3. Tackling the challenges of greenhouse horticulture (approach for the next-generation greenhouse horticulture)

To pursue the establishment of a top-runner model (next-generation greenhouse horticulture) capable of overcoming the challenges facing Japan's greenhouse horticulture all together in the form of matching the nation's natural conditions by (1) installing advanced environmental control, (2) expanding the scale of operation through the utilization of employment, and (3) making use of regional energy, taking clues from greenhouse horticulture in the Netherlands.

1. **Productivity improvement by install of advanced environmental control technology**

Realize the year-round production based on the sales plan with the greater yield by the horticulture in the weather-resistant Greenhouse with an environmental control system which is able to control different environments at the same time by utilizing ICT.

(Example) Success in yielding 30-40t/10a of large tomatoes (National average of 10t/10a)

2. **Large-scale management utilizing employed labor**

Realization of efficient production and expansion of management scale by utilizing employed labor through preparation and review of appropriate work plans, due assignment of employees, standardization of work processes, etc.

3. **Reduction of dependence on fossil fuels by utilization of local energy resources**

Realize the stable management of farms by the reduction of dependence on fossil fuels where price rise has a potent influence on farm management due to the fuel expenses account for big portion in the farming costs.

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### Reference: Differences in natural conditions between Japan and the Netherlands

<table>
<thead>
<tr>
<th></th>
<th>Japan</th>
<th>The Netherlands</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperature</strong></td>
<td>Hot and humid in summer</td>
<td>Cool in summer</td>
</tr>
<tr>
<td><strong>Accumulation of snow</strong></td>
<td>Present</td>
<td>Almost non-existent</td>
</tr>
<tr>
<td><strong>Big wind</strong></td>
<td>Occasional brunt of typhoons</td>
<td>Absence of hurricane brunt</td>
</tr>
<tr>
<td><strong>Main fuel</strong></td>
<td>Fuel oil reliant on imports</td>
<td>Natural gas from North Sea oil field</td>
</tr>
</tbody>
</table>
3. Tackling the challenges of greenhouse horticulture (development of base of next-generation greenhouse horticulture)

- Formation of ten model bases across Japan to create next-generation greenhouse horticulture matching natural conditions, etc. of the country extended north and south
- To rotate the PDCA cycle by collecting the environment, growth, work and other data at the model bases and assess yield per 10a, the rates of reduction in the use of fossil fuel and productivity per worker in order to study integrant technologies for next-generation greenhouse horticulture.
- To accumulate evidence that can help overcome the challenges facing Japan's greenhouse horticulture and improve profitability

Data to be collected at model bases

**Daily program**
- Environment, growth of plants, amount of fuel used and other factors inside greenhouses
- Work plans and results

**Grasping challenges and improvement (PDCA cycle)**

**Benchmarks**
- Yield per 10a
- Rate of reduction in use of fossil fuel
- Yield per worker

**Improvement in balance of management (PDCA cycle)**

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5. Toyama Prefecture (Toyama City)
[Completed in June 2015]
Tomato (2.9 ha)
Ornamental plants including Eustoma (1.2 ha)
Waste heat

7. Hyogo Prefecture (Kasai City)
[Completed in August 2015]
Tomato (1.8 ha)
Cherry tomato (1.8 ha)
Woody biomass

10. Miyazaki Prefecture (Kunitomi Town)
[Completed in July 2015]
Sweet pepper (2.3 ha)
Cucumber (1.8 ha)
Woody biomass

6. Aichi Prefecture (Toyohashi City)
Cherry tomato (3.6 ha)
Water discharged from a sewage effluent heat
Woody biomass

9. Oita Prefecture (Kokonoe Town)
[Completed in March 2016]
Red pepper (2.4 ha)
Heat from hot spring

8. Kochi Prefecture (Shimanto Town)
[Completed in March 2016]
Tomato (4.3 ha)
Woody biomass

2. Miyagi Prefecture (Ishinomaki City)
Tomato (1.1 ha)
Red pepper (1.3 ha)
Woody biomass
Ground thermal

3. Saitama Prefecture (Kuki City)
Tomato (3.3 ha)
Woody biomass

4. Shizuoka Prefecture (Oyama Town)
[Completed in January 2016]
Tomato (3.2 ha)
Red pepper (1.1 ha)
Ground thermal
To realize year-round production of strawberry with cool weather of summer in the north area of Japan.
To introduce the advanced environmental control technology and make toward high quality and low cost production of strawberry.

Advanced environmental control-based cultivation, seeding and production
Selection and processing
Storage
Supply of energy
Product development and branding
Distribution and sale
Delivery and logistics

Overview of project
(1) greenhouses, (2) woody biomass, (3) facilities for production of seeding, and (4) facilities for collection and shipment
Demonstration of devices for warming inside and around a bench, mist cooling, application of CO2, etc. adopting advanced environmental control technology
(1) Establishment of regional brands for new products (2) expansion of overseas sales, etc.

Names of consortium and its members
Name: Consortium of the Next-Generation type of Greenhouse Horticulture in Hokkaido
Members: Tomatoh Farm Co., Ltd. / morimoto Co., Ltd. / The Hokkaido Confectionery Association / Tomatoh Inc. / TANJI FORESTRY Co., Ltd. / Tomakomai-Kouiki Japan Agricultural Cooperatives / Hokkaido Food Industry Promotion Organization / Hokkaido Government / Tomakomai City

<table>
<thead>
<tr>
<th>Crops</th>
<th>Area</th>
<th>Yield (goal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strawberries</td>
<td>4ha</td>
<td>314t (7.5t/10a)</td>
</tr>
</tbody>
</table>

Stock photos used

Year-round cultivation of strawberries in cold area
Venlo greenhouses
woody biomass

Hokkaido (Tomakomai City)