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Rice Industry in Korea

<table>
<thead>
<tr>
<th>Growing Area</th>
<th>850,000 ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Production</td>
<td>4,200,000 ton</td>
</tr>
<tr>
<td>No. of varieties registered in PVP</td>
<td>293 varieties</td>
</tr>
<tr>
<td>No. of varieties enlisted in National Lists</td>
<td>270 varieties</td>
</tr>
</tbody>
</table>

Breeding and multiplication of Rice in Korea

<table>
<thead>
<tr>
<th>Subject</th>
<th>Public Sector</th>
<th>Private sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breeding</td>
<td>National Crop Research Institute (Rural Development Administration)</td>
<td>Farmer, grower, professor small scale seed company</td>
</tr>
<tr>
<td>Seed supply</td>
<td>Korea Seed and Variety service/MIFAFF Seed certification required</td>
<td>Breeder, seed company Seed certification required</td>
</tr>
<tr>
<td>Royalty</td>
<td>Absent</td>
<td>Exclusive license with RPC Form harvest material</td>
</tr>
</tbody>
</table>
Comparison of Price of Rice Seed and Grain

Price of grain is slightly higher than that of seed because the government grants a subsidy for rice seed production.

PVP system & Individual Breeding

- PVP system was enforced in Korea from 1998
- The authority (KSVS) provide information to individual breeders, encourage them to breed new varieties and procedures to get PVP
- Government gives benefits to individual breeders when they develop new varieties, providing several opportunities to undergo training programs (domestic and oversea)
- Composition of individual breeder: farmer, grower, professor, small-scale seed company
**Increase of Variety Developed by Individual Breeder in Korea after introduce PVP**

![Graph showing the increase of variety developed by individual breeders in Korea after introduce PVP.

- **No. of individual breeder**
- **Year**
- **No. of varieties**

**Rice from breeder to consumers**

<table>
<thead>
<tr>
<th>Breeding</th>
<th>Seed Propagation</th>
<th>Production</th>
<th>Processing</th>
<th>Marketing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government(KSVS)</td>
<td>Local government</td>
<td>Seed company</td>
<td>Breeders</td>
<td></td>
</tr>
</tbody>
</table>

KSVS : Korea Seed & Variety Service, RPC : Rice Processing Complex
Case Study 1: Geumsung rice

Plant Variety Protection of Geumsung

- Breeder: Younghae KIM/Farmer breeder
- Application date: 30-03-2000
- Characteristics
  - Maturity: early
  - Flag Leaf Attitude: semi erect
  - Leaf length: short
  - Stem length: medium (88cm)
  - Panicle awns: very short
  - Decorticated grain shape: semi round
  - Decorticated grain color: light brown
  - Endosperm type: Non-glutinous

Granted PVP on 15 march 2006
(28/5/2002 ~ 28/5/2022)
**Distribution of the Geumsung**

Seed of Geumsung rice

**Procedure of seed propagation**

- **Breeders’ seed (breeder)**
  - Provide 500kg of pre-basic seed every 2 years

- **Certified Seed (Yeoju county)**
  - Propagation & certification of Geumsung (1.5ha)

- **Farmers**

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**Growing Area & Production of Guemsung Rice**

**Estimation, 2012**

<table>
<thead>
<tr>
<th>Region</th>
<th>Area</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yeoju</td>
<td>200ha</td>
<td>1,200 ton</td>
</tr>
<tr>
<td>Ulsan</td>
<td>20ha</td>
<td>120 ton</td>
</tr>
<tr>
<td>Others</td>
<td>80ha</td>
<td>480 ton</td>
</tr>
<tr>
<td>Nationwide</td>
<td>300ha</td>
<td>1,800 ton</td>
</tr>
</tbody>
</table>

**Total amount of seed supplied to farmers is estimated 18 ton ($30,000) in 2012**
Commercialization of ‘Geumsung’

Price of White Rice Geumsung

Small size packing of ‘Guemsung’ rice

Awarded ‘Korea Top Variety Award’

Received from Minister of Ministry of Agriculture, 7 December 2007
Plant Variety Protection of Jinsang

- Breeder: Yoo-hyun CHO/small scale seed company ('Seedpia')
- Application date: 22-03-2011
- Characteristics
  - Maturity: early to medium
  - Flag leaf attitude: semi erect
  - Panicle awns: very short
  - Panicle exertion: moderately-well
  - Decorticated grain shape: semi round
  - Endosperm type: intermediate
  - Alkali digestion: completely digested
  - Decorticated grain aroma: absent

Under the DUS examination
(Application number: 2011-...)

Jinsang
Chucheong
Good Taste rice Jinsang

Low amylose content: 11.9%
Delicious: Toyo tester 76

Exclusive license with 4 RPC of ‘Jinsang’

1.6% of gross profit

Commercialization & Marketing

Big hit of Jinsang (estimation, 2012)
Rice production: 3,000 ton
Market size: 6,500,000 USD

* RPC: Rice Processing Complex

* RPC: Rice Processing Complex
Plant Variety Protection of Seonong 6

- Breeder: Hee-jong KOH/professor
- Application date: 28-02-2000
- Characteristics
  - Maturity: late
  - Flag Leaf Attitude: semi erect
  - Stem length: medium to tall (107 cm)
  - Panicle awns: very short
  - Panicle exertion: just exerted
  - Decorticated grain shape: semi round
  - Endosperm type: glutinous
  - Embryo size: very big

Granted PVP on 15 March 2008
(16/5/2003 – 15/5/2023)
Functionality of Seonong 6 Rice

γ-amino butyric acid (GABA)

- Inhibitory neurotransmitter
- Prevents over-firing of the nervous cell
- Helps brain cell metabolism

GABA contents (Pm/g)

<table>
<thead>
<tr>
<th></th>
<th>Average</th>
<th>Seo-nong 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown rice</td>
<td>13.7</td>
<td>58.1</td>
</tr>
<tr>
<td>Germinated</td>
<td>58.1</td>
<td>58.1</td>
</tr>
<tr>
<td>Brown rice</td>
<td></td>
<td>129</td>
</tr>
</tbody>
</table>

PVP Implementation of Seonong 6

- Breeder
  - Exclusive License
  - 1% of gross profit
- Farmers
  - Contract for production
  - 200 ton in 2012
  - 20% higher sale price
- Agricultural Corporation ‘Shinjiwon’
  - Processing & Marketing
    - Commercialization & Marketing
    - Processing products of small package
Future Rice Breeding in Korea

- Government has pushed the farmer breeding as future growth engine of Korea seed industry
- Potential individual breeders came out and lots of varieties developed last 10 years
- Their varieties were cultivated and made the money to the farmers
- They found a diverse way to make a profits from their own varieties
- Contract with RPC or agricultural corporation through exclusive licensing followed successfully in Korea
- Seed price of rice produced by government should be at least equal with private rice seed to make competitiveness rice seed industry in Korea

Thank You For Your Attention