Prospects for the Chilean potato industry

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Outline of presentation

✓ Potato industry in the Netherlands
✓ Potato industry in Chile
✓ Potato prospects for Chile: Adding value
✓ Potato processing: starting in a country
✓ Suggested improvements
Potato industry in the Netherlands

✓ Population: 16.7 million
✓ Average acreage: 160,000 hectares
  – Seed potatoes: 35,000 ha – 1.2 million tons
  – Table potatoes: 3,000 ha – 1 million tons
  – Processing: 87,000 ha – 3.3 million tons
  – Starch potatoes: 35,000 ha – 2 million tons
✓ 70-80% of potato volume is processed
  – French Fries, chips, ready-made meals, starch
✓ Number of growers: 9,000

Potato industry in Chile

✓ Population: 17 million
✓ Average acreage: 55,000 hectares
✓ Average yield: 20 tons/ha
✓ Average production: 1.1 million tons
✓ Annual potato imports: 70,000 (raw) tons
  – Mainly (75%) Deep frozen French fries imports: EU, Canada, US
✓ Average consumption: 60 kg/person
  – Chiloe island: 200 kg/person
✓ Number of growers: 67,000
Chile: Products and costs

✓ Fresh consumption: 90 %
✓ Niche market for Papa nativas: 500 ha
✓ Increasing market potential for processed product
✓ Current cost of production per
  – Pesos 1,240,000
  – Euro 2,000
✓ Current cost of production per kg (at 20 t/ha)
  – Pesos 62
  – Euro 0.10

The markets of Chilean produced potatoes

National production and utilization (study 2011)
✓ 61 % fresh consumption
✓ 15 % seed
✓ 6 % processing
✓ 4 % animal food
✓ 14 % lost in post-harvest phase
The markets of Chilean produced potatoes

Challenge:

✓ 27,000 tonnes French fries = 54,000 tons raw material

✓ Substitute imports deep-frozen French fries with Chilean grown potatoes

Effect of yield on production cost

<table>
<thead>
<tr>
<th>yield (t.ha⁻¹)</th>
<th>cost per kg in Pesos</th>
<th>cost per kg in Euro</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>62</td>
<td>0.10</td>
</tr>
<tr>
<td>30</td>
<td>41</td>
<td>0.07</td>
</tr>
<tr>
<td>40</td>
<td>31</td>
<td>0.05</td>
</tr>
<tr>
<td>60</td>
<td>21</td>
<td>0.03</td>
</tr>
</tbody>
</table>
Actual situation in Chile

- Limited local raw material for processing
  - Chips processing well organized
  - Potato salads: small scale operations
  - French fries processing poorly organized

- Limited use of modern technology in:
  - Disease (late blight) control
  - Harvesting and handling
  - Storage

- Limited use of added value opportunities
  - Washing & packing fresh potatoes incl. Papas nataivas
  - Processing

Potato prospects for Chile: adding value
Potato prospects for Chile: adding value

Performance
Genotype
Environment
Management
Society

\[ P = G \times E \times M \times S \]

Elaboration of these elements:
Performance = kg “high end washed, graded and packed potato” per ha or “kg Ff per ha”

Environment = altitude, rainy season, dry season

Management = soil preparation, fertilization, irrigation, crop protection, mechanization

Society = price setting (in some countries organic, non GM,...)
Potato prospects for Chile: adding value

- Radiation
- Temperature
- CO₂
- Volatilisation
- Fertilisation
- Mineralisation
- Uptake
- C & N
- Uptake
- Leaching
- Immobilisation
- Capillary rise
- Drainage
- Irrigation
- Rain
- Transpiration
- Evaporation
- Uptake
- H₂O

Ground Cover

Grid, crop scan, solarimeters, estimates

Dry matter: g m⁻²

Total

Product

Intercepted light: MJ m⁻²

Time

0 - 100 %

Potato prospects for Chile: adding value
Potato prospects for Chile: adding value

Yield levels

Potential yields:
theoretical, unobtainable
(driven by sunshine temperature)

Attainable yields:
obtainable, may not be economical
(limited by water, nutrients)

Actual yields:
growers’ yields
(reduced by pests, diseases, weeds)

Potato prospects for Chile: adding value

Inputs below optimum (several surveys)

- Seed: health, age, variety

- Diseases and pests: late and early blight, viruses, brown rot, tuber moth

- Fertilization: pH, NPK, micronutrients

- Water supply: rain and irrigation

- Storage: losses avoidance: in field in dry cool winter, in clamps, Seed DLS

- Mechanization: traction with animals, machines
Potato prospects for Chile: adding value
Potato prospects for Chile: adding value

Concluding:
- Improved resource use efficiency (= higher yields)
- Reduced losses
- Increased value through processing
- A keen eye on sustainability

Potato processing: starting in a country
Potato processing: starting in a country

Processed products:
- Starch
- Flour/flakes
- Peeled
- Peeled and cut
- Peeled, cut, blanched
- Baby potatoes
- Frozen fries
- Crisps (chips)

Variability in processing potato

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Influences</th>
<th>Desired level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry matter concentration</td>
<td>Texture, Fat uptake Recovery</td>
<td>20-24 %</td>
</tr>
<tr>
<td>Nitrate concentration</td>
<td>Acceptance certain markets</td>
<td>Low!</td>
</tr>
<tr>
<td>Black spot susceptibility</td>
<td>Blue discoloration</td>
<td>Minimal</td>
</tr>
<tr>
<td>Non-enzymatic discoloration</td>
<td>Colour of the frozen produce</td>
<td>Minimal</td>
</tr>
<tr>
<td>Reducing sugars</td>
<td>Colour of frozen and finished</td>
<td>&lt; 0.5 %</td>
</tr>
<tr>
<td>Length/widt</td>
<td>Recovery</td>
<td>&gt; 1.6</td>
</tr>
</tbody>
</table>
Variability in processing potato
Characteristics that may vary
size distribution (grading)

Variability in processing potato
After van der Zaag, 1990)

- Tuber maturity
  - variety
  - harvest time

- Crop growth pattern
  - variety
  - daylength
  - seed tuber physiology
  - daylength
  - temperature
  - soil, water, nitrogen

- Crop water and mineral uptake
  - variety
  - soil condition
  - N, P, K, Cl
Variability in potato for processing

✓ Causes of variation between tubers: Management at field level
✓ Causes of variation between tubers: Environment (between plant and spots in the field)
✓ Causes of variation between tubers (same stem): Physiology
✓ Causes of variation between tubers: Number of tubers (so size distribution!)

Suggested improvements

✓ Aim at a competitive supply chain for high end products: table, salads and processed
✓ Meet the specifications of the processors and retailers
✓ Produce potatoes at competitive prices
✓ Introduce modern technology for:
  – Disease control: late blight
  – Handling and storage
  – Precision farming
Suggested improvements

✓ Involve (i.e. Netherlands) top technology in upgrading the entire chain
✓ Organize growers for:
  – More intensive knowledge transfer
  – Joint purchase of inputs
  – Join forces in the supply chain: interdependency
✓ A National Potato Platform should play an initiating role:
  – INIA + Consorcio Papa Chile + Ministry of Agriculture

Thank you for your attention

Huub Schepers