Dealing with global food supply challenge

Precision farming and environmental sustainability

Nan-Dirk Mulder, 9 May 2017
Content

1. Animal protein supply until 2035
2. Precision farming and environmental sustainability
3. Conclusion
Rabobank: The world’s leading global F&A bank

Rabobank group global presence
Animal protein is our sweet spot

14 out of top 20 meat companies are client of Rabobank
Exposure in Animal Protein: EUR 19 billion
Animal protein market to grow by 45% in the next 2 decades

Global animal protein market outlook 2015-2025

Source: Rabobank analysis based on FAO, USDA, OECD 2017
90% of global growth will be in emerging market, 60% in Asia

*Change in global demand for meat and eggs 2015-2025*

X 1,000 tonnes

First tier: 57% of growth

Second tier: 25% of growth

18%

Source: Rabobank analysis based on FAO, USDA, OECD 2017
Asia lacks adequate resources, Latin America and Africa have plenty

Global land and water availability per capita

Available new agricultural land

Source: Rabobank, FAO 2017
What has changed?
Slowdown in biofuel demand

**Global demand for biofuels**

- **Biodiesel:**
  - 17% of global soy oil supply
  - 10% of global palm oil supply
  - 25% of global rapeseed oil supply
  - 1% of global sunflower oil supply

- **Ethanol:**
  - 12% of global corn supply
  - 16% of sugar cane supply

**Impact on agriculture**

- **Fast growth**
  - CAGR: 24%

- **Consolidation:**
  - CAGR: +3%

Source: Rabobank analysis based on FAO and BP, 2016
Pressured global supply and demand: volatility in prices

*Grains and oilseed price monitor 2000-2016*

Source: Rabobank analysis based on Bloomberg 2017

Commodity boom years

New reality

Prices still 50% above pre 2007 long term average

USD/tonne

Wheat

Corn

Soybeans

Source: Rabobank analysis based on Bloomberg 2017
Need for a fast modernizing of the animal protein industry

- Higher incomes and welfare
- Modern distribution
- Food safety
- Animal disease threat
- High feed prices/limited resources

- Modern value chain
- Larger companies
- Vertical integration
- Efficiency
- Yield
- Value chain management
- Optimal biosecurity
- Sustainability

More modern animal nutrition demand

Source: Rabobank analysis, 2017
More global trade in meat

Asian meat imports by tonnes and share in global markets

- Pre-Commodity boom years: CACG: +6%
- New reality: CACG: +9%

Source: Rabobank analysis based on USDA, FAO, Bloomberg, 2017
Imports: 10 countries represent 60% with sharp rising Chinese pork imports

**Top 10 global meat importers**

<table>
<thead>
<tr>
<th>Country</th>
<th>% of Trade</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>Tier 1: 35%</td>
</tr>
<tr>
<td>Japan</td>
<td>Tier 2: 34%</td>
</tr>
<tr>
<td>Mexico</td>
<td>15%</td>
</tr>
<tr>
<td>United States</td>
<td>12%</td>
</tr>
<tr>
<td>South Korea</td>
<td>8%</td>
</tr>
<tr>
<td>Russia</td>
<td></td>
</tr>
<tr>
<td>Hong Kong</td>
<td></td>
</tr>
<tr>
<td>EU</td>
<td></td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td></td>
</tr>
<tr>
<td>Philippines</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

**China’s impressive growth in imports**

Source: Rabobank analysis based on FAO, OECD, USDA, 2017
Content

1. Global animal protein supply until 2035
2. Precision farming and environmental sustainability
3. Conclusion
Global food supply challenge

Meat demand

Food demand

Fuel demand

Meat supply

Food supply

Fuel supply

Livestock/poultry supply

Grains and oilseed supply

Land use

Source: Rabobank, 2017
What can be improved by precision farming?

- Growth rates
- FCR
- Yields

- Mortality rates
- Density
- Diseases
- Stress

- Efficiency
- Energy
- Water usage

- Reduction costs
- Increasing yields

Technical performance
Animal health and welfare
Environmental impact
Financial performance
A shift from intuitive to fact based decisions

*Decision making in agriculture now and in future*
## Changing applications in livestock and poultry farming

**Developing new mechanics and bringing them to perfection**
- The mechanised farm

**Precision mechanics with IT**
- Automation, robots, auto steer with GPS

**Making machines smart**
- Variable rate application, expert systems, artificial intelligence

**Providing integrated farm solutions**
- Simultaneous optimisation of inputs, fine-tuning of inputs

**Chain optimisation**
- Fine-tuning the farm to the value chain and vice versa
Meeting future sustainability needs requires multidisciplinary approaches.

- Genetics
- Health management
- Productivity and efficiency improvements
- Animal nutrition
- Farm equipment
- Food processing equipment
- Smart farming knowhow
Conclusions

Rising global meat demand especially in Asia, limited resources and rising social concerns is pushing industries to further innovate in agricultural models.

Precision farming and big data application have the potential to set further big steps in industry efficiency and to meet rising social expectations.

New applications will be enrolled in the next years with more integrated solutions between different input industries and new specialized applications.
Thanks for your attention

Questions?
nan-dirk.mulder@rabobank.com

Nan-Dirk Mulder, 9 May 2017