Protected Horticulture in the Netherlands
Case of Success and Problems for Introduction

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President　Hiraaki Tomita

トミタテクノロジー株式会社

Introduction

What is success?

- Being happy
- Satisfaction
- Able to be absorbed

Who is the actor?

- Influence society
- Accomplish a purpose

Mission

Contribute to society by developing agriculture using leading-edge technology that creates optimum environment

Reflecting on years of association based on the protected horticulture in the Netherlands and our mission, we would be grateful if you would think about today's theme with us.

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When was introduction of greenhouses from Netherlands started?

1970 Broad way greenhouses (Dutch Light greenhouses) were imported from Hancock, UK, and sold.

1971 Tomita Technologies Ltd. (Tomita Iron Factory at that time) collaborated technically with Hancock and started manufacturing. It spread around Fujisawa city, Kanagawa.

Fujisawa city, Kanagawa prefecture

At hordijk, the Netherlands

1973 Collaborated with The Hordijk Holding, the Netherlands.
Started import of Venlo® greenhouses.
VENLO is the registered trademark of our company.
We first delivered 3.9 ha to Fujioka city, Gunma, then continuously delivered to Kazo city, Saitama, Takasaki city, Gunma and related locations as part of a subsidy project by the Ministry of Agriculture, Forestry and Fisheries.

1975 In the Kyushu area, we delivered 2 ha to Gunchiku Greenhouse Association, Yatsushiro city, Kumamoto, later, also to Nissin Greenhouse Association.

Gunchiku Greenhouse Association, Yatsushiro city, Kumamoto

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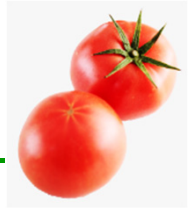
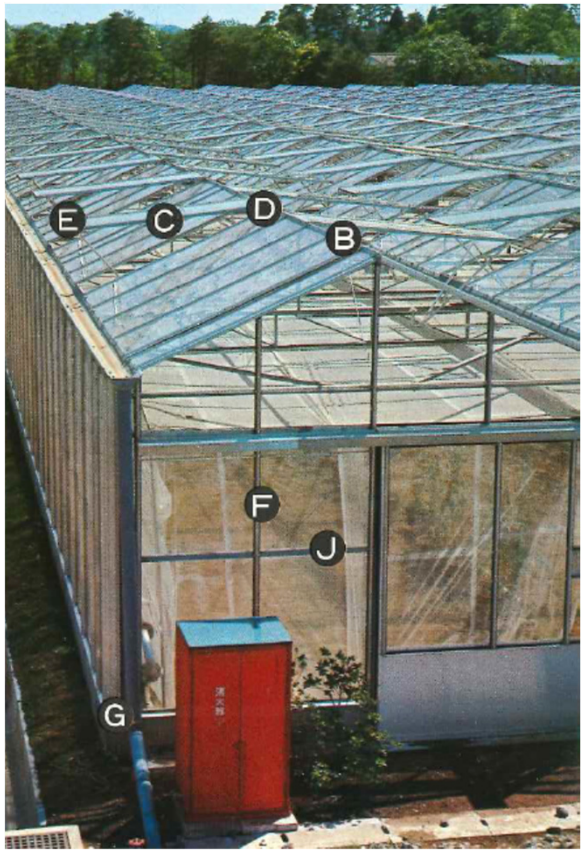
The First Venlo® Greenhouse



Model	Broad way type	Venlo type
Width	3.2 m	6.4 m
Length	4.46 m	3 m
Height	2.3 m	2.5 m
Standard iron frame materials	____	
Truss		Lightweight ditch type steel 100x50x3 mm
Pillar	Square pipe 40x40x3 mm	H-shaped steel 80x40x4x4 mm
Gutter	____	Steel sheet
Glass		
Roof	____	730x1650 mm Thickness 4 mm
	Gutters are held by aluminum-glass clips	
Skylight window	____	Flip-up type, one sheet of four sheets



At the time of introduction, the greenhouses were improved by installing side windows, enlarging the steel pillars, making the foundations stouter, reinforcing the trusses, increasing horizontal braces, and narrowing the first span of the glass.

After completion of domestic production, further improvements were made with the Japan Greenhouse Horticulture Association based on Standard on Safety of Facilities for Horticulture.

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Remarkable Growth of Protected Horticulture in the Netherlands

1980s In the Netherlands, export industrialization, enlarged scale and systemization of the facilities, higher productivity and labor-saving in protected horticulture were promoted.

1988 Venlo greenhouse was remodeled.

Introduced from DACE

Model	Venlo type
Width	6.4 m・8 m・9.6 m
Length	4 m
Height	3.5 m・4 m
Standard iron frame materials	
Truss	Square steel pipe 60x30x2 mm
Pillar	Square steel pipe 90x60x2 mm
Gutter	Aluminum
Glass	
Roof	780x1650 or 995x2113 mm, thickness 4 mm The edge of the glass are rounded with aluminum mold material, zigzag alignment with 4 sheets /set of glass Float glass or tempered glass
Skylight	Rack and pinion

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Introduction of large-scale production facilities from the Netherlands

1995 Large-scale Venlo® greenhouses were first delivered in Japan to Shinchi-machi, Fukushima prefecture.
This is a pioneer of the large-scale production facilities introduced by an enterprise that entered into agriculture.

Integro, an environmental control unit from Priva, was first delivered in japan.

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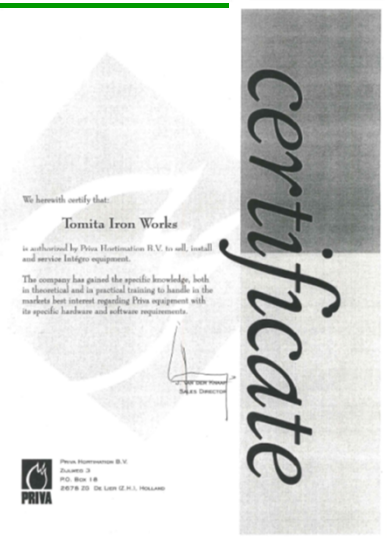
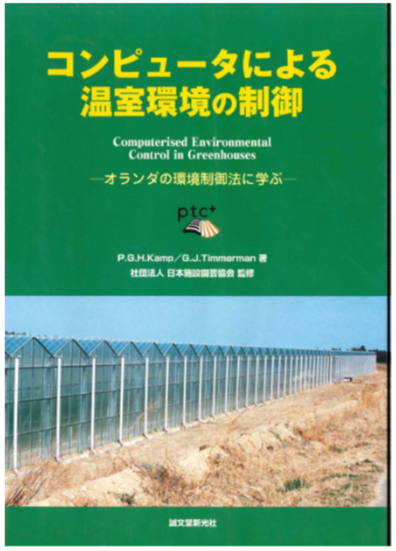
Introduction of environmental control technology from the Netherlands

1994 Concluded a contract with Priva as dealer
1995 Priva Integro computer sales began
1998 Ultraviolet disinfection device Vialux sales began

2004 “Computerized Environmental Control in Greenhouses” edited by Japan Greenhouse Horticulture Association was published. This is a textbook of Dutch Education Center PTC+Ede. It plainly describes physics, plant physiology, engineering, and control engineering from principles to actual control regarding environmental control and is accessible to beginners.





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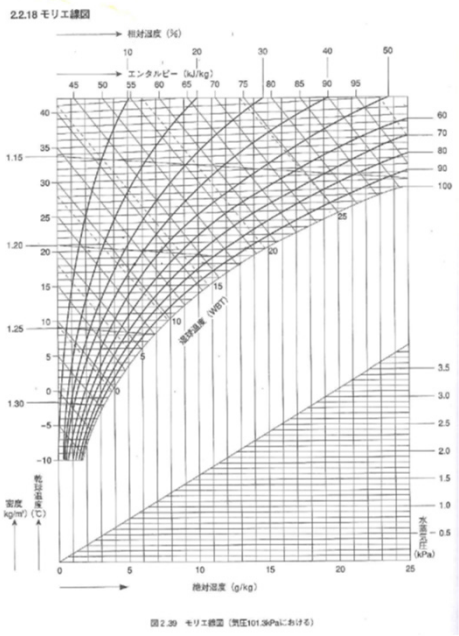

Priva Intégro

プリーバ インテグロ

Priva Integro

温室の制御は、温度、湿度、CO_2などの変数が相互に影響し、全てについて希望通りの値を保つことが困難な場合があります。相互のバランスで最善の方法をとる以外に不可能と言うことが多いとも言えます。これらに対して現実的な最善策を与えてくれるのがPrivaコンピュータシステムです。

インテグロコンピュータは、温室制御に関する限り、容易に導入できる、操作が簡単という面と自分の希望に合わせた制御ができるという面を兼ね備えたシステムです。

Priva Hortimation

Priva Hortimation社は、農業分野で長い歴史をもった会社です。1960年代にマーケットに進出して以来、温室暖房、CO_2バーナ、換気装置などの製品を供給してきており、農業用コンピュータでも最も古いメーカーの1つであります。現在では、環境制御用各装置を含むオートメーションシステムの世界最大のメーカーです。

Priva Hortimation社の強みは、長い歴史の中で育んできた知識と経験です。また、それは単にコンピュータ技術だけでなく、作物の栽

Introduction of production technology from the Netherlands

1993 Enforcing custom duties and minimum access of agricultural commodity started by the agreement of GATT Uruguay Round

DACE, the Netherlands, first delivered in Korea Venlo greenhouses for large-scale production to POSCO and accomplished production of 35t/10a of pink tomato

Import of Dutch paprika permitted

1994 DACE sold facilities and technology for producing paprika in Cheju by Korean Air

1995 Through united efforts by the government and private organizations, Korea started to export paprika for Japan.

2000 Turnkey project for paprika 1ha
A full-scale paprika production started in Kagawa prefecture
A Dutch cultivation consultant was stationed for a year and transferred technology of cultivating paprika.

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Branding of paprika and local revitalization 1
Ways to brand

2005 Establishment of farming corporation Richfield Kurihara ltd., entering into agriculture Miyagi prefecture “New Generation Agribusiness Creation Project”

- Job creation
- Development of sales channels independent of existing distribution
- Local revitalization

2006 Summer and autumn Paprika cultivation started

Richfield Kurihara completion ceremony

Tohoku Rakuten Golden Eagles PIEMENT BUON GIORNO

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Branding of paprika and local revitalization 2

2006 Richfield Kurihara started shipment of domestic paprika
2007 VEGi-Dream Kurihara Corporation was established with Toyota Tsusho Corporation Completion of the first farm
2010 Dole Japan Inc. started paprika production in Tome city
VEGi-Dream Kurihara completed the second farm, 4 ha, the largest paprika producing facilities in Japan
2011 The Great East Japan Earthquake
2012 VEGi-Dream Kurihara started production in the third farm in Ohira-mura, making use of exhaust heat from electricity generator in the factory of TOYOTA MOTOR CORPORATION
2016 In Ishinomaki city, which suffered enormous damage from the Great East Japan Earthquake, De Liefde KITAKAMI started paprika production as “Miyagi-Base” supported by the Ministry of Agriculture, Forestry and Fisheries; Project for accelerating the introduction of next-generation protected horticulture

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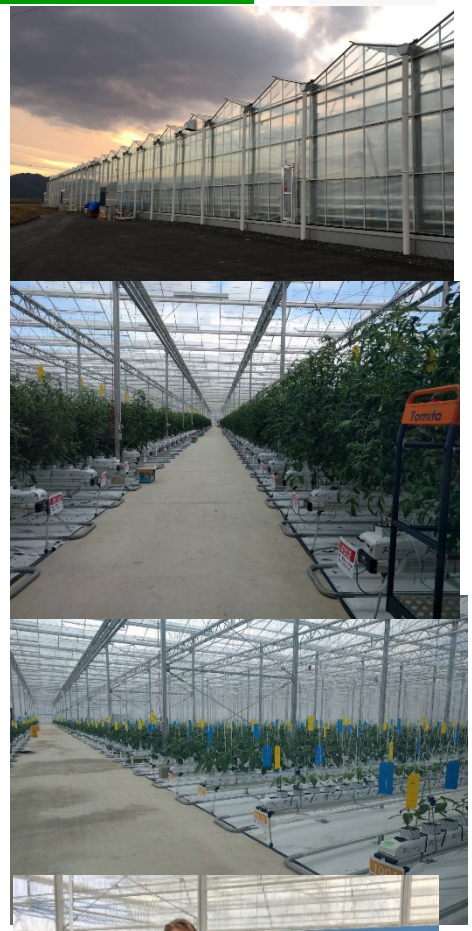
VEGi-Dream Kurihara



De Liefde KITAKAMI completion ceremony

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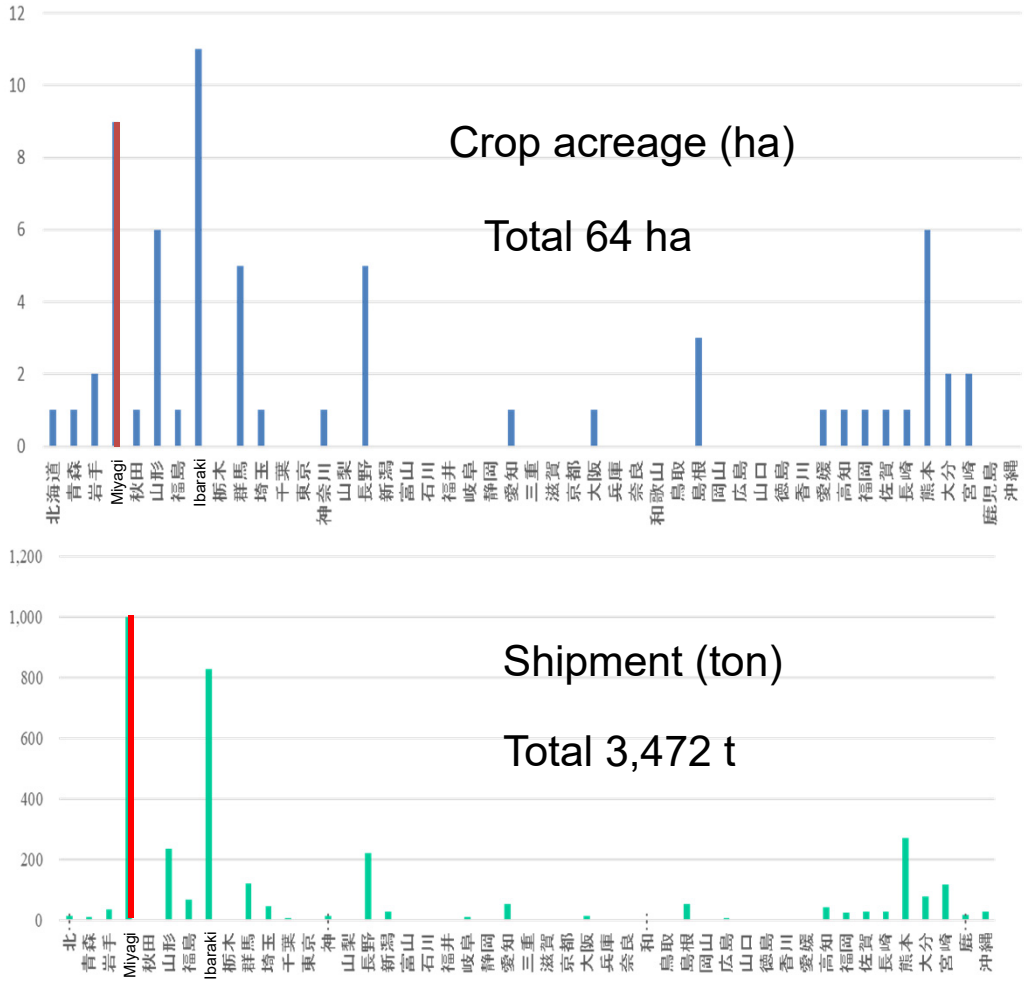
Branding of paprika and local revitalization 3

- Paprika production in each area
- Miyagi prefecture shows the largest domestic shipment in Japan

Shipment from domestic production area (2014)



Source: “The production status of local specialty vegetables,” the Ministry of Agriculture, Forestry and Fisheries

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Problems with introducing protected horticulture from the Netherlands

Problem 1 Compatibility between the structural standard of Dutch greenhouses and Japanese Standard on Safety of Facilities for Horticulture

Problem 2 Maintenance of the products from the Netherlands
- Commonization of standards
- Commonization of parts

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Problem 3 Lowering energy costs and effective use of resources
The Dutch people have a high level of awareness regarding environmental issues, such as global warming countermeasures, reducing CO_2 output.

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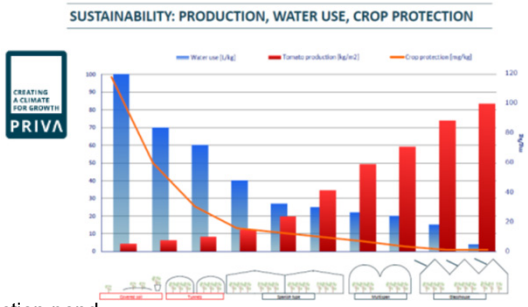
Problems Lowering energy costs and effective use of resources 1

Introduced from Dutch protected horticulture

- Utilize rainwater
- Reduce the amount of water and fertilizers by recycling hydroponic cultivation that uses ultraviolet-sterilized drainage
- Tri-generation that uses LNG as energy source is not popular, but utilizing exhaust gas of air heating from LNG or LPG as energy source and heat storage are widespread
- Effective use of CO_2 and heat

Ultraviolet disinfection device Vialux



CO_2 Unit

Heat storage tank

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Rainwater collection pond

Problems Lowering energy costs and effective use of resources 2

Promising energy can be used in Japanese protected horticulture

- Use of heat discharged from waste incineration plant and factories
- Use of geothermal heat
- Use of heat discharged from woody biomass power generation and woody biomass boiler

Takahiko Agro-Business Co., Ltd. Geothermal greenhouses

De Liefde KITAKAMI Woody biomass boiler and woody chips
SHIMANTO TOMATO inc. Woody biomass boiler Sawdust

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Use of heat discharged from woody biomass power generation and woody biomass boiler

Forest accounts for 67% of Japan's land area　　Artificial forest accounts for 40%
Artificial forest is ready for harvest and we have entered an era when we should take advantage of the grown forest. However, the price of woody chips has risen and they are difficult to obtain

Why?

- Japanese cedar and Japanese cypress, planted for building material, cannot compete with imported wood with lower costs　　Imported wood accounts for 80%
- Regeneration-cutting is not profitable
- Forest has become devastated without cutting trees

↓

Social problems

Lowering costs for nursery activity/cutting/logging of timber from forest thinning
Utilize domestic timber actively
Rotate the cycle of: planting→growing→cutting

↓

Solution

Enhancing function that absorbs CO_2 and prevents warming by reducing sediment disaster
Effective use of timber from thinning and scrap wood
It leads to lowering energy costs and effective use of resources

Conclusion

From now on, toward solving the social problems such as climate change and resource depletion, together with the friends in the Netherlands, an environmentally-advanced country, we hope that we can generate innovation in producing agricultural commodities by using resources effectively and sustainably.

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