Cold Chain Logistics Management in Japan

PPFS Seminar (Japan): Enhancing market entry for MSMEs including smallholders in Asia-Pacific region

(6 Aug. 2018)
Cold Chain:
“a temperature-controlled supply chain, which is an uninterrupted series of storage and distribution activities to maintain a given temperature range.”
• Maintaining the controlled temperature and not breaking the “Chain”
• From “Farm to Fork”
Temperature and Deterioration

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>Relative Velocity of Deterioration</th>
<th>Relative Postharvest-Life</th>
<th>Loss per Day (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>100</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>3</td>
<td>33</td>
<td>3</td>
</tr>
<tr>
<td>20</td>
<td>7.5</td>
<td>13</td>
<td>8</td>
</tr>
<tr>
<td>30</td>
<td>15</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>40</td>
<td>22.5</td>
<td>4</td>
<td>25</td>
</tr>
</tbody>
</table>

Cold Chain provides;
• Extended Shelf-Life
• Improved Appearance
• Maintained Freshness and Flavor
• Reduced Deterioration

Source: The role of post-harvest management in assuring the quality and safety of horticultural produce, University of California and FAO (2003)

**PRECOOLING (1st stage of Cold Chain)**
- Product temperature is the main cause for Postharvest Deterioration.
  “It is important to cool the products as quickly as possibly after harvest.”
- Precooling Method rapidly lowers the temperature of freshly harvested produce and is most effective when done immediately after harvest to minimize spoilage.
  (ex. Room cooling, forced-air cooling, hydro-cooling, ice cooling and vacuum cooling)
## Customized Temperature Control

### Potatoes

<table>
<thead>
<tr>
<th>Type</th>
<th>Temp (°C)</th>
<th>Humidity (%)</th>
<th>Storage Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lettuce</td>
<td>0~1 °C</td>
<td>90~95</td>
<td>1~4 weeks</td>
</tr>
<tr>
<td>Sweet Corn</td>
<td>0 °C</td>
<td>85~90</td>
<td>4~8 days</td>
</tr>
<tr>
<td>Cucumber</td>
<td>7~12 °C</td>
<td>90~95</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Eggplant</td>
<td>7~10 °C</td>
<td>85~90</td>
<td>10 days</td>
</tr>
<tr>
<td>Tomato (Ripe)</td>
<td>0~7 °C</td>
<td>85~90</td>
<td>1~4 weeks</td>
</tr>
<tr>
<td>Garlic</td>
<td>-1.5~0 °C</td>
<td>70~75</td>
<td>6~8 months</td>
</tr>
<tr>
<td>Ginger</td>
<td>1.5~3.5 °C</td>
<td>85~90</td>
<td>15 weeks</td>
</tr>
<tr>
<td>Onion</td>
<td>-3~1.5 °C</td>
<td>70~90</td>
<td>6~9 months</td>
</tr>
</tbody>
</table>

### Potato (First Early)
- Temp: 3~4 °C
- Humidity: 85~90
- Storage Period: 2~3 weeks

### Potato (Old, Consumption Purpose)
- Temp: 4.5~10 °C
- Humidity: 88~93
- Storage Period: 2~8 months

### Potato (Old, Seeding Purpose)
- Temp: 2~7 °C
- Humidity: 85~90
- Storage Period: 5~8 months

- To minimize weight loss of the potatoes, the temperature has to be gradually dropped by no more than 0.5 °C daily.
- Based on the purpose, the storage temperature will also be different.

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Some vegetables harvested in the mornings have benefits in terms of both taste and life of the produce.

Since some vegetables replenishes the moisture lost during the day, they are sweeter, crisper and juicier when picked during the early morning hours.

By harvesting the produce when their internal temperatures are relatively low, the produce will have a longer shelf life and will also contributing to reducing the energy needed for pre-cooling.
Traceability of Food Products in Japan ① Meat

- The spread of the Global Mad Cow Disease, which also discovered in Japan in 2001, led the government to enforce regulations on the traceability of cattle meat.
- Every cattle was required to wear ear tags with Individual ID No.
- Producers had to submit data on the animal’s:

1. Date of birth
2. Sex
3. Breed
4. Name/Address of owner
5. Location of fattening
6. Date of fattening commenced
7. Date of slaughter
Japanese Supermarkets: Individual Identification Number for Meat Products

1. Individual ID Number
2. Processed Date (Y.M.D)
3. Expiry Date (Y.M.D)
4. Producer’s Name
5. Production Place *
6. Required Storage Temperature

* Gunma Prefecture

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Japanese Supermarkets: Individual Identification Number for Meat Products

- Consumers can self-search the details of the meat they purchased through search using home computers through the “Search service of Individual Identification Information of Cattle” Website.
- Service is available both in Japanese and English.

https://www.id.nlbc.go.jp/top.html?pc
Meat Stall at an Open Air Market
Traceability of Food Products in Japan

2 Cut Vegetables

- **Raw Material Intake**: *Intake Log* has to be recorded for each lot received (date, supplier name, product name, place of production, quantity, rank and price).
- **Processing Center to Cutting Room**: *Traceability Log* which includes processing date, product name, intake date, place of production, quantity and name of worker.
- **Packing Room**: *Labelling* will be placed on the packaging (product name, raw material names, place of production, volume, expiry date, manufacturing date, storage method, producer name and address).
- **Shipment**: *Shipment Log* recorded for each location (date, destination, product name and quantity).
Flow of Information is another key factor in logistics management. Knowing the exact location and quantity of the products within the Supply Chain, in combination with the ability to narrow down to the source of each raw ingredient, will ensure timely response to any emergency situations. “Top-Quality Food from Producer to Consumer”
Traceability of Food Products in Japan

- Traceability is currently being applied to various food products in Japan.

Egg Product with the Faces of Producers

- It says that Mr. & Mrs. Nakamura proudly produced these eggs in Iwate Prefecture.
THANK YOU