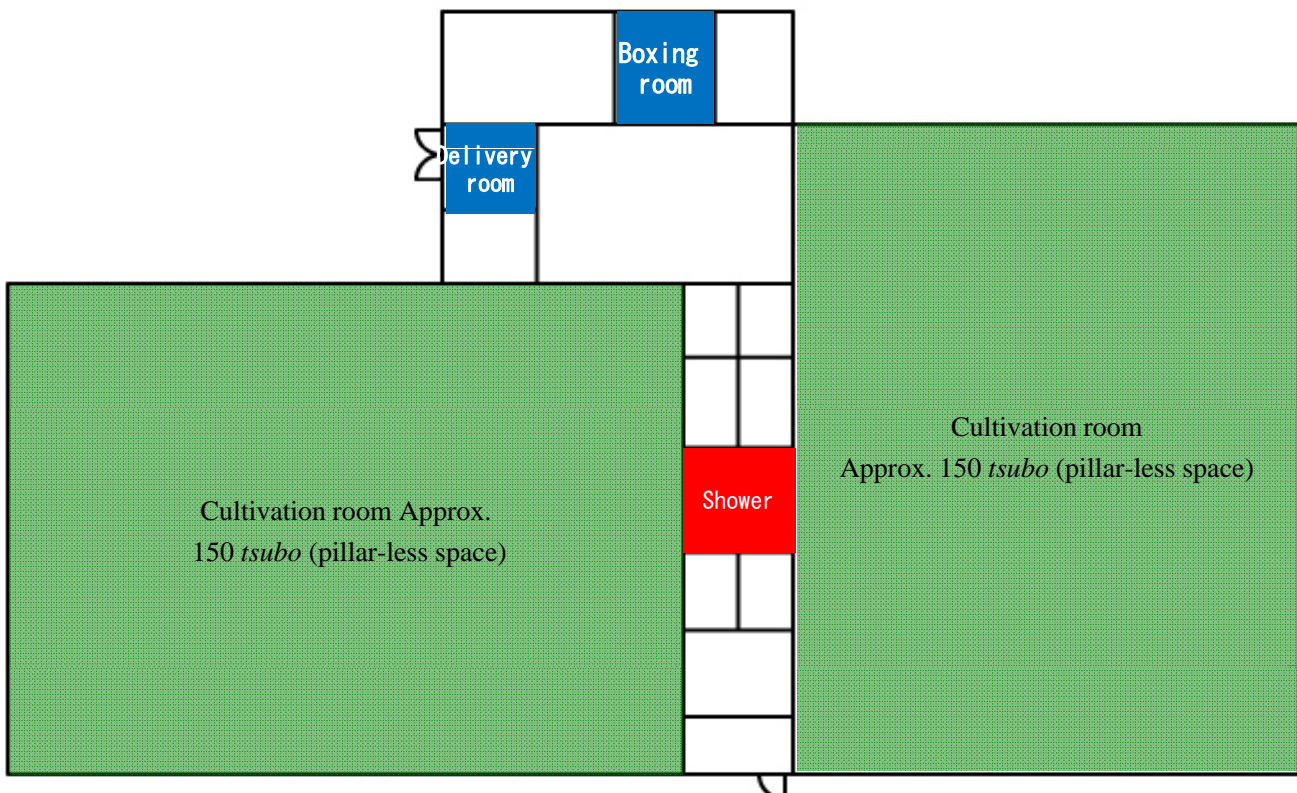
Plant cultivation requires stability and it's important to control appropriate temperature and keep the air environment within the plant clean. As a building material, wood has insulation qualities that improve air conditioning efficiency and the monocoque structure of wooden frame construction creates airtightness that shuts out anything unnecessary from the outside. The characteristic of a construction method where pillars do not stand out inside maximizes the effective floor space of the building.

- The 6-meter-high ceiling and thick walls that improve insulation and airtightness

For the expansive space needed to build a plant factory, the frame forming the basic structure was made 2 x 8 (two-by-eight). This secured the 6-meter-high ceiling, while at the same time the thickness of the insulation in the walls was made at 180mm to maintain the temperature needed to grow plants, materializing the necessary high insulation and airtightness.

- Use a special truss to create a span of approx. 20 m.

Mitsui Home's original metal plate connectors are used to combine the special truss and bridge to create a truss unit, of which 12 are employed, raising efficiency and heightening safety during construction to form a space without pillars of approx. 150 *tsubo* (26m x 19m).



Plant factory under construction (Built by Mitsui Home)

Mirai's Plant Factory Project Initiatives

[Developments in this business]

■ Syowa Station (Antarctica)

- Syowa Station (Antarctica) introduced Mirai's technology in March 2008 and can now harvest lettuce year-round.

■ Exporting Large Plant Factories to Mongolia

- Scale of approx. 450 m² (capacity to produce 3,000 plants daily) x 2 wings
- Delivered a plant factory to Nomads, a major Mongolian restaurant chain, during an exchange between private companies. As of January 2014, a trial cultivation factory was already operating.

■ Other Overseas Business Developments

- Established Chinese subsidiary MIRAI FIELD BEIJING CO., LTD in 2013.
- Established Mongolian subsidiary Mirai Field Mongolia Co., Ltd. in 2014.
- Considering further expansion with Mitsui Fudosan in places including Russia, China, the Middle East, Southeast Asia and Africa.

■ Installation at JA Tozai Shirakawa (Shirakawa, Fukushima Prefecture)

- Scale of approx. 500 m² (capacity to produce 3,000 plants daily) x 1 wing
- Started operation in April 2014, and first example of JA installing a plant factory in Japan.

Mitsui Fudosan's Initiatives for Co-Creation with Startups

[Development of Incubation Offices]

• Since 1991 with the opening of the **Japan Business Center in the World Business Garden**, Mitsui Fudosan has been setting up startup incubation facilities.

• In 2013, LIAISON-STAGE Kasumigaseki opened in the Kasumigaseki Building. The following support menu was offered to startups who became tenants of the building.

Matching with Mitsui Fudosan Associates

Introduce a customer network made up of the 3,000 tenant companies in Mitsui Fudosan office buildings all over Japan, and actively use products and services in Mitsui Fudosan business fields.

Mentor Team

Establish consultation centers in various fields such as accounting, taxation, law, intellectual property and human resources with support from many specialists, such as Ernst & Young ShinNihon LLC, a tenant in the Kasumigaseki Building.

Capital Support

Provide advice on using systems for things like subsidies and implement introductions to financial institutions. Mitsui Fudosan may also make investments.

[Mitsui Fudosan's Plant Factory Project with Mirai is a Model Case of its Support for Startups]

Mirai has become a symbol of Mitsui Fudosan's co-creation with startups initiatives. It has been a tenant at LIAISON-STAGE Kasumigaseki since its opening. As part of Matching with Mitsui Fudosan Associates, we performed such tasks as arranged investments (through the Sixth Industrialization Fund set up by an alliance of the JA Group) and utilized LIAISON-STAGE Kasumigaseki support menu services such as various types of support from mentor teams and capital support through Mitsui Fudosan's investment. This project also uses Kashiwa-no-ha Campus City, which was developed by Mitsui Fudosan.

[Establishing the Kashiwa-no-ha KOIL and Venture Co-Creation Department (2014)]

• Mitsui Fudosan newly established in April the Venture Co-Creation Department to share startup support expertise and networks. We are operating it as a platform for entrepreneurs seeking venture support and gathering supporter passionate about backing entrepreneurs.

• We are considering the use of Mitsui Fudosan's tenant network for sales route development support and actively incorporating technology into development properties.

• Kashiwa-no-ha KOIL, which also opened in April, will be used as a platform base for people to gather together as a front base. Well-developed programs will also be provided at Kashiwa-no-ha KOIL.

Factory Overview

Location	221-1 Aza Motowari, Aota Shinden Tobichi, Kashiwa City, Chiba Prefecture
Site area	Approx. 2,986 m ²
Gross floor area	Approx. 1,260 m ²
No. of floors	2 floors above ground
Contractor	Mitsui Home Co., Ltd.
Schedule	Start of construction: September 26, 2013 Completion: January 24, 2014 First shipment: June 2, 2014

