Food Security Prospective and Strategic Plan for Korea

Summary

- Analysis of food situation in South & North Korea
- Study based on the nutritional anthropology
- Potential assessment of North Korea's food production
- Prediction of Korean food supply & demand assuming future unification
- Comparison of the two camps' sea food production, survey of changing consumption, and study of further improvement

Predict supply & demand for future unification, then set acquisition method for 70 million people's food

Six suggestions of food policy for Korea unification
### Index

1. Food situation in Korea
2. North Korea’s food production
3. Food demand in case of sudden unification
4. Food policy projects for Korea unification

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#### I

**Food situation in Korea**
World Food Security Ranking

**Food & Grain self-sufficiency of Korea is critical**
Low self-sufficiency can become a potential threat in the food war

Food crisis of North Korea

Food shortage of North Korea is expected to continue
because of inefficiency of agricultural system, shortage of agricultural materials (fertilizers, pesticides, etc.), and contradiction of economic regime
Aid of North Korea by South Korea

- **1995**
  - Free aid of rice 150,000 tons

- **After 2000**
  - Loan (10 year-grace, 20 year-repayment, interest rate: 1%/year)

- **1995 ~ 2007**
  - Rice 2.5 million tons, Corn 0.2 million tons

- **2008**
  - The Korean government interrupted food & fertilizer aid to N. Korea (Worsening of the two Koreas’ relationship)
  - Provide aid for vulnerable group (infants) through government, private and international organization

- **2009**
  - Supply vaccine and hand sanitizer for swine flu

- **After 2010**
  - No further aid as sanctions were imposed on North Korea due to the sinking of the Cheonan vessel

Change of Food energy supply

- **Energy supply (kcal/person/day) of Korea**

  - The food energy supply of North Korea (2014) was 2/3 of the supply of South Korea
Change of Life expectancy at birth

The recent Life expectancy at birth of North Korea (2016) was 10 years shorter than Life expectancy of South Korea

Food supply and demand of the North Korea

<table>
<thead>
<tr>
<th>Unit (1000 tons)</th>
<th>Rice</th>
<th>com</th>
<th>A sort of barley</th>
<th>Miscellaneous grain</th>
<th>potato</th>
<th>soybean</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply (A)</td>
<td>1,573</td>
<td>2,200</td>
<td>71</td>
<td>137</td>
<td>473</td>
<td>268</td>
<td>4,722</td>
</tr>
<tr>
<td>Main crop production</td>
<td>1,573</td>
<td>2,200</td>
<td>137</td>
<td>148</td>
<td>268</td>
<td>4,326</td>
<td></td>
</tr>
<tr>
<td>Spring crop production</td>
<td></td>
<td>71</td>
<td>325</td>
<td>396</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demand (B)</td>
<td>1,819</td>
<td>2,677</td>
<td>201</td>
<td>137</td>
<td>473</td>
<td>267</td>
<td>5,524</td>
</tr>
<tr>
<td>For food</td>
<td>1,525</td>
<td>2,073</td>
<td>177</td>
<td>105</td>
<td>302</td>
<td>245</td>
<td>4,427</td>
</tr>
<tr>
<td>For feed</td>
<td>-</td>
<td>110</td>
<td>-</td>
<td>-</td>
<td>20</td>
<td>-</td>
<td>130</td>
</tr>
<tr>
<td>For seed</td>
<td>50</td>
<td>70</td>
<td>12</td>
<td>10</td>
<td>80</td>
<td>9</td>
<td>230</td>
</tr>
<tr>
<td>Harvest loss</td>
<td>245</td>
<td>374</td>
<td>12</td>
<td>22</td>
<td>71</td>
<td>13</td>
<td>737</td>
</tr>
<tr>
<td>Expected amount of imports (C)</td>
<td>150</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deficiency amount (B-A)</td>
<td>246</td>
<td>427</td>
<td>130</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>802</td>
</tr>
<tr>
<td>Net deficiency amount (B-A-C)</td>
<td>652</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- The total food deficiency amount of 2017/2018 was 802,000 tons
- Even if the planned 15,000 tons of food imports were made as planned, the net deficiency amount of North Korean food in 2018 amounted to 652,000 tons
**Food and nutrition situation of North Korea**

- **Vulnerable(weak) groups be more than 7.6 million people**
  - Children, pregnant & nursing women, the elderly, the disabled, and tuberculosis patients

- **The UNICEF/WFP/North Korea survey on 2013**
  - One-third of pregnant women are malnourished and anemic
  - Percentage of underweight children under 5:
    - Urban: 13.2%
    - Rural: 26.7%
  - Food shortage in rural areas is more serious than in urban areas

**UNICEF (United Nations Children’s Fund)**
**WFP (World Food Programme)**

**Food and nutrition situation of South Korea**

- **Increase adult diseases** by nutritional excess and overweight

- **Face high level of food dependence on overseas import** because of food waste and lowered food self-sufficiency
  - **Flour**: 100% imported
  - **Edible beans**: 30% self-sufficiency, 70% imported
  - **Feed grains**: Less than 3% self-sufficiency, 97% imported

- **Reduced rice consumption** by westernization of diet

- **Increase in flour consumption** due to intake of instant noodle
Change of food self-sufficiency of South Korea

Food self-sufficiency of South Korea

 Decline of total food self-sufficiency

Food balance sheet (1970-2012), Korea Rural Economic Institute

Assessment of nutritional anthropology of Korea

<table>
<thead>
<tr>
<th></th>
<th>S. Korea</th>
<th>N. Korea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farming population (1000 person)</td>
<td>1,367 (2018)</td>
<td>2,930 (2014)</td>
</tr>
<tr>
<td>Ratio of farming population (%)</td>
<td>4.9 (2018)</td>
<td>11.7 (2014)</td>
</tr>
<tr>
<td>Average food intake (g/person/day)</td>
<td>1,300</td>
<td>500 (+)</td>
</tr>
<tr>
<td>Energy intake (kcal)</td>
<td>2,400</td>
<td>1,600</td>
</tr>
<tr>
<td>Component ratio of energy (Carbohydrate : protein : fat)</td>
<td>65 : 15 : 20</td>
<td>80 : 12 : 8</td>
</tr>
<tr>
<td>Self-sufficiency of grain (%)</td>
<td>26</td>
<td>63</td>
</tr>
<tr>
<td>Average height (cm, men/women)</td>
<td>175/159</td>
<td>166/155</td>
</tr>
<tr>
<td>Change of weight (%)</td>
<td>obesity rate of adult, 33</td>
<td>chronic malnutrition, 42</td>
</tr>
<tr>
<td>Incidence rate of tuberculosis / mortality rate (person / 100,000 person)</td>
<td>90/8</td>
<td>344/25</td>
</tr>
<tr>
<td>GDP per person (US $, 2019)</td>
<td>29,743</td>
<td>648</td>
</tr>
<tr>
<td>Political system</td>
<td>open free liberal democracy</td>
<td>closed communitarianism</td>
</tr>
</tbody>
</table>

South Korea: High obesity rate by high fat intake, Low self-sufficiency of food
North Korea: Malnutrition and tuberculosis patients due to lack of food & energy intake
## North Korea’s food production and composition

### Food production of North Korea

- **in 2017:** 4.7 million tons
- **About 1.8 million tons of insufficiency** compared with the average of standard calorie requirement which recommended by FAO

<table>
<thead>
<tr>
<th></th>
<th>Crops</th>
<th>Rice</th>
<th>Com</th>
<th>Barley</th>
<th>Pulses</th>
<th>Potatoes</th>
<th>etc</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>4,807</td>
<td>2,101</td>
<td>1,762</td>
<td>176</td>
<td>165</td>
<td>582</td>
<td>21</td>
</tr>
<tr>
<td>2014</td>
<td>4,803</td>
<td>2,156</td>
<td>1,722</td>
<td>174</td>
<td>171</td>
<td>558</td>
<td>22</td>
</tr>
<tr>
<td>2015</td>
<td>4,512</td>
<td>2,016</td>
<td>1,645</td>
<td>164</td>
<td>154</td>
<td>502</td>
<td>21</td>
</tr>
<tr>
<td>2016</td>
<td>4,803</td>
<td>2,224</td>
<td>1,702</td>
<td>154</td>
<td>154</td>
<td>550</td>
<td>19</td>
</tr>
<tr>
<td>2017</td>
<td>4,702</td>
<td>2,192</td>
<td>1,667</td>
<td>146</td>
<td>146</td>
<td>532</td>
<td>19</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>4,725</strong></td>
<td><strong>2,138</strong></td>
<td><strong>1,700</strong></td>
<td><strong>163</strong></td>
<td><strong>160</strong></td>
<td><strong>545</strong></td>
<td><strong>20</strong></td>
</tr>
</tbody>
</table>

**Composition ratio (%)**
- **100.0**
- **45.0%**
- **36.0%**
- **0.03%**
- **0.03%**
- **0.12%**
- **0.00%**

*Statistics Korea (2018)*
### Solutions for increase of food productivity of North Korea

1. **Set-up for infrastructure of agricultural materials**
   - Modernization of old manure factories in North Korea
   - Aid from South Korea

2. **Mechanization of agriculture**
   - Mechanization of agriculture have stopped since 1980s due to shortage of fuel and machine parts

3. **Improvement of production system**
   - Development of superior species
   - Improvement of cultivation techniques
   - Improvement of irrigation facilities

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- **III** -

**Food demand in case of the sudden unification**
Prediction of food demand for 10 years after unification (KFSRF)

- **Plan 1**
  Step1. Maintain calorie intakes per each North Korea resident right after unification
  Step 2. Increase to regular calorie intakes after 10 years, unification

- **Plan 2**
  Step 1. Provide food ration and transfer to the market economy right after unification
  Step 2. Increase food intake as same as food intake of 1980’s South Korea after 10 years, unification

### Prediction of food demand after unification (KFSRF)

<table>
<thead>
<tr>
<th>Year</th>
<th>Demand Plan 1</th>
<th>Demand Plan 2</th>
<th>Supply</th>
<th>Shortage Plan 1 (1)</th>
<th>Shortage Plan 2 (2)</th>
<th>(3)</th>
<th>Plan 1 (1)+(3)</th>
<th>Plan 2 (2)+(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>29.0</td>
<td>29.5</td>
<td>28.5</td>
<td>0.6</td>
<td>1.0</td>
<td>15.7</td>
<td>16.3</td>
<td>16.7</td>
</tr>
<tr>
<td>2025</td>
<td>30.5</td>
<td>30.7</td>
<td>29.5</td>
<td>1.0</td>
<td>1.1</td>
<td>15.8</td>
<td>16.8</td>
<td>16.9</td>
</tr>
<tr>
<td>2030</td>
<td>31.9</td>
<td>31.7</td>
<td>30.4</td>
<td>1.4</td>
<td>1.2</td>
<td>15.8</td>
<td>17.2</td>
<td>17.0</td>
</tr>
</tbody>
</table>

- **Shortage of food after 10 years of unification**
  - Plan 1 : 17.2 million tons
  - Plan 2 : 17.0 million tons

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KFSRF (Korea Food Security Research Foundation)
Implication of food demand after unification

- Increase food production from Korea.
- Improve the self-sufficiency of soybean.
- Improve self-sufficiency of animal feeds to decrease the dependence on animal feed import.
- Maintain and enhance the superior farmlands.
- Establish food policies for preparation of the unification.

- IV -

Food policy projects for Korea unification
1. Legislation of 1.2 million tons of rice holding program

Legislation of 1.2 million tons of rice holding program based on Trust-building process policy

- **Storage of Rice:**
  - Storing 0.6 million tons of rice annually for 2 years
  - and then releasing the reserved rice to processing industry

2. Implementation of rice coupon system

Implementation of rice coupon system to improve the welfare of the poor

- After unification, it can be legal basis to supply the rice reserves to North Koreans
- Set the welfare system for poor people in South Korea
- After Korea unification, almost all North Koreans fall under the lower income family, so they can receive the benefits
3. Increase rice production

Increase rice production

- To generate rice demand because of rice storage (1.2 million tons) for unification, rice coupon system, and policy support of rice processing industry
- Requirements of 4.8 million tons of rice production annually in South Korea
- Current rice production: 4 million tons

Additional demands for 800,000 tons of rice each year

4. Plan for self-sufficiency in soybean

Plan for self-sufficiency in soybean

- Traditional Korean diet based on rice and soybean dishes
  - Soybean sprouts, tofu, soybean paste soup, etc.
  - Need to self-sufficiency of rice and soybean
- Self-sufficiency of soybean in South Korea:
  - 1990 (60%) → 2016 (29.1%)
- North Korea is suitable for production of soybean:
  - Geography of North Korea is mostly mountainous, and wide field area
  - Need of conversion of corn field into soybean field.
5. Improve self-sufficiency of animal feeds

- Self-sufficiency of animal feeds in South Korea
  - Feed grains: usage (8.8 million tons), self-sufficiency 2.1%

**Main reason of decline in self-sufficiency of foods** in South Korea

1) Set the Limit of animal population per farmland area
2) Development of compulsory **self-sufficiency of animal feeds** to a certain level
3) Reasonable **licensing system** for livestock industry

6. Develop food industry

- **Develop food industry as a main body of food supplier in case of a food crisis in Korea/world**

  - Korea Food Industry works as a main body of Food Supplier for Korean People
  - A plan for balanced development of food industry in Korea
  - Need for transport/logistic systems along the major ports in North Korea
  - Enhancement of national competitiveness of Korea food industry
Thank you for listening