THE ECONOMICS OF MILK PRODUCTION

2020
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Department of Veterinary Forensics and Economics

DEFINITION OF MILK

• “Milk is a sweet, fresh liquid obtained from cow by uninterrupted milking, which does not contain any foreign matter and does not lose any of its own components.” (Min. of Agr., 1924)
• So milk means cow’s milk, in the case of other milks the name of the species has to be added, for example: sheep’s milk, goat’s milk, buffalo’s milk, mare’s milk.
• Milk equivalent: The amount of milk used for producing a specific dairy product.

1 litre milk = 1.03 kg milk

Holstein Friesian
Simmental
Jersey
Hungarian Spotted
World total milk production between 1961-2018 (tonnes)


World milk production by species (2018)


Table 1. World dairy market at a glance

Distribution of world milk production in 2018


India 30.21%
EU 27.07%
USA 15.87%
Pakistan 7.36%
Brazil 5.48%
China 5.65%
Russia Federation 4.92%
New Zealand 3.44%

Milk production of India vs. EU (2010-2018)


FAO Food Commodity Price Index

Milk consumption prospects

- One of the biggest challenges of the dairy sector is the growing world population with continuously growing demand for dairy products.
- In developed countries, the aging society, while in developing countries, the growing number of children and young ones will cause this demand.
- Another factor is urbanization, which also contributes to this.

MILK CONSUMPTION IN THE WORLD IN 2005-2014

CONSUMPTION
Developing countries: 69.5 kg/cap/year (2011)
Developed countries: 234.0 kg/cap/year (2011)
The ideal and healthy level of consumption: 260-270 kg/cap/year


Milk consumption in the World in 2010-2017

World: per capita consumption and population

Source: The World Dairy Situation 2018, IDF.
### Milk consumption (kg/capita/y)

Per capita milk consumption, 2017

Average per capita milk consumption, rounded to the nearest gram per year. This includes the milk equivalents of dairy products made from milk ingredients, but excludes cream.

**Source:** FAOSTAT, 2020.

### EU milk production by member state in 2019

<table>
<thead>
<tr>
<th>Member State</th>
<th>Milk Production (10,000 tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1,234</td>
</tr>
<tr>
<td>B</td>
<td>1,234</td>
</tr>
<tr>
<td>C</td>
<td>1,234</td>
</tr>
<tr>
<td>D</td>
<td>1,234</td>
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<tr>
<td>E</td>
<td>1,234</td>
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<td>F</td>
<td>1,234</td>
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<td>G</td>
<td>1,234</td>
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<td>H</td>
<td>1,234</td>
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<tr>
<td>I</td>
<td>1,234</td>
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<tr>
<td>J</td>
<td>1,234</td>
</tr>
<tr>
<td>K</td>
<td>1,234</td>
</tr>
</tbody>
</table>

**Source:** EUROSTAT, 2020.


<table>
<thead>
<tr>
<th>Change in Milk Deliveries (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1%</td>
</tr>
<tr>
<td>2%</td>
</tr>
<tr>
<td>3%</td>
</tr>
<tr>
<td>4%</td>
</tr>
<tr>
<td>5%</td>
</tr>
<tr>
<td>6%</td>
</tr>
<tr>
<td>7%</td>
</tr>
<tr>
<td>8%</td>
</tr>
<tr>
<td>9%</td>
</tr>
<tr>
<td>10%</td>
</tr>
</tbody>
</table>

**Source:** ec.europa.eu, 2020.
Table 3. Trade in dairy products: Principal exporting countries

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SKIM MILK POWDER</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>World</td>
<td>2,000</td>
<td>2,000</td>
<td>0.0%</td>
</tr>
<tr>
<td>New Zealand</td>
<td>1,900</td>
<td>1,900</td>
<td>0.0%</td>
</tr>
<tr>
<td>The EU and the US</td>
<td>100</td>
<td>100</td>
<td>0.0%</td>
</tr>
<tr>
<td>Others</td>
<td>100</td>
<td>100</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>FULL MILK POWDER</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>World</td>
<td>2,000</td>
<td>2,000</td>
<td>0.0%</td>
</tr>
<tr>
<td>New Zealand</td>
<td>1,900</td>
<td>1,900</td>
<td>0.0%</td>
</tr>
<tr>
<td>The EU and the US</td>
<td>100</td>
<td>100</td>
<td>0.0%</td>
</tr>
<tr>
<td>Others</td>
<td>100</td>
<td>100</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>CREAM</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>World</td>
<td>2,000</td>
<td>2,000</td>
<td>0.0%</td>
</tr>
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<td>New Zealand</td>
<td>1,900</td>
<td>1,900</td>
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<td>0.0%</td>
</tr>
<tr>
<td>Others</td>
<td>100</td>
<td>100</td>
<td>0.0%</td>
</tr>
</tbody>
</table>


World trade of milk and milk products (2015)

In milk equivalents

Rabobank, 2016.

Major Dairy Exporters and Importers

Main EU export markets for all dairy products (in value – EUR)

- China
- United States
- Saudi Arabia
- Algeria
- Hong Kong
- Korea
- Korea South
- Switzerland
- United States
- Russia


World: self-sufficiency rate (per region)

<table>
<thead>
<tr>
<th>Region</th>
<th>2010</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia</td>
<td>93%</td>
<td>90%</td>
</tr>
<tr>
<td>Europe</td>
<td>105%</td>
<td>110%</td>
</tr>
<tr>
<td>EU</td>
<td>107%</td>
<td>213%</td>
</tr>
<tr>
<td>Non-EU</td>
<td>100%</td>
<td>102%</td>
</tr>
<tr>
<td>North America</td>
<td>102%</td>
<td>109%</td>
</tr>
<tr>
<td>South America</td>
<td>102%</td>
<td>100%</td>
</tr>
<tr>
<td>Africa</td>
<td>88%</td>
<td>84%</td>
</tr>
<tr>
<td>Central America</td>
<td>82%</td>
<td>79%</td>
</tr>
<tr>
<td>Oceania</td>
<td>311%</td>
<td>289%</td>
</tr>
</tbody>
</table>

Source: The World Dairy Situation 2018, IDF.

Top 20 destinations for international dairy trade, 2015 vs. 2010

- China
- Mexico
- India
- Algeria
- Japan
- Thailand
- Malaysia
- Ukraine
- New Zealand
- South Korea
- Brazil
- UAE

Rabobank, 2016.
The elements of EU market regulations

1. Internal market regulation
   - Price system
   - Intervention
     - Quota system (the last quota year was 2014/2015)
2. Direct producer subsidies
3. Foreign trade regulations (export subsidies)

Comparative favourability of milk production

• The milk production is in line with comparative cost advantages
• Grassland productivity is driven by a combination of precipitation, land quality, sun hours and land structure
• Current cow distribution across the EU is largely in line physical favourability

Grass productivity in the EU 2009
Advantages of milk production at agricultural corporate level

- Proper utilization of fodders
- Manure production
- Continuous income (milk)
- Developed technological systems
- Continuous employment

Disadvantages of milk production at agricultural corporate level

- Significant demand on assets
- Long payback period
- Regular market disorders
- Low income generating capacity
- Significant demand on forage area
- Large interval between generations ("slow breeding animals")

Average composition of assets in a dairy farm

- Value of livestock: 33-35%
- Value of buildings: 32-33%
- Machinery and equipment: 18-20%
- Fodder reserve: 15-20%

Average value of a dairy cow: 2-3 thousand EUR
Demand on forage area

0.6-1.1 hectares/livestock unit (cow)

(In Hungary there are 12 cows per 100 hectares agricultural land on an average)

Factors influencing the production value of milk production

**PRODUCTION VALUE**
- Yields
  - Biological base
  - Breeding management
  - Forage management
  - Animal health
  - Microclimate
  - Management
  - Human factors
- Demand - Supply
  - Price premiums
  - Quality
- Subsidies
  - Quality
- Price premiums
  - SCC
- Other factors
  - Fat content
  - Protein content
  - Other revenues

Factors influencing the costs of milk production

**PRODUCTION COST**
- Inputs
  - Materials (e.g. feed)
    - Energy
    - Animals
    - Labour
    - Machinery operation
    - Maintenance and repairment
    - Other inputs
- Price level of inputs
  - Price of produced inputs
  - Price of purchased inputs
  - Time of procurement
  - Volume of procurement
  - Cooperations
- Other factors increasing Production Cost
  - Subsidies
    - Insurance compensation
    - Profit or loss on financial operations
  - Other revenues
  - Interests
  - Costs of financial operations
  - Insurance fee
  - Duties
  - Other expenditures
Average cost structure of milk production in the Hungarian dairy farms

<table>
<thead>
<tr>
<th>Cost</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed cost</td>
<td>&gt;50</td>
</tr>
<tr>
<td>Labour cost</td>
<td>≈10</td>
</tr>
<tr>
<td>Depreciation</td>
<td>5-10</td>
</tr>
<tr>
<td>Animal health cost</td>
<td>2-4</td>
</tr>
<tr>
<td>Energy cost</td>
<td>2-4</td>
</tr>
<tr>
<td>Other direct cost</td>
<td>10-15</td>
</tr>
<tr>
<td>Farm indirect cost</td>
<td>10-15</td>
</tr>
</tbody>
</table>

Human resource
(Hungarian data)

- Labour costs give ≈10% of all the production costs
- Working hours per 100 litre milk 2.8-3 hours/100 l
- Milk yield per one employee 70 000 l/capita/year
- Number of cows per one employee 18-20 cows/capita

Number of cows per 1 employee as a function of farm size:
- 1-10 cows 6 cows per capita
- 30-100 cows 14 cows per capita
- above 300 20 cows per capita

END